BalticSeaH2

Cross-border Hydrogen Valley around the Baltic Sea

D1.2 Risk management report

WP1 – Project coordination and management

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Executive summary

This report provides a comprehensive analysis of the risk management framework employed by the BalticSeaH2 project during its initial phase. The report highlights the strategies implemented, the operationalisation of the risk management process, and the status of identified risks. The document presents a Table of Critical Risks, offering insights into the assessment and mitigation strategies for the identified main risks. The report serves as a foundational document, laying the groundwork for subsequent updates that will capture the evolving risk landscape of the BalticSeaH2 project.

By fostering transparency and accountability, this report not only outlines the current risk profile of the BalticSeaH2 project but also sets the stage for ongoing improvements and adaptations to ensure the project's success in navigating uncertainties. The BalticSeaH2 project adopts a robust three-tiered risk management model to ensure effective oversight and mitigation strategies throughout its execution.

1. Introduction

This report encapsulates the risk management framework employed by the BalticSeaH2 project. It is a dynamic document that undergoes regular updates to reflect the evolving nature of the project. Providing a comprehensive overview, the report describes the holistic risk management strategy of BalticSeaH2, explains the operationalisation of the risk management process, and presents the status of identified risks, offering insights into their assessment and mitigation strategies.

2. Risk management approach of BalticSeaH2

The BalticSeaH2 project incorporates a comprehensive risk management framework, organised in a three-tiered monitoring structure as depicted in Figure 1. This model involves three key components: the Management Committee, the BalticSeaH2 Handbook, and the Valley Steering Group.

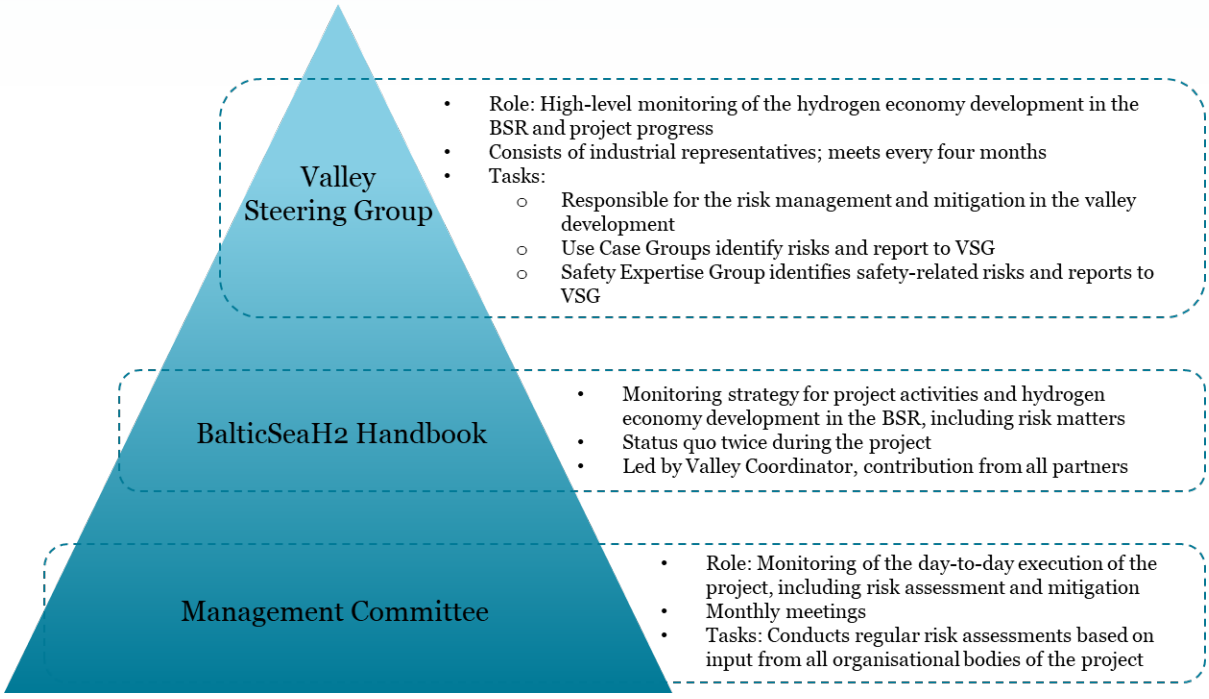

Figure 1. Overview of the monitoring hierarchy in BalticSeaH2.

Management Committee (MC)

At the operational level, the Management Committee assumes responsibility for the day-to-day execution of the project and conducts regular risk assessments. Monthly meetings serve as a robust platform for in-depth discussions, fostering efficient decision-making and swift responses to emerging challenges. Deviations from the work plan are thoroughly identified, discussed, and documented during these committee meetings.

