



D1.4 Risk Assessment Report v1



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Big Energy Data Value Creation within SYNergetic enERGY-as-a-service Applications through trusted multi party data sharing over an AI big data analytics marketplace

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Abbreviations and Acronyms

Acronym	Description
BIM	Business Innovation Manager
CA	Consortium Agreement
CP	Consortium Plenary
DCOM	Dissemination and Communication Manager
DEM	Demonstration Manager
DoA	Description of Action (annex I of the Grant Agreement)
DPO	Data Protection Officer
EC	European Commission
GA	Grant Agreement
LEPI	LEgal and Policy Issues Officer
PC	Project Coordinator
PMB	Project Management Board
PO	Project Officer
PSC	Project Steering Committee
TC	Technical Coordinator
TL	Task Leader
TM	Technical Manager
ToC	Table of Contents
WP	Work Package
WPL	Work Package Leader

Table 1 – Abbreviations and Acronyms list



Executive summary

Throughout the duration of the SYNERGY project, the management process will identify and monitor technical, managerial, financial and ethical risks that might affect the project's progress towards its objectives, in order to carry out mitigation actions as early as possible.

While the Work Package (WP) Leaders are responsible for the risk assessment and monitoring within their WPs, the Project Coordinator (PC) will be ultimately responsible for the oversight of the entire project against milestones and for the risk management effectiveness.

Risks can arise from unexpected technical difficulties or scientific findings, poor communication or co-operation between the partners, resource shortage by the partners, objectives not achievable in terms of budget or feasibility, partners leaving the consortium, human operational errors: planning errors, poor quality, etc. Risks need to be identified as early as possible and their probability and impact need to be evaluated in order to assign them a rating. According to the magnitude of the rating, risks will be handled and/or monitored until they are considered low.

Risks will be continuously updated and included in the risk management plan tables.



1 INTRODUCTION

1.1 Purpose of the document

The objective of this report is to define a risk assessment methodology that can be a valid tool to decrease the probability and impact of events adverse to the project.

The risk management must provide continuous risk assessment and in case of problems, initiate the required corrective actions in co-operation with the concerned partners. To minimize the risks and potential delays or nonfulfillment of the promised goals, a general risk mitigation strategy will be prepared and will be observed during the whole projects' lifespan.

1.2 Scope of the document

Risk management is a continuous process throughout the lifetime of a project and addresses the planning of risk management, identification, analysis, monitoring and control. This document outlines policies and procedures for identifying and handling uncommon causes of project deviations that may compromise objectives (the risks). Risk assessment will be updated throughout the project lifespan as unexpected sources of risk can be identified at any time.

1.3 Structure of the document

Firstly, Section 2 explains the governance and structure of SYNERGY as it is required to identify the responsibilities of the risk management procedures of the project. Afterwards, section 3 details the risk management methodology of the project. Finally, the tables with the risks identified by the partners are shown in Section 4.



2 GOVERNANCE AND STRUCTURE OF THE PROJECT

In order to understand the Risk Management procedures, an insight of the governance and structure of the SYNERGY project [1] is included in the section.

The project management structure is based in a shallow management hierarchy, as shown in Figure 1, with transparency in the information flow in order to facilitate a team of empowered and motivated individuals to respond to the needs of new products development and large demonstrations. The responsibilities and specific tasks to be undertaken by each of the different roles within this management structure are already described in detail in D1.1 Project Handbook, together with the names of those partners taking each role. In this section, just a short summary is presented as a reminder of those roles.

