

WP T3

D.T3.2.7

Joint implementation re-
port for the pilot in the **Version 2**
Energy and Environment **09.2022**
sector





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1 EXECUTIVE SUMMARY

1.1. PP2 Styrian Technology Park

The Energy Concept of Slovenia, a document that sets out strategic orientations and sets the political framework for implementing energy projects in Slovenia, with goals until 2055, defines the following overarching goals:

- reducing energy-related greenhouse gas emissions by at least 40% by 2035 from 1990 levels;
- reducing energy-related greenhouse gas emissions by at least 80% by 2055 from 1990 levels.

In order to meet the objective, it will be necessary to halt the growth of final energy consumption, to make energy efficiency a priority for economic development, and to intensively promote the increase of RES consumption – among other, to make mobility sustainable (**e-Mobility**) and to boost the transformation of the traditional economy to the high-end **Circular Economy**, e.g. Environmentally friendly Innovation economy, with special emphasis on fostering Industrial Symbiosis through the development of a novel and innovative business models, industrial processes optimisation, innovative training approaches etc.

Due to the above-mentioned Energy and Environment fields, STP wants to upgrade existing long-term experiences and knowledge, within the CHAIN REACTIONS pilot project, to get to a much higher level / offering CS services and support via: **Chain Reactions e-Mobility and Circular Economy Innovation HUB ("Hotspot") of Slovenia (Styria)**.

Within CHAIN REACTIONS Styrian (Slovenian) pilot on the topic of Energy and Environment the following two transnational partners participated:

- PP4 - Chamber of Commerce Croatia (CCE-ZCC)
 - Role: exploring the opportunities on business innovation models
- PP7 - Wroclaw Technology Park (WTP)
 - Role: exploring the opportunities on new technological approaches and ICT

Evaluation partner:

- PP10 - R-Tech (duo partner of Energy and Environment)

Innovation tools support partner:

- PP6 - BWCON

IGAs actively supported pilot and its related actions / activities. They participated in the dissemination / promotion activities as well as participated in / on online platform, webinars, and other cross-linked activities.

IGA members are: Regional Development Agency for Podravje - Maribor, Tehnocenter of the University of Maribor, E-Institute (Institute for Comprehensive Development Solutions), Wcycle Institute Maribor – Institute for Circular Economy.

The members of IGA supported STP as one of the partners in CHAIN REACTIONS project mainly in the following activities:

- Implementation of transnational pilots aiming at supporting value chain innovation – STP had a leading role in the pilot for the industrial sector energy and environment. In this respect, STP in cooperation with R-Tech (PP10) has already elaborated Value chain analysis report for the industrial sector: energy and environment (D.T3.1.3).



- Development of transregional innovation networks and agendas – as part of WPT4 with the aim to create open spaces for collaboration in the energy and environment sector.

1.2. PP10 R-Tech

As of now, electromobility is the key to climate-friendly mobility. The operation of electric vehicles generates significantly less CO₂, especially in conjunction with electricity generated from renewable sources. In addition, vehicles using alternative fuels or power strands with optional energy storage systems can compensate for fluctuations in wind and solar power in the future, and thus, support the expansion and market integration of these unsteady energy sources. Therefore, it is necessary to explore the implementation of new technologies for cross-industry cooperation of energy systems and electromobility. This transnational pilot will boost cooperation by transferring knowledge from the different sectors between Chain Reactions partners.

The transnational pilot was designed as a **series of three virtual online transnational technology transfer workshops** with experts from the Chain Reactions consortia PP5 and PP11. The technology transfer workshops were organized by the R-Tech GmbH with relevant contributions from the other project partners.

- PP10 - R-Tech GmbH as responsible partner (Germany): Integration of electromobility in existing energy networks.
- PP5- RDA Pilsen as collaboration partner (Czech Republic): exploring opportunities for electrical vehicles for public transportation and operation of smart grids.
- PP11 – GAPR Górnośląska Agencja Przedsiębiorczości i Rozwoju as collaboration partner (Poland): Analyzing the transition from a coal based energy system to a clean energy supply and the development of microgrids.
- PP2 – STP ŠTAJERSKI TEHNOLOŠKI PARK – Poslovno Podporni Center in Inkubator & Regijski Center za Tehnološki Razvoj (Slovenia): Evaluation partner.
- PP6 BWCON (Germany): partner for innovation tool support.

The transfer focussed on cross sectoral topics: the sector electromobility and the sector energy systems. Each partner took care to organize one expert for each of these three workshops. By this methodology external knowledge was spread most efficiently. To raise awareness for the upcoming workshop series, we hosted a preceding online workshop local IGA and SME in Regensburg on June 16th, 2020, with the title „Development of new technologies based on hydrogen and fuel cells for the mobility of tomorrow”. Participants included the City of Regensburg, R-Tech GmbH, Biopark, Continental AG, Zentrum Industrie 4.0, Cluster Sensorik, Cluster IT Security, International Chamber of Commerce, Insys GmbH, Kronos AG, University of Regensburg, OTH Regensburg, Baywing, Bertrandt AG, Energy Agency and Infineon AG.



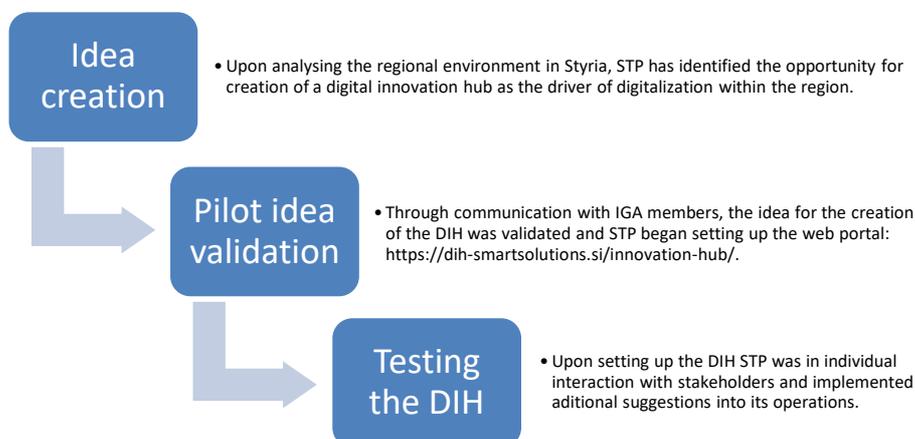
2 REPORT ON ACTIVITIES IMPLEMENTED

2.1. For PP2 Styrian Technology Park

The DIH activity focus was on providing knowledge on Smart or Advanced technologies, which present an enormous growth potential for Europe. Technologies such as the Internet of Things, industrial data, advanced manufacturing, robotics, 3D printing, blockchain technologies and artificial intelligence offer a range of opportunities that will enable European industry to expand its leadership in the emerging markets for the products and services of the future. Advanced technologies are a fusion of digital and key enabling technologies (KETs), and the integration of physical and digital systems. They give rise to innovative business models and new processes, and the creation of smart products and services. They underpin the shift to a greener economy and drive the development of entirely new industries. EU businesses are not taking full advantage of these advanced technologies or the innovative business models offered by the collaborative economy.

Within the Chain Reactions project the joint digital hub for dissemination of knowledge, showcasing of practices and networking among stakeholders in the field of digitalization was established: <https://dih-smartsolutions.si/innovation-hub/> (as the DIH is dedicated to the Slovenian stakeholders, the main bulk of the context has not been translated into English).

The DIH Innovation Hub was established within the project Chain Reactions following the steps depicted below:



The specific knowledge disseminated through the DIH as a platform was in the following categories:

I. DIGITALIZATION OF SMEs



Digitization or digital transformation represents a great potential for growth, as it is estimated that a digitally oriented and functioning society can use its potentials and resources more than ten times more efficiently, faster and more environmentally friendly.

Industry 4.0 – Digital Transformation represents the final phase of the current industrial revolution. A feature of the digital transformation taking place in SME operations is the functional use of the Internet and digital solutions in the areas of production, marketing, promotion, sales and design. A tailored approach throughout the value chain allows companies to immediately adapt to customer needs, and the phases between product design and product delivery are shorter, more technologically advanced and more cost-effective. Digital transformation is not tied to a particular industry or type of business. The key areas of digitalisation or digital transformation of the EU and Slovenia are identified in [the Digital Europe Program](#) and the [Digital Slovenia 2020](#) strategy.

