D9.10: Update of IPR and Innovation strategy

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D9.10: Update of IPR and Innovation strategy
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Technical References

Project Acronym	INCIT-EV
Project Title	Large demonstration of user centric urban and long-range charging solutions to boost an engaging deployment of electric vehicles in Europe
Project Coordinator	CIRCE Miguel Zarzuela – mzarzuela@fcirce.es
Project Duration	January 2020 (M1) – June 2024 (M54)

Deliverable No.	D9.10
Dissemination level [1]	CO
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Lead beneficiary	34-QiA
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[1] PU = Public

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Document history		
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V1.0	24/6/24	QiA Draft V1
V2.0	24/7/24	QiA final

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EXECUTIVE SUMMARY

This document is the deliverable D9.10 *"Update IPR and Innovation Strategy"* of the H2020 project INCIT-EV (project reference: 875683). It contains the **final** results of task T9.4 which has dealt with IPR and Innovation management during the whole project, updating the interim results that were described in D9.6 in M24.

The activities performed have been categorised in two sections: innovation management and IPR management. The proposal made by the task coordinator (Qi Energy till 29/06/21 and QiA from that date onward) for the content is described below:

A. Innovation management

A.1. Market Study (identification of actors, initiatives, etc worldwide)

A.2. Project Outcomes

A.3. Innovation capacities enhanced

A.4. Innovation Roadmap and Strategy approach

B. Intellectual Property Rights

B.1. Management of the IP used by the project (background info)

B.2. Capturing and management of the IP generated by the project (foreground info)

B.3. Assessing the IP and the Opportunities

B.4. Protecting the IP

B.5. Exploitation Roadmap and Strategy approach

Some tools and strategies have been defined to develop this set of points.

Subtasks included in group A try to manage all activities related to innovation, from market need through capturing the IP to market deployment. The innovation management team, led by QiA, identified major market opportunities related to the developed products or services and suggested reorientation of research in case of deviation from the market focus and contribute to the consistency of research among different working groups eliminating overlapping and ensuring the efficient use of resources and the value for money.

Subtasks included in group B have produced several tables and information to determine **the background and foreground ownership rights for all/some of the project partners**. This methodology first included the know-how and resources that each partner is putting in, at the beginning of the project (background information) and, at the end, the expected scope and achievement for every partner, delimiting their contribution to the IPR (foreground or results) and whether the expectation of all the partners is compatible and coherent. Some of the results generated has been in open source and published in open repositories for the use of the scientific and technical community, but some others are confidential and subjected to exploitation based on the protection of the know-how generated.

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The Innovation and IPR Board took care of this activity organising the project results among the assigned stakeholders.

The main project results subjected to different types of protection have been the following;

- **Charging solutions** (hardware infrastructure) with Innovative (technical) upgrades.
  - Dynamic charging e-corridors in the urban area (30 kW) and the periphery (90 kW)
  - Static opportunity wireless charging solution (50 kW)
  - Charging hub in a park-and-ride facility with a direct connection of fast chargers to the tram's DC network (150 kW plus 2*3.6 kW)
  - Superfast Charging Systems for European corridors (200 kW)
  - Low power DC bidirectional charging infrastructure for EV, including two-wheelers (25 kW)
  - Software as a service for Smart charging and V2G
- **Decision Support System** for mobility planners that will allow seamless integration of the charging solutions into the existing transport, grid, ICT and civil infrastructures.
- **Applications Platform** improving the users' experience (payment, location, use…) and engaging them in sustainable mobility solutions.
- **Some specific solutions like:**
  - **Online payment**
  - **V2X**
  - **Scalable Charging hub**
  - **Theft proof for LEVs**
  - **DWPT. Dynamic Wireless Power Transfer**
- **New methodology to incentivize the adoption of electromobility**
- **New Life Cycle Assessment for city planners and LCCA and business models for investors**

The intermediate report, Deliverable D9.6, reviewed the strategy for IPR and innovation management, emphasizing the importance of protecting project outputs in a competitive environment and meeting new patent requirements. IPR activities began early to align researchers with market trends and the complexities of the innovation process. Researchers were educated on the business development process to help them capitalize on opportunities. Throughout the project, market watch activities, including periodic bulletins and SWOT analyses, were conducted to identify threats and opportunities. Audits of WPs 3, 4, 5, and 6 identified key outputs and clarified ownership and research contributions.

D9.6 provided tools to facilitate innovation tracking and protection. As the project progressed, focus shifted to consolidating results and defining exploitation paths. Deliverable D9.10 compiles the final results, identifying high-TRL products and services ready for market introduction, including hardware upgrades, a Decision Support System, user experience apps, and specific solutions like online payment and wireless chargers. The exploitation roadmap aligns with the broader business plan for the use cases described in T9.1, T9.2, and T9.3.

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List of Acronyms

Acronym	Definition
DWPT	Dynamic Wireless Power Transfer
OWPT	Opportunity Wireless Power Transfer
EV	Electric Vehicle
FTO	Freedom to Operate
IP	Intellectual Property
IPR	Intellectual Property Rights
KPIs	Key Performance Indicators
LEVs	Light Electric Vehicles
PCT	Patent Cooperation Treaty
RSS	Really Simple Syndication
S&T	Socio-Economic and Technical
SC	Steering Committee
SWOT	Strengths, Weaknesses, Opportunities and Threats
UX	User Experience
V2X	Vehicle to other (grid, vehicle, etc)

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0 INTRODUCTION

INCIT-EV aims to demonstrate an innovative set of charging infrastructures, technologies, and associated business models, ready to improve the EV users experience beyond early adopters, thus, fostering the EV market share in the EU. The project will seek the emergence of EV users' subjective expectations. 5 demo environments at urban, peri-urban, and extra-urban condition will be ready for the deployment of 7 use cases (UC) addressing:

- UC1: Smart and bi-directional charging optimized at different aggregation levels – Amsterdam – Utrecht Area.
- UC2: Dynamic wireless charging lane in urban areas - Paris
- UC3: Dynamic wireless charging for long distances -Versailles
- UC4: Charging Hub in a Park&Ride facility – Torino
- UC5: Superfast charging systems for EU corridors - Tallin
- UC6: Low power DC bidirectional charging infrastructure for EVs, including two-wheelers - Zaragoza
- UC7: Opportunity wireless charging – Zaragoza

0.1 Objectives

To contribute to improve the EV users experience through innovative charging infrastructures, the task 9.4 *"IPR review and Innovation management"* deals to coordinate internal activities within the consortium aiming to:

1) Provide useful information that help the project partners to translate the project results into products, services or processes with a differential value proposition in the market.
2) Identify the relevant IP generated in the project and protect it to enable its commercial exploitation.

0.2 Methodology

This deliverable is structured in two main sections: innovation management and IPR management.

For the innovation management, a project team led by QiA has identified major market opportunities related to the developed products or services and suggested reorientation of research in case of deviation from the market focus and contributed to the consistency of research among different working groups eliminating overlapping and ensuring the efficient use of resources and the value for money.

For the IPR management, several tables have been elaborated to clearly identify the background and foreground ownership rights for all/some of the project partners. This methodology first includes the know-how and resources that each partner is putting in, at the beginning of the project (background information) and the expected scope and achievement for every partner, delimiting their contribution to the IPR (foreground or results) and whether the expectation of all the partners is compatible and coherent. At the end of the project, the results (foreground information) have been revised and the ownership and pathway to market have been drafted.

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0.3 Contribution from partner table

Partner	Task[1]	Contribution
CIRCE, TRIA, POLITO, EESTI, EVBOX, LINKS, Qi Energy, QiA	Subtask A.1. Market Study. Identification of technologies and competitors	Description of technologies, competitors in their respective working areas. Continuous activity reflected in the periodic IIPR bulletins. Discussion on SWOT analysis QI Energy[2] /QiA consolidation and bulletin edition. Raise the information to the Executive Committee.
LINKS, Qi Energy /QiA/POLITO	Subtask A.2. Project Outcomes	LINKS, POLITO and Qi Energy /QiA. Identification of all project outcomes through questionnaires and workshops
All project partners	Subtask A.3. Innovation capacity enhanced	Description of own innovation capacity enhanced. The information is gathered by Qi Energy /QiA in the IIPR workshops.
Qi Energy /QiA	Subtask A.4 Innovation Roadmap and Strategy	Innovation roadmap and strategy approach prepared by Qi Energy /QiA
Qi Energy /QiA. Contribution of all partners with background info	Subtask B.1. Background info	Qi Energy / QiA prepare the background tables. All project partners with background contribute.
QiA. Foreground info.	Subtask B.2. Foreground info	QiA prepared the foreground tables.
QiA. Contribution of all partners with confidential results that may be commercially exploited.	Subtask B.3. Assessing the IP and the Opportunities Subtask B.4. Protecting the IP Subtask B.5. Exploitation Roadmap and Strategy approach	QiA completed the foreground tables. All project partners generating outputs contributed.

[1] Tasks and subtasks are those mentioned in the Executive Summary

[2] Qi Energy was the former QiA before the split of the company. From that moment Qi Arrow (QiA) assumed all the activities assigned originally in the GA to Qi Energy (M19)

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1 INNOVATION ACTIVITIES

1.1 Innovation objectives and scope

INCIT-EV project is an Innovation Action (IA) with the goal to demonstrate how a set of charging technologies and its associated business models could improve the electric vehicles (EVs) user experience (UX). Ultimately, the project aims to impulse EV adoption in the EU.

The focus of INCIT-EV is not on research nor on technology development. It is on demonstration and innovation. It is all about applying technologies and business models in a better, smarter, and more innovative ways.

Being aware of the nature of this project, the consortium allocated the required effort to **design an innovation methodology and manage internal and external activities** in order to identify major market opportunities, suggest reorientation of the project activities in case of deviation from the market, and contribute to the consistency of the project objectives among different working groups, eliminating overlapping and ensuring that its contributions are as relevant and innovative as expected at the beginning.

The innovation activities within INCIT-EV project will be considered successful if they achieve the following results:

- The consortium is always **informed about relevant innovations** being made inside and outside the project and **provided with actionable insights**.
- The consortium is **aware of the degree of innovation** of its own activities in relation to the global mobility ecosystem.
- The consortium can **protect the property rights of the innovations** generated in the previous WPs.
- The consortium is **able to exploit and maximize the impact** of its results through the fast and smart application of innovation tools (platforms, business models, etc.).

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1.2 Innovation Methodology

1.2.1 Innovation Methodology Overview

Innovation in the context of INCIT-EV project was expected to result from a systematic effort to monitor the project and its environment, detect strengths, weaknesses, opportunities, and threats (SWOT), and advise the Steering Committee to use the results in such a way that the project results are at the forefront of the sector and have a high impact on the EV adoption.

INCIT-EV innovation methodology was made up of four elements:

- **Strategy**. It answers key questions about the preferred ways or patterns of the project to innovate and create value.
- **Structure**. It defines the organization in terms of roles and dependencies among partners participating in or having an impact on innovation activities. It includes formal committees responsible to evaluate the information and make decisions regarding innovation.
- **Process**. It is the flow of activities that can be performed during the project lifecycle to detect needs and trends, adapt the project technologies and/or business models to accommodate those needs, and arrange the necessary conditions for the innovation to reach the market. It is a sequence of single or iterative actions aimed to boost innovation.
- **Tools**. To inform and engage partners in the innovation and IPR activities, different methods, and tools such as a market watch service or guided innovation sessions put in place. These tools were also designed to make an effective use of resources.

The following sections detail the methodology applied step by step.

1.2.2 Innovation Strategy

According to an article published in 2015 by the innovation expert Gary P. Pisano in Harvard Business Review journal[3], "despite massive investments of management time and money, innovation remains a frustrating pursuit in many companies". Having an innovation strategy "is the only way to make sound trade-off decisions and choose the right practices".

INCIT-EV project started its innovation activities by defining an innovation strategy to:

- promote alignment
- clarify priorities
- help focus efforts

Following the cited article, the strategy was defined by answering three questions:

[3] Gary P. Pisano, in Harvard Business Review journal. You Need an Innovation Strategy. June 2015

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Strategic Question #1: How will the project innovations create value for customers?

INCIT-EV innovations have created value for customers in three ways:

- **Charging solutions** (hardware infrastructure) with Innovative (technical) upgrades.
- **Decision Support System** for mobility planners that will allow seamless integration of the charging solutions into the existing transport, grid, ICT, and civil infrastructures.
- **Applications Platform** improving the users' experience (payment, location, use…) and engaging them in sustainable mobility solutions.

INCIT-EV methodology was based on 7 Use Cases. In each one, several partners have collaborated to demonstrate the value provided by the innovations.

Strategic Question #2: How will the project partners capture a share of that value?

The intellectual property rights of the new innovations will be protected and exploited through new products, new services, or technology transfer.

However, **it was not clear at the beginning** what products or services must be developed, at what cost, what benefits must be recognised by the end customers, what business models must be used or what legal organization will exploit them.

To address this complex problem, T9.1 has elaborated a **Value Network Model**, while T9.2 and T9.3 has performed **Cost/Benefit analyses** and **Business Models** in public scenarios and private businesses.

Once the ecosystem has a positive net value, a negotiation among partners was done to adjust the value/benefit sharing.

Strategic Question #3: What types of innovation will create and capture more value?

When creating an innovation strategy, a choice must be made about how much to focus on technological innovation and how much to invest in business model innovation.

To determine which type of innovation is best suited to the project interests, a two-dimensional characterisation of innovation types has been used. On the vertical axis, there is the degree to which it involves a change in business model. On the horizontal axis, there is the degree to which it involved a change in technology. These axis can be used to form four quadrants or categories defined by Pisano as:

- *Routine innovation*: builds on existing technological competences fitting with existing business models.
- *Disruptive innovation*: requires a new business model but not necessarily a technological breakthrough.
- *Radical innovation*: is the opposite of disruptive innovation, as it is purely based on technological progress.

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- *Architectural innovation*: that combines technological and business model disruptions. It is the most challenging for incumbents to pursue.

INCIT-EV has a diverse portfolio of innovations in all the 4 categories (see figure):

The scalable charging hub that was developed in WP3 or the theft proof charger for light electrice vehicles that was developed in WP4 are examples of *routine innovation*, which should not be underestimated, as they generate the majority of profits.

The dynamic wireless power transfer (DWPT) system that was developed in WP3 belongs to the *radical innovation* category, although it will require innovative business models for its exploitation, leading to architectural innovation.

Onlyne payment and vehicle-to-x solutions (WP5) can be considered as *disruptive innovations*, as the technologies used are already available, but the new business models are the key differential elements.

Finally, INCIT-EV platform (including *decission support* and applications from WP6) could be an example of *architectural innovation* in the project because it combines an innovative combination of software technologies with business model innovation.

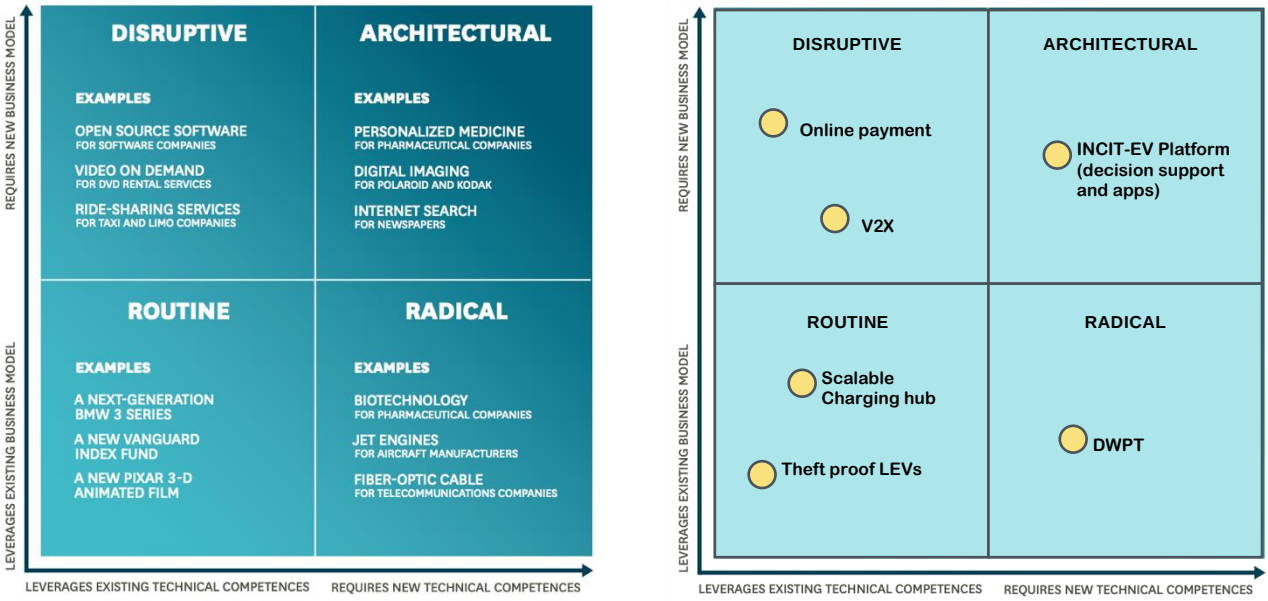

Figure 1: Quadrant of innovation types – extracted from Pisano (2015) (left); Mapping of INCIT-EV innovations (not exhaustive) in the corresponding innovation quadrants (right).

Overall, INCIT-EV has innovated creating user-centric (WP2) hardware (WP3-4) and software (WP5-6). These innovations have been demonstrated (WP7-8) through Use Cases, but even more important than the products and services themselves is the business model innovation, which was expected and achieved in the project (WP9) to add more value and capture it.

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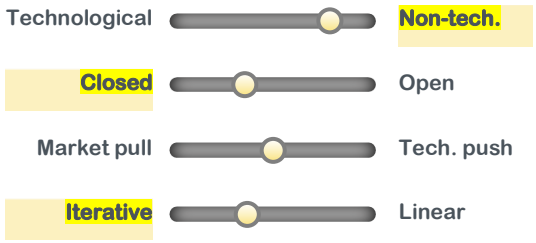
Innovation Strategy definition

After discussing the strategic position of the project through the three questions, the innovation strategy was defined as: "fostering non-technological innovation applying collaborative business models, mainly among partners and synergic EU projects, with a balanced mix of technology push and market pull, using a lean-*start-up* methodology with several validation cycles in each pilot".



