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5G4LIVES D5.6_IMPACT ASSESSMENT STRATEGY

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5G4LIVES D5.6. IMPACT ASSESSMENT STRATEGY	

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REVISION TABLE

Version	Date	Comments
0.1	28.02.2024	Decision on the impact assessment framework, Key Impact Pathways (KIPs) and Key Performance Indicators (KPIs)
0.2	10.03.2024	Final decision on framework and KIPs from all parties involved.
0.3	26.03.2025	Final decision on KPIs from all parties involved.
0.4	28.03.2025	Decision on KPIs, expected results, and value.
0.5	27.05.2025	Decision on document structure, potential ToC and assessment process.
0.6	10.06.2025	Final decision on KPIs, expected value, and results from all parties involved, added one new KPI.
0.7	20.06.2025.	Addition of the assessment process and self-assessment tool, results.
0.8	26.06.2025.	Final review by partners and additions per request.
1.0	30.06.2025.	Final version, ready for submission

5G4LIVES ABSTRACT

In an era where technology is advancing at an unprecedented pace, the project takes centre stage as an initiative committed to harnessing innovation for the greater good. This project unfolds its transformative vision across two distinct geographic clusters, Latvia and Italy. It strategically leverages 5G connectivity alongside cutting-edge technologies such as Unmanned Aerial Vehicles (UAVs or drones) and alternative hydrogen power. With a dual mission of enhancing public safety and environmental health, the project unfolds a narrative where data-driven forecasting and real-time aerial situational awareness become the bedrock of a more secure, efficient, and sustainable future.

At its core, the project seeks to enable optimal emergency management and data-driven forecasting, a mission encompassing the entirety of public safety. Through the dynamic fusion of 5G connectivity and UAVs, this initiative aims to provide real-time aerial situational awareness and automatic vulnerability assessment for at-risk areas. The project's scope extends beyond traditional rescue operations, pushing the boundaries of innovation to safeguard both human lives and the environment.

The project in Latvia involves using drones and 5G technology for monitoring and rescue operations, especially at Vecaku Beach and Kisezers Lake in Riga. This approach aims to enhance police efficiency, particularly in challenging terrains. In Turin, the focus is on developing a 5G-enabled service for situational awareness and vulnerability assessment to counter natural disaster threats. This includes testing anti-drone hacking technology, integrating satellite data, and improving pilot-drone command for better emergency response. The project also includes research in Riga on safety protocols and procedures for urban drone operations and beyond-visual-line-of-sight (BVLOS) flight methodologies with EU-wide relevance. A significant aspect of the project is to engage in extensive communication to inform and educate local, national, and EU networks about these technological solutions.

By leveraging 5G and drones, the project promises quicker and more effective emergency response, addressing staff shortages in law enforcement and expanding their skill set. In Latvia, the use of drones and 5G connectivity will empower law enforcement to intervene more swiftly, addressing staff shortages and expanding the skill set of police officers. In Italy, the project will mitigate the threat of natural disasters and test innovative anti-drone hacking technologies, leading to more efficient emergency responses. Additionally, developing safety protocols and procedures for urban drone flights and validating BVLOS flight methodologies will set new standards for public safety and security. The project emphasises community involvement and knowledge sharing, ensuring that the benefits of these technological advancements extend beyond immediate emergency management to foster a more resilient and informed society.

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ABBREVIATIONS AND ACRONYMS

ECO	Electronic Communications Office of Latvia
KIP	Key Impact Pathway
KPI	Key Performance Indicator
R&D	Research and development
R&I	Research and Innovation
RCC	Riga City Council
WP	Work Package

EXECUTIVE SUMMARY

The present deliverable is D5.6, which is "Impact Assessment Strategy" of the 5G4LIVES project to evaluate its contributions across technological, economic, societal, environmental, and regulatory areas. This strategy is designed to align with Horizon Europe objectives and broader European policy priorities, ensuring the project's outcomes are both meaningful and measurable.

This impact strategy serves not just as a reporting mechanism, but as a guiding compass, integrated across the project rather than isolated in a single workstream. It's designed to observe change from multiple points: within organisations, across national agendas, and in the broader international context.

At its core, the strategy promotes shared responsibility. All partners are involved in measuring and understanding the project's progress through jointly defined metrics and contribution tables. These tools clarify who does what and how each action links to measurable outcomes. Rather than relying solely on numeric indicators, the approach encourages thoughtful reflection, allowing the project to capture not only what is achieved but also how and why it matters. The methodology is dynamic, as it includes periodic self-evaluation checkpoints using a tailored digital tool, creating space for learning and recalibration along the way. These recurring assessments track milestones and surface insights that inform future decisions and ensure transparency across the consortium and beyond.

Importantly, the framework distinguishes between visible, immediate results and subtler, longer-term changes. This distinction allows the project to uncover impacts to create effective, scalable 5G solutions for public safety and emergency response. By embedding this strategy throughout the lifecycle of 5G4LIVES, the project ensures that evaluation is not a final step, but a continuous, collective effort that sharpens focus, aligns intentions, and amplifies the significance of every contribution.

INTRODUCTION

This document presents the **impact assessment strategy of the 5G4LIVES project,** outlining the framework, methodology, and tools used to systematically evaluate the project's impact across technological, economic, societal, environmental, and regulatory dimensions. The purpose of this document is to **define a structured approach to assessing both the direct and indirect effects of the project's activities, locally and across borders,** ensuring that the outcomes are meaningful, measurable, and aligned with the broader objectives of Horizon Europe and European policy priorities.

The impact assessment outlined here is not an isolated work package but a **cross-cutting activity** that interacts with and supports all other work packages (WPs). It links directly to the core objectives and expected outcomes defined in the Grant Agreement and Project Proposal. The **Key Impact Pathways (KIPs) and Key Performance Indicators (KPIs)** described in this strategy are mapped against specific tasks and deliverables across the project, ensuring that all partners actively contribute to impact creation and its measurement. Two internal coordination tools - the Task-to-KPI Table and KPI-to-Partner Table - were developed to facilitate this alignment and promote ownership and accountability throughout the consortium.

The strategy is designed to evaluate impact across three levels:
- the organisational level, examining internal changes among partner institutions.
- the national level, focusing on alignment with country-specific priorities such as innovation, sustainability, and public service enhancement.
- the international level, assessing scalability, knowledge transfer, and policy relevance beyond the project's geographic scope. These levels reflect the layered and interconnected nature of impact, ensuring that both immediate outputs and longer-term transformations are captured.

To support adaptive management and continuous learning, the document also introduces a **self-assessment process** embedded in the project's workflow. All partners participate in three scheduled assessments using a structured online tool developed specifically for this purpose. These exercises feed into a series of Impact Assessment Progress Reports and will culminate in a Final Impact Report, ensuring that insights and progress are communicated transparently both within the consortium and to external stakeholders.

The current report **presents the first Impact Assessment Progress Report** (Annex 4), developed through a structured self-assessment survey completed by project partners. This initial internal evaluation captures progress made during the first year of the project and measures its impact based on results achieved in 2024. Partners' participation was instrumental in establishing a strong initial baseline for impact tracking. The summarised KPI results and explanations for the first project year are provided in Annex 4.1 of the report. Looking ahead, the next assessment is scheduled for early 2026 to reflect progress in the second project year (2025), aiming to showcase expanded impact across all dimensions. This first round has laid a solid foundation for ongoing improvement and evidence-based evaluation throughout the project's lifecycle.

Ultimately, this impact assessment strategy aims to support not just reporting obligations but to foster reflection, improvement, and strategic alignment throughout the project lifecycle. It is a forward-looking and collaborative tool that empowers all partners to track, evaluate, and amplify the value of their contributions to the mission of 5G4LIVES: to develop scalable, sustainable, and high-performing 5G-enabled emergency and risk management services.

1. OVERVIEW OF IMPACT ASSESSMENT

Impact assessment in research and innovation (R&I) projects is a **systematic process** to identify, evaluate, and communicate the broader societal, economic, and scientific effects of research activities. As public funding and policy frameworks increasingly emphasise societal relevance, impact assessments have become integral in project planning, implementation, and evaluation - especially in EU-funded contexts [1]. Impact in R&D refers to the **long-term outcomes** that extend beyond immediate project results. According to the OECD (2010), impact includes both intended and unintended long-term effects. Horizon Europe distinguishes between outputs (immediate products), outcomes (short-to medium-term uptake), and impacts (long-term societal, economic, or scientific changes) [2]. Some frameworks, such as the UK Research Excellence Framework, emphasise impact "beyond academia," whereas others include academic effects as well [3].

Impact evaluation often relies on a mix of frameworks and tools to capture the full range of outcomes. **Logic Models or Theories of Change** help map the pathway from inputs and activities to measurable impacts, supporting both planning and evaluation stages [4]. **Indicator-based frameworks**, like Horizon Europe's Key Impact Pathways (KIPs), use quantitative metrics, such as patents, publications, or job creation, to track short-, medium-, and long-term effects [5]. When numbers aren't enough, **narrative methods** like case studies are used to highlight broader societal impacts, as seen in the UK REF's requirement for institutions to submit real-world impact stories beyond academic outputs [3].

