INVADE

*Smart system of renewable energy storage based on **IN**tegrated E**V**s and*

*b**A**tteries to empower mobile, **D**istributed and centralised **E**nergy storage*

in the distribution grid

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Peer reviewed by:

Partner	Reviewer
EPESA	Santi Martínez Farrero
Lyse	Dagfinn Wåge

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WP / Task
All WPs and tasks

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Abbreviations and Acronyms

Acronym	Description
CA	Consortium Agreement
DoA	Description of Action (annex I of the Grant Agreement)
EC	European Commission
GA	Grant Agreement
MR	Monthly Progress Report
OC	Other direct costs
PC	Project Coordinator
PCC	Project Coordination Committee
PM	Person-Month
PO	Project Officer
QM	Quality Management
TCC	Technical Coordination Committee
TL	Task Leader
WP	Work Package
WPL	Work Package Leader

Executive summary

This deliverable establishes the Project Management Plan for the INVADE project. The plan includes all the processes and articulates the responsibilities at person/partner level in order to ensure the production of high-quality results in line with the project plan as described in the Description of Action. It establishes also the Quality Plan and the Risk Management and Contingency Plan

The different bodies of the project are identified, the working plan is confirmed and the different Work Packages and Task Leaders are nominated.

The deliverable defines all the documents to be used during the project, both the internal Consortium documents and the rest of required documents as specified in the Grant Agreement.

The Quality assurance chapters exposes the way the consortium will face the documents' generation process, especially the project's deliverables, in order to guarantee the required quality and focus of the released documents. It establishes the different processes and responsible persons together with an estimated timing of each phase of the process. In these chapters the information process for the Quality Assurance issue is also established.

The plan includes all the processes and their responsible person/body that will ensure the management and the preventive and curative actions and decisions' taking for each of the identified risk, foreseen or happened at any phase of the project execution.

1 Management structure

As already mentioned in the Description of the Action (DoA), the consortium has defined different governing bodies for the governance, execution, control and monitoring of the project:
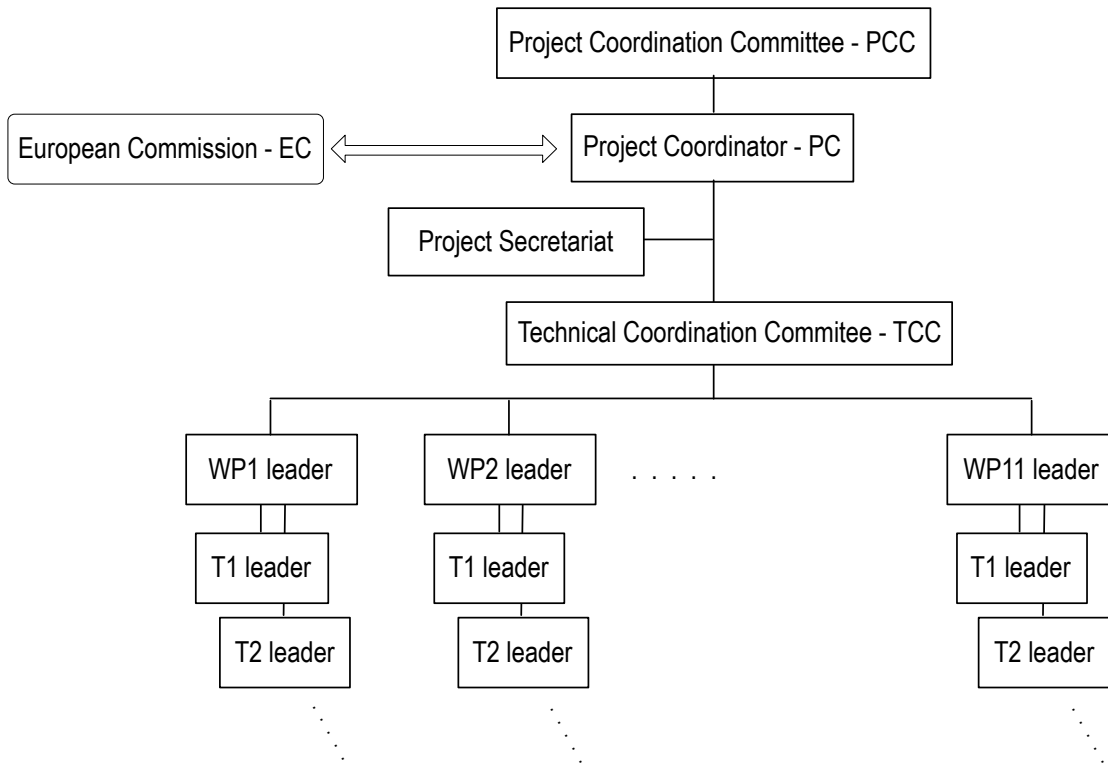
Figure 1: The governing structure of INVADE

1.1 Coordination Committees (PCC and TCC)

The different bodies have been constituted as follows:

Partner	PCC	TCC
SmartIO	Dieter Hirdes	Dieter Hirdes
UPC	Andreas Sumper	Roberto Villalfafila
NTNU	Magnus Korpås	Magnus Korpås
VTT	Johannes Hyrynen	Mikko Pihlatie
eSmart	Henrik Løvfold	Stig Ødegaard Ottesen
NewEn	Arne Henn	Arne Henn
Albena	Dimitar Stanev	Dimitar Stanev

Partner	PCC	TCC
Schneider	Per Gjerløw	Per Gjerløw
Lyse	Dagfinn Wåge	Sindre Tøsse
EPESA	Santi Martínez Farrero	Ramón Gallart
Elaad	Frank Geerts	Arjan Wargers
GreenFlux	Hans de Boer	Michel Bayings

Table 1: PCC and TCC members

Their respective roles are the ones identified in the DoA and thoroughly explained in the Consortium Agreement (CA) that contains the following sections:

- Members

- Tasks and duties

- Representation in meetings

- Preparation and organisation of meetings

- Voting rules and quorum

- Veto rights

- Minutes of meetings and reporting

1.2   Work Package Leaders (WPL)

The WPL role is the one identified in the DoA.

The management responsibility for each work package is attributed to the appointed partner, who nominates an individual as Work Package Leader. The WPL is responsible for coordinating the work done by all participants in the work package. The WP Leader submits the Monthly Progress Reports and presents the work package progress when required by the PCC or TCC and at the external reviews. WP Leader reviews all deliverables of the WP, being responsible for their quality.

The initial activity of the consortium was to nominate the corresponding Work Package Leaders, as the highest level of technical responsibility within each WP.

	WP	Partner	WPL
1	Management	SmartIO	Dieter Hirdes
2	Dissemination and Communication	UPC	Pol Olivellas
3	Exploitation	SmartIO	Bernt Bremdal
4	Overall INVADE architecture	UPC	Pau Lloret
5	Flexibility Management System	NTNU	Hossein Farahmand
6	Energy Storage Technologies	VTT	Ari Hentunen
7	Communication Platform	Schneider	Cristóbal Cordobés
8	Integrated INVADE Platform	eSmart	Stig Ødegaard Ottesen
9	Business models and energy market	Lyse	Gunnar Crawford
10	Pilots	Schneider	Per Gjerløw
11	Ethics	SmartIO	Øivind Berg

Table 2: Work Package Leaders

1.3 Task Leaders (TL)

The management responsibility for each task in a work package is attributed to the appointed partner, who nominates an individual as Task Leader.

The Task Leader is responsible for coordinating and reporting the work done by all participants in the task. The Task Leader presents the task progress when required by the WP Leader.

			Task leaders	Partner
WP1		**Management**		
	T1.1	Administrative	Dieter Hirdes	SmartIO
	T1.2	Quality control	Dieter Hirdes	SmartIO
	T1.3	Meetings, reviews, communication	Dieter Hirdes	SmartIO
	T1.4	Technical Coordination	Dieter Hirdes	SmartIO
WP2		**Communication and Dissemination**		
	T2.1	Dissemination and communication	Pol Olivella	UPC
	T2.2	Digital media	Mette Magnussen	SmartIO
	T2.3	Technical Advisory Group	Pol Olivella	UPC
	T2.4	Participation in EC events and project clusters	Heidi Tuiskula	SmartIO
	T2.5	INVADE large scale events	Pol Olivella	UPC
WP3		**Exploitation**		
	T3.1	Stakeholders engagement plan	Bernt Bremdal	SmartIO
	T3.2	Stakeholders analysis	Bernt Bremdal	SmartIO
	T3.3	Business and Exploitation plan	Bernt Bremdal	SmartIO

