Just Transition Platform Working Groups

Action 16 & 17: Hydrogen economy in JTF regions

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Regional and Urban Policy

Action 16 & 17: Hydrogen economy in JTF regions

Action leader: *Town Hall in Wałbrzych*

Action contributors: *Arbeitgeberverband Chemie Rheinland-Pfalz e. V.*

Category: *Chemicals*

The **Just Transition Platform (JTP) Working Groups (WGs)**, established in November 2021, bring together all stakeholders from across Europe with a common concern for the people and places affected by the transition to a climate-neutral economy. The WG for **Steel, Cement and Chemicals** each have a focus on a specific carbon-intensive sector that is heavily impacted by the transition, while a fourth WG focuses on **Horizontal Stakeholder Strategy**.

After finalising their Scoping Papers, outlining the focus areas and objectives of their WG, the WG members developed a common Implementation Plan, which sets out their 17 actions. This plan was finalised and published in April 2023. Throughout the rest of the year, the Action leaders, together with other WG members contributing to the Action, have been implementing their respective actions.

This document presents the final output of Actions 16 and 17.[1]

[1] During the work on the Actions, Actions 16 and 17 were merged. The original titles, as found in the Implementation Plan, are: Action 16: Develop a strategy paper with recommendations on interregional research partnerships for green hydrogen for the chemical industry; Action 17: Develop a proposal for a JTM coordination platform on building of hydrogen infrastructure across JTF regions.

Introduction

Challenges addressed by Action 16 & 17

The energy transition and a zero-emission circular economy are leading to the building of new, widespread applications of green hydrogen in the chemical industry. By 2050, green hydrogen is expected to become an important energy carrier, in particular for the storage and generation of electricity. It is estimated that the demand for hydrogen will grow in various industries linked to the chemical industry: metallurgy (heat, steam, reductant in the steel industry); sustainable fuels for transport (mainly shipping, long-distance road transport and aviation); and sustainable chemical feedstocks (methanol, ammonia, fertilisers, biodegradable plastics etc.).

The green chemical industry, which is being created with huge effort, is supported by initiatives from policymakers at the European and national levels. The increasing number of hydrogen projects initiated or starting soon in the chemical industry is a good indicator of the interest in hydrogen and underlines the need for immediate action. Considering the considerable variation between EU countries in the development of the chemical industry as well as in renewable energy resources, it is reasonable to assume that the pace of development of the green chemistry branch, particularly in the initial phase, will vary considerably. This will be a result of the different energy and hydrogen strategies of individual countries, which should be reviewed and updated with the results of new technological and economic analyses based on the experience of countries such as the Netherlands, Denmark or Germany.

European chemical companies, particularly those operating, or being established, in post-coal areas, may use the opportunities of the emerging hydrogen economy and create a competitive advantage. They can leverage their strong global assets, existing supply chains, sales and distribution, hands-on engineering expertise, etc. to start building a leading role in the global hydrogen and green chemistry economy. This can only be done if European and national politics make sure that the supply of the needed huge amounts of green hydrogen and CO_2 is available at low and internationally competitive prices. Local green hydrogen production and prices may be sufficient for small-scale chemical production, but not enough for large-scale plants competing in global markets.

Additionally, the supply of hydrogen needs to be ensured with the appropriate infrastructure. The regional actions must be in line with the overall infrastructure plan in Europe and to Europe from non-EU countries. A key question to many regions with strong chemical sectors considering green hydrogen is the access to extra capacity in renewable energy sources both in physical and legal terms. Green hydrogen is expected to play a bigger role in the chemical sector even before it becomes a market commodity. It is therefore also important to focus on infrastructural projects within particular companies producing green hydrogen for their own use which is more probable and a shorter vision of the use of hydrogen in the economy than building pipelines.

Potential green hydrogen leaders in the EU should be strengthened by treating chemical industry locations in post-coal areas as places where good practices are created and creating a European innovation ecosystem for the hydrogen economy and green chemistry.

Objectives of Action 16 & 17

The main objective of the Action is to inform about existing hydrogen projects in EU regions. By doing so, the Action will help to raise awareness among decision-makers at the national and EU level on the need to coordinate hydrogen endeavours – in research but also concerning hydrogen infrastructure.