While external evaluations are essential, **self-assessment** plays a vital role in continuous internal learning, course correction, and preparing structured input for formal assessments. Self-assessment methods offer several unique advantages in the context of KIP/KPI tracking:

- **Early Detection of Gaps:** Projects can identify weak or underperforming areas before final reporting deadlines.
- **Encourages Reflective Practice:** Teams are encouraged to think critically about whether their outputs are leading to meaningful outcomes.
- **Supports Agile Management:** Enables mid-project strategy shifts or reallocation of resources based on real-time insights.
- **Builds Internal Ownership:** Involving team members in evaluating impact reinforces commitment and understanding of shared goals.

Embedding self-assessment into project workflows requires more than occasional check-ins; it must be a structured, ongoing process. Effective practice includes establishing **regular internal review cycles**, such as annual or quarterly sessions, to evaluate progress against KIP indicators and refine targets as needed. Team-based scoring enhances the quality of assessments by incorporating diverse perspectives from different work packages or stakeholder groups. To maintain transparency and credibility, all self-assessment inputs should be backed by verifiable evidence, such as reports, emails, or meeting notes. Finally, version control through shared digital tools like Google Sheets, Notion, or SharePoint ensures that updates are traceable over time and accessible to the full team.

1.1. EXPLICIT VS. IMPLICIT PROPOSITION

In the context of impact assessment and value proposition analysis, distinguishing between explicit and implicit propositions is crucial for accurately capturing the multifaceted nature of value creation. Explicit value propositions are articulated benefits that stakeholders can readily identify and measure. They often align with immediate, tangible outcomes, such as cost savings, efficiency gains, or specific performance improvements. These propositions are typically communicated directly and are supported by quantifiable metrics, making them more straightforward to assess and validate [7].

Conversely, implicit value propositions refer to the underlying, often unspoken benefits that emerge over time. These are not immediately evident and may encompass long-term strategic advantages, such as enhanced brand reputation, increased customer loyalty, or the development of organisational capabilities. Implicit propositions require a deeper analysis to uncover, as they are embedded within the broader context of stakeholder experiences and perceptions. They often necessitate qualitative assessment methods, including case studies, interviews, and narrative analyses, to understand their impact [8] fully.

The distinction between explicit and implicit value propositions is not merely academic; it has practical implications for how organisations design, implement, and evaluate their initiatives. Recognising and articulating both types of value propositions enables a more comprehensive understanding of an initiative's impact, ensuring that both immediate outcomes and longer-term benefits are considered. This holistic approach aligns with the principles of service-dominant logic, which emphasises value co-creation and the importance of context in value realisation [9].

Incorporating both explicit and implicit value propositions into impact assessments allows for a more nuanced evaluation framework. It acknowledges that while some benefits are readily measurable, others require time and contextual understanding to materialise fully. By embracing this dual perspective, organisations can better capture the full spectrum of value their initiatives deliver, leading to more informed decision-making and strategic planning [10].

1.2. KEY IMPACT PATHWAYS

In our impact assessment, we will adopt the **KIPs** framework used by Horizon Europe, which provides a structured approach to evaluating diverse outcomes. The KIPs are divided into **five main categories**: societal, technological, economic, environmental, and regulatory. Societal impacts capture improvements in well-being, social inclusion, education, and public engagement. Technological impacts refer to the development and application of new knowledge, innovations, or digital solutions. Economic impacts cover areas such as job creation, startup formation, and increased productivity. Environmental impacts assess contributions to sustainability, resource efficiency, and climate goals. Lastly, regulatory impacts evaluate influence on policy, standards, and governance frameworks. Using this comprehensive model allows us to capture both tangible and intangible outcomes across short-, medium-, and long-term timeframes [6].

KIPs framework is a powerful tool for impact assessment because it moves beyond traditional metrics and offers a **multi-dimensional, forward-looking approach** to understanding research and innovation outcomes. Developed within Horizon Europe, KIPs are not just a checklist; they are a strategic alignment tool, helping projects to explicitly connect their activities to broader EU policy priorities such as the Green Deal, digital transformation, and social resilience.

What makes KIPs particularly valuable is their temporal structure: they distinguish between short-term outputs (like scientific publications), medium-term outcomes (such as technology adoption or regulatory input), and long-term impacts (like shifts in societal behaviour or policy change). This allows evaluators to capture the full lifecycle of impact, including the often-overlooked lag between research and real-world effects.

Moreover, KIPs are policy-sensitive; they are designed to show how research aligns with or influences policy frameworks, making them especially useful for institutions aiming to demonstrate their relevance and accountability to public funders. They also promote comparability across disciplines and projects, while still allowing room for qualitative context and narrative justification.

By incorporating societal, technological, economic, environmental, and regulatory dimensions, KIPs help ensure that no impact domain is siloed or overlooked. This is particularly critical in complex, interdisciplinary initiatives where outcomes emerge across sectors and timeframes. In short, KIPs offer both structure and flexibility, making them a robust framework for evidence-based, policy-relevant impact evaluation.

2. IMPACT ASSESSMENT STRATEGY FOR 5G4LIVES

The **Impact Assessment Strategy** outlines the **detailed methodology** that the 5G4LIVES project will follow to systematically evaluate, verify, and measure its impact. Specifically, it focuses on two key dimensions:

1. Assessing the **overall impact** of the project's results across multiple levels, ranging from the organisational scale up to the international stage.
2. Examining the **potential for scaling and replicating the results** achieved within the project's use cases, ensuring that successful outcomes can be transferred or expanded into new contexts.

This strategy has been developed based on a thorough review of relevant literature, an in-depth analysis of the project's core documents (including the Grant Agreement and Project Proposal), as well as a careful examination of key strategic documents. Together, these sources provide a solid foundation for assessing the project's outcomes and ensuring that its impact is meaningful, measurable, and aligned with broader objectives.

2.1. FRAMEWORK

5G4LIVES project's Impact assessment strategy outlines the **framework for impact assessment, methods, tools and criteria** used to assess the project's impact as well as guidelines for gathering the necessary data to reduce resources required for filling the impact assessment exercise. The framework is created in cooperation and discussions with the project's partners.

2.1.1 Perspective and levels

The framework for the impact assessment of the 5G4LIVES project is built upon **five distinct but interconnected perspectives: technological, economic, societal, environmental, and regulatory**. By considering these five dimensions, the project ensures a comprehensive evaluation of its outcomes, capturing not only the technical advancements but also the broader implications for society, the economy, the environment, and the regulatory landscape.

To capture the full extent of its influence, the overall impact of the project's results will be **measured across three critical levels: the organizational level**, focusing on the participating institutions and stakeholders; **the national level,** examining how the outcomes contribute to country-wide progress and innovation; and **the international level**, assessing the project's relevance, scalability, and influence on a global scale.

This multi-level approach allows the project to understand both its immediate and far-reaching effects, ensuring that its contributions are meaningful and aligned with larger strategic goals.

2.1.2 Key Impact Pathways (KIPs)

Each impact perspective within the 5G4LIVES project is monitored through a defined set of **KIPs**, which serve as the primary tools for assessing and measuring impact over time. These KIPs are directly linked to the project's **eight defined outcomes (O1–O8)** as outlined in the 5G4LIVES framework, arising from the seven defined project objectives to achieve **overall objective of the 5G4LIVES project** that is to design, test and create a 5G-enabled scalable, sustainable, innovative, and high performing emergency management and risk prevention service - focusing on search and rescue operations in Riga and the management of natural disasters in Turin. On top of that, some KIPs are linked to additional aspects from project tasks specified in the project's Grant Agreement. Together, they provide a structured approach for capturing the most important elements of each impact perspective.