			Task leaders	Partner
	T3.4	Face to Face Consultations and dedicated workshops	Gunnar Crawford	Lyse
	T3.5	Exploitation Users Group	Bernt Bremdal	SmartIO
	T3.6	Engagement with municipalities, DSOs	Håkon Duus?	SmartIO
	T3.7	Life cycle analysis	Pau Lloret	UPC
	T3.8	Contribution to policy and regulatory agendas	Bernt Bremdal	SmartIO
	T3.9	Contribution to Standards	Arjan Wargers	Elaad
	T3.10	Intellectual property rights management	Bernt Bremdal	SmartIO
WP4		**Overall INVADE architecture**		
	T4.1	Concept design and use cases 1- 4	Pau Lloret	UPC
	T4.2	SGAM Architecture	Pau Lloret	UPC
	T4.3	Flexibility Cloud software architecture	Glen Thomas Berger	eSmart
	T4.4	Standards and communication protocols	Arjan Wargers	Elaad
	T4.5	Architecture adaptation for pilots' implementation	Pau Lloret	UPC
	T4.6	Architecture review	Pau Lloret	UPC
WP5		**Flexibility Management System**		
	T5.1	Analyse the flexibility alternatives in distribution grids with high penetration of renewables and grid constraints	Hossein Farahmand	NTNU
	T5.2	Assessment of the potential value of alternatives in the future with demand growth from EVs, renewables integration and distributed storage units	Magnus Korpås	NTNU
	T5.3	Storage units allocation/positioning algorithm (design and programming)	Hossein Farahmand	NTNU
	T5.4	Design and program the flexibility management operation algorithm	Pol Olivella	UPC
WP6		**Energy storage technologies**		
	T6.1	Storage system dimensioning and design	Ari Hentunen	VTT
	T6.2	Battery state of health and lifetime	Ari Hentunen	VTT
	T6.3	Battery techno-economics and optimal operation	Ari Hentunen	VTT
	T6.4	Battery safety and lifecycle management	Ville Erkkilä?	VTT
	T6.5	Pilot specific research support	Ari Hentunen	VTT
WP7		**Communication Platform**		
	T7.1	Communications Specification Plan	Cristobal Cordobes	Schneider
	T7.2	Specification of the CP-API	Bjørn Asvard Olsen	eSmart
	T7.3	Feasibility analysis of BPL and field devices integration	Cristobal Cordobes	Schneider
	T7.4	Communications Test Plan, Test and Test Report	Cristobal Cordobes	Schneider
WP8		**Integrated INVADE platform**		
	T8.1	Implementation of the Flexibility Cloud data architecture	Stig Ødegaard Ottesen	eSmart
	T8.2	Implementation of the Flexibility Cloud control architecture	Stig Ødegaard Ottesen	eSmart
	T8.3	Implementation of the Flexibility Cloud flexibility management algorithms, functions, and monitoring & control dashboards	Stig Ødegaard Ottesen	eSmart
	T8.4	Integration of Electric Vehicles in the Flexibility Cloud	Michel Bayings	GreenFlux

				Task leaders	Partner
	T8.5	Testing and validation of the INVADE platform and its components in the test-lab environment		Pol Olivella	UPC
	T8.6	Development of mobile applications for INVADE users		Stig Ødegaard Ottesen	eSmart
WP9		**Business models and energy market structures**			
	T9.1	Review of state-of-the art		Bernt Bremdal	SmartIO
	T9.2	User Practises and behaviour analysis		Marianne Ryghaug	NTNU
	T9.3	Local policy and regulations implications		Arjan Wargers	Elaad
	T9.4	Business model development and classification		Dagfinn Wåge	Lyse

		Pilots			
WP10	T10.1	Pilots methodology preparation		Per Gjerløw	Schneider
	T10.2	Data collection and management		Jan Tore Gjøby	eSmart
	T10.3	Pilots implementation in Norway		Trond Thorbjornsen	Lyse
	T10.4	Pilots implementation in the Netherlands		Michel Bayings	GreenFlux
	T10.5	Pilots implementation in Bulgaria		Dimitar Stanev	Albena
	T10.6	Pilots implementation in Germany		Arne Henn	NewEn
	T10.7	Pilots implementation in Spain		Ramón Gallart	EPESA
	T10.8	Validation and certification		Per Gjerløw	Schneider

Table 3: Task leaders

2 Working plan and resources

The working plan is following the contractual document Annex 1 – DoA, both in terms of activities and scheduling. The different outcomes are also identified in the list of deliverables, in the mentioned document.

Related to the resources, the following break-down was agreed in the Kick-off meeting.

	Period	SmartIO	UPC	NTNU	VTT	eSmart	NewEn	Albena	Schneider	Lyse	Lyse Elnett	EPESA	Elaad	GreenFlux	TOTAL
WP1 T1.1. Administrative	1-36	16,0	2,0	2,0	2,0	2,0	2,0	2,0	2,0	2,0		2,0	2,0	2,0	38,0
T1.2. Quality control	1-36	8,0													8,0
T1.3. Meetings, reviews, communication	1-36	8,0													8,0
T1.4. Technical Coordination	1-36	4,0	1,0	1,0	1,0	1,0	1,0	1,0	1,0	1,0		1,0	1,0	1,0	15,0
		36,0	3,0	3,0	3,0	3,0	3,0	3,0	3,0	3,0		3,0	3,0	3,0	**69,0**
WP2 T2.1. Dissemination and communication	1-36	3,0	7,0	4,0	3,5										17,5
T2.2. Digital media	1-36	7,0	0,5	0,5	0,5										8,5
T2.3. Technical Advisory Group	1-36	0,5	3,0	0,5	0,5	0,5			0,5				0,5		6,0
T2.4. Participation in EC events and project clusters	1-36	2,0	0,5	0,5		2,5	2,5	2,5	2,5	2,5		2,5	2,5	2,5	23,0
T2.5. INVADE large scale events	12-36	5,5	7,0	0,5	0,5	1,0	0,5	0,5	1,0	0,5		0,5	1,0	0,5	19,0
		18,0	18,0	6,0	5,0	4,0	3,0	3,0	4,0	3,0		3,0	4,0	3,0	**74,0**
WP3 T3.1. Stakeholders engagement plan	1-24	2,5	0,5	0,5	0,5	0,5	0,5	0,5	0,5	0,5		0,5	0,5	0,5	8,0
T3.2. Stakeholders analysis	1-24	5,0				1,0	1,0	1,0	1,0	1,0		1,0	1,0	1,0	13,0
T3.3. Business and Exploitation plan	6-36	7,0	2,0	2,0	2,0	2,0	2,0	2,0	2,0	2,0		2,0	2,0	2,0	29,0
T3.4. Face to Face Consultations and dedicated workshops	1-36	3,0	1,0	1,0	1,0	1,0	1,0	1,0	1,0	2,0		1,0	1,0	1,0	15,0
T3.5 Exploitation Users Group	6-36	2,0				0,5	0,5	0,5	0,5	1,0		0,5	1,0	0,5	7,0
T3.6. Engagement with municipalities, DSOs	1-36	3,0					1,0	1,0		1,0		1,0	1,0		8,0
T3.7. Life cycle analysis	6-36		8,0	0,5	0,5					1,0		1,0			11,0
T3.8. Contribution to policy and regulatory agendas	6-36	3,0	2,0		1,0		0,5	0,5		1,0		0,5	2,0		10,5
T3.9. Contribution to Standards	6-36		1,0	0,5	0,5	1,0			1,0	0,5			5,0	1,0	10,5
T3.10. Intelectual property rights management	1-36	2,5	0,5	0,5	0,5	1,0	0,5	0,5	1,0	1,0		0,5	0,5	1,0	10,0
		28,0	15,0	5,0	6,0	7,0	7,0	7,0	8,0	11,0		7,0	14,0	7,0	**122,0**
WP4 T4.1. Concept design and use cases 1-4	1-5	1,0	7,0	2,0	2,0	2,0	1,0	1,0	2,0	1,0		1,0	1,0	1,0	22,0
T4.2. SGAM Architecture	1-7		6,0						2,0					1,0	9,0
T4.3. Flexibility Cloud software architecture	1-7		1,0	1,0	0,5	5,0							1,0	0,5	9,0
T4.4. Standards and communication protocols	1-24		1,0			0,5			1,0				4,0	0,5	7,0
T4.5. Architecture adaptation for pilots implementation	1-10		6,0			2,0	2,0	2,0	2,0	2,0		2,0	2,0	2,0	22,0
T4.6. Architecture review	20-24		4,0	1,0	0,5	0,5			1,0				0,5	0,5	8,0
		1,0	25,0	4,0	3,0	10,0	3,0	3,0	8,0	3,0		3,0	8,5	5,5	**77,0**
WP5 T5.1 Specification and Design	1-6		6,0	8,0								2,0	2,0	2,0	20,0
T5.2 Software Development	6-15	2,0	6,0	10,0		2,0			2,0	2,0			4,0	4,0	32,0
T5.3 System Integration	1-24	2,0		24,0	2,0										28,0
T5.5 Test	12-24	6,0	16,0	16,0		5,0			6,0	2,0			2,0	2,0	55,0
		10,0	28,0	58,0	2,0	7,0			8,0	4,0		2,0	8,0	8,0	**135,0**