The strategic decisions taken are explained below:

1. **Non-technological innovation**. Given that technology development in the field of charging infrastructures requires relative long research, development, and innovation cycles (longer than the project duration), it is not likely that the competitive environment changes considerably since the project was designed until the end of its execution. However, business models can be designed, launched, and validated or rejected very quickly. For this reason, the innovation strategy within INCIT-EV is focused on emerging business model innovation, as a complement to the already planned technology or the routine innovations.
2. **Collaborative business models mainly among partners** and synergic EU projects. During the project lifecycle, the innovation management activities has encouraged collaboration among partners and third parties (Synergy club), as the consortium is highly complementary and includes most stakeholders involved in the use cases of interest.
3. **Balanced mix of technology push and market pull**. The project is oriented to the user and wants to improve the experience while using charging technologies to increase adoption. However, the type of innovations expected are equally from the stimulation of the market and the creation of more user-friendly technologies.
4. **Lean-start-up methodology**. The proposed strategy is based on iteration instead of linear cascading planification and execution. This approach allows to formulate hypotheses, test them, and repeat the process to provide as much value as possible in the shortest timeframe.

This strategy can be seen as a set of preferred choices when allocating effort to new innovation activities complementing or boosting the already expected innovations.

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1.2.3 Innovation Structure

The second element of INCIT-EV's innovation methodology is the formal structure or the organisation of tasks, roles, and decision-making inside the project, regarding innovation.

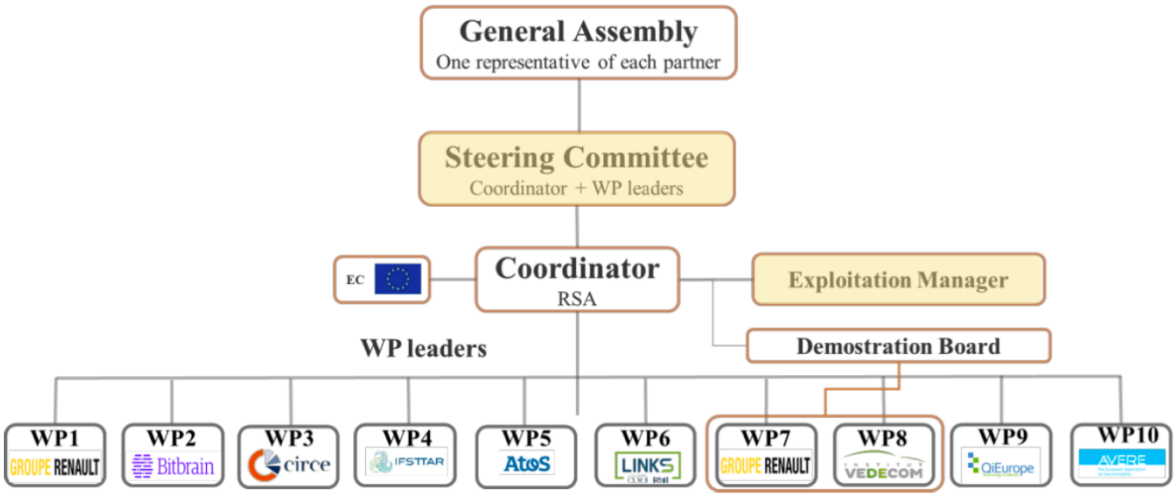

Figure 2: INCIT-EV overall management structure

Exploitation and Innovation Manager

The consortium has designated as Exploitation and Innovation Manager of the project Mr. Juan de Blas Pombo from QiA.

The Exploitation Manager had the responsibility of working in strict cooperation with the WP Leaders providing general guidelines for the preparation of replication and exploitation strategy enlarging the market vision and business opportunities.

Exploiting the activities and the results achieved in technical WPs, INCIT-EV has iteratively considered the evolution of products and market solutions.

The Exploitation manager have also supported the project in adjusting its objectives and requirements, in order to better identify exploitable results and maximizing exploitation potential.

Steering Committee

The steering committee (SC) was made up of the project coordinator and the WP leaders. It met remotely every month, and, among other functions, it was responsible to provide strategic guidance to the project activities and to ensure the relevance of the deliverables, applying corrective measures if some deviations were detected. At this regard, the evolution of innovations inside and outside the project can trigger a strategic response from the SC. The Exploitation and Innovation Manager was responsible to raise relevant threats, opportunities, weaknesses, or strengths that may be worth leveraging to increase the impact of the project, especially in relation with the exploitation of results.

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1.2.4 Innovation Process

After defining the innovation strategy and structure, the project innovation process was designed as a sequence of single or iterative actions aimed to **boost innovation**.

The process had four stages as depicted in the figure below:

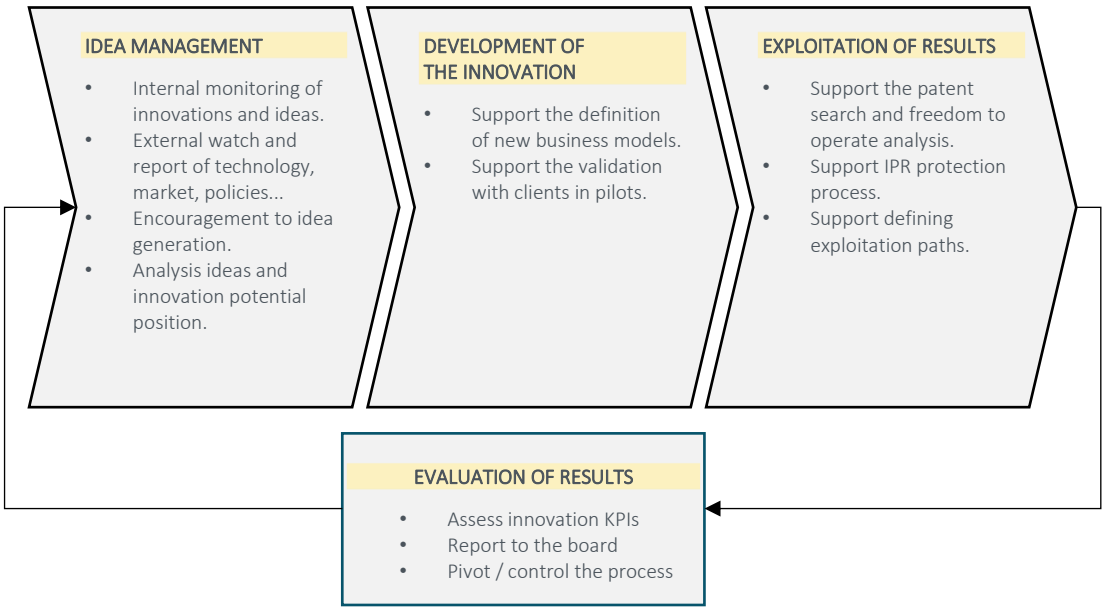

Figure 3: INCIT-EV innovation process

Idea Management

In this first stage, different mechanisms have been used to foster the generation of ideas that contributed to address the challenge of getting more drivers to switch to electric vehicles and use the proposed charging solutions. It was through observing competitors and merging some of their best practices with new technologies, or it might be offering the project results through a new business model, changing the value proposition, the channel, the relation with the customer, etc.

Development of the innovation

The ideas generated in the previous stage were gathered and discussed. If an idea looked relevant and feasible to be developed and tested in one or several of the project demonstrators, the innovation management team supported the development and proposed it at the SC. If it was approved, it was integrated in the project activities (e.g., tested in the pilot). As the strategy is focused on business model innovation, it seems feasible to have and test several approaches to deliver the same technology.

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Exploitation of results

The proposed solutions (either with a more technological or a more business-oriented innovation) should be exploited after the project ends. To increase the probabilities of success, the innovation management team provided support to elaborate preliminary freedom-to-operate analyses, propose the most convenient protection measures and help draft the exploitation paths. These services are further explained in section 3.

Evaluation of results

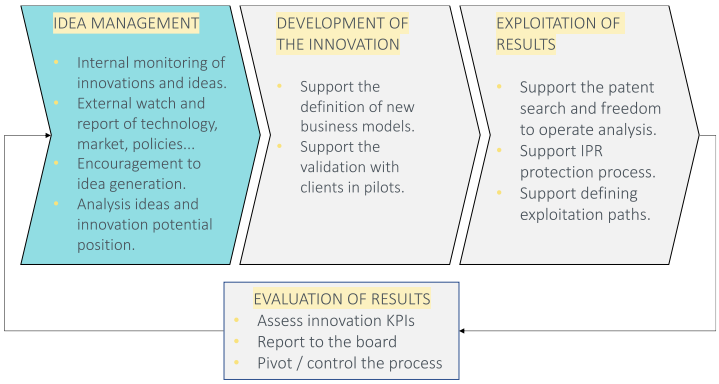
The innovation activities and results were measured qualitatively or quantitatively, and the process also be monitored and reported to the SC using key performance indicators (KPIs).

1.2.5 Innovation Tools

Idea Management Tools

To facilitate the generation of innovative ideas, two tools have been used:

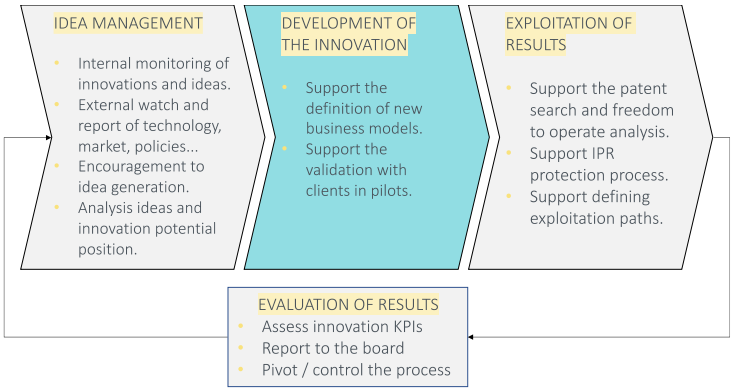
- **Periodic news bulletin** – clipping and categorisation of external and internal news about technology, market, IPR and legal aspects potentially affecting the project.
- **Innovation alarm service** – regular analysis of information and reporting to the board of the most relevant progress (internal and external) and strategic implications (SWOT).



Innovation Development Tools

The elaboration of innovative ideas that may be implemented within the project were supported using two tools:

- **Innovation sessions** – structured events aimed to generate, curate and/or discuss innovative ideas using collaborative activities and resources.
- **Support on-demand** – provide methodologies and tools for the innovation events that may be arranged by partners at the demonstrators.



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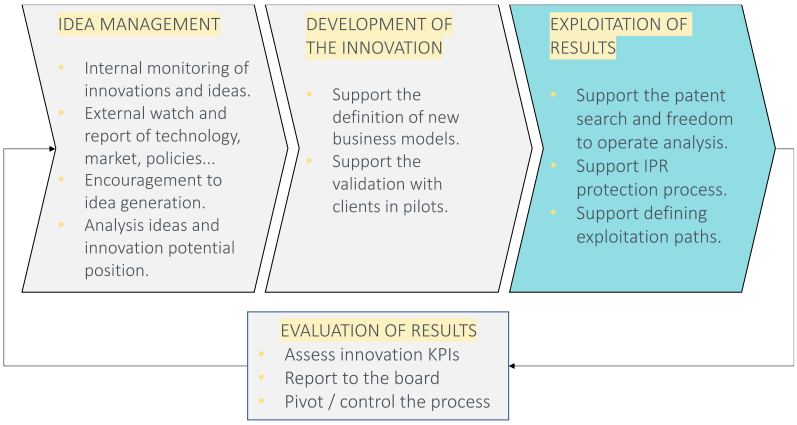
Exploitation of Results

The exploitation of results was supported through the following tool:

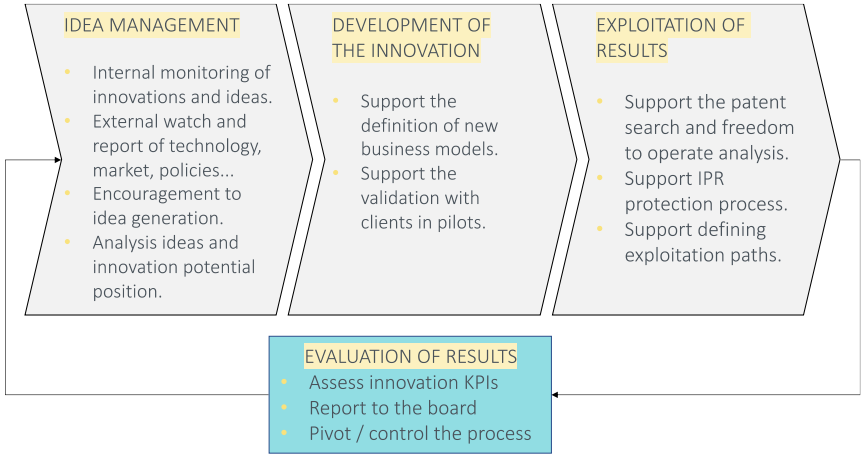
- **IP audits** - systematic, thorough, and solution-focused review of the intellectual assets owned, used, or acquired by the businesses to ascertain their legal status, value, potential IP-related risks and the means for protection and to capitalise on them.



Evaluation of Results

The evaluation of results was supported through the following tool

- **Innovation dashboard** – metrics and KPIs periodically updated to assess the level of innovation of the project and make decisions.



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1.3 Innovation activities' results

1.3.1 Innovation Periodic Bulletins

One of the tools that generated more interest from the project partners was the periodic news bulletin. This tool, belonging to the first stage of the innovation management process, which is idea management, aims to inform all the project partners about the latest news, trends, events, products, or services relevant to the project. The first four bulletins were focused on external information although they added information on IP Rights in the last editions, once these aspects were clarified.

To achieve the objective, T9.6 proposed to undertake a continuous technology and market watch. This service deal with the detection of relevant information and its processing. Its result was a confidential newsletter published periodically (on average quarterly).

The technology and market watch methodology used was based on the current best-practices and standards:

- **UNE-166006** on "*R&D management: watch and intelligence systems*"
- **ISO-56006** on "*Innovation management — Tools and methods for strategic intelligence management*"

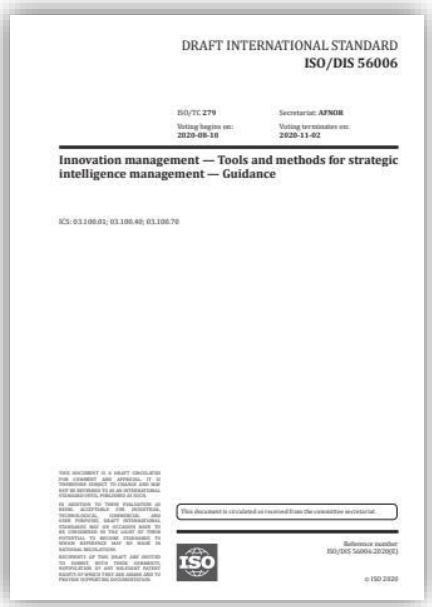

UNE

Norma Española
UNE 166006
Abril 2018

Gestión de la I+D+i: Sistema de vigilancia e inteligencia

Esta norma ha sido elaborada por el comité técnico CTN 166 *Actividades de investigación, desarrollo tecnológico e innovación (I+D+i)*, cuya secretaría desempeña UNE.

UNE


DRAFT INTERNATIONAL STANDARD
ISO/DIS 56006

ISO/TC 279 Secretariat: AFNOR
Voting begins on: 2020-08-18
Voting terminates on: 2020-11-02

Innovation management — Tools and methods for strategic intelligence management — Guidance

ICS: 03.100.01; 03.100.40; 03.100.70

This document is circulated as received from the committee secretariat.

ISO

Reference number
ISO/DIS 56006:2020(E)

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Basically, the next four steps were followed to implement the technology and market watch system:

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1. Identification of information needs and information sources

The innovation management team used the INCIT-EV work plan to find and extract the information needs or **topics** that should be watched. In addition, each topic was assigned the types of **sources** that will more likely contain relevant information. The result of this work is a table with all the information needs and types of sources where each topic may be found.

Figure 4: Overview of the table of information needs and sources. The rows are topics, and the columns are types of sources. The full readable version can be found in the annex.

