

CoPCoVEs - Forum on Vocational Excellence

9 September 2025

Kolding, Denmark

2nd Workshop Session: Hydrogen Upskilling and Reskilling

Kolding Kommune Uddannelsescenter



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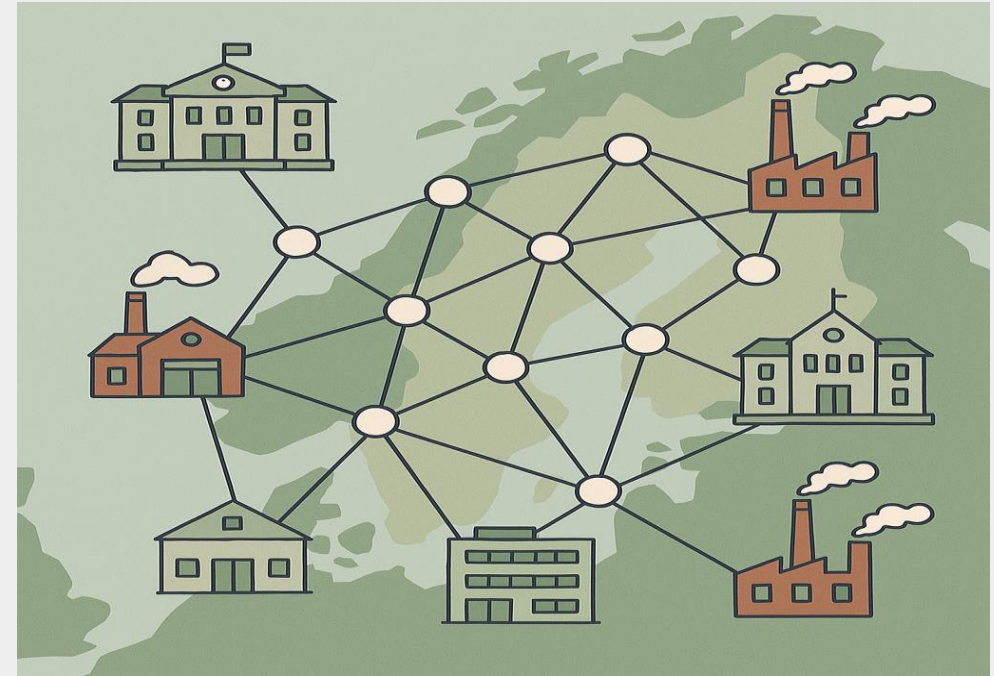
The overall goal of the H2CoVE project?

Create hydrogen vocational courses and training modules



Pictures: Made by ChatGPT

Regional and European Networks



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Hydrogen Centres of Vocational Excellence: Goals

-  **25** – Learning courses in Hydrogen
-  **75** – Teachers trained
-  **80** – International teacher workshop participants
-  **300** – Participants info sessions (incl. external workforce)
-  **800** – Business stakeholders engaged
-  **1,000** – Employees upskilled/reskilled in industry
-  **100** – Students in 5 partner regions' competitions
-  **30 + 10** – Students & staff in international competition
-  **12** – Project / Bachelor / Master theses

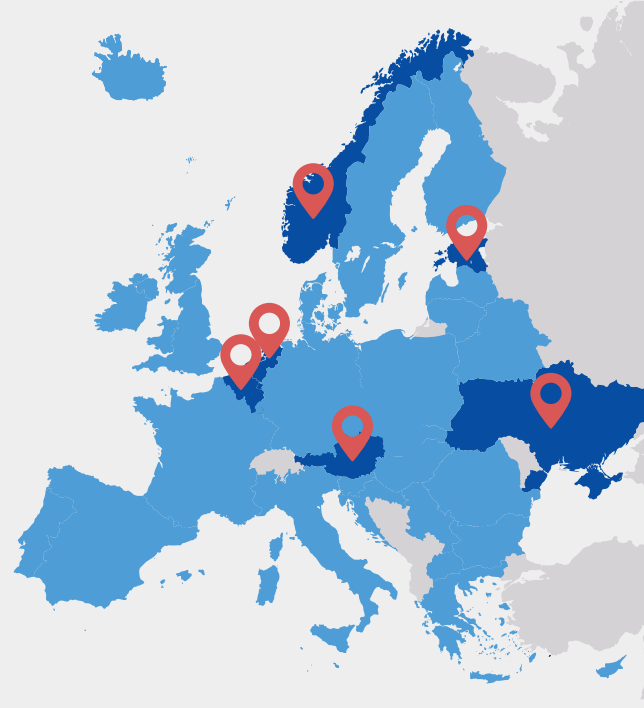
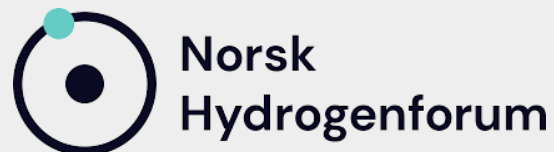
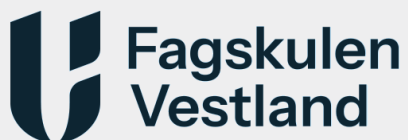


