D8.9 BUSINESS MODEL ANALYSIS – FINAL

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Abstract

The Deliverable 8.9 outlines the business models in the electromobility market based on the AS IS evaluation, according to the updated legal framework in the filed such us the Environmental, Social and Governance (ESG) indicators, the Recovery funds availability and the pathway of possible solutions for the e-mobility market enhancement, based on the bottom-up paradigm of bottlenecks-possible solutions incurred by the cities.

According to the new regulatory framework named "Fitfor55" package in USER-CHI business model(s) explored in the preliminary version Del. 8.8. They are herewith analysed and validated with the Sustainable Business Model CANVAS (SBMC)model, integrated the requirements of new regulatory framework and the solutions-based approach achieved by each partner in the project implementation. Besides, it is provided an outlook on different available funds and incentives at EU and National level, including the National Recovery Funds, to implement the

products and to sustain the exploitation beyond the project duration. The tool kit for funds is also available toward the replicability of the USER-CHI projects proposed solution.

The 7 business models are now described under the sustainable business model CANVAS. Each SMB contains: a matrix describing the bottlenecks incurred within the project implementation, the solutions achieved, the funds available and the description of the key elements for socio-economic costs and benefits, environmental costs, risks and reaction in accordance with the ESG parameters. The validation here provided at an outlook on the viable, sustainable and replicable business models in free market conditions and beyond the project duration.

The 7 sustainable business models are listed as follows: SBM1 – Logistics hubs; SBM2 – Citizens e-Mobility Stations; SBM3 –City centre (park & charge); SBM4 – E-trucks; SBM5 – E-taxis stops; SBM6 – Special events; SBM7 – Mobile charging stations.

Keywords

Sustainable Business Model CANVAS modelling, ESG criteria, Funds, Recovery Funds, Bottlenecks, Viable solutions, Multi-stakeholders' approach, grant, value proposition.

Copyright statement

Executive summary

The purpose of this document is to provide the final analysis of the seven business models considered in project objective O5 updated with the ESG's parameters according to the new EU legal framework, the solutions achieved in the project implementation toward the co-design and sustainable business and market alternatives to foster investments and to enable replication in the electromobility sector. Integrating the previous analysed business models, the USER-CHI community and the stakeholders are provided to a smart tool kit for feasibility of application of the different e-mobility models achieved by overcoming the bottlenecks related to the application

and the replicability, together with incurred solutions and the available funds to sustain the implementation beyond the project duration.

The Deliverable 8.9 is not intended to be exhaustive, but constructive. The overview provides to support the completion of the Del. 6.3 Demonstration execution, Del. 7.2 Cross site evaluation, Deliverable 8.7 Targeted dialogue with stakeholders, market influencers and financiers and Del. 8.8 Exploitation of results, because the outcomes there provided allow to obtain a sound business plan toward the exploitation along the EV's ecosystem. Starting from the real cases in project development, the bottlenecks incurred become a pathway available for all partners and stakeholders. Those experiences have been shifted in the sustainable business models CANVAS and have been capitalized accordingly, thus to effectively support decision makers and stakeholders in the diffusion of e-mobility challenges.

Each Sustainable business model is described with the new elements necessary to be viable such as the new targets of the end users and, in the medium term; the solutions achieved and available, the funds available up to 2023, the cross cut with the new legal framework.

Indeed, the integrations of these elements within the sustainable business model take into account the input of the deployment in real scenario and provides at a baseline for other cities and beyond the project duration in terms of sustainable viability. Therefore, the business models become a tool kit for viable electromobility in the short-term period and with a wider range of feasibility in terms of: scalability of the infrastructure, demand and market management programs, environmental context, presence or not of relevant e-Mobility operators, users, suppliers, timelines, competition's rules in comparison with private operators.

The descriptions allow the updating of the business model choices tailored on the single realities thus to permit the replicability with precise indications as baseline to overcome possible administrative, legal and financial paths toward the exploitation, the dialogue with influencers, key stakeholders and financiers, the assessment and the communication and dissemination strategies and tools.

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1. Introduction

The purpose of this document is to provide an updated analysis of the seven business models considered in project objective O5, to co-design and demonstrate novel and sustainable business and market alternatives to foster investments and enable replication in the electromobility sector. It integrates the real scenario toward the replicability and diffusion of the e-mobility viable business models. The sustainable business models are outlined taking into account: the new legal framework adopted in EU level for e-mobility mainly contained in "Fitfor55" package[ii], the bottlenecks incurred in the development of the pilot cases, the solutions achieved by partners, an overview on the viable funds and incentives at European, National and Recovery Plans and the ESG parameters. ESG stands for Environmental, Social, and Governance. Investors are increasingly applying these non-financial factors as part of their analysis process to identify material risks and growth opportunities[iii]. The framework of the sustainable business models herewith described in Del. 8.9 verify the assumptions provided in the preliminary version within Del. 8.8. Then, by applying the implementation addresses updated to 27.1.2023 describes each key element for socio-economic costs and benefits, environmental costs, risks and reaction in accordance with the ESG parameters and funds and/or toolkit available in Europe to allow the viability both for implementation and exploitation beyond the project duration and in free market conditions. Besides, the deliverable herewith described proposes in a constructive way the situation AS-IS according to the challenges to be achieved in terms of bottlenecks overcoming and suitable solution for cities, municipalities. The description, without any claim to be exhaustive constitutes a baseline in order to start up with the enhance the EV's ecosystem as a sustainable pathway by the environmental, social and governance perspectives in short and medium periods, indicating the supporting funds as well as the effective economical sustainability.

Within the previous Del. 8.8. the business models have been analysed and defined considering different environmental scenarios and adopting a multi-stakeholder approach, specifying the assumptions and key factors for each demo city interested in the BM development. The outputs and models containing the market characteristics, trends, limits and constraints, target clients, users, new stakeholders and operators, their profiles, market size and business opportunities. The CANVAS and analyses are updated with the bottleneck's description, solutions achieved and funds integrated with the ESG parameters and the indication by the "Fitfor55" package. They also provide to an overview bottom-up based approach from each City which allow the validation by tackling the realistic delays, the possible lack of information and the scenario not predictable since the project preparation such as the Corona pandemic, Ukraine-Russia conflict and fuel crisis. In this way, the sustainable models below proposed are fitted in the related situations and immediately ready for the replicability, viability, sustainability even beyond the project duration not only for USER-CHI's partners but for the whole e-mobility community at EU level.

The seven sustainable Business Models (BMs) are: SBM1 – Logistics hubs; SBM2 – Citizens e-Mobility Stations; SBM3 –City centre (park & charge); SBM4 – E-trucks; SBM5 – E-taxis stops; SBM6 – Special events; SBM7 – Mobile charging stations.

1.1 Document structure

The Deliverable 8.9 reports the business modelling analysis conducted for all the USER-CHI specific cases and outlines the business models developed in each demo site utilising the products realised in the project, updated with the ESG parameters, the bottlenecks incurred and solutions achieved, indication of EU, National and Recovery funds available. Therefore, they become Sustainable Business Models SBM. The Deliverable provides a pivotal overview, useful for each stakeholder able to start up and complete and/or implement any actions with a baseline of experiences and solutions already carried out in order to achieve the objective of e-mobility enhance in real market conditions.

Furthermore, the CANVAS are updated with the ESG indicators using the business model process provided by the new sustainable business model Canvas as foreseen by the "Fitfor55" package, validating the added value on electric mobility diffusion from a baseline which put the operators and stakeholders in the position to adopt the adequate business model and the operative viability of each solutions together with the pathways of appropriate rules for tendering and applying the incentives avoiding risks such as the distortion of competition, the lack of coordination with sustainable and feasible multimodal integration and the linked urban plans.

The USER-CHI implementation, as far as the research and innovation projects, provides an effective overview of the development bottom-up based. The outcomes of carrying out the demo highlight in real conditions the bottlenecks to overcome in the demo implementation and tests. They are mainly related to administrative problems, identification and/or modification of sites, tender procedures, products deployment, legal restraints that could affect the business models development together with the exploitation. The constructive approach of the USER-CHI's partnership allows a cross cut set up of viable business models able to be immediately available together with the indication of viability beyond the project duration. The further information will be provided in Del. 7.3 Cross site evaluation, Del. 7.4 Impact assessment, Del. 8.7. Target dialogue with influencers, key stakeholders and financiers and Del. 8.8 Exploitation Plans after they completion.

The structure of Deliverable 8.9 is aligned with the preliminary analysis provided in Deliverable 8.8 and consist of updates, description, integration and explanations on rules and available funds and/or incentives at European level and for each Country involved.

1.2 Background

The premises of Deliverable 8.8 herewith summarized in three main points which are:

a) the positioning of the e-vehicles charging points along an integrated multimodal chain in the 2023 scenario;

b) the integration of e-vehicles infrastructures as part of smart cities;

c) the financial sustainability of investments both at public and private level and, profit for investors and users.

Nowadays, the adoption of a business model(s) and its validation in real market conditions for the electric vehicles (EVs) is based on new elements: the new regulatory framework, the post-pandemic scenario, the fuel emergency, the ESG parameters and the funds available. All these items are indicated in each business plan and, consequently allow the upgrade for the business model choosing.

The sustainable business model analysis herewith provided takes into account these elements based on the following considerations:

a) The raising of awareness about the necessity to implement the use of EVs due to the climate change challenges is strictly linked to the fuel emergency[iv]. The item is therefore connected to the necessity to implement multimodal pathways in order to ensure the positioning of the e-vehicles infrastructures close to public transportation hubs and nodes toward the CO2 emission reduction foreseen up to 2035[v].

b) The behaviours choices in transportation field[vi] have been modified in a very short term by due to the increasing of EV's demand[vii] in the pandemic and post pandemic scenarios[viii], the fuel crisis and the Russia-Ukraine conflict which modify in.

c) The integration of charging infrastructures in the urban plans and in the planning need a precise framework[ix] together with an adequate flexibility and resiliency[x] for each city requirements[xi] as well as the infrastructure has to be deployed in combination with grid edge technologies and solar panels integrated with decentralised generation, storage, microgrids and smart buildings as integrated part of smart grids toward the co-design of smart cities[xii]; it has to be ensured a sound financial sustainability of EV's investments[xiii].

d) The ESG[xiv] indicators in the business model(s) analysis integrated in sustainable CANVAS belong to the new legal framework at EU level and they became compulsory in each planning models for smart cities including EV's integration[xv].

e) The EV's sustainable business model has to be integrated with the complexity[xvi] and flexibility assumptions in planning the smart cities.

f) The sustainable business models allow to enhance the EV's use toward the 2035[xvii] [xviii]goals for carbon neutrality[xix] as introduced in Nov.22 by the adoption of the "Fitfor55" Regulatory framework by the European Council.[xx].

These factors contribute to the business model analysis updating with the mentioned indicators and will allow to have a tool kit available beyond the project duration thus to achieve USER-CHI results and outcomes for CO_2's emissions reduction.

2. Sustainable Business model generation process in real situation(s): bottlenecks and solutions in USER-CHI

This section describes the methodology and the process used to generate USER-CHI business models reported in the next section following the methodology proposed by Osterwalder and Pigneur and integrated with European Commission new regulatory framework and ESG's parameters toward sustainable business models. Besides the business model(s) generations process is based on Osterwalder and Pigneur lean business model canvas as upgrade by Oxford in Sustainable business model global and case framework updated version 2022[xxi].

2.1 Guidelines

The present document integrates the preliminary business model analyses in Deliverable 8.8 and validate the business models there provided with the integration of the models' generation process with the contributions from partners development in real situation based on the paradigm: bottlenecks-solutions-funds toward the exploitation of products along the EV's ecosystem.

Since, the traditional business models are developed with profit as the overarching aim. The sustainable transport sector and, in particular the EV's ecosystem has to be supported by the upgrade of sustainable business model for the impacts and the trends of market indicating a very fast expansion. Besides, the regulatory package under "Fitfor55" addresses the enhancement of the sector for light vehicles up to 2035 and for heavy vehicles up to 2040. Therefore, the legal framework contains the challenges and the inputs which will affect the business model(s) assessment toward a feasible sustainability.

Whereas the traditional business models are developed with profit as the overarching aim, nowadays the sustainable business model CANVAS (SBMC) and related Sustainable Business Models (SBMs) have been introduced as after the adoption of the United Nation Sustainable Development Goals (SDG)[xxii]. The model was developed on the basis of the Business Model Canvas that enables sustainability-oriented development of business models[xxiii]. The model is integrated with three inputs: economic, environmental and social impact. [xxiv]It aims to broaden the definition of value creation by integrating social and environmental performance dimensions

besides the primary fabric of business. SBMs are thus defined in terms of their ability to internalise these three sustainability dimensions into the core of business.

Social and environmental and values are desirable from a collective point of view and are nowadays integrated with governance parameters in the new regulatory framework in "Fitfor55" package. Despite to the fact that the post-pandemic scenario and the fuel crisis modified the choice pattern, USER-CHI results support the classification of economic sustainability in the enhance of Electric mobility by providing a pattern of business models actualized to the real situation. Indeed, the EV's market maturity has been increased very fast by the indicated external factors not predictable in the project preparation as well as the modification of tender's requirements in the overall context.

The adoption of financial measures like the Nationals recovery Plans, the adoption of co-created regulatory framework and the modifications of rules for accessibility to European Bank of Investment (EIB) funds[xxv], issued on last 2022, December 14th, for sustainable transport affect the business model definition.

The main outcomes of this new scenario reduce the gap between public and private transportation, trying to harmonize the sustainable transport in the context of smart cities as unique value with common rules, well tuning the benefits in terms of quadruple effects: economic, social, environmental and for governance. Therefore, the final version of business model(s) herewith proposed is able to support the USER-CHI consortium partners in:

- Integrate the value proposition of EV's adoption with ESG and the baseline of solution viable along the implementation process both for customers and all the stakeholders;
- Identifying how to deliver the related values to the operators and communities;
- Identifying the properly available funds and application process to support the viability beyond the project duration and in free market conditions.
- The AS-IS Step 1: creating a bottom-up vision for USER-CHI services

The steps toward the business modelling process adopted in USER-CHI was to outline a unified vision of delivered services and to identify common characteristics facilitating the definition of concrete value propositions. Within this document the premises and outcomes have been integrated and well-tuned by the following activities:

1. **Activity 1: Monitoring of the implementation AS-IS :** the business models have been updated by the monitoring and contribution of each demo city involved (Barcelona, Berlin, Budapest, Rome, Turku) taking into account: the real scenario integrated with the Urban Mobility Plans and the real market bottlenecks, the solutions achieved and the integration with the complexity framework as described in the ESG for the planning of realistic long term plans having as baseline the tool kit of viable solutions for administrative and tendering pathways as well as financial flows.
2. **Activity 2: Operational activities**: a pattern contained in the matrix allow the management of day-by-day activities with the innovations of products and the co-creation of EV's ecosystem in order to capitalize the USER-CHI's experiences and

products as a tool kit for other stakeholders. It ensures a common baseline for replicability of results and outcomes.

3. **Activity 3 Reflexive activities, replicability and viability:** it includes the monitoring of the implementation as-is, assessment and evaluation of experimental policies and practices to revise overarching visions and plans where necessary according to the ESG indicators. Assessments and evaluations, when shared and disseminated effectively, can also lead to broader changes outside the single system toward the EV's community and ecosystem implementation. This step will be completed by M45 included in the final version Deliverable 8.7 which will include the data of demo site and users test delayed by the project extensions allowed.

The activities are carried out step by step as described in the next paragraphs.

2.2 Steps 1: Sustainable business model(s) in USER-CHI identify and map ecosystem actors

The identification of the elements which belong to USER-CHI value chain have been explored and identified, then put in the business models with the ESG parameters. The ESG parameters, according to the comparison carried out on line and in presence with the Local Experts have been adopted as element of the Value proposition. In this way, the SBM is able to set out immediately the effective value of the investment in mid-long-term period. The analyses of the value chain highlighted as crucial actors also the public bodies involved in the choices such as the municipalities vs. mobility agencies and the urban planners. Besides, the producers have got a strategic role for three main reasons: the timeline for products delivery, the incoming innovation during the products development and the raw materials availability in the deployment on large scale. Therefore, the ecosystem is enriched by the identification of the responsible of the choices like venues and integration with multimodal hubs together with the final customers exigencies as well as, for instance, availability, fastness of recharge stations, costs and incentives. In this way, the bottlenecks as far as "pain relivers" and solution as "gain creators" become elements of a value proposition immediately viable.

2.3 Step 2: A methodology for developing sustainable business models according to the ESG's parameters in USER-CHI and beyond

The methodology used for the USER-CHI business modelling generation process refers to the business model CANVAS, introduced by Alexander Osterwalder and Yves Pigneur[xxvi]. It has been updated with ESG parameters[xxvii] according to the model proposed by Casper van Leeuwen [xxviii] to enhance and well tune the qualitative process addressing the pathways to be gained to achieve the EV's implementation goals[xxix] and contributes to the "FITfor55" achievements. They take into account the feasible business in terms of economic, environmental and social assessment toward

a realistic governance both for business and planning[xxx]. The canvas describes the structure of business models and how they create, deliver and capture value. The CANVAS (see Figure 1) comprises nine building blocks: a value proposition (a product or service that is offered to customers), customer interfaces (segment identification and related relationships) and distribution channels, a financial model (cost and revenue structure that distributes benefits across business model stakeholders), key partners, resources and activities.

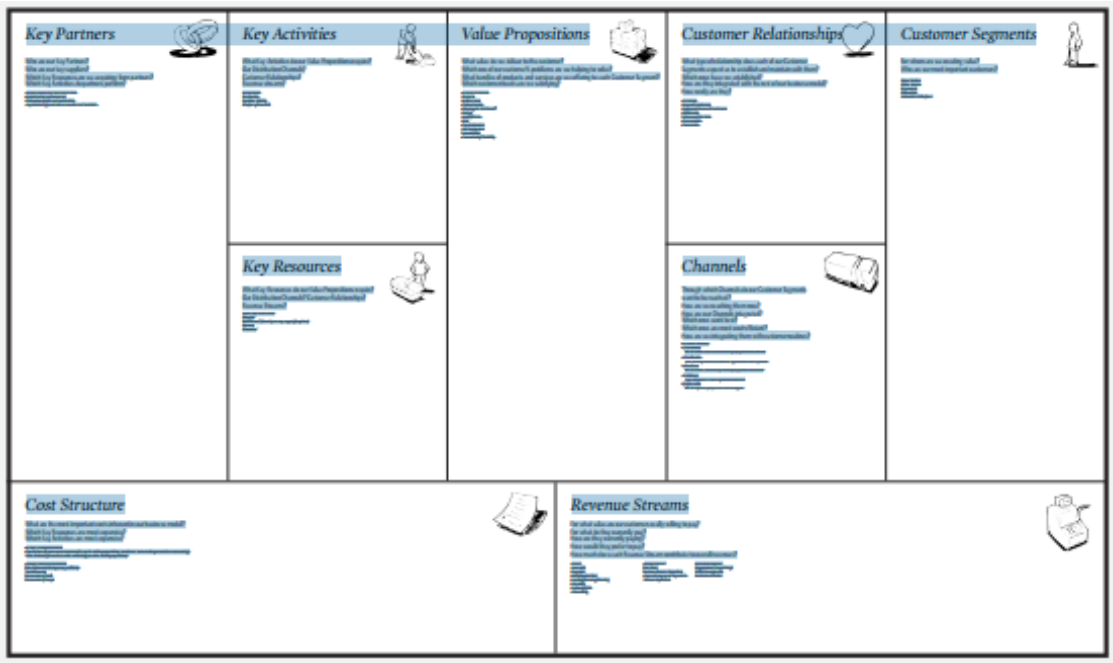

Figure 1: Business model CANVAS

Moving from a general overview of the electromobility landscape with its current trends, the business models reported in the next section have been elaborated with an iterative process depicted in Figure 2, where initial assumptions (aimed at identifying the value chain and values per each actor) were modelled in a design experiment (sketching the value propositions and the overall business model) and then submitted for validation tests to potential customers/stakeholders in dedicated workshops, in order to gain relevant insights and recommendations.

In the CANVAS with ESG indicators herewith provided (Fig.2) shows how the business model(s)change by the integration of sustainability parameters.

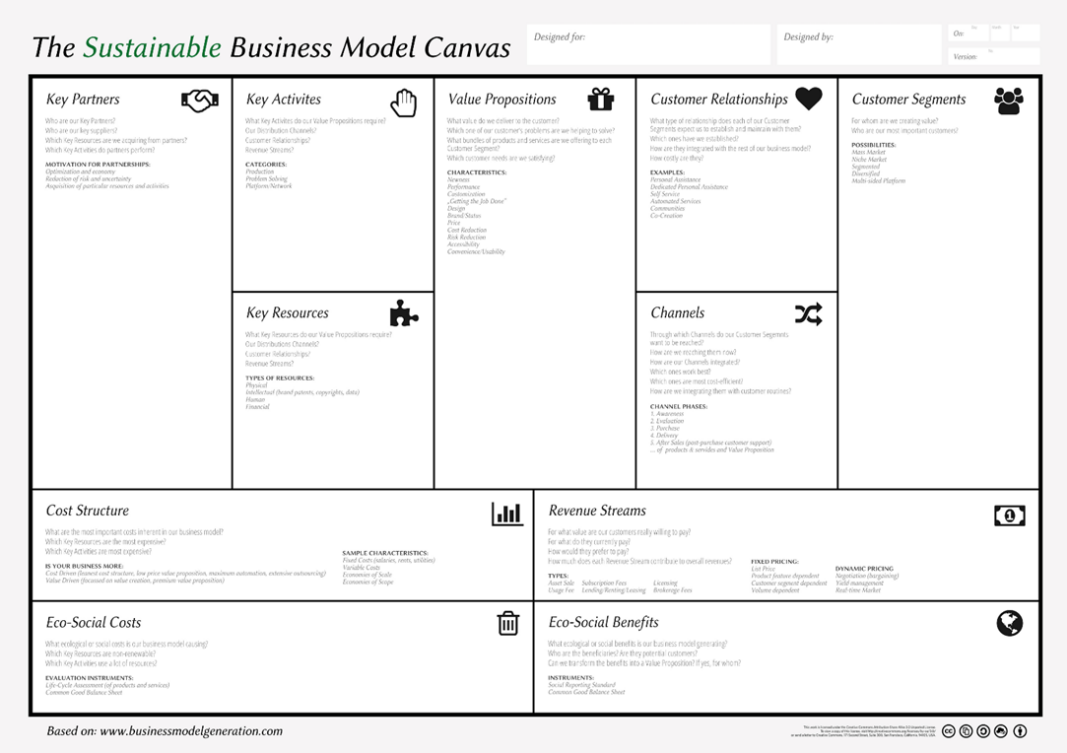

Figure 2: The Sustainable Business Model Canvas with ESG indicators

As shown in the figure, the SBMC takes into account the impact of the eco-social costs and benefits.