The KIPs reflect the core dimensions and indicators about which data and information are systematically collected throughout the project's lifecycle. This ongoing tracking enables the project team to monitor progress, identify trends, and generate detailed reports on how well the project is advancing toward its intended impacts. By grounding the assessment in clearly defined pathways, the project ensures that its progress can be transparently measured, reported, and understood across all key areas of impact.
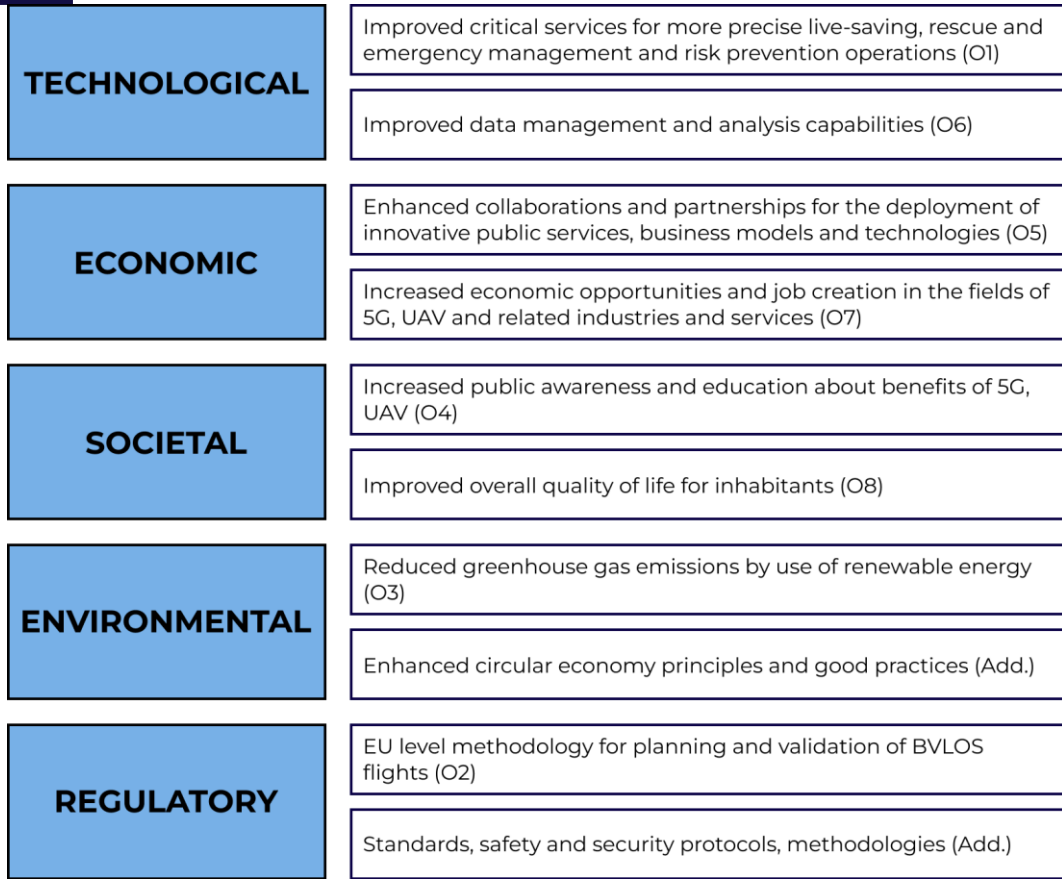
Figure 1. 5G4LIVES Key Impact Pathways

2.1.3 Key Performance Indicators (KPIs)

In the 5G4LIVES Project Proposal 3, general KPIs were defined:

> Number of new connections of socio-economic drivers to 5G networks: 3
> Number of new users of 5G networks: 2
> Number of enabled 5G-based use cases: 4

However, to ensure a comprehensive assessment, each impact perspective within the 5G4LIVES project is structured around a **carefully selected set of specific KPIs**. These KPIs are directly aligned with the defined KIPs to ensure that the project's results and achievements are systematically captured, both throughout the project's implementation and at its conclusion, and to provide a clear, measurable picture of the project's overall impact (see Appendix 1 for details).

Because all project partners contribute to creating impact through a wide range of tasks, and many of these tasks require evaluation from multiple perspectives, the KPIs have been **designed to closely align with the specific tasks and deliverables** outlined in the project. This alignment ensures that impact can be assessed not only at the general project level but also at the task level, allowing for a more detailed and meaningful evaluation. Furthermore, this approach enables all partners to track whether the tasks listed in the Grant Agreement are being completed as planned, providing an additional layer of accountability and clarity.

The initial set of KPIs is defined in this report, D5.6, deriving from a thorough analysis of the tasks and deliverables in the Grant Agreement. To avoid duplicating information, similar objectives from various project tasks were thoughtfully grouped, allowing the definition of distinct KPIs that each carry their own expected results. This process was highly collaborative: project partners jointly reviewed the initial KPI proposals, provided feedback and suggestions for improvements, and ultimately reached a shared agreement on the final set of KPIs.

To ensure a comprehensive and well-balanced assessment, a **total of 21 KPIs have been defined,** covering all five impact perspectives:

TECHNOLOGICAL – 5 KPIS
ECONOMIC – 4 KPIS
SOCIETAL – 3 KPIS
ENVIRONMENTAL – 4 KPIS
REGULATORY – 5 KPIS

For each KPI, an expected result and value have been established (see Appendix 2), which serves as a reference point to determine whether the KPI has been achieved and whether the project's intended outcomes have been met. This robust set of indicators enables the project team to carry out a comprehensive and meaningful impact assessment, ensuring that all five perspectives are fully considered and that the project's progress can be transparently measured and reported.

2.1.4 Direct and indirect impact

While some KPI expected values are clear and immediately measurable, delivering **immediate added value** to the project and its stakeholders, others are less obvious at first and only reveal their true value over the medium or long term. Because of this, the impact of the 5G4LIVES project results is intentionally differentiated between **direct and indirect impact** to ensure a nuanced and meaningful assessment.

Direct impact refers to the clear, immediate, and measurable outcomes that emerge directly from the project's activities. These include tangible results such as the development of new technologies, the creation of innovative services, or the generation of new knowledge and insights. These impacts can typically be tracked and demonstrated within the project's active timeline and offer stakeholders quick, visible evidence of progress and success.

In contrast, **indirect impact** encompasses the broader, more gradual effects that unfold over the medium to long term. These outcomes may not provide immediate added value but carry prospective benefits that become evident over time. Examples of indirect impacts include policy changes influenced by the project's findings, long-term improvements to infrastructure, strengthened institutional capacities, or enhanced skills and competencies among stakeholders and beneficiaries. Such effects often ripple beyond the immediate scope of the project and contribute to sustained change at the sectoral, national, or even international level.

By distinguishing between direct and indirect impacts, the 5G4LIVES project's impact assessment framework ensures that both the short-term achievements and the long-term contributions are captured, recognised, and valued. This dual perspective enables a more holistic understanding of the project's overall success and supports the identification of both immediate gains and future opportunities for scaling, replication, and sustained influence. Both impact types are compared in Table 1, offering a quick overview.

Table 1. Overview of direct and indirect impact types.

ASPECT	DIRECT IMPACT	INDIRECT IMPACT
What it is	Immediate, clear outcomes from project activities	Mid/long-term effects that appear over time
Examples	New technologies, services, and knowledge	Policy changes, better infrastructure, and new skills
Timing	Short-term, during the project	Medium/long-term, after the project
Value	Quick, measurable benefits	Future, sustained benefits
Tracking	Easy to measure within the project scope	Needs longer follow-up, broader observation

2.1.5 Impact assessment levels

In our project, we will conduct impact evaluations not only at the individual use case level but also across organisational, national, and international levels to ensure a holistic understanding of how our activities contribute to broader change. This multi-level approach allows us to capture both the immediate and extended significance of our work.

At the **organisational level, we aim to assess how each partner institution benefits internally,** whether through improved processes, increased capacity for innovation, adoption of new technologies, or enhanced staff competencies. These insights will help us understand how the project supports institutional development and aligns with internal strategic goals.

On the **national level,** our evaluation will focus on how the project contributes to country-specific priorities, such as advancing digital infrastructure, fostering local innovation ecosystems, or supporting national sustainability and economic objectives. This is particularly important for demonstrating how the outcomes of our work align with policy frameworks and public investments.

Finally, at the **international level**, we will examine how our project supports cross-border collaboration, contributes to global challenges, and aligns with broader frameworks. Whether through knowledge transfer, alignment with international standards, or global dissemination of results, we recognise the importance of situating our impact within a wider context.

By explicitly including these three layers in our evaluation strategy, we ensure that the project's value is measured not only in terms of immediate outputs but also in its contribution to long-term, systemic transformation. This approach reflects our commitment to transparency, relevance, and meaningful change across all levels of engagement.

2.1.6. Process flowchart for defining KIPs and KPIs for impact assessment

To ensure a structured and consistent approach to assessing a project's impact, a dedicated methodology has been developed for defining and validating KIPs and KPIs. Figure 2 illustrates the complete process for defining KIPs and KPIs.
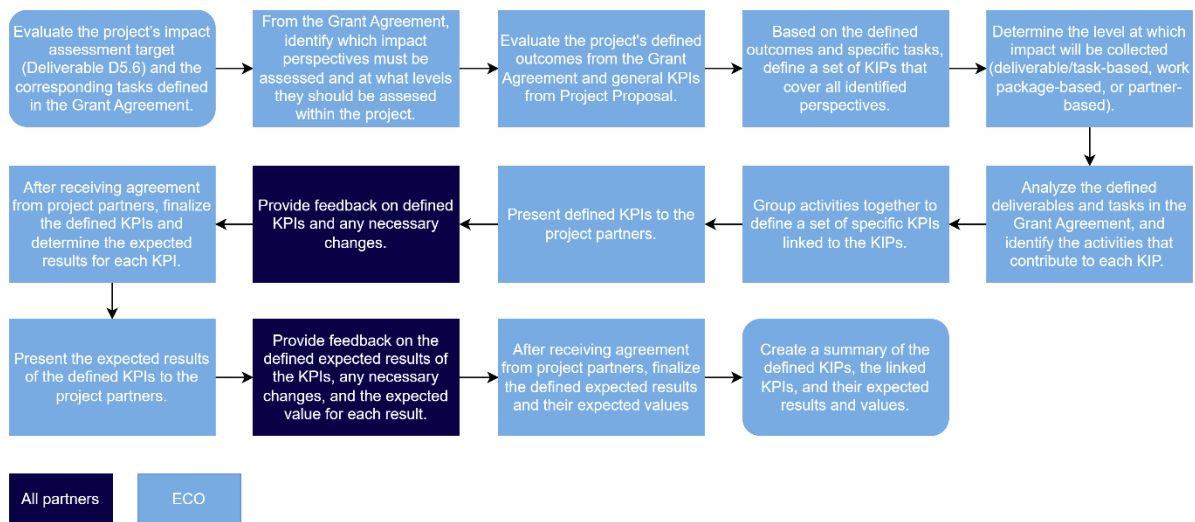
Figure 2. Step-by-step process flowchart for defining KIPs and KPIs for impact assessment