Stakeholders targeted by Action 16 & 17

Regional and local governments, companies, academia, institutions, and social partners. Synergies might exist with existing initiatives such as the IPCEI Hy2Tech, IPCEI Hy2Use, Regions Hub of Clean Hydrogen Partnership, and H2REGIONS.EU, Grande Region Hydrogen, Clean Energy Ministerial Hydrogen Initiative (International Energy Agency), European Hydrogen Backbone initiative etc.

How this Action was implemented

The Action leaders mainly relied on the collection and analysis of information on research partnerships and infrastructure for green hydrogen for the chemical industry through desk research, meetings and exchanges. An important part of the activities was the development of a survey. This survey was conducted from September until November 2023 and targeted the Just Transition Fund (JTF) regions.

Hydrogen economy in JTF regions

The survey focused on the regional scientific and economic potential for building and developing a hydrogen economy in the region. It was divided into five chapters, namely:

1. Support measures related to the funding of H2 technologies;
2. Research, development and innovation potential of the region;
3. Infrastructure for the hydrogen economy;
4. Education;
5. How could the JTP support the hydrogen economy in JTF regions?

The complete structure of the survey can be viewed in the annex.

The following text contains detailed data from a survey addressed to selected EU regions with a well-developed chemicals sector, including so-called 'post-coal' sub-regions. Responses to specific questions on the development of a hydrogen economy in these regions came from 15 European sub-regions or regions, all but one of which are working on their own Territorial Just Transition Plan (TJTP). These regions are listed below, highlighting those that are so-called post-coal regions (7 out of 15 regions):

- Wider Midlands (IE);
- Provence Alpe Cote d'Azur (FR);
- Groningen (NL);
- Lithuania (LT) – not involved in TJTP;
- **Wielkopolska Wschodnia (PL)**;
- **Western Macedonia (GR)**;
- Galati (RO);
- North Denmark, South Denmark (DK);
- Région Grand Est (FR);
- **Normandie (FR)**;
- **Hunedoara (RO)**;
- **Silesian Voivodeship (PL)**;
- **TJTP Saša region, TJTPP Zasavje region (SI)**;
- West-Noord-Brabant (NL);
- **Gorj (RO)**.

The most important results from each section of the survey are presented below and serve as an overview. Based on the results of the survey, strategy papers could be developed as a next step.

1. Support measures related to the funding of H2 technologies

Two thirds (10 of 15) of the participating JTF regions have measures included in their TJTP that address hydrogen technologies and infrastructure. Those measures are:

- Measure to support a coherent Denmark with strong local business beacons. The funds are targeted at CCSU, PtX and sector coupling.
- Measure to support technology and business development within PtX.
- Measure to create better conditions for green conversion in small and medium-sized enterprises, also with hydrogen.
- Private investment in green H2 production.
- Development of technologies in systems and infrastructures for the production, stocking and usage of green hydrogen.
- Research in the fields of energy transition, new alternative fuels, hydrogen technologies, and energy management.
- Restructuring of energy location from coal to green technologies, for e-mobility, for development of North Adriatic Hydrogen Valley.
- Subsidy for development of infrastructure for green hydrogen.

2. RDI potential of the region

In the dynamic landscape of hydrogen technology, various regions across the surveyed area are actively contributing to research, development and innovation. This overview highlights the key achievements and involvement of these regions, showcasing their presence in university projects, national and international research endeavours, the presence of hydrogen-related companies, operational installations, and active participation in initiatives driving advancements in hydrogen technology.

- 11 of 15 regions have universities performing RDI projects in the H2 sector;
- 9 of 15 regions realised national or international research projects in the field of hydrogen technology in the last 10 years;
- 10 of 15 regions have start-up or mature companies in the area of hydrogen technology (19 examples quoted in the surveys);
- 7 of 15 regions have at least one installation already producing and/or processing H2 (grey) for material or energetic use (6–10 users in Region Alpe Cote d'Azur);
- 11 of 15 regions are involved in regional/national and/or international initiatives related to hydrogen technology.

