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MED•GEM MEDITERRANEAN GREEN ELECTRONS AND MOLECULES NETWORK

Renewable Power-to-X (PtX) Training Schedule

August 2024 (Online)

Week 1 *(Estimated time: 4 hours)*

Module 1 - Introduction to Renewable Power-to-X

✓ **Module 1.1** - The Concept of PtX and its Role in the Energy Transition
✓ **Module 1.2** - Opportunities and Challenges for PtX in the Context of Energy Efficiency (EE)
✓ **Module 1.3** - Sector Coupling and the PtX Value Chain
Quiz Module 1 (Mandatory)
Further Reading Module 1 (Optional)

Learning Objectives
• *explain the concept of PtX and the importance of sustainability*
• *explain the role of PtX in the overall energy transition*
• *name the relevant energy carriers for PtX processes*

Module 2 - Production of Renewable Hydrogen and PtX Pathways

✓ **Module 2.1** - Options for Hydrogen (H2) Production
✓ **Module 2.2** - Production of Renewable PtX/ Step 1: Electrolysis
✓ **Module 2.3** - Production of Renewable PtX/ Step 2: Carbon Sourcing
✓ **Module 2.4.1** - Production of Renewable PtX/ Step 3: Four production processes
✓ **Module 2.4.2** - Production of Renewable PtX/ Step 3: PtX Applications and Production Readiness Levels
Quiz Module 2 (Mandatory)
Further Reading Module 2 (Optional)

Learning Objectives
• *differentiate between sustainable and non-sustainable H2 production methods (colours of H2)*
• *describe the basic functioning of an electrolyser*
• *differentiate the parameters and explain the functioning of the three presented electrolyser technologies*
• *indicate methods for Carbon Capture*
• *describe the four presented production pathways for PtX*
• *explain the technical and economic feasibility of these four production pathways*

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Week 2 *(Estimated time: 6 hours)*

Module 3 - Renewable PtX Economies

✓ **Module 3.1** - Production Cost of Green Hydrogen (GH2)
✓ **Module 3.2** - Renewable Energy (RE) Generation Cost Development
✓ **Module 3.3** - Electrolyser Cost Development
✓ **Module 3.4** - Scale-Up and Outlook for H2 and PtX Production
Quiz Module 3 (Mandatory)
Further Reading Module 3 (Optional)

Learning Objectives
- *name factors for cost and cost reduction of GH2*
- *break down long-term cost development of wind and solar energy*
- *name factors for cost and cost reduction of electrolysers*
- *give a basic outlook on the cost development of H2 and PtX production*

Module 4 - Renewable PtX Infrastructure

✓ **Module 4.1** - Transport Options for H2
✓ **Module 4.2** - Storage Options for H2
Quiz Module 4 (Mandatory)
Further Reading Module 4 (Optional)

Learning Objectives
- *identify critical factors for the transportation of H2/ PtX products*
- *select appropriate transportation options based on these critical factors*
- *differentiate physical and material storage of H2*
- *identify critical factors for the storage of H2/ PtX products*
- *select appropriate storage options based on these critical factors*

Module 5 - Markets for Renewable PtX

✓ **Module 5.1** - Current and Future Demand for H2
✓ **Module 5.2** - Three Initial Steps to Find and Evaluate Your PtX Potential
✓ **Module 5.3** - PtX Use Case - Green Steel in Sweden and Germany
✓ **Module 5.4** - PtX Use Case - PtL for Aviation in Brazil
Quiz Module 5 (Mandatory)
Further Reading Module 5 (Optional)

Learning Objectives
- *indicate the present and future demand for H2*
- *point out three initial steps to find and evaluate the PtX potential of your country*
- *name PtX use cases for green steel and aviation*

Week 3 *(Estimated time: 4 hours)*
Module 6 - Sustainability Criteria for Renewable PtX ✓ **Module 6.1** - PtX Sustainability Criteria in the EESG Framework ✓ **Module 6.2** - Environmental Dimension of EESG Framework (Deep Dive) ✓ **Module 6.3** - Social Dimension of EESG Framework (Deep Dive) ✓ **Module 6.4** - Economic Dimension of EESG Framework (Deep Dive) ✓ **Module 6.5** - Governance Dimension of EESG Framework (Deep Dive) **Quiz Module 6** (Mandatory) **Further Reading Module 6** (Optional) ***Learning Objectives*** • *give an overview of the four PtX sustainability dimensions of the EESG framework* • *name the assessment levels and tools of the EESG framework* • *name risks of the PtX stratgey and to explain how to convert them into chances*
Module 7 - Support Policies and Regulations for Renewable PtX ✓ **Module 7.1** - Setting Up a GH2 Project ✓ **Module 7.2** - Regulatory Architecture and Policy Proposals ✓ **Module 7.3** - Setting Up a National PtX Strategy **Quiz Module 7** (Mandatory) **Further Reading Module 7** (Optional) ***Learning Objectives*** • *list five essential policy instruments for a PtX market scale-up* • *name the components of the regulatory architecture for a H2 economy* • *name steps to set up a national PtX strategy*