A flowchart outlines the step-by-step methodology for defining, validating, and finalising KIPs and KPIs within a project. It ensures alignment with the Grant Agreement and the project's expected results by identifying relevant impact perspectives, levels, outcomes, deliverables, and tasks. The process includes collaboration among all project partners to define and agree on KPIs, determine expected results, and produce a final summary (Appendix 1 and 2) of impact measurement targets and metrics. It is led by the ECO with iterative feedback and approval loops from all partners to provide clarity and consensus on impact assessment across all levels of the project.

2.1.7 Guidelines for the project's partners

While developing the project's impact assessment strategy framework, two internal guidelines to support partners in effectively conducting the impact assessment exercises were developed:

1. **Task-to-KPI Table**: This table links each task from the project's Grant Agreement with its assigned task lead, the additional partners involved, and the relevant KPI(s) associated with that task. This helps ensure clarity on responsibilities and alignment between tasks and impact measures.

2. **KPI-to-Partners Table:** This table maps each defined KPI to the specific partners responsible for contributing to its expected value. It ensures that all partners understand their roles in achieving the project's targeted outcomes and facilitates coordinated efforts across the consortium.

3. IMPACT ASSESSMENT PROCESS

This chapter provides a comprehensive overview of the **impact assessment process** designed and implemented within the 5G4LIVES project to systematically evaluate the project's progress, outcomes, and overall impact. The process ensures that the contributions of all partners are carefully measured, tracked, and monitored throughout the project lifecycle to provide meaningful insights into both short-term achievements and long-term potential.

The chapter is structured to describe the key components of the assessment process, including the timeline of **impact assessment exercises**, the use of **self-assessment surveys**, the preparation of **progress reports**, and the development of the **final impact report**. Together, these steps create a clear and structured framework that allows the project consortium to monitor advancements, identify areas for improvement, and assess the project's effectiveness against the defined KPIs and outcomes.

Additionally, the chapter includes a **process flowchart** that visually summarises the sequence and interactions of these activities, offering a clear and accessible guide to the overall impact assessment approach. By following this structured process, the project ensures that its progress is transparent, its results are well-documented, and its achievements can be communicated effectively to both internal and external stakeholders.

3.1. IMPACT ASSESSMENT EXERCISES

All project partners will actively contribute by completing **three impact assessment exercises** designed to collect and track information over time.

- The **first assessment** was conducted in **Month 18 (M18)**, alongside the finalisation of the project's impact assessment strategy, to evaluate the impact achieved during the project's **first year (2024)**. These initial results serve as important **benchmark indicators** for the subsequent assessments, providing a reference point to measure progress toward the defined project outcomes.
- The **second assessment** will take place in **Month 26 (M26)** to evaluate the impact achieved during the **second project year (2025)**.
- The **third and final assessment** will be conducted in **Month 34 (M34)**, focusing on the impact generated during the **third year (2026)**.

This structured timeline ensures that the project's progress is systematically monitored, allowing the consortium to track advancements, identify gaps, and demonstrate cumulative impact over the course of the project.

3.2. SELF-ASSESSMENT

To help each partner evaluate their work on the project's tasks, regarding the defined KPI expected values and planned outcomes, the impact assessment will be conducted as self-assessment exercises using the Google Forms online platform.

The lead of D5.6 has developed a structured impact assessment survey (see Appendix 3), which partners are required to complete and submit within the specified periods. This self-assessment approach ensures that each partner reflects on their contributions, provides accurate input, and helps build a comprehensive picture of the project's overall progress and impact.

3.3. IMPACT ASSESSMENT PROGRESS REPORTS

The data collected from the **impact assessment exercises** will be gathered, summarised, and analysed by the representative responsible for **Deliverable D5.6**. Following the data analysis, this representative will prepare an **Impact Assessment Progress Report** (an internal document), which will summarise key findings and insights. All project partners will be informed once the report is completed, and, where possible, the report will also be integrated into the project's **Technical Report** for broader reference.

Throughout the project, a total of **three Impact Assessment Progress Reports** will be produced, ensuring systematic tracking and reporting of the project's progress and impact across all planned assessment periods.

3.4. IMPACT ASSESSMENT PROCESS FLOWCHART

Based on the results of the three self-assessments, which compile the measured impacts from project years 1, 2, and 3 as documented in the Impact Assessment Progress Reports, the project partners will collaboratively develop the Impact Assessment Final Report in Month 36 (M36).

This final report will present a comprehensive summary of the project's overall impact and the results of the impact assessment. It will provide a detailed overview of the project's effectiveness, achievements, and lessons learned, as well as insights into the project's potential for scalability and replication beyond its original scope.
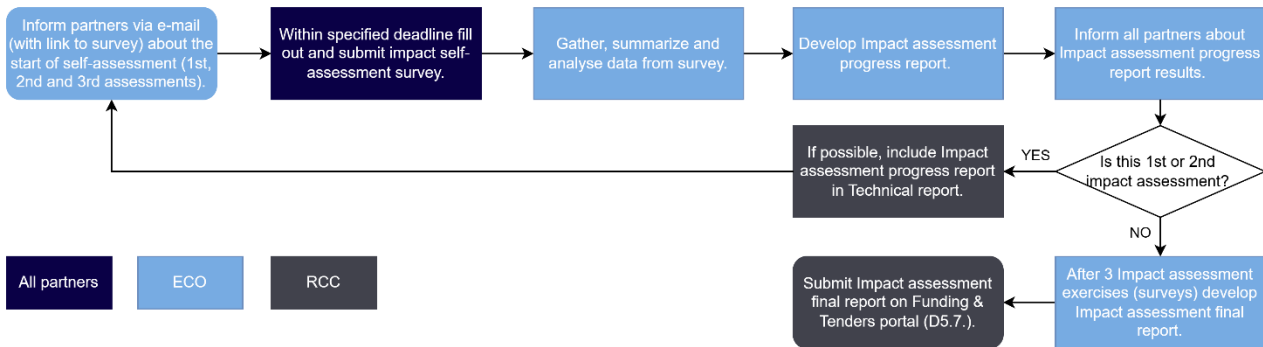
Figure 33. Impact assessment exercise process flowchart

The flowchart (Figure 3) outlines a structured process for conducting impact self-assessments and compiling the final impact assessment report within the project. The process begins with the Impact Evaluation Coordinator (ECO) informing all partners via email about the launch of the self-assessment round, whether it is the first, second, or third, and providing a survey link. Each partner, through their designated contact person, is responsible for completing and submitting the survey by the given deadline. Once submissions are received, the ECO gathers and analyses the data to develop an Impact Assessment Progress Report. If the current round is either the first or second assessment, the results are shared with all partners, and the report may also be integrated into the periodic technical report. Following the completion of all three assessment rounds, the ECO compiles the final Impact Assessment Report, which is then submitted via the Funding & Tenders Portal (D5.7). This process ensures continuous monitoring and documentation of project impact, supported by active partner engagement and timely data collection.

CONCLUSIONS

The 5G4LIVES impact assessment strategy provides a clear and practical approach for evaluating the project's contributions across technological, societal, economic, environmental, and regulatory areas. It ensures that both short-term results and longer-term changes are captured, including outcomes that may not be immediately visible but are still valuable over time.

By combining measurable indicators with self-assessment and reflection, the strategy supports continuous improvement and helps all partners stay aligned with project goals. The distinction between direct and indirect, as well as explicit and implicit impacts, allows for a more realistic and well-rounded understanding of progress.

Importantly, this approach not only helps monitor performance but also builds a strong foundation for communicating results to stakeholders. It prepares the project to demonstrate its value, both during its implementation and in the years to follow, while supporting learning, accountability, and future scaling of successful outcomes.

Additionally, the strategy strengthens collaboration across the consortium by clearly linking tasks, responsibilities, and expected outcomes. Tools like the Task-to-KPI and KPI-to-Partners tables have helped clarify each partner's role in contributing to impact, ensuring that efforts are coordinated and transparent. This shared framework encourages consistency in how progress is tracked, while also allowing flexibility to adapt as the project evolves. As a result, 5G4LIVES is well-positioned to not only achieve its objectives but also to demonstrate its relevance and added value across multiple levels.