			Most relevant information sources									
	Search Area	Specific topics	News	Market reports	Technical reports	Official statistics	Patents	Scientific papers	Regulations and laws	Standards	Webinars / Events	Social Media	Commercial websites
WP2	Charging infrastructure	Needs, usage, behaviour, perception and acceptance			X	X		X			X	X	
	Charging infrastructure	Policies to increase massive deployment and adoption	X		X			X	X		X		
	Charging infrastructure	Market segmentation		X									
	Electric Vehicles	Purchase and penetration per category				X							
	Electric Vehicles	Concerns and barriers for the adoption			X			X				X	
	Electric Vehicles	Strategies to incentivize adoption			X			X	X				
	Mobility	Mobility and parking patterns in cities			X	X		X					
	Mobility	Mobility patterns in peri-urban and extra-urban scenarios			X	X		X					
	Mobility	Mobility planning, mobility planners	X		X			X	X				
WP3	Charging infrastructure	Low and medium power DC-DC bidirectional chargers	X		X		X	X		X			X
	Charging infrastructure	High power superfast DC chargers	X		X		X	X		X			X
	Charging infrastructure	Opportunity wireless power transfer / chargers	X		X		X	X		X			X
	Charging infrastructure	Urban dynamic wireless power transfer	X		X		X	X		X			X
	Charging infrastructure	Extra-urban wireless power transfer	X		X		X	X		X			X
WP4	Power grid infrastructure	Grid requirements for wide deployment			X			X		X			
	Power grid infrastructure	Grid congestion in peak hours	X		X	X		X					
	Power grid infrastructure	Power quality issues derived from harmonics	X		X	X		X		X			
	Power grid infrastructure	Grid modernisation, investment, improvements	X		X	X		X	X				
	Power grid services	Services provided by electric vehicles to the grid	X		X		X	X	X	X			X
	Power grid infrastructure	Electric sizing and sitting of charging infrastructure			X			X	X	X			
	Power grid services	Usage of the grid for V2V charging	X		X		X	X	X	X			
	Power grid infrastructure	Synergies of existing DC networks (e.g. transport)			X			X					
	Power grid infrastructure	Power interface of charging infrastructure to DC grids			X		X	X	X	X			X
	Road infrastructure	Integration of wireless charging in roads	X		X		X	X	X	X			
	Charging infrastructure	Robust and theft-proff parking and charging for light vehicles	X				X						X
WP5	Charging software	Interoperability for charging stations (databases, APIs, etc.)			X			X		X			
	Charging software	Cybersecurity and privacy for charging stations			X			X		X			
	Charging software	Roaming in charging points	X		X				X	X			X
	Charging software	Payments in charging points	X		X					X			X
	Charging software	Human-machine interface											X
	Charging software	Visualisation tools for charging infrastructure				X							X
WP6	Mobility	Software solutions for city mobility planning			X			X					X
	Mobility	Influence of transport, grid, ICT, social and civil factors in mobility planning	X		X			X	X	X			
	Mobility	Human Behaviour Model						X			X	X	
	Mobility	Power Grid Model						X				X	
	Mobility	EV Model						X				X	
	Mobility	Traffic Model						X				X	
	Power grid services	Price Model						X				X	
	Charging infrastructure	Charging Points Models						X				X	
	Software	Optimal multi-objective mobility planning tools						X				X	
	Charging apps	Interoperable direct payment			X			X		X		X	
	Charging apps	Charging Point reservation	X		X					X		X	
	Charging apps	Charging Point location and availability	X		X					X		X	
	Charging apps	Smart Charging	X		X			X		X		X	
	Charging apps	Quick scan tool			X			X				X	
	Charging apps	forecast and EV charging profile baseline creation			X			X				X	
WP7	Urban charging case	V2G charging for community-shared cars			X					X			X
	Urban charging case	Aggregation of several charging stations			X			X		X			X
	Urban charging case	Dynamic wireless charging lane in urban area	X		X		X	X		X			X
	Urban charging case	Low power DC bidirectional charging infrastructure for LEV	X		X		X	X		X			X
	Urban charging case	Opportunity wireless charging for taxi lanes	X		X			X					X
	Urban charging case	International deployment cases of innovative charging infrastructures in cities	X		X								X
	Urban charging case	Innovative business models in urban areas	X		X								X
WP8	Peri-extra-urban charging case	Charging HUB in a park-and-ride facility	X		X								X
	Peri-extra-urban charging case	Dynamic Wireless Charging for long distance	X		X								X
	Peri-extra-urban charging case	Superfast Charging Systems for European corridors	X		X								X
	Peri-extra-urban charging case	International deployment cases of innovative charging infrastructures	X		X								X
	Peri-extra-urban charging case	Innovative business models in peri-urban and extra-urban areas	X		X								X

2. Information search, capture, and filter

In this step, searches have been performed and programmed on **Google Alerts**, using the topics previously identified.

All the results generated by the Google Alters service are received and centralized using the **RSS[4] protocol** into an aggregator software (RSS reader).

In addition to the web searches, other **relevant sources** were added using a similar alerts system or a subscription system (e.g., academic and patents databases). The results were sent to the common information aggregator system.

Finally, the results were **filtered** to eliminate irrelevant content and ensure that they belong to the topics and the period under study. Boolean operators ('AND', 'OR', 'NOT') were used to create automatic rules and narrow down the results.

3. Information valorisation: categorization and enrichment

After gathering the potentially relevant search results, the objective was to valorise the information, to make it easy to consume and easy to link to INCIT-EV activities.

Each piece of information was listed in a spreadsheet and manually categorised into one or more WPs of the project work plan.

[4] RSS (*RDF Site Summary or Really Simple Syndication*) is a web feed that allows users and applications to access updates to websites in a standardized, computer-readable format.

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In addition, the expert reviewers participating in this activity, enriched the pieces of information by adding metadata. i.e., more categories to which that information belongs. One of the metadata fields being used was the categorization of the information as an *opportunity* or a *threat* to the project.

4. Information sharing

The technology and market watch activity results in a newsletter that was published, for internal use of the partners, every two or three months. The newsletter or bulletin is a selection of the most relevant information for partners to be informed and up to date regarding the electromobility sector and more specifically the charging infrastructures and services.

Figure 5: Frontpage of eight periodic bulletins published.

Although the recommended way to consume this information is as a pdf document, it is also distributed as an Excel (or CSV) file with more information and all the metadata that can be used to filter by work package, date, etc.

For time-sensitive content, such as webinars, a message was distributed in the internal project workspace.

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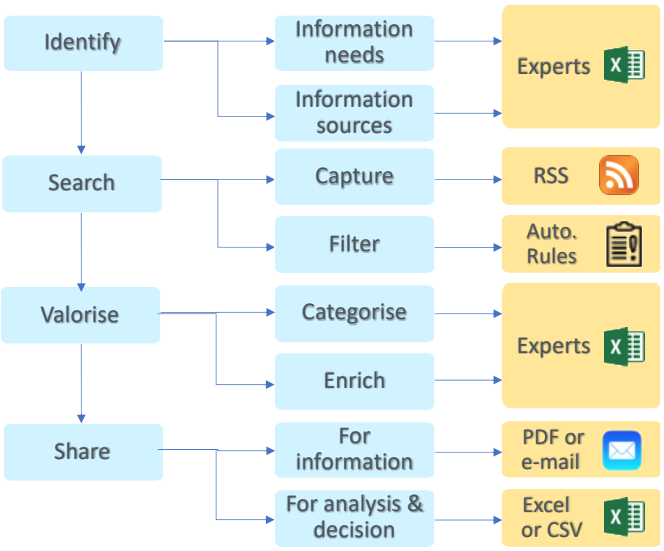
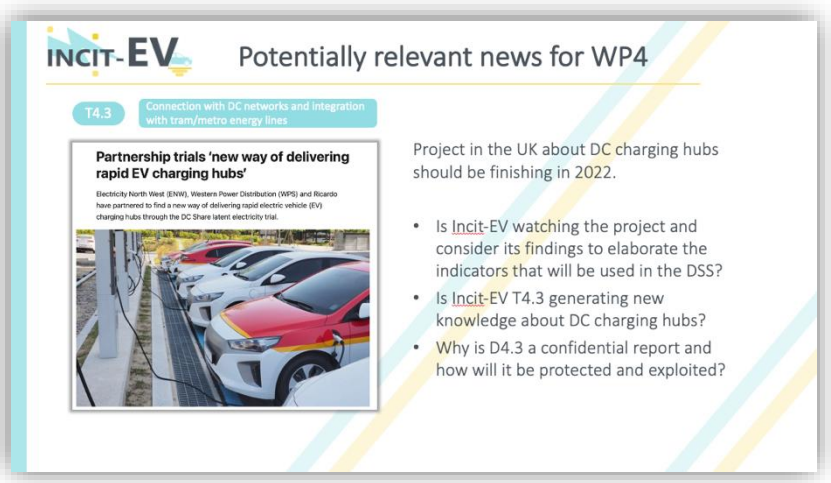


Figure 6: Technology and market watch methodology (blue) and tools (yellow)

1.3.2 Innovation Observatory

Beyond the information gathering, curation and publication as quarterly newsletters, the innovation observatory was the interpretation of the external events in terms of threats and opportunities and the implications that they may have in the project or the exploitation of its results.

The activity of the observatory was mainly selecting the most relevant news and raising questions, concerns, or ideas about how companies or entities outside INCIT-EV were facing the EV charging adoption challenge.



The selection of news or articles, together with the questions or aspects to be discussed, were compiled in a document shared with the partners more directly affected.

At least one piece of relevant information was selected per task from the periodic bulletins. This activity was focused on technology development work packages: WP3, WP4, WP5 and WP6.

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1.3.3 Innovation Sessions

In October and November 2021, two online workshops were organized to share and discuss the results of the innovation observatory. These workshops included also the IPR sections explained in the corresponding chapter ahead.

- WP3-WP4 workshop was dedicated to discussing potential innovations in the fields of charging infrastructures as well as grid, urban and road infrastructures.
- WP5-WP6 workshop was dedicated to discussing potential innovations in the fields of information technology infrastructures and decision support systems.

In 2022 and 2023, the potential innovations resulting from the new charging technologies and the user-centric approach of Incit-EV project were discussed as part of task and work package meetings.

The results of the discussion among partners were gathered in the minutes of the meetings and the summary was presented to the SC by the Exploitation Manager, so they could decide aiming to keep the project relevant and impactful.

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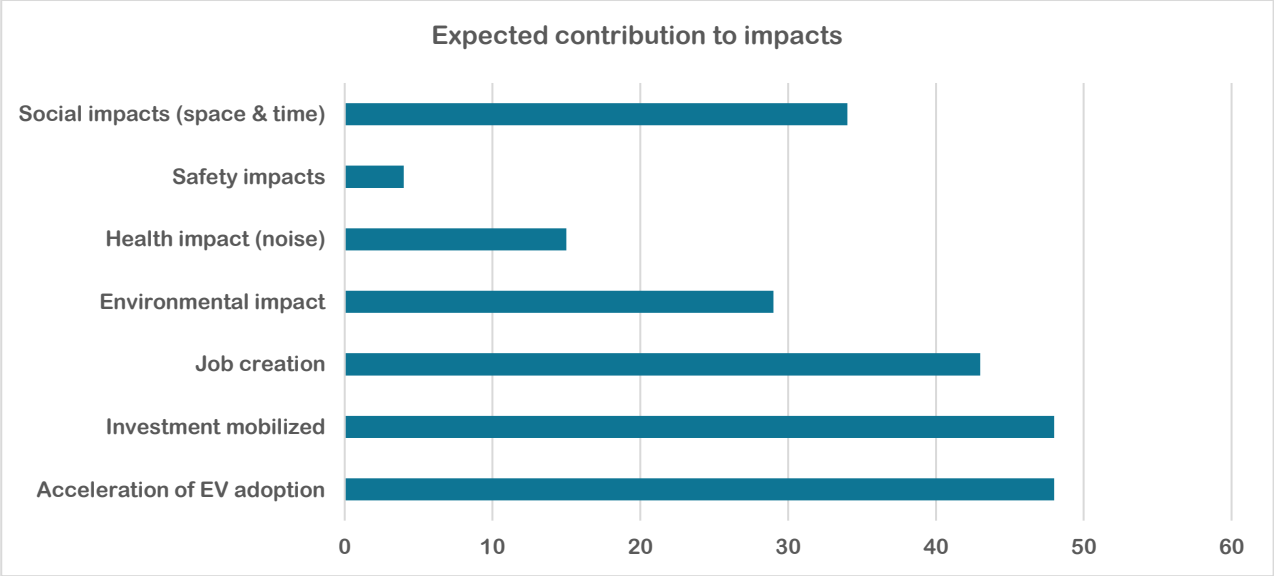
1.3.4 Innovation Dashboard

The Innovation Dashboard was used to make a follow up of project innovations (new products, new services, new business models), and check that the acceptability, penetration speed, and expected impacts (economic, environmental, social, etc..) were feasible and progressing as expected.



	Format	Type of innovation	Acceleration of EV adoption	Investment mobilized	Job creation	Environmental impact	Health impact (noise)	Safety impacts	Social impacts (space & time)	Foreseen degree of innovation and potential impact
INCIT-EV Platform	Product	Architectural	4	5	4	5	5	-	5	This potential product or service combines technology and business model innovation. It provides support to the decision makers to select the right charging infrastructure, thus orienting investment and providing good value for money, as the positive impact on citizens is expected to be high in terms of job creation, environmental impact, social impact (thanks to the planning of routes and support to optimal placement of the chargers). No specific impact beyond the state of the art is expected in the safety domain.
Strategies to incentivize different categories of EV users	Service	Routine	5	4	4	-	-	-	-	This methodology for the advanced assessment of user preferences and needs is an innovative service. Specially if it applies novel techniques as the ones provided by Bitbrain. If not, the innovation level would be relatively low. Nevertheless, it is a valuable result with potential to make a significant impact on the adoption of EVs.

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V2G DC superfast chargers	Product	Disruptive	4	5	4	4	-	-	5	The superfast charger designed with the user in mind and with the capability of providing grid services could be disruptive, although the progress in the market could make these advantages a commodity if the commercialization gets delayed. It is expected to have a high impact on investment, as it avoids updates on the grid, and it would also be positive for the environment, and the job creation. The end users would benefit from fast charging sessions, similar to the current petrol-station experience.
EV charging hubs	Product	Disruptive	5	5	4	5	5	4	5	This innovation includes several ingredients that make it potentially disruptive: the combination of different charging technologies in a single place could make it very convenient for users; the peri-urban location of the hub and the possibility to commute and use public transport could be decisive for some users; las but not least, the possibility of connecting directly to existing DC grids (e.g. the tram or metro power supply) could be a win-win from a technical and business model perspective. It is expected that this model contributes to many positive impacts: EV adoption would be accelerated, as the location and charging options make it easy for users to adopt EVs; investment is not too high, as it reuses existing power supply lines; environmental impact would be reduced due to the combination of private transport with public transport, which also benefits environment, reduces noise in the cities and avoids congestion as well as risk of accidents.
Low power V2X charging infrastructure	Product	Disruptive	5	5	4	5	-	-	-	This potential product uses state-of-the-art technology (silicon carbide semiconductors) but also, and most importantly, it adds V2G functionality, which can be disruptive and lead to boost EV adoption, investment (especially from the private sector) and job creation. V2G functionality can help optimize the use of the existing power grid infrastructure, which is also a very positive impact.
User centric smart charging	Product	Disruptive	5	5	5	5	-	-	-	This potential product or service uses mainly commercial hardware, but it integrates it in a novel way, leveraging software to create a network of chargers capable of adapting their charging speed to the conditions of the power grid and the needs of end users. This is an innovation that could disrupt the existing market. Moreover, it is expected to improve adoption of EVs, create new business models and attract investors, generate new jobs to maintain the distributed network of low-voltage chargers, or reduce CO2 emissions as a result of power grid optimization and avoidance of additional generation or construction of infrastructure.
Secure low power DC racks for LEVs	Product	Routine	5	4	4	5	5	-	5	This potential product is an incremental innovation that, by removing friction from the user experience, is expected to increase the adoption of light EVs. As a result, a positive impact is expected in many aspects, including reduction of driving time, reduction of noise levels, or reduction of CO2 emissions.
Static wireless power transfer for opportunity charging	Product	Radical	5	5	4	-	-	-	4	This potential product proposes a novel configuration which is safer and more economic than the state-of-the-art. This radical innovation would have a positive impact on adoption, as it reduces the friction caused by the need of plugging the EV. It also mobilizes investment from industry to produce and deploy this type of chargers in private garages. Finally, the reduction of charging time is also considered a positive impact for the user.

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Dynamic wireless power transfer charging for urban environments	Product	Radical	5	5	5	-	-	-	5	This potential product is a radical innovation, enabled by new technologies, engineering designs, and construction or testing methods. This innovation could be highly disruptive for the whole EV sector, as it could affect the design of EVs, in particular the sizing of the battery. The expected impacts are very positive: increased adoption of EVs, mobilization of investment (from public sector mostly), creation of jobs for the construction of infrastructures, and reduction of both public spaces used, and drivers time spent.
Dynamic wireless power transfer charging for electric roads	Product	Radical	5	5	5	-	-	-	5	This potential product is a radical innovation, enabled by new technologies, engineering designs, and construction or testing methods. This innovation could be highly disruptive for the whole EV sector, as it could affect the design of EVs, in particular the sizing of the battery. The expected impacts are very positive: increased adoption of EVs, mobilization of investment (from public sector mostly), creation of jobs for the construction of infrastructures, and reduction of both public spaces used, and drivers time spent.
			48	**48**	**43**	**29**	**15**	**4**	**34**	

Definition of the main terms according to the EC H2020 Online Manual:

Innovation	The introduction within a firm or market of a new or significantly improved: • product (good or service) • process • marketing method • organisational method (business practices, workplace organisation or external relations) The minimum requirement for an innovation is that the product, process, marketing method or organisational method must be new (or significantly improved) to the firm.
Prototype, testing activities	Proof of S&T feasibility: Results of innovation activities that confirm/verify the technical feasibility of new products and processes in a (near)operational environment. Includes: • prototypes & demonstrations of new products and processes • results of testing/piloting with users • trial production and pilot plants in manufacturing • trials & testing for services, such as how new technologies affect provision or how significant improvements in existing services perform
Product	Good or service introduced to the market or to the company/organisation that is new or significantly improved in its **capabilities**, **usability**, **components,** or **sub-systems**. **Goods** include packaged & downloadable software/music/film.
Process	Production process, distribution method or supporting activity that was implemented within an organisation.
Method	Refers to organisational method or marketing concept/strategy in business/organisational practices (including knowledge management). 1. **organisational method** - covers workplace organisation or external relations not previously used by your enterprise/organisation 2. **marketing method** - significant changes in product design or packaging, product placement, product promotion or pricing that have not been used before

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2 IPR ACTIVITIES

The activities considered in this subsection are those related to the Intellectual Property rights, which include capturing the IP generated, asses the Intellectual Property and opportunities, provide guidance on protection of the results and connect the IPR to the future exploitation pathways. The relation between the IPR, the innovation actions and the exploitation activities are roughly described in the following chart.

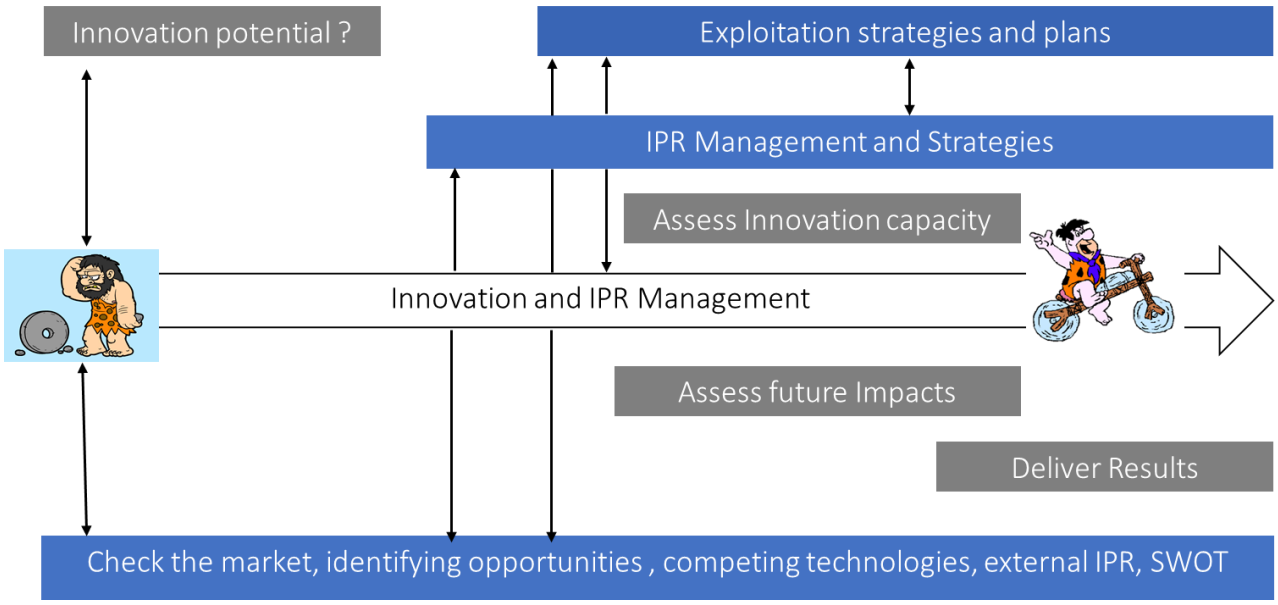

Figure 7. Relation among innovation management, IPR and Exploitation activities (own preparation).