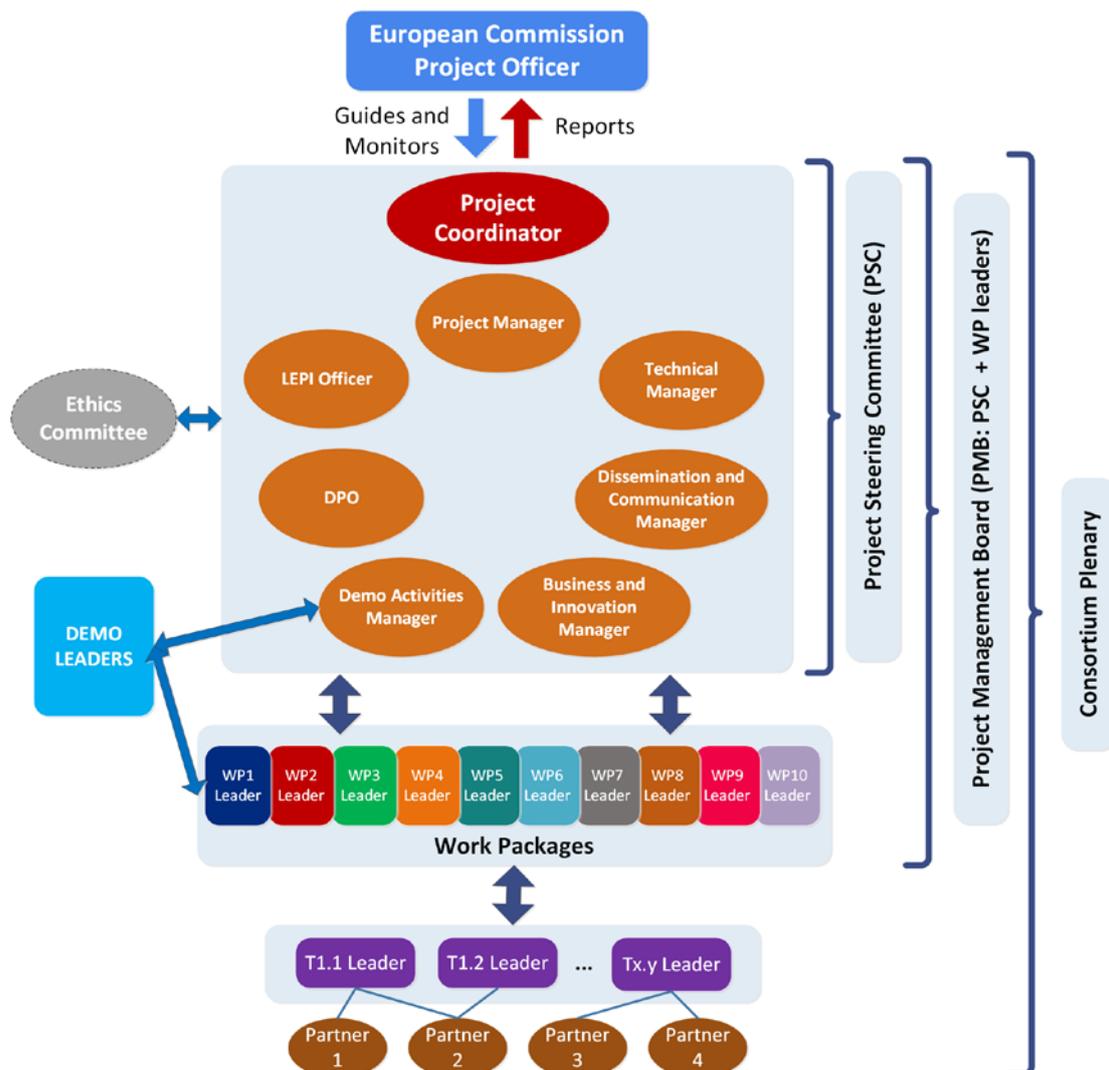


Figure 1 - SYNERGY Management Structure



The Project Coordinator (PC) takes responsibility for overall project management and counts with the support of the Project Manager (PM) on the day-to-day management activities of the project. The PC and PM are supported in management tasks by the Project Steering Committee (PSC), which comprises also the roles of: the Technical Manager (TM), who supports the PC in technical matters; the Dissemination and Communication Manager (DCOM) who will be responsible for all dissemination and communication activities and direct interaction with end-users, mass media and energy sector stakeholders; the Business and Innovation Manager (BIM) will be in particular responsible for the exploitation activities and innovation management; the Demonstration activities Manager (DEM) will coordinate demonstration activities of the project; finally, the Legal and Policy Issues Officer (LEPI) as the coordinator of all the activities related to legal and policy issues that may arise in the project and the Data Protection Officer (DPO) to supervise the data protection and information security aspects including also the alignment with the new GDPR regulation. Related to the latter, an Ethical Advisory Committee (EAC) is established in the project to closely monitor any ethical issues that may arise in the project.

Furthermore, the Project Management Board (PMB), is composed of WP leaders (WPL), responsible for activities and objectives specified in the Work Packages of the project plan, and the PSC. Within each work package the Task leaders (TL) will be the direct responsible for the day-to-day work needed to carry out the tasks related to their specific activity.

Finally, all the partners are represented in the Consortium Plenary (CP). The CP is the key liaison between the project and partner organisations.

Focusing on the risk assessment procedures, it is the responsibility of the Project Coordinator and the Technical Coordinator to provide continuous risk assessment and in case of problems, initiate the required corrective actions in co-operation with the concerned partners. The general risk mitigation strategy must be part of this process and will be observed during the whole projects' lifespan, to minimize the risks and potential delays or nonfulfillment of the promised goals.



3 RISK MANAGEMENT METHODOLOGY

The risk management in SYNERGY is based on the FERMA standard [2].

The consortium's experience in managing complex international projects in conjunction with its technological competence on communication and networking permits to identify the following main areas of possible risks:

- Technical: lack of competence to overcome unexpected difficulties.
- Financial: deterioration of the economic situation of a partner, which imposes a stop or an unacceptable reduction of all its activities.
- Key resources availability: abandon of the participation to the project of resources with key roles.

Various combinations of these three main negative factors could also happen with the effect to increase their impact.

The level of **technical** risk is intrinsically reduced by the composition of the SYNERGY Consortium, thanks to the participation of a well-assorted set of primary Industries and Research Centres, with a demonstrable consolidated experience as leaders in the technological areas in which each of them contributes to the project.

In case of **financial** problems or lack or **resources** availability, the corrective measures will include distributing to the remaining partners the activity not fulfilled or to transfer them to a third party, or a combination of the two. The corrective measures will be chosen after an evaluation of their impact and relevance on the project.

For the SYNERGY project, a risk is defined as an event that may or may not occur in the future, which could potentially have an adverse effect on a team's progress and success. A risk has a severity of impact and a probability of occurrence – formal definition can be found in next section.

3.1 Definitions

Risk

Risk is a measure of the inability to achieve overall project objectives within defined cost, schedule, and technical (performance and quality) constraints and has two components:



1. The probability of failing to achieve a particular outcome and
2. the consequences (impact) of failing to achieve that outcome.

For SYNERGY, risk is a measure of the difference between actual performance of a process and the known best practice for performing that process.

Risk can also be the potential that a given threat will exploit vulnerabilities of an asset or group of assets to cause loss of, or damage to, the assets. It is ordinarily measured by a combination of effect and likelihood of occurrence.

Risk Event

Risk events are those events within SYNERGY that, if they go wrong, could result in problems in the development of the expected research results, production and assessment of the prototypes, and dissemination of the results. Risk events should be defined to a level such that the risk and causes are understandable and can be accurately assessed in terms of likelihood/probability and consequence to establish the level of risk.

Type of Risk

A **Technical Risk** is the risk associated with the evolution of the research results and the prototypes development of SYNERGY affecting the level of performance necessary to meet the requirements of the DoA.

A **Financial Risk** is associated with the ability of the project to achieve its cost objectives as determined in the DoA. Two risk areas bearing on cost are:

1. The risk that the cost estimates and objectives are not accurate and reasonable and
2. the risk that project execution will not meet the cost objectives as a result of a failure to mitigate technical risks.

Schedule Risks are those associated with the adequacy of the time estimated and allocated for the development, production, and fielding of the system. Two risk areas bearing on schedule risk are:

1. The risk that the schedule estimates and objectives are not realistic and reasonable and
2. the risk that program execution will fall short of the schedule objectives as a result of failure to mitigate technical risks.



Risk Ratings

This is the value that is given to a risk event (or the overall project) based on the analysis of the likelihood/probability and impact of the event. For SYNERGY, risk ratings of Low, Moderate, or High are assigned based on the following criteria:

- **Low Risk:** Has little or no potential for increase in cost, disruption of schedule, or degradation of performance. Actions within the scope of the planned project and normal management attention should result in controlling acceptable risk.
- **Moderate Risk:** May cause some increase in cost, disruption of schedule, or degradation of performance and/or quality. Special action and management attention may be required to control acceptable risk.
- **High Risk:** Likely to cause significant increase in cost, disruption of schedule, or degradation of performance and/or quality. Significant additional action and high priority management attention will be required to control acceptable risk. This type of risk may be subject to a report to the Commission.

