



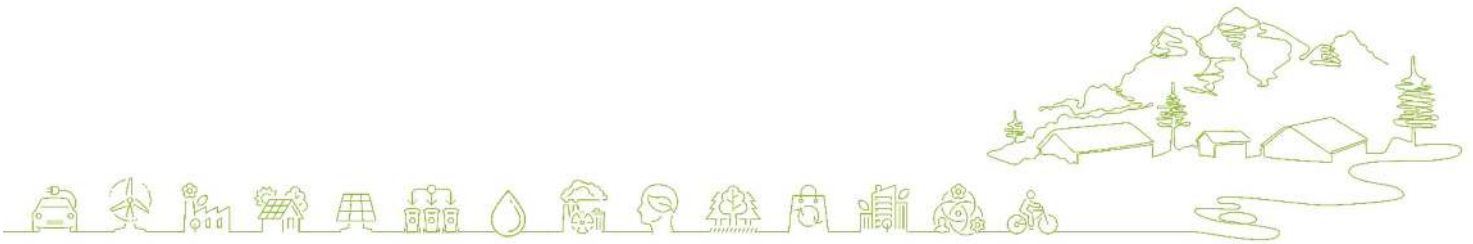
H2MA

D.2.2.1

Local Working Groups summary Template

Activity 2.2

February, 2024



Partner: **PPXX - NAME**

Date of the meeting: **XX/XX/XXXX**

Location :

Participants

| Name | Organisation | Role | NUTS 2 / 3 | |
|------|--------------|------|------------|--|
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This template serves as a comprehensive tool for summarising the outcomes and progress achieved during the Local Working Group (LWG) meetings conducted as part of Activity 2.2 in WP2.

Please follow the instructions below to ensure a full and detailed report:

H2MA planning tool

Summarize the content and outcomes of the training sessions conducted to familiarise participants with the H2MA planning tool. Include any challenges faced and solutions proposed:

Who created the scenarios: stakeholders or partners?

- Were there any challenges or technical issues with the tool?
- How user-friendly was it?

- In your stakeholders 'view, how effective was the tool in facilitating the design of transalpine green H2 mobility routes? Any specific suggestions from stakeholders for improving the 'H2MA planning tool'?

- What were the comments made on reviewing the outputs integrated into the H2MA tool and what were the feedback provided on their accuracy and relevance from your stakeholder's perspective?

Tool SWOT

| Strengths | Weaknesses |
|---------------|------------|
| | |
| Opportunities | Threats |
| | |

Business needs

- How can stakeholders leverage the 'H2MA planning tool' to design efficient transalpine green hydrogen mobility routes that meet their business objectives?

Policy planning

1. Beyond Tool Scenarios:

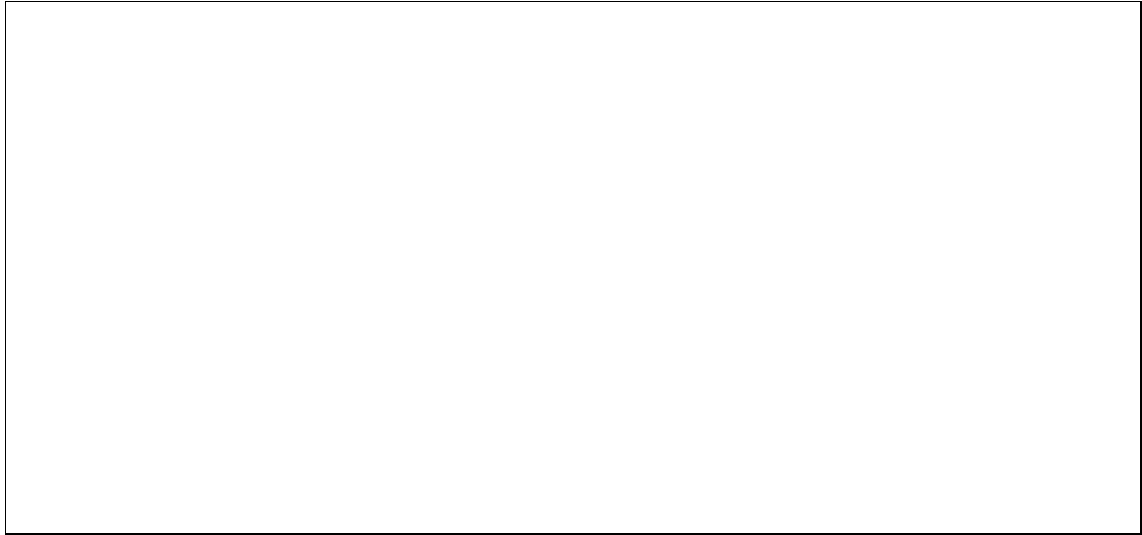
- What additional factors should future policies and planning consider regarding hydrogen infrastructure, beyond the scenarios covered by the 'H2MA planning tool'?

2. Exploring Additional Demands for Hydrogen:

Aside from the mobility sector, what significant demands for hydrogen exist in nearby industries or sectors that stakeholders should consider in regional planning?

Stakeholder Collaboration

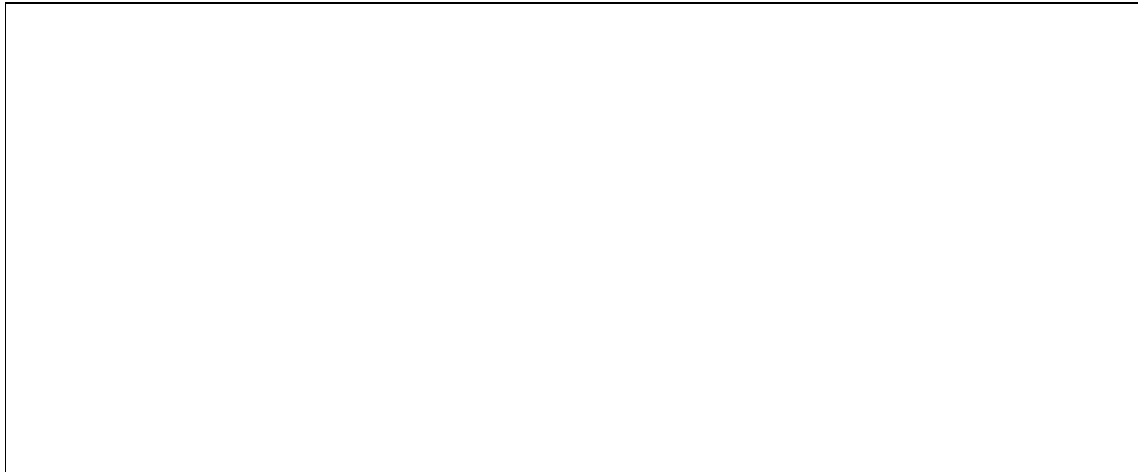
How can stakeholders collaborate to increase awareness and understanding of hydrogen technology? What strategies can engage major industries in adopting hydrogen infrastructure?



Territorial Green H2 Route Plans:

(On Teams, in the file “Scenario 1 “; include all the files generated for scenario 1 (installed HRS, H2 production, H2 delivery, summary table), same for scenario 2, scenario 3 etc.)

1. Provide an overview of the Excel file containing the scenario-based data for green H2 route planning covering both regional mobility and industrial hydrogen needs.
2. Discuss the significance of the selected infrastructures for interconnection in each scenario.
3. Identify key elements such as hydrogen refueling stations, storage facilities, and transportation links within each scenario.
4. Evaluate the effectiveness of the green H2 network optimisation based on the specified infrastructure requirements.



Conclusion

Summarise the key lessons learned during the LWG meetings. Include feedback from participants, challenges encountered, and successful approaches identified.

Highlight any innovative ideas or solutions proposed during the meetings.

Questions raised from participants:

-
-
-

Other comments:

H2MA

D.2.2.1

Local Working Groups Summary Template

Activity 2.2

May, 2024



Partners:

- **PP02- BSC, Ltd, Kranj**

Date of the 1st meeting: 26/03/2024

Date of the 2nd meeting: 06/05/2024

Location of the 1st meeting: Kranj, Slovenia

Location of the 2nd meeting : on-line

- **LP01 – Energy Agency of Savinjska, Šaleška and Koroška Region**

Date of the 1st meeting: 02/04/2024

Date of the 2nd meeting: 17/05/2024

Location of the 1st meeting: Meeting room: Administration building of the Esotech d.o.o. company, Preloška cesta 1, 3320 Velenje

Location of the 2nd meeting: MIC Velenje, Koroška cesta 62a, 3320 Velenje

Version 1 prepared: 18. 4. 2024, by Blanka Odlazek

Version 2 prepared: 8. 5. 2024, by Blanka Odlazek

Version 3 prepared: 24.05.2024, by Matevž Šilc & Blank Odlazek

PP02- BSC, Ltd, Kranj

Participants on the 1st meeting

| Name | Organisation | Role | NUTS 2 / 3 |
|------------------|----------------------------------|----------------------------------|------------|
| Dušan Marjanović | TPJ Ltd Jesenice | Expert on the gas thematic | SI02 |
| Janez Blaž | The Ministry of the Environment, | Addressing policies for hydrogen | SI02 |

| | | | |
|----------------|---------------------|-------------------------------------------------------------------|-----------|
| | Climate and Energy | | |
| Jerneja Sedlar | HSE Ltd | Expert on hydrogen planning and LP for Western Adriatic H2 valley | SI02/SI03 |
| Matevž Šilc | KSSENA | responsible for H2MA implementation of 2.2 for SI03 | SI03 |
| Miha Trunkelj | ZSIS/SI Plin | Expert on the gas thematic | SI02 |
| Uroš Debelak | SCANIA Slovenia Ltd | Expert on HDV and H2 | SI02 |
| Rok Zajc | BSC, Ltd, Kranj | Technical assistant | SI02 |
| Alenka Sluga | BSC, Ltd, Kranj | Preparing minutes | SI02 |
| Blanka Odlazek | BSC, Ltd, Kranj | responsible for H2MA implementation of 2.2 for SI02 | |



Alpine Space

H2MA

LIST OF PARTICIPANTS / LISTA PRISOTNIH

Event/Dogodek: LWG Kick off and 1st LWG / začetni sestanek lokalne delovne skupine in delavnica strokovne skupine

Venue/Kraj dogodka: Kovačnica, Poštna ulica 4, 4000 Kranj

Country/Država: Slovenija / Slovenija

Date/Datum: 26. 3. 2024

| No. / Št. | Name / Ime | Surname / Priimek | Organization / Organizacija | E-mail | Signature* / Podpis |
|-----------|------------|-------------------|--------------------------------------|-------------------------------|---------------------|
| 1 | Alenka | Sluga | BSC, d.o.o., Kranj | alenka.sluga@bsc-kranj.si | |
| 2 | Blanka | Odlazek | BSC, d.o.o., Kranj | Blanka.odlazek@bsc-kranj.si | |
| 3 | Dušan | Marjanovič | TPJ, d.o.o., Jesenice | d.marjanovic@tpj.si | |
| 4 | Janez | Blaž | MOPE | Janez.Blaz@gov.si | |
| 5 | Jerneja | Sedlar | HSE d. o. o. | Jerneja.Sedlar@hse.si | |
| 6 | Matevž | Šilc | KSSENA | matevz.silc@kssena.velenje.eu | |
| 7 | Miha | Trunkelj | IMP Promont d. o. o. ZSIS/SI PLIN | miha.trunkelj@imp-promont.si | |

* Prosimo, da izpolnite prijavnico z osnovnimi kontaktnimi podatki. Podatki se bodo uporabljali izključno za namene, povezane z izvajanjem projekta (doseganje in optimizacija dosega glavnih ciljnih skupin, izboljšanje rezultatov projekta s neposrednim vključevanjem deležnikov v razvojni proces) v skladu z obstoječo zakonodajo in pravili programa Interreg Območje Alp. V skladu s Splošno uredbo o varstvu podatkov (GDPR) (EU) 2016/679 imamo KSSENA pravno dolžnost varovati vse podatke, ki jih zbiramo od vas. Informacije, pridobljene s tem obrazcem, veljajo za zaporne, namenjene izključno uporabi prvotnega prejemnika in jih ne bodo delile tretje osebe, razen za namene obveščanja in razširjanja projekta. Upošteвайте, da bodo vsi projektni dogodki fotografirani in/ali posneti. Udeleženci, ki ne želijo srenjanja ali fotografiranja, naj o tem predhodno obvestijo organizacijo.

* Please fulfil the registration form by providing basic contact information. The information will be applied solely for purposes related to project implementation (achieving and optimizing outreach to main target groups, improving project results through direct stakeholder engagement into the development process) in accordance with existing legislation and rules of the Interreg Alpine Space programme. Respective to the General Data Protection Regulation (GDPR) (EU) 2016/679, we KSSENA have a legal duty to protect any information we collect from you. Information acquired through this form are considered confidential, intended for the exclusive use of the original recipient and will not be shared by any third parties if not for information and dissemination purposes of the project. Please be aware that all project events will be photographed and/or filmed. Participants who do not wish to be filmed or photographed should notify the organisation accordingly in advance.

The H2MA project is co-funded by the European Union through the Interreg Alpine Space programme

<https://www.alpine-space.eu/project/h2ma/>

| | | | | | |
|----|------|----------|---------------------------|------------------------------------|--|
| 8 | Nejc | Petrovič | Elektro Gorenjska d. d. | Nejc.Petrovic@elektro-gorenjska.si | |
| 9 | Rok | Zajc | BSC, d.o.o., Kranj | rok.zajc@bsc-kranj.si | |
| 10 | Uroš | Debelak | SCANIA Slovenija d. o. o. | <uros.debelak@scania.com> | |
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Participants on the 2nd meeting

| Name | Organisation | Role | NUTS 2 / 3 |
|----------------|-----------------|-------------------------------------------------------------------|------------|
| Jerneja Sedlar | HSE Ltd | Expert on hydrogen planning and LP for Western Adriatic H2 valley | SI02/SI03 |
| Matevž Šilc | KSEENA | responsible for H2MA implementation of 2.2 for SI03 | SI03 |
| Jan Pavličič | HSE Ltd | Expert on hydrogen planning and LP for Western Adriatic H2 valley | SI02/SI03 |
| Blanka Odlazek | BSC, Ltd, Kranj | responsible for H2MA implementation of 2.2 for SI02 | SI02 |

Uredi
Pridruži se
Zaseden
Ne opominjaj me
Kategoriziraj
Anketa za razporejanje

H2MA sestanek s HSE

Pon 6. 05. 2024 13:00–14:30

Pridružite se srečanju v aplikaciji Teams Srečanje v aplikaciji Microsoft Teams

Microsoft Teams [Ali potrebujete pomoč?](#)

[Pridružite se srečanju zdaj](#)

ID srečanja: 379 576 286 644
Geslo: yC8fDn

Za organizatorje: [Možnosti srečanja](#) | [Ponastavi kodo PIN za klic](#)

Sledenje

Organizator

BO Blanka Odlazek
Poslano dne Petek, 26. 04. 2024 ob 12:14

Udeleženci

Da: 3

- JS** Jerneja Sedlar
Zahtevano
- MS** Matevž Šilc
Zahtevano
- JP** Jan Pavličič
Izbirno

LP01 – Energy Agency of Savinjska, Šaleška and Koroška Region

Participants on the 1st meeting

| Name | Organisation | Role | NUTS 2 / 3 |
|------------------|------------------------------------------------------------|---------------------------------|------------|
| Nada Petelin | Faculty of Mechanical Engineering, University of Ljubljana | Researcher | SI04/SI041 |
| Žiga Debevec | Valmor d.o.o. | CEO | SI04/SI041 |
| Rok Miklavžina | Public Utility Company of Velenje | Senior Expert/Engineer | SI03/SI034 |
| Ervin Miklavžina | Public Utility Company of Velenje | Head of Energy | SI03/SI034 |
| Andi Miklav | TIKI HVAC d.o.o. | Head of Product Management | SI03/SI034 |
| Aleš Koželjnik | Kolektor Setup d.o.o. | Managing Director | SI04/SI041 |
| Jure Lodrant | Artes d.o.o. | CTO | SI03/SI034 |
| Robert Hudournik | Esotech d.o.o. | CEO | SI03/SI034 |
| Tone Brodnik | Municipality of Velenje | Head of the Communal Department | SI03/SI034 |
| Boštjan Krajnc | KSSENA | Director | SI03/SI034 |
| Matevž Šilc | KSSENA | Project Manager | SI03/SI034 |
| Hana Kolenc | KSSENA | Project Manager | SI03/SI034 |