The Sustainable Business Model Canvas supports the development of an idea into a viable business model. It follows a holistic approach regarding the relationships within and outside the business. Besides economic criteria it focusses on ecological and social consequences of the activity. It aims at maximizing positive and avoiding negative impacts on society and nature. Therefore, sustainability is integrated into the core business.

The visualization on the canvas fosters coherence of the concept and clarification among the team members. It further supports communication with third parties and prepares for a solid business plan. It is composed by 11 elements instead of 9. Specifically, the eco-social cost benefits are referred to Social and environmental benefits are the external benefits that the project produces for the communities and the environment in which it operates. It is crucial to consider the benefits of a project on these communities and environments to:

- position the services/products as a project that has a positive social and environmental impact;
- enriched/strengthen the credibility of the project's value proposition to the target groups to attract financial support[xxxi] from governments[xxxii], donors or impact investors that may support the scalability[xxxiii] of the project.

In USER-CHI cases, as demonstrated by the demo implementations and the deployment of products, the impacts related to social and environmental features become crucial elements in the EV's ecosystem for instance for positioning of the column, areas identification, technologies choices, allocation of funds, upgrade and or modification of sustainable urban plans and so on. The evaluation of those streams is linked to the target groups[xxxiv]. Indeed, in USER-CHI the target group identified in the proposal have been slightly modified by the scenario of post pandemic and fuel crisis and it has been increased the awareness of the future users of EV's which can be segmented in three main categories[xxxv]:

- Upper mid class for EV's property
- Millennials
- User addicted[xxxvi] mainly in high congested cities even if well connected with other modalities nodes

The updated target identification together with the new policies and incentives describe a scenario where the socio-economic costs-benefits become structural elements of the sustainable CANVAS model (SBMC) which addresses the adoption of the seven models provided by a different perspective which allows to the cities and operators to have an effective role in the EV's ecosystems with immediate figures out of the costs/benefit with and without incentives. Therefore, the EV's market increase[xxxvii] need to be supported by the implementation of e-charge station with specific features such as the accessibility, the widespread and the closeness to the multimodal hubs. After these requirements are integrated, it is possible to identify the pivotal incentives for each model for public charging.

The next steps of the BM analyses allow an overview on the scenario by adoption of the ESG business CANVAS fully integrated[xxxviii]. (Fig.3)

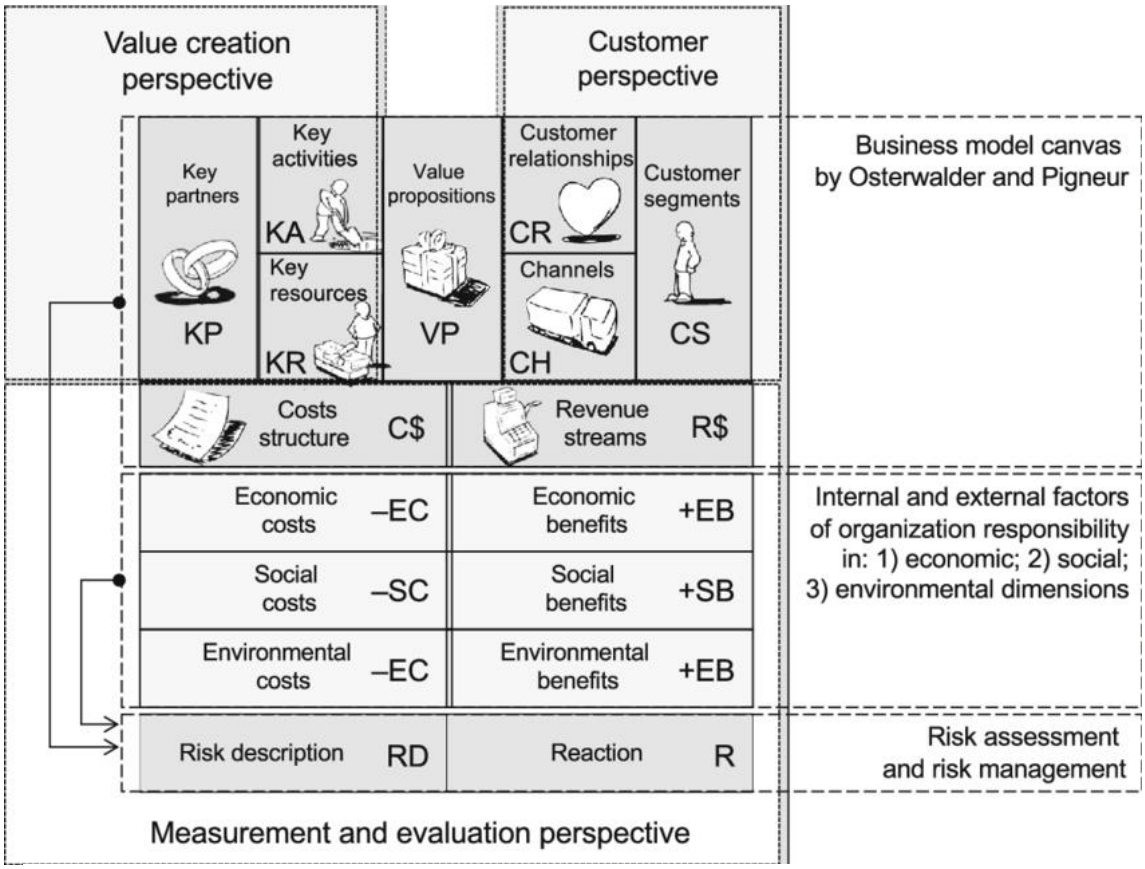

Figure 3: Business Model Canvas integrating the ESG parameters

The CANVAS SBM shows the operational features which take into account economic, social and environmental dimensions[xxxix] and leave to the "Risk assets and risk management" the address toward the governance that according to the "FITfor55" package and the GRI need to be identified and integrated in EV's ecosystem planning[xl].

Besides, according to the USER-CHI outcomes we found out that the more fitting CANVAS model for EV's analysis is the one provided by Finch&Beak on 2022[xli] for BMW but applicable with all the providers/supplier and scenarios. (Fig.4)

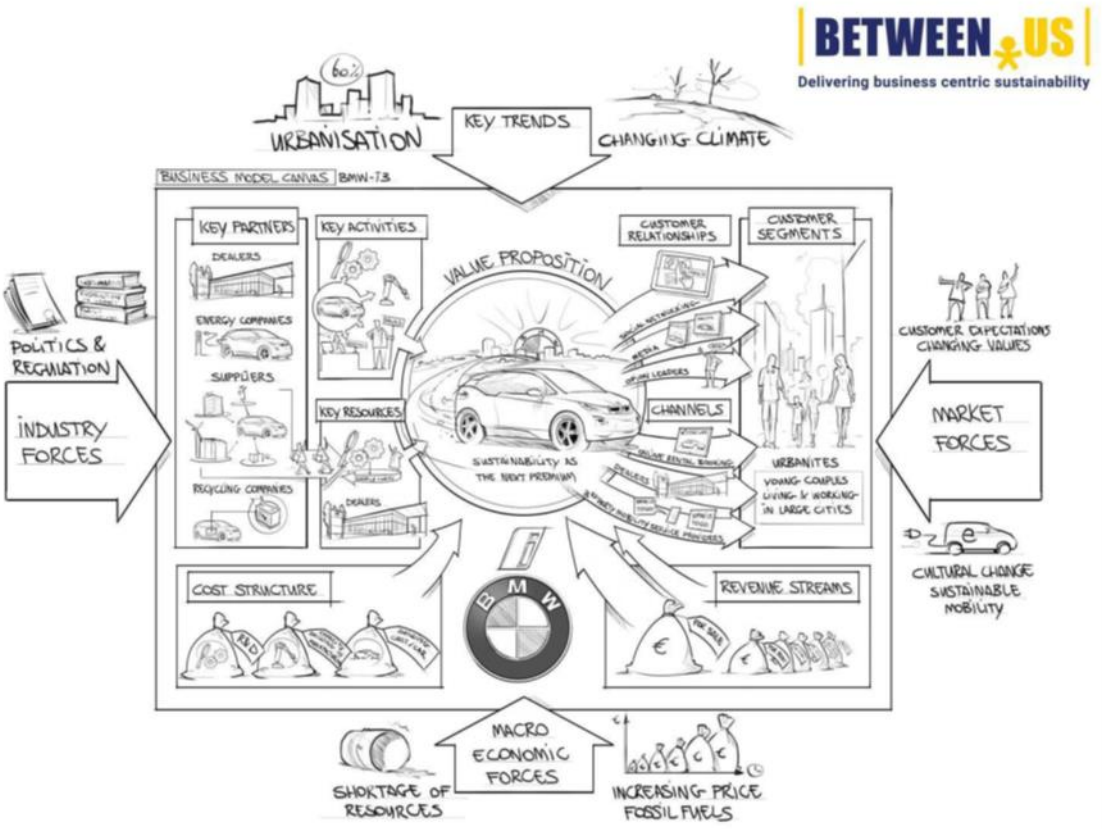

Figure 4: The ESG CANVAS for BMW

2.4 Step 3: identifying and engaging key stakeholders with ESG for SMB in USER-CHI

During the peer visiting in Rome (Jan. 23) and in Barcelona (Nov. 22) and by the conclusion of other deliverables and costumer's behaviour of EU research[xlii] and during the development of the users test outlines it has been highlighted that, since the planning phase it is of utmost importance, the involvement of a wider range of stakeholders in updating the SBM. Despite to the fact that, often stakeholders are not directly involved in delivering the value proposition but somehow identified in the value chain because they have an advantage from the success of the business case. Indeed, the ESG clearly map the different stakeholder's engagement in the value proposition for business model(s)[xliii].(Fig.5)

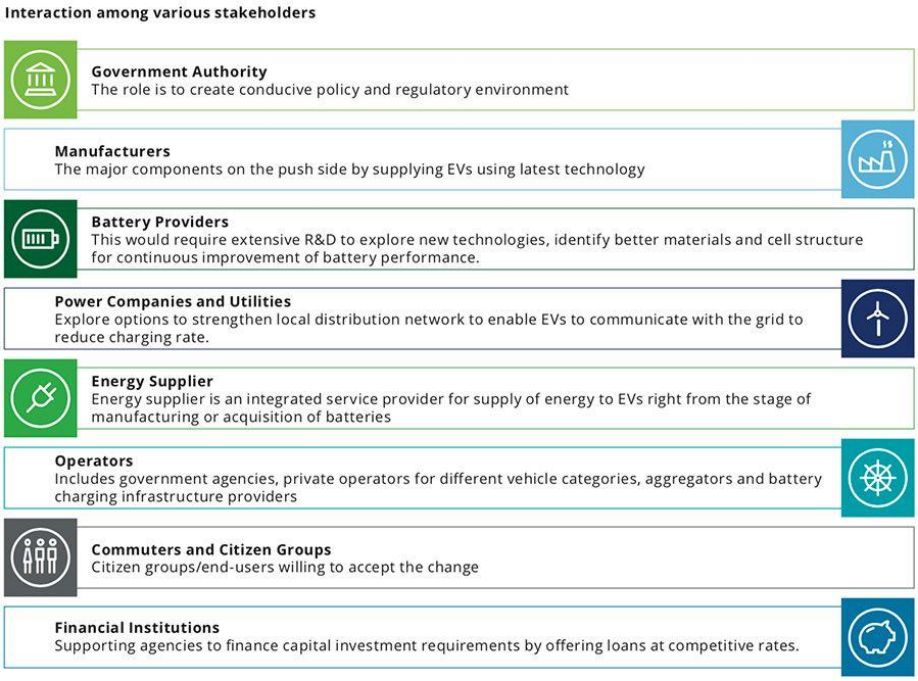

Figure 5: The Stakeholder engagement in EV's ecosystem with ESG's

Whereas these inputs take into account the new legal framework, in USER-CHI we assume that it is necessary to put the ESG as value proposition and the stakeholders as well as the user tester should be internal to a single body as far as external. It is appropriate to bring together the different approaches and exigenciesxliv toward a planning and site indicationsxlv as much as possible adequate. Specifically, USER-CHI by the adoption of this approach get feasible the assumption from European Commission for

1. **resiliency**: "*Make mobility fair and just for all – for instance by making the new mobility affordable and accessible in all regions and for all passengers including those with reduced mobility and making the sector more attractive for workers*";

2. **sustainability**: "*Boosting the uptake of zero-emission vehicles, vessels and aeroplanes, renewable & low-carbon fuels and related infrastructure - for instance by installing 3 million public charging points by 2030 and pricing carbon and providing better incentives for users – for instance by pursuing a comprehensive set of measures to deliver fair and efficient pricing across all transport*

3. **smartness**. Last but not the least for "*Making connected and automated multimodal mobility a reality – for instance by making it possible for passengers to buy tickets for multimodal journeys and freight to seamlessly switch between transport modes*".

For instance, the last point related to the automated multimodal mobility within the USER-CHI framework is under adoption by the Berlin Municipality in terms of incentives for integrating EV's private use with other transportation system".

Combining the different approaches with a correct stakeholder's engagement, it is possible to properly address the funds and to exploit the results in large scale with the aiming of replicability and EV's community implementation as crucial factor of success for emission neutrality as well They may be transport operators, logistics service providers, facility managers, energy supplier companies, national/European authorities, financial entities, etc.

Indeed, since the beginning in USER-CHI, the engaging process was considered as a key step for capturing support from these subjects as success factor of the business model because of their capacity to attract, influence or aggregate potential customers or to provide knowledge and assistance in the operational phases for infrastructure, legal, and financial services. By the integration of observation and deliverables and experience's exchange within USER-CHI it is possible to validate that:

- the stakeholder's engagement is a crucial factor in BM development even with the SBMC integration;
- the ESG's BM allows a more well-tuned application of the products to EV' value chain[xlvi] and a more qualified allocation[xlvii] of financial resources[xlviii];
- the adoption of SBMC allows a long-term evaluation of the EV's ecosystem at local level and along the ecosystem of eco-sustainable mobility[xlix];

2.5 Service design outlook in SBM for USER-CHI and EV's ecosystem

This step relates to additional considerations facilitating the uptake of business models featured in terms of sustainability. Within USER-CHI's implementation of products and demo site in slight delay, together with the phases of user test foreseen in WP7, the outcomes reflect the scenario described: fuel crisis, new legal frameworks, increased availability of funds, necessity of multistakeholder engagement, enlargement of targets identification and involvement since the planning phase.

The incurrent situation does not modify the assumptions outlined in the version of this documents' release in Del. 8.8. We report for the readers convenance in few lines.
In USER-CHI implementation toward the business model(s) validation the considerations are that:

a) In the start-up phase a new service may be adopted by enthusiastic innovators (a very limited number of customers) and very aware about the benefits by personal interested and not as effect of dissemination actions;

b) the so-called early innovators and later the early majority (usually identified as "crossing the chasm") are harder to be engaged without incentives and clear definition of pricing models, subscription schemes, nudging or gamification since the promotional and communication phases: the embedding and involvement, for instance, as external "testers" in the demo implementation and/or in the discussion groups are foreseen by the active citizenship policies;

c) The features sketched in the business models proposed in Del. 8.8 and here updated are finalized to be immediately available. Summarizing, the investigation herewith carried out demonstrates that the service design needs in all the cases and for replicability the following items:

   1) In every business model the added value proposition has to be integrated with socio-environmental parameters toward the real based governance;

   2) the risk management has to include the stakeholder's engagement outcomes and the socio-environmental costa benefit calculation;

   3) the grants and incentives policies need to be calculated and compared with the free market conditions;

   4) a double check to avoid any possible distortion of competition in the incentives policies has to be carried out at three level at least: by the internal office of the municipalities, by the agencies for mobility and with the regional government or ministries how appropriate;

   5) a preliminary investigation for the installation needs to be integrated with multimodal hubs since the location site choosing thus to capitalize the investments in the ecosystem and/or ensure the effectiveness of incentives investigated in the next project period and reported in Del 8.7.

3. USER-CHI business models with ESG

This section reports the results of the iteration analysis conducted about the seven Sustainable Business Models (SBM) considered in the project objective O5 together with the outcomes of USER-CHI implementation, the new regulatory framework adopted by European Union and entry into force on 14.1.2023[i] and the funds available and the outcomes by the implementation of project within USER-CHI in real situation.

Now the business models are described as sustainable business models and provides an updated version toward the exploitation and the targeted dialogue with stakeholders, market influencers and financiers.

SBM1 – Logistics hubs; SBM2 – Citizens e-Mobility Stations; SBM3 –City centre (park & charge); SBM4 – E-trucks; SBM5 – E-taxis stops; SBM6 – Special events; SBM7 – Mobile charging stations.

For each SBM, specific focuses are reported on the project cities that expressed interest in the business case and its updating (**Error! Reference source not found.**) and the sustainable C ANVAS templates (SBMC, here in after) describing the structure of sustainable business models. Before describing the business analysis results, a recap of the USER-CHI products associated with the local use cases is reported.

Table 1: Cities – Sustainable Business models matrix

	BARCELONA	BERLIN	BUDAPEST	TURKU	ROME
SBM1 – Logistics hubs	X				
SBM2 – Citizens e-Mobility Stations		X	X		X
SBM3 – City centre (park & charge)		X			
SBM4 – E-trucks				X	
SBM5 – E-taxis stops	X			X	
SBM6 – Special events			X	X	X
SBM7 – Mobile charging stations					X

3.1 USER-CHI products at a glance

With the aim to achieve its strategic challenges and objectives, USER-CHI generates a wide-ranging set of solutions[li] comprehending all aspects of a massive deployment of electric vehicles toward the sustainable transport and the challenges foreseen in "Fitfor55" package[lii].
The following table summarises the main characteristics of USER-CHI products to be implemented and then associated in the different use cases of the pilot sites.

Table 2: USER-CHI products to be implemented in the Pilot Sites

Product	Short description
CLICK – Charging Location and Holistic Planning Kit	CLICK will be conceived as an easy-to-use question-and-answer online tool for the top-down location planning for charging infrastructure. The main objectives rely in the optimisation of the location and planning of new charging infrastructure in cities and TEN-T corridors, matching the users' needs, preferences, and habits, with the existing charging technologies and typologies available in the market.
INCAR – Interoperability, Charging and Parking Platform	INCAR will consist of a platform able to offer customised solutions to different end-users to satisfy their needs and so improve the customer experience. Its offer includes a set of innovative integrated EV-related services such as (i) interoperability and roaming to access EVSEs, (ii) booking features of parking slots and charging stations avoiding waiting times and increasing the usage of existing infrastructure (park & charge combined service), (iii) real-time information about publicly accessible EVSEs, (iv) searching and routing to EVSEs, and (v) integration with route planning of EV fleets.
SMAC – Smart Charging Tool	SMAC will provide users with a platform offering smart grid integration services for slow, medium, fast, and ultrafast charging. This will be complemented by a set of high-value services for EV drivers, such as maximising Renewable Energy Sources (RES) electricity supply and competitive charging prices.
INSOC – Integrated Solar-DC charging for LEVs	INSOC will include a software and hardware combined solution to satisfy LEVs (e-bikes, e-

	scooters, etc) charging needs, by also integrating on-site production of RES and theft-proof parking.
INDUCAR – Inductive Charging for e-Cars	INDUCAR will foresee an inductive charging solution to deliver a high level of automated power transfer. This will allow offering a very advantageous charging experience to the user (e.g. avoiding manual handling of cables).

3.2 USER-CHI Bottlenecks and Solution in products implementation city by city

According to survey carried out among the participant cities Barcelona, Berlin, Budapest, Rome Turku updated at 26.1.23 related to the state of art in products implementation, the following table shows the map of bottlenecks and solutions achieved by each City.

The following table summarizes the main characteristics of USER-CHI products to be implemented and then associated in the different use cases of the pilot sites.