3. Infrastructure for the hydrogen economy

Concerning hydrogen infrastructure, 10 out of 15 regions are actively engaged, encompassing the following hydrogen infrastructure:

- chemical plant for production using grey/blue hydrogen (six regions);
- production/distribution of green hydrogen (five regions).

However, the development of the hydrogen economy faces challenges, with burdensome bureaucracy (12 mentions) lack of financial support (11 mentions), and lack of effective partnerships (eight mentions) being the most frequently cited barriers. Additionally, nine regions host hydrogen laboratories, with five exclusively located within universities, reflecting a commitment to advancing research and innovation in this critical field.

4. Education

Of the participating regions, 10 have regular or specific training courses, seminars, conferences, educational material or websites on hydrogen technologies.

5. How could the JTP support the hydrogen economy in JTF regions?

Concerning the potential support of the JTP for the hydrogen economy in JTF regions, the survey respondents mention a wide range of proposals. Those include:

- production and certification guidelines for the EU Community-wide trade in green hydrogen need to be prepared;
- institutional capacity and human resources skills and competencies;
- learning from the experience of other regions, sharing own experience and identifying good practices and best solutions;
- conferences, exchange visits and publishing research needs reports;
- conducting an analysis of legal provisions and regulations directly and indirectly related to the hydrogen economy;
- interregional cooperation with international academics.

Annex

Call for evidence and expertise on the development of the hydrogen economy in Just Transition Fund regions

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Just Transition Platform - Call for evidence and expertise on the development of the hydrogen economy in Just Transition Fund regions

This call for evidence and expertise will collect stakeholders' feedback on the development of the hydrogen economy in Just Transition Fund (JTF) regions.

The feedback will help implement Action 16 – Develop a strategy paper with recommendations on interregional research partnerships among JTF regions for green hydrogen for the chemical industry and Action 17 – Develop a proposal for a Just Transition Mechanism (JTM) coordination platform on building of hydrogen infrastructure across JTF regions of the Just Transition Platform Working Groups Implementation Plan (April 2023).

If you have any questions, do not hesitate to contact the Just Transition Platform (JTP) Secretariat at chemicals.wg@justtransitionplatform.eu.

1. Identification of survey participant

1.1 Name

1.2 Surname

1.3 Organisation

1.4 Function

1.5 Email address

1.6 Country of origin

EU member states

- AT - Austria
- BE - Belgium
- BG - Bulgaria
- HR - Croatia
- CY - Cyprus
- CZ - Czechia
- DK - Denmark
- EE - Estonia
- FI - Finland
- FR - France
- DE - Germany
- EL - Greece
- HU - Hungary
- IE - Ireland
- IT - Italy
- LV - Latvia
- LT - Lithuania
- LU - Luxembourg
- MT - Malta
- NL - Netherlands
- PL - Poland
- PT - Portugal
- RO - Romania
- SK - Slovak Republic
- SI - Slovenia
- ES - Spain
- SE - Sweden

1.7 Please specify your **Just Transition Fund (JTF) region**.

1.8 Are you involved in the implementation of the **Territorial Just Transition Plan (TJTP)**?

- Yes
- No

1.9 Is your territory a (post-)coal region?

- Yes
- No

1.10 Does your TJTP/JTF programme have **support measures related to the funding of hydrogen** technologies and / or infrastructures?

- Yes
- No

2. Research, technological development and innovation

2.1 Are there any **academic universities or research units** in your JTF region carrying out research directions related to green energy sources, including in particular hydrogen and/or e-fuels?

- Yes
- No

2.2 Has your JTF region realised any **national or international research projects** in the field of hydrogen technology in the last ten years?

- Yes
- No

2.3 Are there any **start-up or mature companies** in the area of hydrogen technology in your JTF region?

- Yes
- No

2.4 Are there any factories/chemical installations in your JTF region **producing** hydrogen (material and/or energetic use)?

- Yes
- No

2.5 Are there any factories/chemical installations in your JTF region **processing** hydrogen (material and/or energetic use)?

- Yes
- No

2.6 In which **regional** / **national and** / **or international initiatives** related to hydrogen technology is your JTF region involved?