Participants on the 2nd meeting

| Name | Organisation | Role | NUTS 2 / 3 |
|------------------|------------------------------------------|---------------------|------------|
| Klemen Sredenšek | Faculty of Energy, University of Maribor | Assistant professor | SI03/SI034 |
| Marko Rojs | Energy and Climate Agency of Podravje | Project Manager | SI03/SI032 |
| Tomaž Robič | Energy and Climate Agency of Podravje | Project Manager | SI03/SI032 |
| Mitja Tašler | Thermal Power Plant Šoštanj | Director | SI03/SI034 |
| Sonja Krajnc | Faculty of Energy, University of | Secretariat | SI03/SI034 |

| | | | |
|-------------------------|-----------------------------------|-----------------|------------|
| | Maribor | | |
| Gašper Škarja | Public Utility Company of Velenje | Director | SI03/SI034 |
| Anže Sovinc | Municipality of Velenje | Project Manager | SI03/SI034 |
| Andreja Belavić Benedik | A-Sol d.o.o. | Manager | SI03/SI034 |
| Boštjan Krajnc | KSSENA | Director | SI03/SI034 |
| Matevž Šilc | KSSENA | Project Manager | SI03/SI034 |
| Nejc Jurko | KSSENA | Senior Expert | SI03/SI034 |
| Ines Ahmić | KSSENA | Project Manager | SI03/SI034 |



SEZNAM UDELEŽENCEV

Alpine Space

Dogodek: PROJEKT H₂MA - LOKALNA DELAVICA DELEŽNIKOV 1
 Lokacija: VELENJE (ESOTECH D.O.O.)
 Datum: 02.04.2024

H2MA

| Št. | Ime | Priimek | Organizacija | E-mail | Podpis* |
|-----|---------|------------|-----------------------|----------------------------------|---------|
| 1 | Nada | Petelin | UNI LJ, FS | nada.petelin@uni-lj.si | |
| 2 | Žiga | Debevec | VALMOR d.o.o. | ziga.debevec@valmor.si | |
| 3 | Robt | Miklavžina | KP Velenje d.o.o. | rob.miklavzina@kp-velenje.si | |
| 4 | EDVIN | MIKLAUŠIČ | KP Velenje d.o.o. | | |
| 5 | Boštjan | KRAJNC | KISENA | boštjan.krajnc@kisena.velenje.eu | |
| 6 | ANTON | MRAK | | tonemrak0@gmail.com | |
| 7 | ANDI | MIKLAV | TIGI HUK d.o.o. | andi.miklav@tiki.si | |
| 8 | ALES | KOŽELNIK | KOLEKTOR SETUP d.o.o. | ales.kozelnik@kolektor.com | |
| 9 | JURE | Lodrant | Artos d.o.o. | juro.lodrant@artos.si | |
| 10 | ROBERT | HUDOURNIK | Esotech, d.d. | robert.hudournik@esotech.si | |
| 11 | TOME | BRODIK | NOV | tome.brodik@velenje.si | |
| 12 | MATEVŽ | SILC | KSEENA | matevz.silc@kssena.velenje.eu | |
| 13 | HANA | KOLENC | KSEENA | hana.kolenc@kssena.velenje.eu | |



SEZNAM UDELEŽENCEV

Alpine Space

Dogodek: PROJEKT H₂MA - LOKALNA DELAVICA DELEŽNIKOV 2
 Lokacija: VELENJE (NIC)
 Datum: 17.05.2024

H2MA

| Št. | Ime | Priimek | Organizacija | E-mail | Podpis* |
|-----|---------|-----------|-------------------------|----------------------------------|---------|
| 1. | KLEMEN | SREDENŠEK | FAKULTETA ZA ENERGETIKO | klemen.sredenssek@um.si | |
| 2. | FRANJ | PRAVJIČ | -/- | franje.pravjic@eas.si | |
| 3. | Marko | ROJŠ | ENERGYSP | marko.rojs@energy.sp.si | |
| 4. | TOMAŽ | ROBIČ | ENERGAP | TOMAZ.ROBIC@ENERGAP.SI | |
| 5. | Miha | ČISTEK | TBS | miha.cistek@tbs-saraj.si | |
| 6. | SONJA | KRAJNC | FAKULTETA ZA ENERGETIKO | sonja.krajnc@um.si | |
| 7. | INES | AHMIČ | KISENA | ines.ahmic@kssena.velenje.eu | |
| 8. | GAŠPER | ŠKARJA | KP VELENJE | gasper.skarja@kp-velenje.si | |
| 9. | SAŠO | MOZGANJ | KSEENA | saso.mozganj@kssena.velenje.eu | |
| 10. | ANŽE | SOVINIČ | NOV | ANZE.SOVINIC@VELENJE.SI | |
| 11. | ANDREJA | BELAVIČ | K-SOL KOLEKTIVA | andreja@k-sol.si | |
| 12. | NEX | JURKO | KSEENA | nex.jurko@kssena.velenje.eu | |
| 13. | Boštjan | KRAJNC | KISENA | boštjan.krajnc@kisena.velenje.eu | |
| 14. | JERNEJ | MRAK | - | jernejmtrak@gmail.com | |
| 15. | MATEVŽ | SILC | KSEENA | Matevz.silc@kssena.velenje.eu | |

This template serves as a comprehensive tool for summarising the outcomes and progress achieved during the Local Working Group (LWG) meetings conducted as part of Activity 2.2 in WP2.

Please follow the instructions below to ensure a full and detailed report:

H2MA planning tool

Summarize the content and outcomes of the training sessions conducted to familiarise participants with the H2MA planning tool. Include any challenges faced and solutions proposed:

Who created the scenarios: stakeholders or partners?

- Were there any challenges or technical issues with the tool?
- How user-friendly was it?

BSC KRANJ: The first LWG was prepared on the same day as the transnational H2MA LWG kick off, the 26th of March 2024. The participants gathered in the BSC, Ltd, Kranj premises and attended on-line event jointly. Thus, the introduction of the tool was done by video presenting the tool and Politecnico di Milano. After the on-line event PP2 continued with the presentation and moderation of knowledge exchange on the thematic of planning the H2 infrastructure for production, storage, distribution and refueling stations. The scenario presented on the LWG was done by PP2 according to the only policy, the Market Development Strategy for the Establishment of an Appropriate Infrastructure for Alternative Fuels in the Transport Sector in the Republic of Slovenia, which gives a set of KPI to be achieved in terms of number of H2 vehicles by 2030, in Slovenia.

Use of the tool is time consuming due to multiple system failures. The scenario was not done with the final beta version, but prefinal one. In any case, planning a valid H2 infrastructure scenario needs to take into consideration more information than H2MA tool has and can process.

KSSENA: LGW 1 - The first Local Working Group was convened on the 2nd of April 2024 at the premises of the company Esotech d.o.o. in Velenje (NUTS 2 – SI03 Vzhodna Slovenija, NUTS 3 – SIO34 Savinja Region). Given the current state of the H2MA tool development at the time, the Gamma (3rd version) of the H2MA planning tool was presented. The participants greeted the context and the concept of the tool itself and highlighted the importance of the H2MA tool. Its functionalities were highly recognized, especially by the general H2 market newcomers (especially privateers) entering the H2 infrastructure market. The tool itself was also praised by the local decision makers and other stakeholders. Since the user interface of the tool, was a little bit vague at that time, the participants highlighted the importance of the development of the general platform for the common overview of the Alpine Space green H2 infrastructure map, which was shared with the H2MA tool developers at that time. The participants also highlighted the general system availability of the tool, which should work without any technical issues, and should be free to be downloaded as such and also advised us to reduce the general working time of the tool, which was a little bit slow at the time, as a lot of working time was needed to run the tool itself and optimize scenarios, which was lagging at the time. Also the importance of the walkthrough video and a supporting document of a “read be before using” sort of profile was mentioned. The general response of the stakeholders was supportive and encouraging. The focus was not on the scenario development on the LGW1, which was however mentioned, but not

implemented as at the time, the partners of the H2MA project were making up for the delayed workload and the inputs for the LWGs were still being developed.

LGW 2 – The second Local Working Group was convened on the 17th of May 2024 at the premises of the Public High-School Research Centre – MIC VELENJE in Velenje at the Koroška 62a street in the City of Velenje (NUTS 2 – SI03 Vzhodna Slovenija, NUTS 3 – SIO34 Savinja Region). On the 2nd repetition of the LWG, the Alpine Space version, the 5th release was presented to the stakeholders and LWG participants, which generally pleased the stakeholders as, the 5th release, contained much additional functionalities and was more responsive and a lot quicker than the 1st version. The participants deemed that the 5th version of the tool was more user-friendly.

As KSENA also participated on both LWGs, which have been convened by the PP02 – BSC KRANJ and as Slovenia is a very small country without any regional governments, which technically means that all the planning is done on the national level, the scenarios for both NUTS 2 regions of Slovenia were shaped mutually with the colleagues from BSC KRANJ, but each individual organization focused on their regional context a bit more than the other, and organized its LGWs regionally, in each NUTS 2 region, to draw the interested local stakeholders as well as local decisionmakers and market players.

- In your stakeholders' view, how effective was the tool in facilitating the design of transalpine green H2 mobility routes? Any specific suggestions from stakeholders for improving the 'H2MA planning tool'?

BSC KRANJ: Stakeholders did not try to use the tool. The scenario was done preliminarily to the LWG by the PP2.

KSENA:

As expressed in the box above, the participants of the 1st LWG, which KSENA organized on the 2nd of April 2024, were acknowledged with the "Gamma" version of the H2MA planning tool, which had a lot of technical issues and user interface related shortcomings, which were gradually improved with the later versions of the tool. However, at the first LGW, organized by KSENA the stakeholders also did not try to use the tool themselves, as at the time the tool was not yet ready to be disclosed publicly. Therefore, the tool cases were only presented on the meeting, on which the shortcomings were discussed.

- What were the comments made on reviewing the outputs integrated into the H2MA tool and what were the feedback provided on their accuracy and relevance from your stakeholder's perspective?

KSSENA & BSC KRANJ: The scenario used data with which also the national policy makers are operating (i.e. Market development strategy for establishing adequate infrastructure for alternative fuels in the transport sector in the Republic of Slovenia (2017) and Action program for alternative fuels in transport for 2022, 2023 (2021)). Therefore, the result of the scenario was showing that the most optimal solution for the development of H2 infrastructure is on the or near TEN -T corridors, the Baltic sea – Adriatic sea corridor – going through Maribor – Ljubljana – Koper and Mediterranean corridor going through the same cities, which is in accordance to national plans of H2 infrastructure. Beside this there is already existing or under construction refueling infrastructure on the corridor Western Balkan – Eastern Mediterranean, going through Gorenjska region. The scenario presented on the LWGs was inserted in the PPT presentation, therefore only map with locations was shown. One cannot identify micro locations, only macro. When checking micro locations with GIZ, the proposed locations for the H2 infrastructure were in most cases non sensical. Therefore, we need to use the optimisation scenario done by the tool as a reference to the area, not as a precise location. This error may be occurring because of different settings in GIS system according to the country.

In terms of current planning of H2 infrastructure, the issue is demanding. They are predictions and plans, but there isn't a breakdown of the locations and capacities and detailed infrastructure planning in Slovenia.

KSSENA: On KSSENA's 2nd LWG meeting, it was figured out that the tool optimizes the HRS locations based upon the future demand of the H2, presented in "Scenario definition" tab of the tool. However, the tool optimizes the HRSs only on the calculated future spatial demand on Hydrogen but lacks to include the conditions set up in the newly adopted EU regulation - AFIR (Alternative Fuels Infrastructure Regulation). The HRSs produced by the tool are thus designed only with the hydrogen daily capacity of few hundred kg/day, which does not take into account the fact that the new AFIR regulation assumes that all newly built HRSs must be designed with the cumulative hydrogen daily capacity of at least 1T/day, with a few exceptions of the reduction of this capacity for not more than 50% in the regions where the daily density of HDVs is less than 2,000 vehicles per day, which is not so applicable for Slovenia, as all the major transport nodes are right on or very near the TEN-T corridors, as Slovenia is a small country judging by space, but on the other hand a very important one judging by transit, as all the major transport corridors going to the Balkans, Italy or South-west Europe, cross the country in some point.

Tool SWOT

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|-----------|------------|
| Strengths | Weaknesses |
|-----------|------------|

| | |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>Eventually does the job according to the data inputs and gives a 40 to 50% accurate scenario. The lower % from 100% is due to the lack of multiple parameters influencing the setup of H2 economic and infrastructural ecosystem and inaccurate location proposal.</p> <p>Comprehensive, transparent and useful map of the Alpine area in the “Current situation” tab</p> <p>An excellent way to collect, calculate and store and adjust input data, which is not the case for other publicly accessible green H2 mobility related platforms (H2livetool, H2-map, TEN-T interactive map viewer, etc.)</p> | <p>Time consuming, limited to manual inserts of data and chosen parameters.</p> <p>Poor user interface</p> <p>Does not take into account all the EU legislation (especially AFIR)</p> <p>Being an offline tool, and due to the time needed to use it, it is not so attractive for wide public use.</p> <p>-The scenarios can only be saved as a different format (shp., html., xls.), but not as a version of the tool itself, since they need to be recreated after each individual use of the tool.</p> |
| <p>Opportunities</p> <p>It is a DSS and this is how it needs to be taken. One can use it to get the basic scenario and then it needs to take into consideration everything else that is not provided by the tool to create a valid and sensible scenario, useful long-term and proven by end operation.</p> <p>User-interface could be further enhanced</p> | <p>Threats</p> <p>Relying only on the outputs of the H2MA tool, inserting unrealistic data, thus getting unrealistic outputs.</p> <p>Stop being used after the project implementation due to the poor accessibility of the tool.</p> <p>Stop being used after the project due to the poor promptness of the algorithms and baseline input data.</p> |

Business needs

- How can stakeholders leverage the 'H2MA planning tool' to design efficient transalpine green hydrogen mobility routes that meet their business objectives?

KSSENA & BSC KRANJ: To an extent they can leverage the H2MA planning tool to design a scenario for transalpine green hydrogen mobility routes. One thing that hasn't been considered and affect the quality of H2MA tool optimization scenarios is that for Slovenia data were provided per 2 regions on the NUTS level 2. The optimization does not consider the interlinkage of the whole territory, but considers territories separately.

Policy planning

1. Beyond Tool Scenarios:

- What additional factors should future policies and planning consider regarding hydrogen infrastructure, beyond the scenarios covered by the 'H2MA planning tool'?

KSSENA & BSC KRANJ: For the scenario to be valid, useful, it needs to have good data inputs that stand on the real future demand predictions in Slovenia, according to the domestic H2 vehicle ownership and transit H2 mobility demand and political decisions on freight road transport and freight rail transport. According to this data the tool could on the basis of current state, process the road HDV and bus transit scenario for the future with 50 to 60% accuracy, so for about 10% better than it currently does. However, we need to take into the account also the refueling infrastructure capacities (H2 economy ecosystem) cross border, i.e. Italy and Austria and national business deals with other countries in terms of production and import of H2 and real scenario of H2 mobility adoption take-off.