1) **Barcelona**

Table 3: USER-CHI bottlenecks-solutions and grants

Product	Short description	Bottlenecks	Solutions	New Timeline	National Recovery Funds*
CLICK – Charging Location and Holistic Planning Kit	CLICK will be conceived as an easy-to-use question-and-answer online tool for the top-down location planning for charging infrastructure. The main objectives rely in the optimisation of the location and planning of new charging infrastructure in cities and TEN-T corridors, matching the users' needs, preferences, and habits, with the existing charging technologies and typologies available in the market.	Development of Click has been a little behind. There are under evaluation the data needs as far as concern the multiplier factors to be taken into account in the updated restraints for optimizing the location and the tests. GIS data seems to be required	Clearer communication on what is needed MaaS data required integrated with GIS	Under planning	https://www.idae.es/en/node/12845
INCAR – Interoperability, Charging and Parking Platform	INCAR will consist of a platform able to offer customised solutions to different end-users to satisfy their needs and so improve the customer experience. Its offer includes a set of innovative integrated EV-related services such as (i) interoperability and roaming to access EVSEs, (ii) booking features of parking slots and charging stations avoiding waiting times and increasing the usage	Delays and Technical problems with the EV station installed in AMB, therefore additional test is still needed. In late December some tests started which now are going to continue			

	of existing infrastructure (park & charge combined service), (iii) real-time information about publicly accessible EVSEs, (iv) searching and routing to EVSEs, and (v) integration with route planning of EV fleets.				
SMAC – Smart Charging Tool	SMAC will provide users with a platform offering smart grid integration services for slow, medium, fast, and ultrafast charging. This will be complemented by a set of high-value services for EV drivers, such as maximising Renewable Energy Sources (RES) electricity supply and competitive charging prices.	Delays and Technical problems with the EV station installed in AMB so some tests are still needed. In late December some tests started which now are going to continue			MOVESI III Plans
INSOC – Integrated Solar-DC charging for LEVs	INSOC will include a software and hardware combined solution to satisfy LEVs (e-bikes, e-scooters, etc) charging needs, by also integrating on-site production of RES and theft-proof parking.	Certification of electric scooters has to be completed and scooted are going to be sent to Italy soon. The canopy procurement and costs are not yet available.	A legal assessment and market research is under process according to Fitfor55 package	Estimated March 2023	MOVES III Plan
INDUCAR – Inductive Charging for e-Cars	INDUCAR will foresee an inductive charging solution to deliver a high level of automated power transfer. This will allow offering a very advantageous charging experience to the user (e.g., avoiding manual handling of cables).	Delivery of second car, which is still in trials.		Estimated to be on track since early January	MOVES III plan

2) Berlin

Table 4: USER-CHI bottlenecks-solutions and grants

Product	Short description	Bottlenecks	Solutions	New Timeline	National Recovery Funds*
CLICK – Charging Location and Holistic Planning Kit	CLICK will be conceived as an easy-to-use question-and-answer online tool for the top-down location planning for charging infrastructure. The main objectives rely in the optimisation of the location and planning of new charging infrastructure in cities and TEN-T corridors, matching the users' needs, preferences, and habits, with the existing charging technologies and typologies available in the market.	Delays in product development. First testing has started.	Moving activities to 2023.	T2.4-Testing and Integration (Lead: IKEM) starts February 2021 now (e.g., User's support material: webinars and handbook) Final Demonstration starts in March 2023 (same start as in every city)	https://www.bundesfinanzministerium.de/Content/DE/Downloads/Broschueren_Bestellservice/deutscher-aufbau-und-resilienzplan-darp.pdf?__blob=publicationFile&v=6
INCAR – Interoperability, Charging and Parking Platform	INCAR will consist of a platform able to offer customised solutions to different end-users to satisfy their needs and so improve the customer experience. Its offer includes a set of innovative integrated EV-related services such as (i) interoperability and roaming to access EVSEs, (ii) booking features of parking	Delays in app development.	Increase work force and skilled workforce	Start in Berlin in beginning of February 2023	

	slots and charging stations avoiding waiting times and increasing the usage of existing infrastructure (park & charge combined service), (iii) real-time information about publicly accessible EVSEs, (iv) searching and routing to EVSEs, and (v) integration with route planning of EV fleets.				
SMAC – Smart Charging Tool	SMAC will provide users with a platform offering smart grid integration services for slow, medium, fast, and ultrafast charging. This will be complemented by a set of high-value services for EV drivers, such as maximising Renewable Energy Sources (RES) electricity supply and competitive charging prices.	Development of OCPI2.2.	Finding developers with help of ETRA	Still pending	https://www.bundesfinanzministerium.de/Content/DE/Downloads/Broschueren_Bestellservice/deutscher-aufbau-und-resilienzplan-darp.pdf?__blob=publicationFile&v=6

3) Budapest

Table 5: USER-CHI bottlenecks-solutions and grants

Product	Short description	Bottlenecks	Solutions	New Timeline	National Recovery Funds*
INCAR – Interoperability, Charging and Parking Platform	INCAR will consist of a platform able to offer customised solutions to different end-users to satisfy their needs and so improve the customer experience. Its offer includes a set of innovative integrated EV-related services such as (i) interoperability and roaming to access EVSEs, (ii) booking features of parking slots and charging stations avoiding waiting times and increasing the usage of existing infrastructure (park & charge combined service), (iii) real-time information about publicly accessible EVSEs, (iv) searching and routing to EVSEs, and (v) integration with route planning of EV fleets.	Delayed demo sites will connect later to INCAR then other cities.	More Regular communication with INCAR developers and ETRA, running tests	Under planning	Not foreseen in Hungary
SMAC – Smart Charging Tool	SMAC will provide users with a platform offering smart grid integration services for slow, medium, fast, and ultrafast charging. This will be complemented by	Delayed demo sites will connect later to INCAR then other cities, SMAC capabilities	More Regular communication with INCAR&SMA	To be set soon	NA

	a set of high-value services for EV drivers, such as maximising Renewable Energy Sources (RES) electricity supply and competitive charging prices.	will be tested once the demo-site is up and running	C developers and ETRA, running tests as soon as possible, site set up		
INSOC – Integrated Solar-DC charging for LEVs	INSOC will include a software and hardware combined solution to satisfy LEVs (e-bikes, e-scooters, etc) charging needs, by also integrating on-site production of RES and theft-proof parking.	Receiving the 'Installation manual' - Delivery of the product INSOC	Start preparations for installation once the manual is at our disposal	Estimated timeline -February 2023 for Installation manual, -July 2023 for delivery of INSOC product - sept. 2023 launch of INSOC demo	NA
INDUCAR – Inductive Charging for e-Cars	INDUCAR will foresee an inductive charging solution to deliver a high level of automated power transfer. This will allow offering a very advantageous charging experience to the user (e.g., avoiding manual handling of cables).	Delivery of second car, which is still in trials		Estimated to be on track since early January	NA

4) Rome
PENDING THE UPDATES by 31.1.

Product	Short description	Bottlenecks	Solutions	New Timeline	National Recovery Funds*
CLICK – Charging Location and Holistic Planning Kit	CLICK will be conceived as an easy-to-use question-and-answer online tool for the top-down location planning for charging infrastructure. The main objectives rely in the optimisation of the location and planning of new charging infrastructure in cities and TEN-T corridors, matching the users' needs, preferences, and habits, with the existing charging technologies and typologies available in the market.	Development of Click has been a little behind. There are under evaluation the data needs as far as concern the multiplier factors to be taken into account in the updated restraints for optimizing the location and the tests. GIS data seems to be required	Clearer communication on what is needed MaaS data required integrated with GIS	Under planning The internal tests and user's benchmark is ongoing by ENEL X	Ecobonus https://www.mise.gov.it/it/normativa/circolari-note-direttive-e-atti-di-indirizzo/circolare-30-dicembre-2022-ecobonus-incentivi-2023-per-lacquisto-di-veicoli-non-inquinanti
INCAR – Interoperability, Charging and Parking Platform	INCAR will consist of a platform able to offer customised solutions to different end-users to satisfy their needs and so improve the customer experience. Its offer includes a set of innovative integrated EV-related services such as (i) interoperability and roaming to access EVSEs, (ii) booking features of parking slots and charging stations avoiding waiting times and increasing the usage of existing infrastructure (park & charge combined service), (iii) real-time	Delays and technical problems with data management late December some tests started which now are going to continue	Intergration with MaaS	Estimated in Apr.2023	

	information about publicly accessible EVSEs, (iv) searching and routing to EVSEs, and (v) integration with route planning of EV fleets.				
SMAC – Smart Charging Tool	SMAC will provide users with a platform offering smart grid integration services for slow, medium, fast, and ultrafast charging. This will be complemented by a set of high-value services for EV drivers, such as maximising Renewable Energy Sources (RES) electricity supply and competitive charging prices.	Delays and Technical problems with the location choice and the integration of products	The restraints have been overcome by the new identification. Internal tests have been carried out to shorter the gap in tests and exploitation. Application of resiliency infrastructure by ENEL X	Start of work Feb.2023 – Start o final users test Spet.2023	Ecobonus https://www.mise.gov.it/it/normativa/circolari-note-direttive-e-atti-di-indirizzo/circolare-30-dicembre-2022-ecobonus-incentivi-2023-per-lacquisto-di-veicoli-non-inquinanti
INSOC – Integrated Solar-DC charging for LEVs	INSOC will include a software and hardware combined solution to satisfy LEVs (e-bikes, e-scooters, etc) charging needs, by also integrating on-site production of RES and theft-proof parking.	The canopy procurement and costs are under estimation	A legal assessment and market research is under process according to Fitfor55 package	Estimated April 2023	Ecobonus https://www.mise.gov.it/it/normativa/circolari-note-direttive-e-atti-di-indirizzo/circolare-30-dicembre-2022-ecobonus-incentivi-2023-per-lacquisto-di-veicoli-non-inquinanti

5) Turku

Table 6: USER-CHI bottlenecks- solutions and grants

Product	Short description	Bottlenecks	Solutions	New Timeline	National Recovery Funds*
CLICK – Charging Location and Holistic Planning Kit	CLICK will be conceived as an easy-to-use question-and-answer online tool for the top-down location planning for charging infrastructure. The main objectives rely in the optimisation of the location and planning of new charging infrastructure in cities and TEN-T corridors, matching the users' needs, preferences, and habits, with the existing charging technologies and typologies available in the market.	CLICK has been little behind our first estimate on when can start testing. Communication with data sets that cities need to use CLICK have also been provided quite late. Would also like to hear more info on what happens for the tool after project, many interested cities in Finland that would like to use CLICK	Clearer communication on what kind of data is viable for the tool.	Tool testing starting in early 2023 in Turku	https://vm.fi/en/green-transition https://julkaisut.valtioneuvosto.fi/handle/10024/163176
INCAR – Interoperability, Charging and Parking Platform	INCAR will consist of a platform able to offer customised solutions to different end-users to satisfy their needs and so improve the customer experience. Its offer includes a set of innovative integrated EV-related services such as (i) interoperability and roaming to access EVSEs, (ii) booking features of parking slots and charging stations avoiding waiting times and increasing the usage	2.1Start of the project communication 2.2 should have been clearer, so cities and demo partners could have started finding ocpi 2.3 capable partner faster. Situation in in Turku is quite good, when we got partner in summer 2021.	Clearer communication.	Turku ready for demonstrations, Only v2g ready in 2-3/23	

	of existing infrastructure (park & charge combined service), (iii) real-time information about publicly accessible EVSEs, (iv) searching and routing to EVSEs, and (v) integration with route planning of EV fleets.				
SMAC – Smart Charging Tool	SMAC will provide users with a platform offering smart grid integration services for slow, medium, fast, and ultrafast charging. This will be complemented by a set of high-value services for EV drivers, such as maximising Renewable Energy Sources (RES) electricity supply and competitive charging prices.	2.1Start of the project communication 2.2 should have been clearer, so cities and demo partners could have started finding ocpi 2.3 capable partner faster. Situation in in Turku is quite good, when we got partner in summer 2021.	Clearer communication.	Turku ready for demonstrations, Only v2g ready in 2-3/23	https://vm.fi/en/green-transition https://julkaisut.valtioneuvosto.fi/handle/10024/163176
INSOC – Integrated Solar-DC charging for LEVs	INSOC will include a software and hardware combined solution to satisfy LEVs (e-bikes, e-scooters, etc) charging needs, by also integrating on-site production of RES and theft-proof parking.	Early communication with design on INSOC. The demo in Turku required is related to e-bike and winter proof not foreseen in INSOC. It required a match with other solution and extra estimation costs and budget.	Clearer communication Earlier stakeholders' and users' engagement Pre-feasibility analysis on need in real scenario Cross cut of funds	Turku will be ready for the demo once it starts.	https://vm.fi/en/green-transition https://julkaisut.valtioneuvosto.fi/handle/10024/163176

According to the outlook, within the bottom-up approach methodologies, we updated the product implementation as-is with the aim of providing a pathway based on bottlenecks - possible solutions toward the definition of baseline for next steps, replicability and the purpose to develop a sustainable business model based on the effective pathways to be run in order to exploit the E-mobility for each pilot.

Since the Business model is strictly linked to the demo site results and their outcomes, in this deliverable it is introduced a tool kit based on the real situation describing the bottlenecks and the ways/possible solutions incurred by each city together with the funds and incentives availability

By the way, the USER-CHI's extension of the demo timeline, and the current lack of related data, are analysed in order to address the project and the exploitation of results as a tool. The report and capitalization of the experiences carried out by each city in the project implementation, which will become part of the validation for the business models.

Therefore, in the Del. 8.9 the business models described capitalize the bottlenecks incurred by each city in a tool kit for replicability in addition with the indication of available funds in order to ensure the sustainability beyond the project duration of each product. In this way have been updated the basis for a tool kit able to merge the replicability with the exploitation and to highlight the possibility of use other funds in order to develop the EV's ecosystem in the new regulatory framework.

The sustainable business models below described will become in this way something concrete for who is going to apply/replicate or enter in the EV's community by using pathways already validated in terms of legal framework and ways to overcome the real market conditions "bottlenecks" by providing the integration with grants available at National and European level and the addresses of new rules both at European and national's level.

In the following tables there are summarized the Bottleneck-Solutions provided by the cities which become part of the sustainable models as far as concern the socio-environmental and economic cost/benefits by the integration of each model with the sustainable business model CANVAS.

They are based on the evaluation of the route to the market necessary to further exploitations and suggest the baseline to start up in real market scenario and for replicability.

The insights suggest to take into more consideration the enhancement of communication and exchange practices. Besides, they validate the assumptions described before of the stakeholder's engagement since the beginning of the planning for EV's. A specific solution is warmly suggested for the location identification which needs to be integrated with ESG's parameters and in urban planning. Lastly, the baseline shows that the lack of harmonization in tender procedures could constitute a gap in challenges and deadlines respect. To reduce and mitigate the risk of inhomogeneous application with effect on business model adoption and possible distortion of competition, therefore USER-CHI project becomes a trial area for the applications of rules as foreseen by the "Fitfor55" package related to the tenders and the enhancement of EV's ecosystem[iii].

In further paragraphs the description of the sustainable business models for each type of solution provided are reported and explained.

3.3 SBM1 - Logistics Hubs

The digitalisation and electrification of logistics is one of the top treated topics in relation to the environmental impacts of transport, especially in the recent years with the growing of international logistics demand due to e-commerce business.

The subject does not involve only local industries but all the three main sectors characterising the business: supply, storage, and last mile distribution. The European Commission published on 2022, October 18th a plan of action[liv] to support these developments by tackling a plan of action which provides at:

a) formally re-establish the existing Smart Grids Task Force. The group will be renamed the 'Smart Energy Expert Group' and will have greater responsibilities and involve all Member States and additional relevant stakeholders. Within this expert group, the Commission will set up, by March 2023 at the latest, the "Data for Energy" (D4E) working group to support with developing and rolling out a common European data space for energy.

b) In the longer-term, digitalisation will be a prerequisite for the integration of decentralized forms of renewable energy in the grid, which will enable the EU to become less reliant on imported fossil fuels, and therefore less exposed to their price volatility. The integration of renewable energy sources requires more grid decisions to be taken closer to the edge of the network. It also requires more grid flexibility, which can be provided by active consumers and prosumers that flexibly manage their energy assets. By doing so, they can also lower their energy bills and reduce their carbon footprint.

c) A seamless access to more granular data about the state of the electricity smart grids and smart consumer assets (such as heat pumps, solar panels, home batteries, smart thermostats, building automation systems or electric vehicle charging points) will be central, but this can only happen if digital tools and shared data infrastructure for delivering energy services at the right moment in time become widespread.

The "Fitfor55" clear addresses the measures toward the improving of efficiency and electrification of local facilities together with operational solutions for related infrastructures implementation[lv]. The EC accepts the comments of the European Court of Auditors [lvi], the ALICE observations[lvii] and introduce the proposal for switching the Regulation on AFIR into a Directive for European Member State[lviii]. Specifically, on 19.10.22 the European Parliament adopted a resolution for provides to overcome the underperformances.[lix]. Further it indicated the grants to support the logistic hub implementation[lx]. The trends for the integrated EV's implementation and enhancing of infrastructures for charging shows an underperformance in comparison with 2021 in extra EU countries[lxi]

The commitment of the SBM is focused on those segments of mobility which have the greatest potential for electrification, as urban logistics, promoting not only the acquisition of electric vehicles, but also the improvement of related infrastructures[lxii].

This care must be supported from both private entities and public authorities[lxiii], with the aim to reduce the pollution footprint of mobility and logistics in urban areas. European, national, and local authorities are nowadays addressed to apply the "Fitfor55" and related funds instruments there provided[lxiv]. All these commitments have been translated in plans to support the development of urban freight distribution and, consequently, also the related necessary cargo infrastructures.

Not only funds for the acquisition of new fleets and realisation of facilities, but also rules and incentives for facilitating the transition to new operating systems like harmonisation of rules, discounts or exemptions from congestion charges/tolls, access to priority lanes, access to pedestrian areas, consolidated services with the sharing of last mile using EVs, realization of pilot tests with infrastructures specific for e-urban logistics, promotion of last-mile distribution by bike, electric motorbikes, through micro-platforms, etc.

The implementation of operational strategies and solutions for zero-emission logistics raised different questions regarding the use of Battery Electric Vehicles (BEV). Most of them are related to the charging infrastructure required and apply to three sectors[lxv]:

- **Location and type of charging stations**. Ideal location for the business, necessary power capacity in relation to operational use.
- **Operational requirements.** In consideration of logistical segments, journey types and number of stops.
- **Charging strategy**. Battery swapping or classic power grid connection.

In the urban e-logistics field, the operating route is the main element influencing the charging strategies to implement. The most considered charging strategies are three:

- Overnight charging and performing the entire journey during the day without recharging.
- Overnight charging and performing the journey during the day considering, when necessary, the use of at least one charging station along the route.
- Overnight charging and recharge during stop at customer's premises and getting through the day in that way.

Nowadays, the of the locations for charging a logistics e-vehicle are indicated in every 60kms[lxvi] only along the TENT corridors including all the charging infrastructure available at companies, in the public space, at the destination on the customer's premises, and at the depot[lxvii].

-capacity charging station is usually sufficient for vehicles and less heavily laden journeys.

Regarding the convenience of implementing a complete fleet of logistics e-vehicles with the challenges up 2035 a set-up of regulation has been provided by European Commission and EIB[lxviii] together with an addressed national policy[lxix] for tax reduction and incentives[lxx].,

In this operational and market context USER-CHI project elaborated a business case addressing Logistics Hubs and proposing recharging services addressed to logistics o mobility operators working in (or accessing to a) shared infrastructure. These Logistics Hubs for electric vehicles will is under implementation studied in Barcelona demo site and can help to maximise the productivity of the EV fleet.

Logistics Hubs within urban perimeters, such as sharing services hubs (for cars, vans, scooters, motorcycles, bikes, etc.), can offer easy charging, visibility in front of the customers, and less expensive logistic operations. The designed value proposition is therefore to equip such infrastructure with project tested solutions such as:

- INCAR for the implementation of a hub allowing Charging Point Operators (CPOs) management systems for roaming and extra-services through OCPI (Open Charge Point Interface) 2.2 communication
- SMAC for creating a software tool calculating the optimal charging profile (i.e. the amount of energy to provide) of the charging stations and for smart grid integration and demand management services for slow, medium, fast and ultrafast charging inside the logistics hubs.
- INDUCAR for the vehicles inductive charging during the time at the logistics hub.

Within this demo, the provision of a rage of 60kms between the charging point is respected by the Barcelona Urban Plan[lxxi].

The following table represents the SUSTAINABLE CANVAS of the identified business model, a more detailed description of the “Logistics Hubs” business model updated with the ESG indicators.

3.3.1 SUSTAINABLE CANVAS – Logistics Hubs

Table 7: Logistics Hubs SUSTAINABLE CANVAS

<table>
<tr>
<td rowspan="2">KEY PARTNERS
Charging Point Operators
Technology Solution Providers
Grid Infrastructure Managers
Energy supplier companies
Local Authorities/Mobility Agencies (for rules and urban planning and public surface)
National and Regional Authorities (for standards and policies and subsidies)
European Authorities (for standards, policies and subsidies)
Logistics real estate companies and landowners (in case of a private surface)</td>
<td>KEY ACTIVITIES
Analysis of local energy grid characteristics and power capacity
Analysis of local ordinances
Public space context analysis
Logistics routes analysis
Taxi and sharing services necessities and routes (in case of shared urban logistics/intermodal hubs)</td>
<td rowspan="2">VALUE PROPOSITION
Possibility to stop and charge in strategic points of the city
Charging infrastructure pertinent with the city area characteristics
Charging infrastructure pertinent with logistics needs (e.g., pantographs)
Ultra-fast charging for logistics vehicles in strategic areas
Grid balancing solutions
Sharing of logistics areas</td>
<td>CUSTOMER RELATIONSHIP
charging infrastructures available at:
company places,
public spaces,
at the destination on customer’s premises,
at company depot.</td>
<td rowspan="2">CUSTOMER SEGMENTS
Logistics operators (catering, courier/express, retail food, retail non-food, etc.)
Public multiutility companies (e.g., waste management companies)
Industrial companies
Logistics real estate companies
Sharing services operators (in case of shared urban logistics/intermodal hubs)
Taxi drivers (in case of shared urban logistics/intermodal hubs)</td>
</tr>
<tr>
<td>KEY RESOURCES
Municipal electrical assets
Power grid
Logistics operations data
Strategic locations
Deals with most important energy suppliers</td>
<td>CHANNELS
Specific contact channels for industrial and logistics partners
Web site
Contact persons
Apps
Location-based visibility
Utility companies’ channels
Charging point totems</td>
</tr>
<tr>
<td colspan="3">COST STRUCTURE
Electricity grid upgrade (especially for DC fast charging points)
Purchase of charging points specific for heavy vehicles and logistics operations
Cost of energy
Installation of charging points
Land procurement
Administrative expenditures
Maintenance
Staff, security</td>
<td colspan="3">REVENUE STREAMS
Logistics vehicles recharging
Ancillary logistics services
Grid balancing
Advertisement
Fees for charging points renting
Fees for charging operations
Fees for parking
Ancillary general services (in case of shared urban logistics/intermodal hubs)</td>
</tr>
<tr>
<td colspan="3">ECONOMIC-SOCIAL COSTS
Administrative extra-expenditures
Maintenance for lack in raw material availability
Staff, security</td>
<td colspan="3">ECONOMIC-SOCIAL BENEFITS
Administrative common pathways and homogeneous tender’s procedures
Enhancing of R&D in new materials by products and circular economy
Increase of skilled workers</td>
</tr>
</table>

• Updating of urban pans • Measure for awareness enhance • Not mature ancillary general services (in case of shared urban logistics/intermodal hubs) • Cost of electricity (if not enough provided by renewable sources)	• Renewal of the fleet • Valorisation of peripheral areas
ENVIROMENTAL COSTS • Charging points products increase • Installation of charging points and no circular possibility to reuse of land and materials • Grid and panels recirculating	**ENVIROMENTAL BENEFITS** • CO2 significant reduction in mid term • Decongestion of traffic • Effective enhance of multimodal public transportation • Harmonization of charger battery at EU/Int level (i.e., charger joint adoption) • Boosting the circular economy • Enhance the renewable energy production
RISKS DESCRIPTION • Short term for adequation to EITfor55 standard from 2024 up 2035 • Lack of increase of EV's matriculation • Resistance to adopt new fleet with law grants • Accessibility to funds and grants • Reception of incentives and taxes policy in National framework • Costs of electricity AC/DC if not sufficient the gap between the demand, renewable production and consuming, especially for e-trucks	**REACTION** 1) The Decision maker tighter with the local actors has to integrated asap the Urban Planning and the costs provision with the EU instruments and to provide a realistic timeline for the 60Kms' charging point distance objectives. 2) Besides, it is necessary to provide a Plan B for costs energy mitigation in comparison with carbon market 3) provide at pivotal incentives along the multimodal supply chain 4) Provide to figures yearly based the assumption of energy consumption vs. energy production form all the sources 5)Multitarget dissemination action to explain cost/benefit 6) Upskills and reskill of workforce integrating the EU funds

3.4 SBM2 - Citizens e-mobility stations

According to the premises of preliminary analysis on business model the basic concept behind the realization of Mobility Stations is the better use of public space, for a more efficient urban transport and space sharing[lxxii]. The public space does not have to be seen only as a private parking for polluting cars but could be considered as access point for different public services, also to sustainable mobility related. In the new regulatory European framework, which adopt the indications of United Nations[lxxiii] it is a clear address toward the regeneration of urban spaces integrating the sustainable mobility[lxxiv].