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Perspective	Key Impact Pathway (KIP)	Key Performance Indicator (KPI)
TECHNOLOGICAL	Improved critical services for more precise lifesaving, rescue, emergency management and risk prevention operations (O1)	**TECH1** Innovative solutions (technologies, products, services, processes, methods) **TECH2:** Improved existing solutions (technologies, products, services, processes, methods) **TECH3** Feasibility studies, pilot and/or use case integrations that could underpin innovations or improved solutions
	Improved data management and analysis capabilities (O6)	**TECH4** Project concept execution in real conditions (5G-based use cases) **TECH5** Improved effectiveness of search and rescue operations (reduced number of involved human resources and deployed equipment, accelerated response times and reduced rescue times, management of an ongoing emergency and automatic aerial monitoring via 5G-enabled services)
ECONOMIC	Enhanced collaborations and partnerships for the deployment of innovative public services, business models and technologies (O5)	**ECO1** Exploitation activities for the deployment of new products, services or business models **ECO2** Synergies and/or new collaborations with other relevant projects, initiatives, partnerships and/or establishment of new networks/initiatives (international, national and/or regional level)
	Increased economic opportunities and job creation in the fields of 5G, UAV and related industries and services (O7)	**ECO3** Project results that have commercial value and will be further developed or brought to market **ECO4** Value generated by innovative or improved existing solutions
SOCIETAL	Increased public awareness and education about the benefits of 5G, UAV (O4)	**SOC1** Activities to reduce potential concerns and issues (such as privacy concerns), enhance societal acceptance, as well as increase the acceptance level of 5G technology based on the support of rescue operations **SOC2** Communication and dissemination activities
	Improved overall quality of life for inhabitants (O8)	**SOC3** Developed results that have societal value and improve the overall quality of life for inhabitants
ENVIRONMENTAL	Reduced greenhouse gas emissions by the use of renewable energy (O3)	**ENV2:** Successful reduction of wasted fossil fuel usage **ENV3** Solutions evaluated to enhance the use of renewable energy
	Enhanced circular economy principles and good practices (Add.)	**ENV1** Activities to enhance circular economy principles and good practices **ENV4** Recommendations from lifecycle analysis (LCA) to reduce environmental impact
REGULATORY	EU level methodology for planning and validation of BVLOS flights (O2)	**REG1** Formulated recommendations/ propositions to improve the existing regulatory framework at the international (EU) or national level
	Standards, safety and security protocols, methodologies (Add.)	**REG2** Developed/ implemented methodologies, standards, safety and security protocols **REG3** Assessments and strategic analyses conducted to identify, evaluate, and mitigate regulatory barriers and align with end-user requirements for concept deployment **REG4** Cases contributing to the implementation of EU strategies and initiatives for the development of unmanned systems **REG5** Assessment of regulatory applicability and constraints through real-world testing of BVLOS flight operations using 5G in near-urban areas and major airports

APPENDIX 2 KPI, EXPECTED RESULTS AND EXPECTED VALUES

KPI	EXPECTED RESULTS	EXPECTED VALUE
TECHNOLOGICAL		
TECH1 Innovative solutions (technologies, products, services, processes, methods)	Number of innovative solutions (technologies, products, services, processes, methods)	6
TECH2: Improved existing solutions (technologies, products, services, processes, methods)	Number of improved search and rescue operations/ services	4
	Number of advancements in technology	4
TECH3 Feasibility studies, pilot and/or use case integrations that could underpin innovations or improved solutions	Number of feasibility studies	5
	Number of use case designs	4
TECH4 Project concept execution in real conditions (5G-based use cases)	Number of use case executions in the summer and winter seasons	5
TECH5 Improved effectiveness of search and rescue operations (reduced number of involved human resources and deployed equipment, accelerated response times and reduced rescue times, management of an ongoing emergency and automatic aerial monitoring via 5G-enabled services)	Reduced number of human resources and equipment	30%
	Accelerated response times and reduced rescue times	10%
	Enhanced and improved management of an ongoing emergency through increased situational awareness and decision making.	Improved
	Saving in costs, time and the safety of the field officers with automatic aerial monitoring	Improved
ECONOMICAL		
ECO1 Exploitation activities for the deployment of new products, services or business models	Number of exploitation activities for the deployment of new products, services or business models	2
ECO2 Synergies and/or new collaborations with other relevant projects, initiatives, partnerships and/or establishment of new networks/initiatives (international, national and/or regional level)	Number of collaborations and/ or partnerships with relevant stakeholders	Regional: 3 National: 3 International: 7
	Number of cooperations and synergies with the grantees under ongoing or other relevant EU project calls and other projects	6
ECO3 Project results that have commercial value and will be further developed or brought to market	Number of identified solutions/methodologies for replication	4
	Number of identified exploitable results	2
	Number of roadmaps for the commercialisation of the project outcomes	1
ECO4 Value generated by innovative or improved existing solutions	Number of assessments of quantitative and qualitative indicators concerning the value generated by services/ functions	1
SOCIETAL		
SOC1 Activities to reduce potential concerns and issues (such as privacy concerns), enhance societal acceptance, as well as increase the acceptance level of 5G technology based on the support of rescue operations	Number of activities or solutions implemented to address identified barriers, reduce concerns, and enhance understanding and social acceptance of the concept	3
SOC2 Communication and dissemination activities	Communication and dissemination plan completion (meeting numerical goals)	100%
	Results of communication and dissemination activities	>500 views per social media post >10 engagements per social media post >20 interviews, articles in traditional media (TV,

		radio, online media, magazines)
SOC3 Developed results that have societal value and improve the overall quality of life for inhabitants	Number of developed results that have societal value and improve the overall quality of life for inhabitants	3
ENVIRONMENTAL		
ENV1 Activities to enhance circular economy principles and good practices	Number of activities/solutions tested to implement circular economy principles and good practices in technologies/ processes	2
	Preliminary analysis of the environmental impact of the technologies and solutions	1
ENV2: Successful reduction of wasted fossil fuel usage	Reduced percentage of wasted fossil fuels	30%
ENV3 Solutions evaluated to enhance the use of renewable energy	Number of evaluated solutions of renewable energy implementation	3
ENV4 Recommendations from lifecycle analysis (LCA) to reduce environmental impact	Number of systematic lifecycle analyses (LCA) with recommendations	4
REGULATORY		
REG1 Formulated recommendations/ propositions to improve the existing regulatory framework at the international (EU) or national level	Number of formulated recommendations/ propositions	3
REG2 Developed/ implemented methodologies, standards, safety and security protocols	Number of developed methodologies, standards and protocols	2
REG3 Assessments and strategic analyses conducted to identify, evaluate, and mitigate regulatory barriers and align with end-user requirements for concept deployment	Number of assessments to overcome regulatory constraints	3
REG4 Cases contributing to the implementation of EU strategies and initiatives for the development of unmanned systems	Number of cases contributing to the development of unmanned systems	1
REG5 Assessment of regulatory applicability and constraints through real-world testing of BVLOS flight operations using 5G in near-urban areas and major airports	Number of tests of flight acceptance by using 5G near a city and a large airport	1

APPENDIX 3: SELF-ASSESSMENT SURVEY

Part 1: General information

Partner	*Select the project partner from the given list who will complete the self-assessment.*
Report submitter (name, surname)	*Enter the name and surname of the person submitting the self-assessment.*
Report submitter (e-mail)	*Enter the e-mail address of the person submitting the self-assessment.*
Assessment (reporting period)	*Selects the reporting period (year 2024, 2025 or 2026) for which the self-assessment is being submitted.*
First time or revised answer	*Selects whether this is a first-time self-assessment or a revised submission (if revisions or corrections were requested).*

Part 2: Impact assessment (self-assessment)

KPI (defined in strategy)	Are the expected results achieved during the reporting period? (Answers: Yes; No; Partially; N/A)	Expected results (defined in strategy)	Expected value (achieved during the reporting period)	Information on the task completion (provided if expected value >0)	Is the impact of the results direct or indirect? (Answers: Direct; Indirect; None; N/A)	At which level do the results create an impact? (Answers: Organizational; National; International; None; N/A)	Additional explanations about the self-assessment survey
TECHNOLOGICAL **TECH1** Innovative solutions (technologies, products, services, processes, methods) **TECH2:** Improved existing solutions (technologies, products, services, processes, methods) **TECH3** Feasibility studies, pilot and/or use case integrations that could underpin innovations or improved solutions **TECH4** Project concept execution in real conditions (5G-based use cases) **TECH5** Improved effectiveness of search and rescue operations (reduced number of involved human resources and deployed equipment, accelerated response times and reduced rescue times, management of an ongoing emergency and automatic aerial monitoring via 5G-enabled services)							
TECH1	*From the answers given, select whether the expected results are achieved during the reporting period.*						If the answer is "Yes" or "Partially", the survey continues with the next question (Expected results). Otherwise, the survey continues with the next KPI.
		Number of innovative solutions	*Indicates the achieved numerical value*	*Provides additional information about the completed task/ achieved result*	*From the answers given, select the impact type*	*From the answers given, select the level at which results create impact*	
TECH2	*From the answers given, select whether the expected results are achieved during the reporting period.*						If the answer is "Yes" or "Partially", the survey continues with the next question (Expected results). Otherwise, the survey continues with the next KPI.
		Number of improved search and rescue operations/ services	*Indicates the achieved numerical value*	*Provides additional information about the completed task/ achieved result*	*From the answers given, select the impact type*	*From the answers given, select the level at which results create impact*	
		Number of advancements in technologies	*Indicates the achieved numerical value*	*Provides additional information about the completed task/ achieved result*	*From the answers given, select the impact type*	*From the answers given, select the level at which results create impact*	