	Period	SmartIO	UPC	NTNU	VTT	eSmart	NewEn	Albena	Schneider	Lyse	Lyse Elnett	EPESA	Elaad	GreenFlux	TOTAL
WP6 T6.1. Storage system dimensioning and design	1-24			4,0	14,0		2,0	2,0	2,0			2,0			26,0
T6.2. Battery state of health and lifetime	1-24				16,0				0,5						16,5
T6.3. Battery techno-economics and optimal operation	1-24	1,0			10,0										11,0
T6.4. Battery safety and lifecycle management	1-24				10,0				0,5						10,5
T6.5. Pilot specific research support	1-24				5,0										5,0
		1,0		4,0	55,0		2,0	2,0	3,0			2,0			**69,0**
WP7 T7.1. Communications Specification Plan	1-9								7,0				1,5		8,5
T7.2. Specification of the CP-API	1-18					2,0			8,0	2,0		1,0	2,5		15,5
T7.3. Feasibility analysis of BPL and field devices integration	6-24					3,0	1,0	1,0	5,0	1,0		1,0	1,0	1,0	14,0
T7.4. Communications Test Plan, Test and Test Report	9-24					4,0	2,0	2,0	12,0	2,0		2,0	2,0	2,0	28,0
						9,0	3,0	3,0	32,0	5,0		4,0	7,0	3,0	**66,0**
WP8 T8.1. Implementation of the Flexibility Cloud data architecture	1-7					8,0			1,0				1,0		10,0
T8.2. Implementation of the Flexibility Cloud control architectu	1-26					12,0			1,0				1,0		14,0
T8.3. Implementation of the Flexibility Cloud flexibility manage	12-34					19,0			1,0			1,0	2,0	1,0	24,0
T8.4. Integration of Electric Vehicles in the Flexibility Cloud	9-26		5,0			4,0			1,0				3,0	13,0	26,0
T8.5. Testing and validation of the INVADE platform and its co	6-30		20,0			12,0			1,0					1,0	34,0
T8.6. Development of mobile applications for INVADE users	10-30					9,0	2,0	2,0	1,0	2,0		2,0	2,0	5,0	25,0
			25,0			64,0	2,0	2,0	6,0	2,0		3,0	9,0	20,0	**133,0**
WP9 T9.1. Review of state-of-the art	1-9	5,0				1,0			1,0	2,0			1,0		10,0
T9.2. User Practises and behaviour analysis	6-36	1,0		15,0			1,5	1,5		3,0		1,5	1,5	1,5	26,5
T9.3. Local policy and regulations implications	6-18	3,0	4,0				1,5	1,5		4,0		1,5	6,0		21,5
T9.4. Business model development and classification	12-36	4,0			1,0	5,0	1,0	1,0	3,0	8,0		1,0	1,0	3,0	28,0
		13,0	4,0	15,0	1,0	6,0	4,0	4,0	4,0	17,0		4,0	9,5	4,5	**86,0**
WP10 T10.1. Pilots methodology preparation	1-26	1,0	1,0	1,0	1,0	2,0	2,0	2,0	3,0	2,0		2,0	2,0	2,0	21,0
T10.2. Data collection and management	1-36	1,0	1,0	1,0	1,0	3,0	1,0	1,0	4,0	1,0		1,0	1,0	1,0	17,0
T10.3. Pilots implementation in Norway	1-36					3,0			6,0	32,0	10,0				51,0
T10.4. Pilots implementation in the Netherlands	1-36					3,0			6,0				16,0	24,0	49,0
T10.5. Pilots implementation in Bulgaria	1-36					3,0		42,0	6,0						51,0
T10.6. Pilots implementation in Germany	1-36					3,0	42,0		6,0						51,0
T10.7. Pilots implementation in Spain	1-36					3,0			6,0			44,0			53,0
T10.8. Validation and certification	18-36	1,0	1,0	1,0	1,0	2,0	2,0	2,0	8,0	2,0		2,0	2,0	2,0	26,0
		3,0	3,0	3,0	3,0	22,0	47,0	47,0	45,0	37,0	10,0	49,0	21,0	29,0	**319,0**
TOTAL		110,0	121,0	98,0	78,0	132,0	74,0	74,0	121,0	85,0	10,0	80,0	84,0	83,0	1150,0

Table 4: resource allocated per WP, task and Partner

3 Quality Assurance

Quality can be defined as meeting or exceeding the recipients' expectations achieved by way of outputs and deliverables and/or activities performed to produce those outputs and deliverables.

The Quality Assurance is an integral part of the Project Management Plan. Under WP1 Project Management, the consortium decided to establish a dedicated task devoted to ensure that the project processes will be executed and the deliverables generated with the required high quality level, obtained by monitoring and assessing the progress and results provided by the different work packages in a continuous way and following established processes and rules.

The implementation of this quality assurance activity is normally defined through a Quality Plan, where operational aspects are stated and regulated. The INVADE Quality Plan can be defined as a set of activities planned at the beginning of the project that helps achieving the requested quality during the Project's execution.

The purpose of the Quality Plan is to define these activities/tasks intended to ensure the production of concrete, focused and high-quality results that will be aligned with the project plans and fulfilling the contractual commitments of the Project and the Partners, while focussing on achieving recipients' quality expectations. The INVADE Quality Plan includes the implementation of Quality Events (peer reviews, checklist execution…) by using various Quality Materials (templates, checklists…) available within the Consortium documents' repository.

Thanks to that plan the project participants are aware of all quality-related rules to be applied all along the project and in any phase of the works carried out.

The Quality Plan covers the related quality aspects of the activities of the work packages, with a detailed definition of rules and procedures concerning managerial and technological aspects of the works, resulting in the generation of a number of processes and tools that will help in achieving the project objectives.

4 Quality responsibilities

The Quality Plan, that includes different rules, processes, document templates and conventions, is envisioned to check, validate and eventually approve the appropriateness of all the different actions of the project (concrete works, tasks,

decisions, documents…) in terms of structure, substance and quality, focus, alignment and fulfilment of the envisaged purposes.

WP1 Project Management will include the management of Quality Assurance, as agreed by the Consortium. The rules and procedures stated in this plan will be deeply used in the Consortium, and particularly by the PC and its Secretariat as management tools that will help in assuring the goals of the project.

The Quality Plan compliance is the result of a cooperative collaboration between the different persons, organizations and bodies such as the researchers, the partners, the PC, the WPLs, the TCC and the PCC, who are accountable for applying all the rules and processes established in order to secure the highest possible quality of the project execution and results.

The PC is entitled to achieve the following objectives:

- To make sure that the conditions for project quality modelling, implementation and validation are appropriate;

- To make sure that the quality model matches reality to the best possible extend;

- To produce, maintain and review the Quality Assurance Processes;

- To implement the Quality Assurance Processes in an effective way;

- To guarantee that all participants and all members of the project bodies understand the relevant importance of the application of the Quality Plan;

- To provide all needed mechanisms enabling a suitable interface for partners on all quality assurance-related activities

- To provide clarification and consultation related to quality issues, when needed.

For these reasons, all participants are entitled to fulfil the different quality control processes that, in detail, include following targets:

- To ensure that all project actions (specific works, tasks, decisions, documents…) are completed in time and with the expected quality, following the detailed rules stated in this Quality Plan.

- To monitor and audit the project activities for conformance with the project plans, in particular performing milestone reviews of contractual deliverables.

- To ensure good communication between the partners during the project execution, in any of its phases;

- To assist the PC and the TCC in any quality-related issues;

- To adhere adequately to the defined Quality Assurance processes during the project execution, in any of its phases; and

- To inform the PC of any Quality Assurance-related problem immediately.

By approving this deliverable, decision is taken by the TCC to apply the RACI matrix methodology in order to secure having a broadly accepted responsibilities follow-up mechanism.

5 RACI matrix methodology

The RACI Matrix is a system that brings structure and clarity when assigning the roles people play within a team. It is a simple grid system used to identify people's responsibilities intended to ensure that everything the team needs to do is taken care of.

The RACI defined roles are:

- **R - Responsible**: Each action in the project has a specific responsible, in charge of its execution/generation. The responsible may be a concrete person/partner or a group of persons/partners as this role can be shared, the scope and degree of responsibility is to be defined by the Accountable person.

  A typical case for this responsibility would be a task leader, responsible for the execution of a specific task within one WP of the project.

- **A - Accountable**: Despite the action is executed by the nominated responsible(s), it will have finally a unique accountable person which is the one that will approve or reject the final results of the action. This includes "yes" or "no" authority and veto Power. Only one Accountable person can be assigned to an action.

  A typical case of accountable person is the Work Package Leader (WPL) who should secure the correct execution of the WP under his/her responsibility despite the works are directly carried out by the different tasks leaders.

- **C - Consulted**: Each specific action of the project may require some inputs from other persons/partners/WP prior to a final decision or action. This may represent requirements for the works, or validation of the results. This is a predetermined

need for two-way communication where input from the designated position is required.

A typical case for this role is the TCC and its members that manage the different technological issues during the project.

- ▪ **I - Informed**: People that need to be kept updated and/or informed on progress or <u>after a decision or action is taken</u>, but they do not need to be formally consulted, nor do they contribute directly to the action. They may be required to take action as a result of the outcome. It is a one-way communication.

  A typical case for this role is the PCC and its members that must be regularly aware of the project progress.

The person nominated as Accountable is responsible for generating the RACI matrix related to any specific action, assigning all the roles and responsibilities.

This RACI Matrix facilitates the definition of responsibilities and, in this respect, it should be used in a way that any action executed during the project (task, outcome, decision, document…) should be identified with its responsible nominated as well as its accountable person/partner and, where appropriate, defining who needs to be consulted for the purpose of the action as well as who must be informed of it.

6 Document conventions and procedures

All partners shall ensure that complete and correct issues of specifications, drawings, technical requirements, test and validation instructions, and project reports are available as applicable at the time and place of design, manufacture, inspection, test, and installation along the life of the project. Any changes to the issue of partner documentation will be communicated to the WP Leader who will be responsible for ensuring that a list of the most up to date documentation is available to all the partners in the shared documents' repository (Dropbox/INVADE Project/WPx).

6.1 Types of documents

There are two types of documents: contractual documents (the ones listed in the Grant Agreement and its annexes) and the project internal documents. For each type of documents the approval procedure will be done according with the level of its own importance; for the contractual documents the approval procedure will be more

demanding than for internal documents where this approval procedure will follow lighter rules.