Specifically focusing on the critical component of the BalticSeaH2 project, the implementation of Use Cases undergoes thorough evaluation in designated Use Case Groups. These groups, integral to the project management structure, report to both the Management Committee and Valley Steering Group (detailed below). Use Case risks receive ongoing attention within the Management Committee, where any identified risks or potential deviations are meticulously assessed.

This comprehensive approach ensures that the Management Committee remains vigilant in overseeing the project's operational intricacies and promptly addresses any risks or deviations that may arise during the course of the BalticSeaH2 project.

BalticSeaH2 Handbook

The BalticSeaH2 Handbook, produced under the leadership of the Valley Coordinator with contributions from all project partners, plays a pivotal role in the second layer of our risk management model. It establishes a monitoring strategy for project activities and the development of the hydrogen economy in the Baltic Sea Region (BSR). Conducting status quo assessments twice during the project timeline (D1.7 by M30 & D1.8 by M60), the Handbook provides a structured approach to risk management and offers insights into the broader context of hydrogen economy development in the BSR. The Handbook includes a set of Key Performance Indicators (KPIs) that provide a status quo from different perspectives, including technical, economic, environmental, safety, security, system-level, and regulatory aspects.

Valley Steering Group (VSG)

At the highest level of monitoring, the Valley Steering Group oversees both the hydrogen economy development in the BSR and the overall progress of the BalticSeaH2 project. Comprising representatives from various industries, this group brings diverse perspectives to the table. Meetings are convened every four months, providing a strategic overview and allowing industrial stakeholders to contribute their insights. The Valley Steering Group enhances our risk management efforts by incorporating industry expertise and ensuring alignment with broader economic trends in the region.

In parallel, the Use Case Groups play a crucial role in evaluating risks associated with the implementation of the hydrogen economy. These specialized groups not only convene regularly to delve into the intricacies of specific Use Case development but also provide progress updates and risk assessments to the Valley Steering Group. Furthermore, a dedicated organizational body known as the Safety Expertise Group (SEG), comprising Safety Experts from the Use Case Groups, convenes regularly to share safety-related information and knowledge pertaining to Use Case development. This group specifically identifies safety risks and maintains records of observed safety incidents. The Safety Manager of the project leads the SEG and, as a member of the VSG, reports on the status of safety risks during VSG meetings. The VSG, with its overarching perspective, actively monitors and documents the status of all Use Case-related risks, assesses their mitigation, and ensures a comprehensive risk management approach to facilitate the successful implementation of the hydrogen economy in the Baltic Sea region.

By integrating these three layers of risk management, the BalticSeaH2 project aims to proactively identify, assess, and address potential risks at various levels. This hierarchical approach ensures a resilient and adaptive strategy, with the Management Committee handling the operational details, the BalticSeaH2 Handbook providing a structured framework, and the Valley Steering Group overseeing the highest level of monitoring in the dynamic landscape of hydrogen economy development in the Baltic Sea Region.

3. Risk management process in BalticSeaH2

The success of the BalticSeaH2 project hinges on a robust risk management process that encompasses a systematic approach to identify, assess, and mitigate potential risks. This chapter outlines the key components of our risk management methodology, which includes the following stages:

1) Identification of Risks

The first step in our risk management process involves a thorough identification of potential risks. Through a collaborative effort involving project stakeholders, we proactively identify uncertainties, challenges, and external factors that could impact the project's objectives. This risk identification process is carried out by the Work Package groups, Task teams, the Use Case Groups, and the Safety Expertise Group who diligently examine project components in their respective meetings, ensuring a comprehensive and inclusive approach to risk identification.

Any newly identified risks or noteworthy developments are promptly brought to the attention of the Management Committee and the Valley Steering Group. These governing bodies are responsible for processing and addressing the identified risks, ensuring a cohesive and strategic response to safeguard the project's objectives. The collaborative exchange of information and swift action underscores our commitment to a dynamic risk management process that adapts to the evolving landscape of the BalticSeaH2 project.

2) Evaluation of Probability and Occurrence

Once risks are identified, our next focus is on evaluating their probability and potential occurrence. We employ a quantitative and qualitative analysis to gauge the likelihood of each risk event and understand its potential impact on the project. This step ensures that our attention is directed towards the most critical and probable risks that could affect the BalticSeaH2 project. The initial evaluation of probability and occurrence is conducted by the project group/team responsible for the identification of the particular risk or challenge, and subsequent assessments are carried out collaboratively by the Management Committee.

3) Impact Assessment

Understanding the potential impact of identified risks is crucial for effective risk management. We conduct a thorough impact assessment to quantify the consequences of each risk on project objectives, timelines, and deliverables. This assessment aids in prioritizing risks based on their severity and allows for the allocation of resources and efforts accordingly.

The impact assessment is carried out by the Management Committee, ensuring a comprehensive evaluation. Additionally, in the case of Use Case-related risks, the Valley Steering Group contributes to the assessment, paying particular attention to potential impacts on the overall hydrogen economy development in the Baltic Sea region.

4) Actions to Control and Mitigate the Risks

Armed with a comprehensive understanding of identified risks and their potential impacts, we implement strategic actions to control and mitigate these risks. This proactive approach involves developing contingency plans, implementing preventive measures, and establishing response strategies to minimize the adverse effects of potential risks on the BalticSeaH2 project. The Management Committee and the Valley Steering Group share these responsibilities, working collaboratively to ensure a unified and effective risk management strategy that safeguards the project's objectives and contributes to the overall development of the hydrogen economy in the Baltic Sea region.

5) Documentation and Follow-Up

A crucial aspect of our risk management process involves documenting each stage. We maintain a detailed Risks and Deviations Table that encompasses all identified risks and deviations, along with their assessments and corresponding mitigation strategies. The status information stored in this detailed table is summarized in Chapter 4 of this report and its subsequent versions. The updates in the report will be sourced from the detailed Risks and Deviations Table, ensuring that the Table of Critical Risks in Chapter 4 consistently reflects the latest risk status information.

In addition to the detailed Risks and Deviations Table, the BalticSeaH2 Handbook provides status quo information against a large set of KPIs twice during the project timeline, which is documented in two deliverables, D1.7 and D1.8. The KPIs offer insight into the progress of the project and also contribute to enhancing understanding of the development of the hydrogen economy in the Baltic Sea region.

Regular follow-up and review processes, overseen by the Management Committee and the Valley Steering Group, ensure that the risk management strategy remains dynamic, adapting to the evolving project landscape. Any new deviations and identified risks are recorded in the minutes of the Management Committee and the Valley Steering Group, respectively. Deviations related to project progress are also documented in the regular Project Progress Reports. This comprehensive documentation of risks and deviations in the BalticSeaH2 project promotes transparency, supports well-informed decisions, and facilitates continuous improvement.

By adhering to this comprehensive risk management process, the BalticSeaH2 project aims to proactively navigate uncertainties, optimize decision-making, and enhance the overall project resilience, ultimately contributing to the successful development of the hydrogen economy in the Baltic Sea Region.

4. BalticSeaH2 project's Critical Risks and their analysis

Table 1. Critical risks, their assessment, mitigation strategies, and actions taken.

Nr	Description of critical risk	WPs	Risk mitigation measures	Status
1	**Effect of prolonged COVID-19 restrictions** Likelihood: medium Severity: low	All	Virtual presence will replace physical if needed. A web meeting platform will be provided under WP1 activities. Event and meeting participation will depend on the options offered – if possible, physical participation will be preferred to virtual.	The project is no longer affected by COVID-19. The hybrid working models established during COVID-19 are efficiently in use in the project.
2	**Partners do not deliver the expected quality/time/budget** Likelihood: low Severity: high	All	Project planning, monitoring and quality management will detect potential lack of quality or delays. Quality assurance and risk management procedures will be put in place. All partners have their distinct roles outlined in the work plan. Constant monitoring of budgetary plans and their implementation by the coordinator and the Management Committee.	The project has started positively with active partner participation and cooperative behaviour. While a few deviations from the plan have been noted in the MC meetings and documented in the Project Progress Report (D1.9), the consortium has proactively identified strategies to adjust tasks and responsibilities, as well as to replace the cancelled Use Cases. An amendment is currently under preparation to address these adaptations.
3	**Key team members leave/cannot continue** Likelihood: medium Severity: low	All	In case of unexpected problems, new team members will be recruited. Consistent documentation, tight cooperation between and within partner organisations and regular project review meetings contribute to risk mitigation, especially in terms of being able to recruit a new team	The project is in its early phase, and many partners have recently recruited new staff for project implementation. Currently, there are no indications of key team members leaving the project.

			member quickly and to catch them up to speed without any significant loss of time resources.	
4	**Lack of communication between partners** Likelihood: medium Severity: low	All	Holding regular meetings for maintaining dialogue between the partners; implementing the outlined internal communication strategies for a smooth flow of information, oversight from the project coordinator in terms of preventing gaps and breaks in communication. The project will be managed on several levels in order to meet the set targets: CLIC act as the overall coordinator, focusing especially on the Nordic region, GG assumes the responsibility for leading all technical activities, and EHC makes sure that the Baltic partners are well involved in the project.	Project governance structures at different levels have been successfully set up, ensuring frequent communication between the project partners.
5	**Insufficient outreach to quadruple helix stakeholders** Likelihood: medium Severity: medium	WP2 WP7 WP8	In order to increase the impact of the project, dissemination and outreach will be targeted at all the stakeholder groups, including the academia, industry, public sector and general public, with the CDE plan guiding these activities in a structured, well thought out manner. Additional stakeholder engagement activities and public outreach campaigns are foreseen in WP2. The consortium includes several hydrogen clusters and associations that have members from all the relevant stakeholder groups and are connected to several hydrogen-related networks and communities.	The associated activities are presently in the planning phase. All consortium partners in charge of engagement activities have been provided with support materials, tools and contact persons to successfully include ethics & gender dimension perspectives into engagement activities as well.

6	**Inability to exploit the project results** Likelihood: low Severity: medium	WP2 WP7 WP8	WP8 specifically focuses on exploitation activities to mitigate this risk, including the contribution from virtually all other WPs that deal with demonstration and piloting, with the ultimate goal of exploiting project results. The project will target exploitation activities both at the consortium level, focusing on the post-project phase, and the BSR in general, providing insights for developing cross-border green hydrogen value chains. This will be achieved through macro-regional road-mapping, creating a vision for the region for the coming decades, and with the Replication Toolkit, which will gather the project learnings.	The project is in its initial stages. The 1st version of the exploitation plan has been developed and submitted on time in M6.
7	**Legal barriers to implement some of the solutions** Likelihood: medium Severity: medium	WP3 WP4	The lack of legal space could be a considerable construction, production, and handling risk. It will certainly take time to process the necessary regulations and this may cause delays in production, supply and consumption, affecting the progress of the project. As part of the Use Case development in WP3 and WP4, the project will screen and identify potential certifications that could delay the cases.	One of the project partners has encountered a regulatory barrier that has jeopardized their carbon negative strategy, prompting a re-evaluation of their investment plans. Since the legislation is beyond the control of the project, the consortium has taken action to identify an additional Use Case for compensation to be included in the project. Additionally, the consortium is planning to develop a Policy Brief/Position Paper explaining the particular regulatory barrier for hydrogen economy development.
8	**Missing H2 support, including lacking financial support**	All	One of the main risks is the failure of initiating a cross-border hydrogen economy between Estonia and Finland,	Although the project is only in its initial stages, we acknowledge that this risk is real

	Likelihood: medium Severity: high		leading to a negative effect for the entire BSR. This could be due to the lack of financial and legislative support from the state and to the loss of (local) government support. The first risk affects investment in the green hydrogen supply chain, and the second risk affects in particular the creation of a precondition for consumption and the start of consumption. The lack of a "personal example" of the state and local government sends a very strong negative signal to the citizens, and it is impossible to overcome this point with entrepreneurship alone. The BalticSeaH2 project will mitigate this throughout WP2 and WP7 trying to mobilise all the relevant stakeholders to promote the take-up of hydrogen technologies and co-create a vision for the macro-region. Policy planning workshops and cross-border/macro-regional road-mapping with clear business and investment plans will be key in this.	and demands well-planned and executed quadruple helix activities from the consortium. The partners are committed to planning and delivering high-quality engagement activities to foster positive attitudes and, consequently, the needed support. Additionally, the project task to discuss and assess policies and regulations has been initiated a head of time.
9	**Diffusion of innovations across the value chain not adequate** Likelihood: low Severity: medium	All	From planning and design through end use, all relevant players will be included in the form of partnerships, supporters, or local stakeholders. WP7 and WP8 activities aim at ensuring scalability, replication and exploitation. The innovation management does not lie as much in the technological solutions that will be deployed, but rather in the integrated and cross-border manner in which setting up the green hydrogen value chain will be tackled in Finland and Estonia. This knowledge and experience will be diffused as widely as possible, of course focusing on the BSR.	The project is in its initial stages. The 1st version of the exploitation plan has been developed, and the stakeholder engagement activities are presently in the planning phase.

10	**Unexpected technological issues** Likelihood: medium Severity: low	WP3 WP4	The technology offer includes documentation of risk behaviour, instructions and appropriate training for risk prevention, minimisation, and resolution. Thus, we know that documentation of risk behaviour exists, but we do not know the details. The instructions and details of the risk behaviour will become clearer once the preparation and baseline activities are underway. It will be possible to approve guidelines for the prevention, avoidance, and minimisation of risks immediately before the start of production. Production, supply and consumption comply with EU legislation and standards. The delivered technology has been tested and the corresponding certificates are available.	The technical development work for the project has just commenced.
11	**Infrastructure risks** Likelihood: low Severity: high	WP3 WP4	The partners involved in Use Case development will monitor infrastructure risks, highlighting them to both the Valley Steering Group (VSG) and the Management Committee (MC). These groups will assess the potential impacts and strategise for actions to control and mitigate these risks.	Use Case Groups have been established and will commence their work in 2024. MC has been operational since the start of the project and VSG since October 2023.
12	**Lack of green electricity** Likelihood: medium Severity: medium	WP3 WP4	For later production and delivery, one risk is the absence or scarcity of green electricity. Recently, the Baltic Sea countries have signed a declaration to commit to increase offshore wind power from today's capacity of 2.8 GW to 19.6 GH by 2030. The green electricity capacity (current, future) will be mapped in the project and taken into consideration to mitigate this risk properly.	Mapping of planned wind power and PV projects has started.

13	**Lack of clear demand of green hydrogen** Likelihood: low Severity: medium	WP7 WP8	With no clear demand of green hydrogen, the investors may see the whole sector too risky to invest in. That is what the project seeks to tackle – to bring together both the supply and demand sides – as well as mobilize additional resources to build up full value chains.	The project is in its initial stages, and the stakeholder engagement activities for full value chain development are presently in the planning phase.
14	**High production costs of green hydrogen** Likelihood: medium Severity: medium	WP6	Higher priced green hydrogen is competing against established lower priced grey options, particularly in capital-intensive sectors with low profit margins. With initial public funding to help build out green hydrogen capacities and mobilise stakeholders, the prices are expected to come down.	The project is in its initial stages, and stakeholder engagement activities are presently in the planning phase. To mitigate this risk, we will extend our quadruple helix approach to a penta helix and involve the (public) funding sector in discussions and cooperation at an early stage.
15	**Technical barriers** Likelihood: low Severity: medium	WP3 WP4	Technologies are not operating as assumed and the commercialisation will slow down. Here, thorough design and planning will mitigate the risk, with constant performance monitoring to detect concerns.	The technical development work for the project has just commenced.
16	**Undeveloped infrastructure** Likelihood: medium Severity: high	WP3	Building costs for the necessary infrastructure are too high and make it impossible to utilise the existing green hydrogen production capacity. Here, again, public funding in the early stages is crucial to start building out full value chains, providing additional impetus for further developments.	To mitigate this risk, we will involve the public funding sector in discussions and cooperation at an early stage.
17	**Safety challenges related to hydrogen handling** Likelihood: medium	WP3 WP4	Hydrogen has a wide range of flammable concentrations in air and lower ignition energy than gasoline or natural gas, which means it can ignite more easily. In addition, some metals can become brittle when exposed to	Safety Expertise Groups (SEG) has been set up, consisting of Safety Experts of each Use Case and the Safety Manager of the project. Any safety-related risks will be brought up

	Severity**:** high		hydrogen, so selecting appropriate materials is important to the design of safe hydrogen systems. Hazard realisation may dilute public acceptance.	and assessed in the SEG. SEG reports to both VSG and MC.
18	**Insufficient fresh water supply for electrolysis** Likelihood: low Severity: high	WP3 WP4	Desalinated sea water from Baltic Sea Region will be utilised for electrolysis, enabling sustainable hydrogen production.	Assessment of water availability and utilisation has commenced in WP3. The spatial-temporal availability of freshwater resources will be initially evaluated for the Finnish part of the Main Valley.
19	**Associated Partners not receiving funding** Likelihood: low Severity: low	WP2 WP3 WP4 WP6 WP7	The consortium includes several Associated Partners that have a role in the collaborative tasks involving all partners and that also participate in certain specified tasks. The current understanding of the consortium is that all Associated Partners already have secured funding for their role/part in the project. These partners are relevant but none of them are leading any task in the project and in general their contribution is limited. The consortium is big, hence, able to perform all collaborative tasks even in the case of some Associated Partner having problems with funding. However, the consortium and coordinator will guide and support any Associated Partner with funding problems, placing special focus on finding new funding for any investment cases connected to BalticSeaH2. Such support can mean, for example, matchmaking with some new potential funders or proposal preparation support.	At present, no funding risks or issues related to the Associated Partners have been identified.

5. Main changes compared to previous status

As this is the inaugural risk management report, this section is not applicable.

6. Funding statement and disclaimer

Co-funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or the Clean Hydrogen Partnership. Neither the European Union nor the granting authority can be held responsible for them.

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