In the 1st SI LWG the current state of traffic (freight and bus traffic) pressure on the main road connections in Slovenia was presented. Looking only on the generated scenario from the H2MA tool, the most sensible positioning of H2 infrastructure would be on the TEN-T corridors and nearby, going through Slovenia. There are currently two possible deviations in the H2MA tool, caused by the inaccurate data input. The Western Baltic – Eastern Mediterranean corridor was not inserted in the H2MA tool and the second is that the tool does not recognize the traffic pressure on the corridor and identifies only existing and planned infrastructure, therefore only 1 additional refueling station was proposed by the optimization scenario and it was on the wrong location.

The AFIR proposes setting up the refueling infrastructure every 200km, Gorenjska does not necessarily fall under this condition. It will depend on the cross boarder H2 infrastructure. The only AFIR policy that corresponds to planning H2 refueling stations in Gorenjska is for the urban nodes. We can identify 2 to max 3 in Gorenjska. The EU policies are important because of the financing opportunities, however to facilitate the H2 mobility, the infrastructure needs to be set-up to provide a care free and convenient user experience.

If we address the NUTS 02, Western cohesion region, it includes the maritime transport (port Koper) and the main logistic hub for maritime traffic – rail – road traffic. There, significant investments are planned for H2.

In terms of H2 production, it is a question of green H2 production capacities and import needs and H2 economy ecosystem. That further influences the needs for storage and distribution capacities. According to the mix of energy sources in Slovenia, we need to consider also other more stable H2 production capacities, like production of H2 from nuclear power plants or currently produced grey hydrogen or

other ways of H2 production which is not green, but is technically and financially viable to the successful business model. In terms of grey H2 production, short term production could be acceptable also in the future, if turned into blue H2 production. The production of green H2 is a goal, but the NEPN - the national energy and climate plan of the Republic of Slovenia draft already recognizes two predominant options for H2 production in the future – renewables and nuclear plant production. The pink H2 production has also the economic benefits of heat usage and has in terms of costs and production stability more advantages.

2. Exploring Additional Demands for Hydrogen:

Aside from the mobility sector, what significant demands for hydrogen exist in nearby industries or sectors that stakeholders should consider in regional planning?

KSSENA & BSC KRANJ: H2 has been used in industry for decades. Decarbonizing industry with environmentally friendlier H2 should be a priority use of H2, since in Slovenia industry produces more negative emissions (GHGE) than mobility. In the initial stage of H2 HDV road mobility it is likely that the business models will need to create synergies with industrial use of H2 to balance production and demand. However, also this is not without challenges. With an increasing H2 mobility demand, H2 mobility economy can become more independent.

BSC KRANJ: In Gorenjska we already have 2 facilities that could and do cater to the mobility as well. The RESHUB project is setting up the H2 production facility for the military use. Military facility and vehicles will provide a needed demand and the surplus, if any, could be used on a smaller scale to refuel the H2 vehicles in case of need. The second production is already in place by TPJ Ltd Jesenice. It is a grey H2 production. They had also a green H2 production, but there was no business model and they closed it. There is one H2 car coming from AT to fuel.

KSSENA: In Savinjsko-Šaleška region, which is also included in the JTM and thus funded by the JSF, the plan of the HSE (Holding of the Slovenian Power Plants) group is to expand the capabilities of the already existing Electrolyser, currently providing the grey H2 for the industrial usage in the Thermal Power Plant Šoštanj. The current production of grey Hydrogen is limited to 32 kg/day (11 t/a), majority of which is used at the site, for the “cooling action” in emergency scenarios. The currently installed electrolyser is of the 200kW power, but the plan is to gradually expand the electrolyser capacity by the year of 2030 with 3 additional phases. The plan is to produce H2 with the 20 MW of Electrolyser capacity at the final phase of the project. With such power, more than 2000 tonnes of green hydrogen would be produced at the site, when the final phase is reached. The “green” hydrogen would be secured through the installation of a major photovoltaic plant, which would be build on the nearby artificial lake. The plan is to build a 140 MWp photovoltaic plant, which will support the development of green hydrogen.

Stakeholder Collaboration

How can stakeholders collaborate to increase awareness and understanding of hydrogen technology? What strategies can engage major industries in adopting hydrogen infrastructure?

BSC KRANJ: The participants of the 1st LWG were complimenting the organization of such meeting and the fact that we invited stakeholders from different economic branches. The latter triggered a professional debate, where not everyone agreed with everything said and presented their view of the field, according to their profession. Disagreements are the added value when planning a green transition and when talking about H2 economy, increasing awareness and understanding of hydrogen technology.

KSSENA & BSC KRANJ: For the adoption of H2 by industries all policies regarding the H2 economy on the EU level and national level need to be adopted and implemented. The whole H2 economy ecosystem needs to be established. Industries need to see a profitable business model in the use of environmentally friendlier H2. All safety aspects of hydrogen use must be met.

Territorial Green H2 Route Plans:

(On Teams, in the file "Scenario 1 "; include all the files generated for scenario 1 (installed HRS, H2 production, H2 delivery, summary table), same for scenario 2, scenario 3 etc.)

1. Provide an overview of the Excel file containing the scenario-based data for green H2 route planning covering both regional mobility and industrial hydrogen needs.
2. Discuss the significance of the selected infrastructures for interconnection in each scenario.
3. Identify key elements such as hydrogen refueling stations, storage facilities, and transportation links within each scenario.
4. Evaluate the effectiveness of the green H2 network optimisation based on the specified infrastructure requirements.

SCENARIO FOR NUTS 2 – SI04 – WESTERN SLOVENIA (BSC KRANJ):

According to the Market development strategy to establish adequate infrastructure for alternative fuels in the transport sector in the Republic of Slovenia (2017) data and H2MA optimization scenario, adjusted localization, the additional H2 refueling stations would be positioned:

From the Nord to South:

- Near the Baltic - Adriatic and Mediterranean, Blagovica Petrol station in municipality Domžale, Central Slovenia region, with on-site H2 production.

From the Central part of Slovenia to the Westrn part – Gorenjska toward Austria and Italy

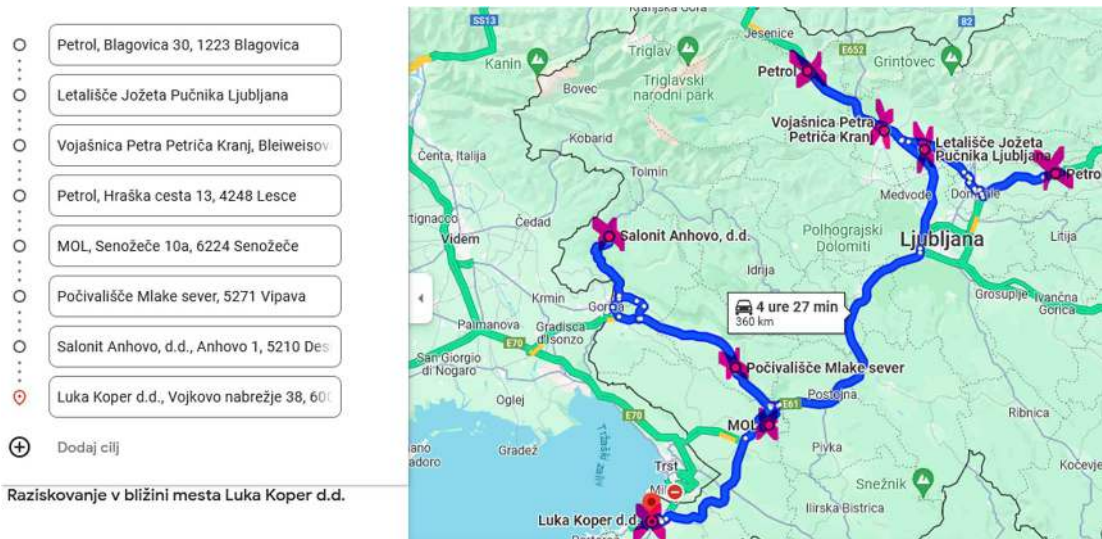
- Near Western Balkan – Eastern Mediterranean corridor, in Lahovče, Municipality Cerklje na Gorenjskem, with on-site H2 production. This location does not make sense. It is 6.1 km from the TEN-T corridor and the connection is highly under traffic pressure. On the other hand, Airport Jožeta Pučnika, Zgornji Brnik, which has the industrial zone and is a logistic hub is only 4.3km away from the proposed location and makes more sense because of the airport proximity. Another better location than proposed is Primskovo, Kranj, where a mega charging hub for electric HDV, buses and other vehicles is planned and partially already under construction.
- The already under construction is also previously mentioned HRS in Kranj, military facility, on Bleiweisova road, with onsite green H2 production.
- The existing HRS in Lesce petrol station, 9,4km from Western Balkans - Eastern Mediterranean TEN-T corridor that requires distribution of H2 by truck.

From the Central part of Slovenia to the South

- The scenario proposed the location near Senožeče, on MOL petrol station, Razdrto-Senožeče regional road connection. Approximately 3.8km from the highway, TEN-T corridors. Distribution of H2 would be done by trucks.
- Further to the South, optimization scenario proposed HRS should be in the

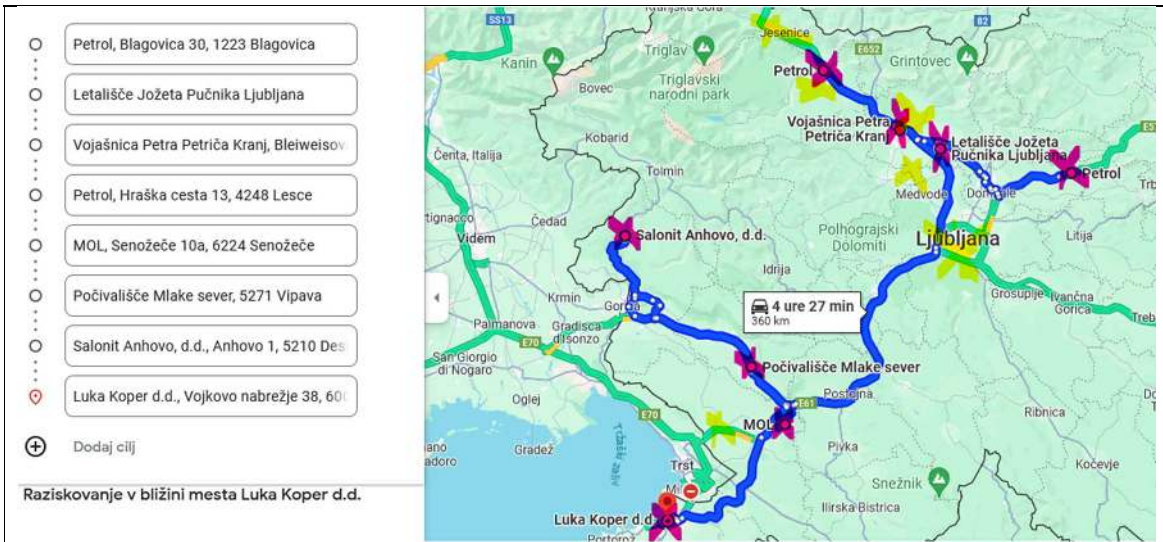
middle of the forest, however, the possible location in this area, Vipava - Ajdovščina, could be on the petrol Petrol station, resting parking lot Mlake, near Vipava. This highway road leads o Nova Goricia - Goricia border crossing. The production proposed is on site, which could actually work with storage facilities, since the production of H2 could be based on wind energy.

- In Deskle, Goriška region, 46km to Baltic-Adriatic and Mediterranean TEN-T corridor, there is existing HRS, standing on the premises of Concrete factory Anhovo. It doesn't operate because there are no H2 trucks, but it was built to cater to the needs of the factory.
- On the coast, scenario proposed a new HRS with an onsite production, near salt warehouse, near the most touristic area of the coast, Portorož. Much better location would be Koper port, truck parking lot. The location is in the proximity of the Baltic - Adriatic and Mediterranean TEN-T corridors.



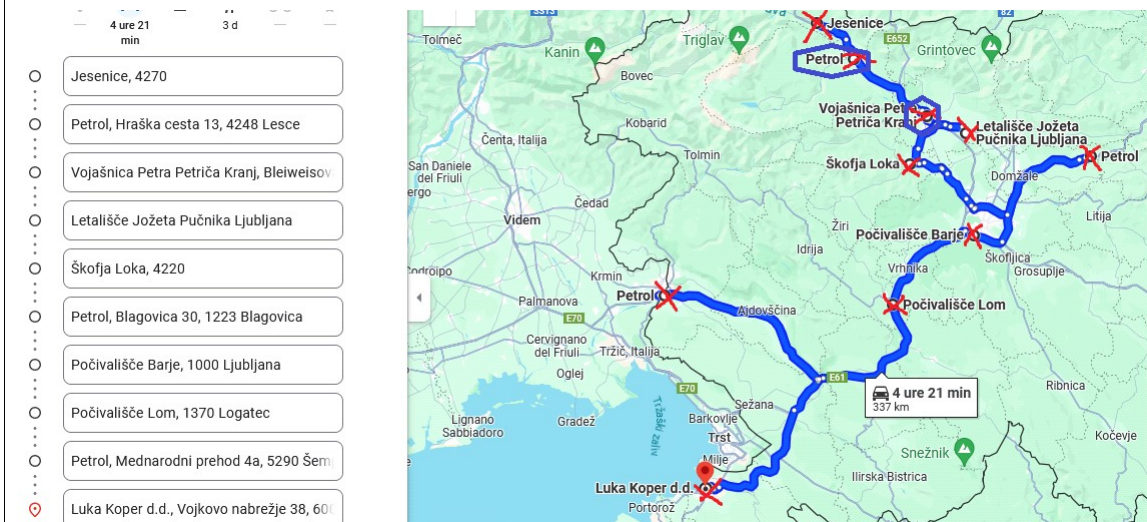
The weakness of the H2MA tool is that it doesn't proposes production capacities per singular location. In the H2MA we haven't discussed the connection of H2 mobility demand in connection to the industry demand and production, therefore this was not the subject of the study. If we come across data that could connect the industry demand and production to mobility demand, we will use it. Otherwise, we will focus on the H2MA AF. Production of green H2 for the industry use cannot be increased on random mobility demand. It can be that storage capacities incorporate a possible increase in green H2 demand catering also to the H2 mobility demand.

According to the AFIR, HRS should be also situated on the urban nodes. In Gorenjska this would apply to the location of Jesenice, Radovljica, Kranj (marked with yellow), maybe Škofja Loka. Additional HRS would need to be near or in Ljubljana, Sežana/Divača.



The next steps for the preparation of the final scenario is organizing additional meetings with relevant stakeholders, comparing data / scenario from Eastern Cohesion Region, trying to gain information about planned HRS and production facilities cross border and localize bulk data for H2 production and infrastructure on the national level.

Update from the 2nd meeting:



Proposal to set up a HRS on the Petrol Station Lom, on the Ljubljana ring, near Nova Gorica - Petrol station or OMV station Vrtojba. The “circled” points are existing HRS. The other red crosses are optional locations.

Scenario done according to the Action program for alternative fuels in transport for 2022, 2023 (2021) and by H2MA tool shows the following positioning of the HRS infrastructure.