All reports, minutes, or presentations shall be based on the project document templates applicable for all documents created within the scope of this project. The templates for format are mandatory and made available to all partners and participants through the shared folder repository (Dropbox/INVADE Project/3.Templates/).

6.1.1   Document owner

It is established that any document, internal or contractual, has a unique owner. This is the person in charge of generating it. The document owner often will integrate the work of several contributors, e.g. for a Deliverable or a Partner progress report, but at last the owner is the final person responsible and <u>accountable</u> for it.

The owner is the person in charge of creating the document, starting from the corresponding template, and naming it as explained in the following sections, including the version numbering.

6.1.2   Contractual documents

The Grant Agreement mentions some mandatory documents to be generated and delivered by the Consortium. The consortium shall transmit the reports and other deliverables through the coordinator to the Commission using the electronic exchange system set up by the European Commission (EC), namely the SyGMa system.

Project Deliverables - D

Deliverables are official documents constituted as contractual commitments for the project.

These Deliverables serve as the basis for periodic reviews. As such, beyond being the substantial outcomes of the project they also serve as content-oriented reporting towards all the partners, the PC and the EC.

Their production and delivery processes should particularly follow the quality processes rules conditions established in the present document, as their importance is crucial both for the project team itself and for the review to be made regularly.

Before releasing any deliverable and deliver it to the EC, the final version needs to get the formal authorization from the TCC. Only when the complete Quality Process is

positively completed, the approved deliverables are then authorized and delivered by the PC to the EC through the SyGMa on-line system

Each deliverable has a responsible Beneficiary from the consortium, as it is stated in section 1.3.2 WT2 list of deliverables, of the Annex I part A of the GA. The beneficiary will nominate an accountable person inside the organization that will be in charge of the production of the deliverable. This accountable person will be the owner of the document.

Project Periodic Reports - PPR

Periodic Reports are documents that have to be submitted to the EC by the PC, for each reporting period, and will include (as detailed in the GA article 20.3):

- (a) a 'periodic technical report' containing:
  - (i) an explanation of the work carried out by the beneficiaries;
  - (ii) an overview of the progress towards the objectives of the action, including milestones and deliverables identified in Annex 1.
  - (iii) a summary for publication by the Agency;
  - (iv) the answers to the 'questionnaire', covering issues related to the action implementation and the economic and societal impact, notably in the context of the Horizon 2020 key performance indicators and the Horizon 2020 monitoring requirements;
- (b) a 'periodic financial report' containing:
  - (i) an 'individual financial statement' from each beneficiary and from each linked third party, for the reporting period concerned.
  - (ii) an explanation of the use of resources and the information on subcontracting and in-kind contributions provided by third parties from each beneficiary and from each linked third party, for the reporting period concerned;
  - (iii) a 'periodic summary financial statement', created automatically by the electronic exchange system, consolidating the individual financial statements for the reporting period concerned and including — except for the last reporting period — the request for interim payment.

Certificate on the Financial Statements - CFS

Beneficiaries shall submit a certificate on the financial statements when the amount of the financial contribution of the Union claimed under the form of reimbursement of costs is equal to or superior to 325.000€, when cumulated with all previous payments for which a certificate on the financial statements has not been submitted yet.

Project Final Report - PFR

In addition to the periodic report for the last reporting period, Final Report is a document that has to be submitted to the European Commission at the end of the project. The report must include (as detailed in the GA article 20.4):

▪ (a) a 'final technical report' with a summary for publication containing:

· (i) an overview of the results and their exploitation and dissemination;

· (ii) the conclusions on the action, and

· (iii) the socio-economic impact of the action;

▪ (b) a 'final financial report' containing:

· (i) a 'final summary financial statement', created automatically by the electronic exchange system, consolidating the individual financial statements for all reporting periods and including the request for payment of the balance and

· (ii) a 'certificate on the financial statements' for each beneficiary and for each linked third party, if it requests a total contribution of EUR 325 000 or more, as reimbursement of actual costs and unit costs calculated on the basis of its usual cost accounting practices.

6.1.3   Internal Documents

Internal documents are Consortium working documents that can be considered as instrumental for the daily management of the project execution. These documents are intended to help following up the progress of the project, keeping control on the resource allocation and budget distribution, and are aimed at mitigating and resolving risks that can appear during the project implementation.

There are a number of identified internal documents for the purpose of the project:

▪ Internal discussions and reports

▪ WPL monthly progress reports (MR)

- Partners' quarterly person-month (PM) and other direct costs (OC) reports

- Partners' progress reports

- Meeting Minutes

- Project presentations

Internal discussions and reports - ID

During the life of the project a certain number of internal discussions will be necessary to exchange information and to settle and agree on the different technological issues that may arise in the different tasks, especially between WPs. These discussions may be addressed by e-mail, Skype for Business (or any other equivalent system) call conferences, in face to face meetings or by phone calls between the relevant researchers.

For this reason, no special template is established for the discussion activities and reports. All relevant decisions and agreements may be included in the corresponding WPLs' monthly reports or Meeting Minutes, whatever is appropriate.

The dissemination level of internal discussions is strictly confidential (CO) as it is relevant only to the Consortium members. The Quality plan establishes that at least accountable persons (Task leaders, WPL or the PC depending on the issue) may store the discussion documents and messages minutes in their respective archive folder in the shared documents' repository.

WPL monthly progress reports - MR

WPL's monthly progress reports are prepared monthly by each WP leader and addressed to the TCC. These reports always refer to a determinate calendar month.

The WP monthly progress report will state the progresses and the achievements of the corresponding WPs and their tasks during the last month, <u>from a work package's point of view</u>. The report must include all the deviations in regards to the work plan, and all the proposed resolution/mitigation actions.

Any quality and/or risk issue must be declared despite it may have already been informed to the PC and all relevant participants.

These reports will serve as the basis for the monthly TCC meeting, chaired by the PC, allowing a proper project follow-up. As a consequence, the reports should be made available to the TCC meetings' participants (TCC members and WPLs) well in advance

the allocated date, and at least 1 week before its celebration. WPLs should use the TCC meeting Dropbox directory of the corresponding session of the TCC.

A template is delivered and will stay available to participants in the shared documents' repository.

Each WPL will be the owner of the report for his/her WP.

Partner quarterly reports – PM and OC

It is established that every 3 months, the partners will have to submit their specific reports regarding the personnel resources' consumption and other direct costs incurred during the past 3 months' period, <u>from a partner's point of view</u>.

The Partners will indicate the personnel involvement in each of the WP and their tasks.

All direct cost will be declared in order to allow a suitable management of the budget in accordance with the DoA, and to anticipate possible deviations.

This personnel and cost reporting will be realised through specific MS excel files templates, available to participants in the shared documents' repository.

The responsible person of each Beneficiary for this reporting is the beneficiary's member of the TCC.

WPL quarterly progress reports - QR

The reporting periods are established in two periods of 18 months. In order to help following up the work progress, a correct allocation of resources and raising risks, a WP progress report is requested to all the WPL every 3 months, to be generated <u>from a work package's point of view</u>. The report must include all the deviations in regards to the work plan, and all the proposed mitigation actions.

Any quality and/or risk issue must be declared despite it may have already been informed to the PC and all relevant participants.

These reports will be consolidated and transmitted to the TCC and the PCC allowing a proper project follow-up.

A template is delivered and will stay available to participants in the shared documents' repository.

The responsible person for each WP report is the corresponding WPL.

Meeting minutes - MM

In order to disseminate the outcomes and results of any project meeting and related to a task or a WP, to a WPL, a TCC or a PCC meeting, meeting minutes will be generated as soon as possible.

The minutes will include agreements and decisions taken, and will state the next steps to perform and a ToDo list.

The minutes will be distributed to and confirmed by all the meetings' attendees, distributed to all relevant recipients that should be aware of the results of the meeting and stored in the corresponding shared repository folder.

A template is delivered and will stay available to participants in the shared documents' repository.

The responsible person for the generation of the minutes is the person that have called the meeting.

Project presentations - PP

Presentations not only serve as meeting documentation, they are also an important building block for dissemination purposes (workshops, conferences, presentations…).

A template taking into account the project's general layout and graphical image is delivered and will stay available to participants in the shared repository.

The responsible person for the generation of the presentation is the person that will present the document in the related event.

Timesheet - TS

In order to help beneficiaries that have not yet implemented an internal time recording system that suit the needs of the project and its reporting, a timesheet template is proposed and made available in the shared repository.

6.2   Naming conventions

The naming of each document is established in this section, together with its proper management rules. An incorrect use of the naming convention and/or its application

may generate unwanted mistakes and confusions, implying additional workload and costs.

The naming of the documents may use the following fields:

- Document identifier

- Document name

- Time identifier, Partner and Contributor

- Version

Document identifier

Each document is identified by a unique document identifier written with capital letters and depending on the type or nature of the document:

Identifier	Internal document type
ID	Internal discussion or report
MM	Meeting Minutes
MR	WPL Monthly Progress Report
QR	WPL Quarterly Progress Report
PP	Project presentation
TS	Time sheet

Identifier	Contractual document type
CFS	Certificate on the financial statements
D	Project deliverables
PPR	Project Periodic Report (M18, M36)
PFR	Project Final Report (M36)

Table 5: Documents' identifiers

Document name

The name of the document will be the description of the content, especially for documents type ID (indicating the issue treated in the document), MM (indicating the official name of the meeting) and PP (indicating the presentation name, or event/conference where the presentation is to be shown).