Mobility stations[lxxv] aim to provide the most suitable means of transport at any time and any place in order to reduce private vehicle ownership of residents and customers. They combine and provide different transport modalities in a unique hub.

The concept is to find in the same location several mobility technologies (car-sharing both stationary and free-floating, scooters, normal bikes and cargo bikes) connected with public transport and ancillary services (Wi-Fi, toilettes, cafeteria, bike repairing, etc.).

In the most sophisticated and advanced mobility hub, these services can include electromobility: different zero-emission and shared transport modes available and linked together in a network.

The existing context, the transportation offers and the user needs can also influence layout and localization of such Mobility Stations by the stakeholder's engagement as described in chapter 2 both according to the renewed active citizenship[lxxvi] and social media[lxxvii] interaction[lxxviii].. The shape of mobility station as well as the location can be very different by the final users and stakeholders' indications. As they can be as small as only two (e-)bikes at a street corner or they can contain a combination of e-(cargo) bikes, light electric vehicles (such as e-scooters and e-cargo bikes), even electric carsharing and/or public transport possibilities now, after 24.1.2023 they have to be integrated in the sustainable mobility ecosystem[lxxix].

Whereas the "Fitfor55" cross cut several aspects and frameworks, within USER-CHI we highlight by the implementation of demo cases related to e-mobility station how are taken into consideration the interaction among existing transportation networks and routes, network of cycling routes, limited traffic zones, points of attractions, electricity network, in order to overcome the issue of the physical barriers among transport modes and to solve the 'cluttering' of public space caused by the wide variety of shared services, bikes, cars and e-scooters, which are often indiscriminately parked on pavements and in pedestrianised areas

Indeed, the outcomes from potential users[lxxx] and stakeholders are a crucial factor both in the adoption of sustainable business model as far as to address the investment, even if co-financed by grants[lxxxi].

Examples of places where such e-Mobility stations can be integrated are: on-street parking spaces, in between existing landscaped areas, dead space (negative aspect can be the low visibility or safety for potential users). Besides, they can also support additional services such as city logistics[lxxxii] which needs relief in an environment of constantly growing traffic, especially in city centres.

Concerning e-Mobility, innovative services that can be provided are: battery swapping, inductive charging, and fast charging solutions.

The continuous innovation progress, together with the proliferation of EV charging and the increasing competition will erode energy margins for CPOs, emphasising the need to deliver additional services[lxxxiii]. Given that the growth needs to be delivered with profitability, an alternative can be focusing on electric fleets deployment, especially with high-use vehicles and seamless integration of different transport modes. Nowadays, most of the public and alternative mobility services in urban areas have to operate with electric vehicles: car/scooter/bike-sharing, public transport, taxis, etc. All these operative sectors imply a high use of vehicles that can generate revenues for mobility operator, maintenance operator and charging point operator.

For CPOs, having a large group of workplaces charging users provide a captive network to sell secondary services such as advertising, maintenance, etc. Moreover, once these spaces are fitted with a sophisticated offering, workplace charging could act as a balancing mechanism for the grid (especially in heavy industrial and power-intensive locations). All these energy-related services can create new sources of value for the customers as well as for energy, digital and mobility service providers as well as indicated by the Operational Digital Platform[lxxxiv] of EC whit the aiming of contribute to achieving the EU's environmental, energy and digitalisation targets by enabling a cyber-secure Internet of Energy and an optimised transport system along major European pathway".

Finally, CPOs typically do not own the land where charging assets are installed[lxxxv]. The important element is to figure out benefits for site owners since their involvement form the beginning of the planning adoption providing adequately incentives and an ESG evaluation. Operators have to understand what to offer to site owners, such as a fee or rental income, that will allow their business model to work and be profitable[lxxxvi]. In some cases, the site owner may not even expect any income, treating charging as a free service (as in the case of Wi-Fi) to attract footfall. Indeed, USER-CHI, supports the design of a viable business model, ensuring that the pilot will live on as a real service and scale up to be able to integrate into the mobility provision. Therefore, to foster integration, authorities must understand business models to set the rules and create the incentives for the actors and users. In fact, business models normally concentrate on the value creation and efficient delivery of a particular service but not on the efficiency of the integrated offer or the goal of sustainability. The SBM in USER-CHI become a part of a DSS for authorities, it is strategic to build a framework for the development of the mobility ecosystem, within the existing local and market conditions.

In this operational and market context, USER-CHI project elaborated a business case addressing e-Mobility Stations and proposing recharging services addressed to e-drivers (private or professional), to logistics and/or mobility operators working in (or accessing to a) mobility hub.

These e-Mobility Stations for electric vehicles are under implementation in Berlin, Budapest and Rome demo sites and can help to maximise the productivity of any kind of e-Mobility solution[lxxxvii].

E-Mobility Stations within different urban contexts can provide easy access to a wide set of charging solutions in every area of the city, and so can be able to offer multiple services for different e-transport and logistics modalities in a unique hub (PT, sharing services, etc.).

Furthermore, the possibility to attract a variety of e-Mobility subjects can open the business opportunities also to the provision of different ancillary services such as: ticketing facilities, waiting zones, postal lockers, toilets, coworking areas, resting areas, cafeteria, battery swapping, tourist info, inductive charging, fast charging points, safe parking areas, etc.

Last but not the least, it is possible to support the E-mobility supply chain as integrated business by grants like EIB[lxxxviii], CEF and ERA-Net[lxxxix], National Recovery Plans[xcxci] with the possibility to cross cut the different funds by modular approach. It is useful to highlight that according to the indication of European commission[xcii] only the projects for E-mobility which provide an integrated solution can be granted. It is a clear indication about the shape and content which the grants aid has to provide for. With the reference to E-mobility has outlined it is clear that the business evaluation has to take into account the necessity to plan both at project and large-scale application the E-mobility and CPO as part of an ecosystem for urban regeneration[xciii] as well as for sustainable mobility[xciv].

Based on these assumptions and to the objectives expressed by the USER-CHI demo sites, the designed value proposition is therefore to equip these kinds of e-Mobility infrastructures with project tested solutions such as:

CLICK	
BERLIN	*For the top-down location planning of charging infrastructure*
ROME	*As demo web service that should be used by professionals and with the collaboration of ENEL X.*
BUDAPEST	*For supporting local urban mobility planners in defining the most suitable places to install new chargers*
INCAR	
BERLIN	*For the implementation of a platform allowing a unique interoperability management system for roaming, charging, and routing to booked parking slots*
ROME	
BUDAPEST	*For offering innovative services to both users with an EMSP contract and users without an EMSP contract, considering that the EMSP is participating in the INCAR platform*
INSOC	
ROME	*For building theft-proof parking for e-bike/e-kick scooter equipped with solar panels for renewable energy production (DC – Charging stations).*
BUDAPEST	*For Integrated Solar DC – Charging stations. INSCOC is considered interesting for e-bikes and also for e-scooters services. Budapest foresees to deploy two facilities characterized by a theft-proof parking for e-bike equipped with solar panels for renewable energy production.*

SMAC	
BERLIN	*For dynamically optimizing the power supplied to the charging points*
ROME	*For providing CPOs and EMSPs with a tool including smart grid integration services, RES electricity supply, reduction of grid impact and demand management features.*
BUDAPEST	*For calculating the optimal charging profile (amount of energy to provide) in the charging stations.*

The following table represents the sustainable CANVAS of the identified business model, we relink to Del. 8.8 to a more detailed description of the "Citizens e-Mobility stations" business model alongside with the related market analysis is reported in **Annex 2 "Citizens e-Mobility stations business model analysis"**

3.4.1 Sustainable CANVAS – Citizens e-Mobility stations

Table 8: Citizens e-Mobility Stations Sustainable CANVAS

<table>
<tr>
<td rowspan="2">KEY PARTNERS
Electromobility Service Providers
CPOs
Technology Solution Providers
Grid Infrastructure Managers
Energy supplier companies
TSPs
Local Authorities/Mobility Agencies
National and European Authorities
OEMs
TSPs
Financial and payment system companies
Location owners
Land owners
Active citizenship network
Category association
Final users' community and associations</td>
<td>KEY ACTIVITIES
Identification of local conditions as neighbourhoods traffic type and destinations (commercial, residential, business, cultural, touristic, etc.)
Power grid characteristics
Analysis and design of public space
Analysis of local ordinances and policy willingness
Analysis of current transport network and barriers
Analysis of relevant pools of attraction
Analysis of traffic bans and restrictions
Analysis of market trends
Deals with most important energy suppliers
Roaming deals with different CPOs
Social media campaign
Analysis of health disease in the areas</td>
<td rowspan="2">VALUE PROPOSITION
Provision of multiple services for different e-transport and logistics modalities in a unique hub (PT, sharing services, etc.)
Provision of ancillary services (ticketing facilities, waiting zones, postal lockers, toilets, coworking areas, resting areas, cafeteria, battery swapping, tourist info, inductive charging, fast charging points, safe parking areas, etc.)
Monitoring utilities (like remaining time for charging)
Maintenance services for EVs and LEVs
Provision of appropriate charging pattern
Integration of E-mobility with ESG's</td>
<td>CUSTOMER RELATIONSHIP
Charging subscriptions (private and business)
Harmonized charging standards
Multimodal payment solutions
Grid load balancing discounts
Ancillary services
Charing pattern modality discounts
Park &Charge discounts
Park&Public transport discounts
Automatic free point detection in the station
Partnership and agreement discounts</td>
<td rowspan="2">CUSTOMER SEGMENTS
Private drivers
Professional EV drivers (also taxis)
Grid Infrastructure Managers
Companies with electric fleets
Electromobility operators
Logistics operators
Ancillary Services operators</td>
</tr>
<tr>
<td>KEY RESOURCES
Municipal electrical assets
Power grid
Logistics operations data
Strategic locations
Deals with most important energy suppliers
Grant's availability</td>
<td>CHANNELS
On-street visibility
Apps
Web sites
Local and/or national public administration visibility
Current fuel stations
Location-based visibility (commercial, business, etc)
Social media</td>
</tr>
<tr>
<td colspan="3">COST STRUCTURE
Electricity grid upgrade (especially for DC fast charging points)</td>
<td colspan="2">REVENUE STREAMS
Private vehicle recharging</td>
</tr>
</table>

• Cost of energy • Installation of charging points and station structures • Land procurement • Charging points realization • Maintenance of the Station • Market analysis • Administrative expenditures • Partnership and agreement costs	• Fleet's vehicle recharging • Ancillary services • Grid balancing • Maintenance services • Logistics operators' services • EV drivers' data valorisation • Station location fees • Connected services (i.e., bars, restaurants, public services, increase in integrated tickets for public transport)
ECONOMIC-SOCIAL COSTS • Electricity grid upgrade (especially for DC fast charging points) • Cost of energy from traditional sources • Land reclamation • Charging point realization for raw material costs in large scale • SWOT analysis • Extra administrative expenditures • Planning of E-mobility station integrated with ancillary services • Seamless and digital services adoption and maintenance • Social media campaign for consensus and awareness enhancement multilanguage and for people with special needs	**ECO-SOCIAL BENEFITS** • Private vehicle recharging by renewable energies • Fleet's vehicle recharging by renewable energies • Ancillary services and smart services enhancement • R&D in raw materials both for CPO and smart services • Pollution reduction • No land consumption • Urban regeneration • Neighboured revitalization • Upskills and reskill for NEXT generation • New job opportunities • Reduction of disease • Reduction of accident and damages to personal safety • New communication modalities • New models for stakeholder's engagement
ENVIROMENTAL COSTS • Raw material for infostructures and devices • New budling costs and disposal • Not well tuned compensation CO_2 emission in installation • Land use	**ENVIROMENTAL BENEFITS** • Adoption of materials from circular economy process • Significant Reduction of CO2 emissions • Land rehabilitation • Green areas increase • Enhancement of integrated public transport use
RISKS DESCRIPTION 1) The increase of significant numbers of E-mobility station in short term period form 2024 up to 2035 according to "Fitfor55" need to be integrate din the urban mobility plans (estimated redouble from 2022) 2) The land reclamation process both for private and public areas identified 3) The cross cut of different bodies involved in the decision process without a common procedure at EU 4) Fragmentation of regulatory framework among Countries and areas 5) Lack in efficient communication strategy(ies)	**REACTION** 1) Adequate and direct measure of financing sustains to the entire process 2) Communication strategy(ies)toward the awareness and viability of the E-mobility stations by involvement of students and young generation 3) Adoption at National level on common procedures for the E-mobility process 4) Incentives for recycled raw materials in tender procedures according to SGRI and ESG's bank parameters 5) Integration of urban planning and urban regeneration process integrated with E-mobility 6) Common tender procedures and score evaluation criteria at EU level

3.5 SBM3 - City Centre (park & charge)

One of the main market barriers for the enhance of electromobility is related to three main factors: charging infrastructures, policies and maintenance costs[xcv]. According to the outlook provided by EC only 8 Countries on 27 Member States have provided at an adequate plan integrating the support to electromobility in their national transport plans and SUMPS, one of this is Finland which is partner in USER-CHI.

Whereas the premises of the preliminary business case[xcvi] described this bullet point, the green transition is now in a more mature stage and has to be cross cut on one side with the spatial panning and on the other side with the fuel emergency and the post pandemic scenario. Indeed, despite to the fact the in 2022 the monitoring of charging stations describes a static shoot, the increase of different modes of transportation matched with the incurrent situation shows a very flexible trend[xcvii]s in terms of increase of number of users, number of vehicle and enhance of awareness about the electromobility[xcviii]with an overlook increase of +75% in comparison with 2021.

These factors, together with the new regulation, speed up the entire process for electromobility and the compulsory[xcix] new distances between electric chargers modify completely the scenario. As outcomes, it is of utmost importance to provide an adequate charging capacity, the charges have to be compliant with a mixing of energy sources (both renewable and traditional), it has to be respected the new regulatory framework for chargers[c]. By the reference to charging capacity and its interoperability within USER-CHI has been developed the analysis of INFRA under Del. 3.2[ci] the conclusion there indicated are herewith reported as part of the sustainable business model for park and charge (P&C) in the city centre.

Besides, the sustainable CANVAS model herewith proposed, whereas confirm the assumption of the necessary stakeholder's involvement in the process: Governments, Municipalities, Utilities companies[cii]together with ancillary or linked services providers[ciii]. In addition, it is useful to take into account also the outcomes from the literatures[civ], the project outcomes[cv] and the legal framework[cvi] which overcome the triple X. Therefore, if in USER-CHI has been outlined in Del 3.2, that: "the availability of parking data for combined parking and charging service ('Park and Charge', P&C) is of high importance for interoperability and constitutes the sixth minimum requirement" there is also to take into account that, currently, there are no standards for a uniform data exchange between stakeholders (particularly for off-street) and, instead, multiple proprietary solutions are being used. A way to overcome this is to use open standard systems, e.g., Alliance for Parking Data Standards (APDS), and to integrate Park and City (P&C) data into roaming platforms from the planning on. The availability of routing services for roaming and charging platforms that allow EV driver an easy access to P&C services constitutes the seventh minimum requirement. Thus, open charging protocols should be used as well when providing routing services". These assumptions based on the bottom-up approach open new integrated scenario that can properly analysed by the Sustainable business model CANVAS.

Specifically, the data integration area treated under the socio-economic and environmental boxes not provided in the standard CANVAS business model as well as in the box of "Reaction" and

they constitute a base not only for[cvii] the increase of awareness but also as revenue streams generator within the digitalization package for open science and planning.

In the sustainable business model CANVAS for P&C the role of actors assumes the double interoperability of Key partner and Key Resources because for each of them, nowadays it is a baseline for ensuring to the final users and the communities a pattern of services supported by grants like ERA Net[cviii] and the adoption of common incentives[cix]. In this way, it is possible to add to revenue streams a dedicated row to the economic, social and environmental aspect which become part of the governance tool as decision supporting system for instance, in the location seek, in the supporting of integrated services along the transport chain and ancillary services and the centre decongestions[cx] challenges.

The USER-CHI experiences carried out since now, described in Del. 2.3, Del.8.6, Del. 7.1 and under implementation in Del..7.3 demonstrates that the engagement with final users and citizens, and collaboration of stakeholders are fundamental prerequisites for understanding kind, location, power capacity and plug-in type to install. These aspects are all components that categorize electric vehicle charging equipment in the sustainable business model The market analysis in the electromobility updated with the post pandemic scenario data[cxi] and the fuel crisis[cxii].

a) With the reference to the post-pandemic scenario the market analysis shows that: "The share of electric cars in global car sales must climb to around 50% by 2030 to be aligned with a pathway to net-zero emissions by 2050.. *and*...remain a bright spot[cxiii]". But on the other side, the data related to e-vehicles registration both at world[cxiv] and EU[cxv] shows that the pandemic scenario modify the trends by an unexpected increase (+ 7,1% from 2020 up to 2021) of new cars registration which requires an increase of charging area and P&C stations[cxvi].

Actually, the availability up to 4.11.2022 in Europe is estimated 375,000 charging stations but according to the analysis by McKinsey[cxvii] combining the "The EV Charging Infrastructure Masterplan", conducted for a report from the European Automobile Manufacturers' Association (ACEA), suggests that—in even the most conservative scenario—the EU-27 will need at least 3.4 million operational public charging points by 2030. Combined with the private CP, the estimation integrated with the "Fitfor55" package sums a need of CP of 6.8 million by 2030 by a cumulative cost upward of €240 billion by 2030. In coherence with the cross-cut funds, it is possible to achieve grants up to 70% by combining different funds together with the revenues stream linked to two main services related: digital services and care-giving services.

These assumptions are based on the analysis of the 2035'goals[cxviii] published on 28.10.22 by several countries in EU and with the announcement of 3.11.22 the full phase-out of internal combustion vehicles over the next 10-30 years[cxix].

Due to countries' commitments to achieve net-zero emissions, and given the way governments in key car markets responded to the Covid-19 crisis by emphasising support for electric vehicles in recovery plans[cxx], there are grounds for optimism. Yet, many of these plans were set to cover the remainder of the year 2020. In some cases, a maximum quota was set that was reached in just a few weeks (i.e., France's enhanced cash-for-clunker scheme[cxxi]). This approach, although effective in providing impetus to the market for electric vehicles, does not constitute a guarantee for persistent sales growth of electric vehicles over time due to the necessity of raw materials and adequate PCO's.

b) The fuel crisis is strictly linked in the EV's ecosystem to the procurement of raw materials[cxxii] and the circular approach[cxxiii]. In the sustainable CANVAS model(s) both these elements constitute specific insights int the boxes of ESG' evaluation and the costs analysis.

Indeed, as assumed in the preliminary analysis in USER-CHI where it has been highlighted the difficulty to evaluate the revues streams generated by the impact of vehicle charging on the electric grid and how this component puts downward pressure on electricity rates for public operators without the utility (or other stakeholders) support.[cxxiv] By adopting the sustainable business CANVAS model the lack in figures is overcome by

- the assesses within the appropriate boxes of the calculation of return in terms of ESG combined with Sustainable Global Return on Investment assessment (SGROI[cxxv].
- the principles of International Financial Reporting Standards IFRS provided a paper[cxxvi] with the indication on the appropriate calculation even for public operators along the EV's ecosystem and a specific tool for grid[cxxvii].

The SBM(s) now upgrade the two categories assumed in three as follows described:

- not just city-dwelling drivers but also the commuters
- the users are set-up vs. the spaces available in the city centre for park and charge in the MaaS;
- together with the availability of other charging station along the urban, suburban, rural, regional and national network integrating the map in the TEN-T as required by the "Fitfor55" package and providing to the respect of 60kms by each charging point at least[cxxviii].