Scenario definition - Hydrogen in mobility

Enter the FCEV share for each vehicle category (enter values between 0 and 1)

| Passenger cars | Light-duty trucks | Medium-duty trucks | Heavy-duty trucks | Taxis/ambulances | Buses |
|----------------|-------------------|--------------------|-------------------|------------------|--------|
| 0.0047 | 0.0031 | 0.0172 | 0.0072 | 0.0073 | 0.0032 |

Specific hydrogen consumption in FCEVs by vehicle category [kg/100km]

| Passenger cars | Light-duty trucks | Medium-duty trucks | Heavy-duty trucks | Taxis/ambulances | Buses |
|----------------|-------------------|--------------------|-------------------|------------------|-------|
| 88 | 1.0 | 8.6 | 7.5 | 7.5 | 8.8 |

Hydrogen production and import

Hydrogen production options

Centralised production with PV
 Centralised production with wind
 Onsite production at HRSS

PPA electricity price for onsite production at HRSS (€/kWh): 0.300 €/kWh

Hydrogen delivery modality

Hydrogen pipelines

Scenario definition - Vehicles stock (all fuels)

Vehicle stock in the area for all fuel types, by vehicle category

| Passenger cars | Light-duty trucks | Medium-duty trucks | Heavy-duty trucks | Taxis/ambulances | Buses |
|----------------|-------------------|--------------------|-------------------|------------------|-------|
| 813489 | 51931 | 2828 | 19069 | 21223 | 1727 |

Average mileage per vehicle [km/y], by vehicle category

| Passenger cars | Light-duty trucks | Medium-duty trucks | Heavy-duty trucks | Taxis/ambulances | Buses |
|----------------|-------------------|--------------------|-------------------|------------------|--------|
| 23111 | 27881 | 18805 | 30318 | 75000 | 110808 |

Total hydrogen demand for mobility: 2 kt/y

Confirm scenario

Initialise scenario

Start optimisation

Installed HRSS

Save HRSS .shp

Save map .html

Scenario definition - Hydrogen in mobility

Enter the FCEV share for each vehicle category (enter values between 0 and 1)

| Passenger cars | Light-duty trucks | Medium-duty trucks | Heavy-duty trucks | Trailers/semitrailers | Buses |
|----------------|-------------------|--------------------|-------------------|-----------------------|--------|
| 0.0047 | 0.0051 | 0.0072 | 0.0072 | 0.0072 | 0.0082 |

Specific hydrogen consumption in FCEVs by vehicle category [kg/100km]

| Passenger cars | Light-duty trucks | Medium-duty trucks | Heavy-duty trucks | Trailers/semitrailers | Buses |
|----------------|-------------------|--------------------|-------------------|-----------------------|-------|
| 0.8 | 3.0 | 6.0 | 7.5 | 7.5 | 8.0 |

Hydrogen production and import

Hydrogen production options

Hydrogen import points

- Centralised production with PV
- Centralised production with wind
- Onsite production at HRSs

PPA electricity price for onsite production at HRSs (€/kWh):

Hydrogen delivery modality

Hydrogen pipelines

Scenario definition - Vehicles stock (all fuels)

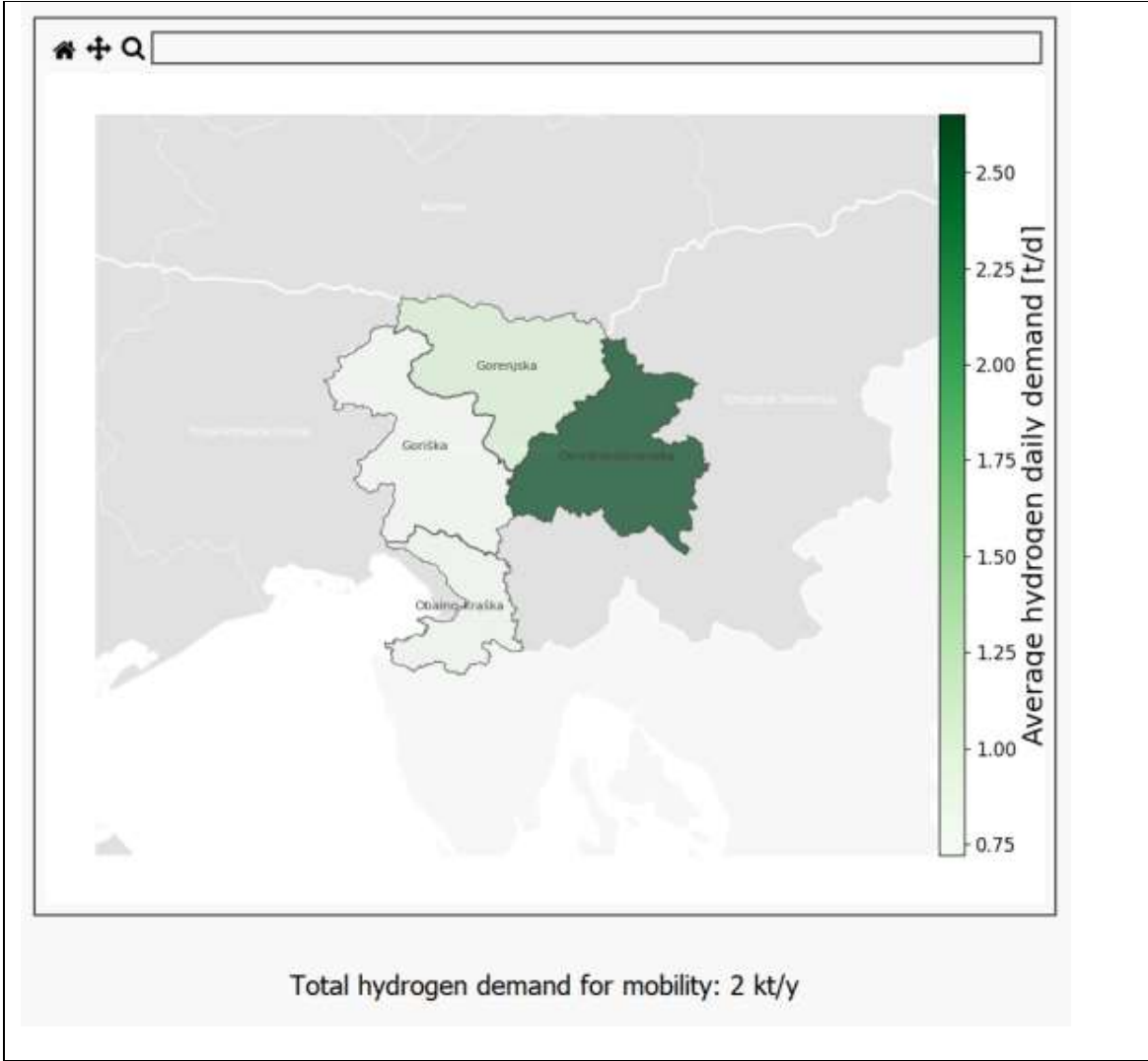
Vehicle stock in the area for all fuel types, by vehicle category

| Passenger cars | Light-duty trucks | Medium-duty trucks | Heavy-duty trucks | Trailers/semitrailers | Buses |
|----------------|-------------------|--------------------|-------------------|-----------------------|-------|
| 613489 | 51331 | 2826 | 19069 | 21223 | 1727 |

Average mileage per vehicle [km/y], by vehicle category

| Passenger cars | Light-duty trucks | Medium-duty trucks | Heavy-duty trucks | Trailers/semitrailers | Buses |
|----------------|-------------------|--------------------|-------------------|-----------------------|--------|
| 21311 | 27891 | 14445 | 20116 | 75000 | 110909 |

Confirm scenario

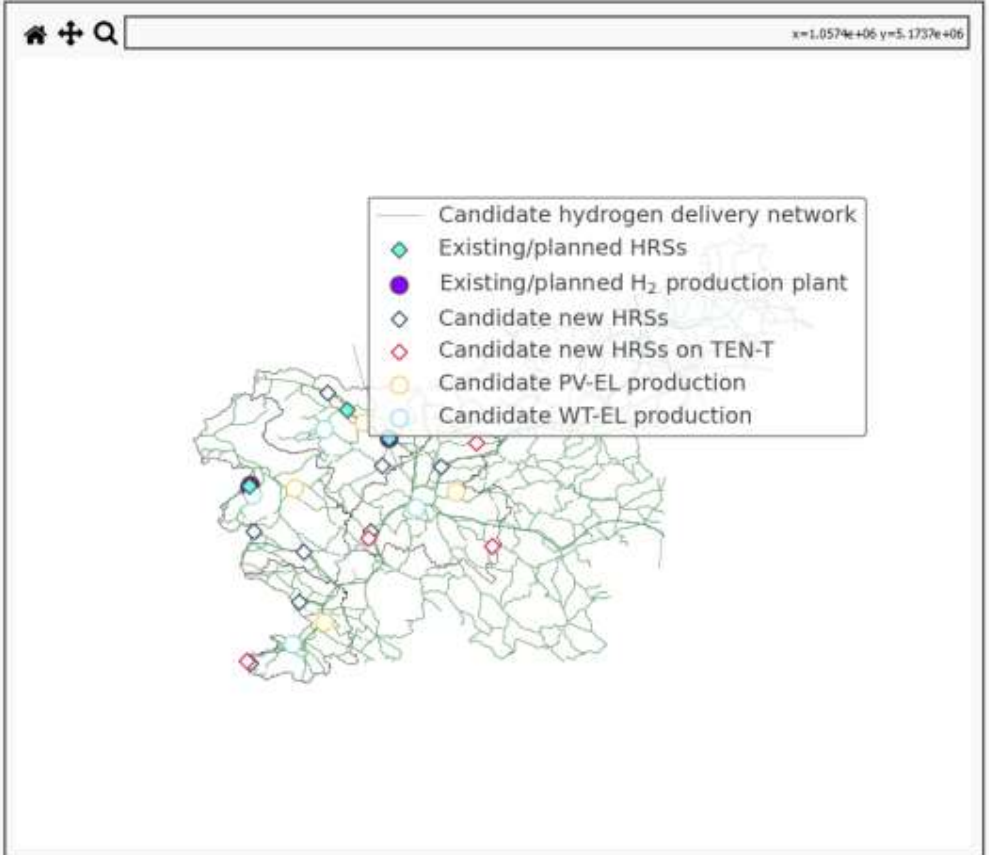


Current Situation

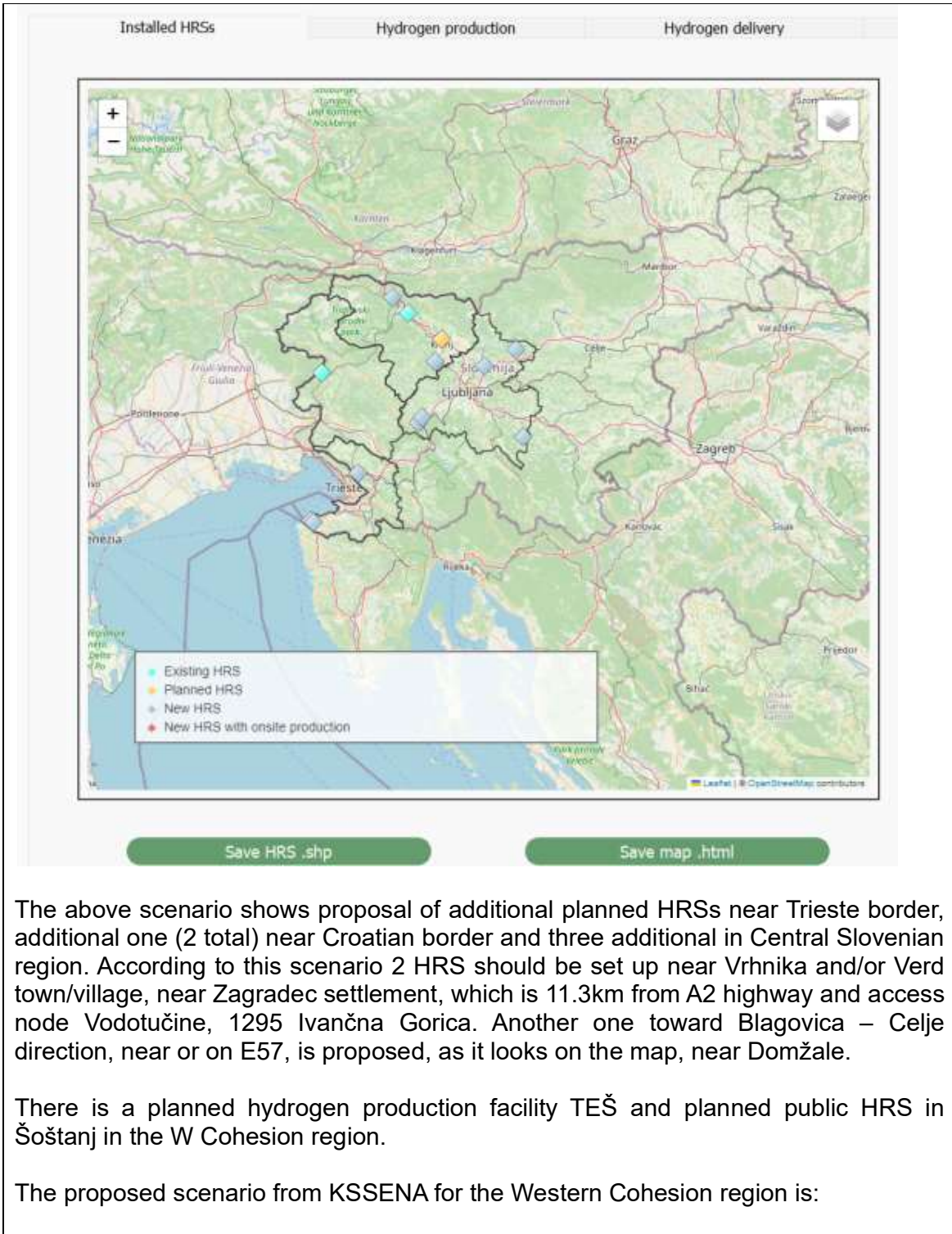
Scenario definition

Data

Initialise scenario



Start optimisation



The above scenario shows proposal of additional planned HRSs near Trieste border, additional one (2 total) near Croatian border and three additional in Central Slovenian region. According to this scenario 2 HRS should be set up near Vrhnika and/or Verd town/village, near Zagradec settlement, which is 11.3km from A2 highway and access node Vodotučine, 1295 Ivančna Gorica. Another one toward Blagovica – Celje direction, near or on E57, is proposed, as it looks on the map, near Domžale.

There is a planned hydrogen production facility TEŠ and planned public HRS in Šoštanj in the W Cohesion region.