- ☐ Clean Energy Ministerial (CEM) Hydrogen Initiative (International Energy Agency)
- ☐ European Hydrogen Backbone (EHB) initiative
- ☐ Green Chemistry Hub
- ☐ H2REGIONS.EU
- ☐ H2UB
- ☐ IPCEI Hy2Tech
- ☐ IPCEI Hy2Use
- ☐ Methanol Institute
- ☐ Mission Innovation Hydrogen Valley Platform: H2Valleys
- ☐ Other, namely:
- ☐ Regions Hub of Clean Hydrogen Partnership

2.7 Please provide further **information or links on the initiative** you participate in. You can also choose to upload a document.

500 character(s) maximum

Please upload your file(s)

3. Infrastructure

3.1 Which **infrastructure** for hydrogen technologies has been built in your JTF region to date?

The question applies to any form of hydrogen:

- **Grey** hydrogen is the most common form and is generated from natural gas, or methane, through a process called “steam reforming”.
- Hydrogen is labelled **blue** whenever the carbon generated from steam reforming is captured and stored underground through industrial carbon capture and storage (CSS).
- **Green** hydrogen – also referred to as “clean hydrogen” – is produced by using clean energy from surplus renewable energy sources, such as solar or wind power, to split water into two hydrogen atoms and one oxygen atom through a process called electrolysis.

- ☐ Grey hydrogen distribution for transport
- ☐ Blue hydrogen distribution for transport
- ☐ Green hydrogen distribution for transport
- ☐ Water electrolyser
- ☐ Grey hydrogen storage facility
- ☐ Blue hydrogen storage facility
- ☐ Green hydrogen storage facility
- ☐ Chemical plant for synthesis / production using grey hydrogen
- ☐ Chemical plant for synthesis / production using blue hydrogen

- [ ] Chemical plant for synthesis / production using green hydrogen
- [ ] Other, namely:

3.2 To what extent are the following aspects **barriers** for the transformation of the energy and chemical sector into a hydrogen economy in your JTF region?

Please provide your opinion.

Barrier	To a great extent	To a large extent	Somewhat	Little	Not at all
Burdensome bureaucracy	○	○	○	○	○
Lack of financial support	○	○	○	○	○
Lack of technical capacity / human resources	○	○	○	○	○
Lack of citizens/stakeholders /institutional support	○	○	○	○	○
Lack of effective partnerships	○	○	○	○	○
Potential impact of the COVID-19 crisis	○	○	○	○	○
Other, namely:	○	○	○	○	○

3.3 Please **justify your rating** of barriers.

3.4 Are there any **laboratories** in your JTF region for hydrogen projects?

- [ ] Yes, within universities.
- [ ] Yes, within research institutions.
- [ ] Yes, within technology companies.
- [ ] Yes, within technology parks.
- [ ] Yes, other, namely:
- [ ] None

4. Education

4.1 Which **universities or research units, vocational schools etc.** in your JTF region carry out educational activities related to green energy sources, including in particular hydrogen and/or e-fuels?

500 character(s) maximum

4.2 Please provide **leading contact person(s)** of institutios in this regard (e.g. web link, e-mail address to person, etc.).

4.3 Are there any regular or specific training courses, seminars, conferences, educational material or websites on hydrogen technologies are organised in your JTF region?

- ○ Yes
- ○ No

5. Outlook

5.1 How could the **Just Transition Platform (JTP)** **to support** the transformation towards a hydrogen economy in JTF regions?

- ☐ Legislative and policy orientation for energy transition
- ☐ New and more accessible EU funds
- ☐ Exchange of experience at European level
- ☐ Increased awareness among citizens and businesses
- ☐ Other, namely:

5.2 Please provide **other suggestions or information** that may be useful to the JTP Working Group on Chemicals in planning JTP-interregional cooperation on hydrogen infrastructure and / or technologies.

500 character(s) maximum

5.3 Please **upload any documents** you consider relevant to know better initiative(s) towards a hydrogen economy in your JTF regions.

Please upload your file(s)

THANK YOU FOR YOUR PARTICIPATION.

Contact

Contact Form