Of course, in the SBM the analysis of kind of driver, their preferences, characteristics and data (especially at charging session-level) are precious and valuable elements to utilities and cities for both planning development of infrastructure and managing services to users. Therefore, as a best practice, some municipalities and utilities are requesting access to session-level charging data from charging operators in exchange for access to city-owned properties or support from the utility. Operators can also be asked by cities and utilities to fulfil particular performance indicators in order to keep on benefiting from access or support[cxxix].These assumptions are exploited in the Reaction box within the business model but they need also to be sustained by a stakeholders engagement in the new scenario and the update of metadata. It could be useful within USER-CHI implementation to inspire the actions and assessment to the models provided by UK[cxxx] and the models suggested for user- and destination-based approach for locating charging stations (CSs) for EVs—the electric charging demand location (ECDL) model in literacy applied in Austria [cxxxi].

In USER-CHI pilot cases for city centre mainly under development in Berlin trough INCAR and CLICK[cxxxii] the main bottlenecks highlighted by the involved cities are related to the areas identification and the procedures for avoiding the distortion of competition between public and private charging providers. In the replicability and learning city like Murcia and Florence, instead the indication of the areas foreseen the addiction of two other parameters: the energy supply costs and the architectural criteria for supervision bodies[cxxxiii].

The matter of energy costs can be overcome in cases such as that of Murcia by a combination of funds, incentives and tax exemption, thus it is possible to assume adequate the SBM for this and similar cases to support the addresses in Park and Charge adoption in city centre. On the other side, the architectural constraints like in Florence poses a problem in identity of the urban space in the city centres, which is necessary and implies a review of the plans of mobility and an analysis of the business model that must be integrated with the SWOT and other CBA tools that are not foreseeable in the SBC.

Indeed, the assumptions in USER-CHI related to two factors such as the need of mitigation of risks related to overuse of CPO and high simultaneous demand in city centre are confirmed in the project deployment. Therefore, the SBM takes into account the factors and integrates both the address of regulatory framework and the grants available. By the way, the increase of public charging points[cxxxiv] availability remains a critical factor. In fact, the Clean package despite to the provision of emission reduction, treat separately the implementation of public and private charging solution and nowadays there is a lack in the legislation which do not allow to fill in a pivotal reaction indication in the SBMC box on the matter, but simply recommendation as outcome of USER-CHI.

It has to be highlighted also the discrepancy between AC and DC charger. According to Alternative Fuels Infrastructure Directive 2019/94/EU (AFID[cxxxv]) currently requires that all recharging points are, for interoperability purposes, equipped at least with socket outlets or vehicle connectors of Type 2, Mennekes (for AC normal and high-power recharging points), and connectors of the combined charging system, CCS/Combo 2 (for DC high power recharging points). In USER-CHI, these elements have been taken into consideration during the products deployment and the rules have been respected, therefore the results are aligned and viable for exploitation.

Furthermore, in the sustainable business model for park and charge in the City the importance of the choices and needs of the final users[cxxxvi] assumes a key role in the choice of installation of the charging points. They are strictly linked to data availability (MaaS), technological improvements, seamless services and costs. The policy of invectives along the modal shift and/or the integration of multimodal transport hub or decongest the city centre and/or enhance the e the ancillary services become success factors in the exploitation. In the SMB CANVAS they are treated as socio-economic costs on the base of the need of continuous survey and certified big data availability[cxxxvii]. On the other side, their capitalization allows a more efficient allocation of investments at ESG's stage. In USER-CHI is applied the theory of planned behaviour in transport[cxxxviii] choices and it is analysed under WP 7.2, Del 7.3 by providing at test for final users at internal and external level.

To increase the EV drivers' satisfaction level concerning the current public charging infrastructures, different actions can be undertaken, among which, for example: allowing e-drivers to find out where they can charge easily, simplifying the EV charging buying process, supporting EV drivers in being involved with local EV communities, disseminating the utility or city programs concerning EV charge points, etc.by APP or seamless services or integrated incentives like discount in public transportation.

The SBM provided for the exploitation of INCAR and CLICK in Berlin match two business case addressing City Centre (park & charge) and proposing recharging services addressed to citizens and e-drivers travelling within the urban context with electric vehicles. By the aiming of enhance the EV's in the city the solution is analysed in the sustainable CANVAS by providing the inputs from the adaptation to the new regulatory framework and the market trend analysis on the EV's up to 2022 and the pathways of bottlenecks-solutions incurred including the user's test for outcomes.

On 14.12.2022 the EC[cxxxix] approved €1.8 billion German scheme to roll out high power charging infrastructure for electric vehicles under the State aid rules. This decision allows the exploitation of USER-CHI products in Germany in combination with other regulation. The SBM in this way has the possibility to gain the streams generated and to figure out the benefit. Specifically, the Germany's scheme contains:

- the assumption on the necessity and appropriateness to allow for the deployment of HPC recharging infrastructure at a large scale;
- the measure has an "incentive effect" as the beneficiaries would not carry out the relevant investments without the public support; and
- recognizes that Germany put in place sufficient safeguards to ensure that the scheme has a limited impact on competition and trade within the EU.
- the scheme is open to all companies operating in the sector and the beneficiaries will be selected following an open, transparent and non-discriminatory bidding process
- in addition, the German authorities will ensure that the prices charged are in line with those charged by comparable existing infrastructure.

The updated overcome one of the main difficult highlighted by Berlin for the incentives like the 10% discount. By applying the German scheme approved it is possible to provide at direct and indirect incentive for instance by compensation costs or integrated discount not directly on the EV's subscription.

Lastly, the process in data monitoring prices and consumption related which constitute one of the main elements in the SMB is now clearly under public management and in real time[cxl] and become substantial in the USER-CHI and beyond. Furthermore, this choice avoids the risk related to business cartel in case of fuel crisis escalation[cxli].

- INCAR (in the demo led by Qwello and in the demo led by Gewobag) for the implementation of a platform allowing a unique interoperability management system for roaming, charging, and parking.
- CLICK (demo web service) for the top-down location planning of charging infrastructure.

The following table represents the CANVAS of the identified business model, a more detailed description of the "City Centre (park & charge)" business model alongside with the related market analysis is reported in **Annex 3 "City Centre (park & charge)" business model analysis".**

3.5.1 Sustainable CANVAS – City centre (park & charge)

Table 9: City Centre (park & charge) CANVAS

<table>
<tr>
<td rowspan="2">KEY PARTNERS
 
• Electromobility Service Providers
• Charging Point Operators
• Technology Solution Providers
• Grid Infrastructure Managers
• Energy supplier companies
• TSPs
• Local Authorities/Mobility Agencies
• National Authorities
• European Authorities
• Financial and payment system companies
• EV's driver's associations
• EIB
• Big Data Analysts companies
• Commuters
• Cloud providers</td>
<td>KEY ACTIVITIES
 
• Analysis of local energy grid characteristics and power capacity
• Identification of local conditions as neighbourhoods traffic type (commercial, residential, business, cultural, touristic, etc.)
• Analysis of market growth
• Engagement with users and citizens
• Analysis of local ordinances
• Deals with most important energy suppliers
• Realization of roaming deals with different charging operators
• Public space context analysis
• Engagement of ancillary services providers
• Big data analysis on user's behaviour</td>
<td rowspan="2">VALUE PROPOSITION
 
• Possibility to park and charge in every area of the city
• Charging infrastructure pertinent with the city area characteristics
• Possibility to calculate the stops along the charge network
• Possibility to receive incentives for EV's
• Possibility to receive discount for multimodal integrated transport means</td>
<td>CUSTOMER RELATIONSHIP
 
• Charging subscriptions (private and business)
• Special discounts depending on the charging pattern(s)
• Grid load balancing discounts
• Financial Incentive's (i.e., cash-for-clunker)
• Non-financial incentives (i.e., free delivery at home of purchases)
• Tax credit</td>
<td rowspan="2">CUSTOMER SEGMENTS
 
• Charging at home (for those who do not have private charging place)
• Charging at office
• Charging during shopping
• Private business companies
• Charging along the network
• Interoperability AC/DC</td>
</tr>
<tr>
<td>KEY RESOURCES
 
• Municipal electrical assets, including lamp posts or utility poles, roadside space, curb side pavement, road bays
• Power grid
• National and local charging infrastructure plan
• Raw material providers</td>
<td>CHANNELS
 
• On-street visibility (CPO brand or local partner brand)
• Apps
• Web sites
• Local and/or national public administration visibility
• Location-based visibility (commercial, business, etc)
• Utility companies' channels
• Charging point totems
• Social media campaign</td>
</tr>
<tr>
<td colspan="3">COST STRUCTURE
 
• Electricity grid upgrade (especially for DC fast charging points)
• Purchase of charging points
• Cost of energy
• Installation of charging points</td>
<td colspan="3">REVENUE STREAMS
 
• EV drivers' data (preferences, tendencies, behaviour, itineraries, charging time) selling
• Session-level charging data
• Private vehicle recharging
• Business vehicle charging</td>
</tr>
</table>

• Land procurement • Market analysis • Administrative expenditures • Maintenance	• Grid balancing • Advertisement • Seamless integrated services • Parking • Renewable energy extra-production
ECONOMIC-SOCIAL COSTS • Extra administrative costs • Social media campaign • Big data collection and analysis • Awareness campaign • Social media campaign • Assessments costs for incentives • CBA	**ECONOMIC-SOCIAL BENEFITS** • New jobs opportunities • Common building codes • Utilities • Integration of multimodal hub networks • Raw material R&D • Technologies R&D • Harmonization of codes • Updated analysis of behaviour's trends • Map for optimal investment allocation • Budget shift toward sustainable public investments
ENVIROMENTAL COSTS • Disposal costs • Energy costs • Raw material costs both for parks and CP (lithium, nickel, etc) • Earth consumption	**ENVIROMENTAL BENEFITS** • Depollution of areas • Reducing demand of energy • Stimulating of home charging solutions • Tackle the demand side and prioritise energy efficiency
RISKS DESCRIPTION 1. The cross cut of different bodies involved in the decision process without a common procedure at EU level 2. Fragmentation of regulatory framework among Countries and areas 3. Lack in efficient communication strategy(ies) 4. Difficult in certified big data achievement 5. Gaps between the increase of EV's Vs. CP infrastructure development 6. Disposal costs and legal issues 7. Lack of coordination for incentives and grants at National and EU level 8. Uncertain timeline for large scale investment in charging infrastructure to fill the charging gap 9. Not adequate fast charging infrastructure network for Metropolitan cities and big cities 10. Architectural constraints	**REACTION** • Grants and subsidies (i.e., German scheme) • State aid • Synchronize scaling up a range of clean energy technologies with scaling back of fossil fuels • Tackle the demand side and prioritize energy efficiency • Manage the retirement and reuse of existing infrastructure carefully, some of it will be essential for a secure journey to net zero • Ensure diverse and resilient clean energy supply chains in CP • Provide strategic direction and address market failures, but do not dismantle markets especially at cross border level in EU 'regions

3.6 SBM4 – E-trucks

Diesel power is still king in trucking and will be it for a long time. But both public administrations and industry leaders show a huge pull and interest in market electrification.

The European Automobile Manufacturers Association (ACEA) figures out the targets to be met by 2030 of electric trucks on European roads: they will have to rise from around 2,300 at present to 200,000 by 2030 if the EU's CO2 targets are to respected.

USER-CHI project elaborated a business case addressing E-truck sector and proposing recharging services addressed to transport and mobility operators working with electric light and heavy logistics vehicles.

These operational and business solutions analysed for electric trucks are under studying in Turku demo site and can help to maximise the productivity and adoption of e-logistics fleets.

The project foreseen that charging solutions will be provided, within and outside the urban perimeters, for logistics operators but also for e-commerce sellers, freight real-estate firms, and express couriers, that can find every time suitable solutions for their business operated with e-trucks (resistant infrastructure, fast charging systems, energy storage solutions, range anxiety calming, etc.). The designed value proposition is therefore to implement such solutions with the project tested products such as:

- CLICK planning toolkit in the framework of the electromobility master plan that will foresee both quick chargers and standard chargers suitable also for logistics purposes.

- SMAC for testing the intelligent and dynamic management of demand, and for analysing – from both a technical and economic point of view – the reliability of the grid managing the high energy power necessary to trucks and vehicles for logistics. In the sustainable business model CANVAS, the outcome of the E-trucks challenges ae taken into consideration by the integration of added value proposition with the ESG's parameter, subsidy, TC, and behaviour data for the supply chain actors (producer, CPO, drivers, citizen).

An overlook after the legal modifications up to Jan.2023 for the Counties involved and at EU level is herewith provided with the aiming to well-tune the business model analysis toward a viable model and beyond the project duration with the aiming of short-term replicability in other countries addressing properly the grants, incentives and legal framework available toward an integrate EV's ecosystem.

In recent years, the exploration of near-silent, low-maintenance, battery-powered trucks and the related infrastructure is a consistent theme in logistics. The number of electric delivery trucks and vans presented and announced by manufacturers gives the impression that finally, the sector is getting to a tipping point [cxlii].

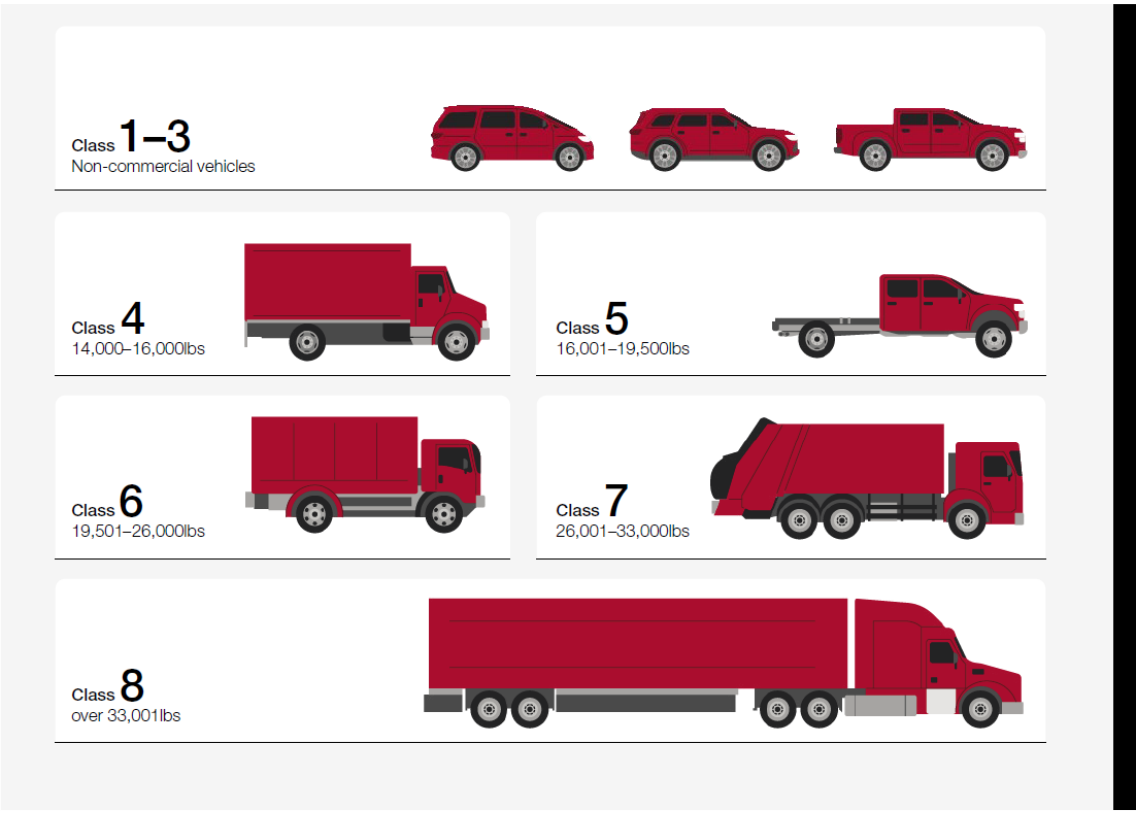

Figure 6: Classes of vehicle by weight by the World Economic Forum

According to the EAA[cxliii] the most part, the base of an E-Truck is similar to a conventional diesel truck. With one major modification: the power train. The conventional diesel engine is replaced with a Production Engineering of E-Mobility Components"(PEM) electro engine. This electro motor is powered by energy from the battery pack. The vehicles' battery pack is mounted on the left and right side of the chassis frame. By removing a number of components, we were able to create enough space for the battery pack. The entire power train of the vehicle, with exception of the electrical engine, is identical to the conventional vehicle. With the major advantage that the vehicle maintenance can be done by your dealer.

In the EU, the Commission is leading companies' awareness for bringing together measures compelling truck-makers to produce and sell zero-emission vehicles.

Table 10: CO2 reduction targets in current and proposed legislation "Fit for55" package

	2025 target for cars and vans	2030 target for cars	2030 target for vans	2035 target
Existing Regulation (EU) 2019/631	15 % below 2021 target	37.5 % below 2021 target	31 % below 2021 target	Same as 2030 (no 2035 target)
Proposed amendments	unchanged	55 % below 2021 target	50 % below 2021 target	100 % reduction

The table shows the CO2 reduction targets in current and proposed legislation 2025 target for cars and vans 2030 target for cars 2030 target for vans 2035 target Existing Regulation (EU) 2019/631 15 % below 2021 target 37.5 % below 2021 target 31 % below 2021 target Same as 2030 (no 2035 target) Proposed amendments unchanged 55 % below 2021 target 50 % below 2021 target 100 % reduction from 2030, only manufacturers responsible for less than 1 000 new vehicle registrations would b

Different companies (both producers and logistics operators) are inviting policymakers and negotiators to promote strong legislation on truck CO_2 emission standards[cxliv]. The paper position in this field have been received by the European Parliament on 15, December 2022.

This is the direction where the market, together with demand, is going. Indeed, some electric trucks are already here. Big, medium and small companies specialise in providing new and alternative solutions aiming at electric and zero emissions road transport and logistics[cxlv].

The outlook on the designer, producers and heavy-duty lorries for E-trucks implementation is updated[cxlvi]. The USER-CHI support the business exploitation by CLICK and SMAC demo cases for e-trucks in Turku by integrating the national policies with the demo. As it is possible to check, both the pilot is aligned with the incurrent legislation and can receive support beyond the project duration by the grants and incentives package there forecast. The subsidy framework brings together producers, governments and users and it is strictly linked to the urban planning. The feedback from European Commission expected by Dec.22 is still pending at the moment, by the way the assumptions address toward the SMB as tool viable.

The phasing out phase for diesel and natural gas trucks should be aligned with the Green Deal objective for E-vans up 2040 and it is supported by grants measures at Eu and National level. ACEA provided at an overview[cxlvii] which ais to be merged with the national's recovery plans and the adoption of extra measures against fuel crisis[cxlviii].

The EU strategy approved to achieve the objectives of decarbonization is in line with the recent studies and trends for E-vans enhance adoption. In the Transport&Enviroment analysis of March 2022[cxlix] the results "finds that electric vans are already the cheapest option for all user groups considered in all six countries when purchase subsidies are included. The average EU electric van is 25% cheaper than the average diesel van (0.15€/km for the e-van versus 0.20 €/km for the diesel van). Even if purchase subsidies are excluded, electric vans are already cheaper on a TCO basis in five out of the six countries considered (and are cheaper in all countries and for all user groups by 2024 at the latest)." By updating the new regulatory subsidy framework per Country

and at EU level, nowadays it is possible to match the direct incentives with subsidies (direct and indirect) for E-truck purchase[cl] together with the R&I funds provided by Horizon Europe, Era-NET and EIB.

Yet, in 2022, e-van buyers can pick from 43 models (19 light van models and 24 heavy van models), more than doubling from 18 models in total in 2019. Eight additional new e-van models have been announced to hit the market by 2025. In 2021 the average light e-van could drive 192 km on a single charge in real driving conditions (up to 255 km for longer range models), while a heavy electric van had a real range of 133 km (up to 154 km for longer range models). New models coming on the market in 2022 advertise higher official ranges (293 km for light e-vans and 263 km for heavy e-vans on average), showing range limitations are quickly being addressed. Regarding average purchase price, a light e-van on the market today costs 34,400€, while a heavy e-van costs 52,900€. Although these e-van models cost around 40%–55% more than equivalent diesel models, these higher upfront costs are more than compensated for by the lower operating costs.

The business in USER-CHI case address also the outcomes of the World Economic Forum 2021[cli] toward a cleaner, safer freight transport achievements.

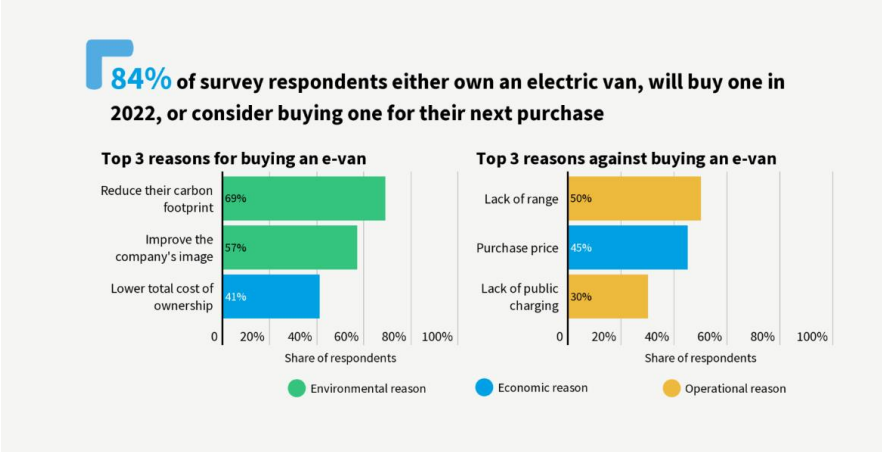

Table 11: Survey results on E-van choices

The outlook in USER-CHI per Country involved set up a harmonized framework for supporting the E-vans purchase:

1. **Spain**

The Spanish government has set a goal for mobility to be emission-free by 2050. To achieve this, it was decided to close the price gap between combustion and plug-in models with a financial aid called MOVES III (MOVilidad Eficiente y Sostenible). Private individuals can now receive up to 7,000 EUR subsidy from the respective autonomous region. The Plan Moves III[clii] is the third edition of the subsidy programme for electric mobility. It is part of the European Economic Recovery Plan and has a budget of 400 million euros, which will be distributed in the form of

direct aid for electromobility and charging infrastructure. The government has committed to doubling these funds if there is sufficient demand.