The proposed scenario from KSSENA for the Western Cohesion region is:

Agenda:

•Rumeni Xi: večmodalna vozlišča

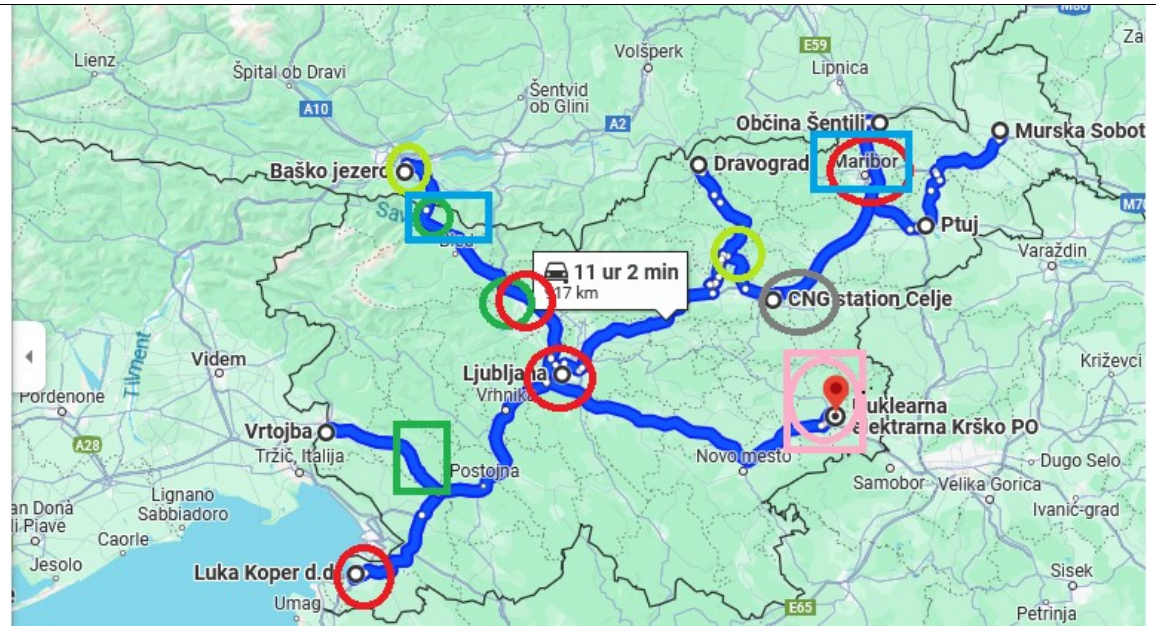
•Rdeči Xi: obstoječe in predvidene polnilnice na TEN-T koridorjih









- Steklarna Hrastnik - Skupina, podjetje za
- Termoelektrarna Šoštanj d.o.o., Termoele
- CNG station Celje, Plinarska ulica 11, 3
- Letališče Maribor, Letališka cesta 10, 23
- Dravograd, 2370
- Murska Sobota, 9000
- Ptuj, 2250
- Šentilj v Slov. goricah, 2212



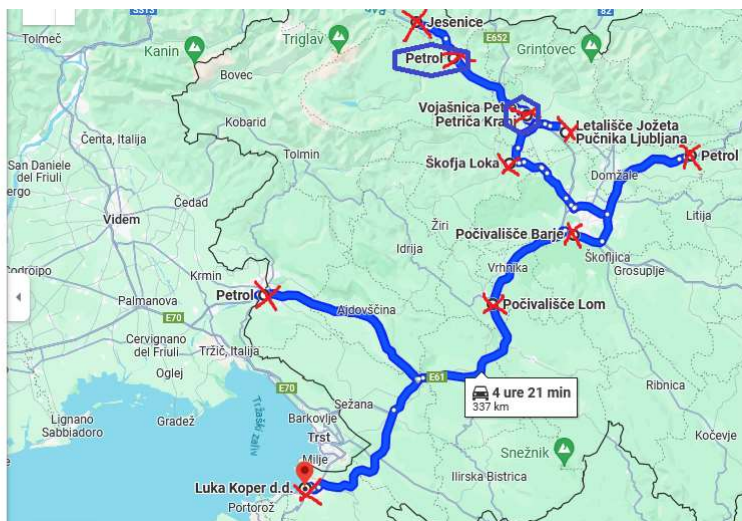
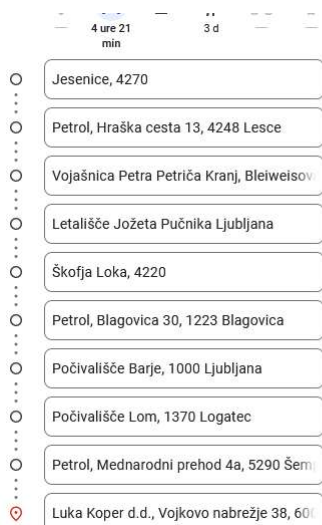
The yellow marks represent multimodal nodes, lilac markings represent main production and fuelling existing and planned facilities near TEN-T corridor.

Looking at Slovenia area one of the possible scenarios is:



| | |
|-------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | The area of planned public HRS, capacity in AT not known, capacity in Slovenia 5t of H2. |
|  | Existing public HRS or under construction. |
|  | Strategic locations where HRS should be positioned, from N to S: Maribor – second largest city with an airport; Ljubljana – first largest city; Luka Koper – the biggest port in Slovenia and logistic hub; Airport Jožeta Pučnika in Gorenjska region – the biggest national airport and logistic hub. |
|  | Possible H2 production and HRS of gray H2. |
|  | Possible HRS of pink H2. |
|  | Planned production of pink H2. |
|  | Potential for production of green H2 from RES - wind |
|  | Potential production of renewable H2 form Hydroelectric production plants. |

Second meeting



SCENARIO FOR NUTS 2 – SI03 – EASTERN SLOVENIA (KSSENA):

After conducting meetings, LGWs and communication via email exchange and phone calls with several decision makers on the regional and national level, important stakeholders and other H2 players, there was no trace of any plans regarding the establishment of new HRSs in NUTS region of Eastern Slovenia (SI03). Since there are no operating HRS in the region, and consequently there was nothing to lean on, the scenario for the “green hydrogen routes” design, was initiated from scratch. The scenario presented, was initiated and produced with “H2MA planning tool”, which has produced the optimal HRS distribution, according to the numbers, set in the *Action program for alternative fuels in transport for the years of 2022 and 2023*, which predicts the increase of the 0,47 % of personal FCEVs, 0,51% of LDV FCEV, 0,82% of FCEV busses and 2,16% of the HDV FCEVs by the year of 2030. However, there are multiple shortcomings related to this particular scenario – The future HRSs will probably be build nearer the TENT corridors, and will probably be designed with greater daily cumulative capacities (At least over 1 tonne of idle green H2 at each location). The current economics of building and deploying the infrastructure is also related to this, as there is currently no demand for hydrogen in mobility in Slovenia. We can also say with certainty that the first HRS to be built in the reigon will be created somewhere in the vicinity of larger cities where, possibly, large hubs intersect with TEN-T corridors.

This again does not apply to this scenario, which has been optimized with the help of the H2MA tool, since most HRS are placed in remote places where there is no high density of transport, but it is true that such an arrangement is more logical, since the hydrogen filling stations are placed in close proximity to each other, and therefore the access of various users both from the TEN-T corridors and from rural areas of the country is therefore much easier, so it is not only designed for those traveling in transit through Slovenia or living next to major cities. Again, this distribution still has many discrepancies, due to various limitations, variables, and unknowns, but it has

Conclusion

Summarise the key lessons learned during the LWG meetings. Include feedback from participants, challenges encountered, and successful approaches identified.

Highlight any innovative ideas or solutions proposed during the meetings.

KSSENA & BSC KRANJ:

Comprehensive legislation needed on the EU and national level. One of the economic potentials of H2 for Slovenia is being engaged in innovation and research and selling knowhow. Comprehensive detailed H2 national Strategy is needed. A white book for the industry development in Slovenia that could include also the use of gases like H2 and some other is needed. Periodical meetings of different expert stakeholders dealing with H2 are needed, but for this to happen, somebody needs to gather them and coordinate the meeting, as it was done in the case of the 1st LWG by PP2. Slovenia should be more connected to the EU environment and information from abroad, especially cross border H2 infrastructure investments would be an added value in terms of planning the H2 capacities in Slovenian territory.

Questions raised from participants:

N/A

Other comments:

KSSENA & BSC KRANJ: On the 2nd meeting of the BSC KRANJ there was a comment from HSE that before we start planning locations and capacities on those locations, one needs to know who is going to be an investor. One needs to have a business model. There is no consensus in Slovenia for the production on site capacities and locations and demand. Even within the interest consortiums there is no consensus. The stakeholders feel like the government is not taking into consideration the interests of those consortiums, because they want to avoid lobbying. Therefore they are planning regardless to the interests of the stakeholders or at least so it seems to some of the stakeholders.

They are macro locations on which are certain that some H2 infrastructure will be build. Those locations are:

1. Luka Koper – Port of Koper
2. Ljubljana as a capital city
3. Nuclear plant in Krško will produce pink hydrogen, since this is already stated in the NEPN document.
4. Termoelektrarna Šoštanj – the project already in motion
5. Airport Jožeta Pučnika as the main national airport
6. Kranj – since the project is already in motion
7. Maribor and thermal plant on Drava, since Maribor is the second largest city in Slovenia and has an airport and since Drava has a constant level of

water, making the production of electricity for production of hydrogen possible.

Interreg



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Alpine Space



H2MA

D.2.2.1

Local Working Groups summary Template

Activity 2.2

February, 2024



Partner: PP 3 – EMS / PP5 - PVF

Participants

| Date of the meeting: 24/04/2024 Location: Metz, Grand Est: FRF | | | |
|-----------------------------------------------------------------------|-----------------------------|-------------------------------------------|---------------|
| Name | Organisation | Role | NUTS 2 |
| Jacques HAENN | PVF | Dinamhyse coordinator | Grand Est |
| Amaury Vaussanvin | Synops conseil | Hydrogen projects development consultants | FRF3 |
| AGAMENNON E Béatrice | Eurométropole de Metz | Vice-President Mobility / Transport | FRF3 |
| AMORER José | Grand E-Nov+ | | |
| BALDE Aissatou Sadjo | SERES technology strasbourg | | FRF1 |
| BENAMAR Ounsia | GAZELENERGY | Renewable energy producer | FRF3 |
| BLASZCZYK Régis | AKG FRANCE | transporter | FRF3 |
| BOLLEY Manon | EIFHYTEC | SME solutions developer for H2 | FRF1 |
| BOUVY Jacques | RH2 - RETROFIT HYDROGENE | Start-up | FRC1 |
| CAMUS Jean-François | EDF | Renewable energy producer | FRF |
| CHAUDRON Valéry | HYDROGAIN | VSB | FRK2 |
| COLOMAR David | EIFHYTEC | SME solutions developer for H2 | FRF1 |
| CRAMA Bertrand | ATAWEY | SME | FRK2 |
| FERRERI Eglé | MEMSIC | Start-up | FRF3 |
| GEORGES Aymeric | EKIUM | Group | FRF1 |
| HANNEQUIN Eloise | Grand Est Region | Local authority | FRF |

| | | | |
|-------------------------------------------------------------------------------------------|-----------------------------------|------------------------------------------------------------|---------------|
| KAMMILI Trishna | Réseau GDS | H2 producer | FRF1 |
| KREBS Sylvain | GAZELENERGIE | Energy producer | FR10 |
| LACOMBE Cindy | Strasbourg eurometropole | Local authority | FRF1 |
| MARCHALAND Lucas | Assemblée nationale | National authority | |
| LUCAS Léo | AKG France | transporter | FRF3 |
| MONVILLE Antoine | ELECTRICFIL SERVICE | Big company | FRF2 |
| MONVILLE Mathieu | POLE DE PLASTURGIE DE L'EST - PPE | SME | FRF3 |
| MORVAN Alexis | CVE | Company | FRL0 |
| MULLER Bernard | VERSO ENERGY | VSB | FR10 |
| PERDRISSET Emmanuel | LHYFE | SME | FRH0 |
| PHILIPPE Brice | Grand Est Region | Local authority | FRF |
| PROST Yann | SYNOPS CONSEIL | consultant | FRC2 |
| RONGVAUX Arthur | GAZELENERGIE | Group | FR10 |
| SELTZ Martin | Grand Est region | Local authority | FRF |
| THIEBAUT Camille | VALECO | company | FRC2 |
| VAUTRIN Loïc | LORR'UP | economic development agency | FRF3 |
| WINTERSTEIN Dylan | AKG France | transporter | FRF3 |
| Date of the meeting: 16/05/2024 Location: Online / FRF | | | |
| Name | Organisation | Role | NUTS 2 |
| Benoît Comfaits | BCO conseil | Renewable energy consultant | FRF3 |
| Nicolas Queromes | PVF | Hydrogen engineer | FRF1 |
| Eve Kron | arhyze | Independent producer of renewable hydrogen and electricity | FRF1 |
| PROST Yann | SYNOPS CONSEIL | | |
| Jacques HAENN | PVF | Coordinator Dinamhyse | FRF1 |
| Date of the meeting: 15/05/2024 Location: Chateauneuf, Auvergne-Rhône-Alpes FRK | | | |
| Name | Organisation | Role | NUTS 2 |
| Mael Michel | Grand Belfort | Local authority, city | FRC |

| | | | |
|-----------------------|----------------------------------------------------------------|-------------------------------------------------|-----|
| BOUTELEUX Emmanuel | MINCATEC Energy | SME | FRC |
| BRICQUER Philippe | SGAR - PRÉFECTURE RÉGION BOURGOGNE - FRANCHE-COMTÉ | SME | FRC |
| CLAVEQUIN Maude | Commune d'étupe | Local authority | FRC |
| CRETIN Nolwenn | SCHRADER Pacific Advanced Valves | Company | FRC |
| DESCOURS Yannick | BDR THERMEA France | Group | FRC |
| FALLOT Pascal | BE4H | VSB | FRC |
| GODARD Yannick | BE4H | VSB | FRC |
| GOURDIN Morgane | SUNTEC INDUSTRIES FRANCE | SME | FRC |
| LAGET Bernard | Mairie de Chateaunoef | Local authority | FRC |
| LEY Aurélien | COMMUNE DE BADEVEL | Local authority | FRC |
| MASSOT Simon | SUNTEC INDUSTRIES FRANCE | SME | FRC |
| MICHEL Maël | Grand belfort | Local authority | FRC |
| PERRIOD Véronique | Commune d'etupes | Local authority | FRC |
| PLAZA Claude | Mairie de chateaunoef | Local authority | FRC |
| STENUIT Olivier | BDR THERMEA France | Group | FRC |
| TOMAS Vital | OFFICE PUBLIC DE L'HABITAT DU TERRITOIRE DE BELFORT | Group | FRC |
| Nathalie Loch | AER BFC | Local authority; Regional Economic Agency | BFC |

This template serves as a comprehensive tool for summarising the outcomes and progress achieved during the Local Working Group (LWG) meetings conducted as part of Activity 2.2 in WP2.

Please follow the instructions below to ensure a full and detailed report:

H2MA planning tool

Summarize the content and outcomes of the training sessions conducted to familiarise participants with the H2MA planning tool. Include any challenges faced and solutions proposed:

Who created the scenarios: **stakeholders** or **partners**

- Were there any challenges or technical issues with the tool?
- How user-friendly was it?

Participants encountered technical difficulties downloading and opening the tool.

They mentioned the possibility to have an online tool available, a website.

- In your stakeholders 'view, how effective was the tool in facilitating the design of transalpine green H2 mobility routes? Any specific suggestions from stakeholders for improving the 'H2MA planning tool'?

Suggestions:

- include other energy sources such as hydroelectricity rather than just wind and PV.
 - the use of QGIS for territorial mapping, highlighting the advantages of open data and the ease with which shapes can be integrated into QGIS.
 - that the user mentions their other projects in the tool to correctly recalculate the relevance of the location.
 - Concerns were expressed about the use of online data in relation to the executable, as well as the limitations of the tool for Switzerland: If a high-intensity project is planned a few kilometers from the border, this could also have a negative impact on the Swiss project.

- What were the comments made on reviewing the outputs integrated into the H2MA tool and what were the feedback provided on their accuracy and relevance from your stakeholder's perspective?

The definition of planned H2 infrastructures must be defined.

Whether they concern hydrogen production or refueling infrastructures.
 Whether these projects are planned only when they have been the subject of an administrative submission with planning permission, or whether there are other criteria for qualifying them as such.

Tool SWOT

| Strengths | Weaknesses |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>good indication tool.</p> <p>good for network of stations: it's about trying to find, to have a location assistant for stations, production in relation to fleets.</p> | <p>Tool lifespan:</p> <p>concerns about updates and the lifespan of the tool, as well as thoughts about the need for a website for the project.</p> <p>Regulatory Bounds:</p> <p>Administrative and regulatory limits on planned projects and data entered by tool users.</p> <p>Other sources omissions:</p> <p>Not including other source of green h2 like Hydroelectricity and biomass</p> |
| Opportunities | Threats |
| <p>Interesting for developing hydrogen valley</p> | <p>Technical limits:</p> <p>Difficulty to update the tool each time there is a project or a new HRS for example.</p> <p>Time consuming</p> <p>The advantage of web applications (which run in a browser) over applications that require an executable to be downloaded. Web application updates are automatic and transparent to users, unlike executables, which must be downloaded and installed manually each time they are updated. What's more, in some companies it is forbidden to run executables that have not been approved by management, making web applications even more practical and secure.</p> <p>Once the H2Ma project has been completed, it is crucial to ensure that it continues to be</p> |

| | |
|--|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | <p>operational and useful. The question is how to guarantee this continuity.</p> <p>For the tool to be effective, users must learn to master it. This means they need to understand how to enter the relevant data, adjust the parameters, and use all the tool's features to maximise its usefulness.</p> <p>Administrative limits:</p> <p>Setting up renewable energy projects involves complex administrative and regulatory procedures. For photovoltaic (solar) projects, it takes around three years to process all the necessary steps, including permit applications, environmental impact studies and other administrative processes.</p> <p>this tool is only indicative at this point in time, and that it cannot incorporate forward-looking concepts.</p> |
|--|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

Business needs

- How can stakeholders leverage the 'H2MA planning tool' to design efficient transalpine green hydrogen mobility routes that meet their business objectives?