Time identifier

Each document has a time identifier that could be a month **Mxx** for a monthly, a quarterly or a progress report (e.g. *M12*) or a date **yymmdd** for a meeting minute, an internal peer review or a project presentation, (e.g. *170205*).

Partner and contributor identification

When necessary, the contributor identification will follow the format **Partner-Contributor**, composed with the partner short name as established in the DoA and it may be followed (in order to avoid confusion) by the contributor's identifier as stated in the file *Dropbox/INVADE project/2.Contacts/contacts.xlsx*.

Version

The version identification of the document will follow the format **vx.y**, where x.y is the current version of the document and will be the same as the one stated in the front page of the document (e.g. *v0.2 for a second version of a draft*)

The owner is the only person that may generate the different versions of the document. Each contributor may generate additional working versions with different naming in order to avoid confusion, but these ones will not be considered as released versions. As far as file-naming conventions is concerned, the following table presents the structure that should be followed when creating any new document of contractual or operational nature.

Document type	Convention	File name example
Internal discussion or report	ID_Name_DocumentDate_Partner-Contributor_Version	ID_WP1 Quality meeting_140417_SmartIO-DH_v1
WPL monthly report	MR_Month_WPnumber_Version	MR_M1_WP1_v1
WPL quarterly report	QR_Month_WPnumber_Version	QR_M3_WP1_v1
Meeting Minute	MM_MeetingName_MeetingDate_Partner-Contributor_Version	MM_Kick-off_170203_SmartIO-DH_v1
Project Presentation	PP_Presentation/eventName_EventDate_Partner-Editor_Version	PP_SmartCityExpoWorldCongress_171117_SmartIO-DH_v1

Table 6: Naming formats

6.3   Document Properties

Each document will include a first page and a second page where its properties are shown.

Properties shall be changed during document creation and adjusted during the writing and the quality process, until its final version.

- **Document name**.

- **Version**: The draft versions start with 0.1 and are incremented by 0.1. Released versions receive x.0 version numbers, e.g. 2.0. The version number for internal discussions (ID) is optional; in this case, the date may guide the readers between the different versions.

- **Dissemination level**: PU (public, fully open), CO (confidential, restricted under conditions set out in Model Grant Agreement) or Internal (Consortium only). The dissemination status for all internal documents (as listed in section 3.1.1) shall a priori be "Internal".

- **Status**: Draft, Peer-Reviewed (once accepted by the peer reviewers), Submitted (once accepted by PC, TCC and beneficiary WPs), Approved (once accepted by the Reviewers and the EC, this will be the final version).

- **Date**: The date denotes when the particular document version was issued.

- **Author, Contributor**: Authoring and contributing partners/persons.

- **DocRef**: Any partner-specific document reference you may need for your internal document management (optional).

- For deliverable, **Peer-reviewers** and **WP/Task beneficiaries** will be determined and stated in its page 2.

6.4   Document change controls

The different changes supported by a document will be reflected and described in the document history table. Accordingly, the corresponding change in the version number will then be applied.

6.5   Document archive

The project coordination already created a documents' shared repository (currently using Dropbox services) with the following structure:

- 1.Contractual
- 2.Contacts

- 3.Templates
- 4.Deliverables
- 5.Reports
- 6.Minutes
- 7.Dissemination
- 8.Meetings
- 9.Reviews
- WP1
- WP2
- WP3
- WP4
- WP5
- WP6
- WP7
- WP8
- WP9
- WP10
- WP11 - Ethics

The numbered folders from *1.Contractual* to *9.Reviews* are under the only responsibility of the PC and the project Secretariat, who will be in charge of storing and archiving all the project's documents (especially their last versions), making them available to the partners.

The rest of the folders corresponds to the WP activities and are under the management of the respective WPL. They will structure it with subfolders, recommending at least one subfolder per WP task and, depending on the works nature, will contain additional sub-folders, e.g. for archiving technical designs, software codes, schematics, internal discussions, on-going documents, presentations, papers, progress files, etc. depending on each WP individual requirements.

Due to the limit in the different dropbox accounts, it is highly recommended not to store in the project's folders any heavy file that will reduce or saturate the capacity of some individual accounts.

7 Quality Management

The Consortium establishes a Quality Management (QM) procedure in order to guarantee the quality of the works to be done along the project. This QM procedure will

support processes focused on managing the quality of the project's deliverables and the overall project results.

7.1   Guarantying the quality of the Deliverables

Deliverables are one of the most important ways to communicate and keep informed the European Commission. As a consequence, the management of the production and delivery of such documents is an important task within the Quality Assurance domain.

This section describes the process of how the overall production of deliverables is managed and controlled and how their reviews shall be performed in order to secure the appropriate fulfilment of requirements (substance, structure, alignment, objectives).

7.1.1   Delivery quality process

All deliverables generated by the respective WP must pass through an internal quality review process in order to guarantee the quality and relevance to the project objectives and expected outcomes. Unless this process is achieved with success, the deliverable could not be submitted to the EC and reviewers.

This delivery process for each deliverable consists of eight steps:
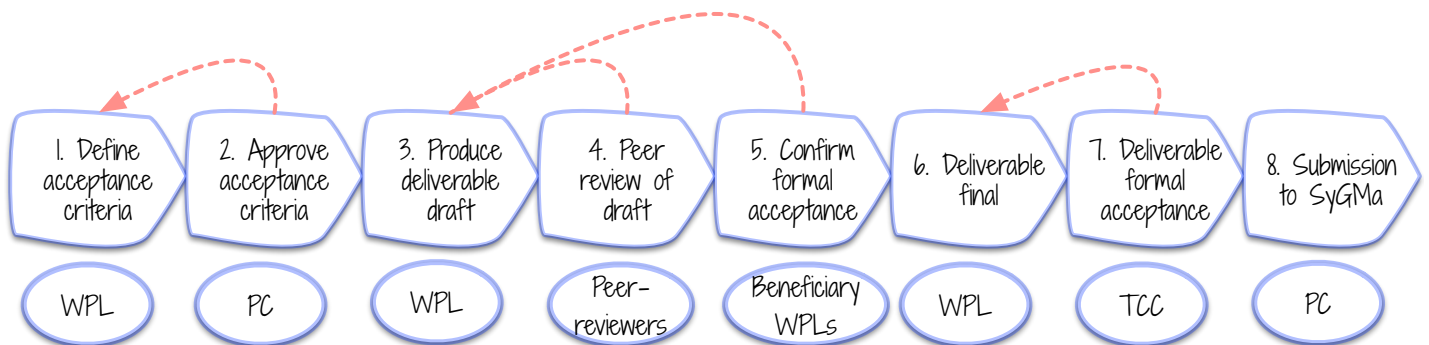
Figure 2: Quality Management process overview and responsible actors

The QM process is to be applied not only to the final deliverables' quality-check review but also during all the production cycle, ensuring that any feedback can be incorporated as early as possible in the process and, as a result, generating an optimal outcome.

The overall process starts by steps 1 and 2 with the formal acceptance of the proposed goals and results and of the applicable acceptance criteria, so that authors become acquainted on whom, how and by means of which acceptance criteria their deliverable

will be reviewed and assessed internally. The acceptance criteria will be in accordance with what is mentioned and forecasted in the DoA.

Following, the authors proceed to the generation of the initial draft version of the deliverable.

The assigned peer reviewers generate their reviewed version, submitting it to the deliverable owner.

The TCC is the Consortium body that will formally accept, or reject, the final deliverable version, and its decision is considered as final.

Once all the process is concluded positively, the PC will finally submit the deliverable to the EC.

Step 1: Definition of the acceptance criteria

The first step of the process consists of defining the criteria that should be used by each specific work package to allow starting the work on a specific deliverable within that work package. The step is tailored to the nature of the work, the specificities of the corresponding work package and the nature and purpose of the deliverable, that including securing its usefulness for the targeted beneficiaries work packages or internal tasks in the originating work package, if this is the case.

The acceptance criteria, for each deliverable, should be in accordance with the description of the deliverable and of the corresponding WP task as contained in the DoA, and fully aligned with the objectives of the originating work package and with the needs and requirements of the targeted beneficiaries work packages.

The WPL submits the acceptance criteria to the PC and the TCC for approval.

Step 2: Approve acceptance criteria

The acceptance criteria are provided to the PC and the TCC for their consideration and discussion. After the TCC has agreed, the PC will sign off the acceptance criteria.

If the acceptance criteria are not approved by the TCC, the WPL will proceed adapting the criteria and step 1 will re-start.

Step 3: Produce draft deliverable

In this step, the originating WPL creates the draft deliverable. Most of the work will be done inside the WP, with the contribution of the involved partners. The WPL can ask

other WPLs, the TCC, the targeted beneficiaries WP or the PC for help or further clarifications, if needed.

In the 'Executive summary' section, basic/brief information about the document, its scope and relations with other deliverables, the summary of related work done, and main findings and conclusions should be included.

Step 4: Peer-Review draft deliverable

Each originating deliverable owner should nominate peer reviewers for his/her deliverable, among those professionals from the Consortium better qualified in terms of competences, expertise and experience to provide substantial insight. At the end, it will be the responsibility of the TCC to formally review and accept deliverables as valid, but the earlier involvement of peer-reviewers will allow for a more secured, efficient and effective production of deliverables.