Contingency Plan

Once identified and assessed, it is essential to trace risks both in their status (Risk Monitoring) and with respect to necessary activities. A contingency plan should cover the registration and reaction to the change of environmental conditions to avoid risk events. In case of materialization of risks, the overall contingency plan can be further elaborated including the mitigation actions.

3.2 Risk Management Organisation and Responsibilities

The SYNERGY Project Coordinator (PC), is the overall risk manager and responsible for:

- Briefing the consortium on the status of SYNERGY risks during CP meetings.
- Tracking efforts to reduce high risk to acceptable levels.
- Facilitating consortium-level risk assessments during PMB meetings.
- Combining risk briefings, reports, and documents as delivered by the WP leaders and required for project reviews by the Commission.

The PMB, and in particular the Technical Coordinator (TC), assists the PC with:



- Maintaining this section of the Project Management Plan - Risk Management – updated (as a supporting process) for SYNERGY.
- Provision and maintenance of the risk information form.

The Work Package Leaders are responsible for the risk assessment within their work packages:

- Risk identification.
- Risk analysis.
- Risk handling.
- Risk information to the PC (in case of moderate or high risk).
- Risk monitoring.
- Briefing the respective Work Package members on the status of risks.
- Tracking efforts to reduce low and moderate risk to acceptable levels.
- Preparing risk briefings, reports, and documents required for project reviews during PSC meetings.

3.3 Risk Management Process

This section describes the SYNERGY risk management process and provides an overview of the SINERGY risk management approach. Figure 2 Shows, in general terms, the overall risk management process that will be followed in SYNERGY. Each of the risk management functions shown in Figure 2 is discussed in the following paragraphs, along with specific procedures for executing them.

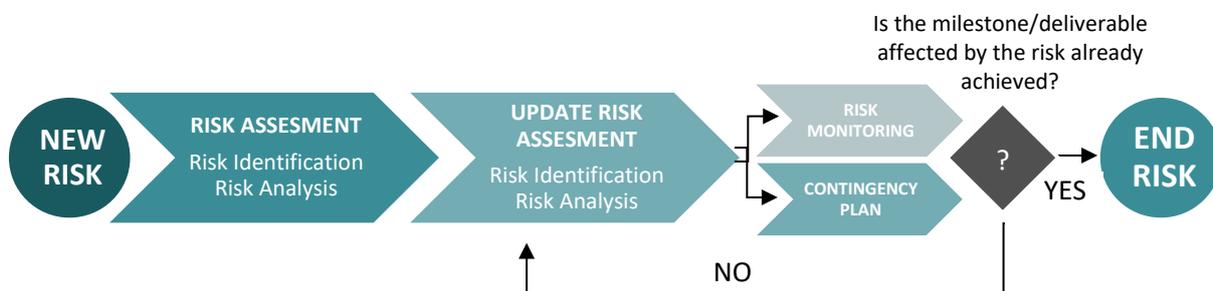


Figure 2 – Risk Management Process

3.3.1 Risk Assessment

Risk assessment includes the identification of critical risk events/processes, which could have an adverse impact on the project, and the analysis of these events/processes to determine the likelihood of occurrence/process variance and consequences.

Risk assessment is an iterative process. Each risk assessment is a combination of risks identified/analysed in the previous phase and the identification/analysis of risks on current milestones/deliverables according to the DoA.

3.3.1.1 Risk Identification Process and Procedure

Risk identification is the first step in the assessment process. The basic process involves searching through the entire SYNERGY project plan to determine those critical events that would prevent the project from achieving its objectives.

All identified risks will be documented in the Risk Table – see section 3.4 -, with a statement of the risk and a description of the conditions or situations causing concern and the context of the risk.

Risks will be identified by all individuals in the SYNERGY project, *particularly by the Work Package Leaders.*

The basic procedure of identifying risks consists of the following steps:

- 1 Understand the requirements and the overall project quality and performance goals. Examine the operational (functional and environmental) conditions under which the values must be achieved by referring or relating to the DoA.
- 2 Identify the processes and activities (tasks) that are needed to produce the results.
- 3 Evaluate each activity/task against sources/areas of risk.

3.3.1.2 Risk Indicators

Following indicators are helpful for identifying risks:

- Lack of stability, clarity, or understanding of requirements: Requirements drive the research and the design of the prototypes. Changing or poorly stated requirements guarantees the introduction of performance, cost, and schedule problems.
- Failure to use best practices virtually assures that the project will experience some risk. The further the deviation from best practices, the higher the risk.



- Insufficient or inadequate resources: People, funds, schedule, and tools are necessary ingredients for successfully implementing a process. If any are inadequate, to include the qualifications of the people, there is risk.
- Test Failure may indicate corrective action is necessary. Some corrective actions may not fit available resources, or the schedule, and (for other reasons as well) may contain risk.
- Negative trends or forecasts are cause for concern (risk) and may require specific actions to turn around.
- Communication is a critical success factor for SYNERGY. Failure to provide (push) available information actively as well as to demand (pull) required information actively will both introduce considerable risk.

3.3.1.3 Risk Analysis Process and Procedure

Risk analysis is an evaluation of the identified risk events to determine possible outcomes, critical process variance from known best practices, the likelihood of those events occurring, and the consequences (impact) of the outcomes. Once this information has been determined, the risk event may be rated against the project's criteria and an overall assessment of low, moderate, or high may be assigned.

The basic procedure for analysing risk comprises the following steps:

- 1 Gather all identified risks.
- 2 Assignment of likelihood/probability and consequence to each risk event to establish a risk rating.
- 3 Prioritisation of each risk event relative to other risk events.
- 4 Quantitative analysis.

For each risk identified during the risk identification process an assignment using likelihood/probability- and impact-assessments will be performed. A risk assessment matrix is used for SYNERGY, to provide a quantitative approach for this process.



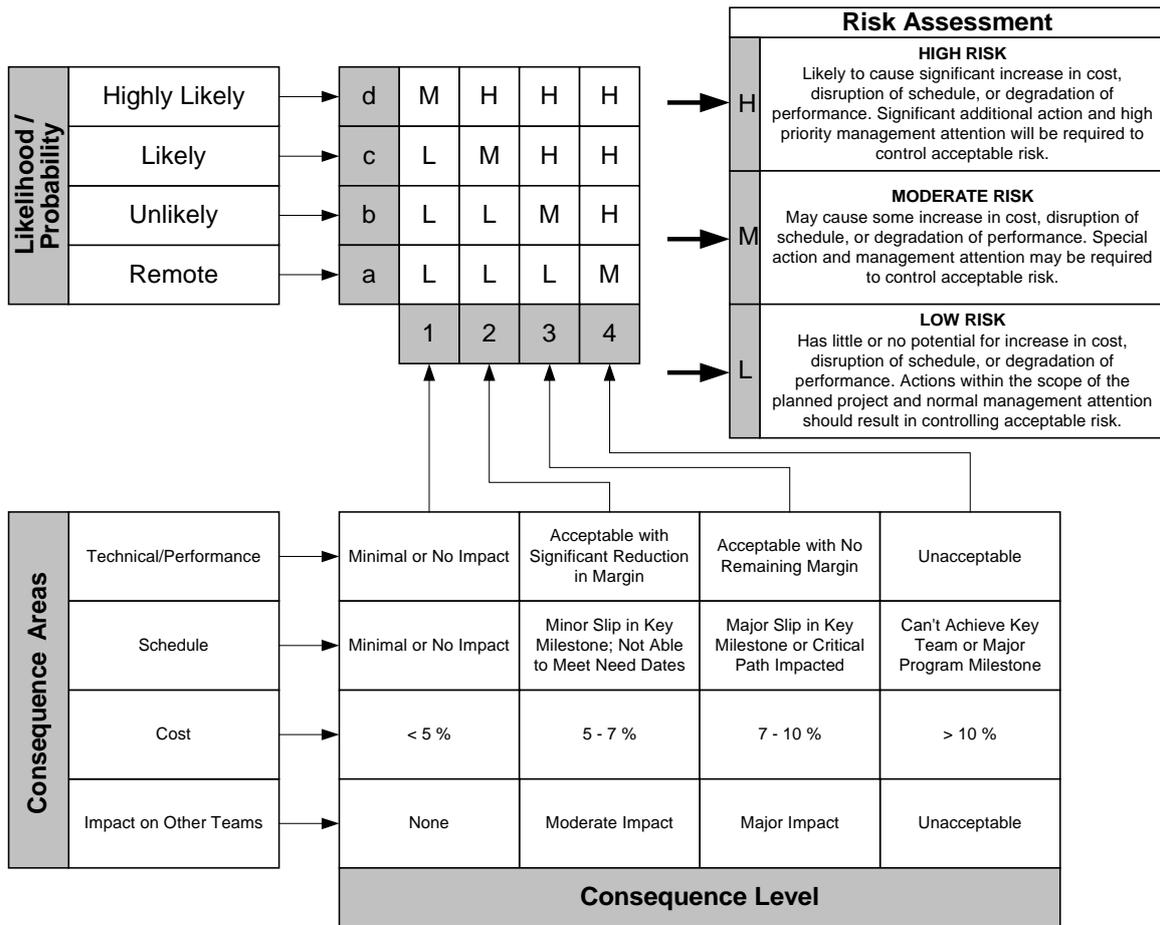


Figure 3 – Risk Assessment Matrix

The following items provide some more details on the most important issues of the risk assessment matrix:

- Likelihood/Probability:** For each risk area identified, the likelihood/probability of the risk must be determined. There are four levels (a-d) in the SYNERGY risk assessment process, with the corresponding criteria of Remote, Unlikely, Likely and Highly Likely. If there is zero likelihood of an event, there is no risk per our definition.
- Consequence/Impact:** For each risk area identified, the following question must be answered: Given the event occurs, what is the magnitude of the consequence? There are four levels of consequence (1-4) for this project. Further, there are four areas that we will evaluate when determining consequence: technical performance, schedule, cost, and impact on other teams (work packages). At least one of the four consequence areas need to apply for there to be a risk; if there is not adverse consequence in any of the areas, there is not risk at all.



- **Technical Performance:** this category refers to content and includes all requirements that are not included in the other three metrics of the consequence table.
- **Schedule:** this category refers to impacts in the overall time framework of the project. It is important to avoid excluding a consequence level from consideration just because it does not affect the work plan of a specific team/work package – i.e. try to have the whole SYNERGY consortium in mind.
- **Cost:** since costs vary significantly within SYNERGY, the percentage criteria shown in the matrix may not strictly apply at the lower levels of the work breakdown structure. Therefore, the work package leaders may set the percentage criteria that best reflect their situation, but have to report any deviation from the matrix to the PC.
- **Impact on Other Teams (work packages):** both the consequence of a risk and the mitigation actions associated with reducing the risk may impact another team. This may involve additional coordination or management attention (resources) and may therefore increase the level of risk.

3.3.1.4 Evaluation of Risks

During Risk Analysis, it is possible that identified scenarios of occurring risk events cause impact to several impact areas. In this case, a consequence combination is present and the worst case of the risk assessment (high risk, moderate risk, low risk) is applicable and influences the required actions as described in the matrix. Of course, all identified consequence areas to a risk event must be recorded and the consequence area caused the final assessment has to be clearly identified.

3.3.1.5 Quantitative Analysis

After completion of the risk analysis, the quantitative analysis takes place and assigns a rating to each risk (low, medium, high). This finally yields an overview on the risk status over the entire course of the project and is part of the risk table in section 3.4.

3.3.2 Risk Monitoring

3.3.2.1 Risk Monitoring Process

Risk monitoring systematically tracks and evaluates the performance of risk-handling actions. It is part of the management board function and responsibility and will not become a separate discipline.



Essentially, it compares predicted results of planned actions with the results actually achieved to determine the status and the need for any change in risk-handling actions.

To ensure that significant risks are effectively monitored, risk-handling actions will be reflected in risk table and analysed at each CP meeting. Identifying these risk-handling actions and events in the context of the work breakdown structure establishes a linkage between them and specific work packages, making it easier to determine the impact of actions on cost, schedule, and performance.

3.1.1.1 Risk Monitoring Procedure

Each member of the consortium is responsible for monitoring and reporting the effectiveness of the handling actions for the risks assigned.

- Risks rated as **High** will be reported to the PC, who will handle and track them until the risk is considered Medium or Low and recommended for "Close Out".
- Risks rated as **Moderate** will be reported to Ws, who will also track them until the risk is considered Low and recommended for "Close Out". However, the risk will be handled within the work package under the responsibility of the work package leader.
- Risks rated as **Low** are tracked within the work package and monitored continuously to ensure they stay low.

The risk management process is continuous. Information obtained from the monitoring process is fed back for reassessment and evaluations of handling actions to improve the process itself in co-operation with the risk manager and the quality manager.

3.3.3 Contingency Plan

3.3.3.1 Risk Handling Process

After the project's risks have been identified and assessed, the approach to handle each significant risk must be developed. There are essentially four techniques or options for handling risks:

- Avoidance (application of tasks in order to avoid the risk event).
- Control (watch the environmental conditions for influences on an already assessed risk).
- Transfer (application of tasks to set a risk to a lower level).
- Assumption (base a decision for handling plans on the assumption the risk event happens).



For all identified risks, the various handling techniques should be evaluated in terms of feasibility, expected effectiveness, cost and schedule implications, the effect on the system's technical quality/performance and the most suitable technique selected.

The results of the evaluation and selection will be included and documented in the risk table. This documentation will include:

- What must be done,
- the level of effort and materials required,
- the estimated cost to implement the plan,
- a proposed schedule showing the proposed start date,
- the time phasing of significant risk reduction activities,
- the completion date,
- their relationship to significant Project activities/milestones,
- recommended metrics for tracking the action,
- a list of all assumptions,
- the person responsible for implementing and tracking the selected option (usually the responsible Work Package leader).

3.3.3.2 Risk Handling Procedure

The respective Work Package Leader or (in case of high risk) the PC is responsible for evaluating the risk handling options that are best fitted to the project's circumstances. Once approved, these are included in the work package's or project's strategy or management plans, as appropriate.

For each selected handling option, the responsible project team member will develop specific tasks that, when implemented, will handle the risk. The task descriptions should explain what has to be done, the level of effort, and identify necessary resources. The team member should also provide a proposed schedule to accomplish the actions including the start date, the time phasing of significant risk reduction activities, the completion date, their relationship to significant project activities/milestones and a cost estimate. The description of the handling options should list all assumptions used in the development of the handling tasks.



3.4 Risk Table

The main tool to keep track of the different identified risks is the Risk Table. It contains all the fields to correctly assess, monitor and mitigate a risk.

The table is structured considering the WPs in SYNERGY in order to create a direct connection between the risks and the responsible of its control. It could be the case that the risk manager – or WP leader – is not the same as the risk responsible – partner that should provide an action plan and mitigate the problem.

The risk table provides an easy way to quantify the severity of the problem. It implements the risk assessment matrix described above and a Global Risk Indicator that considers the assessment of the four consequence areas as a whole.

In this way, the partner identifying a risk, only has to indicate the probability of the risk (HL=Highly Likely=4; L=Likely=3; U=Unlikely=2; R=Remote=1) and the impact in each of the consequence areas (1 Minimum, 4 Maximum). The table is capable of translating the assessment into the three categories (high risk, moderate risk, low risk) and calculate the Global Risk Indicator as an average of the different areas (0 Minimum, 4 Maximum).

As explained before, a low global indicator may still imply a high risk, since the worst case should be always considered. A high risk in a single area will imply a low global indicator; however, it requires the maximum priority and attention. The global indicator serves to prioritize and order risks with the same qualification but affecting more than one area.



4 SYNERGY RISK MANAGEMENT TABLES

In this section, the reader can find the list of risks foreseen by the own partners in SYNERGY.

4.1 SYNERGY risk management table

The following risk table is also available at the project repository.



Nr of Risk	WP leader or Risk Manager	Date		Risk description	Type of Risk (Technical/Financial/Schedule)	Risk responsible	Milestone or deliverable	Probability HL/L/U/R	Consequence/Impact 1=Minimum-4=Maximum				Risk Assessment	Global Risk 0=Minimum 4=Maximum	Dates and trends			Contingency Plan or link to document	Comments
		Identification	Last update						Technical Performance	Schedule	Cost	Impact on other teams			Open	Trend (+ - =)	Close		
WP1-1	ETRA	01/01/2020		Losing critical staff or partners at crucial point of the project	Technical /Schedule	ETRA		2	2	1	2	2	LOW	0,875	01/01/2020			Regular monitoring / The consortium has enough diversity and expertise to replace them by other qualified staff within the same organisation or within the consortium / The knowledge of the rest of partners can cover defaulting partners or partners that leave during the project execution period.	
WP1-2	ETRA	01/01/2020		Technical/ administrative disagreement among consortium partners	Technical	ETRA	M6	2	1	2	1	1	LOW	0,625	01/01/2020			Continuous communication between all the partners / The PM is the responsible for solving conflicts during the project. If necessary, the CP will decide the right solution according to the CA.	
WP1-3	ETRA	01/01/2020		Unexpected delay delivering deliverables	Schedule	ETRA	D1.1	2	2	2	1	3	MODERATE	1	01/01/2020			Regular monitoring of the project / Related WP leaders and task leaders will be supported by other partners not involved before. In parallel the periodic conference calls in the WP scope will prevent undesired delays and in case that a delay is foreseen,	
WP1-4	ETRA	01/01/2020		Communication problems among partners	Schedule	ETRA	D1.1, M6	2	1	2	1	2	LOW	0,75	01/01/2020			The QAP will define the communication procedures and the use of ICT communication tools will be encouraged / The PM is the responsible of solving communication problems, establishing communication flows and calling to bilateral meetings if necessary	
WP1-5	ETRA	01/01/2020		WPs resources not well balanced	Technical / Financial	ETRA	D1.1	1	2	1	1	1	LOW	0,3125	01/01/2020			Regular monitoring of the project / Monitoring of the work and reallocation of resources by the SC in other WPs where necessary.	



WP2 Use Cases, Business Requirements and Architecture Design	WP2-1	UBITECH	01/01/2020		Lack of maturity of key technological components.	Technical	UBITECH, S5	MS4	1	3	1	2	3	LOW	0,5625	01/01/2020		Regular monitoring of the project / Verification of technologies in periodic Living Lab meetings / The technologies used as reference for the SYNERGY implementation (technology brought from partners) will require at least TRL6.	
	WP2-2	S5	01/01/2020		Reluctance from pilot partners to provide data due to confidentiality and security issues.	Technical	S5, ETRA	D2.3, MS3	2	3	2	3	3	MODERATE	1,375	01/01/2020		Consortium Agreement with terms regarding access to data and existing knowledge / Additional confidentiality agreements between the demo partners and the supporting technology partners for the knowledge/ data which is characterized as "sensitive" and "confidentiality"	
	WP2-3	S5	01/01/2020		Significant deviations from the planned technical expectations	Technical	S5, ETRA	MS2	1	2	1	1	2	LOW	0,375	01/01/2020		Iterative development periodically verified in all project meetings guarantees an early detection of deviations / The integration of mature technologies minimizes the chance of significant deviations / TM and BIM will monitor the technical development process	
	WP2-4	S5	01/01/2020		Unavailability of data that would lead in inefficient analytics and optimization methods/algorithms	Technical	S5, ETRA	MS3	2	3	2	2	3	MODERATE	1,25	01/01/2020		Regular monitoring of the project / SYNERGY team includes experts with deep knowledge in their domains to ensure the avoidance of assumptions or simplifications during modelling / Demo partners willing to install	
	WP2-5	VERD	01/01/2020		Performed requirements analysis is ineffective resulting in project drifting into wrong direction	Technical	S5, VERD	MS2	1	3	2	2	3	LOW	0,625	01/01/2020		The TM and respective TL hold significant experience, being TMs in several previous similar projects. / TM and TL will monitor the definition process.	
	WP2-6	VERD	01/04/2020	24/04/2020	Light engagement of project partners during the early stages of the project could lead to delays in the finalization of project's use cases, minimize the available timeframe and	Technical	GECO, VERD, ETRA, S5	D2.1, MS2	2	3	2	2	3	MODERATE	1,25	01/04/2020		Regular monitoring of the requirements definition process. Frequent updates to coordination team who can lead the way as exemplary WP leaders in their UC definitions and finalization. Remote engagement from GECO to ensure that LIs are active continually.	We have observed consecutive delays in the agreed delivery plan of T2.1
	WP2-7	VERD	01/04/2020	24/04/2020	Some of the use cases defined in WP2 may only be implemented in a few demo sites due to missing preconditions	Technical	WP leaders (ETRA, VERD, UBI, ICCS, VTT) Demo Leaders (HEDNO,	D2.1, MS2	1	3	1	1	1	LOW	0,375	01/04/2020		WP leaders to coordinate closely with the all appropriate demo leaders/partners who are related (as per DoA) to the UCs & BRs of their WP to make sure that all specific features of the Demo Sites are taken under consideration.	The strategy followed in the first iteration for the elicitation of the UC was a centralized one, whereby each partner contributes to the respective UCs. This has created some
	WP2-8	VERD	01/04/2020	24/04/2020	Significant delay from involved partners in the completion of the questionnaires on	Schedule	UCY, GECO, VERD	D2.3, MS3	1	1	3	2	1	LOW	0,4375	01/04/2020		Request formal commitment from each relevant partner on their response intentions	



WP3 - End-to-end Interoperable Big Data Management Platform	WP3-1	UBITECH	01/01/2020		Interoperability problems between components that have been built on heterogeneous frameworks	Technical	UBITECH, SS, KONCAR	MS4	1	2	1	1	2	LOW	0,375	01/01/2020		Partners will use best practices to prevent interoperability thrust while assessing the design specifications for each component. Compliance with available open standards will ensure standards-based interoperability / Consortium partners are deeply involved in standardization committees and possess deep knowledge of interoperability issues to be addressed in SYNERGY / TM and technical partners will agree any technical decision that may impact interoperability.	
	WP3-2	UBITECH	01/04/2020	24/04/2020	The possible delays in the plan for the requirements extraction and the formulation of the platform's architecture performed in WP2	Technical	UBITECH, SS	MS4	1	1	1	1	1	LOW	0,25	01/04/2020		The WPL and the TM will regular monitor the activities performed and closely follow the progress in accordance with the formulated plan for the delivery of the services of the platform	
	WP3-3	KONČAR	15/05/2020	01/06/2020	Difficulties in establishing a jointly supported and embraced common information model	Technical/Schedule	KONCAR, UBITECH, SS	MS4	3	4	2	1	2	HIGH	1,6875	01/06/2020		The inability to come up with a common information model highly impacts the project as most functionalities of the project would be affected. Clear communication between the partners involved is established and no decisions will not be done unilaterally and the methodology will be sanctioned by the three principal members involved in the team, and the execution will be supervised jointly.	This technical risk and misunderstandings related to this became very visible during the first technical meeting. Actions are being taken in the scope of T3.1 to mitigate the risk and the table will be updated accordingly



WP4 - Big Data Analytics and Data Sharing Mechanisms	WP4-1	S5	05/06/2020	Unavailability of representative data that leads in inefficient models, analytics and (eventually) business value	Technical	S5	MS6, MS7, MS9	2	3	2	3	3	MODERATE	1,375	05/06/2020	Data landscaping and collection activities start from M1 (in the context of T2.3) and are continuously evolving to collect the necessary data at the right level
	WP4-2	S5	05/06/2020	Limited performance or accuracy of the models and analytics provided by SYNERGY	Technical	S5	MS6, MS7, MS9	2	3	1	2	3	MODERATE	1,125	05/06/2020	Proper selection of training and testing data sets; Frequent stress tests for models' performance and accuracy over "unknown" data
	WP4-3	S5	05/06/2020	Low cooperation between data scientists and energy stakeholders that leads in limited business value of analytics results	Technical	S5	MS6, MS7, MS9	2	3	3	1	3	MODERATE	1,25	05/06/2020	Frequent communication between the demo partners and technical partners; Dedicated focus groups (in the context of the SYNERGY living labs) to discuss analytics results
	WP4-4	S5	05/06/2020	Limited data sharing among energy stakeholders due to organizational, legal or other barriers	Technical	S5	MS6, MS7, MS9	2	3	2	3	3	MODERATE	1,375	05/06/2020	Frequent communication between the demo partners and technical partners; Dedicated focus groups (in the context of the SYNERGY living labs) to discuss data sharing progress
	WP4-5	S5	05/06/2020	Lack of alignment between the offered data analytics and sharing mechanisms in SYNERGY and the actual demonstrators' needs	Technical	S5	MS6, MS7, MS9	1	2	3	3	4	MODERATE	0,75	05/06/2020	Frequent communication between the demo partners and technical partners; Dedicated focus groups (in the context of the SYNERGY living labs) to elicit requirements and needs
	WP4-6	S5	05/06/2020	Failure to leverage state-of-the-art data analytics and sharing technologies	Technical	S5	MS6, MS7, MS9	1	3	3	3	3	LOW	0,75	05/06/2020	Continuous technology watch across the different development activities
	WP4-7	S5	05/06/2020	Delays in the development of the core data analytics and sharing components	Technical	S5	MS6, MS7, MS9	1	2	3	3	3	LOW	0,6875	05/06/2020	Continuous monitoring of the development activities; Adoption of agile patterns so as to early detect any delays and take appropriate preventive/corrective action



WP5 - Advanced Grid-level Analytics for Optimized Network and Asset Management Services and Applications	WP5-1	CUERVA	15-may		If there is not an appropriate commercial tool for the electricity cost estimation the PPA that is expected to be sign between CUE and COBRA will not be relevant	TECHNICAL	CUERVA/C OBRA		2	3	2	1	1	MODERATE	0,875	15/05/2020			The consortium should adquire a commercial tooling for the price estimation
WP7 - Building/District-level Analytics for Optimized Energy Performance Management	WP7-1	CIRCE	19/05/2020		Availability of data input from DEMOS	Technical	CIRCE		2	3	2	1	3	MODERATE	1,125	19/05/2020			Advance the request of data, propose the signing of NDAs if needed
	WP7-2	CIRCE	19/05/2020		Availability of data measurement from DEMOS	Technical	CIRCE		2	3	2	1	3	MODERATE	1,125	19/05/2020			Explore new ways to extract the information
	WP7-3	VTT	01/01/2020		Data availability, missing data set	Schedule	FVH, CAV, KRK, KONCAR, EEE	D7.3	2	3	1	1	1	MODERATE	0,75	01/02/2020			Change data set if so needed, add metering technology if possible
	WP7-4	VTT	01/01/2020		Unpredicted restrictions in demo site technological systems	Technical	FVH, CAV, KRK, KONCAR, EEE	D7.2 - D7.3	1	2	1	2	1	LOW	0,375	01/02/2020			Possible actions: change demo site, negotiate updates of said technological systems, possible changes to systems, etc.
	WP7-5	VTT	01/01/2020		Lack of maturity of key technological components	Technical	FVH, CAV, KRK, KONCAR, EEE	D7.2 - D7.3	1	3	2	1	1	LOW	0,4375	01/02/2020			Possible actions: change demo site, negotiate updates of said technological systems, possible changes to systems, etc.
WP8 - Demonstration and Impact Assessment	WP8-1	HEDNO	01/01/2020		Limited acceptance by the end-users	Technical	ICCS, ETRA, S5, GECCO	MS10, MS11, MS12	1	1	2	2	2	LOW	0,4375	01/01/2020			Well defined user requirements and baseline, along with cost-benefit validation of the solution / TM and BIM will follow up and monitor the user requirements activities accomplishment / Specific engagement activities are foreseen to ensure co-creation with the end-users towards enhanced acceptance
	WP8-2	CIRCE	19/05/2020		Availability of data input from DEMOS	Technical	CIRCE		2	3	3	1	3	MODERATE	1,25	19/05/2020			Advance the request of data, propose the signing of NDAs if needed
	WP8-3	CUERVA	15/05/2020		Problems in adquiring data in nearly real time from the meters	Technical	CUERVA		2	3	2	3	1	MODERATE	1,125	15/05/2020			Explore new ways to extract the information nearly to real time



WP9 - Dissemination, Communication and Stakeholder Engagement	WP9-1	GECO	01/01/2020		Failure to fully engage stakeholders in demo sites and technical development	Technical	GECO, demo and WPLs		2	2	3	1	3	MODERATE	1,125	01/02/2020		Each of the involved partners has significant experience working with the required stakeholders, will build on their existing initiatives and utilise the strong local networks of consortium partners in the pilot areas to identify and recruit stakeholders for each of the proposed engagements. In addition, the user-driven innovation approach (LLs) is designed to create and sustain stakeholder engagement.
	WP9-2	GECO	01/01/2020		Disconnect on the ways to integrate stakeholder feedback leading to a delay in realising task outcomes	Technical	GECO, task and WPLs		3	3	1	1	3	HIGH	1,5	01/02/2020		Any potential disconnect is negated by the research expertise of the partners. In addition, the user-driven innovation approach (LLs) is designed to avoid such disconnect.
WP10 - Exploitation and Business Innovation	WP10-1	MAG	01/01/2020		Out of the radar competition could hinder innovation and commercialization of results	Technical	MAG, ETRA	D10.5, D10.6, D10.7	1	2	1	2	1	LOW	0,375	01/01/2020		Market intelligence activities will ensure continuous monitoring and analysis of the market and competition landscape/ The BIM will ensure the thoroughness and quality of the resulting reports.
	WP10-2	ETRA	01/01/2020		Disputes over ownership of IPR amongst consortium partners	Schedule	ETRA	D10.4	1	1	2	2	2	LOW	0,4375	01/01/2020		Standard IPR and access rights clauses included in the CA signed before the project started in order to avoid future disputes. The consortium has already discussed these aspects for the avoidance of such problems. The PM together with the BIM are responsible for solving such conflicts. If necessary, the PSC will decide according to the CA.



4.2 SYNERGY COVID-19 risk management table

Due to the COVID-19 outbreak, the consortium has performed further risk management in order to reduce negative impacts due to this exceptional situation.

The SYNERGY project started in January 2020 and two months later (mid-March) the coronavirus outbreak had as a consequence the declaration of alarm status in several countries of the European Union, therefore affecting many activities related with the project work plan.

As SYNERGY has not started yet its demonstration activities, the COVID-19 seems no to have an important negative impact in the project and will not lead to any delay. Some other work in progress has also been considered as part of the assessment and the proper corrective actions have been applied.

The following risk table is also available at the project repository.



Nr of Risk	WP leader or Risk Manager	Date		Risk description	Type of Risk (Technical/Financial/Schedule)	Risk responsible	Milestone or deliverable	Probability HL/L/U/R	Consequence/Impact 1=Minimum, 4=Maximum			Risk Assessment	Global Risk 0=Minimum 4=Maximum	Dates and trends			Contingency Plan or link to document	Comments	
		Identification	Last update						Technical Performance	Schedule	Cost			Impact on other teams	Open	Trend (+ = -)			Close
WP1 - Project Management and Ethics Coordination	WP1-1	ETRA	24/03/2020		Technical meeting planned for 13-14 May, postponed or cancelled due to COVID-19	Schedule	ETRA, S5		3	2	2	1	1	MODERATE	1,125	01/04/2020		Exploring other possibilities: an alternative is to organise online meeting. Regular monitoring of the situation and taking the decision in line with the official recommendations.	
	WP1-2	ETRA	06/04/2020		Delay in preparation and submission of deliverables during COVID-19 outbreak	Schedule	ETRA		2	1	2	1	1	LOW	0,625	06/04/2020		Close monitoring with partner responsible of the deliverable. Permanent reporting of status.	
	WP1-3	ETRA	01/05/2020		Problems with data on the pilot sites related to reduced budgeting due to COVID-19 measures	Financial/Schedule	ETRA		3	1	2	2	2	MODERATE	1,3125	01/05/2020		High involvement of the Technical and Project coordination to analyse the availability of data and to decide on the budgetary implications to minimize the impact on the democase implementation	
WP2 Use Cases, Business Requirements and Architecture Design	WP2-1	VERD	01/04/2020		Limited effectiveness of LLS on the 1st iteration on UCs and Business Requirements Validation due to non feasible	Technical	GECO	D2.1, MS2	3	2	1	1	2	MODERATE	1,125	24/04/2020		Alternative methods of acquiring stakeholders' feedback (Online workshops/interviews etc.)	
	WP2-2	ETRA	23/04/2020	#####	In certain cases (e.g. Austrian demonstrator), COVID-19 has put the rollout-phase of smart meter devices/sensors/etc. on hold, thus causing delays in the refined documentation of the available assets for the realization of the project demonstrators	Technical	ETRA, S5	D2.3, MS2	3	3	2	1	2	HIGH	1,5	24/04/2020		Depending on the duration of the delay	
	WP2-3	KONCAR	01/05/2020		In Ponikve Eko otok Krk several activities have been cancelled due to reduced tourist activity and may require reassignment of initially planned funding towards keeping the existing data acquisition	Technical	ETRA, KRK	MS2	3	3	2	2	1	HIGH	1,5	01/05/2020		Redirection on part of the infrastructural funds already discussed in the technical meeting towards keeping the current data landscape in Krk in place	



WP7 - Building/ District-level Analytics for Optimized Energy Performance Management	WP7-1	VTT	24/04/2020		Limited access to demo sites and consequential delay in gathering demo information and implementing project demo actions.	Technical	FVH, CAV, KRK, KONCAR, EEE	D7.2 - D7.3	2	3	3	1	1	MODERATE	1	24/04/2020		Negotiate early access to demo sites if possible, speed up demo process in later phase if access restrictions persist	If delayed over summer, the effect can be considerable. If only delayed for some months, the impact of the delay can be mitigated.
	WP7-2	VTT	24/04/2020		Engaging key stakeholders to define target framework for energy analytic. Due to COVID-19 city authorities and building facility managers have other priorities.	Schedule	FVH, CAV, KRK, KONCAR, EEE	D7.1	2	2	3	1	1	MODERATE	0,875	24/04/2020		Possible interaction in smaller stakeholder groups and focus on key stakeholders	
	WP7-3	VTT	24/04/2020		Due to corona, citizens behaviors are affected significantly, and thus reliable data of mobility behaviors cannot be collected at the moment.	Technical	FVH, CAV, KRK, KONCAR, EEE	D7.3	2	3	1	1	1	MODERATE	0,75	24/04/2020		Wait for the situation to be over. The future behaviour of citizens cannot be accurately forecasted.	However, in case the situation will normalize by Autumn, there should not be problems in finalizing everything before M42 deadline
WP8 - Demonstration and Impact Assessment	WP8-1	VTT	28/04/2020		New Helsinki KYMP building commissioning late due to delayed construction schedule	Schedule	FVH	D8.1	2	3	2	1	1	MODERATE	0,875	28/04/2020		Frequent discussions with the building owner and City of Helsinki. Opportunity to use Viikki office building as a backup.	
WP9 - Dissemination, Communication and Stakeholder Engagement	WP9-1	VTT	28/04/2020		Risk of delayed workshops or unable to perform workshops using face-to-face meetings.	Social	CAV, FVH	D9.1	1	1	1	1	1	LOW	0,25	28/04/2020		Can be mitigated by using e.g. remote workshops, but might affect quality of feedback received.	
	WP9-2	GECO	24/04/2020		Problems to access the right stakeholders to be involved in LL activities	schedule	GECO, demo and WPLs	d9.1 (2nd version)	1	2	3	1	3	LOW	0,5625	24/04/2020		Each of the involved partners has significant experience working with the required stakeholders, will build on their existing initiatives and utilise	
	WP9-3	GECO	24/04/2020		Living Lab activities at local sites to be postponed	schedule	GECO, demo leaders	d9.1 (2nd version)	1	2	3	1	3	LOW	0,5625	24/04/2020		Remote engagement (telcos, email surveys) can be performed	



5 CONCLUSIONS

This deliverable has introduced SYNERGY risk management governance and methodology, along with the main risks foreseen at the time of writing this deliverable.

The main partners that will handle the risk management will be the Project Coordinator and the Technical manager, with the support of the Project Management Board (in which are included the Work Package Leaders).

The basic procedure that these members will implement for analysing risk comprises the following steps:

1. Gather all identified risks.
2. Assignment of likelihood/probability and consequence to each risk event to establish a risk rating.
3. Prioritisation of each risk event relative to other risk events.
4. Quantitative analysis.

The SYNERGY Consortium has produced a first version of the overall risk table for the project, after the initial analysis of WP leaders and demo partners. This table will be used as the starting point and will be revised periodically. Due to the COVID-19 outbreak, the consortium has also performed further risk management in order to reduce negative impacts due to this exceptional situation.



6 REFERENCES

[1] SYNERGY Consortium, "SYNERGY GA - ANNEX 1," 2019.

[2] FEDERATION OF EUROPEAN RISK MANAGEMENT ASSOCIATIONS, FERMA, "A RISK MANAGEMENT STANDARD," [Online]. Available: <https://www.ferma.eu/app/uploads/2011/11/a-risk-management-standard-english-version.pdf>. [Accessed June 2020].