In the previous innovation section, we have seen the need to assess the innovation potential of the solutions provided by the project. This action requires basically to check what is going on outside the project and compare it with the internal developments. This benchmarking action is needed to check if an internal innovation must be protected or not, depending on the market opportunity and the existing equivalent solutions which in some cases could jeopardise such protection. When a protection is decided, it must be accompanied by an exploitation plan and a dissemination plan defining target group, marketing tools, etc to achieve the expected medium-term goals.

2.1 IPR management methodology

The IPR management activities were explained to all partners in a dedicated workshop in the February 2021 General Assembly. All the concepts, implications, roadmap of actions and expectations were described in such event. Namely:

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2.1.1 Basic Concepts

A definition of IP was provided; i.e., Intellectual property (IP) refers to creations of the mind, such as inventions; literary and artistic works; designs; and symbols, names and images used in commerce.

IP is protected in law by, for example, patents, copyright, and trademarks, which enable people to earn recognition or financial benefit from what they invent or create.

IPR	DEFINITION OF PROTECTION
Patent	Any invention, product or process that offers a new way of doing something or provides a new solution to a problem
Utility model	Minor inventions or minor improvements of existing products
Design	Ornamental or aesthetic aspects of a product
Trade mark	Any sign capable of distinguishing your goods or services from your competitors
Copyright	Literary and artistic works: music, books, paintings, computer programs, databases, etc.
Trade Secrets	Any information that is not generally known, confers a competitive edge and is subject to reasonable efforts to maintain its secrecy
Geographical Indications & Appellations of Origin	Signs used on goods with a specific geographical origin, and which possess qualities, reputation or characteristics mainly related to that place of origin

Figure 8. Different type of protections.

2.1.2 Main organizations providing IP standards

Key Organizations

World Trade Organization (WTO). The TRIPS Agreement is the most comprehensive multilateral agreement on intellectual property addressing standards, enforcement, and dispute settlement.

World Intellectual Property Organization (WIPO) is the global forum for intellectual property (IP) services, policy, information and cooperation. A self-funding agency of the United Nations, with 193 member states. WIPO convention was established in 1967.

Global Protection System

PCT. The Patent Cooperation Treaty (PCT) launched by WIPO is an international patent law treaty, concluded in 1970. It provides a unified procedure for filing patent applications to protect inventions in each of its contracting states. A patent application filed under the PCT is called an international application, or PCT application.

2.1.3 Capturing IP Rights

It was explained that:

- Intellectual property is an asset that has value and can be traded
- The creator of the IP must be aware of the value of its creations and the steps to protect them.

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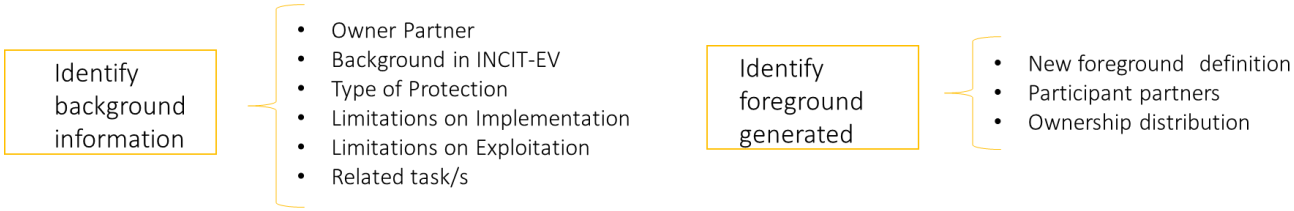
- The creator must disclose internally the creation (not the details). Proactively (at a review meeting) or, opportunistically (phone call, e-mail, formal project disclosure), through the following steps:
    - Clarify ownership (particularly if there are other partners involved)
    - Identify all relevant IP (software, paper, know how)
    - Recover inventors´ opinion about competition, technologies, and markets.

The Capturing process must be implemented in two steps:



It was also explained to be careful with:

- Check for hidden traps (publications, posters, etc.) which might affect patentability. Check novelty, inventiveness, and industrial application.
- Common inadvertent disclosures enable to impede the protection like literature, posting info on internet, thesis, library, oral or written disclosure with a customer at scientific meetings or any circulated abstract or pre-print of a paper to be reach at such meeting, any talk or demonstration with a client in an open day, disclosure without confidentiality, public trials, advertisement, sales, etc.

The obligation of two or more participants generating a creation suitable for protection to establish during the project implementation a separate joint ownership agreement, defining in concrete terms the allocation and terms of exercising their ownership.

Unless otherwise agreed in the consortium agreement or the joint ownership agreement and according to the default grant agreement rules, each joint owner may grant non-exclusive licenses to third parties to exploit the jointly owned results (without any right to sub-license), if the other joint owners are given:

- at least 45 days advance notice and
- fair and reasonable compensation.

2.1.4 Assess IP and market opportunities

To perform this activity, the four steps hereinafter were explained:

a. Analyze patentability

- Is it patentable? What is not patentable; Artistic creations, mathematical algorithms or models, mental concepts, plans or schemes, principles, or theories.
- Has it novelty? Novelty means new. Nothing must be disclosed in advance (if something is disclosed always with a Confidential agreement)
- Is the innovation inventive? If the creation is obvious to skilled person is not patentable

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- The innovation is useful? whether someone would buy it. From 2013, a requirement to disclose a specific, substantial, and credible use of the patent invention was added.
- Has the innovation a prior use? If you have been selling the product, using the process in your business, or if you have licensed it, this prior use disqualifies it.

b. Benchmarking. Competing technologies

- Product and Services definition compared with competing products & services
- Innovation services are here appropriate to watch the market (study of prior IP)

In addition, the **innovation enhanced capacities** were also evaluated. This task implied:

c. Define the skills developed during the project execution.

- Innovation capacity is a project impact

2.1.5 Protecting IP rights

Questions to solve that where highlighted where:

- What type of protection will be selected (patent, utility model, trade secret…)?
- In which countries, territories the creation will be protected (national protection, PCT?)
- How is the background assessed? And the time and efforts of different partners during execution?
- How is the ownership distributed among participant partners?
- Who pays the protection? How will be the costs shared? by territory? by application? By partner? by the exploitation entity?
- Who will be the primary institutions holding the patent?
- Conflict resolution depending on territory, sector, etc.

The foreground must be offered open source or protected in less than four years after project end. We also explained the complexity of a PCT.

- A PCT protect worldwide but the process includes later, country by country, the so-called Freedom to Operate analysis that must be also paid.
- FTO entails analyzing and ensuring that you have freedom to test, market or sell a product or a service in a specific geographical area.
- Then you must pay the fees in each country where you protect the innovation
- Total costs can easily reach 30.000 € to 50.000 € including the patent office. The protection is normally extended for 20 years. Every year an update of the fees must be paid.

Although it is not mandatory to inform other partners about the protection activities, it is considered good practice to consult with them before deciding whether to protect the own results or not.

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2.1.6 IP Exploitation

Should the results be reasonably expected to be commercially or industrially exploited and their protection possible, reasonable, and justified, then participants must provide for adequate protection of the results during an appropriate period and in a suitable territory

Thus, although IP protection is vital for a prospective commercial or industrial exploitation, on the other hand it is not always mandatory.

Where a participant does not intend to protect a result, it is also best practice to consider offering to transfer it to other consortium partners or third parties, better positioned for the exploitation of the results and willing to seek their protection.

Participants that have received European Union funding but do not intend to protect their results must be careful not to perform any dissemination activities without first informing the European Commission. This notification is mandatory up to four years after the end of the project.

In this case, the European Commission may decide, with the consent of the participant to whom the result belongs to, to assume ownership and take the necessary measures to protect it.

Participants receiving European Union funding must use their best efforts to take measures aiming at ensuring the exploitation of their results up to four years after the project.

Exploit means:

Use results in further research activities other than those covered by the project concerned, or

- in developing, creating, and marketing a products or processes, or
- in creating and providing a service or
- in standardization activities

The exploitation does not need necessarily to be done by directly by the participants. Indeed, they may prefer to ensure its use by another entity. Such indirect exploitation can be performed by licensing the results or assigning them to third parties.

Participants have the obligation to disseminate their results as soon as possible, unless it goes against their legitimate interests and subject to any necessary restriction due to their commitments concerning particularly the protection of results and confidentiality.

Exploitation might be research, commercial, investment, social, environmental, policy making, setting standards or skills and educational training, where relevant.

Preparation of exploitation and commercialization strategies including the project results as a whole.

Coordination of individual partner´s exploitation plans according with their internal strategies and to avoid conflicts among project partners.

Preparation of more detailed strategies and plans during the project.

Adapting to changes and trends in market and technologies during the project execution.

A table with different types of exploitation types was also provided.

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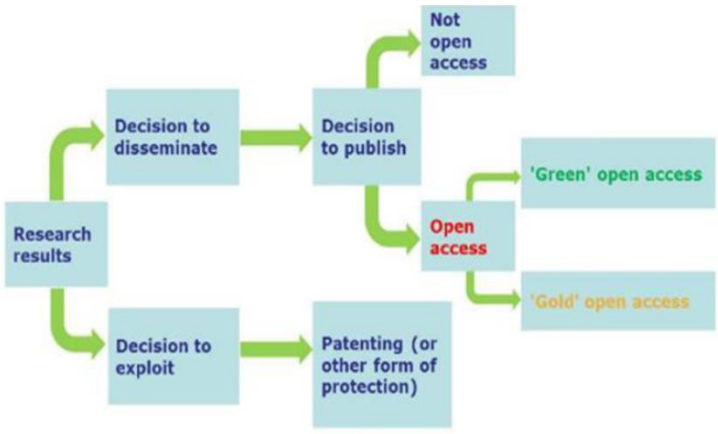
Further internal research	•These research activities must be beyond the project. •Relevant for research organisations and research intensive companies.
Collaborative Research	•The results used as background of future collaborative research projects. •Relevant for research organisations and research intensive companies.
Internal product development	•Results used in developing, creating and marketing a product/process. •Relevant for companies.
Internal service creation	•Results used in creating and providing a service. •Relevant for companies.
Licensing	•Results exploited by other organisations through out-licensing. •Relevant for all participants, but care should be taken to comply with Horizon 2020 rules.
Assignment	•Results exploited by other organisations by the transfer of ownership. •Relevant for all participants, but care should be taken to comply with Horizon 2020 rules.
Joint Venture	•Results used as background of a joint venture. •Relevant for all participants, but care should be taken to comply with Horizon 2020 rules.
Spin-off	•A separate company established in order to bring to the market technology resulting from the project. •Relevant for all participants, but care should be taken to comply with Horizon 2020 rules.
Standardisation activities	•Results used either to develop new standardisation activities, or to contribute to on-going standardisation work. •Relevant for all participants, but care should be taken to comply with Horizon 2020 rules.

Finally, some clarifications were given in relation to the dissemination options according to the EC methodology and represented in the following figure.



- **Green Open Access**. Placing a version of an author's manuscript into a repository, making it freely accessible for everyone. The version that can be deposited into a repository is dependent on the funder or publisher
- **Gold open access** is where an author publishes their article in an online open access journal.

All these previous clarifications were given to all partners defining a methodology to implement the action. A roadmap to capture the relevant information was defined along the project execution where the **IP audits** by WPs was considered very relevant to discuss what expected outputs could be protected and later exploited. An IP audit was defined as a systematic thorough and solution-focused review of the intellectual assets owned, used, or acquired by the businesses to ascertain their legal status, value, potential IP-related risks, and the means for protection and to capitalise on them.

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2.2 Events organised

Three workshops were organised to first, explain the IPR strategy as described in previous points and later to discuss IP related options. These events were prepared as follows:

Title Event	Date	Attendants	Content
IPR Review and Innovation management	1/02/21 2 hours	All partners. Online	Definition of strategy for IPR and innovation management
IP Audit WP3 and WP4 / Innovation workshop	3/11/21 2 hours	All task leaders in WP3 and WP4 Online	External and internal analysis and SWOT to detect potential IPR and how to distribute them
IP Audit WP5 and WP6 /Innovation workshop	12/11/21	All task leaders in WP5 and WP6 Online	External and internal analysis and SWOT to detect potential IPR and how to distribute them
IPR review within the Steering committee meeting	Every 6 months for all the project duration.	Coordinator and WP leaders; Chaired by CIRCE	Guidelines for IPR protection and exploitation strategy enlarging the market vision and business opportunities.

Figure 9. IPR Events organized in the first two years of INCIT-EV execution

2.3 Tools

2.3.1 IPR Audits

As indicated in the previous chapter, two IPR Audits workshops were organised for WP3 and WP4 and later WP5 and WP6.

The agendas for the workshops were as follows (the agenda for the first workshop is included here but it is also applicable to the second workshop substituting WP3-4 by WP5-6)

Time	Topic	Partner
10:00	External Analysis	
10:00 – 10:20	Presentation of the detected trends and potential disruptions in the competitive environment that may affect WP3 and WP4 activities.	Qi Arrow
10:20 – 10:40	Discussion to select the most relevant threats and opportunities for the objectives of WP3-4 in INCIT-EV project.	All WP3-4 partners

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10:40	Internal Analysis	
10:40 – 10:55	WP3 IP identification and ownership. Revision of WP3 results (deliverables) to detect project outcomes that may be exploitable. Assess whether the intangible is owned by a single partner or there is a joint ownership. Detect potential problems to avoid or fix them	WP3 task leaders or representatives
10:55 – 11:10	WP4 IP identification and ownership. Revision of WP4 results (deliverables) to detect project outcomes that may be exploitable. Assess whether the intangible is owned by a single partner or there is a joint ownership. Detect potential problems to avoid or fix them	WP4 tasks leaders or representatives
11:10 – 11:20	WP3 IP Exploitation pathways. Discuss the next steps to exploit WP3 results so they can be commercialised with limited risk of liability for infringement.	WP3 leader
11:20 – 11:30	WP4 IP Exploitation pathways Discuss the next steps to exploit WP4 results so they can be commercialised with limited risk of liability for infringement.	WP4 leader
11:30	IP SWOT Analysis and conclusions	
11:30 – 12:00	WP3-4 IP SWOT Analysis A preliminary SWOT analysis will be performed (crowdsourced by WP3-4 partners), to clearly reveal the strengths, weaknesses, opportunities, and threats of the audited IP assets	All WP3-4 partners

Figure 10. Example of an agenda for WP 3-4 Audits

The external analysis was made based on the market research done by the innovation team that was showcased in the IIPR bulletins.

The idea was to highlight other initiatives related to the INCIT-EV WPs affected that could impacts on the project results. For example, some of the identified solutions outside INCIT-EV provide advance features that are not contemplate inside INCIT-EV for an equivalent product or someone is offering the same features but at much competitive prices. In other cases, it was suggested looking for a collaboration with other research groups outside INCIT-EV to improve the value proposition for a similar product or service.

In the workshop some questions were raised to confirm if the technology was known by the working team or if some networking actions were previously in place.

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The external competitive environment must be considered to position the INCIT-EV products or services in the future and also to see obstacles for IP protection as maybe some other working groups are implementing a similar technology, and a patent wouldn't be possible.

To explain the concept, we add herein an example of two slides referred to task 5.3 where these questions were indicated.

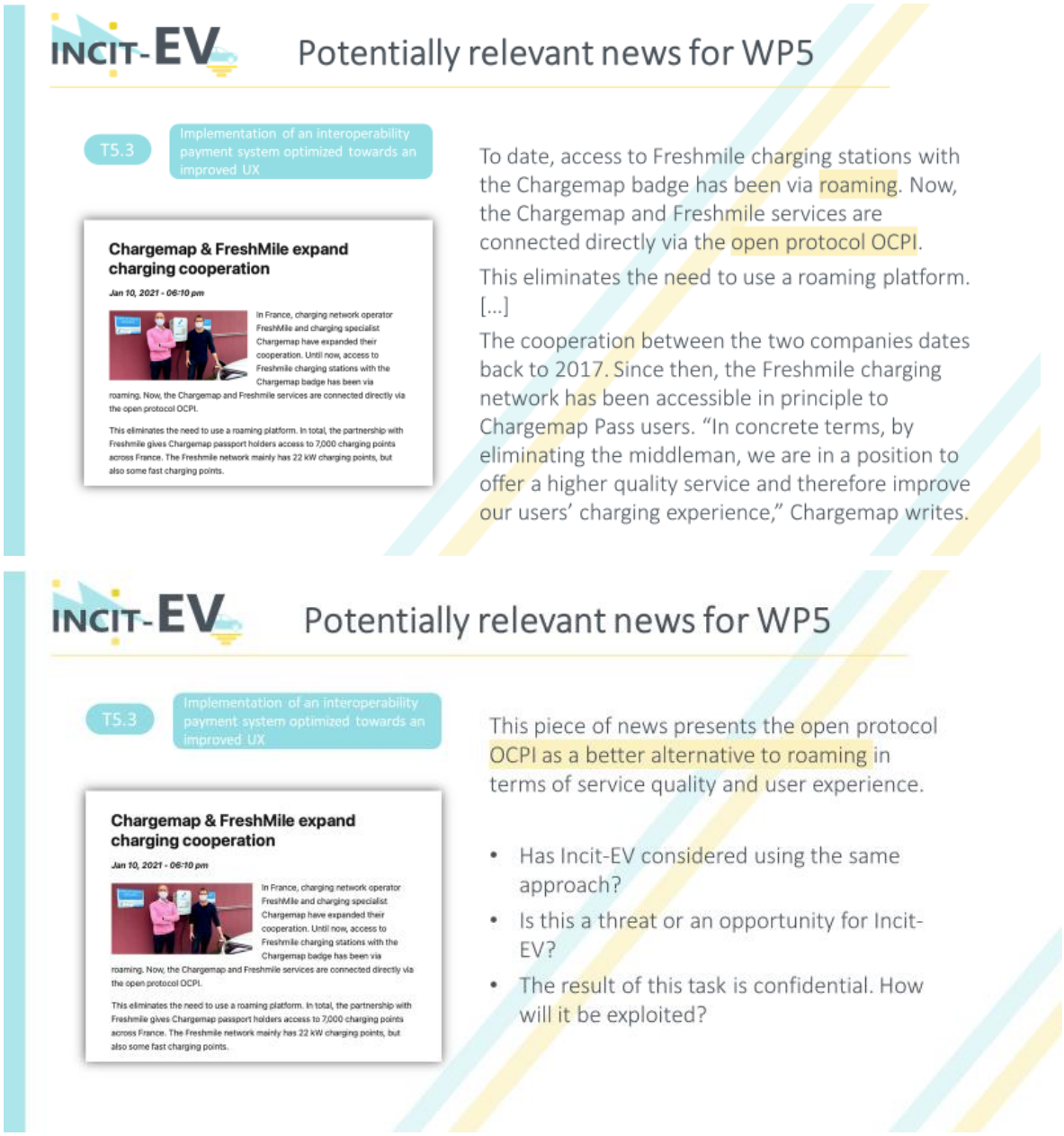

Figure 11, Slides with some discoveries outside INCIT-EV but affecting T5.3

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2.4 Main results

Most of researchers participating in the technology, products or services developments were initially not aware of what their companies would do with the final results.