TECH3	*From the answers given, select whether the expected results are achieved during the reporting period.*					If the answer is "Yes" or "Partially", the survey continues with the next question (Expected results). Otherwise, the survey continues with the next KPI.
		Number of feasibility studies	*Indicates the achieved numerical value*	*Provides additional information about the completed task/ achieved result*	*From the answers given, select the impact type*	*From the answers given, select the level at which results create impact*	
		Number of use case designs	*Indicates the achieved numerical value*	*Provides additional information about the completed task/ achieved result*	*From the answers given, select the impact type*	*From the answers given, select the level at which results create impact*	
TECH4	*From the answers given, select whether the expected results are achieved during the reporting period.*						If the answer is "Yes" or "Partially", the survey continues with the next question (Expected results). Otherwise, the survey continues with the next KPI.
		Number of use case executions in the summer and winter seasons	*Indicates the achieved numerical value*	*Provides additional information about the completed task/ achieved result*	*From the answers given, select the impact type*	*From the answers given, select the level at which results create impact*	
TECH5	*From the answers given, select whether the expected results are achieved during the reporting period.*						If the answer is "Yes" or "Partially", the survey continues with the next question (Expected results). Otherwise, the survey continues with the next KPI.
		Reduced number of human resources and equipment	*Indicates the achieved numerical value*	*Provides additional information about the completed task/ achieved result*	*From the answers given, select the impact type*	*From the answers given, select the level at which results create impact*	
		Accelerated response times and reduced rescue times	*Indicates the achieved numerical value*	*Provides additional information about the completed task/ achieved result*	*From the answers given, select the impact type*	*From the answers given, select the level at which results create impact*	
		Enhanced and improved management of an ongoing emergency through increased situational awareness and decision making.	*Indicates achieved value (improved/ not improved)*	*Provides additional information about the completed task/ achieved result*	*From the answers given, select the impact type*	*From the answers given, select the level at which results create impact*	Expected value is defined as "Improved" (not a numerical value)
		Saving in costs, time and the safety of the field officers with automatic aerial monitoring	*Indicates achieved value (improved/ not improved)*	*Provides additional information about the completed task/ achieved result*	*From the answers given, select the impact type*	*From the answers given, select the level at which results create impact*	Expected value is defined as "Improved" (not a numerical value)

ECONOMIC
ECO1 Exploitation activities for the deployment of new products, services or business models
ECO2 Synergies and/or new collaborations with other relevant projects, initiatives, partnerships and/or establishment of new networks/initiatives (international, national and/or regional level)
ECO3 Project results that have commercial value and will be further developed or brought to market

ECO4 Value generated by innovative or improved existing solutions							
ECO1	*From the answers given, select whether the expected results are achieved during the reporting period.*						If the answer is "Yes" or "Partially", the survey continues with the next question (Expected results). Otherwise, the survey continues with the next KPI.
		Number of exploitation activities for the deployment of new products, services or business models	*Indicates the achieved numerical value*	*Provides additional information about the completed task/ achieved result*	*From the answers given, select the impact type*	*From the answers given, select the level at which results create impact*	
ECO2	*From the answers given, select whether the expected results are achieved during the reporting period.*						If the answer is "Yes" or "Partially", the survey continues with the next question (Expected results). Otherwise, the survey continues with the next KPI.
		Number of collaborations and/ or partnerships with relevant stakeholders	*Indicates achieved numerical values (3)*	*Provides additional information about the completed task/ achieved result*	*From the answers given, select the impact type*	*From the answers given, select the level at which results create impact*	Collaborations and/ or partnerships are counted on three levels: regional (municipal), national and international.
		Number of cooperations and synergies with the grantees under ongoing or other relevant EU project calls and other projects.	*Indicates the achieved numerical value*	*Provides additional information about the completed task/ achieved result*	*From the answers given, select the impact type*	*From the answers given, select the level at which results create impact*	
ECO3	*From the answers given, select whether the expected results are achieved during the reporting period.*						If the answer is "Yes" or "Partially", the survey continues with the next question (Expected results). Otherwise, the survey continues with the next KPI.
		Number of identified solutions/ methodologies for replication	*Indicates the achieved numerical value*	*Provides additional information about the completed task/ achieved result*	*From the answers given, select the impact type*	*From the answers given, select the level at which results create impact*	
		Number of identified exploitable results	*Indicates the achieved numerical value*	*Provides additional information about the completed task/ achieved result*	*From the answers given, select the impact type*	*From the answers given, select the level at which results create impact*	
		Number of roadmaps for the commercialisation of the project outcomes	*Indicates the achieved numerical value*	*Provides additional information about the completed task/ achieved result*	*From the answers given, select the impact type*	*From the answers given, select the level at which results create impact*	
ECO4	*From the answers given, select whether the expected results are achieved during the reporting period.*						If the answer is "Yes" or "Partially", the survey continues with the next question (Expected results). Otherwise, the survey continues with the next KPI.

		Number of assessments of quantitative and qualitative indicators concerning the value generated by services/ functions	*Indicates the achieved numerical value*	*Provides additional information about the completed task/ achieved result*	*From the answers given, select the impact type*	*From the answers given, select the level at which results create impact*	

SOCIETAL
SOC1 Activities to reduce potential concerns and issues (such as privacy concerns), enhance societal acceptance, as well as increase the acceptance level of 5G technology based on the support of rescue operations
SOC2 Communication and dissemination activities
SOC3 Developed results that have societal value and improve the overall quality of life for inhabitants

SOC1	*From the answers given, select whether the expected results are achieved during the reporting period.*						If the answer is "Yes" or "Partially", the survey continues with the next question (Expected results). Otherwise, the survey continues with the next KPI.
		Number of activities or solutions implemented to address identified barriers, reduce concerns, and enhance understanding and social acceptance of the concept	*Indicates the achieved numerical value*	*Provides additional information about the completed task/ achieved result*	*From the answers given, select the impact type*	*From the answers given, select the level at which results create impact*	
SOC2	*From the answers given, select whether the expected results are achieved during the reporting period.*						If the answer is "Yes" or "Partially", the survey continues with the next question (Expected results). Otherwise, the survey continues with the next KPI.
		Communication and dissemination plan completion (meeting numerical goals)	*Indicates the achieved numerical value*	*Provides additional information about the completed task/ achieved result*	*From the answers given, select the impact type*	*From the answers given, select the level at which results create impact*	
		Results of communication and dissemination activities	*Indicates achieved numerical values (3)*	*Provides additional information about the completed task/ achieved result*	*From the answers given, select the impact type*	*From the answers given, select the level at which results create impact*	Results of activities are counted as three separate values: views per social media post, engagements per social media post and interviews, articles in traditional media.
SOC3	*From the answers given, select whether the expected results are achieved during the reporting period.*						If the answer is "Yes" or "Partially", the survey continues with the next question (Expected results). Otherwise, the survey continues with the next KPI.
		Number of developed results that have societal value and improve the overall quality of life for inhabitants	*Indicates the achieved numerical value*	*Provides additional information about the completed task/ achieved result*	*From the answers given, select the impact type*	*From the answers given, select the level at which results create impact*	

ENVIRONMENTAL
ENV1 Activities to enhance circular economy principles and good practices
ENV2: Successful reduction of wasted fossil fuel usage
ENV3 Solutions evaluated to enhance the use of renewable energy

ENV4 Recommendations from lifecycle analysis (LCA) to reduce environmental impact

ENV1	*From the answers given, select whether the expected results are achieved during the reporting period.*						If the answer is "Yes" or "Partially", the survey continues with the next question (Expected results). Otherwise, the survey continues with the next KPI.
		Number of activities/ solutions tested to implement circular economy principles and good practices in technologies/ processes	*Indicates achieved numerical value*	*Provides additional information about the completed task/ achieved result*	*From the answers given, select the impact type*	*From the answers given, select the level at which results create impact*	
		Preliminary analysis of the environmental impact of the technologies and solutions	*Indicates achieved numerical value*	*Provides additional information about the completed task/ achieved result*	*From the answers given, select the impact type*	*From the answers given, select the level at which results create impact*	
ENV2	*From the answers given, select whether the expected results are achieved during the reporting period.*						If the answer is "Yes" or "Partially", the survey continues with the next question (Expected results). Otherwise, the survey continues with the next KPI.
		Reduced percentage of wasted fossil fuels	*Indicates achieved numerical value*	*Provides additional information about the completed task/ achieved result*	*From the answers given, select the impact type*	*From the answers given, select the level at which results create impact*	
ENV3	*From the answers given, select whether the expected results are achieved during the reporting period.*						If the answer is "Yes" or "Partially", the survey continues with the next question (Expected results). Otherwise, the survey continues with the next KPI.
		Number of evaluated solutions of renewable energy implementation	*Indicates achieved numerical value*	*Provides additional information about the completed task/ achieved result*	*From the answers given, select the impact type*	*From the answers given, select the level at which results create impact*	
ENV4	*From the answers given, select whether the expected results are achieved during the reporting period.*						If the answer is "Yes" or "Partially", the survey continues with the next question (Expected results). Otherwise, the survey continues with the next KPI.
		Number of systematic lifecycle analyses (LCA) with recommendations	*Indicates achieved numerical value*	*Provides additional information about the completed task/ achieved result*	*From the answers given, select the impact type*	*From the answers given, select the level at which results create impact*	

REGULATORY
REG1 Formulated recommendations/ propositions to improve the existing regulatory framework at the international (EU) or national level
REG2 Developed/ implemented methodologies, standards, safety and security protocols
REG3 Assessments and strategic analyses conducted to identify, evaluate, and mitigate regulatory barriers and align with end-user requirements for concept deployment
REG4 Cases contributing to the implementation of EU strategies and initiatives for the development of unmanned systems
REG5 Assessment of regulatory applicability and constraints through real-world testing of BVLOS flight operations using 5G in near-urban areas and major airports

REG1	*From the answers given, select whether the expected results are achieved during the reporting period.*						If the answer is "Yes" or "Partially", the survey continues with the next question (Expected results). Otherwise, the survey continues with the next KPI.
		Number of formulated recommendations/ propositions	*Indicates achieved numerical value*	*Provides additional information about the completed task/ achieved result*	*From the answers given, select the impact type*	*From the answers given, select the level at which results create impact*	
REG2	*From the answers given, select whether the expected results are achieved during the reporting period.*						If the answer is "Yes" or "Partially", the survey continues with the next question (Expected results). Otherwise, the survey continues with the next KPI.
		Number of developed methodologies, standards and protocols	*Indicates achieved numerical value*	*Provides additional information about the completed task/ achieved result*	*From the answers given, select the impact type*	*From the answers given, select the level at which results create impact*	
REG3	*From the answers given, select whether the expected results are achieved during the reporting period.*						If the answer is "Yes" or "Partially", the survey continues with the next question (Expected results). Otherwise, the survey continues with the next KPI.
		Number of assessments to overcome regulatory constraints	*Indicates achieved numerical value*	*Provides additional information about the completed task/ achieved result*	*From the answers given, select the impact type*	*From the answers given, select the level at which results create impact*	
REG4	*From the answers given, select whether the expected results are achieved during the reporting period.*						If the answer is "Yes" or "Partially", the survey continues with the next question (Expected results). Otherwise, the survey continues with the next KPI.
		Number of cases contributing to the development of unmanned systems	*Indicates achieved numerical value*	*Provides additional information about the completed task/ achieved result*	*From the answers given, select the impact type*	*From the answers given, select the level at which results create impact*	
REG5	*From the answers given, select whether the expected results are achieved during the reporting period.*						If the answer is "Yes" or "Partially", the survey continues with the next question (Expected results). Else survey continues with self-assessment submission (Part 3).
		Number of tests of flight acceptance by using 5G near a city and a large airport	*Indicates achieved numerical value*	*Provides additional information about the completed task/ achieved result*	*From the answers given, select the impact type*	*From the answers given, select the level at which results create impact*	

Part 3: Self-assessment submission

Final thoughts or feedback	*An open-ended question where the partner can share any final thoughts or feedback about the self-assessment before submitting the completed form.*

APPENDIX 4 IMPACT ASSESSMENT PROGRESS REPORT (NO. 1)

1. General information

Project title:	5G for a Better Tomorrow: Protecting Lives and the Environment in Riga and Turin
Project acronym:	5G4LIVES
Assessment No.:	First assessment round
Contributing partners:	✓ Riga City Council ✓ WIND TRE SPA
	✓ LMT ✓ CITTA DI TORINO
	✓ VEFRESH ✓ POLITECNICO DI TORINO
	✓ Electronic Communications Office of Latvia
Reporting period:	Year 2024
Report date:	27.06.2025.
Report prepared by:	Linards Larionovs, Electronic Communications Office of Latvia, Risk and Quality manager
	Monta Baltā, Electronic Communications Office of Latvia, Project manager

2. Purpose of the impact assessment

The impact assessment progress report presents the first internal impact assessment, conducted via a structured self-assessment survey, to evaluate the progress and measure the impact of the project's results in the first year of the project (2024). The impact assessment is an activity carried out according to the project's Impact Assessment Strategy (deliverable D5.6), which outlines the framework, methods, tools, and criteria used to track and evaluate the impact.

The main objectives of the assessment are:

1. To assess the overall impact of the project's results across multiple levels: organisational, national, and international.
2. To examine the potential for scaling and replicating the results achieved within the project's use cases, ensuring that successful outcomes can be transferred or expanded into new contexts.

The impact assessment is structured around five impact perspectives: technological, economic, societal, environmental and regulatory. Each perspective is evaluated using 21 specific Key Performance Indicators (KPIs) that are linked to a defined set of Key Impact Pathways. The assessment also distinguishes between direct and indirect impact and measures progress across three levels: organisational, national, and international.

The assessment is designed to oversee the generated direct and indirect impacts, extending beyond immediate stakeholders to influence broader societal and systemic levels. Its effects are visible not only within national borders but also internationally, reflecting our commitment to cross-border engagement and fostering the scalability and replicability of the project's solutions. This international dimension strengthens our alignment with shared European objectives, advancing policy coherence, encouraging innovation diffusion, and enabling the sustainable transfer of impactful approaches.

3. Impact assessment approach and methodology

This first impact assessment was conducted as a self-assessment exercise using an online survey. All project partners participated, contributing data and insights relevant to the KPIs within their scope of work and in cooperation across the consortium. The data collected was analysed and compiled by the partner responsible for impact assessment, resulting in this Impact Assessment Progress Report. The assessment process will be repeated two more times during the project to capture the dynamic evolution of project outcomes and impacts.

4. Impact assessment summary

Out of 21 defined KPIs, 5 KPIs (TECH2, TECH3, ECO1, ECO2 and SOC2) showed significant progress, while others are partially achieved and will continue to be developed in the upcoming phases of the project (see Annex 4.1. for

detailed impact assessment results). While some KPIs have already reached or exceeded their expected targets, particularly in areas like social media engagement and stakeholder collaboration, many others are currently in early or mid-stages of progress. This is a natural outcome given the complex, multi-phase nature of the 5G4LIVES project.

Technological

During the first year, the 5G4LIVES project focused on feasibility studies and use case designs, laying a strong technological foundation. These activities have already contributed to innovative improvements and enhancements of existing solutions in 5G and UAV technologies. While still early in the project lifecycle, these initial developments indicate strong potential for technological innovation. In the next assessment period, further progress is expected as the project transitions into implementation and execution of its core concept, moving from design to deployment of 5G-enabled solutions.

Economical

The economic dimension of the project has seen notable progress in its initial phase, with the exploitation strategy developed and multiple synergies and new collaborations established across regional, national, and international levels. This sets the stage for a broader economic impact in the upcoming periods. In the future, the project will focus on identifying solutions for replication, mapping exploitable results, and developing a roadmap for commercialisation. These efforts aim to ensure that innovations within 5G4LIVES can be sustainably scaled and introduced into the market.

Societal

The first year saw intensive communication and dissemination activities, which significantly increased the project's visibility and societal outreach. High engagement on social media and solid presence in traditional media reflect strong public interest and stakeholder involvement. The next steps will involve addressing societal concerns and barriers, improving understanding of the technologies involved, and enhancing acceptance of project outcomes. As real-world demonstrations begin, communication efforts will become more impactful and relatable, strengthening the societal relevance and appeal of 5G4LIVES.

Environmental

From an environmental standpoint, the project began with preliminary analyses on the use of alternative and renewable energy sources within the scope of 5G applications. These insights will inform upcoming activities focused on implementing circular economy principles, reducing fossil fuel waste, and applying sustainable practices. Additionally, Life Cycle Analysis (LCA) is planned after each use case execution (demonstration), offering data-driven recommendations to minimise environmental impacts further.

Regulatory

Regulatory impact pathways have been initiated during the first year, with notable progress including the development of two major methodology proposals aimed at improving the international regulatory landscape—namely, the BVLOS (Beyond Visual Line of Sight) methodology and a methodology for assessing 5G NR Network Coverage and Performance in Airspace Corridors for Unmanned Aerial Vehicle Operations. The project will continue building on this momentum, advancing additional methodologies and assessments that will enable smoother regulatory adaptation and support broader deployment of 5G-based solutions.