Additive technology – 3D printing technology (additive manufacturing) is a process in which objects are formed layer by layer on an operating platform through computer-aided design and manufacturing. Additive Manufacturing (or 3D printing) is one of the technologies under the umbrella of Advanced Manufacturing which has been identified by the European Commission as one of the Key Enabling Technologies (KETs).

Creative industries are core elements of the EU economy. Creative workers are talented and flexible with a range of core capacities that can be developed and improved naturally via practice and lifelong learning. Creative enterprises are usually small, often micro. They work with clients in sectors that have been traditionally connected to creative industries for some time, using flexibility to add value to products by applying their ability to realize innovative ideas.

Increasingly these capacities are becoming more relevant to the European Economy as new sectors find out that they need the skills provided by creative enterprises workers. At the same time new, often disruptive, technologies come to light and require highly skilled creative labour to allow maximum exploitation of capital.

This also applies to other **Advanced Manufacturing** technologies, like Advanced Industrial Robotics (AIR), slowly emerging for small and micro enterprises. Just like AM, AIR is a transversal technology requiring investment and knowledge on design and software can bring crafts closer to the market's needs by customizing batches (i.e. footwear). The global market is estimated to reach \$6.4 trillion by 2025.

Hence Advanced Manufacturing technologies are often adoptable by relatively traditional sectors. However, they often need ready and competent workers. And when they do have a high level of technical skills, workers often lack capacities for creativity, innovation and entrepreneurial approach to use such technologies. These are required capacities if the capital (tools, machines) is to be exploited to the maximum of its potential.

- *Projects: ACCESS-3DP, E3D+VET, 3D4KIDS*

II. MOBILITY

Mobility - one of the key challenges for modern cities, as transport generates a quarter of all greenhouse gases in the EU. If we used to plan urban planning with cars in mind, today we need to plan it with people and the environment in mind. The transport system in cities needs smart change, and growing urbanization creates complex challenges in terms of mobility. Research has shown that urban areas contribute 80% of CO2 emissions, much of which is caused by transport.

The proliferation of electric vehicles thus brings positive effects for their users and their surroundings. It contributes to reducing harmful emissions that increase global warming, which is in line with the guidelines for sustainable development.



E-mobility is not an independent area of the S4 Smart Specialization Strategy, but it is significantly included in Smart Cities and Communities, Mobility and indirectly in other areas.

E-mobility is mainly based on electric vehicles, which are intended mainly for personal transport. This also includes motorcycles, as well as smaller trucks, which use electric propulsion instead of fossil fuels. Due to the small distance between places in Slovenia and the excellent infrastructure of charging stations, Slovenia has great potential for the expansion of traffic with electric vehicles. Examples of good e-mobility practices in Slovenia:

- [Avant2Go](#) (electric vehicle sharing - Sharengo).
- [e-mobile](#) (electric car chargers).
- [EMSISO](#) (electric motor for the first certified all-electric aircraft).
- [GEN-I \(e-mobility\)](#).
- [MAHLE Electric Drives Slovenia](#).
- [Petrol \(e-mobility\)](#).
- [Tushek Supercars](#) (lightest supercar with a hybrid heart).

III. SMART REGIONS

Smart regions are innovative, forward-looking, interconnected communities that are based around people and focused on respect for the environment. They are characterized by a high quality of life and resource efficiency based on intelligent links between their infrastructure and smart technologies and the involvement of key players (researchers, policy makers, planners, entrepreneurs, industry and the public), taking into account the social, economic and environmental aspects of development. They build their work on promoting urban and regional innovation in order to make communities more inclusive, vibrant, resilient and sustainable.

Innovation in data and technologies, combined with community governance, forms development and innovation processes to create a positive future for cities and regions. In Slovenia, the development of smart communities is defined in the Smart Specialization Strategy S4 and divided into the following focus areas and technologies:

- Open system solutions - IT platforms as ecosystems for hosting applications.
- Conversion, distribution and management of energy.
- Cloud computing, open and bulk data.
- Internet of Things and the Internet of the Future.
- Built-in smart systems.
- HPC Infrastructure.
- Capture and use of ground surface remote observations data.

Smart city - A smart city is a place where traditional networks and services are made more efficient with the use of digital solutions for the benefit of its inhabitants and business. A smart city goes beyond the use of digital technologies for better resource use and less emissions. It means smarter urban transport networks, upgraded water supply and waste disposal facilities and more efficient ways to light and heat buildings. It also means a more interactive and responsive city administration, safer public spaces and meeting the needs of an ageing population.

The Smart City Maribor Initiative (SCMI) was launched to spark sustainable development of a smart city environment. The initiative aims at implementing advanced projects that will improve the quality of life in Maribor and its broader region, and encourage technological, social, and organizational innovation.



The Smart City Maribor Initiative network will seek to address urban challenges in the following areas of activity:

- Competitiveness & Research - promoting innovation and setting up a regional R&D centre.
- Health and quality of life - new technologies and services as a response to demographic changes in the region.
- Environment - waste, water, air quality, and green areas management with a particular focus on user-oriented solutions and the latest ICT solutions.
- Mobility - sustainable multimodal mobility based on alternative fuels and ICT solutions.
- Energy - substantial reduction of energy consumption in cities, including public buildings, public utility services, public transport and industry with a strong integration of ICT solutions.
- Smart governance - transparent governance, based on open innovation principles and modern ICT e-governance solutions.
- Education & Creativity - setting-up an open space for creativity and new forms of education at all levels.
- Internationalisation of the city and the SCMI stakeholders through cooperation with Smart City clusters in the EU and worldwide.

Table 1.1: Activities performed – PP2

| Nr | Date | Location ¹ | Type of activity ² | Target group involvement* | | | | | | |
|----|---------------|-----------------------|--|---------------------------|----|------|-----|-----|-------|----------|
| | | | | LRPA | SA | HE&R | SME | BSO | IGA | Other PP |
| 1 | February 2021 | Online | Planning transnational pilot activity | | | | 2 | 3 | (3/5) | |
| 2 | March 2021 | Online | Setting up online transnational pilot | 2 | | 2 | | 1 | (3/5) | |
| 3 | April 2021 | Online | Guidelines for further implementation of pilot activities | | | 2 | 1 | | (2/3) | |
| 4 | May 2021 | Online | Online event for overview of sectoral trends | | | 2 | 2 | 2 | (4/6) | |
| 5 | June 2021 | Online | Online event for identification of future cooperation | | 2 | 2 | | 2 | (4/6) | |
| 6 | July 2021 | Ljubljana | Individual meeting (in person) with Ljubljana Urban Region | | 1 | | | | | |
| 7 | August 2021 | Maribor | Individual meeting (in person) with Komunikacije prihodnosti | | | 1 | | | 1 | |
| 8 | August 2021 | Maribor | Individual meeting (in person) with Regional Development Agency for Podravje Maribor | | 1 | | | | 1 | |

¹ City, country / online

² Type of activity: workshop, conference, training, bilateral meeting, other (please, name the activity)



| | | | | | | | | | | |
|----|----------------|---------|---|--|---|---|----|--|--------|---|
| 9 | August 2021 | Maribor | Individual meeting (in person) with Institute Wcycle Maribor | | | 1 | | | 1 | |
| 10 | August 2021 | Krško | Individual meeting (in person) with Regional Development Agency for Posavje | | 1 | | | | | |
| 11 | September 2021 | Online | Online campaign for animation of SMEs. | | | | 15 | | | |
| 12 | November 2021 | Online | Knowledge transfer with PP6 BEC | | | | | | | 1 |
| 13 | November 2021 | Online | Correspondence meeting with stakeholders | | | | 10 | | (2/10) | |

2.2. For PP10 R-Tech

The focus of the **first Transnational Pilot workshop** was on the analysis of smart grid and e-mobility emphasizing the participating company current situation, the evaluation of their different capabilities and the market situation.