A claim was done by QiA to identify business development managers in the different organizations to participate in the Steering Committee or dedicated IPR meetings linked to the demonstration activities (WP7 and WP8).

It was considered that once the products or services were proven and launched, all partners would be in a better position to determine what to protect and how the exploitation routes would be organised.

Initially (in the first version of this report) the background declared in the Grant Agreement was identified and connected with the expected foreground arising from such background. At this stage, some questions solved were: Who is the owner? In which development it will be used and by who? are joint agreements necessary?

In this final version, the innovative results (foreground) were identified and categorised, focusing on the plans to protect the results, the type of protection, the link with the required background or the expected exploitation routes.

2.4.1 Background

In the first version of this report, a table attached in annex 2 was completed by all project partners that declared some background information at the Grant Agreement stage. It was asked for the background owner partner, the type of protection for such background, the limitations on implementation during the project execution and at the exploitation phase, the related tasks where the background will be used, other partners using such background and the preliminary definition of the foreground that can be associated to such background.

The table includes the following fields:

- Nº of IP
- Owner Partner
- Background potentially used in Incit-EV
- Type of Protection in force
- Limitations on Implementation
- Limitations on Exploitation
- Related project task/s
- Definition of foreground linked to the background
- Other partners contributing to foreground

2.4.2 Foreground

In the IP meetings, the project results with the highest innovation potential were identified. These were initially categorised in the following groups:

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- Charging solutions (hardware infrastructure) with Innovative (technical) upgrades.
    - Dynamic charging e-corridors in the urban area (30 kW) and the periphery (90 kW)
    - Static opportunity wireless charging solution (50 kW)
    - Charging hub in a park-and-ride facility with a direct connection of fast chargers to the tram's DC network (150 kW plus 2*3.6 kW)
    - Superfast Charging Systems for European corridors (200 kW)
    - Low power DC bidirectional charging infrastructure for EV, including two-wheelers (25 kW)
    - Software as a service for Smart charging and V2G
- Decision Support System for mobility planners that will allow seamless integration of the charging solutions into the existing transport, grid, ICT and civil infrastructures.
- Applications Platform improving the users' experience (payment, location, use…) and engaging them in sustainable mobility solutions.
- Some specific solutions like:
    - Online payment
    - V2X
    - Scalable Charging hub
    - Theft proof for LEVs
    - DWPT. Dynamic Wireless Power Transfer
- New methodology to incentivize the adoption of electromobility
- New Life Cycle Assessment for city planners and LCCA and business models for investors

In the second version of this report, all partners contributed to complete a table (annex 3) to clarify and detailing the foreground or expected outputs generated. The table includes the following fields:

- Nº of result
- Exploitable result
- Nº of the organization
- Name of the organization
- Describe the innovation
- Confidential Deliverables where the innovation is reported
- Results contained in the deliverable
- Technology maturity level
- Will you protect it (Y/N)
- Expected type of protection (3)
- Developed jointly with other partners (Y/N)
- Name the other partners participating in the specific research
- It is based in protected background (Y/N)

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- Describe the protected background associated to the new foreground
- Will the innovation be used in a new product or service (Y/N)
- Define the expected new product or service associated to the innovation
- Preliminary/potential exploitation route

The following sections describe the main exploitable results, summarising their innovativeness, the management of their IP rights and their foreseen exploitation pathway.

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2.4.2.1 V2G superfast DC charger

<table>
<tr><th>Result</th><th>V2G superfast DC charger</th></tr>
<tr><td>Innovativeness</td><td>Incit-EV has progressed in three key components that contribute to develop an innovative V2G superfast DC charger:
1. Reference model. It is an engineering document containing the functional specifications (conceptual design) to make a superfast charging system which is also user friendly, scalable and capable of providing ancillary services to the power grid, while providing a gas station-like experience to the EV user.
2. Grid services development. The application of a concentrator with multiple communication protocols for edge computing in smart grids is an innovative component. Moreover, the project has also developed a methodology for the study, sizing and deployment of charging infrastructure taking in consideration the impact on the grid.
3. Hardware implementation. A 200-kW DC power electronics module for a superfast charger was designed and built including the electric subsystems, communications (RTU, SCADA...) and mechanical cabinet.

Although the DC charging technology proposed is like many superfast charging systems on the market (e.g., EVBOX Troniq High Power), it is more user-oriented, and it can provide grid services.</td></tr>
<tr><td>Maturity</td><td>The technology of the High-power DC bidirectional charger - CHAdeMO and CSS - implemented in the project is in TRL8-9.
<table><tr><td>TRL 1</td><td>TRL 2</td><td>TRL 3</td><td>TRL 4</td><td>TRL 5</td><td>TRL 6</td><td>TRL 7</td><td>TRL 8</td><td>TRL 9</td></tr></table>á</td></tr>
<tr><td>IPR ownership</td><td>The following deliverables contain the information required to develop and deploy the V2G superfast DC charger:
<table><tr><th>Results (Deliverables)</th><th>Owners</th></tr><tr><td>D3.2/D3.7. Reference models. Requirements and functional specifications</td><td>POLITO, EESTI</td></tr><tr><td>D4.2/D4.8. Methodology for the study, sizing and deployment of charging infrastructure in the grid including tests and simulation results</td><td>IFFSTAR, ENEDIS, CIRCE, REE, POLITO, MRA-E, PITP, EESTI, UL, ATOS</td></tr><tr><td>D8.6. (PUBLIC) Limited information about the design, engineering and construction.</td><td>CIRCE, EESTI</td></tr></table></td></tr>
</table>

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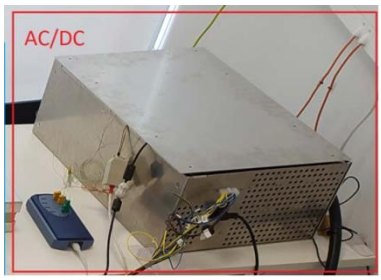
<table>
<tr><td></td><td>
So far, the specifications have been kept secret, not disclosed outside the consortium.

The protection method foreseen for the results in the table is “Trade Secret”. Therefore, partners will continue to adopt adequate measures to ensure that the information remains confidential.

In addition to the foreground, there are three technology components that belong to the background of Incit-EV partners, that are or may be necessary for the implementation and commercialization of the V2G superfast DC charger:
<table>
<tr><th>Background</th><th>Owners</th></tr>
<tr><td>AC and DC charging station up to 475kW.

Power electronic design and capability to have bidirectional active and reactive power flow</td><td>EVBOX</td></tr>
<tr><td>Energy Box, gateway and concentrator with multiple communication protocols and interfaces for Smart Grid environments and edge computing. Created in Flexiciency Project (H2020, GA No 646482).

Real time interfaces for control acquisition and monitoring in microgrid environments</td><td>CIRCE</td></tr>
</table>
Unless otherwise specified (e.g., in the case of a patented tech), the background will use the same protection method as for the foreground.
</td></tr>
<tr><td>Exploitation pathway</td><td>
These results are intended to be applied and commercialized as a product, which is a 200-kW DC charger capable of providing ancillary services under DSO commands (i.e. reactive power compensation, voltage peaks and hollow balancing, and frequency regulation).

The exploitation pathway is currently being led by EESTI (Enefit), which aims to include the charger as a new product in its portfolio, and benefit from the grid services within the company group. Conversations with the project partners that jointly own the result have already started to reach an agreement that satisfies all the parties.
</td></tr>
<tr><td>Images</td><td>



</td></tr>
</table>

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2.4.2.2 Low power V2X charging infrastructure

<table>
<tr><th>Result</th><th>Low power V2X charging infrastructure</th></tr>
<tr><td>Innovativeness</td><td>Incit-EV has progressed in two key components that contribute to develop an innovative Low power V2X charging infrastructure:
1. Reference model. It is an engineering document containing the specifications. No innovations are identified in the low and medium power reference models. However, it is valuable state-of-the-art knowledge.
2. Hardware implementation. The application of SiC power electronics with a bidirectional topology, and the integration of communications and control electronics enabling V2V and V2G energy trading are considered innovative.</td></tr>
<tr><td>Maturity</td><td>The technology of the Low-power V2X charger implemented in the project is in TRL8.
<table><tr><td>TRL 1</td><td>TRL 2</td><td>TRL 3</td><td>TRL 4</td><td>TRL 5</td><td>TRL 6</td><td>TRL 7</td><td>TRL 8</td><td>TRL 9</td></tr></table></td></tr>
<tr><td>IPR ownership</td><td>The following deliverables contain the information required to develop and deploy the V2G superfast DC charger:
<table><tr><td>Results (Deliverables)</td><td>Owners</td></tr><tr><td>D3.1/D3.6. Requirements, standards, interoperability parameters and characteristics of 25-kW DC charger with four-leg topology at the grid-side to provide V2G and V2V capabilities.</td><td>PSA, IDNEO, POLITO, CIRCE, MRA-E, ELES.</td></tr><tr><td>D7.7. Technical details for commissioning are defined in this report from the charger, communication, engineering and deployment</td><td>CIRCE, IDNEO, AYZ</td></tr></table>The IPR have been partially protected:
- The 25kW DC charger topology (power electronics design) was disseminated by CIRCE in the PCIM Europe.
- The industrial design of the cabinet has been registered in the Register of Community Designs.
- The engineering of other subsystems has been kept confidential.
The protection method foreseen for the engineering designs is “Trade Secret”. Therefore, partners will continue to adopt adequate measures to ensure that the information remains confidential.</td></tr>
</table>

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<table>
<tr><td></td><td>In addition to the foreground, there are two technology components that belong to the background of Incit-EV partners, that are or may be necessary for the implementation and commercialization of the low-power V2X charger:
<table>
<tr><th>Background</th><th>Owners</th></tr>
<tr><td>Energy Box, gateway and concentrator with multiple communication protocols and interfaces for Smart Grid environments and edge computing. Created in Flexiciency Project (H2020, GA No 646482).

Real time interfaces for control acquisition and monitoring in microgrid environments</td><td>CIRCE</td></tr>
<tr><td>Control management system for 4-legs B2B power converters. 3-level 4-legs NPC power inverter. Created in the REDACTIVA project</td><td>CIRCE</td></tr>
</table>
Unless otherwise specified (e.g., in the case of a patented tech), the background will use the same protection method as for the foreground.</td></tr>
<tr><td>Exploitation pathway</td><td>These results are intended to be applied and commercialized as a product, which is a fully SiC 50 kW VE Fast Charger with CHAdeMO and CCS protocols, featuring V2G functionality.

The exploitation pathway is currently being led by CIRCE, which has already signed a strategic agreement and started a pre-commercial demonstration project with a potential customer, Acciona Energia,

Conversations with the project partners that jointly own the result have already started to reach an agreement that satisfies all the parties.</td></tr>
<tr><td>Images</td><td> 


</td></tr>
</table>

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2.4.2.3 Static wireless power transfer for opportunity charging

<table>
<tr><th>Result</th><th>Static wireless power transfer for opportunity charging (OWPT)</th></tr>
<tr><td>Innovativeness</td><td>Incit-EV has progressed in two key components that contribute to develop an innovative Static wireless power transfer for opportunity charging:
1. Reference model. The design of the wireless charger could be innovative, as it applies several technologies available to provide a better solution for static wireless power of EVs. The power electronics topology is SP-S, which is intrinsically safer than other alternatives.
The design proposed eliminates the presence of ferrite and aluminium at the primary coil, with the main objective of reducing civil works needed and costs. Moreover, the system is sealed, avoiding fluids to penetrate the system.
2. Implementation. The implementation of the hardware and software systems is not expected to add innovations, although the use of the Energy Box could potentially enable innovations.</td></tr>
<tr><td>Maturity</td><td>The technology of the static wireless power transfer technology for opportunity charging implemented in the project is TRL7 for both the Grid side system and the Vehicle side system.
<table><tr><td>TRL 1</td><td>TRL 2</td><td>TRL 3</td><td>TRL 4</td><td>TRL 5</td><td>TRL 6</td><td>TRL 7</td><td>TRL 8</td><td>TRL 9</td></tr></table></td></tr>
<tr><td>IPR ownership</td><td>The following deliverables contain the information required to develop and deploy the Static wireless power transfer technology for opportunity charging:
<table><tr><th>Results (Deliverables)</th><th>Owners</th></tr><tr><td>D3.3/D3.8. All the systems and parts of the systems described</td><td>CIRCE, TRIA, POLITO, AYZ</td></tr><tr><td>D7.13/D7.14. Description of the commissioning process.</td><td>-</td></tr></table>Although the indicated deliverables are confidential, a dissemination article was submitted by CIRCE with the title "Implementation and verification of a 50kW Opportunity Wireless Charger Design" discussing key aspects related to design and modelling of such system.</td></tr>
</table>

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<table>
<tr><td></td><td>The protection method foreseen for the non-disclosed information is “Trade Secret”. Therefore, partners will continue to adopt adequate measures to ensure that the information remains confidential.

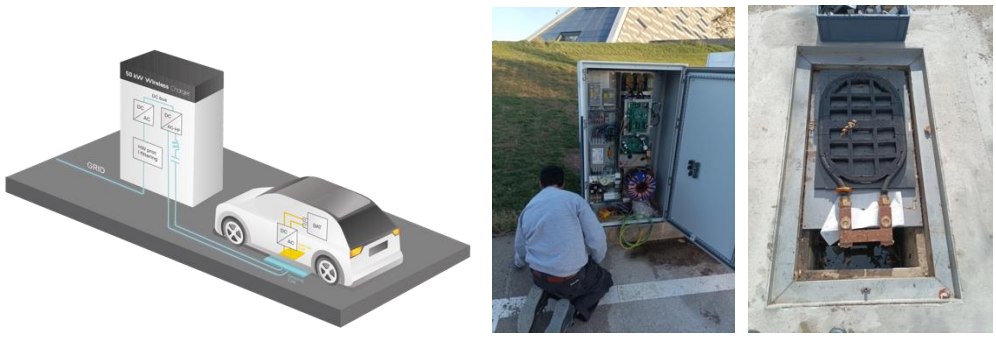
In addition to the foreground, there is one technology components that belong to the background of Incit-EV partners, that is or may be necessary for the implementation and commercialization of the static wireless charger:

<table>
<tr><th>Background</th><th>Owners</th></tr>
<tr><td>Energy Box, gateway and concentrator with multiple communication protocols and interfaces for Smart Grid environments and edge computing. Created in Flexiciency Project (H2020, GA No 646482).

Real time interfaces for control acquisition and monitoring in microgrid environments</td><td>CIRCE</td></tr>
</table>

Unless otherwise specified (e.g., in the case of a patented tech), the background will use the same protection method as for the foreground.</td></tr>
<tr><td>Exploitation pathway</td><td>These results of the project are intended to be applied and commercialized as a product, which is an interoperable high-frequency (85 kHz) wireless charger ensuring high efficiency performance (90%) for misalignment of 20% between the primary and the secondary coils.

The exploitation pathway is currently being led by CIRCE and QiA, which has detected the interest of a large industrial group and is currently in the process of starting the negotiations.

Conversations with the project partners that jointly own the result will begin right after the project ends and all the results including the demonstrator report are completed.</td></tr>
<tr><td>Images</td><td> 
Left: UC7’s electronic & magnetic system. Centre: electronic cabinet.

Right: cooling system & primary inductor.</td></tr>
</table>

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2.4.2.4 Dynamic wireless power transfer charging for urban environments

<table>
<tr><th>Result</th><th>Dynamic wireless power transfer charging for urban environments (DWPT)</th></tr>
<tr><td>Innovativeness</td><td>Incit-EV has progressed in three key components that contribute to develop an innovative dynamic wireless power transfer charger:
1. Reference models. Charging system models designed are innovative as they go beyond the state of the art in interoperability, road integration, safety, high-power options, robustness, communication and integration of standards.
2. Road infrastructure. Innovative system for urban applications based on 1 m long, 30 kW coils, integrated in a plastic support. A solution, for integration in bituminous pavements, has been proposed.
3. Implementation. The implementation of the hardware and software systems is not expected to add innovations. Nevertheless, it is valuable state-of-the-art knowledge.</td></tr>
<tr><td>Maturity</td><td>The technology of the dynamic wireless power transfer technology for urban environments implemented in the project is made up of at least 4 sub-systems. All of them have reached a high TRL, although further development is still required to reach the market:
- Roadside system - TRL7
- On-board system - TRL7
- Communication system - TRL7
- Lane Keeping Assistance system - TRL7
<table><tr><td>TRL 1</td><td>TRL 2</td><td>TRL 3</td><td>TRL 4</td><td>TRL 5</td><td>TRL 6</td><td>TRL 7</td><td>TRL 8</td><td>TRL 9</td></tr></table></td></tr>
<tr><td>IPR ownership</td><td>The following deliverables contain the information required to develop and deploy the Static wireless power transfer technology for opportunity charging:
<table><tr><td>Results (Deliverables)</td><td>Owners</td></tr><tr><td>D3.4/D3.9. Description of all the systems and parts of the systems.</td><td>RSA, PSA, CIRCE, POLITO, MRA-E.</td></tr><tr><td>D4.4/D4.10. New knowledge on integration of charging systems in the pavement. Definition of tests and simulation tools (charging, thermal behaviour, mechanical, etc.)</td><td>Univ Eiffel, VEDECOM, EUROVIA, COLAS</td></tr></table></td></tr>
</table>

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D7.5/D7.10. Description of the commissioning process.	-

So far, the specifications and the engineering of the demo site have been kept secret, not disclosed outside the consortium.

