SEMPRE-BIO

D7.1 Risk Management Plan V1

SEcuring doMestic PRoduction of cost-Effective BIOmethane

CETAQUA
WATER TECHNOLOGY CENTRE

Funded by
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DISCLAMER

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Acronym Glossary

RMP: Risk Management Plan	**BoP:** Balance of Plant
WP: Work Package	**PEMEL:** Proton exchange membrane electrolysis
DEC: Websites, patent filings, videos, etc	**IPR:** Intellectual Property Rights
CA: Consortium Agreement	

1. Executive Summary

SEMPRE-BIO (SEcuring doMestic PRoduction of cost-Effective BIOmethane) is a €9.9M project financed under the Horizon Europe Cluster 5 programme running from November 2022 to April 2026. SEMPRE-BIO aims to demonstrate novel and cost-effective biomethane production solutions and pathways, deemed essential to achieve the European Green Deal and climate and energy targets for 2030 and the net zero greenhouse gas emissions by 2050, and to increase the market up-take of biomethane-related technologies.

With sites in Baix Llobregat (ES), Bourges (FR), and Adinkerke (BE), SEMPRE-BIO will establish three European Biomethane Innovation Ecosystems (EBIEs), which will be indicative of the various baseline settings for biomethane production throughout Europe. The challenge is to lower investment and operating costs, optimize feedstock supply and use, identify alternative feedstock, and reduce their costs, improve plant efficiency and operations, account for carbon savings, and increase and monetize co-benefits, such as from the commercialization of the digestate or the valorisation of residual gas streams.

The aim of the Risk Management Plan (RMP) is to reduce or mitigate the risks that could impact the successful project completion. This document sets out the process of identifying risks, analysing and response planning the actions focusing on reducing or eliminating the potential risks in an effective manner to the different types of critical risks by monitoring and controlling the SEMPRE-BIO project.

The RMP is a living document to be updated throughout the project, in the context of the periodic evaluation/assessment of the project and when significant changes occur.

2. Introduction

The SEMPRE-BIO RMP is a first report on potential risks during the implementation of the project and related recovery actions, setting out mitigation actions. It aims to provide a methodology for managing the risks that are expected to arise as the project develops, for which new mitigation strategies will have to be drafted.

Risks are not only limited to the action plan but must consider its technological, business, and human environment, factors that might be enablers or blockers of project and exploitation success. The SEMPRE-BIO approach on risk definition and management will go hand in hand with the project innovation management. This process entails the identification and prioritization of risks and the application of the necessary resources to mitigate the impact of unfortunate consequences.

Risk management is an activity directed towards assessment, mitigation and monitoring of risks. Each risk will be assessed according to its probability of likelihood and its impact. The combination of probability of likelihood and impact will generate a classification of risks. The most serious risks will first be reported to the Project Coordinator, then to management meetings with the Project Steering Board and Scientific and Technical Committee. The Consortium has made a first assessment and mitigation of the project's risks and will be updated during the implementation of the project.

3. Risk Management

Risk management is the practice of identifying the risk, analysing and responding in an effective way to the different types of critical risks by monitoring and controlling the project.

At the beginning of the SEMPRE-BIO project, the Consortium forecasted a table of risks. This table will be completed and updated during the implementation of the project, in the context of the periodic evaluation/assessment of the project and when significant changes occur: it is then a living document. This Risk Management table (see Table 1) will be maintained and will be used to record all possible risks of the project and any subsequent measures or actions required. The Risk Management table will be accessible through the project management sharepoint software (Basecamp) created as an internal database for all partners.

The Consortium will discuss possible strategies to mitigate any additional risks that might be identified during the project and will then decide how they shall be dealt with. In the unlikely event of severe risks that threaten the success of the project and that are not satisfactorily manageable, the Project Coordinator will contact the Project Officer to inform her about the risk and its possible consequences.

3.1. Risk Identification

Risk identification is the process of documenting any risks that could keep a project from achieving its objective. It is the first step in the risk management process.

Risk identification will be done throughout the life cycle of the SEMPRE-BIO project, with the objective of identifying the risks as early as possible to manage them with effective planning and then carry out monitoring and control.