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Agenda

1. Introduction
 2. Key Regional Findings
 3. Upskilling and Reskilling: Approaches from Norway and the Netherlands
 4. Interactive Breakout Session
 5. Collective Reflection
 6. Closing Remarks
- 

NORWAY



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Key Regional Findings

Regional Roadmap & Ecosystem

- **Vestland**: model region for Norway, **linking education, industry, and public administration**.
- Norway's leading region for sustainable value creation
- Strong expertise in maritime industries, oil & gas, marine sectors, tourism, and process industry
- Anchored by Grøn Region Vestland, FORREGION Vestland and HyValue projects

Hydrogen Value Chain and Stakeholders

- **Broad actors**: Input suppliers, system integrators, project developers, producers, infrastructure developers, off takers.
- Initiatives in **research, development, and pilot projects**; key needs in **safety, engineering, regulation**.

H2 Education Demand

- **EQF 4-5**: *Vocational education and training (e.g. fagbrev, svennebrev) in mechanical and process technology; hydrogen-specific competence growing.*
- **EQF 6-8**: *High demand for engineering and ICT, project development, teaching positions, advanced expertise.*

AUSTRIA

Green Energy Center

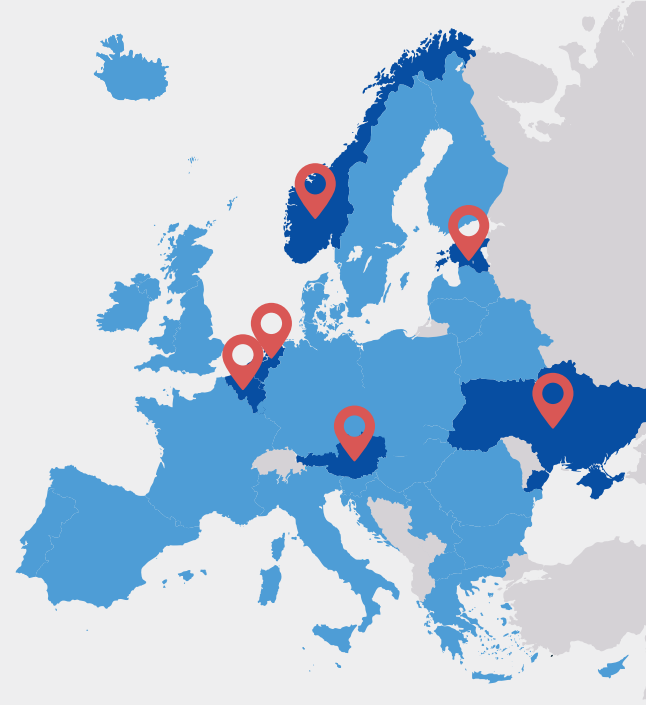


DIE HTL KRAMSACH



Niusha Shakibi Nia

FEN Research GmbH



H2CoVE

HYDROGEN CENTRES OF VOCATIONAL EXCELLENCE



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Key Regional Findings

Regional Roadmap & Ecosystem

- Anchored by **Regional Hydrogen Valley HyWest** and **Clusters**; guided by **Tyrol 2050 energy autonomous strategy**, long-term goal of **climate neutral** and **energy autonomous region**.
- Ecosystem: **Large energy/utility companies, SMEs, and Universities**; **Pilot and Flagship projects** such as **WIVA P&G HyWest, MPREIS Hydrogen**.

Hydrogen Value Chain and Stakeholders

- **Stakeholders** include **SMEs, industry, educational and research institutions**; cluster coordinated by Hydrogen Partnership Austria (**HyPA**).
- Activities across **production, distribution, end-use applications, and industrial processes** and skills shortages in **mobility solutions, service operations**.

H2 Education Demand

- **EQF 4-5: Operation & Maintenance, Installation/Commissioning, Hands-on Modules.**
- **EQF 6: Production & Storage Engineering, Mobility & Infrastructure Integration, Digital & IT Skills.**
- **EQF 7-8: Hydrogen Systems Integration, Project Management, Environmental & Energy Management Specialist, Policy & Regulatory Advisor, Circular Economy Research.**

ESTONIA

TAL TECH



Allan Niidu

TalTech Virumaa College



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Key Regional Findings

Regional Roadmap & Ecosystem

- Anchored by **Hydrogen Valley Estonia** and **Estonian Hydrogen Cluster**; guided by the Estonian Hydrogen Roadmap (targets by 2035)
- Sector transitioning from an emerging phase to a more **structured** and **coordinated development**; over **30 organisations** in production, storage, mobility, research, and education

Hydrogen Value Chain and Stakeholders

- Key actors: **Alexela**, **Eesti Energia** (hydrogen production), **SKYCORP Technologies** (hydrogen drones), **Derivaat NH₃** (ammonia-based hydrogen solutions), **University of Tartu & TalTech** (R&D).
- Activities across **production, distribution, end-use applications, and industrial processes**

H2 Education Demand

- **EQF 4-5**: Lack of technician-level training, need for electrolyser operation, compression & pressure safety, distribution logistics.
- **EQF 5-6**: Missing modules on hydrogen storage systems and mobility/industrial systems.
- **EQF 6-7**: Universities embed electrolysis, safety, fuel cells in broader programmes; no dedicated hydrogen-specific programmes.

The NETHERLANDS



Noorderpoort



ENTRANCE
CENTRE OF EXPERTISE ENERGY



Anke de Poorte

Hanze University of Applied Sciences



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Key Regional Findings

Regional Roadmap & Ecosystem

- **Flagship initiatives:** Hydrogen Campus Valley Europe – regional co-operation to develop the green H2 value chain, HyNorth, HydroGreenNN
- **Close co-operation between research and educational institutions**
(4 institutes of secondary education, 2 Universities of Applied Sciences, 1 Research University)
- >110 businesses

Hydrogen Value Chain and Stakeholders

- Active businesses and investments across **production, distribution industrial processes, and end-use applications.**
- Industry interest especially in **H2 production, Mobility, Storage and Distribution, and H2 for industrial processes** with focus on **safety and business development.**

H2 Education Demand

- **EQF 3-4:** *Technicians (Hydrogen specific safety and system integration skills).*
- **EQF 5-7:** *Electrical Engineers, Policy/economies, Business case modules.*
- **Upskilling** *existing workforce through Hands-on application driven training.*

Upskilling and Reskilling

Takeaways from our research and experiences

- In-company trainings are preferred
- Taking out of working time is difficult – work pressure is high
- Demand for direct-targeted courses to specific knowledge gaps
- Preferably hybrid – make use of existing courses (e.g. Ad, Ba, Ma)
- Support by policies (certification requirements, financial support by government and large companies)

Upskilling and Reskilling Approaches

Hydrogen Training

Norway

Fore frontier of the maritime hydrogen value chain



<https://www.norled.no/nyhet/mf-hydra-verdens-forste/>



Illustrasjon: Azane Fuel Solutions

Training examples:

Ammonia and Hydrogen training
for shipboard crew and onshore personnel

Netherlands

Developments across the value chain



Training examples:

Working on the hydrogen infrastructure
Working on hydrogen vehicles

Upskilling and Reskilling Approaches

Hydrogen Training

Norway



Training for MF Hydra – World's First Liquid H₂ Ferry

Crew training: IGF courses + sailing time (per Norwegian Maritime Directorate requirements)

Internal program: Approved by Directorate, covering systems, equipment & safety

Hands-on practice: Training from suppliers during installation & commissioning

Experience: Multiple bunkering/transfers carried out during commissioning

DNV developing a crew competency standard for hydrogen ships – release expected this fall.

A competency standard for methanol and a recommended practice for ammonia released in 2024

Netherlands



Working on the hydrogen infrastructure

Topics: Hydrogen installations (pipes and conduits) e.g. Block and Bleed

Joint initiative by Enexis, Rendo and Hanze

Goal: Equip installation technicians working on hydrogen infrastructures

Target group: Installation technicians of e.g. the network operators

Approach: Small groups (6) for personal attention, with theory and hands-on practice at locations of all participants

Next step: formal certification

Upskilling and Reskilling Approaches

Hydrogen Training

Norway



Illustration: Klikk.no, Thyssenkrupp Marine Systems

Continuous Education in Hydrogen Technology – HVL

Topics: Hydrogen value chain & technology

Funded by Kompetanse Norge through the **Industry Program for the Maritime Sector**