During this first review process the peer reviewers use the initial draft document, provided by the deliverable owner. All iterations of the reviewing are documented in the status (page 1) and the tables in page 2 of the document by increasing the documents version number and mentioning the name of the peer reviewer and the date of the review. For an easy tracking of proposed changes the "track change" function of Microsoft Word have to be activated and comments may be used and incorporated to the returned version.

The peer-reviewers will check the draft document and evaluate if the following questions are positively addressed:

- Are the goals clearly described?

- Are the results correct and well defined?

- Are the targeted beneficiaries work packages clearly identified?

- Are the needs and requirements of the targeted beneficiaries work packages appropriately outlined and considered?

- Is the content appropriate and sufficient for the purposes of the deliverable?

- Are the relations with other work packages clearly described and considered?

- Are the work package risks identified and measures taken?

The reviewed document is then returned to the deliverable owner. This reviewed document must be kept stored in the corresponding WP files archive.

In case a huge amount of comments or proposed changes appears as a result of the peer review, an ID document could be raised related to this issue, used to provide a more expanded report of the peer review and containing pertinent comments and suggestions of the peer reviewers. A copy of the report must be kept in the corresponding WP folder.

After the peer review is received and taken into account with the pertinent amendments and corrections, the deliverable owner can generate the "Peer reviewed" version of that deliverable.

When the peer-reviewers approve the draft deliverable, the process of the deliverable can go to the next step 5. Otherwise the WPL will have to adjust the deliverable going back to step 3 of the process.

Step 5: Beneficiaries WPs confirm their acceptance

All deliverables to be produced by any work package will have a "transactional" nature, which means that its content should constitute a net contribution to the work to be developed by dependent work packages or by tasks within the same originating work package.

The originating WPL should explicitly indicate in the produced deliverable who are the targeted beneficiaries WPs or tasks, so that the corresponding responsible could formally confirm their acceptance on the submitted deliverable, or request for further improvements in case of need after checking that the outcomes' usefulness are not considered as appropriate.

If the beneficiaries WPL approve the draft deliverable, the production of the deliverable can go to step 6. Otherwise the WPL will have to adjust the deliverable going back to step 3 of the process.

Only after having received a formal acceptance confirmation from the nominated beneficiaries WPLs or task leaders (that should be reflected in the deliverable, indicating the names of the WPL or task responsible and the date in which they have confirmed their acceptance) the deliverable should be considered as completed and transferred to the finalization process.

Step 6: Write final deliverable

The originating WPL will process all comments from the peer-reviewers and from the targeted beneficiaries work packages following the principle "comply or explain".

The originating WPL will keep a record of how suggestions of the peer-reviewers and of the targeted beneficiaries work packages have been integrated or why they have been rejected in the production of the final version of the deliverable.

The originating WPL submits the final version of the deliverable to the consideration of the TCC.

Step 7: Quality review

Before the deliverable is ready for submission there will be a final quality review by the TCC. This review will focus on the procedure that has been followed in producing the deliverable:

- Is the content of the deliverable consistent with the DoA description?

- Have the suggestions of peer-reviewers and of targeted beneficiaries work packages been taken into consideration?

- Is the deliverable ready for submission in time? If the deliverable is not on time, the originating WPL should provide an explanation.

If the TCC approve the deliverable, the deliverable can go to the next step. Otherwise the WPL will have to adjust the deliverable going back to step 6 of the process.

Step 8: Delivery to EC

At the final step of the delivery quality process, the PC will check on whether the provided version of the deliverable has been properly accepted. At this stage, a quick review of the process is performed:

- Is there sufficient/appropriate proof of having complied with the review process?

- Was the review process carried out according to the plan?

- Did all relevant TCC members have a chance to review the deliverable?

- Were the comments appropriately processed in the deliverable?

Should a positive assessment be reached, the PC proceeds to prepare a pdf version of the final version of the deliverable to be submitted to the consideration and approval of the PO and the reviewers. The file is also stored in the appropriate folder of the project repository. Should the production of the deliverable have experienced a delay, the explanations provided by the WPL will be reported to the consideration of the PO.

7.1.2   Planning

For each quality steps the peer-reviewers, the beneficiaries WPLs and the TCC need time for reading and reviewing. As part of the quality check process, the originating WPL and the PC should agree on a reasonable and practical path for the quality and delivery process in that WP, so that the appropriate while flexible timeline can be incorporated in the planning.
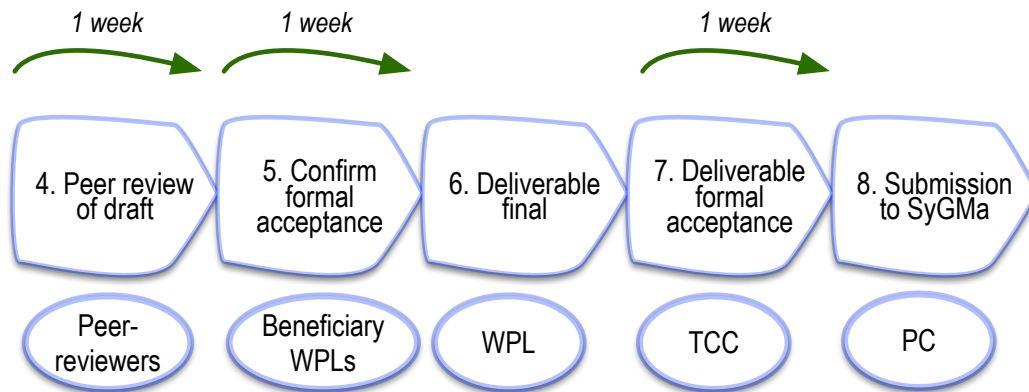

Figure 3: Timeline for the Deliverables

As a first approximation, it will be allowed one week for any document review steps 4, 5 and 7 unless agreed otherwise, and recommend to agree on the dates with the peer-reviewers at the start of the deliverable generation and to inform all peer-reviewers and beneficiaries WPLs preferably three weeks ahead on the final date of any review activity. Also, it is recommended to include a change process in the work plan where appropriate, in order to deal with potential delays and other changes.

Every time a delivery of a new draft is foreseen, a week is envisioned to take into consideration the review comments. For more simple reviews or delivery activities a different period than a week may be agreed upon request and after having reached an explicit agreement. Any such agreement should be reported to the PC.

7.2   Communications

Most if not all of the communications on quality issues will take place over e-mail, call conferences and telephone.

Quality management will be a fixed item in all TMT and WPL meetings, where WPL should be requested to update the situation on the quality cycle of each ongoing deliverable. All PCC and consortium meetings will also incorporate the review of the quality management situation.

7.3   Progress Reporting

Regular progress reporting helps the INVADE Consortium and the EC to monitor the project progress, achievements and difficulties as encountered.

Along the life of the project and apart from the contractual partners' Periodic Reports to be provided for each reporting period, progress reporting will be supported by the production of two types of internal reports: WPL Monthly Progress Reports (to be provided to the TCC every month) and WPL Quarterly Progress Reports (to be prepared by each WPL and provided to the TCC every 3 months), and expected as shown in the following figure:
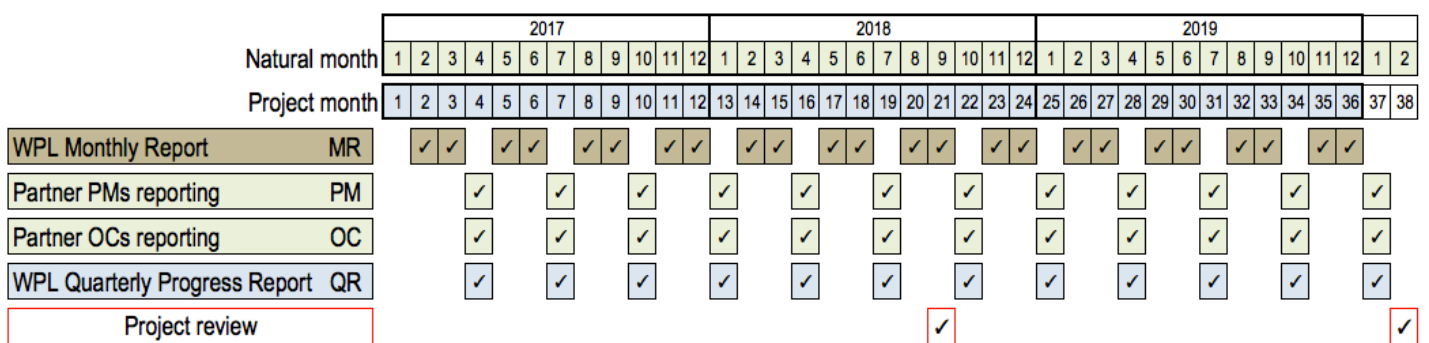
Figure 4: Reporting calendar

Beyond the need to fulfil the above-mentioned obligations, it is also possible that partners could be requested to contribute to other types of reporting throughout the project and after its completion. Examples of additional types of obligations include responding to: questionnaires for socio-economic reporting, the way gender actions have been implemented, and impact on science and society; evaluation and monitoring exercises; contribution to standardisation; or specific requests from the EC or related with the interaction with related projects in the field.

All documents related with reporting activities will have to be provided on time, with appropriate level of detail, using the templates provided for that purpose and devoting particular attention to the provision of substantiated content in order to secure its usefulness. The PC and the TCC will be entitled to reject any report not fulfilling the required level of quality.

7.4 Minutes for the Quality Assurance

All WPL, TCC, PCC and consortium meetings (face-to-face or by online means) and any bilateral or multilateral meetings will have to be reflected in the corresponding minutes. The report should be structured using the corresponding template, as available.