The topics to be considered for risk identification are: analysis of WPs, deliverable and task status. Risks can be picked up by any project member, but should canalise through the WP leaders, they will report the risks and suggestions with mitigation measures to the Project Steering Board, which will agree on the final risk and the response strategy. Identified risks will be included into the Risk Management table, written down by the Project Coordinator.

3.2. Risk Analysis

For each risk identified, it is important to assess and indicate the probability that the risk may occur and if it occurs, the severity of the potential impact. The Steering Boards members will estimate the risk likelihood, impact and overall risk level (weight). Then, for each risk, a mitigation strategy will be elaborated. The results of risk analysis will be included into the Risk Management table.

The risk is estimated using a risk matrix. The risk matrix is based on two intersecting factors: the likelihood that the risk event will occur and the potential impact that the risk event will have on the project objectives.

Risk level meaning:

- Low: either the low probability or the low impact de-classify the risk. However, it is worthy of tracking.
- Medium: The combination of likelihood and impact make this risk unacceptable and a mitigation strategy needs to be drafted.
- High: This risk is not acceptable, for it will most likely affect the project outcomes and endanger the culmination of project objectives.

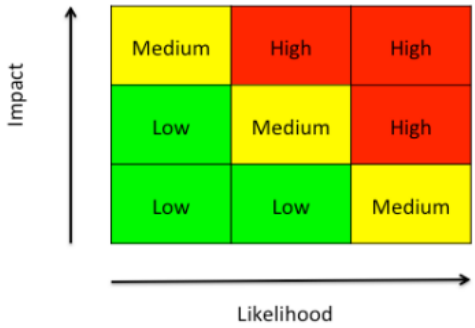

Figure 1. Risk matrix.

3.3. Risk Response Planning

Risk response plans aim to lower the risk, both by reducing the probability of risk occurrence and the impact of the risk on the project's objectives.

Risk response requires the following action plans:

- Risk description with risk assessment.
- Description of the mitigation strategy to reduce the risk.
- Designate an owner of the risk action.
- Risk action completion date.

In risk response plans, it is mandatory to pay more attention to high and medium priority risks than lower priority ones, through mitigation measures to reduce the likelihood and/or probability of the risks to an acceptable level.

For each risk, a risk response must be documented in the risk management table in agreement with the partners. After successfully implementing a set of response plans, the score of a risk could be reduced in agreement with the partners.

3.4. Risk Monitoring and Control

Risk monitoring and control is an iterative process that identifies new risks and plans mitigation strategies, keeps track of existing risks, reclassifies the risk after the mitigation measures and reports risk continuously. The Risk Management table will be accessible to all partners through the Project management sharepoint software (Basecamp).

It is the responsibility of each WP leader to communicate to the Project Coordinator about the status and effectiveness of each risk and mitigation plan in order to update the Risk Management table and assess the relevance of the tools. Each project partner is highly encouraged to communicate and discuss any possible risks and response planning with their Work Package Leader or Project Coordinator.

Risk Reviews will take place in regular project meetings, but they can also be executed during separately planned risk review meetings that can be determined based on the overall risk level of the SEMPRE-BIO project.

3.5. Risk Management Table

The following table lists all identified critical risks within the Annex 1 in the GA, which has been drafted by the Consortium at the beginning of the project and the corresponding risk-mitigation measures taken by the project team.

Table 1. Risk Management table extract.