Goal: Equip the workforce with new skills for restructuring & new tasks

Target group: Employees, unemployed & laid-off in the maritime sector

Example: Attended by cadets from the Royal Norwegian Naval Academy – relevant for Norway's new submarines with hydrogen fuel cell propulsion

Netherlands



Working on Hydrogen Vehicles

Topics: Hydrogen in mobility

Joint initiative by Municipality of Groningen, Holthausen and Noorderpoort (DNA Next)

Goal: Equip technicians to work safely on a variety of hydrogen vehicles

Target group: Automotive Technicians

Approach: Small groups (6) for personal attention, with theory and hands-on practice at locations of all participants

Upskilling and Reskilling Approaches

Methods for Upskilling

Norway



The Europ's first ammonia bunkering terminal is set to be built at Fjord Base in Florø, Norway

Industrifagskolen – Skills Development Framework

- Offers compact modules: 2, 5, or 10 credits
- Employees entitled to leave to complete training
- Companies must prepare participation plans to support workers
- Dedicated fund established:
 - Reimburses companies & employees
 - Focus on wage compensation
- Successfully adapted by H2CoVE project partners (Fjord Base Group and Fagskulen Vestland)
 - To be extended to hydrogen & ammonia trainings

The Netherlands

Green personas – National Programme for LifeLongLearning

	Conscious Developer Eager to learn with provided tools and structure. Learning Think tanks, masterclasses, online training. Values Personal development, Income security, Inspiring leader, Collegiality, Work-life balance		Ambitious Career Builder Highly self-motivated, clear personal goals. Learning Online/self-study, networks, web- & seminars. Values Freedom, Variety, Content development, Autonomy, Status, Flexibility, Creativity
	Pragmatic Do-er Not directly motivated, prefers small, practical steps. Learning Microlearning, peer learning, short courses. Values Security, Freedom, Collegiality, Appreciation, Guidance, Clarity		Goal-Oriented Achiever Learns for personal benefit when circumstances require. Learning Traditional training, certification programs, external visits. Values Challenge, Reward, Results, Growth, Clarity, Speed

Interactive Breakout Session

Discussion Questions:

1. How do you make implicit skills gaps visible in your region?
2. How do you embed learning in work processes?
3. How do you design short, flexible learning interventions that are still effective?
4. Small scale projects – Learning by doing

What was the one takeaway from your group?

How do you make implicit skills gaps visible in your region?

While the mechanisms differ by national context, the most effective strategies all combine regular data collection, structured stakeholder dialogue, and flexible educational frameworks. The central challenge shared across all regions is activating these systems early enough to transform implicit, hidden gaps into visible, actionable training priorities.

How do you embed learning in work processes?

While national contexts, economic situations, and educational systems vary significantly, a universal need for both reskilling and upskilling was acknowledged. The most effective solutions are adaptable, practice-oriented models, such as those exemplified by Cyprus and Finland, that integrate learning directly into the workflow to address the critical shortage of technical skills.

How do you design short, flexible learning interventions that are still effective?

The most effective short-term learning interventions are not merely condensed courses. They are carefully engineered experiences that balance concise theory with immediate practical application, enriched by collaborative learning and validated by formal micro-credentials.

Small scale projects – Learning by doing

The complete "Learning by Doing" workflow, from digital design, construction, implementation to operation and data-driven optimisation, provides a powerful and versatile model for skills development. Its hands-on, iterative nature makes it equally effective for reskilling career-changers and upskilling current technicians, directly addressing the critical shortage of competent, technical talent.

Results from Mentimeter Survey

- 1. Participant motivations and engagement:** The primary reason for attending was clear, with the majority of participants citing “Exploring new ideas” as their key motivation. This was followed by “Learning new skills” and “Sharing knowledge”.
- 2. Key takeaways and content relevance:** The key takeaways reflected the core themes of the workshop with a strong appreciation of “hands-on” and “learn-by-doing”. The importance of “awareness” and the need to “speed up” skills development were also mentioned. Interest was also shown in innovative models, such as using “AI for skills gap identification” and “learn by mentoring”.
- 3. Demand for future topics and best practices:** Participants expressed a strong desire for more concrete, transferable knowledge on reskilling and upskilling. The most requested subjects included: financing models, best-practice examples from other countries, strategies to engage companies to open their internal training to a broader audience, and a clearer understanding of necessary stakeholders and specifics needed to get things going.
- 4. Suggestions for future improvement:** The feedback consistently pointed towards a desire for more interactive exchanges. Key suggestions included: “more practical examples”, “more exchange” and “less subject specific”.

Closing Remarks





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