The energy transition initiated in Germany has resulted in a far-reaching structural change in our electricity supply network. The installed generation capacity is shifting from central, conventional power plants in the higher grid voltage levels to decentralized generation systems in lower voltage levels. In February 2019, the share of renewable energies in power generation in Germany was already around 77% at its peak. The distribution system operators are thus faced with new challenges. The further expansion and the priority connection and purchase authorization of renewable energy systems according to the EEG lead to bidirectional power flows, increased power gradients and volatile feed-in characteristics. There are problems with the ability to integrate other generation systems and consumers - e-mobility in particular requires intelligent solutions for holistic integration into the distribution grid. For example, intensive fast charging methods with charging capacities of up to 450 kW are being worked on (FastCharge research project) in order to achieve broader acceptance of e-mobility. The current market share of electric cars in Germany is 1.6%. When the electric car quota of 30% is reached, there are bottlenecks in the power supply due to simultaneous charging processes, as a current study by the Technical University of Munich shows. Nevertheless, with an intelligent distribution of the charging processes, further expansion of the power grid is not absolutely necessary or can be delayed. However, according to independent studies by Innogy and E.ON, around 1 billion euros must be invested annually to upgrade the grids and avoid charging peaks. E-mobility and charging stations will lead to higher loads at the network nodes/transformer stations due to their electricity requirements. So that these loads do not have to be dealt with purely by cost-intensive grid expansion or by increasing the output of the transformers, an intelligent, holistic solution must be developed to reduce the utilization at the nodes. The network operators have already taken the first measures to encourage load



control of the wall boxes by enabling section 14a EnWG for wall boxes (controllable consumption devices). It states, among other things, that customers should be offered a reduced tariff if the wall box is made available for Section 14a EnWG.

The following topics have been addressed in detail:

- Bright future of electromobility in Jaworzno
- Electrical engineering technologies with high-level of embedded intelligence for transportation
- Future challenges for the energy supply network and integration of e-mobility

To conclude, the output of the workshop included potential business ideas, value propositions and a portfolio of new technologies with potential.

The screenshot shows a Zoom meeting interface. At the top, there are video thumbnails for participants: Michael Strobel, Manfred Bieder, Filip Uhlík, and MS Markus. The main content is a presentation slide from TechBase Regensburg titled "Transfer between science & business". The slide features a horizontal flow of six circular icons, each representing a different aspect of the transfer process:

- Icon 1:** TechLab with offices and workshops for applied research projects.
- Icon 2:** Funding for university spin-offs (startup offices for OTH and University of Regensburg).
- Icon 3:** DGO co-operation with OTH Amberg/Weiden, OTH Regensburg and the University of Regensburg.
- Icon 4:** Involvement of technology-research projects (ZIM, Horizon2020).
- Icon 5:** Joint events (Startup Factory, 3 Euro Business, Hackaburg).
- Icon 6:** Joint projects: TRIO, FIT-Lab, Grow4Digital.

On the right side of the Zoom window, a list of participants is visible, including names like Michael Strobel, Manfred Bieder, and others. The bottom of the window shows the Zoom control bar with options like 'Audio on', 'Video starten', 'Screenshot', 'Teilnehmer', 'Chat', 'Bildschirm freigeben', 'Aufzeichnen', and 'Beenden'.

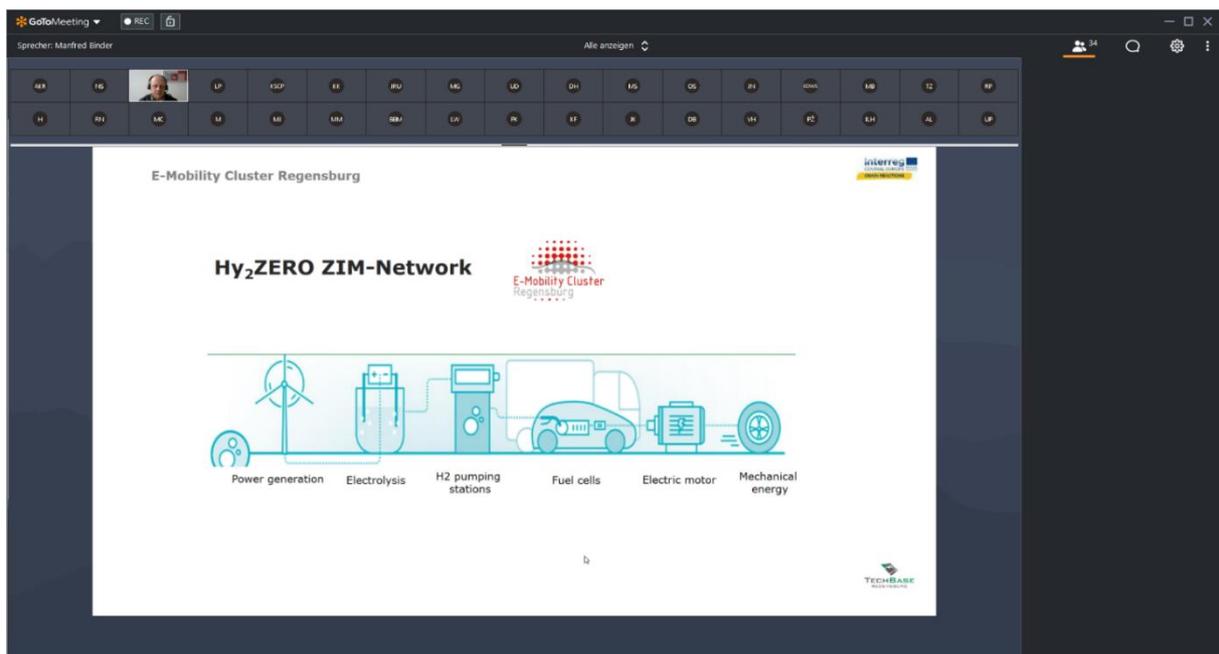
The focus of the **second Transnational Pilot workshop** was on current hydrogen technologies that largely contribute to mobility. New drive technologies, such as electric drives, play a central role in achieving climate protection goals: reducing CO₂ emissions in the transport sector by 40% by 2030 compared to 1990 will only be possible if the use of alternative drives and energy sources becomes an essential part. Hydrogen-powered fuel cell vehicles represent a solution for the mobility sector, since fuel cell vehicles offer a greater range than battery-powered vehicles with a larger payload at the same time and can therefore be used well in passenger cars, in payload vehicles and in public transport. There are currently still significant disadvantages for a market ramp-up, such as the comparatively low efficiency of fuel cell systems, the lack of infrastructure at hydrogen filling stations and the high purchase price.



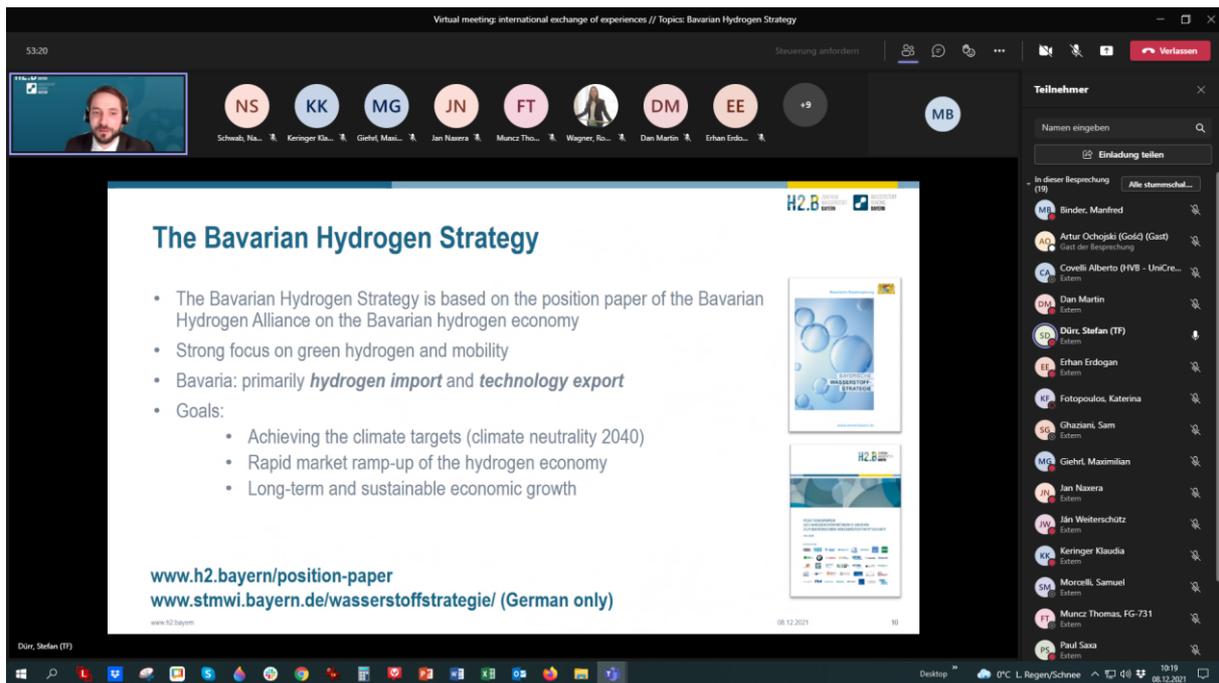
To this end, a **new ZIM network** has been established in Regensburg to facilitate the technology transfer in the framework of the Transnational Pilots. **The HY2.ZERO innovation network** aims to support the industrialization of hydrogen and fuel cell technologies with new and improved solutions and is therefore part of the market ramp-up. The network plans to set up R&D consortium projects that will make it possible to manufacture core components of the fuel cell, such as bipolar plates, more cost-effectively and to increase the efficiency of the fuel cell through innovative power electronics. The projects of the network also include technologies for the generation and intelligent integration of regenerative (surplus) electricity for the production of hydrogen, but also technologies that use hydrogen as an industrial by-product and co-product, since hydrogen and fuel cells play an important and related role in the future energy system will take. With an increasing share of battery electric vehicles in the transport sector, the electricity demand of this sector will increase significantly.