Nº	WP	Risk Identification	Level of Risk			Risk Qualification	Actions	Status
1	WP1	DTU's reactor configuration campaign is delayed, delaying in turn reactor design and start-up	4	3	12	MEDIUM	Allocating time contingencies, early identification of bottlenecks, clear alignment of experimentation needs for reactor design between DTU and CET.	In Progress
2	WP2	Methanation reaction conversion is lower than nominal by design	6	3	18	HIGH	Oversizing the reactor, operating at lower flow rates.	In Progress
3	WP2	Achieved biomethane has not enough purity for use	4	1	4	LOW	Recirculating the biomethane to the biogas header, oversizing equipment, including scrubbing system(s), operating at lower rates.	In Progress
4	WP2	The PEMEL does not achieve the nominal production capacity of 20 Nm3/h	4	1	4	LOW	Operating at lower biogas flow rates.	In Progress
5	WP2	Either the PEMEL or the bio-methanation reactor do not allow for intermittent operation	2	1	2	LOW	De-couple to a certain extent the design of experiments from both pieces of equipment (e.g., including H2 buffer storage or a route to flare H2).	In Progress
6	WP1, WP2	Delay in the development or construction of BoP for the PEMEL	2	3	6	LOW	PEM electrolyser involved partners get in close contact with BoP developer to give necessary specifications and ensure schedule. If the delay is severe, adjust the testing plan after agreement with the project coordinator.	In Progress
7	WP2	The microbial composition is not adapted to the gaseous feedstock and homo-acetogenesis is favoured rather than methanogenesis pathway	2	3	6	LOW	Follow microbial resource management and apply bioaugmentation with pure methanogenic culture to alleviate process inhibition.	In Progress
8	WP2	The digestate does not contain all important nutrients for a sufficient growth of methanogenic microbiome	4	1	4	LOW	Supplementation with exogenous micro-elements that are scarce in the digestate.	In Progress

9	WP3	The water solidification damages the heat exchanger and/or methane slip leads to methane hidrates formation on the heat exchanger	2	5	10	MEDIUM	Introduction of an additional dehydration unit to reduce the effects for mechanical damage and resend condensates to digestor so as to capture the methane slip.	In Progress
10	WP3	Part of the H2S solidification is mixed with the CO2 and the CH4 or it cannot be regenerated by the CO2	4	3	12	MEDIUM	Reducing the amount of water in the raw biogas with traditional solutions or introducing an additional higher temperature regeneration process to restart the heat exchanger once a week.	In Progress
11	WP4	Low productivity of value-added products in the innovative technological systems	4	3	12	MEDIUM	Modification of the operating conditions and the technological configuration to improve the solubility of gases in the liquid phase and the use of other high rate biocatalyzers.	In Progress
12	WP4	Increase of the costs of the materials	2	1	2	LOW	Switching of part of the equipment and materials to cheaper ones or constructing a smaller bench unit.	In Progress
13	WP2, WP3, WP4	Delayed delivery of the equipment, components and materials required to construct the technological systems	2	3	6	LOW	Time contingencies accounted for in the construction and operation phases in project planning. Starting early the design of the demonstration plants and having continuous communication with providers and delivery times. Ranking quotations on providers not only on economic terms but also on delivery terms and reliability (past projects experience).	In Progress
14	WP5	Limited availability of process and operational data for process design primarily due to competition situation and IP-protection	2	3	6	LOW	Utilization of literature data as fallback will be utilised.	In Progress
15	WP6	Dissemination, exploitation and communication activities raise little interest	4	3	12	MEDIUM	The DEC plan will be updated according to the project needs. A low interest in the project can be spotted early, and additional, more targeted communication channels be developed.	In Progress
16	WP6	Lack of internal consortium consensus to IPR issues	4	3	12	MEDIUM	It is planned to prepare internal regulations of IPRs related legal issues and will be analyzed in course of the CA preparation. The preliminary IPR related regulations have been established.	In Progress

17	WP7	Low commitment of the partners to the project plan and deadlines	2	3	6	**LOW**	Most partners (and all with a leading role) are familiar with this type of project and have proven their commitment during proposal preparation. Clear responsibilities are allocated for each task.	Dismissed
18	WP2, WP3, WP4	Permitting of the demonstration plants delays the construction and start-up	4	3	12	**MEDIUM**	Permitting will start early in time by doing an early identification of documentation needs for the three case scenarios. For the Barcelona case a very similar legalization and permitting process has already been obtained by CET, whereas for the French case study the current permit will allow for most of the implementation and operations. The Belgium case study will be the ones where these activities will be the most active.	In Progress

4. Conclusion

This deliverable has introduced its risk management methodology with the aim to improve the chance of successful project completion and reduce the consequences of risks. This deliverable will serve as a reference for the consortium during the execution of the SEMPRE-BIO project under the supervision of the Project Coordinator.

The RMP not only helps in reducing crisis situations but also aids in preventing critical risks from occurring .

This deliverable will be regularly updated as part of the WP7 deliverables. The next regular update is due at M24 (contractual deadline 31st of October 2024).