The protection method foreseen is "**Trade Secret**". Therefore, partners will continue to adopt adequate measures to ensure that the information remains confidential.

In addition to the foreground, there are other technology components that belong to the background of Incit-EV partners, that are or may be necessary for the implementation and commercialization of the dynamic wireless charger:

Background	Owners
• Induction charging system coil design under EMC constraint • Induction charging system on board - vehicle power electronics design and control software. • Vehicle electric and electronic adaptation for integration of contactless induction charging system • Vehicle mechanical integration of contactless induction charging system • Vehicle multiscale control strategies for contactless dynamic charging	RSA
• Patent "Image processing method for recognising ground marking and system for detecting ground marking" WO2017194890 (FR1654322)	VEDECOM
• Software for pavement modelling and design Viscoroute • Removable urban pavement concept • Software for pavement modelling and design CESAR-LCPC (module CVCR) • Removable urban pavement concept • Mechanical tests for evaluation of insertion of charging elements in a bituminous pavement	Uni Eiffel
Engineering designs for: • Static Induction charging system coil design. Electric & electromagnetic simulation • Simulation, measurement of electromagnetic fields concerning health • Vehicle electric and electronic adaptation for integration of contactless induction charging system	PSA Stellantis'

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<table>
<tr><td></td><td>
<table>
<tr><td>• Vehicle mechanical integration of contactless induction charging system
• Thermal management of vehicle induction charging system</td><td></td></tr>
<tr><td>• Knowledge on Thermal transfer modelling in pavement.
• Know-how on pavement monitoring. Pavement structure performance monitoring system of the REGINA bypass project.</td><td>Eurovia</td></tr>
</table>
Unless otherwise specified (e.g., in the case of a patented tech), the background will use the same protection method as for the foreground.
</td></tr>
<tr><td>Exploitation pathway</td><td>These results of the project are intended to be applied and commercialized as a product, which is a modular and interoperable DWPT for different type of vehicles sizes allowing to charge the battery of the vehicle while driving ready for urban (avg. 30 km/h) environments.

The exploitation pathway is currently being led by VEDECOM. Conversations with the project partners that jointly own the result will begin right after the project ends and all the results including the demonstrator report are completed.</td></tr>
<tr><td>Images</td><td> 

 </td></tr>
</table>

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2.4.2.5 Dynamic wireless power transfer charging for electric roads

<table>
<tr><th>Result</th><th>Dynamic wireless power transfer charging for electric roads (Extra-urban)</th></tr>
<tr><td>Innovativeness</td><td>Incit-EV has progressed in three key components that contribute to develop an innovative dynamic wireless power transfer charger:
1. Reference models. Charging system models designed are innovative as they go beyond the state of the art in interoperability, road integration, safety, high-power options, robustness, communication and integration of standards. It is important to note that the vehicles compatible with this extra-urban DWPT system are also compatible with the urban systems as they all work at 30kW in the case of Zoe EV and at 90kW in the case of the Master van.
2. Road infrastructure. Innovative charging system consisting of 10m long coils each of them powered by one inverter located at the side of the road, themselves being powered and controlled by a power supply unit.
4. Implementation. The implementation of the hardware and software systems does not add innovations. Nevertheless, it is valuable state-of-the-art knowledge.</td></tr>
<tr><td>Maturity</td><td>The technology of the dynamic wireless power transfer technology for extra-urban environments implemented in the project is made up of at least 4 sub-systems. All of them have reached a high TRL, although further development is still required to reach the market:
- Roadside system - TRL7
- On-board system - TRL7
- Communication system - TRL7
- Lane Keeping Assistance system - TRL7
<table><tr><td>TRL 1</td><td>TRL 2</td><td>TRL 3</td><td>TRL 4</td><td>TRL 5</td><td>TRL 6</td><td>TRL 7</td><td>TRL 8</td><td>TRL 9</td></tr></table></td></tr>
<tr><td>IPR ownership</td><td>The following deliverables contain the information required to develop and deploy the Static wireless power transfer technology for opportunity charging:
<table><tr><th>Results (Deliverables)</th><th>Owners</th></tr><tr><td>D3.4/D3.9. Description of all the systems and parts of the systems.</td><td>RSA, PSA, CIRCE, POLITO, MRA-E.</td></tr><tr><td>D4.4/D4.10. New knowledge on integration of charging systems in the pavement. Definition of tests and simulation tools (charging, thermal behaviour, mechanical, etc.)</td><td>Univ Eiffel, VEDECOM, EUROVIA, COLAS</td></tr></table></td></tr>
</table>

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D8.4 contains the description of the complete solution for Versailles extra-urban area demonstrator. This is a public deliverable.	VEDECOM, CIRCE, ENEDIS

Although the indicated deliverables are confidential, a dissemination article was submitted by CIRCE with the title “Dynamic wireless charging system design for extra-urban areas based on resonant inductive power transfer”.

In addition to the foreground, there are other technology components that belong to the background of Incit-EV partners, that are or may be necessary for the implementation and commercialization of the dynamic wireless charger for e-roads:

Background	Owners
• Induction charging system coil design under EMC constraint • Induction charging system on board - vehicle power electronics design and control software. • Vehicle electric and electronic adaptation for integration of contactless induction charging system • Vehicle mechanical integration of contactless induction charging system • Vehicle multiscale control strategies for contactless dynamic charging	RSA
• Patent “Image processing method for recognising ground marking and system for detecting ground marking” WO2017194890 (FR1654322)	VEDECOM
• Software for pavement modelling and design Viscoroute • Removable urban pavement concept • Software for pavement modelling and design CESAR-LCPC (module CVCR) • Removable urban pavement concept • Mechanical tests for evaluation of insertion of charging elements in a bituminous pavement	Uni Eiffel
Engineering designs for: • Static Induction charging system coil design. Electric & electromagnetic simulation • Simulation, measurement of electromagnetic fields concerning health • Vehicle electric and electronic adaptation for integration of contactless induction charging system • Vehicle mechanical integration of contactless induction charging system	PSA Stellantis'

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<table>
<tr><td></td><td>
<table>
<tr><td>• Thermal management of vehicle induction charging system</td><td></td></tr>
<tr><td>• Knowledge on Thermal transfer modelling in pavement.
• Know-how on pavement monitoring. Pavement structure performance monitoring system of the REGINA bypass project.</td><td>Eurovia</td></tr>
</table>
Unless otherwise specified (e.g., in the case of a patented tech), the background will keep using the same IPR protection.
</td></tr>
<tr><td>Exploitation pathway</td><td>These results of the project are intended to be applied and commercialized as a product, which is a Modular and interoperable DWPT for different type of vehicles sizes allowing to charge the battery of the vehicle while driving ready in highway (up to 100 km/h) environments.

The exploitation pathway is currently being led by VEDECOM. Conversations with the project partners that jointly own the result will begin right once all the results including the demonstrator report are completed.</td></tr>
<tr><td>Images</td><td>  </td></tr>
</table>

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Figure 12.

Top: simplified demo at CIRCE (Spain).

Left: demo at Vedecom Versailles (France).

2.4.2.6 User centric smart charging

Result	**User centric smart charging**
Innovativeness	Incit-EV has progressed in three key components that contribute to develop an innovative user centric smart charging infrastructure: 1. **Reference models**. It is an engineering document containing the specifications. No innovations are identified in the low and medium power reference models. However, it is valuable state-of-the-art knowledge. 2. **Incit-EV Application layer - smart services**. As part of the Incit-EV platform, the EV driver app comprises several systems including Greenflux's Platform, where an algorithm disaggregates a charge profile to individual chargers providing the smart charging signals enabling flexibility trading. This, in combination with other systems, could be innovative. 3. **Smart charging UC implementation**. The implementation in three different scenarios of the hardware and software systems is not expected to add technical innovations, although it can contribute to innovate in the business models.
Maturity	The technology of the user centric smart charging infrastructure implemented in the project is made up of new hardware and software components: - Hardware system components are commercially available. - Software components have been developed and integrated. The integrated setup is being demonstrated and its maturity is around TRL8.

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	<table><tr><td>TRL 1</td><td>TRL 2</td><td>TRL 3</td><td>TRL 4</td><td>TRL 5</td><td>TRL 6</td><td>TRL 7</td><td>TRL 8</td><td>TRL 9</td></tr></table>
IPR ownership	The following deliverables contain the information required to develop and deploy the user centric smart charging infrastructure: <table><tr><th>Results (Deliverables)</th><th>Owners</th></tr><tr><td>D3.1/D3.6. Requirements, standards, interoperability parameters and characteristics of (4) different low and medium power charging systems</td><td>PSA, IDNEO, POLITO, CIRCE, MRA-E, ELES.</td></tr><tr><td>D5.11 (public) Includes a description of the workflow of all services hosted in the Greenflux platform, as sequence diagrams illustrating the interactions between the components of the platform. D5.14 describes the complete system (architecture) that gathers data from the charging infrastructure and provides services to different stakeholders.</td><td>ATOS, GFX, LINKS, ENEDIS, MRA-E</td></tr><tr><td>D6.3/D6.4 provide a brief explanation of the EV driver services and their interrelation.</td><td>LINKS,UL, ATOS, GFX,EESTI,ELES.</td></tr><tr><td>D7.3 Contains a collection of all the equipment, either brand new developed, commercially purchased or already available in the location, needed for the demonstration campaign</td><td>GFX, WDS, PITPOINT.EV (TotalEnergies), MRAE</td></tr></table> The results based on Greenflux platform for the smart charging will be protected. Although Incit-EV platform has been disseminated (e.g., D5.11), the implementation could be protected. In addition to the foreground, there are other technology components that belong to the background of Incit-EV partners, that are or may be necessary for the implementation and commercialization of the results: <table><tr><th>Background</th><th>Owners</th></tr><tr><td>• GreenFlux Service and Operations Platform. Consisting of functionalities for smart charging, roaming, billing and invoicing, charge station management, charging station interaction and CRM integration • GreenFlux’ electric vehicle charging app ‘Charge Assist’, consisting of functionalities for charging station control, direct payment, charging session insight and smart charging management.</td><td>Greenflux (GFX)</td></tr></table>

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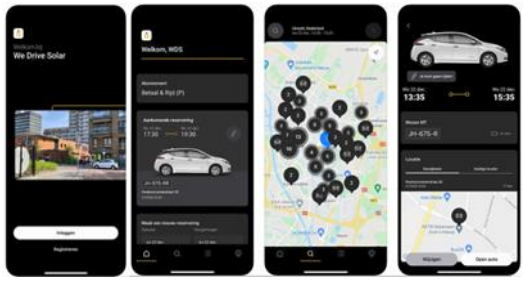
	Unless otherwise specified (e.g., in the case of a patented tech), the background will keep using the same IPR protection.
Exploitation pathway	These results of the project are intended to be applied and **commercialized as a service**, which is a smart charging service for optimizing the grid use at regional level while minimising charging time for car sharing EV fleets and private garage users. The exploitation pathway is currently being led by GFX.
Images	  UC1b – Community Bi-Directional Charging (We Drive Solar, MRAe)

2.4.2.7 Secure low power DC racks for LEVs

Result	**Secure low power DC racks for LEVs**
Innovativeness	Incit-EV has progressed in three key components that contribute to develop an innovative secure low power DC rack for LEVs: 1. **Reference models**. The conceptual design of the power electronics could be innovative. 2. **Detail design** • Innovation 1: High Voltage DC Bus powered. • Innovation 2: Electromechanical anti-vandalism locking systems. • Innovation 3: Interoperable dock stations for different type of 2 wheelers: bikes and kick scooter. • Innovation 4: Wireless battery charging to avoid mechanical connectors. • Innovation 5: Active communication (bidirectional) between 2-wheeler and dock station without the need of 2G/3G and Tag readers. • Innovation 6: Compatible anti-theft charging connectors for e-bikes and kick scooter • Innovation 7: Allow installations along different strategic locations of the cities (kiosks, poles, walls, …) to avoid robberies and vandal acts. Innovative system for urban applications based on 1m long, 30 kW coils, integrated in a plastic support. A solution, for integration in bituminous pavements, has been proposed.

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<table>
<tr><td></td><td>5. Implementation. The implementation of the hardware and software systems is not expected to add innovations. Nevertheless, it is valuable state-of-the-art knowledge.</td></tr>
<tr><td>Maturity</td><td>The technology of the secure low power DC rack for LEVs implemented in the project has reached TRL7.
<table>
<tr><td>TRL 1</td><td>TRL 2</td><td>TRL 3</td><td>TRL 4</td><td>TRL 5</td><td>TRL 6</td><td>TRL 7</td><td>TRL 8</td><td>TRL 9</td></tr>
</table></td></tr>
<tr><td>IPR ownership</td><td>The following deliverables contain the information required to develop and deploy the user centric smart charging infrastructure:
<table>
<tr><td>Results (Deliverables)</td><td>Owners</td></tr>
<tr><td>D3.1/D3.6. Two wheels vehicles charging system architecture / Preliminary User Centric Station Concept.</td><td>PSA, IDNEO, POLITO, CIRCE, MRA-E, ELES.</td></tr>
<tr><td>D4.5/D4.11 Overview of the novel 2-wheeler charging system with anti-theft functionalities.</td><td>IDNEO</td></tr>
<tr><td>D7.7. Description of the commissioning process.</td><td>CIRCE, AYZ, IDNEO</td></tr>
</table>
So far, the listed deliverables have been kept secret, not disclosed outside the consortium.

The protection method is not decided yet. For the time being, the results will be kept as “trade secret” but patenting before launching the product to the market is not discarded.</td></tr>
<tr><td>Exploitation pathway</td><td>These results of the project are intended to be applied and commercialized as a product, which is an anti-theft interoperable locking system for electric bikes and kick scooters including a wireless battery charge solution.

The exploitation pathway is currently being led by IDNEO.</td></tr>
</table>

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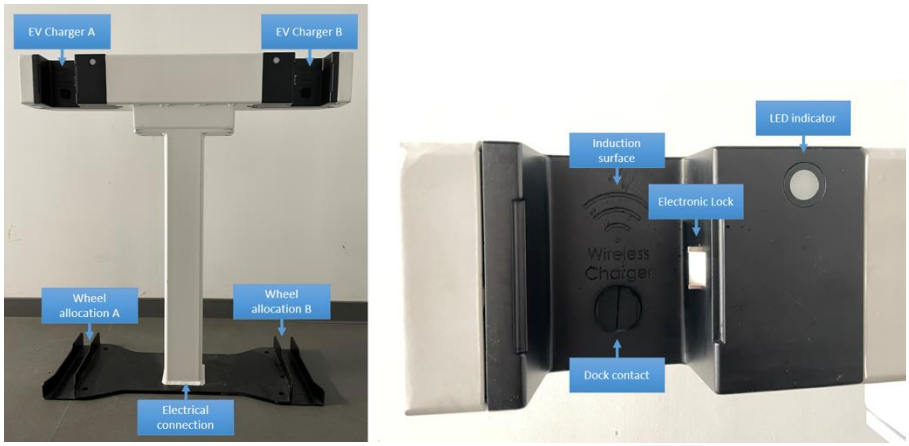
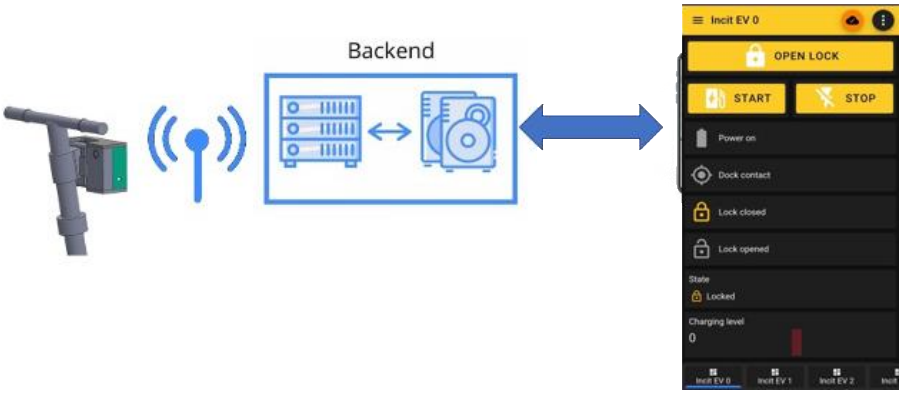
Images	 *Figure 13. Left: Light Electric Vehicle rack. Right: Locking theftproof system*  *Figure 14. Communication with user app*

2.4.2.8 EV charging hubs

Result	**EV charging hubs**
Innovativeness	Incit-EV has progressed in three key components that contribute to develop an innovative user centric smart charging infrastructure: 1. **Reference models**. No innovations are identified in the low and medium power reference models but in the superfast charging models, the functional specifications (functional design) of the charger could be considered innovative. 2. **Charging hub design and implementation**. The specific combination of elements in the hub and its detailed design and engineering could be innovative. It is especially interesting and innovative the direct connection of the charging infrastructure to a DC grid (for example the power supply of a tram or metro).