Topics addressed:

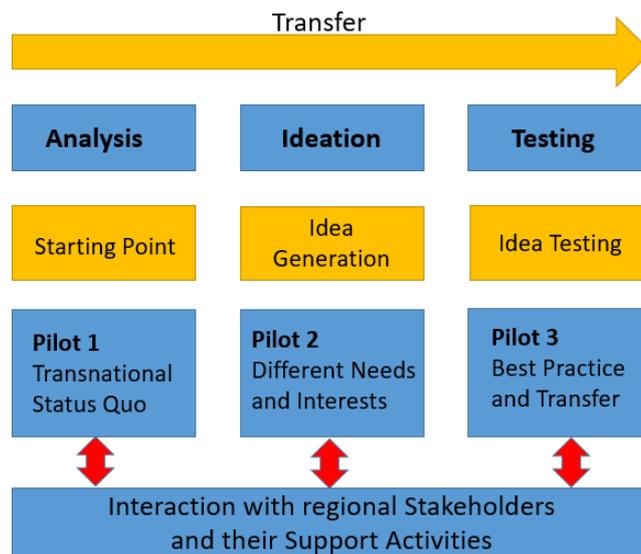
- Hy₂.ZERO Network – Mobility needs Hydrogen
- Hydrogen in Poland - opportunities for research-industry ecosystems
- Current status of hydrogen technologies in the Czech Republic
- Presentation of a full green hydrogen circle – risk, opportunities and limitations



The activity focus of the **third Transnational Pilot workshop** was to introduce the Bavarian Hydrogen strategy as a best practice example. In addition, the outcome of Transnational Pilot Workshops 1 and 2 workshops was analysed and connected to Pilot 3.



In order to give the participants of the third transnational pilot an overview of the approach of the project and especially of the strategy regarding the three pilot events, a review of the previous events was presented during the third transnational exchange. First, the three-stage project structure, which provides the basis for a successful knowledge transfer, was presented and linked to the previous and current events. The following figure outlines the basic strategy and the approach of the implemented pilots.



At the beginning of the pilot series, the first event was on the topic of smart grid and electro mobility. The concept and the status of the topics in the three locations were discussed with Regensburg, Jarwozno and Pilsen. In order to subsequently evaluate the results and to find the most suitable interface



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for the following events, a competence atlas was created that maps the current status on the one hand and presents potential collaboration opportunities, their chances and possible barriers on the other. Based on this, the following pilots were held on the topic of hydrogen, as this topic is highly relevant for all regions and the perspectives have not yet drifted as far in different directions as with battery electric mobility in the conventional sense. In order to stimulate the second point of the project strategy, the generation of ideas, the technical conditions and potentials of hydrogen technologies were presented in three lectures in Pilot 2 in order to create a basis for deepening the topic. After the event, the participants were sent questionnaires which were analysed and evaluated. Based on this, a stakeholder mapping was created, which shows and classifies the four most important topic areas named by the event participants. The following diagram shows the stakeholder mapping and the four main themes that emerged from it.

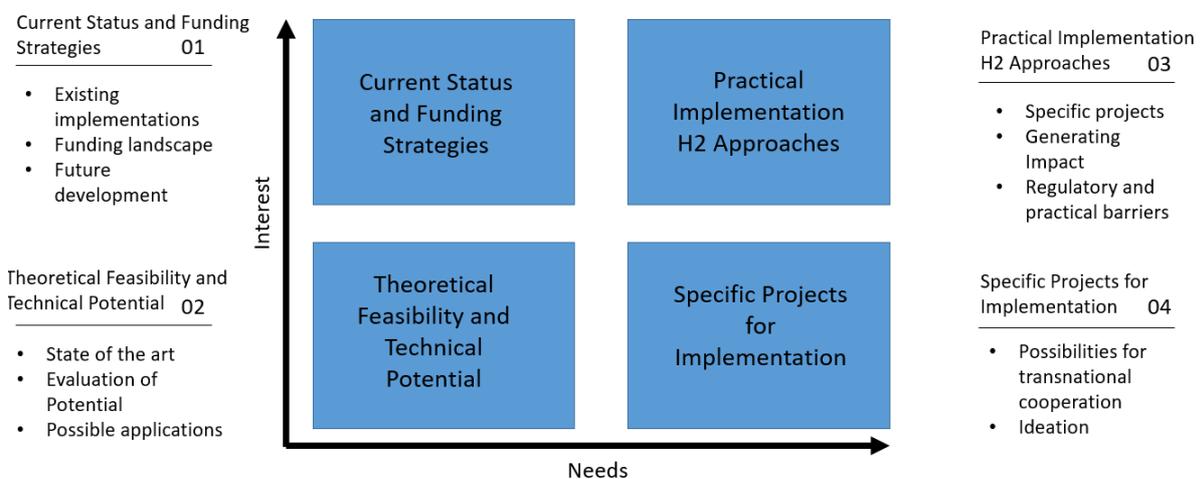


Table 1.2: Activities performed – PP10

| Nr | Date | Location | Type of activity | Target group involvement* | | | | | | |
|----|------------|----------------|---|---------------------------|----|------|-----|-----|-----|----------|
| | | | | LRPA | SA | HE&R | SME | BSO | IGA | Other PP |
| 1 | 02.07.2020 | Regensburg, DE | Chain Reactions update on own institutional website in German and English | x | x | x | x | x | x | x |
| 2 | 07.07.2020 | Regensburg, DE | Planning Transnational Pilot 1 | | | | | 2 | | |
| 3 | 13.07.2020 | virtual | Planning Transnational Pilot 1 | | | | | 1 | | 3 |
| 4 | 15.09.2020 | virtual | Planning Transnational Pilot 1 | | | | | | | 3 |
| 5 | 21.09.2020 | virtual | Planning Transnational Pilot 1 | | | 2 | | 1 | | |
| 6 | 08.10.2020 | virtual | Technical check Transnational Pilot 1 | | | 3 | | 1 | | 2 |



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| | | | | | | | | | | |
|----|------------|---------|---|----|---|----|----|----|----|----|
| 7 | 14.10.2020 | virtual | Transnational Pilot 1: Integrating electromobility | 3 | | 9 | 3 | 7 | 1 | 7 |
| 8 | 08.10.2020 | virtual | Planning Transnational Pilot RDA Pilsen | | | | | | | 3 |
| 9 | 27.10.2020 | virtual | 9. Bayerischer Innovationskongress, Chain Reactions Exhibition | 17 | 1 | 22 | 83 | 35 | 17 | |
| 10 | 18.11.2020 | virtual | Planning Transnational Pilot 2 | | | | | | | 3 |
| 11 | 20.11.2020 | virtual | Planning Transnational Pilot 2 | | | | | | | 3 |
| 12 | 26.11.2020 | virtual | Planning Transnational Pilot 2 | | | | | | | 3 |
| 13 | 24.02.2021 | online | Transnational Pilot 2: Hydrogen Technologies | 4 | | 9 | 11 | 16 | 4 | 7 |
| 14 | 23.03.2021 | online | Technology transfer meeting: IntelliZell | 1 | | 7 | 18 | 3 | 1 | |
| 15 | 26.03.2021 | online | Chain Reactions project meeting | | | | | | | 12 |
| 16 | 12.04.2021 | online | D.T4.1.17 Workshop | | | 4 | 7 | 3 | 2 | |
| 17 | 19.04.2021 | online | D.T4.1.16 Workshop, Kick-Off Meeting: Network HY2.ZERO, Mobility needs Hydrogen | 1 | | 3 | 6 | 4 | 3 | |
| 18 | 03.05.2021 | online | Network HY2.ZERO: Kick-Off FC DCDC Converter group | | | 1 | 2 | | 2 | |
| 19 | 10.05.2021 | online | Network HY2.ZERO: Kick-Off FC Inverter group | | | 2 | 2 | | 1 | |
| 20 | 18.05.2021 | online | Kick-Off Working Group AI Energy and Mobility | | | 2 | 7 | | 1 | |
| 21 | 24.06.2021 | online | Network HY2.ZERO: Kick-Off Hot Hydrogen group | | | 7 | 14 | 5 | 4 | |
| 22 | 28.06.2021 | online | Network HY2.ZERO: Kick-Off Simulations group | | | 4 | 2 | | | |
| 23 | 01.07.2021 | online | Chain Reactions project meeting | | | | | | | 12 |
| 24 | 06.07.2021 | online | Work meeting Hot Hydrogen Group | | | 1 | 1 | | | |