5. Conclusion

The first impact assessment has established a strong foundation, and all partners have contributed meaningfully to this initial round of evaluation. Partner engagement is vital for refining impact measurement over time. The next assessment, scheduled at the start of the year 2026, is expected to demonstrate further progress and more completed KPIs across all perspectives within the second project's year, namely 2025.

The first impact assessment represents a crucial step in the project towards understanding and maximising its impact. Through structured, partner-wide participation, the project has created a reliable baseline for tracking progress. As implementation advances and additional KPIs are fulfilled, 5G4LIVES is well-positioned to deliver meaningful and scalable results.

KPI	Expected results	Expected value	Achieved	Explanation	Achieved partially	Explanation	Impact	Level
TECHNOLOGICAL								
TECH1 Innovative solutions (technologies, products, services, processes, methods)	Number of innovative solutions (technologies, products, services, processes, methods)	6			3	Technical specification for the 5G4LIVES monitoring platform components and connectivity	Direct	Organizational
						Ongoing work to update procedures (2 Riga) of public health and life protection	Direct	International
TECH2: Improved existing solutions (technologies, products, services, processes, methods)	Number of improved search and rescue operations/ services	4			1	The network solution architecture for the 5G4LIVES monitoring platform development	Direct	Organizational
			2	2 updated procedures for public health and life protection (2 Riga)			Direct	International
	Number of advancements in technologies	4	2	2 updated existing procedures for public health and life protection (2 Riga)			Direct	International
					1	The solution is specialised to ensure 5G network connectivity for all components (UE) of the 5G4LIVES monitoring platform (Riga)	Direct	Organizational
TECH3 Feasibility studies, pilot and/or use case integrations that could underpin innovations or improved solutions	Number of feasibility studies	5	2	Study on the essential minimum Requirements for 5G mobile network coverage. Study of end users' requirements, interactions with EU policies and regulatory framework	3	5G4LIVES services co-creation, functional specifications and reference architecture; 5G4LIVES technologies integration concept; 5G4LIVES concept ecosystem	Direct	International
	Number of use case designs	4	2	5G connectivity design, Riga use-case design	3	2 Torino use-case designs; 5G4LIVES monitoring platform in case of 5G connectivity	Direct	International
TECH4 Project concept execution in real conditions (5G-based use cases)	Number of use case executions in the summer and winter seasons	5			1	Demonstration and case study of the drone operation concept within the 5G network and the Remote Operation Control Centre.	Direct	Organizational
TECH5 Improved effectiveness of search and rescue operations (reduced number of involved human resources	Reduced number of human resources and equipment	30%		*Will be evaluated towards the end of the project*				
	Accelerated response times and reduced rescue times	10%		*Will be evaluated towards the end of the project*				

and deployed equipment, accelerated response times and reduced rescue times, management of an ongoing emergency and automatic aerial monitoring via 5G-enabled services)	Enhanced and improved management of an ongoing emergency through increased situational awareness and decision making.	Improved		*Will be evaluated towards the end of the project*				
	Saving in costs, time and the safety of the field officers with automatic aerial monitoring	Improved		*Will be evaluated towards the end of the project*				
ECONOMICAL								
ECO1 Exploitation activities for the deployment of new products, services or business models	Number of exploitation activities for the deployment of new products, services or business models	2	1	Exploitation strategy			Indirect	International
		Regional: 3	3	Valmiera County Municipality; Vidzeme planning region in the framework of the Smart Skies project; DROMT			Indirect	National
ECO2 Synergies and/or new collaborations with other relevant projects, initiatives, partnerships and/or establishment of new networks/initiatives (international, national and/or regional level)	Number of collaborations and/or partnerships with relevant stakeholders	National: 3	7	Riga Technical university, Riga Stradiņš university (project Reducing energy poverty with innovative solutions), Civil Aviation Agency of Latvia (BVLOS methodology; panel at 5GTechritory), Italian Civil Aviation Authority (BVLOS methodology), Ministry of Environmental Protection and Regional Development of Latvia (Open & Agile Smart Cities (OASC) Digitalisation Awareness Forum), National Association of Italian Municipalities (presentation and discussion on the conference), IPROMO (3 workshops on innovation procurement), 5GTechritory (dedicated project panel)			Indirect	National
		International: 7	5	CITYAM, CERITA, Smart City Expo World Congress, Smart Skies, Urban-Air-Mobility Initiative, Cities Community			Indirect	International
	Number of cooperations and synergies with the grantees under ongoing or other relevant EU project calls and other projects	6	4	CITYAM, CERITA, IPROMO, Smart Skies			Indirect	International

Objective	Indicator	Target	Achieved	Result	Value	Description	Type	Scope
ECO3 Project results that have commercial value and will be further developed or brought to market	Number of identified solutions/methodologies for replication	4			1	Methodology for Assessing 5G NR Network Coverage and Performance in Airspace Corridors for Unmanned Aerial Vehicle Operations	Indirect	International
	Number of identified exploitable results	2						
	Number of roadmaps for the commercialisation of the project outcomes	1						
ECO4 Value generated by innovative or improved existing solutions	Number of assessments of quantitative and qualitative indicators concerning the value generated by services/ functions	1						
SOCIETAL								
SOC1 Activities to reduce potential concerns and issues (such as privacy concerns), enhance societal acceptance, as well as increase the acceptance level of 5G technology based on the support of rescue operations	Number of activities or solutions implemented to address identified barriers, reduce concerns, and enhance understanding and social acceptance of the concept	3	1	Various PR events to disseminate information about the benefits of the project (tracked separately under WP6)	1	Participation in the SCEWC panel in Barcelona in 2025	Indirect	International
	Communication and dissemination plan completion (meeting numerical goals)	100%	40%	Communication and dissemination plan completion			Direct	International
SOC2 Communication and dissemination activities	Results of communication and dissemination activities	>500 views per social media post	1000	Views per social media post			Direct	International
		>10 engagements per social media post	25	Engagements per social media post			Direct	International
		>20 interviews, articles in traditional media (TV, radio, online media, magazines)	14	Interviews, articles in traditional media			Direct	International
SOC3 Developed results that have societal value and improve the overall quality of life for inhabitants	Number of developed results that have societal value and improve the overall quality of life for inhabitants	3		*Result evaluation is foreseen in the next periods of the project.*			Indirect	International

ENVIRONMENTAL								
ENV1 Activities to enhance circular economy principles and good practices	Number of activities/solutions tested to implement circular economy principles and good practices in technologies/processes	2		*Not yet tested*		*Not yet tested*	Indirect	International
	Preliminary analysis of the environmental impact of the technologies and solutions	1					Indirect	International
ENV2: Successful reduction of wasted fossil fuel usage	Reduced percentage of wasted fossil fuels	30%		*Evaluation of reduction towards the end of the project*				
ENV3 Solutions evaluated to enhance the use of renewable energy	Number of evaluated solutions of renewable energy implementation	3	1	Preliminary analysis has been conducted on the use of alternative and renewable energy sources for the operation of the 5G4LIVES platform components in	1	A more in-depth analysis has been conducted on the use of alternative and renewable energy sources for the operation of the 5G4LIVES platform components.	Indirect	Organizational
ENV4 Recommendations from lifecycle analysis (LCA) to reduce environmental impact	Number of systematic lifecycle analyses (LCA) with recommendations	4		*After demonstrations*				
REGULATORY								
REG1 Formulated recommendations/ propositions to improve the existing regulatory framework at the international (EU) or national level	Number of formulated recommendations/ propositions	3			2	BVLOS methodology proposal; Methodology for Assessing 5G NR Network Coverage and Performance in Airspace Corridors for Unmanned Aerial Vehicle Operations	Indirect	International
					1	The methodology for integrating real data	Indirect	National
REG2 Developed/ implemented methodologies, standards, safety and security protocols	Number of developed methodologies, standards and protocols	2			1	BVLOS methodology that integrates a mitigation strategy in compliance with the UAS regulatory framework	Direct	International
					1	Ongoing work on User manual - safety protocols and procedures for UAV flights in cities in the Riga use case.	Direct	National
REG3 Assessments and strategic analyses conducted to identify, evaluate, and mitigate regulatory barriers and align with end-user requirements for concept deployment	Number of assessments to overcome regulatory constraints	3			1	Assessment of requirements, gaps, challenges and opportunities in end-user requirements from the Spectrum supervision and planning point of view	Indirect	National
			1	Assessment of regulatory barriers			Direct	National

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REG4 Cases contributing to the implementation of EU strategies and initiatives for the development of unmanned systems	Number of cases contributing to the development of unmanned systems	1			1	Work on identifying scenarios where the integration of 5G and UAV technologies will bring the greatest benefit in terms of improving emergency response and increasing public safety.	Indirect	International
REG5 Assessment of regulatory applicability and constraints through real-world testing of BVLOS flight operations using 5G in near-urban areas and major airports	Number of tests of flight acceptance by using 5G near a city and a large airport	1						