Stakeholders, mainly those who are developing H2 infrastructures in some region NUTS 3, it would be interesting for them to find relevant locations to develop hydrogen-powered supply projects, as well as its usefulness in initiating projects and locating existing and planned stations.

Policy planning

1. Beyond Tool Scenarios:
 - What additional factors should future policies and planning consider regarding hydrogen infrastructure, beyond the scenarios covered by the 'H2MA planning tool'?

Future policies and planning for hydrogen infrastructure should consider several additional factors beyond those covered by the 'H2MA planning tool':

- Processing times for wind and solar projects, underlining the importance of forward planning.
- From the outset of deployment projects, they are asked for very precise information, particularly with regard to regulations. This includes considerations specific to production and distribution infrastructures, such as ICPE (Installations Classées pour la Protection de l'Environnement) and CVESO (Sites à Risques Industriels majeurs) standards. There is also the question of possible interference between a future hydrogen station and existing infrastructures.
- For wind power, there are predefined zones where installation is prohibited. Many factors need to be taken into account in these projects. A crucial element at the moment is the trend towards creating multi-energy stations rather than stations dedicated to a single energy source. In most of the projects they work on, they are asked to adopt a multi-energy approach, integrating several types of energy into a single station.
- The importance of taking water management challenges into account when planning and implementing hydrogen electrolysis projects in the country.

2. Exploring Additional Demands for Hydrogen:

Aside from the mobility sector, what significant demands for hydrogen exist in nearby industries or sectors that stakeholders should consider in regional planning?

In addition to the mobility sector, stakeholders should consider the following significant demands for hydrogen:

Industries. However, it was mentioned that lack of maturity in industries' knowledge of their future hydrogen consumption and the confidentiality surrounding this information.

Heating

Stakeholder Collaboration

How can stakeholders collaborate to increase awareness and understanding of hydrogen technology? What strategies can engage major industries in adopting hydrogen infrastructure?

Stakeholders can collaborate to increase awareness and understanding of hydrogen technology and engage major industries in adopting hydrogen infrastructure through the following strategies:

Discussing ways to extend the reach of tools like H2MA to cover a broader area, allowing stakeholders from different regions to benefit from the technology.

Exploring the possibility of integrating various projects and simulations into a unified platform, which could facilitate collaboration and knowledge sharing among stakeholders.

Ensuring that data entered by users are managed effectively and regularly updated, for relevance and accuracy of information shared among stakeholders.

Initiating collaborative projects between industries, government agencies etc to demonstrate the feasibility and benefits of hydrogen technology in real-world applications.

Territorial Green H2 Route Plans:

(On Teams, in the file “Scenario 1 “; include all the files generated for scenario 1 (installed HRS, H2 production, H2 delivery, summary table), same for scenario 2, scenario 3 etc.)

1. Provide an overview of the Excel file containing the scenario-based data for green H2 route planning covering both regional mobility and industrial hydrogen needs.
2. Discuss the significance of the selected infrastructures for interconnection in each scenario.
3. Identify key elements such as hydrogen refueling stations, storage facilities, and transportation links within each scenario.
4. Evaluate the effectiveness of the green H2 network optimisation based on the specified infrastructure requirements.

Participants discussed the importance of selected infrastructures for interconnection within each scenario.

However, it's essential to acknowledge that certain challenges, such as the placement of PV centers in regions with limited sunlight, may necessitate further change of the optimisation process.

Conclusion

Summarise the key lessons learned during the LWG meetings. Include feedback from participants, challenges encountered, and successful approaches identified.

Highlight any innovative ideas or solutions proposed during the meetings.

Stakeholders discussed the geographical expansion of the tool and its technical development, as well as its integration with other regulatory and technical aspects. Technical issues related to downloading and opening the tool were also discussed.

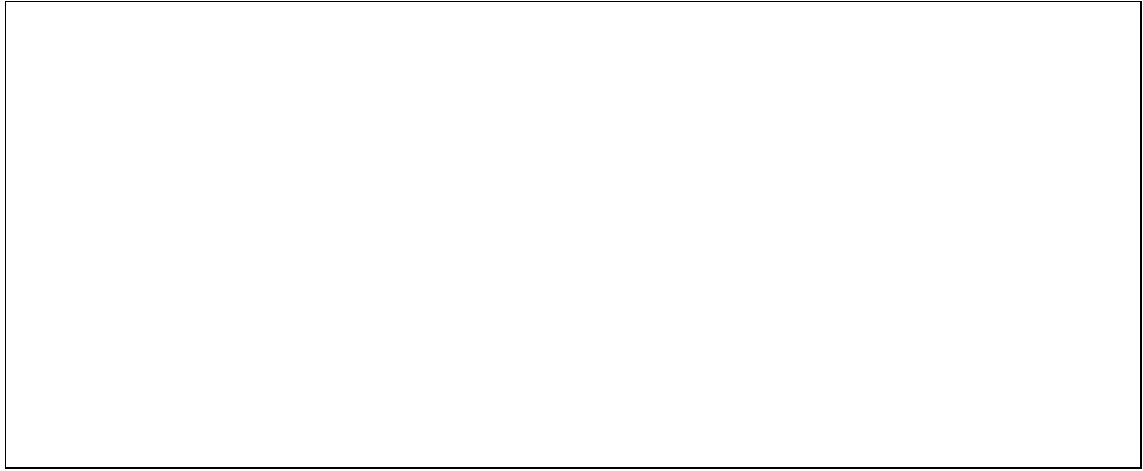
Moreover, they discussed the processing timelines of wind and solar projects, emphasising the importance of forward planning for long-term projects. They addressed regulatory constraints and the potential for renewable energy development. They touched upon the use of QGIS for territorial mapping, highlighting the importance of open data and the ease of integration within QGIS.

Furthermore, participants deliberated on the impact of hydrogen production on industries, particularly concerning industrial consumption. They highlighted the lack of maturity in industry knowledge regarding their future hydrogen consumption, as well as the confidentiality surrounding this information. The discussion also highlighted the current disinterest of companies in power purchase agreements due to declining energy tariffs.

Questions raised from participants:

- Is it possible for tool users to gather multiple simulations on one table and integrate other already secured projects into the calculation process?
- What are the administrative and regulatory limits concerning planned projects and the data entered by tool users?
- What are the impacts of hydrogen production on water?

Other comments:



D.2.2.1

Local Working Groups summary Template

Activity 2.2

February, 2024



Partner: Regione Lombardia

Date of the meeting: 15/05/2024 – 29/5/2024

Location : Milan and webex

Participants

| Name | Organisation | Role | NUTS 2 / 3 |
|--------------------|------------------------------------------|-------------------------------------------------------------------------------|------------|
| Gian Luca Gurrieri | Regione Lombardia | Head of UO Climate, Emissions and Physical Agents, DG Climate and Environment | NUTS2 |
| Silvia Galante | Regione Lombardia | DG Climate and Environment | NUTS2 |
| Luca Pastore | Regione Lombardia | DG Climate and Environment | NUTS2 |
| Giovanni Storto | Regione Lombardia | DG Climate and Environment | NUTS2 |
| Paolo Colbertaldo | Politecnico of Milan | | |
| Francesco Mezzera | Politecnico of Milan | | |
| Carlo Santoro | University of Milan Bicocca | | |
| Vanessa Gallo | Federation of Renewable Energy Producers | | NUTS1 |
| Michele Colli | Federation of Renewable Energy Producers | President | NUTS1 |
| Alessandra Bellomi | Regione Lombardia | DG Infrastructure and Sustainable Mobility | NUTS2 |
| | | | |
| Marco Trollese | Politecnico of Milan | | |
| Raffaele Sparano | Edison Next | | |
| Luigi D'Onofrio | Edison Next | | |

Participants

| Name | Organisation | Role | NUTS 2 / 3 |
|------------------|-------------------------------------------------|--------------------------------------------|------------|
| Davide Picchi | University of Brescia | | |
| Mita Lapi | Lombardy Environmental Foundation | | |
| Luca Bissossero | SEA Milan Airports | | |
| Daniela Negri | Regione Lombardia | DG Infrastructure and Sustainable Mobility | NUTS2 |
| Stefano Erba | Ferrovie Nord Milano | | |
| Annalisa Randon | Industrial Federation | | |
| Fabrizio Fattori | Insubria University | | |
| Giuseppe Muliere | | | |
| Giorgia Farella | Energy and Strategy Group, Politecnico of Milan | | |
| Davide Guelfi | Politecnico of Milan | | |
| Andrea Fumagalli | Politecnico of Milan | | |

This template serves as a comprehensive tool for summarising the outcomes and progress achieved during the Local Working Group (LWG) meetings conducted as part of Activity 2.2 in WP2.

Please follow the instructions below to ensure a full and detailed report:

H2MA planning tool

Summarize the content and outcomes of the training sessions conducted to familiarise participants with the H2MA planning tool. Include any challenges faced and solutions proposed:

Who created the scenarios: stakeholders or partners?

- Were there any challenges or technical issues with the tool?
- How user-friendly was it?

We choose not to use the tool during the meetings, we discussed data and hypothesis in input and showed and discussed related scenarios in output from the tool. In our use that was made to show the results to stakeholders the tool was sufficiently user-friendly.

- In your stakeholders 'view, how effective was the tool in facilitating the design of transalpine green H2 mobility routes? Any specific suggestions from stakeholders for improving the 'H2MA planning tool'?

There weren't specific suggestion on the tool. Some perplexity was expressed about some input data: in particular the cost of hydrogen seemed to be too low in stakeholder's opinion (although it wasn't the current cost but the cost expected in 2030).

- What were the comments made on reviewing the outputs integrated into the H2MA tool and what were the feedback provided on their accuracy and relevance from your stakeholder's perspective?

Some scenarios were shown; there wasn't comments on which one would be the most probable. The scenarios were thought to reflect accurately different penetrations of hydrogen in the transport sector. In any case it was clear that the tool was not showing a unique possibility, it was showing optimal scenarios in the given hypothesis.

Tool SWOT

| Strengths | Weaknesses |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>Easy to understand inputs</p> <p>Clear display of the scenarios calculated</p> <p>Possibility to create different scenarios and visualize them in an external software</p> <p>User can change default data about hydrogen costs, etc</p> <p>The tool gives an accurate overview of the state of hydrogen infrastructures in the Lombardy region</p> | <p>Difficulty to predict input variables evolution to the year 2030 and 2050</p> <p>There is the possibility to run the tool for the whole Alpine area, but the significance of the output is limited due to the lack of data for part of the areas and Switzerland</p> <p>For a limited hydrogen diffusion, the number of HRS is more significative than the spatial location</p> |
| Opportunities | Threats |
| <p>Possibility to compare different scenarios and improve international cooperation on hydrogen</p> <p>The model doesn't consider the interactions with the industrial sector: to model this aspect would enhance the accuracy</p> | <p>The complexity of the process might influence the accuracy of results.</p> <p>The interpretation of the outputs is not so straightforward: this may limit the use of the tool among stakeholders</p> |

Business needs

- How can stakeholders leverage the 'H2MA planning tool' to design efficient transalpine green hydrogen mobility routes that meet their business objectives?

The tool can give a preview of the optimal scenario for spreading hydrogen use in the transport sector; it can be one of the variables considered when planning new investments.

Outputs of the tool will be used to construct the regional hydrogen strategy, that will be a reference for stakeholders.

Policy planning

1. Beyond Tool Scenarios:

- What additional factors should future policies and planning consider regarding hydrogen infrastructure, beyond the scenarios covered by the 'H2MA planning tool'?

Policies and planning should consider the interdependency between the transport and the industrial sector. If hydrogen is available in a particular location because of an industrial user, this can change scenarios also in the transport sector.

2. Exploring Additional Demands for Hydrogen:

Aside from the mobility sector, what significant demands for hydrogen exist in nearby industries or sectors that stakeholders should consider in regional planning?

In the most credited scenario, hydrogen use will spread in the “hard to abate” industrial sectors, when high temperature heat is needed and therefore electrification is difficult

Stakeholder Collaboration

How can stakeholders collaborate to increase awareness and understanding of hydrogen technology? What strategies can engage major industries in adopting hydrogen infrastructure?

Stakeholders can collaborate with the national and regional authorities in the preparation and implementation of hydrogen strategies. They can explain their industrial strategies, because the information will be useful to guide strategies of the public bodies. Better knowledge of the technology and the use of hydrogen will decrease fears of the population on possible risks.

Territorial Green H2 Route Plans:

(On Teams, in the file “Scenario 1 “, include all the files generated for scenario 1 (installed HRS, H2 production, H2 delivery, summary table), same for scenario 2, scenario 3 etc.)

1. Provide an overview of the Excel file containing the scenario-based data for green H2 route planning covering both regional mobility and industrial hydrogen needs.
2. Discuss the significance of the selected infrastructures for interconnection in each scenario.
3. Identify key elements such as hydrogen refueling stations, storage facilities, and transportation links within each scenario.
4. Evaluate the effectiveness of the green H2 network optimisation based on the specified infrastructure requirements.

The Excel files used and created by H2MA tool concern the transport sector only. Scenarios are presented and discussed in detail in the document “scenarios_RL.pdf”

Conclusion

Summarise the key lessons learned during the LWG meetings. Include feedback from participants, challenges encountered, and successful approaches identified.

Highlight any innovative ideas or solutions proposed during the meetings.

During the meeting it was clarified that in the Lombardy region the hydrogen industry is developed and competitive at the European level. On the other hand, RES production is limited due to the lack of wind. Therefore hydrogen import through pipeline might be a good solution in the medium term. Increase in hydrogen use will be challenging in the short term, but it will be a very useful solution approaching to complete decarbonization of the system. Transnational cooperation will be very important in the process.

Questions raised from participants:

-
-
-

Other comments:

Interreg



Co-funded by
the European Union

Alpine Space



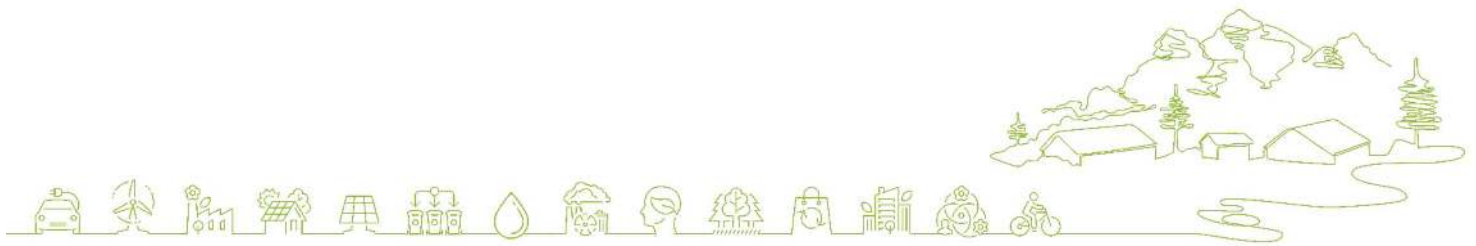
H2MA

D.2.2.1

Local Working Groups summary Template

Activity 2.2

February, 2024



Partner: PP07 – Climate Partners Upper Rhine (Klimapartner Südbaden)

Partner: PP11 – ITALCAM

Date of the meeting: 12.06.2023

Location: virtually held on Teams

Participants

| Name | Organisation | Role | NUTS 2 / 3 |
|--------------------|-----------------------------------------------|------------------------------------------------------------------|---------------------------------------|
| Laura Heuberger | Badische Rheingas | Working student | DE13 Freiburg |
| Tim Lübben | Regionalverband Schwarzwald-Baar-Heuberg | Referent Mobility | DE13 Freiburg |
| Lucia Leal | Landkreis (District) Waldshut | Leader of the economic development agency | DE13 Freiburg |
| Robin Steudten | Badenova | Project Manager Energy Systems | DE13 Freiburg |
| Jakob Jochum | Landkreis Lörrach | Head of Department Mobility, Environment and structural policies | DE13 Freiburg |
| Christopher Schüle | Landkreis Ortenau | Head of Department mobility and climate protection | DE13 Freiburg |
| Thomas Gschwind | Ministry of the environment Baden-Württemberg | Head of Department 66 "Hydrogen" | DE1 Baden-Württemberg, DE11 Stuttgart |
| Michael Freitag | Regionalverband Hochrhein-Bodensee | Deputy Head of Building Department | DE13 Freiburg |
| Fabian Torns | Regionalverband Südlicher Oberrhein | Deputy director | DE13 Freiburg |
| Blaser | Regionalverband Südlicher Oberrhein | Deputy Head of Mobility Department | DE13 Freiburg |

Introduction

For this LWG the partners have invited stakeholders of both industry and public entities. As representatives of the industry gas providers have been invited, who are active in pipeline distribution and truck delivery of different gases, of both the intention to actively participate in future H2-business is publicly known. One of them is also already an active operator of EV-charging infrastructure and thus well able to comment on factors to consider for the planning of refueling stations.