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| | | | | | | | | | | |
|----|--------------------|------------|---|----|---|----|----|----|----|----|
| 25 | 12.07.2021 | online | Work meeting Simulations group | | | 2 | 2 | 1 | 1 | |
| 26 | 22.07.2021 | online | Work meeting FC DCDC group | | | 1 | 2 | 1 | 2 | |
| 27 | 29.07.2021 | online | Work meeting Simulations group | | | 3 | 2 | 1 | | |
| 28 | 07.- 12.09.2021 | Munich | Internationale Automobilausstellung (IAA) München | x | x | x | x | x | x | |
| 29 | 13.09.2021 | online | Work meeting Hot Hydrogen Group | | | 1 | 2 | | | |
| 30 | 14.09.2021 | online | Work meeting Simulations group | | | 1 | 3 | 1 | | |
| 31 | 20.09.2021 | online | Work meeting FC DCDC group | | | 1 | 2 | | 1 | |
| 32 | 22.09.2021 | online | Work meeting Hot Hydrogen Group | | | 1 | 2 | | | |
| 33 | 24.09.2021 | online | Work meeting FC DCDC group | | | 1 | 2 | | 1 | |
| 34 | 30.09.2021 | online | 3.Regensburger Verkehrskongress | 26 | 3 | 16 | 35 | 9 | 18 | |
| 35 | 08.10.2021 | online | Work meeting Hot Hydrogen Group | | | 1 | 2 | | | |
| 36 | 08.10.2021 | online | Work meeting FC DCDC group | | | 1 | 2 | | 1 | |
| 37 | 25.10.2021 | online | Work meeting FC DCDC group | | | 1 | 2 | | 1 | |
| 38 | 27.10.2021 | online | Chain Reactions project meeting | | | | | | | 12 |
| 39 | 28.10.2021 | online | Work meeting FC DCDC group | | | 1 | 1 | | 1 | |
| 40 | 11.11.2021 | online | Work meeting Hot Hydrogen Group | | | 1 | 2 | | | |
| 41 | 16.11.2021 | Regensburg | Jahrestagung Cluster Mobility & Logistics | 2 | 1 | 4 | 10 | 13 | 3 | |
| 42 | 19.11.2021 | online | Work meeting FC DCDC group | | | 1 | 1 | | 1 | |
| 43 | 22.11.2021 | online | Work meeting FC DCDC group | | | 1 | 1 | | 1 | |
| 44 | 23.11.2021 | online | Work meeting Hot Hydrogen Group | | | 1 | 2 | | | |



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|----|------------|--------|---|---|---|---|---|---|---|----|
| 45 | 08.12.2021 | online | Transnational Pilot workshop 3: Bavarian Hydrogen Strategy | 1 | 1 | 2 | 5 | 9 | 3 | 3 |
| 46 | 15.12.2021 | online | HY2.ZERO network meeting | 5 | 2 | 5 | 6 | 7 | 3 | |
| 47 | 18.01.2022 | online | Chain Reactions project meeting | | | | | | | 12 |

*** Target group involvement – number of involved:**

LRPA – Local / regional public authority

SA – Sectoral agency

HE&R – Higher education and research

SME – Small and medium sized enterprises

BSO – Business support organisation

IGA – Innovation and Growth Alliance

Other PP – other project partners



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| Project partner implementing the pilot | PP2 - STP |
| CHAIN REACTIONS' sector | Energy and environment |
| Sub-sector | e-mobility, energy efficiency and digitalisation |
| Description of pilot work plan | <p>Sustainable mobility in Slovenia is based on two pillars, public transport and non-motor forms of mobility, or active mobility. STP is upgrading the existing long-term experiences and knowledge, within the CHAIN REACTIONS pilot project, to get to a much higher level / offering CS services via: Chain Reactions e-Mobility and Circular Economy Innovation HUB ("Hotspot") of Slovenia (Styria). This hotspot was established online, during the project pilot implementation phase as https://dih-smartsolutions.si/innovation-hub/.</p> <p>The primary task of the Styrian pilot is to represent the CHAIN REACTIONS developed tools via mix of energy and environment sector in wider Styria region (combination of the e-Mobility and Circular Economy, supported by the Digitalization/ICT sector).</p> <p>Through the DIH (https://dih-smartsolutions.si/innovation-hub/) STP is connecting companies of all ranges with other R&D&I within the quadruple helix on two levels: 1.) Nationally – as a certified business incubator and accelerator) and 2.) Regionally – as a centre for technological development.</p> <p>Within DIH STP offers three main pillars of support and cooperation in the fields of energy and environment:</p> <ul style="list-style-type: none"> I) Knowledge and awareness raising about new technological possibilities and trainings on their implementation; II) Networking among innovative actors within the region and beyond; and III) Consulting companies in their path towards better efficiency in the field of energy and environment. <p>This is achieved by offering the various subjects of the innovative ecosystem following 6 support services:</p> <ul style="list-style-type: none"> a) Business support, by supporting the development of innovative business ideas and implementing them; b) Networking, by connecting various innovative actors within the region and beyond; c) Business spaces, by offering initial space for early-stage development of ideas; d) Financing, by consulting on funding opportunities; e) Technology support, by providing technological knowledge; and f) General consultancy. <p>More specifically, through the networking activities STP has exchanged the experience of two Slovenian DIHs and connected the key stakeholders within the Styria region and beyond.</p> |



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| <p>Detailed description of activities performed</p> | <p>Within the WP3 the following activities were carried out:</p> <ul style="list-style-type: none"> February 2021: Online Planning transnational pilot activity: Presenting the CHAIN REACTIONS baselines for the preparation of the pilot activities and discussion on the pilot implementation. March 2021: Setting up of online transnational pilot: Preparation of the online format of the pilot activities – the DIH website. April 2021: Online Guidelines for further implementation of pilot activities: Consolidation with IGA members and other stakeholders regarding the future role of the DIH and its website, also about further activities to upgrade the DIH into eDIH. May 2021: Online event for overview of sectoral trends: Overview of sectoral trends within the region of Eastern Slovenia, with an overview of activities of IGA members and other stakeholders. June 2021: Online event for identification of future cooperation: Identification of possible cooperation among the stakeholders and drafting of the roadmap for WP4. July 2021: Ljubljana Individual meeting (in person) with Ljubljana Urban Region; and August 2021: Maribor Individual meeting (in person) with Komunikacije prihodnosti; and August 2021: Maribor Individual meeting (in person) with Regional Development Agency for Podravje Maribor; and August 2021: Maribor Individual meeting (in person) with Institute Wcycle Maribor; and August 2021: Krško Individual meeting (in person) with Regional Development Agency for Posavje: Through a series of individual meetings with relevant stakeholders and IGA members (a joint meeting could not be organised), the roadmap draft was presented and the feedback was collected, as well as possible upgrades for the DIH. September 2021: animation of Slovenian SMEs for the participation in a joint activity with Croatian partner CCE-ZCC, where |
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| | <p>a network of SMEs was activated to identify possible collaboration.</p> <ul style="list-style-type: none"> • November 2021: Online Knowledge transfer with PP6 BEC: Transfer of knowledge and practical experience among PPs. • November 2021: Online Correspondence meeting with stakeholders: Animation of 10 SMEs, recipients of national support in the field of AI (as part of energy and environment) for a transnational workshop within WP4. <p>Based on these activities the final version of the DIH was created, which allows for demonstration of cases supporting digitalization, sharing the knowledge, and networking. Especially the online correspondence meeting provided the overview of the implemented innovations in the companies that received the national support for innovation in the field of logistics, transport and mobility, which provided a joint interregional exchange of innovation in the relevant field during the WP4 event of the duo partners.</p> |
| <p>Use of value chain innovation models and instruments</p> | <p>As the main tool of the value chain innovation models, the portfolio of innovative cases in the industrial field was identified in the D.T1.1.1.</p> <p>This portfolio is part of the ever growing and upgraded collection of cases gathered within the DIH and promoted among the stakeholders either during events and meetings, or through online content of the DIH website, which serves mostly to the generation of knowledge.</p> <p>However, the core of value chain innovation are the companies, researchers and other stakeholders which are being connected into the DIH network, such as the various companies identified as innovators in the field of logistics, transport and mobility were connected. Also, these companies are being connected to the research capacities of University of Ljubljana and University of Maribor through DIH and other stakeholders, such as public authorities that are trying to achieve the creation of a smart city Maribor.</p> |
| <p>Involved actors</p> | <p>Throughout the events with IGA members and other stakeholders, the DIH was promoted and presented to LRPAs; SAs; HEs&Rs; SMEs; BSOs; IGAs and other PPs.</p> <p>Among other things, an event for knowledge transfer was set up with PP BEC, as well as a call for cooperation between Croatian and Slovenian SMEs with PP CCE-ZCC. Finally, within WP4 a transnational workshop was prepared for potential cooperation in the post project period.</p> |
| <p>Monitoring of performance indicators</p> | <p>The content of the DIH website https://dih-smartsolutions.si/innovation-hub/ is constantly growing. There are cases of projects promoting digitalization available.</p> |



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| | <p>A decision was taken, that most of the site will not be translated into English, as it is mostly relevant for the regional stakeholders, therefore it will be in Slovenian language.</p> <p>The milestones set up in the Pilot workplan are reached:</p> <ul style="list-style-type: none"> - Working version of the online DIH with virtual demonstration (cases of Circular Economy and e-Mobility) and online training educations set up; - Training campaign with online/offline trainings; - Workshops with IGAs implemented; - Dissemination CR campaign with best cases of innovation drivers implemented. <p>Through the established DIH the cooperation between members of the network was established.</p> <p>Additionally, together with project partners BEC a knowledge sharing activity took place and a workshop for DIH establishment was conducted.</p> <p>Under the coordination of project partner CCE-ZCC a transnational workshop was prepared, where the DIH network was animated for co-operation.</p> <p>Based on the creation of DIH https://dih-smartsolutions.si/innovation-hub/ the followup activity was to include the DIH into the Slovenian eDIH.</p> <p>In the post-project implementation period a joint event between STP and EURADA was conducted, where the key stakeholders of DIH were cooperating with international DIHs from Hungary and Croatia and also connected to other research and funding institutions from within EU.</p> |
| Key results | <p>The main result of the pilot activity is a set up and consolidated Digital Innovation Hub, created within the Chain Reactions project, which was also the starting point of inclusion into an eDIH for the STP as the partner, in collaboration with key Slovenian national and regional institutions.</p> |
| Follow-up | <p>The DIH will play a crucial role in the support of the Smart City initiative in Maribor, where the national consortia already applied with the best project – unfortunately, the call was cancelled in 2021, but will be repeated in 2022.</p> |
| Delays, problems | <p>The delays faced are due to several issues, but mostly connected to the Covid (inability to host larger live events, thus individual meetings were conducted with various stakeholders; delay in organisation of a transnational workshop), however, there were also technical difficulties (DIH website down) and the cancelation of the call for smart cities (where the application lead by STP was considered as the most quality one).</p> |
| Project partner implementing the pilot | <p>PP10 R-Tech</p> |



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| CHAIN REACTIONS' sector | Energy and Environment |
| Description of pilot work plan | <p>The ongoing transition of energy systems entails major challenges for energy supply networks and transportation systems. This transformation is highly encouraged by policymakers due to the negative effects of common fossil fuels for the climate. The combustion of these fuels does not only generate energy, the greenhouse gas carbon dioxide, which has a highly polluting effect on the environment is released in large quantities. The prevention of this major contributor to global warming is a main objective of policymakers to protect the climate and the environment. In addition, electric vehicles with their energy storage systems can compensate for fluctuations in wind and solar power in the future and thus support the expansion and market integration of these unsteady energy sources.</p> <p>The pilot actions are fundamental to foster transnational collaborations to promote electromobility as a first step to mitigate current emission levels. These efforts will be further improved with experiences from the pilot actions on hydrogen technologies that make the applications transferable.</p> <p>Based on the exchange of knowledge between companies and experts in the field of energy and mobility created by the events, the aim is to develop new business innovations and strategies or to further develop existing ones. By bringing together two key topics, energy and mobility, the planned workshops will provide companies that focus on one of these topics with expertise and practical experience and expand their range of services in both areas. Consequently, the first expected output of the workshops is that participants will turn to a bilateral approach for the integration of electromobility including hydrogen powered vehicles under consideration of energy aspects and that at least some new project ideas will be generated by this new approach. This transnational pilot will boost cooperation by transferring knowledge from the different sectors between Chain Reactions partners.</p> |
| Detailed description of activities performed | <p>Project website: https://www.mobilitylogistics.de/mobility/nachhaltige-mobilitaet/projekt-chain-reactions</p> <p>Updates in German and in English</p> <p>02.04.2021 Industrial innovation workshop: Driving smart industrial growth through value chain Innovation</p> <p>19.04.2021 Kick Off meeting Innovation network Hy2.ZERO, introduction to ChR</p> <p>30.04.2021 Transnational industrial innovation roadmaps WS for the Energy and Environment sector</p> <p>05.05.2021 Stakeholders: HY2.ZERO meets nano4eMob</p> <p>05.05.2021 Exchange R-Tech with Drees & Sommer (Innovation network Hy2.ZERO, ChR)</p> |



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| | <p>11.06.2021 Project development with IGA's within the Innovation network Hy2.ZERO</p> <p>16.06.2021 ChR Next Steps Meeting with Duo Partner STP PP2</p> <p>01.07.2021 ChR Management meeting</p> <p>22.07.2021 Project development with SME within the Innovation network Hy2.ZERO</p> <p>06.08.2021 Coordination of projects in consortia with SME and IGA</p> <p>07.-12.09.2021 IAA München, ChR presentation using the flyer</p> <p>30.09.2021 ChR Next Steps Meeting with Duo Partner STP PP2</p> |
| <p>Use of value chain innovation models and instruments</p> | <p>The implementing partners cooperated closely in the working groups on the tool box development, in which the feedback from the pilot actions and vice versa have been a key issue. We capitalised on results drawn from the value chain analysis and sensibilized the audience for emission free power drives and their projected future development.</p> <p>The automotive market appears to be attractive for new entrants, but the entry barriers of companies with little knowledge of the electricity market are relatively high. Due to the variety of technical approaches and elements used, there are many operating parameters that need to be integrated and considered in the concept. Currently, the bargaining power of supplier in the area of electro mobility is very high. Compared to the construction of conventional cars, the number of components is significantly smaller. Consequently, the importance of the individual parts increases. Particularly, the battery of electro vehicles is distinctive for the success and the usability of electro products. Based on the importance of this integral part and the limited number of battery suppliers, the dependency of the whole e-mobility sector on these suppliers can be considered very strong.</p> <p>Due to a strong competition and substitution in the industry, the power is with the buyers. Another factor that increases the power of the buyers is the limited switching costs. To switch from one model to another has little to no costs for the customer. Therefore, buyers tend to choose their model based on quality, price and service. An answer to mitigate the power of buyers is a better customer service and a stronger focus on brand loyalty.</p> <p>Not every firm in the sector is following the approach of the electrification of the vehicle industry. This leads to an expanded range of products, wherefore the rivalling companies are spread across several market segments. Consequently, the direct rivalry of the existing players in the market decreases.</p> <p>In contrast, the growth of the energy industry is stagnating to declining, as consumption is decreasing due to energy-saving consumers. The federal government's programme to save CO₂ and the planned energy turnaround will lead to a further reduction in energy consumption. Therefore, the energy market in general can be considered as a shrinking market, which reduces the incentive for new firms to enter the market.</p> |



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| | <p>The suppliers of the energy distribution belong to the energy-producing industry, which sells electricity and gas on the relevant exchanges. Individual suppliers have little power over the market price, which is formed by supply and demand on the stock exchange.</p> <p>The bargaining power of the buyers is declining. Customers can compare their potential energy suppliers with a high degree of transparency on Internet platforms such as Verivox or Check24 and frequently switch providers online with an additional bonus. This often leads to customers to pick small providers, who temporarily offer small priced packages. However, with overall increasing energy prices the small providers are outcompeted and disappear from the market, which in turn leads to even more increasing prices.</p> <p>A backward integration of customers takes place in the context of solar plants or terrestrial heat pumps partly, pays for itself for the customers due to the high initial investments, however, only after several years. At the current state, there is no existing alternative for electricity, consequently, there are no available substitutes.</p> |
| <p>Involved actors</p> | <p>We work closely with our project partners PP5 RDA Pilsen and PP11 GAPR from Gliwice, who were essential for us to plan and conduct the Transnational Pilots. We also receive input from our duo partner PP2 STP to stick with our working plan. In addition, we received practical training from PP6 BWCON to learn more about the use of selected tools from the toolbox (e.g. design thinking).</p> <p>To raise awareness for the Transnational Pilot workshop series, we have invited the local HE&R, IGA and SME to attend to preceding online workshops in Regensburg. After the events we scheduled 1:1 meetings with all attendees to exactly understand their needs and what they expect from transnational collaborations. So far, we have collected over 50 protocols.</p> |
| <p>Monitoring of performance indicators</p> | <ul style="list-style-type: none"> - Joint activities implemented aiming to strengthen urban-rural linkages <p>We have started to analyse the public transportation situation in rural areas in collaboration with Ostbayerische Technische Hochschule Regensburg to connect them more to the adjacent cities. We are currently seeking funding for an electric bus that can be used for automated driving. Future passengers will make appointments using an app (not waiting at bus stations) to schedule the next possible chance for transportation. The bus tours will be calculated using AI algorithms to run the optimal schedules for ever changing situations.</p> <ul style="list-style-type: none"> - Participations in joint actions across borders <p>We are supporting our partners from Pilsen (PP5) in their efforts to install a Digital Innovation Hub. To this end, we provide video materials concerning the topics virtual prototyping, additive technologies, robotics and automation and virtual and augmented reality from companies</p> |



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| | <p>in the Regensburg area. In addition, we raise awareness for the Pilsen project among our SME and IGA.</p> <ul style="list-style-type: none"> - Pilot actions developed jointly and implemented in projects <p>Together with our project partners from PP5 Pilsen and PP11 Gliwice we have planned and conducted the first two Transnational Pilot workshops using several rounds of telcos. After running the workshops successfully, we distributed the presentations to local SME. This was well received and helped to start transnational networking, which is facilitated when people realize they belong to the same interest group.</p> <ul style="list-style-type: none"> - Jointly developed solutions <p>At this stage there is a broad consensus that jointly developed solutions will be implemented best in follow-up projects that are in their initial stages.</p> |
| <p>Key results</p> | <p>Value chain innovation analyses and the transnational pilot workshops suggest that the Regensburg region is well positioned to achieve a high significance in the field of hydrogen and fuel cell technology. Thanks to the excellent infrastructure and innovative concepts in the field of energy and mobility, the entire Regensburg economic area - the urban area and the district - is a sustainable model region. Thanks to the excellent networking of business, administration and science, the first projects in the field of hydrogen have already been implemented. A particular success was achieved through the establishment of the largest hydrogen network in Bavaria, Hy₂ZERO. R-Tech GmbH's Cluster Mobility and Logistics is in the lead here. Currently, there are 14 SME, 5 IGA and 7 HE&R actively involved in this network and the number of satellite partners is growing.</p> <p>The ZIM network Hy₂ZERO aims to support the industrialization of hydrogen and fuel cell technologies through new innovative solutions and thus to support the market ramp-up. The network includes various R&D consortium projects planned, which make it possible to manufacture core components of the fuel cell, such as bipolar plates, more cost-effectively, and to increase the efficiency of the fuel cell through innovative power electronics. The project develops and improves technologies for the production of fuel cells (development line 1), system components for fuel cells (development line 2) and technologies for the on-site generation of hydrogen (development line 3). The process of finding new project ideas, e.g., production biogenic hydrogen, for new consortia is ongoing.</p> <p>In addition, the solutions developed in the network will be tested in real laboratories. Through the cooperation of the cooperation partners in the network, all partners can benefit from the excellent structures of the location and the technology transfer and exchange of experience in the field of hydrogen is actively promoted. New Working Groups will be established based on the experience of the partners according to the development lines.</p> |



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| Follow-up | There is a notion among the PP's that Chain Reactions should have at least one follow-up proposal should be submitted based on the results achieved here. The Bavarian Hydrogen Center H2.B will be the contact for future transnational Hydrogen technology projects. |
| Delays, problems | Delays are increasing at the end of the final phase of WT3 due to the Omikron variant outbreak, however, we have been on schedule. |



3 CONCLUSIONS AND LESSONS LEARNED

Using incubator projects such as Chain Reactions as agents of new regional policy to develop regional strategies is useful in many aspects of the present analysis. Its starting point already, the more or less strong "concentration" of companies and key players in key technologies or entire economic sectors, suggests a regional connection. Rarely, according to the research carried out in the course of this opinion, the limits of technology will be selective to the limits of emerging regional identities. However, where the regional focus, the technology hotspot e-mobility, overlaps with that of a (emerging) region, innovation networks defined by their sectoral or technological approach can bring in important skills and help make regional development concepts a success. Conversely, innovation networks are well advised to properly assess the power of such regional links and to make the relationship with them and close cooperation with them as part of their strategy. It is important to develop existing regional strengths and to promote greater cooperation between science, industry and politics, so that future challenges will be addressed adequately and sustainably. And finally, the role of showcasing this collaboration of various helixes of the quadruple (sometimes even quintuple) helix model, strongly contributes to awareness raising and creation of a database of cases to serve as references and good practices for the future.



4 ANNEXES

PP2 STP

The image shows three screenshots of the website dih-smartsolutions.si/en/.

Top Screenshot (Home Page): The main navigation menu includes Home, Business Services, Projects, News, About us, and Contact. The main heading reads "REGIONAL CENTRE FOR TECHNOLOGY TRANSFER BUSINESS SUPPORT CENTER AND INCUBATOR". The central message is "Innovation grows there, where ideas can connect." with a button labeled "Our offer".

Middle Screenshot (Digital Innovation Services Page): The heading is "Digital innovation services". Below it, a sub-heading states: "In a world of constant change, we support your business and activities on the path to digitalisation." A list of services includes:

- Information on current technology trends related to Industry 4.0
- Access to a wide network of partners, organizations and companies active in the field of digitalisation
- Research and analysis of the most relevant advanced technologies in line with the needs and readiness of SMEs
- Business Plan Development for digitalisation
- Technology-oriented projects, (co) financed by the European Community
- Digitization workshops, trainings and mentoring

Bottom Screenshot (Completed Projects Page): This page displays two project case studies:

- 3D4KIDS:** A project titled "Tehnologije Zaključeni" (Technologies Completed).
- E3D+VET:** A project titled "Aktualni Tehnologije Zaključeni" (Current Technologies Completed).



PP10 R-Tech

Participants of R-Tech Transnational Pilot 1

| Target group | Name of Organisation | Name of person, position |
|-------------------------------|--|---|
| Local public authority Poland | Jaworzno City Hall | Bartlomiej Bogunia, Examiner |
| Higher education and research | University of West Bohemia, Pilsen | Jan Michalik, Dipl. Ing., PhD. |
| Business support organization | RDA Pilsen - Regional Development Agency of the Pilsen Region | Jan Naxera, Project Manager |
| Higher education and research | Ostbayerische Technische Hochschule Regensburg (OTH) | Markus Henneke, Researcher |
| Business support organization | R-Tech, E-Mobilitycluster | Maximilian Giehl, Innovation Research |
| Local public authority Poland | Jaworzno City Hall | Pawel Slaby, Field supervisor |
| SME | | Judith Schindler |
| Higher education and research | Ostbayerische Technische Hochschule Regensburg (OTH) | Andreas Bauer, Researcher |
| Other | | |
| Business support organization | R-Tech, E-Mobilitycluster | Dr. Manfred Binder, Project Manager |
| Business support organization | R-Tech, E-Mobilitycluster | Michael Strobel, Project Manager |
| Business support organization | R-Tech, E-Mobilitycluster | Natalie Schwab, Event management |
| Business support organization | GAPR - Upper Silesian Agency for Entrepreneurship and Development Ltd. | Artur Ochoisky, Project Content Manager |
| Business support organization | RDA Pilsen - Regional Development Agency of the Pilsen Region | Filip Uhlík, Project Manager |
| Other | Pilsen | Josef Basel |
| Business support organization | CzechInvest | Karolina Konicarova, Business Development Manager |
| Business support organization | BEC - Bioeconomy Cluster | Katarina Bicklingova, Project Manager |
| Business support organization | PBN - Pannon Business Network | Klaudia Keringer, Communication Manager |
| Local Energy Provider | REWAG Regensburger Energie- und Wasserversorgung AG & Co KG | Marcel Rautter, Company Development |