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<table>
<tr><td>Maturity</td><td>The technologies used in the hub are, independently, in TRL8-9.
<table>
<tr><td>TRL 1</td><td>TRL 2</td><td>TRL 3</td><td>TRL 4</td><td>TRL 5</td><td>TRL 6</td><td>TRL 7</td><td>TRL 8</td><td>TRL 9</td></tr>
</table></td></tr>
<tr><td>IPR ownership</td><td>The following deliverables contain the information required to develop and deploy the user centric smart charging infrastructure:
<table>
<tr><th>Results (Deliverables)</th><th>Owners</th></tr>
<tr><td>D3.1/D3.6. Requirements, standards, interoperability parameters and characteristics of (4) different low and medium power charging systems.</td><td>PSA, IDNEO, POLITO, CIRCE, MRA-E, ELES</td></tr>
<tr><td>D3.2/D3.7. Requirements to make a superfast charging (SFC) system fast, user friendly, scalable and capable of providing ancillary services to the powr grid, while providing a gas station-like experience to the EV user</td><td>POLITO, EESTI</td></tr>
<tr><td>D4.3/D4.9. Analysis of potential benefits and safety considerations of DC charging integrated with tram/metro power lines.</td><td>IFSTTAR/UGE, ENEDIS, EDF, POLITO, IREN SPA</td></tr>
<tr><td>D8.3 Peri-urban area demo-site engineering, commissioning, start-up and operation.</td><td>POLITO, PRIMA, LINKS, IREN, COT, GTT, FPT/IVECO</td></tr>
</table>
So far, the specifications and the engineering of the demo site have been kept secret, not disclosed outside the consortium. The IPR of the results will be protected as “trade secret”.</td></tr>
<tr><td>Exploitation pathway</td><td>These results of the project are intended to be applied and commercialized as a service, which could be consultancy on the design and engineering of scalable charging hubs based on a smart microgrid including a wide choice of DC charging stations powered by the tramway network.
The exploitation pathway is currently being led by POLITO.</td></tr>
</table>

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Images	  *Figure 15. Left: Box with the 3.6 kW power electronics and case of the charger. Bottom-left. 2 x units of the 3.6 kW chargers in its final location. Bottom-right. Electric cabinets in the charging hub site.*  

2.4.2.9 INCIT-EV Platform

Result	**INCIT-EV Platform**
Innovativeness	Incit-EV has progressed in three key components that contribute to develop an innovative Platform to provide several services related to EV charging infrastructure: 1. **Common Information Model (CIM).** The innovation is the combination of existing models to create a common information model that satisfies the needs of multiple charging scenarios and use cases. 2. **Architecture**. The innovation is in the combination and connection of multiple software components so software implementations using the architecture are interoperable. 3. **Payment system**. Several innovations towards future-proof payment mechanisms featuring more pricing transparency, use of open standards, roaming, contactless payment, etc.
Maturity	After being used in the pilot use cases, the technology could presumably reach TRL7-8. TRL 1 | TRL 2 | TRL 3 | TRL 4 | TRL 5 | TRL 6 | TRL 7 | TRL 8 | TRL 9

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<table>
<tr><td></td><td></td></tr>
<tr><td>IPR ownership</td><td>The following deliverables contain the information required to develop and deploy the user centric smart charging infrastructure:
<table>
<tr><th>Results (Deliverables)</th><th>Owners</th></tr>
<tr><td>D5.1/D5.7/D5.13 - (ATOS) Common Information Model (based on existing ones) meeting the requirements of Incit-EV UCs.</td><td>ATOS, Links</td></tr>
<tr><td>D5.2/D5.8/D5.14 - (ATOS) Reference architecture: design how the components are arranged and connected to enable the ICT platform used in INCIT-EV to collect and visualize data from the pilot sites, as well as providing services to support them, with a special focus on the integration and interoperability.</td><td>ATOS, GFX, Links</td></tr>
<tr><td>D5.3/D5.9 - (Greenflux) Payment Mechanisms. Description of the payment mechanisms developed in the project.</td><td>GFX, MRA-E</td></tr>
</table>
All the results revised are reports categorised as confidential and partners will continue to adopt adequate measures to ensure that the information remains confidential.

The implementation of the technology was released as "public demonstrator". However, this does not compromise the confidentiality of the code.

In addition to the foreground, there are other technology components that belong to the background of Incit-EV partners, that are or may be necessary for the implementation and commercialization of the platform:
<table>
<tr><th>Background</th><th>Owners</th></tr>
<tr><td>• Open-source components delivered within the framework of the CPSwarm EU funded PROJECT. Such components include the Simulation and Optimization Environment composed by the Simulation and Optimization Orchestrator, the Simulation API, implemented using XMPP and a set of simulation managers.
• CPSwarm open-source components have been released under Apache license (v 2.0).</td><td>Links</td></tr>
<tr><td>• GreenFlux Service and Operations Platform. Consisting of functionalities for smart charging, roaming, billing and invoicing, charge station management, charging station interaction and CRM integration.</td><td>GFX</td></tr>
</table>
</td></tr>
</table>

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	• GreenFlux' electric vehicle charging app 'Charge Assist', consisting of functionalities for charging station control, direct payment, charging session insight and smart charging management.	GFX
	• FUSE Core Platform. Open Source. Licensed as APACHE; only for research activities.	ATOS
	• FUSE Booking & Publishing Service. Open Source. Licensed as APACHE; only for research activities.	ATOS
	The components provided by ATOS, which are under APACHE license, cannot be used commercially. Therefore, to take to the market the platform, those components must be replaced with an alternative version that allows commercial use.	
Exploitation pathway	These results of the project are intended to be applied and **commercialized as a service**, which is a holistic platform for modelling multi-infrastructure network systems, comprising both DSSs for e-mobility planners and applications for interconnected payment system and charging availability for end-users. The exploitation pathway is currently being discussed by ATOS, GFX and LINKS.	

2.4.2.10 Strategies to incentivize different categories of EV users

Result	**Strategies to incentivize different categories of EV users**
Innovativeness	The innovation is the analysis of users' unconscious expectations regarding EV charging products/services using different techniques from the neuroscience, social psychology, mathematical psychology and statistics. As a result of the analysis, key factors and insights are obtained to facilitate the development of user-driven products/services.
Maturity	These results are considered to be at TRL8-9. TRL 1 | TRL 2 | TRL 3 | TRL 4 | TRL 5 | TRL 6 | TRL 7 | TRL 8 | TRL 9
IPR ownership	The deliverable D2.5 contains several recommendations to foster EV adoption. It focuses both on methodologies for studying the needs of the end users and how to extract information that can drive the planning of charging. Results (Deliverables) | Owners D2.5 : Future strategies and recommendations to support e-mobility | LINKS, RSA, CDP, IFSTTAR, AYZ, COT, POLITO, MRA-E, EESTI, EVBOX, ELES,

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		BITBRAIN, QiE, AVERE, BBB, SWN, QIA
	The deliverable is public and has been disseminated.	
Exploitation pathway	The methodology can be used as part of services for municipalities that are planning their EV charging strategy. The exploitation pathway is currently being led by Bitbrain. The idea is to provide the knowledge as a service for realizing studies. It can also be offered in combination with other results (DSS).	

2.4.2.11 Economies studies for a Smart deployment of e-infrastructure in cities

Result	**LCA for cities, LCCA and business models for new e-chargers**	
Innovativeness	LCA. Support tool based on SUMI methodology and some other new methodologies that evaluates: Public Investments, Positive Externalities, Negative Externalities. LCCA and business models. New holistic approach to analyse business opportunities with e-chargers (7 Use Cases)	
Maturity	These results are considered to be at TRL8-9.	
	TRL 1 | TRL 2 | TRL 3 | TRL 4 | TRL 5 | TRL 6 | TRL 7 | TRL 8 | TRL 9	
IPR ownership	Al studies have been provided in open source including the Excell Spreadsheets .	
	Results (Deliverables)	Owners
	D93 : Cost benefit Analysis from the point of view of the Administrations. Investment and Externalities at city level. D9.4 LCCA for 6 e-charger types and some economic studies for the UC1 divided in three a, b and c. D9.5 Business Models. For the 6 e-chargers and the UC1 software as a service	Qi Arrow developed the tool but provided it in open source. Other partners participated providing data.
	The deliverables are public and have been disseminated.	
Exploitation pathway	The methodology can be used as part of services for municipalities that are planning their EV charging strategy.	

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	The exploitation pathway is currently being led by Qi Arrow. The idea is to provide the knowledge as a service for realizing studies. It can also be offered in combination with other results (DSS).

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3 CONTRIBUTION (WP9) TO EXPLOITATION AND DISSEMINATION

Results	Link to WP9: Exploitation of results
Technology watch (reflected in IIPR bulletins) and SWOT analysis.	Relevant for T9.1 business models, T9.2 Cost-benefit analysis from administration view point and T9.3. Business plans from investors
Dashboard (identification of KPIs and Impacts)	Relevant also for WP9/WP7 and WP8. Some of them will be measured in T7.5 and T8.5 and the monetized in T9.2 (externalities)
IIPR Bulletins	The 8 bulletins, although confidential, have been very useful for project partners to benchmark the competing environment.
Technical articles and conferences	QiA presented the deliverable results in the different IncitEV meetings and will write at least two technical articles in the economic results after the project end.
Software as a Service	An IncitEV team will offer planning services to municipalities in combination with other partners (Bitbrain, boosting electromobility, QiA and Polito, economic studies and Link DSS) to structure the i-infrastructure deployment in cities.

Results	Link to WP10: Dissemination results
Networking	The market watch has generated some networking activities as some partners have entered in contact with other research groups outside INCIT-EV

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4 CONCLUSIONS

Deliverable D9.6 is the intermediate report (M24) associated to T9.4 IPR and Innovation management. The deliverable revises the strategy to implement both activities which are strongly linked, as the protection of the project outputs depends on the competitive environment, which sometimes prevent the goods or services protection due to parallel developments. In addition, the new requirement introduced in 2013 to disclose a specific, substantial, and credible use of the patent invention, justify the need of a very accurate benchmarking of competing solutions and check if our contribution surpass the value proposition of those competitors.

The IPR activities were started early in the project, to align the researchers with the market trends, making them aware of the complexity of the markets and the need to supervise what's is going on outside during the course of the innovation process.

General speaking, researchers are commonly not aware of the business development process, as they are concentrated in their specific solutions. Thus, it is crucial to make them understand the different steps, opportunities and limitations of the business development process providing a broader holistic vision to capitalise the opportunities.

During the central years of the project execution, market watch was performed, with the publication of the most relevant information in eight IIPR periodic bulletins and the corresponding SWOT analysis to detect major threats and opportunities. These conclusions were raised to the Executive Committee. In addition, a Dashboard was prepared to identify the major innovations and the associated KPIs and expected impacts, to be showcased after the demonstrations' start in mid-2022.

In addition, four WPs audits were carried out addressed to WP3,4,5 and 6. The audits identified major project outputs based on the background in some cases or in new innovations in others. To that end, several questionnaires (with an excel table format) were distributed among partners to clarify all the doubts on ownership, join research, background, and foreground, etc.

Deliverable D9.6 provided several tools to facilitate the follow up of the innovation process and start defining the potential project innovations subjected to protection. Later in the task execution, the focus shifted to the consolidation of the results and the definition of the exploitation paths. The present deliverable, D9.10 gathers the final results and clearly identifies the products and services, mostly with a high degree of technology maturity (TRL8), that with some final adjustments will reach the market soon after the project ends.

The identified foreground includes charging solutions (hardware infrastructure) with Innovative (technical) upgrades, the Decision Support System for mobility planners, Apps improving the users' experience (payment, location, use…) and some specific solutions like Online payment, V2X, Scalable Charging hub, Theft proof for LEVs, or Wireless Power Transfer chargers.

The exploitation roadmap for the IP is aligned with the broader business plan for the different use cases described in T9.1, T9.2 and T9.3.

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List of References

[1] De Blas, J. These figures correspond to the whole task T9.4 including D9.6 and D9.10 (final version)

[2] De Blas, J. Tasks and subtasks are those mentioned in the Executive Summary

[3] Gary P. Pisano, in Harvard Business Review journal. You Need an Innovation Strategy. June 2015

[4] RSS (RDF Site Summary or Really Simple Syndication) is a web feed that allows users and applications to access updates to websites in a standardized, computer-readable format.

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ANNEX 1 – TOPICS AND SOURCES TO WATCH

			Most relevant information sources										
	Search Area	Specific topics	News	Market reports	Technical reports	Official statistics	Patents	Scientific papers	Regulations and laws	Standards	Webinars / Events	Social Media	Commercial websites
WP2	Charging infrastructure	Needs, usage, behaviour, perception, and acceptance			X	X		X			X	X	
	Charging infrastructure	Policies to increase massive deployment and adoption	X		X			X	X		X		
	Charging infrastructure	Market segmentation		X									
	Electric Vehicles	Purchase and penetration per category				X							
	Electric Vehicles	Concerns and barriers for the adoption			X			X				X	
	Electric Vehicles	Strategies to incentivize adoption			X			X	X				
	Mobility	Mobility and parking patterns in cities			X	X		X					
	Mobility	Mobility patterns in peri-urban and extra-urban scenarios			X	X		X					
	Mobility	Mobility planning, mobility planners	X		X			X	X				
WP3	Charging infrastructure	Low and medium power DC-DC bidirectional chargers	X		X		X	X		X			X

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	Charging infrastructure	High power superfast DC chargers	X		X		X	X		X			X
	Charging infrastructure	Opportunity wireless power transfer / chargers	X		X		X	X		X			X
	Charging infrastructure	Urban dynamic wireless power transfer	X		X		X	X		X			X
	Charging infrastructure	Extra-urban wireless power transfer	X		X		X	X		X			X
WP4	Power grid infrastructure	Grid requirements for wide deployment			X			X		X			
	Power grid infrastructure	Grid congestion in peak hours	X		X	X		X					
	Power grid infrastructure	Power quality issues derived from harmonics	X		X	X		X		X			
	Power grid infrastructure	Grid modernisation, investment, improvements	X		X	X		X	X				
	Power grid services	Services provided by electric vehicles to the grid	X		X		X	X	X	X			X
	Power grid infrastructure	Electric sizing and sitting of charging infrastructure			X			X	X	X			
	Power grid services	Usage of the grid for V2V charging	X		X		X	X	X	X			
	Power grid infrastructure	Synergies of existing DC networks (e.g., transport)			X			X					
	Power grid infrastructure	Power interface of charging infrastructure to DC grids			X		X	X	X	X			X
	Road infrastructure	Integration of wireless charging in roads	X		X		X	X	X	X			
	Charging infrastructure	Robust and theft-proof parking and charging for light vehicles	X				X						X
WP5	Charging software	Interoperability for charging stations (databases, APIs, etc.)			X			X		X			
	Charging software	Cybersecurity and privacy for charging stations			X			X		X			
	Charging software	Roaming in charging points	X		X				X	X			X
	Charging software	Payments in charging points	X		X					X			X
	Charging software	Human-machine interface											X

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	Charging software	Visualisation tools for charging infrastructure				X							X
WP6	Mobility	Software solutions for city mobility planning			X			X					X
	Mobility	Influence of transport, grid, ICT, social and civil factors in mobility planning		X	X			X	X	X			
	Mobility	Human Behaviour Model						X				X	X
	Mobility	Power Grid Model						X					X
	Mobility	EV Model						X					X
	Mobility	Traffic Model						X					X
	Power grid services	Price Model						X					X
	Charging infrastructure	Charging Points Models						X					X
	Software	Optimal multi-objective mobility planning tools						X					X
	Charging apps	interoperable direct payment			X			X		X			X
	Charging apps	Charging Point reservation	X		X					X			X
	Charging apps	Charging Point location and availability	X		X					X			X
	Charging apps	Smart Charging	X		X			X		X			X
	Charging apps	Quick scan tool			X			X					X
	Charging apps	forecast and EV charging profile baseline creation			X			X					X
WP7	Urban charging case	V2G charging for community-shared cars			X			X		X			X
	Urban charging case	Aggregation of several charging stations			X			X		X			X
	Urban charging case	Dynamic wireless charging lane in urban area	X		X		X	X		X			X
	Urban charging case	Low power DC bidirectional charging infrastructure for LEV	X		X		X	X		X			X

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	Urban charging case	Opportunity wireless charging for taxi lanes	X		X			X					X
	Urban charging case	International deployment cases of innovative charging infrastructures in cities	X		X								X
	Urban charging case	Innovative business models in urban areas	X		X								X
WP8	Peri-extra-urban charging case	Charging HUB in a park-and-ride facility	X		X								X
	Peri-extra-urban charging case	Dynamic Wireless Charging for long distance	X		X								X
	Peri-extra-urban charging case	Superfast Charging Systems for European corridors	X		X								X
	Peri-extra-urban charging case	International deployment cases of innovative charging infrastructures	X		X								X
	Peri-extra-urban charging case	Innovative business models in peri-urban and extra-urban areas	X		X								X

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ANNEX 2 – POTENTIALLY RELEVANT PARTNERS' BACKGROUND

Nº	Owner Partner	Background in INCIT-EV	Type of Protection	Limitations on Implementation	Limitations on Exploitation	Related task/s	Other partners contributing to foreground	Definition of Foreground associated to background
1	RSA	Induction charging system coil design under EMC constraint	Patent Engineering design	Right to use, but limited to limited to the specific activities of the Paris, Versailles Satory, Saragossa Demonstrations	Background shall be granted - upon the signature of a written agreement	T3.4 T7.3	VEDECOM CIRCE	Proposed design (coil, power electronics) for ground and onboard systems
2	RSA	induction charging system on board - vehicle power electronics design and control software	Patent Engineering design	Right to use, but limited to limited to the specific activities of the Paris, Versailles Satory, Saragossa Demonstrations	Background shall be granted - upon the signature of a written agreement	T3.4 T7.3	VEDECOM CIRCE PSA	Proposed vehicle on board system with associated control
3	RSA	Vehicle electric and electronic adaptation for integration of contactless induction charging system	Engineering design	Right to use, but limited to limited to the specific activities of the Paris, Versailles Satory, Saragossa Demonstrations	Background shall be granted - upon the signature of a written agreement	T3.4 T7.3	PSA	Proposed vehicle E&E integration
4	RSA	Vehicle mechanical integration of contactless induction charging system	Engineering design	Right to use, but limited to limited to the specific activities of the Paris, Versailles Satory, Saragossa Demonstrations	Background shall be granted - upon the signature of a written agreement	T3.4 T7.3	PSA	System integrated vehicle for the use cases