The public administration in Germany is split into separate entities. With increasing spatial representation, there are institutions responsible at each NUTS-region level. In order to generate representative feedback, institutions of each NUTS-level have been invited:

NUTS-3: Ministry of Environment of the State Baden-Württemberg

NUTS-2: 3 Regional Associations (Regionalverband Südlicher Oberrhein, Schwarzwald-Baar-Heuberg, Hochrhein Bodensee)

NUTS-1: 3 District Offices (Landkreise Ortenau, Waldshut, Lörrach)

As such, we are confident, that the results of this LWG are representative of the Upper Rhine Valley as H2MA pilot territory.

Authors: Dr. Jan Dormanns, Dr. Fabian Burggraf

Attendance records of the TEAMS call:

H2-MA: Planungstool zur Stand...
Chat Dateien Zusammenfassung **Anwesenheit** Gruppenräume Vortragscoach +2

Mittwoch, 12. Juni 2024 09:18 – 10:14

6
Teilgenommen

09:18 - 10:14
Start- und Endzeit

55Min. 46Sek.
Besprechungsdauer

Teilnehmer

| Name | Erster Beitritt | Letztes Verlassen | Dauer der Besprechung |
|----------------------------------------------------------------------------------|-----------------|-------------------|-----------------------|
| Jan Dormanns <small>jan.dormanns@klimapartner-suedbad...</small> | 09:27 | 10:14 | 46Min. 8Sek. |
| Dr. Fabian Burggraf <small>Fabian.Burggraf@klimapartner-suedb...</small> | 09:27 | 10:14 | 46Min. 25Sek. |
| Tim Lübben (RV SBH) (Ungeprüft) | 09:27 | 10:14 | 46Min. 17Sek. |
| Heuberger, Laura (Extern) <small>Laura.Heuberger@badische-rheingas...</small> | 09:29 | 10:14 | 44Min. 25Sek. |
| Lucia Leal (Ungeprüft) | 09:30 | 10:14 | 43Min. 19Sek. |
| Steudten Robin (Extern) <small>Robin.Steudten@badenova.de</small> | 09:30 | 10:14 | 43Min. 8Sek. |

H2-MA: Planungstool zur Standortfindung von H2-Tankst...
Chat Dateien Details Terminplanungs-Assist... Zusammenfassung **Anwesenheit** +3

Mittwoch, 12. Juni 2024 10:52 – 11:50

8
Teilgenommen

10:52 - 11:50
Start- und Endzeit

57Min. 50Sek.
Besprechungsdauer

Teilnehmer

| Name | Erster Beitritt | Letztes Verlassen | Dauer der Besprechung |
|-----------------------------------------------------------------------------|-----------------|-------------------|-----------------------|
| Jan Dormanns <small>jan.dormanns@klimapartner-suedbad...</small> | 10:56 | 11:50 | 54Min. 6Sek. |
| Dr. Fabian Burggraf <small>Fabian.Burggraf@klimapartner-suedb...</small> | 10:54 | 11:46 | 52Min. 10Sek. |
| Jakob Jochum (Ungeprüft) | 10:58 | 11:50 | 52Min. 15Sek. |
| Christopher Schüle ... (Ungeprüft) | 10:58 | 11:50 | 52Min. 10Sek. |
| Thomas Geschwind (Ungeprüft) | 10:59 | 11:50 | 50Min. 52Sek. |
| Michael Freitag (RV... (Ungeprüft) | 10:59 | 11:46 | 48Min. 36Sek. |
| Blaser, RVSO (Ungeprüft) | 11:00 | 11:50 | 49Min. 34Sek. |
| Fabian Toms (Ungeprüft) | 11:02 | 11:50 | 47Min. 35Sek. |

H2MA planning tool

Summarize the content and outcomes of the training sessions conducted to familiarize participants with the H2MA planning tool. Include any challenges faced and solutions proposed:

Who created the scenarios: stakeholders or partners?

- Were there any challenges or technical issues with the tool?
- How user-friendly was it?

- Partners created scenarios and demonstrated the user interface.
- The tool worked fine. Calculations finished reasonably within <5min. No crashes during use.
- User-friendliness is OK. Only little inputs are required and these are easy enough to fill in. Suggestions for improvement at this point: A) vehicle share in actual percent numbers (and not just 0-1) B) Better adjustments of fields/boxes to changes in window size
- Tool hardly works on mobile devices

- In your stakeholders 'view, how effective was the tool in facilitating the design of transalpine green H2 mobility routes? Any specific suggestions from stakeholders for improving the 'H2MA planning tool'?

- The tool only creates regional H2-scenarios. Higher level planning is not possible with the tool, as there is no cross-border simulation happening. Hence, the tool is not effective for transnational planning.
- If the tool is really to be used for the development, simulation and presentation of trans-alpine mobility routes, the database must be changed. The vehicles registered in a region are not decisive here! Rather, the tool must be fed with real traffic and transit data. However, this data is only available commercially.
- A stakeholder analysis of future tool users is deemed important. Currently it is not clear who is the target audience of tool users.
 - Who will run the HRSs? Has H2MA talked to HRS-owners and developers? Which tools are they using and is a new one actually required? Which factors are required in today's fuel stations?
- No participating institution was interested in using the tool in the future.
- For a detailed planning of possible locations for refueling stations, there exists a range of commercial software. Therefore it's questionable, what the added value of the H2-MA tool could be.
- For short-term scenarios - i.e. "how do I supply my specific stakeholders in the Southern Upper Rhine region" - the database used (and possibly the approach) is not appropriate. Many research institutes take a different approach and use concrete mobility requirements at specific locations, the related travel costs for each hydrogen user and hydrogen backbone data as input in order to develop location proposals. They also evaluate the refueling costs per filling station to determine which filling stations make sense and which customers are better left unserved for the time being. You can find

details on this at:

<https://onlinelibrary.wiley.com/doi/pdfdirect/10.1002/cite.202300123>

- What were the comments made on reviewing the outputs integrated into the H2MA tool and what were the feedback provided on their accuracy and relevance from your stakeholder's perspective?

The outputs were considered OK for the boundary conditions that are implemented in the tool.

However, the boundary conditions are missing several very important factors:

- Number of transit vehicles (very important for TEN-T demand)
- Logistic centers
- "11-minute rule" for max distance of refuelling stations off the highway
- Link HRS to EV-quick chargers
- Available areas and existing fuel station renting contracts of the properties
- The Ministry reported that acquiring or finding large areas (>8000m²) is very difficult along Germany's highways
- Earning calculations: consider the margin between import and selling price at an HRS – major factor for profitability and ROI calculations
- Electricity network: Has the medium voltage network been considered for supplying electricity to hydrogen production sites?
- For E-Mobility there are several commercial tools available, e.g. place2charge.com – Have these been evaluated for as a basis for H2-tool development?

Tool SWOT

| | |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Strengths <ul style="list-style-type: none"> - Useful map with current H2 infrastructure - Database curated by H2-experts, easy use for and high data availability for people new to H2 topics | Weaknesses <ul style="list-style-type: none"> - Offline tool, needs admin rights, not usable by some institutions - Time consuming manual process and interpretation of results - Limited to manual data inputs - Scenarios can only be exported, no option of imports or re-running scenarios - Incomplete boundary conditions - Who will update the tool when the funding period comes to an end? |
| Opportunities <ul style="list-style-type: none"> - Platform for international planning teams (if the data base it set up properly) | Threats <ul style="list-style-type: none"> - Cross-border and transnational infrastructure is not harmonized - No updates after project ends. New infrastructure from 2025 onwards will not be implemented - Only the H2 demand of local mobility is considered. The projected high demands of industry and transit vehicles are critical. |

Business needs

- How can stakeholders leverage the 'H2MA planning tool' to design efficient transalpine green hydrogen mobility routes that meet their business objectives?

Landratsamt (District Administration): Tool could potentially be used for getting introduced to the topic. The map features are nice. The map outputs would however only be used for visualization and communication. The results of the tool are not useful for the tasks of the institution.

Regionalverband (Regional Association): Tool is not useful for their tasks. The Regional Association's mechanism of action is to define priority areas. However, HRSs are too small for them. They are not involved in their planning or approvals.

Ministry of Environment Baden-Württemberg: Tool is not useful for our tasks.

Gas provider: Tool is not useful for our tasks.

EV-charging provider: Tool is not useful for their tasks and from their experience of planning recharge stations the results are wrong or at least missing many important factors for finding suitable HRS locations.

Unfortunately, no possible customer of the H2MA could be identified.

Policy planning

1. Beyond Tool Scenarios:

- What additional factors should future policies and planning consider regarding hydrogen infrastructure, beyond the scenarios covered by the 'H2MA planning tool'?

- **Data on the number of transit vehicles** is crucial for planning. Demand calculations for mobility are hopeless just based on resident vehicles. Particularly long-haul traffic is of high importance for trans-national mobility and missing these numbers creates a big margin of error.
- Pipeline planning needs to also account for **industrial H2 demand**. Parallel H2 infrastructure for industry and mobility will not be cost efficient. Planning needs to account for both.

2. Exploring Additional Demands for Hydrogen:

Aside from the mobility sector, what significant demands for hydrogen exist in nearby industries or sectors that stakeholders should consider in regional planning?

- A detailed analysis of industrial demands has been done by the chambers of trade and commerce in Baden-Württemberg. The results are available here (<https://www.plattform-h2bw.de/service/aktuelle-meldungen/meldungen-detail/regionale-wasserstoffbedarfe-fuer-baden-wuerttemberg-veroeffentlicht>). In our region, the amount of hydrogen needed for industrial purposes was identified to exceed 5 TWh per year in 2030, and 20 TWh per year in 2035. In whole Baden-Württemberg, the total amount is estimated above 22 TWh per year in 2030 and 73.5 TWh per year in 2035.
- Concerning the production of hydrogen, a total capacity of over 1.3 GW of electrolysis needs to be installed until 2030 to fulfill the industrial needs (if NO import should be possible until then).

Stakeholder Collaboration

How can stakeholders collaborate to increase awareness and understanding of hydrogen technology? What strategies can engage major industries in adopting hydrogen infrastructure?

- Implementation of regional networks or (cross-border) network organizations, such as 3H2 (www.3h2.info) where partners from industry, local government and the energy sector exchange and work together on hydrogen infrastructure projects!
- Industrial companies will currently only adopt hydrogen infrastructure if they are absolutely dependent on hydrogen. Tentatively, attempts are being made to electrify processes and energy supply as far as possible. Hydrogen will only be used where electrification is not possible or economically viable. These are primarily the steel industry, paper industry, chemical industry and high-energy metalworking.
- Industrial companies need a clear and reliable timeline as to when which quantities of green hydrogen will be available.
- For industrial companies, the hydrogen issue is closely linked to the electricity issue. For every industrial location, it is about a transformation process away from fossil fuels and towards renewable energy sources. A lot can be achieved here by increasing efficiency and sector coupling. Whether companies adopt hydrogen infrastructure is closely linked to the question of whether they have access to sufficient renewable electricity at their location.

Territorial Green H2 Route Plans:

(On Teams, in the file “Scenario 1 “, include all the files generated for scenario 1 (installed HRS, H2 production, H2 delivery, summary table), same for scenario 2, scenario 3 etc.)

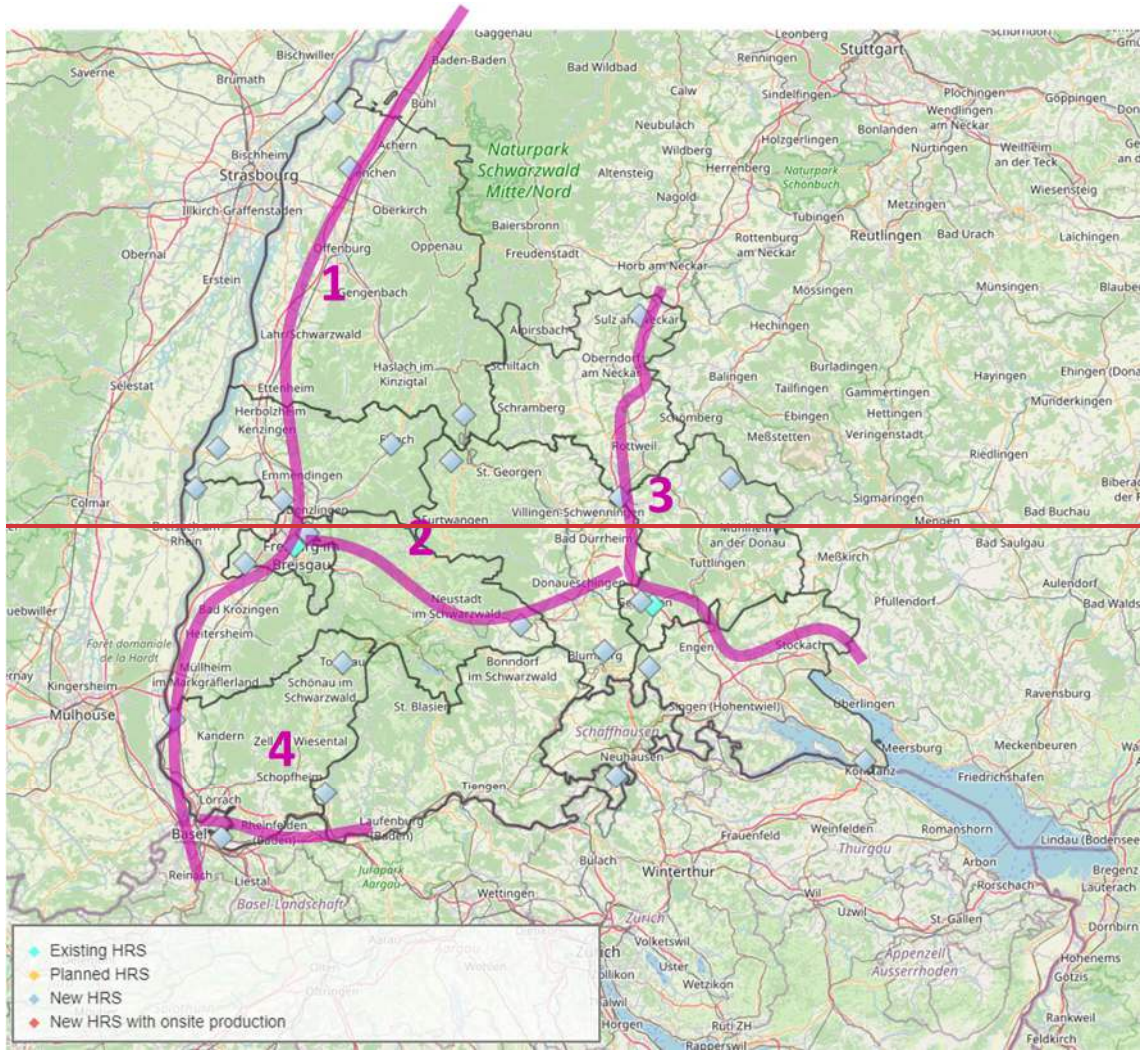
1. Provide an overview of the Excel file containing the scenario-based data for green H2 route planning covering both regional mobility and industrial hydrogen needs.
2. Discuss the significance of the selected infrastructures for interconnection in each scenario.
3. Identify key elements such as hydrogen refueling stations, storage facilities, and transportation links within each scenario.
4. Evaluate the effectiveness of the green H2 network optimisation based on the specified infrastructure requirements.