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| Higher education and re- search | University of West Bohemia, Pilsen | Marek Bures, Doctor of Engineer- ing |
| Business support organiza- tion | STP - Styrian Technology Park | Marco Kac, International Project Manager |
| Business support organiza- tion | STP - Styrian Technology Park | Matjaz Fras, Acting Director |
| Business support organiza- tion | Regional Development Agency Pilsen Area | Pavel Duchek |
| Higher education and re- search | Technische Hochschule Deggendorf (THD) | Otto Kreutzer, Prof. Dr. Ing |
| Other | SGI | Eva Kudrnova |
| Higher education and re- search | Ostbayerische Technische Hochschule Regensburg (OTH) | Thomas Sippenauer, Researcher |
| Higher education and re- search | Silesian University of Technology, Poland | Marcin Koziarz, Senior Software Development Engineer |
| Higher education and re- search | Ostbayerische Technische Hochschule Regensburg (OTH) | Philipp Schulz, Researcher |
| | | Markus Schäfer |
| Higher education and re- search | Główny Instytut Gornictewa, Poland | Mariusz Kruceck, Faculty |
| Other | Bytom, Silesian District, Poland | Agnieszka Hajdas, Communica- tion |



Participants of R-Tech Transnational Pilot 2

| Target group | Name of Organisation | Name of person, position |
|-------------------------------|--|--|
| Business support organization | R-Tech, E-Mobilitycluster | Dr. Manfred Binder, Project Manager |
| Business support organization | R-Tech, E-Mobilitycluster | Michael Strobel, Project Manager |
| Business support organization | R-Tech, E-Mobilitycluster | Natalie Schwab, Event management |
| Business support organization | GAPR - Upper Silesian Agency for Entrepreneurship and Development Ltd. | Artur Ochoisky, Project Content Manager |
| Business support organization | R-Tech, E-Mobilitycluster | Uwe Pfeil, Manager |
| Business support organization | RDA Pilsen - Regional Development Agency of the Pilsen Region | Filip Uhlík, Project Manager |
| IGA | iSyst Intelligente Systeme GmbH | Daniel Heinrich, CEO |
| Higher education and research | Tech. Univ. of Applied Sciences Amberg-Weiden | Max Becker, Scientist |
| Higher education and research | Tech. Univ. of Applied Sciences Amberg-Weiden | Laura Weber, Scientist |
| Business support organization | PBN - Pannon Business Network | Klaudia Keringer, Communication Manager |
| SME | eCharge Hardy Barth | Silvan Söllner, Dipl. Ing |
| Higher education and research | University of West Bohemia, Pilsen | Marek Bures, Doctor of Engineering |
| Business support organization | STP - Styrian Technology Park | Marco Kac, International Project Manager |
| Business support organization | STP - Styrian Technology Park | Matjaz Fras, Acting Director |
| Business support organization | Pannon Business Network Association | Dan Martin, Project Manager |
| Higher education and research | Technische Hochschule Deggendorf (THD) | Otto Kreuzer, Prof. Dr. Ing |
| Governmental | Belgisches Honorar Konsulat München - Wirtschaftsvertretungen - WBI | Quintyn Mathieu |
| Higher education and research | Passau University | Verona Vandieken, Researcher |
| Engineering Company | HX tech s.r.o. | Přemysl Žižka, Ing. |



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| Higher education and re- search | University of West Bohemia Faculty of Mechanical Engineering | Jaroslav Synáč |
| Higher education and re- search | University of West Bohemia | Richard Matas |
| Higher education and re- search | University of West Bohemia | Pavel Žitek, Faculty |
| Higher education and re- search | University of West Bohemia | Miroslav Kepa, Faculty |
| Public | Public | Vit Hubalek, Ing. |
| NGO | nvias, z. s. | Pavel König |
| Cluster | OPTITEC | Alan Martin Redmond, European Business Manager |
| Business and Investment De- velopment Agency | CzechInvest | Filip Kruta |
| Cluster | Silesia Automotive & Advanced Man- ufacturing Cluster, Poland | Luk Palmen |
| Cluster | HYTEP, Czech Hydrogen Technology Platform | Karin Stehlik, Dr. Ing. |
| Association | Initiative Wasserstoff-Region Lands- hut e.V. | Ulrich Durr |
| Cluster | Klastr Chytrý Plzeňský kraj, z.s. | Jiří Prantner, Ing. |
| Public Institution | AHK Prag | Martina Jakl |
| SME, Marketing | Justa Public Relations | Ronna Porter |
| Business support organiza- tion | R-Tech | Ann-Kathrin Roßner |
| IGA | Vitesco | Andrea Heinrich |
| Cluster | RAI Automotive Industry NL | Gerhard Koning |
| Cluster | RAI Automotive Industry NL | Bram Hendrix |
| City owned company | PMDP | Jiri Kohout |
| SME | Automotive Business Development | Thomas Zangerl |
| Cluster | Zone Cluster | Brigitta Balassi-Molnár |
| Cluster | Mobinov - Cluster Automóvel de Por- tugal | Isabella Oliveira |
| Higher education and re- search | New Technologies Research Center UWB | Subramanian Palaniappan, Dr. |
| SME | HyFuture GmbH | Harald Zwander |
| SME | TEDOM a.s. | Petr Haban, Ing. |
| SME | CEZ ESCO | Tomas Knespl |
| Business support organiza- tion | BCNED - Research Centre for Busi- ness Clusters, Networks & Economic Development | Emanuela Todeva, Dr. |



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| SME | Eaton | Milos Toulec |
| Higher education and re- search | Escola Secundária Ferreira Dias | Bernardo Montalvo |
| SME | change agent | Yura Korolchuk |
| Higher education and re- search | University of West Bohemia | Jiří Regner |
| Cluster | Silesia Automotive & Advanced Man- ufacturing | Ewa Dudzic-Widera |
| Notified Body | TÜV SUD Czech | Ondřej Šustaj |
| SME | Air Products | Alexandr Luzny |



Participants of R-Tech Transnational Pilot 3

| Target group | Name of Organisation | Name of person, position |
|-------------------------------|--|---|
| IGA | Bayern Innovativ | Samuel Morcelli |
| Business support organization | GAPR - Upper Silesian Agency for Entrepreneurship and Development Ltd. | Artur Ochoisky, Project Content Manager |
| Business support organization | RDA Pilsen - Regional Development Agency of the Pilsen Region | Jan Naxera, Project Manager |
| Higher education and research | RDA Pilsen - Regional Development Agency of the Pilsen Region | Marek Bures, Ing. PhD |
| Business support organization | R-Tech, Cluster Mobility & Logistics | Maximilian Giehl, Innovation Research |
| Business support organization | R-Tech, Cluster Mobility & Logistics | Uwe Pfeil, Cluster Manager |
| IGA | BMW AG | Thomas Muncz |
| SME | e-motion now | Paul Saxa |
| SME | Asap Engineering Company | Christian Barbu |
| Business support organization | R-Tech, Cluster Mobility & Logistics | Dr. Manfred Binder, Project Manager |
| Business support organization | R-Tech, Cluster Mobility & Logistics | Roxane Wagner, Project Manager |
| Business support organization | R-Tech, Cluster Mobility & Logistics | Natalie Schwab, Event management |
| SME | Hydrogenious LOHC Technologies | Erhan Erdogan |
| Law firm | Watson, Farley & Williams | Arkipova Tetiana |
| Bank | UniCredit | Dr. Martin Würth |
| Bank | UniCredit | Alberto Covelli |
| Business support organization | PBN - Pannon Business Network | Klaudia Keringer, Communication Manager |
| Business support organization | PBN - Pannon Business Network | Martin Dan, Project Manager |
| IGA | Wolftank Hydrogen | Dr. Ing. Jörg Neugärtner |
| Association | Slovak National Hydrogen Association | Jan Weiterschütz |
| SME | Paessler AG | Ralf Kolb |
| Higher education and research | West Bohemian University | Josef Basl |



CHAIN REACTIONS

| | | |
|-------------------------------|-----------------------------------|--|
| Business support organization | JETRO Munich | Hajime Takatsuka |
| SME | Deea GmbH | Hans-Joachim Büscher |
| IGA | Zentrum Wasserstoff.Bayern (H2.B) | Stefan Dürr, Head of technology & innovation |