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5	RSA	Vehicle multiscale control strategies for contactless dynamic charging	Patent	Right to use, but limited to limited to the specific activities of the Paris, Versailles Satory, Saragossa Demonstrations	Background shall be granted - upon the signature of a written agreement	T3.4 T7.3	VEDECOM CIRCE PSA	3 vehicles ZOE (30kW) Master (90 = 3x30kW) PSA LCV (60=2x30 kW) demonstrating the multiscale concept
7	VEDECOM	Public patent IMAGE PROCESSING METHOD FOR RECOGNISING GROUND MARKING AND SYSTEM FOR DETECTING GROUND MARKING WO2017194890 (FR1654322)	Patent	it is necessary to send prior written information from partners to VEDECOM. ACCESS RIGHT shall be granted on a royalty free basis for PROJECT duration only. The transfer of the VEDECOM Software will be identified by a separate and written document/delivery note between VEDECOM and the relevant receiving BENEFICIARY for performance of the PROJECT, unless the patent is already published	ACCESS RIGHT on VEDECOM Software shall be granted upon the signature of a written agreement between VEDECOM and the relevant receiving BENEFICIARY in respect of the VEDECOM's background to the extent needed for use of the results, on fair and reasonable conditions and each use licence will be granted by VEDECOM subject to Third Party's rights and VEDECOM Confidentiality commitments towards Third Parties.	T3.4, T8.3	None	The lateral driver guidance solution proposed in this project uses this patent as an input to operate.
	Univ. Gustave Eiffel	Software for pavement modelling and design Viscoroute	Open-source software	Right for using the Background within the project	Background shall be granted - upon the signature of a written agreement	task 4,4	Colas	Solution for integration of inductive coils in urban demonstrator (in progress)

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	Univ Gustave Eiffel	Software for pavement modelling and design Viscoroute	Open-source software	Right for using the Background within the project	Background shall be granted - upon the signature of a written agreement	task 4,4	Eurovia	Solution for integration of inductive coils in inter-urban demonstrator (in progress)
	Univ Gustave Eiffel	Software for pavement modelling and design CESAR-LCPC (module CVCR)	Software protected by commercial license	Right for using the Background within the project, subject to taking a commercial license	Background shall be granted - upon the signature of a written agreement	task 4,4	Colas	Solution for integration of inductive coils in urban demonstrator (in progress)
8	Univ Gustave Eiffel	Software for pavement modelling and design CESAR-LCPC (module CVCR)	Software protected by commercial license	Right for using the Background within the project, subject to taking a commercial license	Background shall be granted - upon the signature of a written agreement	task 4,4	Eurovia	Solution for integration of inductive coils in inter-urban demonstrator (in progress)
9	Univ Gustave Eiffel	Removable urban pavement concept		Right for using the Background within the project	Background shall be granted - upon the signature of a written agreement	task 4.4	Colas, Vedecom	Solution for integration of inductive coils in concrete removable pavement (to be developed in the project)
10	Univ Gustave Eiffel	Mechanical tests for evaluation of insertion of charging elements in a bituminous pavement		Right for using the Background within the project	Background shall be granted - upon the signature of a written agreement	Task 4.4	Colas, Eurovia, Vedecom	Development of specific test procedures for validation of construction of pavements integrating charging systems
11	PSA STELLANTIS	Static Induction charging system coil design. Electric & electromagnetic simulation	Engineering design	Right for using the Background within the project, associated to PSA ID involvement in the project	This Background will not be used for other uses than the project purposes	T3.4 T7.3	VEDECOM RSA CIRCE	Simulation study in static transfer configuration, 2x30kw
12	PSA STELLANTIS	Simulation, measurement of electromagnetic fields concerning health	Engineering design	Right for using the Background within the project, associated to PSA ID involvement in the project	This Background will not be used for other uses than the project purposes	T3.4 T7.3	VEDECOM RSA CIRCE	Test result in static transfer configuration, 2x30kw

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13	PSA STELLANTIS	Vehicle electric and electronic adaptation for integration of contactless induction charging system	Engineering design	Right for using the Background within the project, associated to PSA ID involvement in the project	This Background will not be used for other uses than the project purposes	T8.3 T7.3	VEDECOM RSA	2x30kw DWPT system integrated on STELLANTIS eK0 platform, type Peugeot Expert either Citroen Jumpy, config L1 ou L2, battery 50kwh
14	PSA STELLANTIS	Vehicle mechanical integration of contactless induction charging system	Engineering design	Right for using the Background within the project, associated to PSA ID involvement in the project	This Background will not be used for other uses than the project purposes	T8.3 T7.3	VEDECOM RSA	2x30kw DWPT system integrated on STELLANTIS eK0 platform, type Peugeot Expert either Citroen Jumpy, config L1 ou L2, battery 50kwh
15	PSA STELLANTIS	Thermal management of vehicle induction charging system	Engineering design	Right for using the Background within the project, associated to PSA ID involvement in the project	This Background will not be used for other uses than the project purposes	T8.3 T7.3	VEDECOM RSA	2x30kw DWPT system integrated on STELLANTIS eK0 platform, type Peugeot Expert either Citroen Jumpy, config L1 ou L2, battery 50kwh
16	COLAS	Electric Road prototype, namely “la piste”		upon joint agreement between Renault and Colas				
17	EUROVIA	Knowledge: Thermal transfer modelling in pavement	Trade Secret			T4.4	VEDECOM	Simulation of thermal transfer in a pavement structure
18	EUROVIA	Julien NAVARO, Denis BRUNEAU, Michel MAZÉ, Ivan DROUADAINE, Frédéric NOEL, Samuel MENDEZ, Bertrand POUTEAU - Modélisation du refroidissement d’un enrobé bitumineux de sa sortie de centrale de production au compactage sur chantier routier - 2010	Trade Secret	Right for using the Background within the project, associated to EUROVIA involvement in the project	This Background will not be used for other uses than the project purposes	T4.4	VEDECOM	Simulation of thermal transfer in a pavement structure

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19	EUROVIA	Know-how: pavement monitoring	Patent 2020 Innovative wireless sensor for road application			T4.4	VEDECOM	Innovative wireless sensor to follow temperature in a pavement structure
20	EUROVIA	PAVEMENT STRUCTURE PERFORMANCE MONITORING SYSTEM OF THE REGINA BYPASS PROJECT, Kamal BERRADA and Marc PROTEAU, CTAA2018	Trade Secret	Right for using the Background within the project, associated to EUROVIA involvement in the project	This Background will not be used for other uses than the project purposes	T4.4	VEDECOM	Implementation of sensors to follow temperature in a pavement structure
21	EUROVIA	SMARTVIA® : 5 years feedback publication, Eurobitume Euroasphalt, B. Pouteau, K. Berrada and I. Drouadaine, 2016	Trade Secret	Right for using the Background within the project, associated to EUROVIA involvement in the project	This Background will not be used for other uses than the project purposes	T4.4	VEDECOM	implementation of sensors to follow temperature in a pavement structure
22	EUROVIA	Road infrastructure health monitoring: Use of NICT for sustainable development, B. Pouteau & M. Maze, Intelligent Transport System, Vienne 2012	Trade Secret	Right for using the Background within the project, associated to EUROVIA involvement in the project	This Background will not be used for other uses than the project purposes	T4.4	VEDECOM	implementation of sensors to follow temperature in a pavement structure

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23	CIRCE	Energy Box, gateway and concentrator with multiple communication protocols and interfaces for Smart Grid environments and edge computing. Created in Flexiciency Project (H2020, GA No 646482)	None	Right for using the Background within the project, associated to CIRCE involvement in the demo sites.	This Background will not be used for other uses than the project purposes	3.1; 3.3	NO	No evolution is expected in the system. An adaptation of the system will be carried out to increase compatibility.
24	CIRCE	CIRCE control management system for 4-legs B2B power converters. 3-level 4-legs NPC power inverter. Created in the REDACTIVA project (Spanish RETOS program, Ministry of Science and Innovation). Right for using the Background within the project, limited to the specific activities of the pilot demonstrations. This Background will not be used for other uses than the project purposes.	None	Right for using the Background within the project, limited to the specific activities of the Zaragoza demonstrations.	This Background will not be used for other uses than the project purposes	3.1	NO	Modula SiC design. Grid compensation.
25	CIRCE	Real time interfaces for control acquisition and monitoring in microgrid environments. CIRCE has a solution based on Gnoga libraries (Ada + svg graphic representation) and open-source charts libraries.	None	Right for using the Background within the project, limited to the specific activities of the Zaragoza demonstrations.	This Background will not be used for other uses than the project purposes	3.1	NO	No evolution is expected in the system. An adaptation of the system will be carried out to increase compatibility.

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26	CIRCE	Bi-directional 50-kW three level AC/DC converter composed by Si semiconductors and feeds a 700-V DC bus.	None	Right for using the Background within the project, limited to the specific activities of the Zaragoza demonstrations.	This Background will not be used for other uses than the project purposes	3.1	NO	No evolution is expected in the system. An adaptation of the system will be carried out to increase compatibility.
27	CIRCE	Isolated bi-directional 10-kW DC/DC converter. SiC semiconductors	None	Right for using the Background within the project, limited to the specific activities of the Zaragoza demonstrations.	This Background will not be used for other uses than the project purposes	3.1	NO	Power increasing up to 50kW. Modular construction
28	CIRCE	High-frequency inductive coupling power transfer system and associated method	None	Right for using the Background within the project, associated to CIRCE involvement in the demo sites.	This Background will not be used for other uses than the project purposes	3.3	NO	Design for industrialization and scalability. It will pursue high integration and a Low-cost system.
29	CIRCE	Automatic method for controlling a high-frequency inductive coupling power transfer system	None	Right for using the Background within the project, associated to CIRCE involvement in the demo sites.	This Background will not be used for other uses than the project purposes	3.3; 3.4	NO	Low communication necessities control system.
30	CIRCE	Inductive system SP-S of 50-kW and 30 kHz of the Victoria project.	None	Right for using the Background within the project, associated to CIRCE involvement in the demo sites.	This Background will not be used for other uses than the project purposes	3.3; 3.4	NO	Design for industrialization and scalability. It will pursue high integration and a Low-cost system. Scalable

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31	LINKS	Open-source components delivered within the framework of the CPSwarm EU funded PROJECT. Such components include the Simulation and Optimization Environment composed by the Simulation and Optimization Orchestrator, the Simulation API, implemented using XMPP and a set of simulation managers,	CPSwarm open-source components have been released under Apache license (v 2.0).	Access to this know-how (not implementation details) will be available to the necessary PROJECT Parties when requested (depending on personnel availability).	If a Beneficiary is interested in using know-how of LINKS to exploit its own Results, an agreement should be reached to cover the specifics of that exploitation.	5.4, 5.6		The INCIT-EV DSS will possibly benefit of few components developed within the CPSwarm project to integrate - using a modular approach - specific resources and assets needed for the decision support process.
32	LINKS	Open-source components, ICT connectors, Simulations tools and frameworks developed within the EU funded PROJECT GREENCOM and Storage4Grid	The only relevant module arriving from Storage4Grid, relevant somehow to INCIT-EV, is the DSF-EVA Module. At the time being a different analytical approach is considered to be adopted so any protection of prior IPR will not become necessary.	Access to this know-how (not implementation details) will be available to the necessary PROJECT Parties when requested (depending on personnel availability).	If a Beneficiary is interested in using know-how of LINKS to exploit its own Results, an agreement should be reached to cover the specifics of that exploitation.	6.3	Politecnico di Torino	The User Behaviour and Mobility Features of the INCIT-EV DSS will be developed from scratch with a different approach by LINKS with the support of Politecnico di Torino in a percentage that shall still be defined.

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33	LINKS	Interactive Visualization Tool (InViTo), a web GIS tool to view, query and analyse spatial data that was developed internally and enhanced within the framework of CIRCUSE and LUMAT EU funded PROJECTs .	No protection foreseen within INCIT-EV project. InViTo has been recently decided to be realised as Open-Source solutions, under the GNU General Public License. Nevertheless, any components or knowledge generated as background IPR from this module will be used in INCIT-EV.	Access to this know-how (not implementation details) will be available to the necessary PROJECT Parties when requested (depending on personnel availability).	If a Beneficiary is interested in using know-how of LINKS to exploit its own Results, an agreement should be reached to cover the specifics of that exploitation.	5.6, 6.3, 6.4	Any	Any foreground will be developed related to this specific background IPR
34	IREN	Existing charging infrastructure: aggregated and/or anonymized data of charging sessions (time stamps, power, energy, others)		IREN will provide only anonymized data. Only aggregated results could be shown	IREN will provide only anonymized data. Only aggregated results could be shown			
35	FIAT	Existing vehicle mission profile data		FPT will provide only anonymized data and aggregated results.	FPT will provide only anonymized data and aggregated results.			

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36	GREENFLUX	GreenFlux Service and Operations Platform. Consisting of functionalities for smart charging, roaming, billing and invoicing, charge station management, charging station interaction and CRM integration	Patent, trade secret, design, trademark, copyright	For the purpose of data analysis, GreenFlux will provide only anonymized data. Only data generated in the project can be shared with project partners, since all other data is the property of our existing customers.	Functionalities of the GreenFlux platform may be used in the project. The underlying algorithms, methods and source code will not be shared.	UC1a, T7.1, T7.2 T5.1, T5.2, T5.3, T5.4, T5.5, T5.6, T6.4 (UC4 T6.4 TBC)	None	Not Applicable
37	GREENFLUX	GreenFlux' electric vehicle charging app 'Charge Assist', consisting of functionalities for charging station control, direct payment, charging session insight and smart charging management.	Patent, trade secret, design, trademark, copyright	For the purpose of data analysis, GreenFlux will provide only anonymized data. Only data generated in the project can be shared with project partners, since all other data is the property of our existing customers.	Functionalities of the GreenFlux platform can be used in the project. The underlying algorithms, methods and source code will not be shared.	UC1a, T7.1, T7.2 T5.1, T5.2, T5.3, T5.4, T5.5, T5.6, T6.4 (UC4 T6.4 TBC)	None	Not Applicable
	GREENFLUX (Additional)					T5.6	LINKS	Work relating to the DSS (Decision Support System), if applicable, although highly unlikely. It is anticipated that Atos will design the HMI (Human Machine Interface) for the DSS
38	EVBOX	AC and DC charging station up to 475kW.		EVBox will use its knowledge in the project but will not divulgate any confidential information.	EVBox keeps ownership on all the charging station related implementations done by EVBox.			

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39	EVBOX	Power electronic design and capability to have bidirectional active and reactive power flow.		EVBox will use its knowledge in the project but will not divulgate any confidential information.	EVBox keeps ownership on all the charging station related implementations done by EVBox.			
40	EVBOX	Energy management system integrated as a local charge point controller.		EVBox will use its knowledge in the project but will not divulgate any confidential information.	EVBox keeps ownership on all the charging station related implementations done by EVBox.			
41	EVBOX	EP2887527 (B1) - Compact and modular electric power supply with multiple converters, in particular for quick charging terminals for electric vehicles		EVBox will use his knowledge in the project but will not divulgate any confidential information.	EVBox keep ownership on all the charging station related implementations done by EVBox.			
42	EVBOX	EP3024108 (B1) - METHOD FOR OPTIMISING BACKUP ELECTRIC ENERGY SUPPLIED BY AN AUXILIARY SOURCE		EVBox will use his knowledge in the project but will not divulgate any confidential information.	EVBox keep ownership on all the charging station related implementations done by EVBox.			
43	EVBOX	EP2736757 (A2) - ELECTRIC BATTERY CHARGING INSTALLATION AND METHOD		EVBox will use his knowledge in the project but will not divulgate any confidential information.	EVBox keep ownership on all the charging station related implementations done by EVBox.			

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44	ATOS	FUSE Core Platform	Open Source	Licensed as APACHE; only for research activities.	Under fair and reasonable conditions to be agreed.	T5.2, T5.4 T6.4, T6.5, T6.6	CIRCE, LINKS, FPT, MRA-E, GFX, EVBOX	Foregrounds are the APIs that enable data integration and interoperability with FUSE platform. Background are the existing APIs for interoperability.
45	ATOS	FUSE Booking & Publishing Service	Open Source	Licensed as APACHE; only for research activities.	Under fair and reasonable conditions to be agreed.	T6.4, T6.5	REE, LINKS, POLITO, MRA-E, GFX, EESTI, UL, ELES	Current versions of the services are the background, their improvement to adequate them to INCIT-EV is the foreground.

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ANNEX 3. MAIN EXPLOITABLE RESULTS

The exploitable results were gathered as a table with the following header:

Nº result	Exploitable result	Nº Org.	Name of the organization (2)	Describe the innovation in the task (novel, innovative, with industrial application) led by your organization (1)	Confidential Deliverables	Results contained in the deliverable	Technology maturity level	Will you protect it (Y/N)	Expected type of protection (3)	Developed jointly with other partners (Y/N) (4)	Name the other partners participating in the specific research	It is based in protected background (Y/N) (5)	Describe the protected background associated to the new foreground	Will the innovation be used in a new product or service (Y/N)	Define the expected new product or service associated to the innovation	Preliminary/potential exploitation route

The results have been formatted and included in section 2.4.2 Foreground.

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Type of protection	Please identify the most likely protection for your innovation
Copyright	Copyright is a legal term used to describe the rights that creators have over their literary and artistic works. Works on engineering can be computer programs, databases, advertisements, maps, or technical drawings
Patent	A patent is an exclusive right granted for an invention. Generally speaking, a patent provides the patent owner with the right to decide how - or whether - the invention can be used by others
Utility model	In some countries, a utility model system provides protection of so-called “minor inventions” through a system similar to the patent. Utility models protect such inventions through granting an exclusive right, which allows the right holder to prevent others from commercially using the protected invention, without his authorization, for a limited period of time
Trademarks	A trademark is a sign capable of distinguishing the goods or services of one enterprise from those of other enterprise
Industrial designs	An industrial design constitutes the ornamental or aesthetic aspect of an article. A design may consist of three-dimensional features, such as the shape or surface of an article, or of two-dimensional features, such as patterns, lines, or colour.
Geographical indications	Geographical indications and appellations of origin are signs used on goods that have a specific geographical origin and possess qualities, a reputation or characteristics that are essentially attributable to that place of origin.
Trade secrets	Trade secrets are IP rights on confidential information which may be sold or licensed. The unauthorized acquisition, use or disclosure of such secret information in a manner contrary to honest commercial practices by others is regarded as an unfair practice and a

[4] Check if the innovation will be a joined innovation among two or more partners

[5] Check if there is any background mentioned in the GA that will be used for the foreground. Please take a look in the next tab where all the background is described

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