Meetings between the EC and the PC or any other representative acting on behalf of the INVADE project will also have to be reflected into the corresponding minutes.

All minutes should be made available to the related management bodies, securing that access is only granted to the members of the related management body. For that purpose, specific restricted folders in the project repository will be created, in particular for the PCC.

8 Risk Management and Contingency Plan

The purpose for the INVADE project to define a Risk Management and Contingency Plan is to guarantee the required assessment of potential risks, therefore allowing the Consortium to take appropriate, preventive, realistic, on time and effective remedial actions.

The Risk Management and Contingency Plan is an instrument at the service of the entire INVADE Consortium, and as such any partner having identified a potential risk is entitled to declare its existence and initiate the specified process for its appropriate characterization and eventual resolution.

The Risk Management Plan supports the management activities of both the PC and the TCC and constitutes the baseline for all decisions concerning anticipated or already identified risks that could result in significant impacts on the INVADE project execution.

The Consortium establishes the Risk Management and Contingency Plan as a continuous process that will be executed throughout the whole life cycle of the project.

The methodology proposed aims to identify the potential risks of the project and to calibrate their likelihood and possible impacts in terms of technological challenges, allocated resources, budget or time scheduling.

All identified risk will be analysed and an individual contingency plan will be designed. If a risk occurs its mitigation actions will be activated.

This Risk Management has to be a reiterative process as new and unexpected risky situations or events may appear at any time during the project.
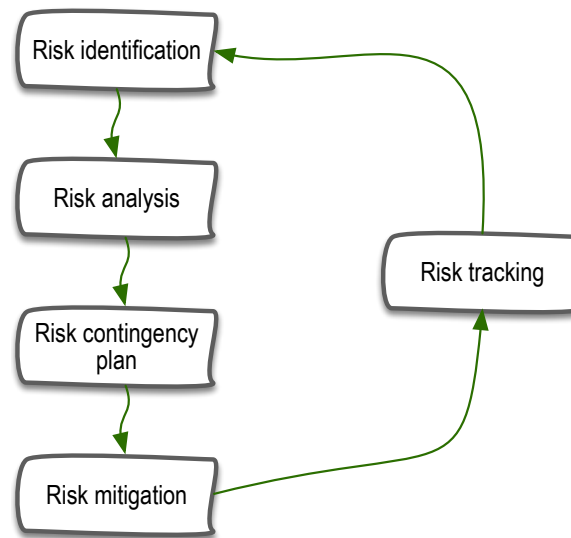

Figure 5: Risk Management and Contingency Plan processes

8.1   Risk identification

A risk cannot be controlled nor mitigated if its proper identification is not carried out first. The different steps of the identification are the risk discovering, the qualification and the communication before it becomes a problem and may adversely affect the project.

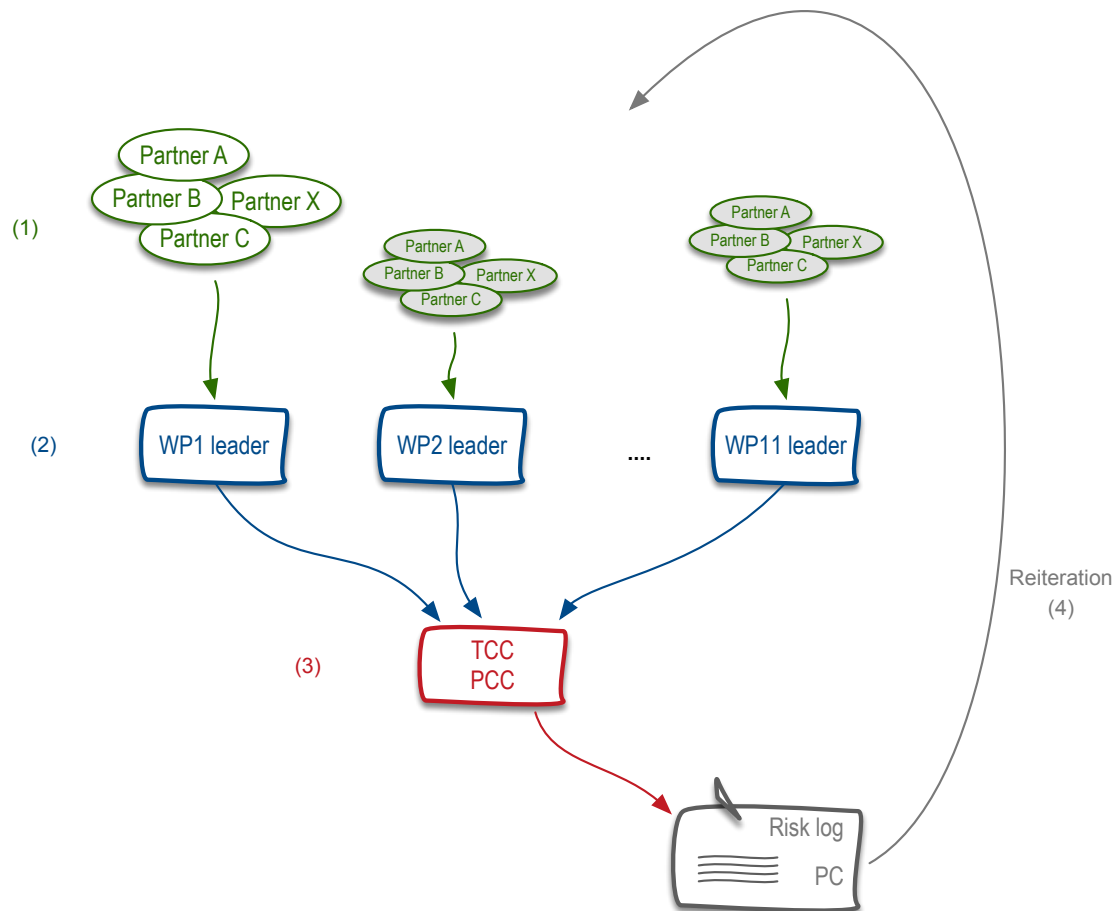The different steps designed to execute a proper risk identification are depicted in following Figure 6:

Figure 6: Risk identification process

At partner's level

Initially, and at partner level (partners involved in each WP), individual brainstorming sessions may be held on any aspect of the partner's involvement in the project and on the whole project itself. The partners may identify the different situations or events in a particular area of the project that can lead to the occurrence of a determined risk. (See step 1 in Figure 6).

This work will benefit from the collection of information that each member of the brainstorming sessions has obtained through its experiences and lessons learnt in previous national or international R&D activities, considering also the risk lists elaborated in similar projects or situations.

At WP level

After the brainstorming at partner's level is made, the identified risks may be communicated to the WPL (step 2 in Figure 6) in order to share suggestions and to spread the perspective of the exercise.

Being the person responsible for the WP, the WPL will summarize and analyse the different risks identified by all the partners involved in the WP and determine the final risks that will be submitted to the consideration of the PC, the TCC and the PCC.

The risks should be presented in some Meeting Minutes (MM) or WPL Monthly Report (MR).

At decision body's level

At consortium level and under the supervision of the PC, the TCC and/or the PCC (depending on the risks' specificity) will take the decision to include or not each submitted risk into the risk log file.

Starting from that moment, the included risk is considered a potential risk of the project and will be managed following the rules stated in the present document.

The TCC or the PCC will qualify the identified risks and assign a risk "owner".

Risk log file

All identified risks will be incorporated into a Risk Log file, responsibility of the PC and duly characterized by:

- Risk number

- Date of registration

- Risk owner

- Risk description

- Risk impact (Very high, High, Medium, Low and Very low).

- Risk likeliness (Very high, High, Medium, Low and Very low)

- Risk situation (Surveying, Pending, Happened, Solved)

- Risk strategy (Accept, Avoid, Mitigate, Transfer, Exploit, Share, Enhance)

- Risk action

- WP especially affected

The corresponding decision body (TCC or PCC) will generate a specific register in the Risk Log file for each identified risk.

All risks, when incorporated into the Risk Log file, will be maintained as permanent registers (never deleted) in order to provide a complete, accurate and updated view of

all the incurred risks of the project (irrespectively on whether or not they have already occurred or been solved).

The Risk Log file will be examined, discussed and utilized to take decisions in each periodic meeting of the TCC.

8.2   Risk analysis

The corresponding decision body (TCC or PCC) will be in charge of analysing each risk included into the risk log file. The analysis results will include at least the following information:

- Risk description

   This will be a short and concise description of the risk nature and characteristics, with clear indication on the part of the project work plan that could be affected by its consequences.

- Risk impact

   For each risk identified, assess the risk event in terms of its effect on project objectives, if the risk event occurs. Each risk may be qualified as Very high, High, Medium, Low or Very low impact.

Impact	Technical performances	Schedule
Very high	Severe degradation. Cannot meet KPI or key technical or supportability threshold. It will jeopardize project success.	Cannot meet key project milestones.
High	Significant degradation or major shortfall in supportability. It may jeopardize project success.	Project critical path affected.
Medium	Moderate reduction with limited impact on project objectives.	Minor schedule slip. Able to meet key milestones with no schedule float.
Low	Minor reduction, can be tolerated with little or no impact on project.	Able to meet key milestones.
Very low	Minimal or no consequence.	Minimal or no impact.

Table 7: Risk impact scale and consequences

- Risk owner

   The corresponding decision body (TCC or PCC) will determine the best partner/person to be in charge of managing each concrete risk within the Consortium.

- Risk likelihood

For each risk identified, assess the risk event in terms of its likelihood of occurrence.

Each risk may be qualified according to the scale shown below. The expected consequences should also be defined in accordance with this.

Likehood		Probability of occurrence
Near Certainty	Very high	~ 90%
Highly Likely	High	~ 70%
Likely	Medium	~ 50%
Low likehood	Low	~ 30%
Unlikely	Very low	~ 10%

Table 8: Risk likelihood scale and consequences

- Risk trigger

The identification of symptomatic events that may contribute to the appearance of the risk is considered of high value for the risk management.

8.3   Risk contingency planning

For each identified risk that could be qualified as a threat, the TCC/PCC will select an appropriate strategy among the following.

Mitigation strategy	
Accept	Recognizing residual risks and devising responses to control and monitor them.
Avoid	Seeking to eliminate uncertainty.
Mitigate	Reducing the probability and/or severity of the risk below a threshold of acceptability.
Transfer	Passing ownership and/or liability to a third party.

Table 9: Risk mitigation strategy

Additionally, three response strategies will also be considered in those cases where risks could be transformed into project opportunities:

Mitigation strategy	
Exploit	Eliminating the risk uncertainty by making the opportunity definitely happen in those cases where its occurrence would have a positive effect on achievement of project objectives.
Share	Allocating ownership to a third party who is best able to handle it, both in terms of maximizing the probability of occurrence, and in increasing potential benefits should the opportunity occur.
Enhance	This strategy is aimed at modifying the "size" of the risk to make it more acceptable, by increasing probability and/or impact, and by identifying and maximizing key risk drivers.

Table 10: Risk mitigation strategy in case of opportunity

The contingency planning will especially include an understandable and objective description of the chosen strategy and adopted countermeasures or actions, with clear indications of the responsible persons involved. This way the risk owner will be able to follow a clear guide during the risk mitigation.

8.4   Risk mitigation

The risk mitigation implementation aims at ensuring the adequate mitigation of the occurring risks. In this sense, the specific tasks to be executed by the Risk Owner are:

- To determine the different actions to be executed by each partner, WPL and/or other stakeholders involved in the defined and approved risk mitigation plan.

- To determine the resources needed to execute the specified actions and tackle the risk (human resources, time demanding, budget allocation and/or contractual requirements).

- To specify the risk reporting needs for an appropriate on-going monitoring.

8.5   Risk tracking

The risk tracking aims to monitor how the risk mitigation process is implemented and to evaluate the results. In this sense, the specific tasks will be:

- To communicate the risk to all the involved parties in the risk mitigation plan and execution.

- To monitor the risk mitigation implementation and update appropriately the Risk Log file.

- To report to the PC and the involved parties when a risk mitigation plan has to be modified due to on-going progress and conditions.

▪ To report to the PC of the risk mitigation evolution and completion.

When requested, the Risk Owner may support the PC in technical meetings and reviews where the risk mitigation implementation and results have to be exposed.

8.6   Risk identification reiteration process

Initially, at proposal phase, the Consortium already identified some specific risks (see section 7). During the project kick-off meeting, a specific time slot was dedicated to a brainstorming session where additional risks were also identified.

This summarised list is the starting point for the brainstorming works to be conducted by each partner once the D1.1 is released (forecast at M2).

During the execution of the project, the Risk Log file must be revisited in order to modify it with updating information from the risk mitigation activities carried out, from new internal circumstances of the project and/or from external conditioning factors. This is considered an on-going activity that will be coordinated by the PC in the different projects meetings held every regularly or ad-hoc.

The Consortium plans to reiterate the process of risk identification at least every 6 months, at M10, M18, M24 and M32 (step 4 in Figure 6).

9 Risk assessment

The following table gives an overview of possible risks identified beforehand, at the time of proposal and confirmed at the kick-off meeting, indicating the remedial and mitigation strategy to prevent them or to reduce their impact in the project in case they happen.

No.	Description	Action	WP especially affected
1	Beneficiaries' risk: Partner underperformance or leaves the consortium.	- Consortium Agreement will describe these particular situations and measures to be taken to prevent non-compliance. - IPR ownership will be described to precise the process of Foreground IP in case a beneficiary would leave.	WP1
2	Project implementation risks: Key milestones and deliverables are delayed or of insufficient quality.	- Technical Coordination will help to discover the risks at earlier stage. - PCC will be aware in advance about delays or issues due to implemented tight working relationships and quality control. - Milestones and deliverables with a critical path will be handled with a special attention. Quality assurance processes improved	ALL
3	Batteries: Batteries come with standard safety and hazards issues such as overheating, fire, static electricity, gas build-up, electrolyte leaks, etc. that must be overcome.	- Respecting operating conditions in EVs and batteries. Excluding battery transportation activities and in absolute need respecting European Transportation code for Hazardous materials. - VTT provides safety and risk management plan for the batteries.	WP6 WP10
4	Invade platform KPIs: Targeted KPIs cannot be reached.	- Standards, open protocols, background IPR, technical recommendations will improve the platform performance KPIs. - Optimisation and improvements of Flexibility Could will be continuously proposed to reach the KPIs set. - Selection of pilot specific requirements and overall architecture will be carefully scrutinised.	WP4 WP10
5	Data processing: Collecting, processing and sharing of data.	- Open data access policy respecting regulations and in the spirit of collaboration will be formulated.mprehensive data management policy developed before pilots go live. - Transparent information and outcomes sharing to establish trustworthiness.	WP3 WP10
6	INVADE platform integration: Uniform integration fails due to the presence of varying standards, policies and regulations at pilot sites or due to a gap in common understanding between hardware suppliers and pilot managers.	- Pilots engagement will be reinforced from the beginning. - Sufficient efforts allocated for pilots integration and implementation by both – piloting site and technology providers. - Engagement with TAG intensified. - Technical workshops enlarged to get broader expertise. - A full chain of stakeholders involved to address different regulatory, policy, technological and businesses challenges.	WP3 WP10
7	Demonstrations: Use cases Mobile, Distributed and Hybrid do not reach envisaged number of end-users.	- Early engagement of end-users will be planned. - Trustworthy relations with communities will be established. - Rules of participation in the pilots detailed in agreements and explained personally. - Improved economic incentives to attract early adopters.	WP9 WP10
8	Business and Exploitation Plan: The business model, business plan and deployment plan does not generate sufficient interest in industry and public sector.	- The consortium driven by the industrial beneficiaries will ensure that the prepared business and exploitation plan is a solid document leading to a fast deployment of the service. - Interest and commitment of industry/citizens will be validated through several workshops, large scale events and other engagement campaigns. - Municipalities, communities and DSOs followers engagement will be intensified through face-to-face communication and project events to get early feedback from them. - Exploitation Users Group will be consulted to enlarger the exploitation potential.	WP3
9	Dissemination: Planned number of participants in the final event cannot be reached. Participants number is low in designed workshops.	- Events location and/or date will be changed. - Professional networks of beneficiaries will be used. - Awareness on social networks like LinkedIn, Twitter will be reinforced. - Technical Advisory Group engaged. - Exploitation Users Group involved.	WP2

Table 11: Identified risks at proposal phase

At M2, date of delivery of the D1.2, the following additional risks have been identified and are under treatment.

10	Journal papers rejection	- To send all publications with enough time to be resubmitted in other journals in order to publish the 13 scientific papers before M36
11	Low activity in the project web-site and social media	- To be very active in social media. - To develop a very user oriented web-site. - To announce the publication of all deliverables in social media.
12	IPR policy vs. dissemination	- Bernt will inform on that in the kick-off - A guide will be produced early in the project. - Good interaction with WP2.
13	Low interest from stokeholders	- High visual factor for the project - A guide will be produced early in the project. - Good interaction with WP2. - Attractive events - Continous dialogue with stakeholders.
14	Gaining the correct parameters of distribution grids and batteries that can be applied in the developed models	- It must be ensured that NTNU can get support from industrial partners in the project to get these parameters
15	Predicting lifetime of batteries is a difficult task with a risk of underestimating it.	Extensive literature review, collaboration with networks, and possibly experimental work on battery lifetime.
16	Delays in INVADE Platform integration	Start with integration meetings with eSmart from the beginning.
17	Regulatory/ policy changes	
18	Corresponding DSOs could delay the pilot because permission may be requested	

Table 12: Identified risks at M2

Annex

File Formatting

The common source file formats for all documents are MS Word (.docx), Excel (.xlsx) and Powerpoint (.pptx). Released version to be submitted outside the Consortium (e.g. to the EC services or reviewers, to press and any other external organization or bodies) will be delivered with Adobe Acrobat format (.pdf).

A format is provided via the respective document templates and its use is mandatory. It provides the following elements:

- Standard font is Arial 11pt;

- Index, Chapters, Sections, Sub-sections and footnotes have a defined format;

- Ordered List with sub-lists (different levels available through indentation);

- Bulleted list with sub-lists (different levels available through indentation);

- List for References (Related literature or reference documents);

- Figure caption and table caption (Arial 10pt, Italic, numbered each by one sequence throughout the document);

- Table heading (Arial 10pt, Bold) and table text (Arial 10pt) for table content.

Minor modifications may be used (e.g. italics/slanted) if necessary, but no change should be made on styles or fonts (e.g. Helvetica instead of Arial, other captions, different headers, etc.). In case of need of new formatting rule, the Project Secretariat should be notified to include it into the project standard templates.