1)

| A | B | C | D | E | F | G | H | I | J | K |
|----------------------------------|----------------------------|--------------------------------------------------|---------------------------|--------------------------|----------------------|-----------------------------|-------------------|---------------------|----------------------------------|---------------------------------|
| Subarea name (NUTS-3) | Average daily demand (t/d) | Number of HRSs (of which with onsite production) | Production capacity (t/d) | Annual production (kt/y) | Annual import (kt/y) | Electrolysis capacity (MWe) | PV capacity (MWe) | Wind capacity (MWe) | Onsite production capacity (t/d) | Annual onsite production (kt/y) |
| Lörrach | 4,658497175 | 3 (0) | 2,4547945 | 0,566783826 | 0 | 0 | 0 | 0 | 0 | 0 |
| Rottweil | 3,239606631 | 2 (0) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Schwarzwald-Baar-Kreis | 4,623950894 | 2 (0) | 0 | 0 | 2,0075 | 0 | 0 | 0 | 0 | 0 |
| Tuttlingen | 3,207875084 | 3 (0) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Konstanz | 5,788661475 | 2 (0) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Freiburg im Breisgau, Stadtkreis | 4,809160983 | 4 (0) | 0,016438356 | 0 | 4,228765535 | 0 | 0 | 0 | 0 | 0 |
| Breisgau-Hochschwarzwald | 5,581772796 | 2 (0) | 0 | 0 | 11,09795815 | 0 | 0 | 0 | 0 | 0 |
| Ortenaukreis | 9,946890986 | 3 (0) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Emmendingen | 3,58417563 | 3 (0) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Waldshut | 3,603264181 | 2 (0) | 21,917808 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

2 & 3) Please refer to the image below and the detailed scenario and route description in the H2MA Teams folder.

4) Based on the inputs and considered parameters, the result looks plausible. However, the discussion with stakeholders during the LWG made it very clear, that too many factors are missing in the simulation. Therefore, the optimization is ineffective.



Conclusion

Summarise the key lessons learned during the LWG meetings. Include feedback from participants, challenges encountered, and successful approaches identified.

Highlight any innovative ideas or solutions proposed during the meetings.

Key takeaway:

There are no future users for the tool in Germany.

Transnational planning is not facilitated by the tool.

The results lack the cross-border perspectives, meaning that transnational planning requires a lot of additional and time-consuming manual work.

HRS planning is not a task of public entities (at least not in Germany). HRS operators need to be included in the project.

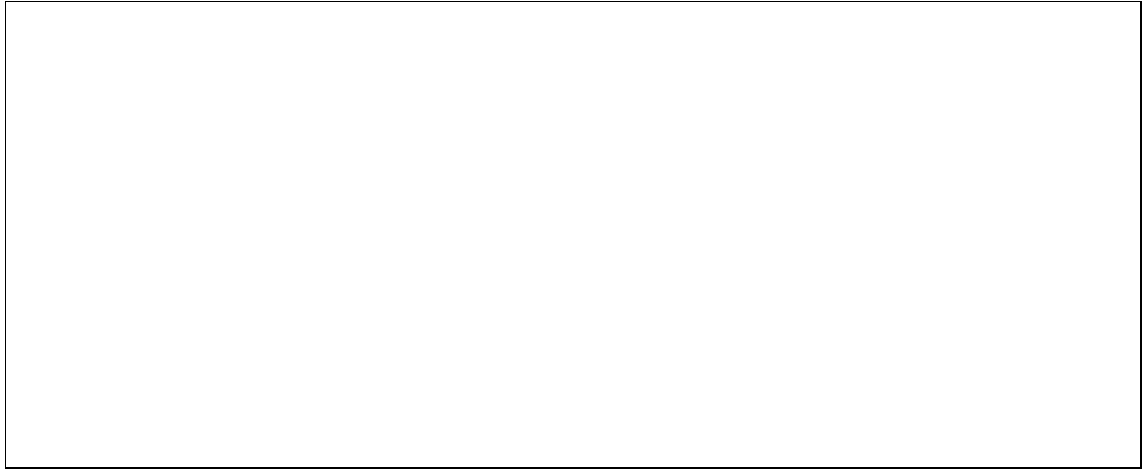
Ideas:

- Projections of FCEV share is difficult. The tool could be used to make suggestions of a growing HRS network with increasing vehicle share.
- Cross-border scenarios are important, maybe they are the only added value the tool could offer. after an update
- Counterparts in Switzerland should be informed.
- Sustainable mobility and transport needs to shift to rail and water. Can these routes be integrated in the tool?

Questions raised from participants:

- Is there a clear idea of **who** should use the tool for **which purpose**?
- Has preliminary market research been carried out on similar tools or commercially available products?
-

Other comments:



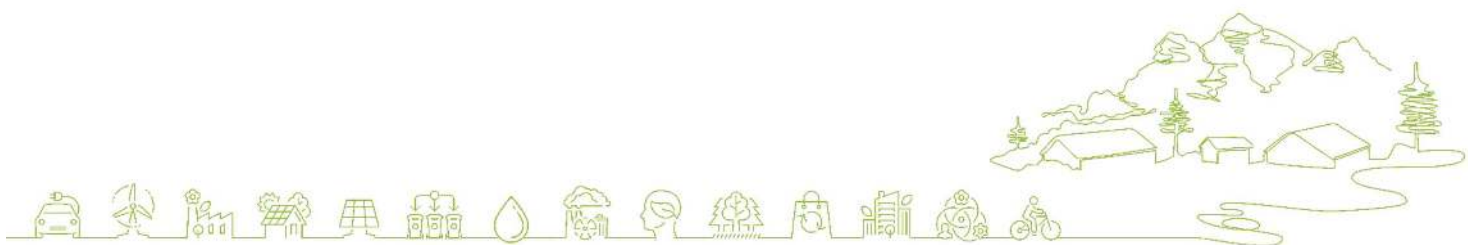
H2MA

D.2.2.1

Local Working Groups summary Template

Activity 2.2

February, 2024



Partner: PP6 Turin Metropolitan City (IT)

Date of the meeting: 17/06/2024

Location : on- line meeting

Participants

| Name | Organisation | Role | NUTS 2 / 3 | |
|-----------------|-------------------------------|-----------------------------------------------|---------------------------------------------|--|
| Giuseppe Estivo | Città Metropolitana di Torino | Project Manager H2MA | Piedmont Region/Metropolitan city of Torino | |
| Massimo D'Avia | Enviroment Park | Manager | Piedmont Region/Metropolitan city of Torino | |
| Pasquale Mazza | Città metropolitana di Torino | Political Councilor | Piedmont Region/Metropolitan city of Torino | |
| Matteo Zittani | Città metropolitana di Torino | Director Mobility Office | Piedmont Region/Metropolitan city of Torino | |
| Giulio Buffo | IREN | Innovation office | Piedmont Region/Metropolitan city of Torino | |
| Luigi D'onofrio | EDISON | Project Manager Hydrogen Business Development | National level | |
| Marco Zanini | GTT | Innovation office | Piedmont Region/Metropolitan city of Torino | |
| Enzo Pompilio | SITO SPA | Vice president | Piedmont Region/Metropolitan city of Torino | |

| | | | | |
|--------------------|------------------------|-----------------|---------------------------------------------|--|
| | | | litan city of Torino | |
| Aolberto Mancino | Confindustria Canavese | member | Piedmont Region/Metropolitan city of Torino | |
| Elisa Re | Bus Company | Project Manager | Piedmont Region/Metropolitan city of Torino | |
| Giovanni Bianco | Benezse Trasporti | Manager | Piedmont Region/Metropolitan city of Torino | |
| Sara Pierro | Bluway | Manager | Piedmont Region/Metropolitan city of Torino | |
| Miriam Pirra | Piemonte Innova | Project Manager | Piedmont Region/Metropolitan city of Torino | |
| Costantino Spataro | CNA | member | Piedmont Region/Metropolitan city of Torino | |
| Cesare Paonessa | AMT | Director | Piedmont Region/Metropolitan city of Torino | |
| Tommaso Giunti | Stellantis | Reserch office | International | |
| Gabriele Restaldo | SAGAT | Project Manager | Piedmont Region/Metropolitan city of Torino | |

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| Massimo D'Avia | Enviroment Park | Manager | Piedmont Region/Metropolitan city of | |

| | | | | |
|-------------------------------------|-------------------------------------|-----------------------------|-------------------------------------------------------|--|
| | | | Torino | |
| Chiara CAVARGNA | Città Metropolitana di Torino | Mobility Office Director | Piedmont Region/Metropo litan city of Torino | |
| Team Idrogeno Piedmont Region | Piedmont Region | | Piedmont Region/Metropo litan city of Torino | |

This template serves as a comprehensive tool for summarising the outcomes and progress achieved during the Local Working Group (LWG) meetings conducted as part of Activity 2.2 in WP2.

Please follow the instructions below to ensure a full and detailed report:

H2MA planning tool

Summarize the content and outcomes of the training sessions conducted to familiarise participants with the H2MA planning tool. Include any challenges faced and solutions proposed:

Who created the scenarios: stakeholders or partners?

- Were there any challenges or technical issues with the tool?
- How user-friendly was it?

The tool was used by Environmentpark on behalf of CMTO to define the reference scenario in the territory in order to build an action plan for the development of hydrogen for long-haul freight transport, metropolitan public transport, and tourist transport. The developed plan will be integrated into the metropolitan SUMP strategies approved by CMT in 2022 and will be considered as a measure of the Sulp to be approved within this year.

The use of the tool has made it possible to test a strategy for implementing H2 distributors that complements the current state, especially in the motorway area at the Turin node, in order to cover the needs of all motorway branches, including the TEN-T Mediterranean corridor.

The tool's results were presented and discussed at the Local Works Group with stakeholders and the Hydrogen Team of the Piedmont Region. Participants in the Local Works Group included:

- Companies managing public and tourist transport services: GTT, Benese Trasporti, Buscompany;
- Energy production and distribution companies: IREN, EDISON, BLUWAY;
- Employer associations: Confindustria and CNA;
- Research foundations: PiemontInnova;
- Industry: Stellantis;
- Freight transport service management (freight village): SITO Interporto SPA;
- Airport service management: SAGAT – Turin Sandro Pertini Airport;
- Piedmont Region: team managing the hydrogen strategy.

The stakeholders accepted the produced results and are ready to support what has been described. Therefore, they request further in-depth work with the establishment of an institutionalized working group.

Regarding the use of the tool, a critical issue can be noted due to the fact that H2ma is not a research project and therefore could present a product in line with the objectives of the Alpine Space program. To reach an acceptable scenario, work beyond the original tool was necessary. The tool remains a starting point where data can be entered to build the current stat

- In your stakeholders 'view, how effective was the tool in facilitating the design of transalpine green H2 mobility routes? Any specific suggestions from stakeholders for improving the 'H2MA planning tool'?

The tool supported the development of a hypothetical scenario which is centered on it and is targeted and accepted by stakeholders and in this way the opportunity for this to be concrete was stimulated.

- What were the comments made on reviewing the outputs integrated into the H2MA tool and what were the feedback provided on their accuracy and relevance from your stakeholder's perspective?

They are all very satisfied with the work presented, they share the need to spread zero-emission mobility that uses hydrogen especially for long-distance freight transport and metropolitan public transport.

The scenario presented is accepted as a completion of the current situation and the investments already financed.

The strategy of covering the Turin ring road junction with at least 2 charging stations is the starting point for the diffusion of hydrogen on the regional territory as from this junction the most important motorway junctions spread in a radial pattern, especially towards the borders of France and towards the port of Savona which is undergoing major investments to increase its accommodation capacity.

Tool SWOT

| | |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------|
| Strengths | Weaknesses |
| <ul style="list-style-type: none"> - Public funding for public transport - Clean technology that meets needs that cannot be covered with BEV technologies | <ul style="list-style-type: none"> - Lack of professional figures - Lack of funding for the freight transport sector |
| Opportunities | Threats |

| | |
|--------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> - New occupation - New Business | <ul style="list-style-type: none"> - Lack of training of local decision makers |
|--------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|

Business needs

- How can stakeholders leverage the 'H2MA planning tool' to design efficient transalpine green hydrogen mobility routes that meet their business objectives?

Stakeholders show interest as the planning tool defines an institutional framework and allows planning of possible investments.

Policy planning

1. Beyond Tool Scenarios:

- What additional factors should future policies and planning consider regarding hydrogen infrastructure, beyond the scenarios covered by the 'H2MA planning tool'?

Define possible incentive measures (pull measure)

2. Exploring Additional Demands for Hydrogen:

Aside from the mobility sector, what significant demands for hydrogen exist in nearby industries or sectors that stakeholders should consider in regional planning?

The airport system participated in the meeting and is interested in the development of hydrogen as a zero-emission fuel.

Stakeholder Collaboration

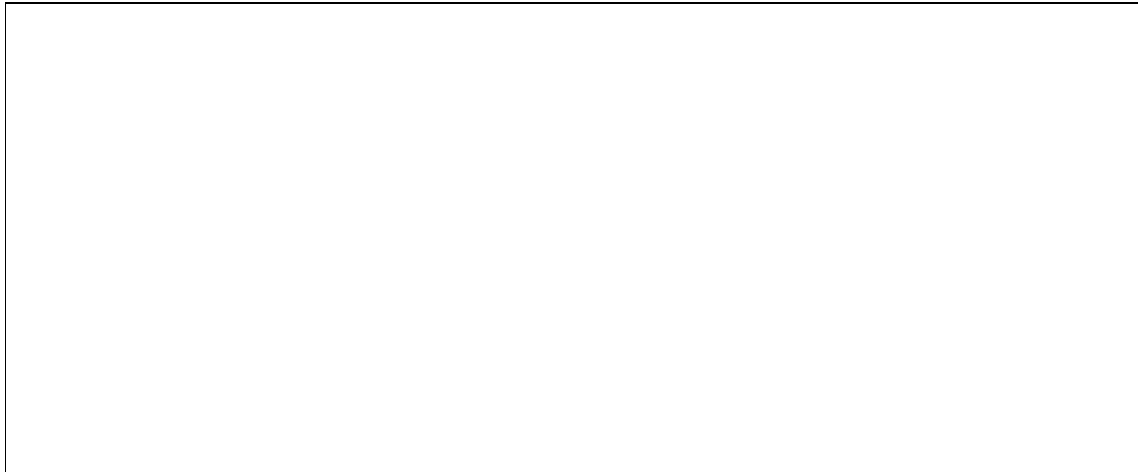
How can stakeholders collaborate to increase awareness and understanding of hydrogen technology? What strategies can engage major industries in adopting hydrogen infrastructure?

All stakeholders demonstrated strong interest in the scenario we presented, The request is made by everyone to define an institutionalized working table in order to materialize the opportunities and pool the investments in charging infrastructure for the various sectors of goods transport/metropolitan/tourist public transport

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Questions raised from participants:

-
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Other comments: