UNITED GRID

Integrated cyber-physical solutions for intelligent distribution grids with high penetration of renewables

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Deliverable 1.3
Risk Management Plan

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Version history

Version	Date	Author	Comments
0.1	20180314	David Steen	Creation
1.0	20180412	David Steen	First draft
1.1	20180427	Anh Tuan Le	Final version

Deliverable abstract

This report presents the **Risk Management Plan** for UNITED-GRID. It includes the risk management procedure, risk assessment and tools for how the risks are handled and monitored. A risk assessment of the project using the provided tool is appended to this report.

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Project overview

UNITED-GRID aims to secure and optimise operation of the future intelligent distribution networks with unprecedented complexity caused by new distributed market actors along with emerging technologies such as renewable generation, energy storage, and demand resources. The project will provide integrated cyber-physical solutions, while efficiently exploiting the opportunities provided by the new actors and technologies. *The core deliverable is the UNITED-GRID tool-box that could be "plugged in" to the existing Distribution Management System (DMS) via a cross-platform for advanced energy management, grid-level control and protection.* This cross-platform allows interoperability from inverter-based DERs up to the distribution grid at the low and medium voltage levels, thus going beyond the state-of-the-art to optimise operation of the grid with real-time control solutions in a high level of automation and cyber-physical security.

The project has genuine ambitions to create impacts and to enhance the position of European member states in the development of smart grids. The core elements in this quest are:

- **Proof-of-concept and demonstration:** Developed UNITED-GRID tool-box and business models will be validated in real-life demonstration sites in Netherlands, France and Sweden which cover a majority of European market conditions. At the sites, UNITED-GRID will demonstrate the capabilities of intelligent distribution grids hosting more than 80% renewables by incorporating the advanced optimisation, control and protection tool-box, which are supported by real-time measurement systems. Such technologies with TRL in a range of 3-4 will be matured via the demonstrations up to TRL level 5-6 to address comprehensively compatibility and interoperability issues.
- **Pathways:** Upon request by directly involved stakeholders such as distribution system operators (DSOs), energy suppliers, UNITED-GRID will develop pathways that will step-by-step guide in the transition from the passive distribution grids of today to the active and intelligent distribution grids of tomorrow. The pathways incorporate technical as well as non-technical considerations such as cost-benefit, investments, business models, end-user privacy and acceptance.
- **Use and deployment:** UNITED-GRID will nourish and firmly support the utilisation and exploitation of technologies, tools, and services in distribution grids by integrating the inherent innovation chain of the partners and their networks with EU such as KIC InnoEnergy and SSERR.

Consortium

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1 Risk Management Plan

This deliverable is part of "Task 1.3 Project monitoring, quality control and risk management" in WP1. The objective of the task is to review and assess quality of work as well as monitor the project progress and contingency plans on potential risks in order to cope with the problems of specifying, integrating, developing and evaluating the concepts, methodologies and technologies within UNITED-GRID. This includes anticipation and assessment of risks and project deviations in order to implement and to apply, if necessary, contingency measures and conflict resolution procedures.

The risk of a project is typically defined as an event or condition that, if it occurs, could have a negative impact on the project's objectives. The **Risk Management** is the process of identifying, assessing, responding to, monitoring, and reporting risks. The **Risk Management Plan** sets out a framework to define how risks associated with UNITED-GRID will be identified, analysed and managed. It will support the Project Management to perform, record and monitor the risk management activities throughout the life-time of the project and provide templates and practices for recording and prioritizing risks.

2 Risk Management Procedure

2.1 Process

The project manager working with the project team will ensure that risks are actively identified, analysed, and managed throughout the life of the project. Risks will be identified as early as possible in the project so as to minimize their impact. The steps for accomplishing this are outlined in the following sections. The project manager (PM) will serve as the Risk Manager for this project.

2.2 Risk Identification

Risk identification will involve the project team, appropriate stakeholders, and will include an evaluation of environmental factors, organizational culture and the project management plan including the project scope. Careful attention will be given to the project deliverables, assumptions, constraints, work breakdown structure, cost/effort estimates, resource plan, and other key project documents.

A **Risk Management Tool** will be created and updated as needed and will be stored electronically in the project archive library located in **Box** under "General documents/risk management".

2.3 Risk Analysis

All risks identified will be assessed to identify the range of possible project outcomes. Qualification will be used to determine which risks are the top risks to pursue and respond to and which risks can be ignored.

2.3.1 Qualitative Risk Analysis

The probability and impact of occurrence for each identified risk will be assessed by the PM, with input from the project management office using the "risk point-system" and risk-matrix which were adopted from [1] as described in Table 1, Table 2 and Figure 1 below.

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Table 1: Risk's probability

Risk	Probability of occurrence	Point
Low	Less than 10%	1
Medium	10-25%	2
High	25-50%	3
Very high	50-100%	4
Absolute	Will occur at least once	5

Table 2: Risk's impact

Impact	Point
Negligible impact	1
Mild impact	2
Sizable impact	3
Large impact	4
Very large impact	5

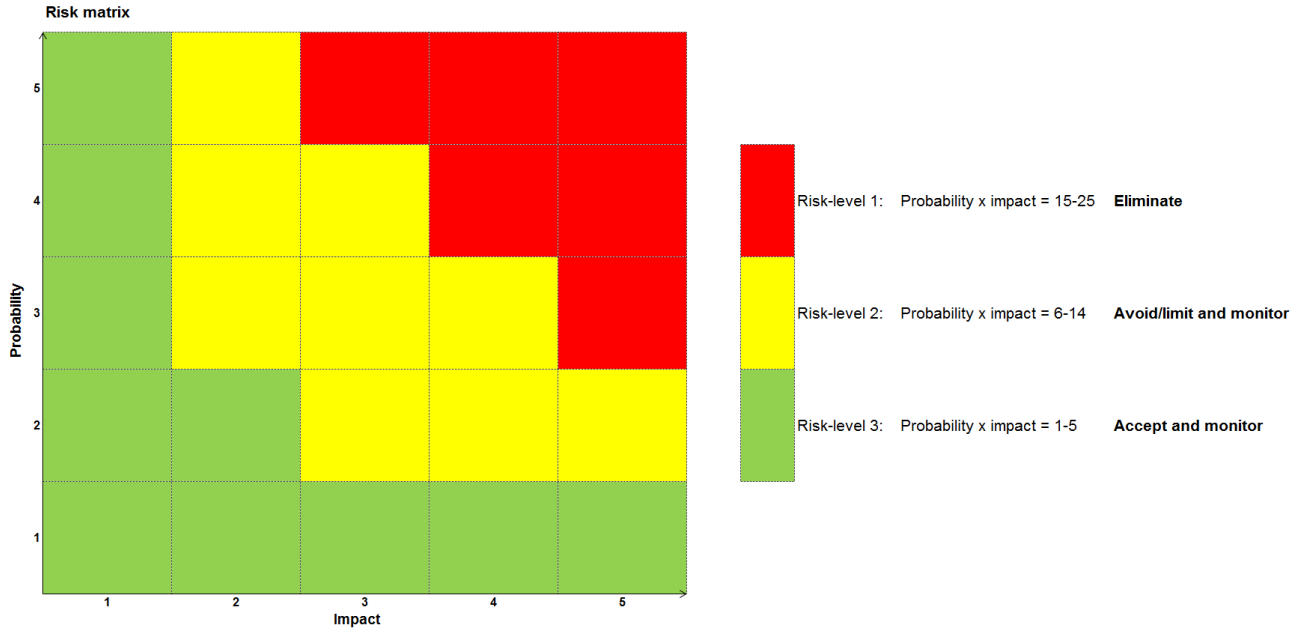

Figure 1: Risk's level

Risks that fall within the RED and YELLOW zones will have the risk response planning which may include both a risk mitigation and a risk contingency plan.

2.3.2 Quantitative Risk Analysis

The risk can be quantified using the numerical rating applied to each risk, and then documented in this section of **Risk Management Plan.**

2.4 Risk Response Planning

Each major risk (those falling in the Red and Yellow zones) will be assigned to a project management office member for monitoring purposes to ensure that the risk will not actually happen. For each major risk, one of the following approaches will be selected to address it:

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- **Avoid** – Eliminate the threat by eliminating the cause
- **Mitigate** – Identify ways to reduce the probability or the impact of the risk
- **Accept** – Nothing will be done
- **Transfer** – Make another party responsible for the risk (buy insurance, outsourcing, etc.)

For each risk that will be mitigated, the project management office will identify ways to prevent the risk from occurring or reduce its impact or probability of occurring. This may include adding tasks to the project schedule, adding resources, etc.

For each major risk that is to be mitigated or that is accepted, a course of action will be outlined for the event that the risk does materialize in order to minimize its impact.

2.5 Risk Monitoring, Controlling and Reporting

The level of risk on a project will be tracked, monitored and reported throughout the project life-time.

A "Top 10 Risk List" will be maintained by the project management office and will be reported as a component of the project status reporting process for this project.

All project change requests will be analysed for their possible impacts to the project.

3 Tools and Practices

A **Risk Management Tool** using Excel has been created and will be maintained by the PM and will be reviewed as a standing agenda item for project management meetings. An example of the Risk Management Tool is shown in Appendix I.

4 References

[1] Tonnquist, B., "Project Management", Bonnier utbildning, 2006

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5 Appendix I: Screenshot of Risk Management Tool

ID	Ri	Risk Description	Cau	Impact	Probability 1 to 5	Impact 1 to 5	Risk score	Risk Mitigation Plan/Actions	Risk Owner
MR1		Changes in consortium members: Due to some reason, one or more partners will not be able to continue to join the project.		This could lead to delays in project implementation or even failure to deliver some of the project deliverables.	2	3	6	If the problem occurs, the project coordination team will take timely measures such as to remove partners or to replace them with new suitable partners. This will be done within the consortium agreement (CA) which will also ensure that all partners are bound to deliver the work in a timely manner.	Project coordination
MR2		Delays compared with the project plan: This refers to the case when the required project activities takes longer time than what planned in		This could lead to delays in reaching project goals/milestones according to the defined plan.	2	3	6	Propose organizational changes which can accelerate the process or make adjustment to the schedule to deliver results without affecting the overall schedule of the project.	WP/Task
MR3		Shortage of personnel of project partners: This happens when the project partner is unable to allocate enough researcher-time for the project activities.		This could make it difficult or even impossible to develop certain project tasks.	2	2	4	Propose required personnel with required skills to perform the tasks within each partners, also consider the possibility to exchange the tasks among the partners if other partners have the possibilities to perform the tasks.	WP/Task
MR4		Budget risks: This concerns the possibility that the cost to carry out the project activities exceeds the allocated budget of the project.		This could lead to problems of carrying out the project tasks as signed with EC.	2	3	6	Propose budget adjustments and discussed among the affected partners so that all partners will agree on the new budget.	Project coordination
MR5		Insufficient dissemination of project results: The project fails in reaching out to stakeholders and results will not be exploited in predicted extent.		This could lead to reduced interest of the communities in the subjects of the project.	2	2	4	Continuously update the dissemination plan and/or propose additional dissemination based on performance of activities. Use professional communication strategists.	WP/Task
MR6		Insufficient exploitation of results. The project fails in reaching the ambitious objective to secure resources to take 2/3 of sustainable potential innovations to the next level beyond project termination.		This could lead to reduced future impact of results	4	3	12	Partners with vast experience and networks drive the activities. The situation analysis team supports with team skills and networks. Collaborate with expert organisations as KIC InnoEnergy and SSERR's	WP/Task
TR1		Data collection and measurement: This risk involves insufficient grid data from e.g. DSOs or measurement data from the demonstration facilities in the project.		This could lead to delay in project execution.	2	5	10	If the data from DSOs or test facilities are not sufficient, available public data (e.g., test network data) or data of similar nature will be used for the project.	WP/Task
TR2		Delay in models development: Developments of models can face unexpected delay due to model complexities, algorithms, etc		This can cause serious delay in the project execution.	2	5	10	WP/Task leader must closely monitor the progress and propose adjustment on task divisions or even re-allocate tasks to other partners to ensure the smooth implementation of models.	WP/Task
TR3		Delay in development of demonstration facilities: This concerns the practical work that is required to set up demonstration facilities for the project.		This will lead to delay in verification of project results (including models, interfaces, control algorithms, etc.)	3	3	9	WP leader must be in close contact with demonstration facility providers to ensure about the schedule and propose adjustment if necessary. If the delay is severe, this has to be dealt with at the project coordination level to adjust to overall plan of the project.	WP/Task and/or Project coordination
TR4		Technical difficulties by a project partner: This concerns the probability that a project partner is not able to carry out project tasks as agreed		This could delay the project as well as affect the objectives of all WPs that the partner is involved in	2	3	6	The partners in the consortium have some degree of technical complementary, the project management can request help from other partners if necessary.	Project coordination

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