2. **Germany**

Germany since 2016 adopted a policy to inventive the E-vans purchase up to 25%[cliii] and the car manufactures are involved in the whole process.

3. **Hungary**

On 21 September 2020, the Minister of Health announced that the government would use money to support the purchase of pure electric vehicles. Within the framework of the announced tender, HUF 2 billion was allocated for 2020 and HUF 3 billion for 2021 for the purchase of electric passenger cars and vans. The amount of the grant is an equivalent of 21% of the gross selling price at the time of purchase, but it can be up to HUF 1.5 million. Strategic measures to achieve the goals include to encourage the deployment of solar capacity, enhance low carbon electricity production, increase the number electric buses and promote the uptake of electric vehicles. A fund of €92 million is to be granted to support small and medium enterprises to switch to energy production from using renewable sources.[cliv]

4. **Italy**

In Italy, in March 2022 the Government get available a total of €650 million running from 2022, 2023, and 2024. The investment is taken from the government's automotive fund, which has a total budget of €8.7 billion until 2030. It has been confirmed by new Government in Nov.2022.[clv]

5. **Finland**

The government by launching on 31.12.2022 the new regulator subsidy scheme for 2023-2024 set up a on 6 Six subsidy schemes for purchasing low-emission passenger cars, vans or trucks[clvi].

For e-vans, Finland under Measures no.3 provide at new subsidy for purchasing an electric van EUR 2,000, EUR 4,000 or EUR 6,000 in support can be granted for purchasing an electric van, depending on the size of the vehicle. Both private persons and companies are eligible to apply for the subsidy.

The 6 scheme packages aim to support the current purchase subsidies for full electric passenger cars and gas-powered trucks and the conversion subsidy for passenger cars can still be applied for in 2022 and 2023. In addition, subsidies can be granted for purchasing an electric truck in 2022 and 2023 and for purchasing an electric or gas-powered van in 2022. Subsidies may be granted within the limits of the appropriation reserved for this purpose. In adoption of the State aid rules under the "Fit for 55" package. [clvii]

The aim of the purchase and conversion subsidies for vehicles is to encourage both households and companies to move away from fossil fuels to alternative fuels and propulsion systems, thus reducing greenhouse gas emissions from transport. Electric and gas vehicles purchased new will eventually enter the second-hand car market, which makes them available to more and more of people. Another aim is to reduce the purchase costs of vehicles powered by electricity or gas to make low-emission vehicles affordable to larger numbers of buyers.

The new subsidies, together with the decision to continue the current purchase and conversion subsidies, are part of the Roadmap for Fossil-free Transport[clviii] adopted by the Government in May 2021. The objective of the Roadmap is to halve emissions from transport by 2030 compared to the level in 2005 and to achieve zero emissions by 2045. Passenger cars account for about 54 per cent and vans and trucks for about 41 per cent of emissions from domestic transport.

All the indicated measures for Country and at EU level do not make any differentiation among the assumptions considered in the preliminary business model of USER-CHI. [clix]which features with the two main branches of action in consideration of the different existing kinds of truck and lorry: urban contexts vehicles and long-haul vehicles. Looking at how technology and innovation are moving forward, electric lorries are penetrating first within the urban environment.

These impacts the sustainable business model by the multi-stake-holders approach and a specific highlight is foreseen both in the evaluation of socio-economic costs and environmental benefits boxes with the SBCM.

Besides, the E-trucks implementation, assumed as proper within USER-CHI demo in Turku and related models for exploitation as far as concern the following items:

- the distribution vans and waste collection trucks as sample of vehicles operating in the urban context that can excellently be fitted with electric solutions like the case study in Valencia[clx]
- Half of the EU's total truck activity (in tonnes-km, a good proxy for CO2 emissions) is driven over distances of less than 300 km[clxi]. These trips with present technology could be covered without problems by electric trucks through new models currently on to the market with about 300 km range (enough to cover nine trips out of ten)[clxii]
- The range of the electric trucks available will swiftly increase to 500 km, covering about two-thirds of kilometres and 19 trips out of 20. The analysis provided by Volvo in Nov.2022[clxiii] results that" According to Eurostat statistics around 45 per cent of all goods transported by road in Europe travel less than 300 km. This suggests that with smart route planning and scheduling, it is possible to transport much of these goods with electric trucks. Volvo Trucks' recent research has also shown that 45 per cent of trucks used in Europe cover daily distances of less than 350 km. Internationally, 33 per cent of trucks cover daily distances of 500 km or less".
- The three zero emission truck types (electric trucks recharging by plug, electric trucks charging dynamically, and hydrogen fuel cell trucks), vital to fully decarbonise road freight by ensuring pan-European infrastructure coverage by 2035 and it is strict connected to the charging infrastructure availability each 60Kms at least. It belongs to the match between economic-social costs vs. environmental benefits and reaction within the SBMC below[clxiv].
- The joint ventures plan along the ecosystem for E-trucks toward a wider range of coverage are suggested in the funds scheme addressing the creation of Public and Private Partnerships (PPP)[clxv]
- Thus, if on the owner side the adoption of electric freight vehicles depends mainly on the total cost of ownership[clxvi], better driver comfort, much lower noise levels, reduced

congestion, and air quality benefits in cities is strictly linked to the long-term subsidy and it is a component of the risk in sustainable business model for the situation as is and by adopting the TCO parameters[clxvii]. The market represents the 66% of the fleet to be renewed by 2040[clxviii].

Despite the outlook on the trends for E-vehicle market up to Jan 2023 demonstrate a more-friendly scenario in the market development together with the benefits related we assume as validates the assumptions of the preliminary business models analysis provided on Del. 8.8 on page 29 and 30. They are related to the following main points:

1. Demand of adequate network for CP with tri-phase AC chargers of 11 or 22 kW overnight for a large share of small and medium electric trucks could charge with.
2. Demand of CP for larger heavy trucks with larger batteries need up to 80 kW overnight charging.
3. Trucks manufactures challenges to ensure the overcoming range anxiety and the fear of being stranded if the charge runs out together with the disposal policies and costs for older fleet.
4. The necessity to cooperate, at least, between grid and trucks provider for an effective network for CP.
5. The battery costs for all the type of vehicles and the disposal costs.
6. The lack of coordination both of regulations, planning and subsidy for the creation of in the so-called "mega chargers" (also called HPCCV or High-Power Charging for Commercial Vehicles).

In this operational and market context USER-CHI project elaborated a business case addressing E-truck sector and proposing recharging services addressed to transport and mobility operators working with electric light and heavy logistics vehicles.

The following table represents the CANVAS of the identified business model, a more detailed description of the “E-trucks” business model alongside with the related market analysis is reported in **Annex 4 “E-trucks business model analysis”.**

3.6.1 Sustainable CANVAS – E-trucks

Table 12: E-trucks Sustainable CANVAS

<table>
<tr>
<td rowspan="2">KEY PARTNERS 
• Charging Point Operators
• Technology Solution Providers
• Grid Infrastructure Managers
• Energy supplier companies
• Local Authorities/Mobility Agencies
• National/European Authorities
• Real estate companies/Landowners/TSPs
• Research institutions
• Manufactures industry
• Truck driver associations</td>
<td>KEY ACTIVITIES 
• Analysis of local energy grid characteristics and power capacity
• Engagement is strategic for logistics operators
• Analysis of local ordinances
• Public space context analysis
• Evaluation of e-trucks sales
• Analysis of most strategic logistics and industrial sites
• Assessments of CBA for e-trucks purchase
• Enhancement of PPP adoption</td>
<td rowspan="2">VALUE PROPOSITION 
• Suitable solutions for logistics and distribution with e-trucks
• Charging infrastructure pertinent to logistics and urban distribution
• Ultra-fast charging for logistics vehicles in strategic areas
• Range anxiety reduction
• Energy storage solutions
• PPP's adoption
• Joint venture schemes
• Pan European network for infrastructure pivotal integrated with producers and research</td>
<td rowspan="2">CUSTOMER RELATIONSHIP 
charging infrastructures available at:
• company places,
• public spaces,
• at the destination and customer's premises,
• at company depot
• strategic hubs
• Truck's driver's engagement

CHANNELS 
• Specific contact channels for industrial and logistics partners
• Web site
• Contact persons
• Apps
• Location-based visibility
• Utility company channels
• Charging point totems
• Social media campaign
• Embedding</td>
<td rowspan="2">CUSTOMER SEGMENTS 
• Logistics operators (catering, courier/express, retail food, retail non-food, etc.)
• Public multiutility companies (e.g., waste management companies, TSPs)
• Industrial companies
• Logistics real estate companies
• Raw material providers
• Battery providers</td>
</tr>
<tr>
<td>KEY RESOURCES 
• Municipal electrical assets
• National and cross-border electrical assets
• Power grid
• National and local charging infrastructure plans
• Logistics operations data
• Strategic logistics and industrial locations
• Deals with most important energy suppliers
• Deals with raw material providers
• Disposal plans and subsidy</td>
</tr>
<tr>
<td colspan="3">COST STRUCTURE 
• Electricity grid upgrade (especially for DC fast charging points)
• Purchase of charging points specific for heavy vehicles and logistics operations
• Cost of energy
• Installation of charging points
• Land procurement
• Administrative expenditures</td>
<td colspan="3">REVENUE STREAMS 
• Logistics vehicles recharging
• Ancillary logistics services
• Grid balancing
• Advertisement
• Fees for charging points renting
• Extra energy production</td>
</tr>
</table>

• Maintenance	• Ancillary linked services • Adoption of new material
ECO-SOCIAL COSTS • Electricity grid upgrade (especially for DC fast charging points and CP three phase) • Purchase of charging points specific for heavy vehicles and logistics operations • Cost of energy • Installation of charging points • Land procurement and disposal • Extra Administrative expenditures • Extra Planning costs • Maintenance • Battery costs • Disposal cost • Grid • Total cost for owners • Training courses • Insurances costs • Social media campaign	**ECO-SOCIAL BENEFITS** • Reduction of energy costs by implementing the renewable use • Reduction of pollution and noise • Tax and financial benefits • Increase of alternative jobs • Greater spatial accessibility for pedestrians • Enhance of research and innovation in material and technologies • Shift of balance toward human centred activities • Increase of new services providing • Better driver comfort • Reduction of social cost for health system • Lower Cost per Kms
ENVIROMENTAL COSTS • Battery costs • Raw material costs • Land use • Adapting the CP network • Additional professional services fees for assessment and certifications • Range anxiety management	**ENVIROMENTAL BENEFITS** • Lower running costs • Low maintenance cost • Zero Tailpipe Emissions • No noise pollution • Greater spatial accessibility • Decrease of accidents
RISKS DESCRIPTION • Total cost for owners • Hazards in CP • Manual handling risks associated with heavy battery pack replacement or disposal. • The possibility of people being unaware of vehicles moving as when electrically driven they are silent in operation • Not adequate network of CP and realistic availability of Charging Points	**REACTION** • Introduce common system and tool for TCO calculation at EU level • Provide at pivotal subsidy measure for long-term period toward 2024 challenges for the fleet • Forecast adequate financial instruments to improve the research in material and disposal of batteries and minerals • Get compulsory the upskills in safety training courses to develop skills and knowledge • Use safety signs to assist in ensuring that correct procedures are being adhered to lock off and isolate before working on electric and hybrid vehicles for maintenance • Adoption of APP for the ability to refuel/recharge anywhere at the shortest possible time (Power vs. Time) along the network • Coo-finance enhancement of infrastructures network and e-trucks by cross cut funds (direct and indirect) • PPP' models' adoption • Joint venture instruments between private operators and applied research

3.7 SBM5 – E-taxi stops

After the adoption of the "Fit for 55" package the European Commission published on 2.2.2022[clxix] a Notice related to correct classification of E-taxi within the sustainable transport framework regulation and funds scheme.

The E-taxi are treated as part of the passenger transport-on-demand, mostly provided by taxis and Private Hire Vehicles with drivers is and it is recognized its importance in the sustainable mobility offers available to citizens.

The developments in the passenger transport-on-demand sector and the emergence of new market players and business models have also led to tensions and to different legislative responses among Member States. There is no specific EU law on the matter. Whereas customers have generally welcomed the new services, taxi drivers and operators[clxx] have struggled with increased competition. Taxi companies feel disadvantaged in view of competitive advantages that Private Hire Vehicles with driver (PHV) operating on ride hailing apps enjoy, as these do not need to comply with the same strict rules as taxis. Indeed, PHV in turn feel disadvantaged by rules which they consider as obsolete and see them as mere obstacles to efficient and sustainable operations. At the same time, concerns are often raised about the working conditions of drivers and the employment status of people working through platforms, especially PHV drivers working on ride-hailing apps. Working conditions, social rights and questions of employment status are of high relevance and, at the same time, concern many kinds of different services provided through platforms, ranging from, for example, food delivery, IT services to translation services, platform-work hence warrants a specific initiative.

The regulatory framework in this field updated on 2.2.2022 by C (2022) 529 final Commission Notice on well-functioning and sustainable local passenger transport-on-demand (taxis and PHV)[clxxi] in considered in the USER-CHI sustainable business model.

The admitted lack of coordination in legal framework do not affect the USER-CHI sustainable development analysis herewith provided because the challenges highlighted along the project implementation are fitting with the takes into account of European Commission and Nationals Governments.

In USER-CHI are analysed three case studied named CLICK, INCAR and SMAC with business case related to E-TAXI and their impact on EV's ecosystem in Turku and in Barcelona. The aiming of the present chapter is to provide at an updated sustainable business model CANVAS for implementation AS-IS and the replicability beyond the project duration and in other countries as far as concern the increase of the demand in passengers transport on demand market.

CLICK	
TURKU	*planning toolkit in the framework of the electromobility master plan that will foresee both quick chargers and standard chargers suitable for e-taxis stop purposes.*

INCAR	
BARCELONA	*For implementing a hub allowing CPOs management systems for roaming and extra-services through OCPI 2.2 communication.*
TURKU	*For providing users with a high-quality tool allowing for an interoperability among EMSPs.*
SMAC	
BARCELONA	*For creating a software tool calculating the optimal charging profile (i.e., the amount of energy to provide) of the charging stations.*
TURKU	*For testing the intelligent and dynamic management of demand, and for analysing – from both a technical and economic point of view – the reliability of the grid managing the high energy power necessary to trucks and vehicles for e-taxis.*

The premises of the business model analysed in the preliminary study[clxxii]case studies match the input for e-Mobility challenges together with new assumptions such as:

a. the increase of demand of mass public transportation;

b. the post pandemic scenario;

c. the user's behaviour in choosing the ownership of a vehicle in comparison with the adoption of other means of transportation including the sharing modalities and the transport on demand;

d. the incentives and taxation including tax credit and reimbursement for e-mobility use;

e. the cost benefit analysis of E-taxi both for drivers and users with the TCO[clxxiii]

f. the role of the organisations with large vehicle fleets intensively used, such as taxi companies, toward the transition towards cleaner means of transportation in Fitfor55 challenges

These elements applied to the sustainable business model CANVAS modify the outcomes in the choices for E-mobility.

The E-taxi SBM validate the input of the preliminary business model study and are enriched by other elements like the interaction of availability of public charging points with massive incentivise for e-vehicles adoption in comparison with the total cost's ownership. The model demonstrates that the relationship between the infrastructures, the CP's availability and e-vehicles are crucial factors in sustainable mobility development. The market barriers like the costs of purchase as well as the time consuming in charging are overcome by the petrol costs increase with no provision in id-terms and the subsidy also in management of the passenger's transport on demand.

In the SBMC herewith provided the preliminary assumptions are validated and listed below with the integration of the updated inputs:

a) the characteristics of the electric powertrain, the increase of plans[clxxiv] for banning and/or limit access to urban areas toward the Zero Emission Zones ZEZ[clxxv];

b) the demand of fleet renewal according to the new legislation[clxxvi] and the costs comparison for maintenance matched with incentive and subsidy for large scale passenger services providers like taxi companies;

c) the post pandemic scenario increases the door-to-door service[clxxvii], privacy, comfort, high city space coverage, and all daytime availability in comparison with other public transport modes which are expected to hit 18.2% by 2027[clxxviii].

d) the replacement of taxis scheme (BE instead of ICE) and the subsidy for ZEZ in accordance with the updated guidelines for SUMPS[clxxix] and become revenue streams in the SMB because for instance, the introduction of e-vehicles that can cover up to 500 kilometres in a single recharge into the market, there is an option to convert them into taxis.

e) the increase of number of CP[clxxx] with a multi-daily demand from E-taxi drivers vs. time for recharge avoiding the peak hours (more in a day scheduling the time for recharge with APP for data flow monitoring)

f) the integrated rules for decongest the urban areas in smart cities provisions[clxxxi] and the MaaS as model for big data management and funds allocation;

g) the need of a wide fast-charging outline dedicated to e-taxis,

h) the regulation for commercial purpose of the E-taxis positioning on the market has to take into account as key factors also in the SMB insights like the temporal price differentiation, pathways for shortcut in case of heavy busy charging stations in case of queues, developing of a route planning system for e-taxis considering both charging and Zero Emission Zones (ZEZ) locations, prioritising e-taxis in the customer queue, smart queue systems

In this operational and market context USER-CHI project elaborated a business case addressing E-taxis and proposing recharging services addressed to their operational necessities in accordance with the sustainable business model CANAVAS take into account the key factors and the risks by addressing the reaction to move up the adoption of exploitation in long terms by matching the different funds

These operational and business solutions analysed for electric taxis are under performing in Barcelona and Turku demo site and can help to maximise the productivity and adoption of their e-fleets and sustain the choices beyond the project duration by pilot funds and incentives local policies like

The outlook to the updated policies and subsidy shows that in the USER-CHI countries involved the match of funds and incentive are foreseen from2021 as follows:

1) Spain

The Spanish Government approved on 31.12.2022 the integration of The Moves Plan III[clxxxii] with the following facilities for E-taxi:

- direct aid for purchase of electric or plug-in hybrid vehicles and for installation of charging facilities they are up to 7,000€ for private vehicles even to renew the taxi company's fleet;
- direct support for companies includes higher sums for SMEs and can amount to 4,000 euros for the purchase of an electric passenger car and up to 5,000 euros for the purchase of a van. The Plan also fosters the scrapping of vehicles, which is essential to reduce pollutant emissions, improve road safety and contribute to the circular economy;
- improves support for the installation of charging facilities for individuals, owners' associations and small- and medium-sized enterprises, and for rapid and ultra-rapid charging points in 5 years;
- an additional 10% in three cases: the purchase of electric cars to be used as taxis or mini-cabs, actions in municipalities with less than 5,000 inhabitants and amounts for persons with reduced mobility that need to adapt their vehicles. In addition, this edition of the Plan maintains an additional discount of at least 1,000 euros from dealerships for the purchase of cars and vans.

2) Germany

Germany government approved a scheme for reducing of subsidy for e-vehicle on 26.7.22 because they validated that in Germany "E-vehicles are becoming more and more popular and will no longer need government subsidies in the foreseeable future[clxxxiii]," therefore the plans nowadays:

- Excludes the renewal of the fleet for e-taxi purchase and passenger transport on demand companies;
- Under the plan, subsidies for purely electric-powered vehicles priced below 40,000 euros will fall to 4,500 euros from 6,000 euros currently at the beginning of next year, and to 3,000 euros over the course of 2023;
- for cars priced over 40,000 euros the premium will drop to 3,000 euros at the start of next year from 5,000 euros currently;
- there is no subsidy for the purchase of cars priced over 65,000 euros, and that will apply to vehicles priced at 45,000 euros and more from 2024.

The Germany decision tool shows the maturity of the market in terms on E-taxi's increase and provided an added value element to the USER-CHI sustainable business model and its replicability.

3) Hungary

The EC approved on Dec. 2022 the National reform programme of Hungary 2022 and published it on 27.1.2023[clxxxiv].

It substantially confirms the incentives and grants for E-vehicle purchase both for private and associated operators up to 55% according to the following rules under the new plan:

- subsidies up to HUF2.5mn will be available for EVs priced under HUF11mn. EVs priced between HUF11mn and HUF15mn are eligible for a maximum of HUF500,000 in support. Cars priced above the ceiling will not be entitled to state support. These include premium cars such as Tesla Models or Jaguar I-Pace;
- the price advantage of combustion engine cars will disappear with the €7,000 subsidy for cheaper EV models, analysts said, who welcomed the increase in state funding at the low-end price range;
- the most affordable zero-emission vehicle on the Hungarian market is Skoda CITIGO and iV at a HUF6.5mn list price, which will be available for HUF4mn with subsidies.
- The government expects to see the stock of EVs rise by 1,000.
- Since February, when the former subsidy programme ran out, car prices grew by 4-5% due to the rising logistics costs and the weaker forint.
- Subsidies for vehicles to be used as taxis will be capped at 55% of the purchase price. The rate of subsidy for e-bikes will be the same up to HUF1mn, but it will only be available for delivery companies and sole proprietors.
- The government did not wish to support the purchase of e-scooters for private usage, according to the Ministry of Innovation and Technology responsible for the programme.
- The government promised to simplify administration and speed up the application process and pay-out.

4) Italy

The Ecobonus approved in 2020 by the Italian Government and confirmed by the Legge di bilancio 2022 by Circolare[clxxxv] no.30 issued on 30.12.2022, allows:

- the commercial grants are available for N1 & M1 type cars purchased between 1 January 2021 and 31 December 2023;
- Public Procurement: According to Italian budget law for 2022, public administrators when renewing their fleet have to reserve a 50% quota for the purchase or rental of electric, hybrid or hydrogen vehicles.
- Tax Benefits shared between

  a) Ownership tax: In most Italian regions, both fully-electric vehicles and plug-in hybrids are exempt from paying annual ownership tax for five years from the date of registration. After this five-year period, they benefit from a 75% reduction of the equivalent tax rate for most petrol vehicles.

  b) Company car tax: 25% discount on tax for cars emitting less than 60g/km CO2

  c) 'Eco-tax': New ICE vehicles purchased or leased and registered in Italy between 1 March 2019 and 31 December 2023 will have to pay a penalty for choosing a polluting model.
- Local Benefits

- Free parking & free circulation in ZTL (Limited Traffic Zones): Some cities in Italy offer further incentives, such as free parking in urban areas and free circulation in limited circulation areas (ZTL zones) for hybrid or electric cars.
- Increasing funding by 50% to boost EV uptake post-Corona: The latest bill will boost the EV and EV charging incentives available to Italian residents for the rest of 2023.

5) Finland

The Finnish Government on 8.12.22 proposed that the President of the Republic approve the amendments, which have been passed by Parliament, to the Act on Purchase and Conversion Subsidies for Low-emission Vehicles. The President of the Republic is to approve the bill on 9 December 2022[clxxxvi]. The new framework does not confirm the funds for e-taxi by the way the rules are settled as follows:

- The application period for the purchase subsidy for electric and gas-fuelled vans and trucks would be extended until the end of 2024, as the Government has allocated additional financing for this scheme. Under the current Act, the application period for the purchase subsidy would end no later than 31 December 2022 for vans and 31 March 2023 for trucks.
- In contrast, the application periods would be shortened by three months for the purchase subsidy for fully electric cars, i.e., battery electric vehicles (BEVs), and the conversion subsidy for passenger cars, as the Government has not allocated an appropriation for these schemes for 2023. The application periods would close on 31 December 2022.
- The period of validity of the Act would be extended until 31 December 2026.
- Any purchase subsidies applied for under the previous Act on Purchase and Conversion Subsidies for Low-emission Vehicles (971/2017) would be processed in accordance with the provisions of that Act.

Charging solutions for urban environment where it is possible to find every time suitable solutions for the taxi business operated with electric vehicles (fast charging systems, fleets tailored solutions, prioritization in the queues, etc.).

The following table represents the CANVAS of the identified business model integrated with using the triple bottom line (TBL) approach. And the fuel crisis measures integration, a more detailed description of the “E-taxis” business model alongside with the related market analysis is reported in **Annex 5 “E-taxis business model analysis”.**

3.7.1 Sustainable CANVAS – E-taxi stops

Table 13: E-taxi stops sustainable CANVAS

<table>
<tr>
<td rowspan="2">KEY PARTNERS 
• Local Authorities/Mobility Agencies
• Charging Point Operators
• Technology solution providers
• E-taxi drivers/organizations
• National Authorities and European Authorities
• Grid Infrastructure managers
• Energy Supplier companies
• Taxi vehicle manufacturers
• TSPs
• TNC's</td>
<td>KEY ACTIVITIES 
• Analysis of local energy grid characteristics and power capacity
• Analysis of most strategic taxi sites
• Engagement strategic for taxi corporations
• Analysis of most important taxi routes
• Analysis of local ordinances
• Deals with most important energy suppliers
• Subsidy's request for e-taxi available by NRRP
• Planning of</td>
<td rowspan="2">VALUE PROPOSITION 
• Provision of taxi specific charging solutions
• Fast charging solutions
• Provision of private and fleet charging solutions under particular circumstances
• New application(s) of MaaS</td>
<td rowspan="2">CUSTOMER RELAHONSHIP 
• Temporal price differentiation
• Charging subscriptions
• Ultra-fast charging solution
• Taxi specific prices
• Taxi specific charging strategies (queues, lines, prioritization, etc.)
• R&I actors</td>
<td rowspan="2">CUSTOMER SEGMENTS 
• Taxi drivers
• Taxi corporations
• Private EV drivers
• Companies with vehicle fleets
• Long Covid groups
• Door to doors users' services
• Mobility agency
• E-taxi</td>
</tr>
<tr>
<td>KEY RESOURCES 
• Power grid
• Taxi parking bays
• Taxi operating areas
• Subsidies for purchase</td>
<td>CHANNELS 
• Apps specific for taxis
• Telephone contacts
• On-street visibility
• Location based visibility
• Public administration visibility
• PPP
• Joint venture
• Social media campaign</td>
</tr>
<tr>
<td colspan="3">COST STRUCTURE 
• Electricity grid upgrade (especially for fast charging points)
• Purchase of charging points
• Cost of energy
• Installation of charging points
• Land procurement (if necessary)
• Market analysis</td>
<td colspan="3">REVENUE STREAMS 
• Taxi charging session (during the day)
• Private users charging session (during the night)
• Grid balancing
• Ancillary services
• Taxes
• Big data</td>
</tr>
</table>

• Maintenance	
ECO-SOCIAL COSTS In addition to the cost structures: • unfair competition with traditional taxis • limited compliance with social legislation • end to be disproportionately younger, college educated, and more affluent • E-taxi services more expensive than public transit, • The use relies on smartphones and credit cards, imposing financial barriers for low-income people • reduce public support for transit subsidies • social media campaign • extra administrative costs for fair regulation • revenue service time being sacrificed for charging	**ECO-SOCIAL BENEFITS** • extend or complement public transit, • reduce car ownership and congestion, • minimize parking supply • socio-technological system to be available for third Countries less developed • safe modes of transport • convenient mobility options • and respond to taxi demand fluctuations • improve transit availability in disadvantaged and remote areas • create new job opportunities • provide flexible working hours for drivers • research and innovation costs • bid data management (MaaS) • new application and services alongside the value chain • upskilling and reskilling
ENVIROMENTAL COSTS • Vehicle KMs travelled (VKT) • energy consumption • parking demand • land consumption • battery costs • disposal costs • raw materials availability • training course for safety and e-taxi use	**ENVIROMENTAL BENEFITS** • greenhouses gas emission reduction • decongestion of traffic • PC implementation network • optimization of the peak in CP • decrease of queue • new applications and services along the value chain (i.e., charging infrastructure (charging hardware, charging services, navigation); power sector (smart charging/smart grid applications, aggregated demand-side management); cars and components (e.g., battery leasing); recycling services.
RISKS DESCRIPTION • lack of affordability • neutral at number of at-risk drivers on the road • inefficient regulations • TCO without subsidy • Lack of information about the opportunities and consequences of shifting towards e-taxis hamper • refuelling times vs. traditional taxi • lack of grid and CP availability i suburban and peripheral areas • revenues services sacrificed length the times to shift to E-taxi purchase for private and small fleet	**REACTION** • Adoption of compensative measure • Integration of the e-taxi station in the intermodal hubs with incentives to hub and spoke toward other transportation means • Improve of data management • Seamless analytic service linked to MaaS • Adoption SUMPS for e-taxi integration • Providing at enhance the infrastructures network with ore fast charging facilities should become available at strategic locations like airport or hubs • Adopting regulatory plans for data management and pricing tariffs • Pivotal local incentives toward ZEZ

3.8 SBM6 - Special events

After the COP 26 in Glasgow 2021[clxxxvii] the addresses in sustainable models for special events are taken into account. Focusing on Electric vehicle (EV's the attention highlights the assumptions of the business model have to take into account:

a) range of anxiety related to infrastructures;

b) need of increase of CP

c) Smart charging solution

d) MaaS

e) the planning and managing of weekly and seasonal peaks

f) the multimodal integration of means of transportation

g) the human centred choices

h) the fuel crisis

i) the demand of fast charging, back-up and energy storage systems, provision of mobile charging stations and grid balancing schemes

j) the speed up of investments and the framework to funds' accessibility including the PPP, joint venture, crowdfunding

k) the evaluation of ling term benefits

l) the address for governance scheme integrated by MaaS data

Whereas the meaning of special events refers not only to the emergencies but also to events industry such as cultural events, sport, conferences etc. the sustainable business model CANVAS in USER-Chi provided allow to upgrade the exploitation with the new regulatory framework, the extra-grants availability and the network of infrastructure mismatching overcoming.

The range of anxiety is recognized as elements of the lack of infrastructures[clxxxviii] despite to the vehicle abilities and to the linked service related.

With extraordinary circumstances, it is not meant only emergencies or catastrophes, but also events out of normal and daily utilization of electric vehicles.

The Zero emissions roadmap[clxxxix] shows that the special events models pattern allows to outline a baseline for EV's ecosystem implementation and along the interdependence[cxc] with sustainable development.

The Ukraine war and the fuel crisis showed how the special events model is useful in boosting the EV's ecosystem in daily management. Indeed, while the full extent of the impact is not yet known, analysts are already speculating about how the conflict could affect the production and availability of EVs in the coming months. The electric vehicle industry is in a state of flux. The recent war between Russia and Ukraine has had a profound impact on the global market for EVs.

Many manufacturers have had to re-evaluate their production plans and some have even had to completely abandon their operations. Many analysts believe that the war will lead to a decrease in demand for EVs, as consumers become more concerned about the stability of the region. Additionally, the conflict could lead to higher prices for battery materials and components, which would make EVs less affordable for consumers. Despite these challenges, some experts believe that the long-term prospects for the EV industry remain positive, as increasing concerns about climate change and air pollution are likely to boost demand for clean vehicles in the coming years.[cxci] The future of the EV industry is still very much up in the air. It is unclear how the current geopolitical climate will impact the demand for EVs. However, one thing is certain, the EV industry will never be the same.

If we assume that the war constitutes a special event in large scale in the EV's ecosystem it is clear that the model and solution achieved in the management of special events constate an input for the sustainable business model analysis.

The "Fitfor55" adopting some of the addresses from COP 27 [cxcii]held in Egypt in November 2022 put together the assumption of recognizing the role of electric mobility as the primary tool to reduce carbon emissions from road transport and on the other side the necessity to speed up with the investment in infrastructures network for CP and smart charging solution as far as the ones applied in the special events.

In USER-CHI In this operational and market context project elaborated a business case addressing Special events and proposing recharging services for e-drivers travelling during extraordinary situations[cxciii].

These operational and business solutions analysed for Special events are under development in in Budapest, Turku, and Rome demo sites and can help to maximise the adoption, reliability, and usability of the EVs in every situation.

Charging solutions for every event that can support e-drivers with fast charging, back-up and energy storage systems, provision of mobile charging stations and grid balancing schemes. The designed value proposition is therefore to implement such solutions with the project tested products such as:

CLICK	
BUDAPEST	*For supporting local urban mobility planners in defining the most suitable places to install new chargers that can suit for special situations.*
TURKU	*For the framework of the city-wide master plan for EV expansion project foreseeing both quick chargers and standard chargers (with and without photovoltaic production) that can be located in places suitable for every kind of situations (also extraordinary ones).*
ROME	*For supporting the development of the City's Traffic Masterplan in a holistic mode (also considering problems due to presence of Cultural Heritages).*
INCAR	

BUDAPEST	*For a unique interoperability management system for roaming, charging, and parking to both users with an EMSP contract and users without an EMSP contract (considering that the EMSP is participating to the INCAR platform) in every particular situation, also special and emergency ones.*
TURKU	*For providing users with a high-quality tool allowing for interoperability among EMSPs also in situations out of normal daily routine.*
ROME	*for short range services as useful tool for different user categories to allow a unique interoperability management system for roaming, charging, and parking.*
SMAC	
BUDAPEST	*For dynamically optimise the power supplied to the charging points and so offering both the maximum power and a high-quality level.*
TURKU	*For testing the intelligent and dynamic management of demand, and for analysing – from both a technical and economic point of view – the efficiency of managing the energy supplied to CPOs as well as for improving the service to the end-user.*
ROME	*For providing to CPOs and EMSPs with a tool including smart grid integration services, RES electricity supply, reduction of grid impact and demand management features.*

Since during out of normal demand values, the electric grid has to face two main troubles for adopting new mobility technologies: the extraordinary request of energy, mainly during emergency and special situations, and the, foreseeable but often not enough to justify the general upgrading of the grid.

The COP 27 [cxciv]adopted a set of rules to support the special events sustainable by indicates as of utmost importance the integration of the entire supply chain of the vents industry toward the balance of different models including the EV's ecosystem and the increase on the spot demand of energies related. The bullet point on EV's is summarized here below:

- Before the end of 2023, publish the organisation's pathway to achieve net zero by 2050 at the latest, with an interim target in line with the Paris Agreement's requirement to reduce global GHG emissions by 50% by 2030
- Identify and prioritise actions to reduce emissions [such as energy management, water conservation, materials management, food and beverage waste reduction, housekeeping initiatives, sustainable procurement, stakeholder management and employee engagement] and set goals accordingly

- Address residual emissions, once they've been minimized, through the purchase of credible carbon offsets with efforts to transition to those that represent carbon removal/capture
- Contribute resources, time and/or expertise to develop a collective low carbon roadmap for the events industry.
- Publicly announce the signing of this pledge and actively promote and advocate for net zero across the industry
- Advocate for carbon reductions and perform due diligence as part of procurement processes
- Promote and participate in initiatives within and beyond the events industry to raise awareness of synergies, find solutions and design collaborative opportunities for reducing carbon emissions

USER-CHI sustainable business model surely contributes by its outcomes into road map development and allow the exploration and route to the market updating the business model and the importance of integration of data form EV' users behaviour in the MaaS.

Despite of the rejection of responsibilities of European Commission in the lack of enhance for network for PC [cxcv]announced by Herald Ruijters, head of investment in innovative and sustainable transport the EC EU funding will help to rectify this mismatch. Indeed, the EC[cxcvi] on 13.1.2023 adopted a Commission Implementing Decision of the CEF 2022 call for proposals under the multi-annual work programme 2021-2027.[cxcvii]to support the smart grids also for special events.

The EIB under the programme 2012-2027 confirmed the possibility to join funds like Jasper[cxcviii] also for the management and supply to energy demand for special events.

Besides, there is the availability in Era Net funds[cxcix] for the topics related to the network implementation and reduction of range of anxiety in EV's ecosystem,

Furthermore, with the EV market growing and a world always more dealing with special circumstances, the lack of electric mobility in disaster events planning is becoming a part of the upgrading of SUMPS assessment of the impact of the grid in daily management by implementing the MaaS. With the entry into force of the "Fit for 55" package the distances between the CP are now reduced up to 60KMs it means a quick adaption and at the same time the necessity to improve the smart charging and mobility charging stations and battery-based charging solutions during special and emergencies.

As fa as concern USER-CHI, ENEL X in May 2022 has completed construction of an innovative microgrid that leverages solar energy and battery storage to support the facility and EV charging at Global Partners LP's Alltown Fresh® service station in Ayer, Massachusetts[cc]. The case leads out solutions both for planning and backup of energy storage. By this installation ENEE X opened the scenario and business model to the resiliency for EV's ecosystem,

The assumptions of the USER-CHI business model related to charging station utilization are confirmed even in the suitable updated business model and now they are set up as follows:

- the present ability be used in the time and location where they are installed,
- the ability to satisfy extraordinary situations when there is an over request of charging due to special occasions or emergency situations
- the capacity to provide and satisfy additional services not directly connected to recharging a vehicle.

These assumptions are integrated with:

- the habits and trends of EVs utilization provided by data in MaaS[cci]
- the assessment of potential peaks and drops of the different place's utilization
- the time trends in the different day and year phases
- the figure on the ESG's impacts on the exploitation in mid-long-terms period

It is here validated the assumption of the potential EV's flexibility by smart challenging strategies matched with research in raw material, disposal framework and pilot trials in demo sites in case of impossibility or high delays in upgrading the gird's network

The following table represents the CANVAS of the identified business model, a more detailed description of the "Special events" business model alongside with the related market analysis is reported in **Annex 6 "Special events business model analysis".**

3.8.1 Sustainable CANVAS – Special events

Table 14: Special events Sustainable CANVAS

<table>
<tr>
<td rowspan="2">KEY PARTNERS
Technology Solution Providers
Grid Infrastructure Managers
Energy supplier companies
Local Authorities/Mobility Agencies
National/European Authorities
Grid Infrastructure Managers
Location owners
TSPs
Electromobility service operators</td>
<td>KEY ACTIVITIES
Analysis of local energy grid characteristics and power capacity
Analysis of local ordinances
Local space context analysis
Identification of local conditions as neighbourhoods
Analysis of local power utilization trends</td>
<td rowspan="2">VALUE PROPOSITION
Support to EVs in: Emergency cases, Occasional Events
Provision of fast charging stations
Provision of back up charging and energy storage systems
Provision of Mobile Charging Stations
Grid balancing solutions (as ancillary services, not as main business)</td>
<td>CUSTOMER RELATIONSHIP
Charging subscriptions (private and business)
Special discounts depending on the charging pattern
Energy storing subscription
Charging infrastructures renting</td>
<td rowspan="2">CUSTOMER SEGMENTS
Private drivers
Professional EV drivers
Grid infrastructure managers
Road infrastructure managers
Fair and event organizers</td>
</tr>
<tr>
<td>KEY RESOURCES
Deals with most important energy suppliers
Power grid
Deals with local emergency authorities
Deals with local event and fair organizers</td>
<td>CHANNELS
Specific contact channels for industrial partners
Specific contact channels for private customers
Web site
Apps
Location based visibility
Charging point totems</td>
</tr>
<tr>
<td colspan="3">COST STRUCTURE
Electricity grid upgrade (especially for DC fast charging points)
Purchase of charging points
Purchase of mobile charging points
Cost of energy
Installation of charging points
Land procurement
Administrative expenditures
Maintenance
Market analysis
Systems transferring</td>
<td colspan="3">REVENUE STREAMS
Ancillary services
Fees for charging points renting
EV drivers' data (preferences, tendencies, behaviour, itineraries, charging time)
Session-level charging data
Private vehicle recharging
Emergency or governmental vehicle recharging
Grid balancing
Advertisement
Fees for charging operations
Taxation
Social media incomes
Training course
Raw material researches outcomes</td>
</tr>
</table>

ECO-SOCIAL COSTS In addition to costs structures • Training course • Extra administrative costs • Certification costs • Raw material • Business plan for each event • Assessment on the #to go #not to go for each event • Range of anxiety management • Maas integration • Social media campaign • Tender procedures • Upgrading of the SUMPS	**ECO-SOCIAL BENEFITS** • Upskilled and reskilled communities • New job placement • New services both direct and ancillary • New business opportunities in the sustainable event industry • Updated metadata •
ENVIROMENTAL COSTS • Land rehabilitation after the event • Disposal • Battery charge • Certifications • Raw materials research • Smart and back storage solution on demand by the fastness of the technology's implementation	**ENVIROMENTAL BENEFITS** • Toolkit for emergencies and special events management • Access to different areas by intermodal meaning of transportation • Updating on the effective reduction of emissions •
RISKS DESCRIPTION • Charger management • Charger location availability • Cyber risks • Vehicle repair • Delays in smart sols and network improvement • Driver training • Vulnerable road users • Lack in adoption of joint venture and agreements	**REACTION** • Increased supplies of clean energy along the EV's ecosystem • Integration of data in Maas • Compulsory training course • Information camping on the funds and the framework available • Risk management services • Insurances common regulatory framework costs • Data management exchange system at EU's level • Integration among operators • Extra funds provision at local level

3.9 SBM7 – Mobile charging stations

As far as declared by European Commission of Auditors in 2021[ccii] the electric vehicles (EVs) adoption and charging infrastructure implementation are not growing in a parallel way besides, as confirmed by European Commission in Lisbon during TRA and, by the update monitoring issued in Dec.2022 the charging network is growing, but there are significant differences in deployment across the EU[cciii] The increase of the EV's market toward European Green Deal's objectives, the fuel crisis and the supporting to overcome the gap are crossing cut several funds and policies.

Electric car sales reached a record high in 2021, despite supply chain bottlenecks and the ongoing Covid-19 pandemic. Compared with 2020, sales nearly doubled to 6.6 million (a sales share of nearly 9%), bringing the total number of electric cars on the road to 16.5 million. The sales share of electric cars increased by 4 percentage points in 2021. The Net Zero Emissions by 2050 Scenario sees an electric car fleet of over 300 million in 2030 and electric cars accounting for 60% of new car sales. Getting on track with the Net Zero Scenario requires their sales share to increase by less than 6% percentage points per year[cciv].

To avoid this gap have been adopted within "Fitfor55" package a pattern of integrated actions matched with pathways coming several EU projects, bottom-up approach baseline and viable solution ready to market.

Mobile charging stations were outlined[ccv], dividing different charging strategies in the three main categories: mobile charging (including the subcategories: portable charging station, truck mobile charging stations and vehicle-to-vehicle (V2V) power transfer), fixed charging (private and public charging stations) and contact-less charging (battery swapping and wireless road charging). Data from the driver for mobile charging include the suggested location for the charging event, electricity need, and time to charge, and after a correct charging, the driver will receive information on total cost of the charging

Within the USER-CHI sustainable business model(s) related to MCSs are under evaluation in Rome by a set of four different products aiming at:

CLICK	
ROME	*Planning toolkit for the development of the City's Traffic Masterplan in a holistic mode and for finding the locations, with Enel X, of the new charging points to realize (and before to test with solutions as the mobile charging stations).*
INCAR	
ROME	*INCAR for the implementation of a platform allowing a unique interoperability management system for roaming, charging, and parking with all the kind of charging stations available, also MCSs. In the Rome demo site this solution will be tested only for charging stations of ENEL X. No other MSP will be engaged*

INSOC	
ROME	*INSOC for the Integrated Solar DC – Charging stations. Some solutions of mobile charging stations integrate also solar panels*
SMAC	
ROME	*SMAC for the optimal charging profile (amount of energy to provide) in all the kind of charging stations.*

Despite to the slight increase of[ccvi] to the battery swapping and wireless charging lanes in the last years they are still underutilized due to several factors such as electricity availability, self-confidence with the services, range of anxiety, accessibility to the APP and exchange system. Therefore, at Jan.23, it is assumed still valid the assumption related to the Mobile Charging Stations (MCSs) as a viable option that can serve EV charging in a portable, flexible, and put-on wheels manner.

Since, the EU has several regulatory measures in place that aim at increasing the number of charging points and the uptake of PEVs across the EU. The most prominent instrument is Directive 2014/94/EU and bmi up to amendment approved in 2021[ccvii] on the deployment of alternative fuels infrastructure. By promoting infrastructure for both refuelling and charging with alternative fuels such as electricity, hydrogen and natural gas, this directive is seeking to facilitate the market uptake of electromobility across the EU and to reduce European dependence on oil and oil related products. Moreover, it aims to facilitate the standardisation of the technical specifications of charging points and make information on the use of alternative fuels more easily available to customers. Each EU Member State is obliged to submit a national strategy on AFID implementation. For example, the German national strategy lays out an investment plan of almost EUR 1 billion, of which EUR 300 million are allocated towards charging infrastructure programmes.

According to the technologies available MCSs are able to provide charging services without time and location constraints and are assumed as baseline for the value proposition and the exploitation of the sustainable business model as well as concern[ccviii].

Thus, if the assumptions of the features of MSC's are validated from preliminary analysis in Del. 8.8 herewith in application of SBMC it can be postulated that:

- land as a resource will become severely scarce in the forthcoming years;
- the MCS system is a movable charging station, which is not fixed in one place[ccix];
- as charging demand varies with the transportation situation, the MCS system can be moved to a new demand centre, usually for charging or emergency rescue charging;
- storage technology and its applications have made significant breakthroughs in recent years, especially in battery storage, which was used in the optimization of electricity grid networks and movable energy supply scenarios[ccx]

The MSCs adoption within the USER-CHI sustainable business model offer a pathway for well-tune the added value proposition and the revenue streams[ccxi] mainly related to the replicability and cost effectiveness sustainable return on investment.

The pandemic, scenario, the blockchain adoption in transport field, the fuel crisis and MaaS implementation confirm the trends related to the viability of MSCs as a reliable tool in EV' ecosystem. Besides, due to the dimension of the city of Rome and its specificity which contains almost of the constraints belonging to the in EV's ecosystem such as cultural heritage constraints, integration of SUMPS with urban planning for requalification, renewable energy in buildings fragmentation for architectural constraints, integration of the network in TEN-T for intermodal transport, delays on more eco-friendly public transportation means, fragmentation of the offer for passengers services on demand, interaction among several public bodies, special events location, Vatican presence and so it is possible to assume within the present SMB analysis that model is realistic an tested in a very complex scenario as far as concern the complexity in EV's ecosystem according to the ESGs parameters[ccxii].

Therefore, if MCSs have been developed to meet:

- the need of solving the issue of overloaded Fixed Charging Stations (FCSs);
- the requests coming from EVs users as community by the deployment of MaaS
- the increase demand of energy toward the availability of FCS;
- the increase of demand toward the overload and destabilized fix grid;
- the interaction with APP's a data exchange tools
- the optimization of location[ccxiii] and related flexibility;
- the integration inside the E-vans with slightly modification of the features[ccxiv]

Mobile charging stations can be set up at defined points, for example, spread out across a city, and their flexible locations can be easily found by developers and users via internet or apps.

The service can be integrated with trucks or inside vans. This means that the station can move freely in every location where charging is needed, thanks also to their ability to be installed with or without the connection to the grid. When independent from the grid, they are usually equipped with solar panels, self-contained generating systems, or with Battery Energy Storage Systems (BESS).

In this last situation, how the charging station is used, and consequently the duration of the battery package, depends on both the provider and the user's demand.

Depending upon on-site capabilities, chargers can be powered not only through existing power at the location, but also by solar panels, or self-contained generating systems.

Mobile EV charging solution offers a highly adaptable Electric Vehicle Supply Equipment (EVSE) and Charging as a Service (CaaS) option that is available for long-term renting or for immediate use.

According to the "Fitfor55" package smart charging allows network operators to optimize energy flow into EVs. In other words, they can regulate energy intake according to peaks and lows in energy demand. This means they can provide more reliable services to their customers.

Indeed, if EVs simply plug-in and charge, taking as much energy from the grid as they need to. Smart chargers 'communicate' with the cars they are plugged into, the utility provider, and the charging point owner through data connections, like in a cloud. Through these data connections, charging operators can measure and manage energy usage and power levels remotely, in real-time.

As a result, smart charging enables grid operators to develop dynamic connected energy systems that can withstand future surges in demand for EV charging. It future proofs business for grid operators, who can offer the best service to their customers by avoiding power shortages and providing energy whenever needed despite unanticipated spikes in demand.

In the exploitation of the SMB in comparison with other viable solution, USER-CHI provides by demo test to well-tune the real impact of MCS's within a pattern of demo case by product and receive the feedback from a wider range of users both at internal level among the stakeholder's engagement within the Countries involved in the project and with a significant phase of test users at external level by updating the map of users to millennials.

In coherence with the assumption ESG's related it is possible to highlight in terms of benefits and value proposition that the MSC intensive adoption allows:

- the possibility to storage energy[ccxv]. This element could be helpful not only to reduce the negative influence of Direct Current Fast Charging (DCFC) in the grid but also to reduce the total number of FCSs needed to cover charging requests in a specific location and to temporarily store sustainably generated power;
- be a solution to lower stress on grid infrastructure and a support to fill the charging gap and provide a fast remedy;
- as CaaS providers directly to e-drivers, MCSs can provide vehicles charging directly where is necessary, saving the travelling time for going to the nearest FCS. The CaaS can be integrated in the MaaS[ccxvi];
- the optimization in services delays
- by leveraging the power of smart charging to balance the grid, operators can optimize charging infrastructures to be more efficient, more convenient, and more cost-effective for EV's ecosystem and smart cities challenges[ccxvii];
- the second life to batteries[ccxviii] by decreasing the demand or raw material such as Lithium;
- to optimize the grants allocation[ccxix] in the network of charging facilities vs. the infrastructure installation to stimulate the EV's adoption;
- in short terms the enhancement of MSC achieve the Fit for 55 and REPowerEU[ccxx] objectives as updated on 18.5.2022 by EC by providing at "A plan to rapidly reduce dependence on Russian fossil fuels and fast forward the green transition".

- in terms of governance, since the market of MSC is considered as independent and not yet regimented the MSC deployment set up a real bottom-up based approach able to identify the key factors and the socio-economic sustainability and profitability given the assumption of fully environmentally friendly features.

The SBM is integrated with the funding supporting scheme in the development of USER-CHI beyond the project duration and for replicability by cross cutting the different funds, grants and incentives set up from EC and EIB mainly and the National Recovery Funds.

Specifically, EC on Question time of 18.10.2022[ccxxi] clarified that: "in order to reach the Fit for 55 and REPowerEU objectives for renewables and energy efficiency, it is estimated that about EUR 584 billion of electricity infrastructure investments are needed between 2020 and 2030, in particular in the distribution grid. Investments in digital solutions such as grid optimisation at distribution level will help reduce further capital expenditure on enhancing the existing grid infrastructure, allowing for a faster deployment of electric cars, decentralised renewables, heat pumps and other technologies - due to reuse of existing infrastructure. To increase the efficiency and smartness of the grid for the benefit of the energy system as a whole, the Commission will support closer cooperation between the EU Transmission System Operators (TSOs) and the distribution grids operators (DSOs) to create a virtual model of the European electricity grid. To guide investment, the Commission will also support the European Union Agency for the Cooperation of Energy Regulators (ACER) and the national regulatory authorities (NRAs) in their work to define common smart grid indicators and related objectives that would contribute to this goal. This will allow NRAs to monitor smart and digital investments in the electricity grid annually as of 2023 and measure progress towards the creation of the digital twin of the grid.

Moreover, in this operational and market context USER-CHI project elaborated a business case addressing Mobile Charging Stations and proposing recharging solutions for exploiting the potentialities and benefits derived by using MCSs in Rome. help to maximise the adoption, reliability, and usability of the EVs with the support of MCSs.
The grants available for this kind of development are listed:

1) The Horizon Europe 2021-2027 programme[ccxxii] can support initiatives to enhance interoperability, engage consumers in the new energy market and pilot energy data spaces. In the 2023-2024 programme, the Commission intends to launch a flagship initiative to support digitalisation of the energy system.
2) The Digital Europe Programme will be pivotal in kick-starting the deployment of the common European energy data space building on the results of the Horizon Europe-funded projects that demonstrate solutions for this data space. It will also fund the newly established European Cybersecurity Competence Centre and the Network of National Coordination Centres.
3) Connecting Europe Facility grants can be used to support some cross-border smart grid projects being identified as Projects of Common interest (PCIs).
4) National Recovery and Resilience Plans are tools through which Member States can channel funding into the digitalisation of the energy sector.

5) The LIFE Clean Energy Transition (CET) sub-programme supports the development of smart energy services' solutions to empower citizens and communities in the energy system.
6) Cohesion Funds can also be used by Member States, regional and local authorities to target the digital transformation across sectors, including energy, with a particular focus on smart energy systems and smart grids.
7) The Commission calls on Member States to increase their R&I support for the testing and piloting of digital technologies in the energy sector and promote cooperation between digital and energy stakeholders through the national R&I programmes.
8) The Innovation Programme

Charging solutions for every kind of e-drivers, increasing their confidence with electric vehicles thanks to the services provided by the MCSs as the Charging-as-a-Service, support in emergency situations, off grid charging, back-up and storage systems, etc.

The SBM takes also into account in the risks box description about two input:

- the limit under current legislation (group prohibition and rules for congestion management from the Electricity Act and Grid Code[ccxxiii])may not trade, generate or supply. It is unclear whether they may purchase flexibility from third parties. The question is whether this is in line with the statutory duties of the grid operators. As a result, it is unclear whether they may deploy Smart Charging. Under current regulations, grid operators may only temporarily apply congestion management. They are obliged to eliminate situations [ccxxiv]of transmission scarcity as quickly as possible by investing in grid upgrades.
- risk of congestion at regional network operator[ccxxv]: the use of the storage capacity of electric cars for certain types of Smart Charging, which, for example, aspire to the use of reserve markets for balancing or complying with the programme responsibility could lead to congestion in regional grids. For example, when the cars that are used for this simultaneously charge (or discharge) on the same regional low voltage grid. Increased EV charging paired with increased other power consumption in homes. Some local risks of reduced stability/outage.

The following table represents the sustainable model CANVAS of the identified business model, a more detailed description of the “Mobile charging stations” business model alongside with the related market analysis is reported in **Annex 7 “Mobile charging stations business model analysis”.**

3.9.1 Sustainable CANVAS – Mobile Charging Stations

Table 15: Mobile Charging Stations CANVAS

<table>
<tr>
<td rowspan="2">KEY PARTNERS 

Electromobility Service Providers
Technology Solution Providers
Grid Infrastructure Managers
Energy supplier companies
TSPs
Local Authorities/Mobility Agencies
National/European Authorities
Financial and payment system companies
Energy storage providers
Logistic providers
Mobile operators
</td>
<td>KEY ACTIVITIES 

Analysis of local energy grid characteristics and power capacity
Analysis of market growth (users and operators)
Analysis of local ordinances
Deals with most important energy suppliers
Analysis of local power utilization trends
Analysis of local most important events and fairs
Analysis of users and energy provider’s demand
CBA on MCS adoption vs. FCS
</td>
<td rowspan="2">VALUE PROPOSITION 

Charging as a service (CaaS)
Possibility to park and charge in every situation
Support to EVs in: Emergency cases, Occasional Events
Grid balancing solutions
Provision of charging solutions also in areas underserved
On-time service solutions
Temporary charging solutions
Off grid charging solutions
Energy storage as main service and not ancillary
CaaS and MaaS
</td>
<td>CUSTOMER RELATIONSHIP 

Charging subscriptions (private and business)
Special discounts depending on the event
Grid load balancing discounts
Charging infrastructures renting
Emergency readiness on-call solutions
Mobile operators
Event organizers
</td>
<td rowspan="2">CUSTOMER SEGMENTS 

Private drivers
Professional EV drivers
Grid infrastructure managers
CPOs
Road infrastructure managers
Fair and event organizers
Power energy providers
Mobile operators
</td>
</tr>
<tr>
<td>KEY RESOURCES 

Power grid assets
Deals with most important energy suppliers
Deals with local emergency authorities
Deals with local event and fair organizers
Appropriate charging technology solutions (grid and off grid)
Energy storage systems
</td>
<td>CHANNELS 

Specific contact channels for industrial partners
Web sites
Local and/or national public visibility
Location based visibility (commercial, business, etc)
Social media campaign
</td>
</tr>
<tr>
<td colspan="3">COST STRUCTURE 

Purchase of charging points
Purchase of energy storage systems
Cost of energy
Market analysis
Administrative expenditures
Maintenance (especially batteries)
Transport vehicles and systems transferring
</td>
<td colspan="3">REVENUE STREAMS 

Ancillary services
Fees for charging points renting
EV drivers’ data (preferences, tendencies, behaviour, itineraries, charging time)
Session-level charging data
Private vehicle recharging
Emergency or governmental vehicles recharging
Grid balancing
</td>
</tr>
</table>

	• Energy storage • Advertisement • Social media campaign • Taxes • Raw materials industry • Circular economy operators • Batteries recyclers operators • Revues from logistic in system transferring
ECO-SOCIAL COSTS **In addition to cost structure** • Range of anxiety • Raw materials • Training courses • Social media Campaign • Health investigation • Insurances costs • Extra administrative costs • Procurement costs • Training courses	**ECO-SOCIAL BENEFITS** • Optimize the grants allocation in the network of charging facilities vs. the infrastructure installation to stimulate the EV's adoption; • Enhancement of MSC achieve the Fit for 55 and REPowerEU • Ggovernance tool for DSS big data deployed
ENVIROMENTAL COSTS • Battery recycling • Raw material • APP • Assessment on installation • Logistic costs assessment • Reliability of the spare-parts • Disposal • Land use and rehabilitation	**ENVIROMENTAL BENEFITS** • Energy storage • Reduce the negative influence of Direct Current Fast Charging (DCFC) in the grid • Reduce the total number of FCSs needed to cover charging requests in a specific location and to temporarily store sustainably generated power; • Lower stress on grid infrastructure and a support to fill the charging gap and provide a fast remedy; • CaaS providers directly to e-drivers for nearest FSC addresses • CaaS integrated in the MaaS; • Optimization in services delays • Optimize charging infrastructures • Battery recycles • Decrease of Raw material demand (Lithium and Nickel demand) decrease • Empower flexible charging, • Reduce traffic jams, • Support to fixed charging stations during times with high demands
RISKS DESCRIPTION • Energy storage not trade, generate or supply • Risk of congestion at regional network operator • IoV (Internet of vehicle)	**REACTION** • Regulatory framework for MSC as main services • Data management system

4. Conclusions

This deliverable has outlined the results of a sustainable business model analysis about the seven use cases considered in the project objective O5.

The areas of impact considered take into account the input from cities within USER-CHI project implementation, the new regulatory framework, the analysis of the business model according to the ESG parameters, the availability of funds for exploitation and replicability of the outcomes.

The analyses have been realized with the direct support of the cities, the capitalization of results from the other deliverables, the working group during the peer visits in Barcelona and Rome, a survey on the state if art and next steps to move forward to achieve the USER-CHI objectives and the challenges to enhance the EV's ecosystem.

For each sustainable business model herewith described there have been updated the feasibility of each products and pattern in real market conduction, by identifying the key factors for added value proposition and the business opportunities.

The USER_CHI sustainable business model analysis addresses the challenges as follows:

- Enhance the final user's engagement since the planning phase
- Support the sustainable transport in the EV's by integrated funds and incentives
- Stimulate the applied research in raw materials and disposal and/or recycling of electromobility vehicle and infrastructures
- Increase the use of tool like the Public-Private Partnership and Joint Venture
- Optimize the social media communication
- Ingrat the MaaS in CaaS
- Exploit the business opportunities by applying the ESG parameters
- Adopt the stakeholder's engagement as part of the whole process

The reason of this approach is because assessments and evaluations, when shared and disseminated effectively, can also lead to broader changes outside the system in question. These assumptions provided in the preliminary analysis under Del. 8.8 are validated by demonstration in the present document by the baseline from the practical execution of the demo tests and considering the uptake of the different steps characterizing the adoption of new services/products: the "start-up" phase, the "early innovator" phase, and then the "crossing the chasm" phase.

Besides, the final business model is now updating with the three main inputs: new regulatory framework, ESG parameters, available funds. The sustainable models SMB are explored in CANVAS for each Key factors thus, the services and models have been analysed and designed, focusing on methods to properly sustain the adoption of the case and examining strategies such as pricing solutions, subscription schemes, nudging and gamification.

5. Acronyms

Acronym	Meaning
AC	Alternating Current
AFID	Alternative Fuel Infrastructures Directive
BESS	Battery Energy Storage Systems
BEV	Battery Electric Vehicle
CaaS	Charging as a Service
CBA	Cost Benefit Analysis
CC	Consolidation Centre
CCS	Combined Charging System
CLICK	Charging infrastructure Locatlon and HolistiC Planning Kit
CNG	Compressed Natural Gas
CPO	Charging Point Operator
DC	Direct Current
DCFC	Direct Current Fast Charging
DSS	Decision Supporting System
EC	European Commission
ECA	European Court of Auditors
EIB	European Bank of Investment
EP	European Parliament
ESG	Environmental, Social and Governance
EVE	Electric Vehicle Equipment
EVSE	Electric Vehicle Supply Equipment
FDI	Freight Directive Investment
FITFOR55	Fit for 55 package is a set of legislative proposals and amendments to existing EU legislation that will help the EU cut its net greenhouse gas emissions and reach climate neutrality.
GHG	Green House Gas
HPCCV	High-Power Charging for Commercial Vehicles
ICE	Internal Combustion Engine
ICEV	Internal Combustion Engine Vehicles
IFRS	International Financial Reporting Standards
INCAR	Interoperability, Charging and Parking Platform
INDUCAR	Inductive Charging for e-Cars
INSOC	Integrated Solar-DC charging for LEVs
IoV	Internet of Vehicles
KPI	Key Performance Indicators
LEV	Light Emissions Vehicle
LEZ	Low Emission Zone
MCM	Mobile Charging Station
MW	Mega Watt

MSP	Mobility Service Provider
M2M	Machine-to-Machine
OEM	Original Equipment Manufacturer
OCPI	Open Charge Point Interface
PHV	Private Hire Vehicles
PHEV	Plug-in Hybrid Electric Vehicle
PEM	Production Engineering of E-Mobility Components"(
PPP	Public and Private Partnership
ProEME	Promoting Electric Mobility Europe
RFCS	Regulatory Framework for Sustainable cities
SBM	Sustainable Business Model
SBMC	Sustainable Business Model CANVAS
SDG	Sustainable Development Goals
SMAC	Smart Charging Tool
SGROI	Sustainable Global Return on Investment
SUMP	Sustainable Urban Mobility Plan
SROI	Sustainable Return on Investment
SWOT	Strengths, Weaknesses, Opportunities and Threats.
TCO	Total Cost of Ownership
TEN-T	Trans European Network - Transport
TNC's	Transportation network companies
TSP	Transport Service Provider
UN	United Nation
WEF	World Economic Forum
WP	Work Package
ZBE	Zone de Baixes Emissions
ZEZ	Zero Emissions Zone

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1) The Horizon Europe 2021-2027 programme can support initiatives to enhance interoperability, engage consumers in the new energy market and pilot energy data spaces. In the 2023-2024 programme, the Commission intends to launch a flagship initiative to support digitalisation of the energy system
2) The Digital Europe Programme will be pivotal in kick-starting the deployment of the common European energy data space building on the results of the Horizon Europe-funded projects that demonstrate solutions for this data space. It will also fund the newly established European Cybersecurity Competence Center and the Network of National Coordination Centers.
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5) The LIFE Clean Energy Transition (CET) sub-programme supports the development of smart energy services' solutions to empower citizens and communities in the energy system.
6) Cohesion Funds can also be used by Member States, regional and local authorities to target the digital transformation across sectors, including energy, with a particular focus on smart energy systems and smart grids.
7) The Commission calls on Member States to increase their R&I support for the testing and piloting of digital technologies in the energy sector and promote cooperation between digital and energy stakeholders through the national R&I programmes.

[lxi] In contrast to 2020, when Europe's fast charging installations significantly outpaced slow charging ones, installations were about the same in 2021. The number of public fast chargers in Europe was up by over 30% to nearly 50 000 units. This includes 9 200 public fast chargers in Germany, 7 700 in the United Kingdom, 6 700 in Norway, 4 500 in France, 2 600 in Spain and in the Netherlands. The United States counts about 22 000 fast chargers, of which nearly 60% are Tesla superchargers. Korea has 15 000 fast chargers, 50% more than in 2020. The trends in 2022 shows an increase up to 13%. Source: https://www.iea.org/reports/global-ev-outlook-2022/trends-in-charging-infrastructure

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[lxvi] https://www.europarl.europa.eu/news/en/press-room/20221003IPR42118/fit-for-55-transport-meps-want-car-recharging-stations-every-60-km

[lxvii] Proposal for a REGULATION OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL on the deployment of alternative fuels infrastructure, and repealing Directive 2014/94/EU of the European Parliament and of the Council COM/2021/559 final - https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52021PC0559

[lxviii] https://www.eib.org/attachments/thematic/future_mobility_initiative_en.pdf
[lxix] One case for all, is the Spain loan under CEF co-financed by EIB in May 2022 for 40,000,00€. https://www.eib.org/en/projects/pipelines/all/20200784
[lxx] Please, see the outlook per Country. https://www.acea.auto/files/Electric-Vehicles-Tax-Benefits-Purchase-Incentives-2022.pdf
[lxxi] https://ajuntament.barcelona.cat/ecologiaurbana/en/what-we-do-and-why/productive-and-resilient-city/electric-vehicle-master-plan
[lxxii]XXV International Conference Living and Walking in Cities - New scenarios for safe mobility in urban areas (LWC 2021), 9-10 September 2021, Brescia, Italy Analysing the Criticalities of Public Spaces to Promote Sustainable Mobility Stefania Bogliettia*, Michela Tibonia. https://doi.org/10.1016/j.trpro.2021.12.023

[lxxiii]https://unece.org/fileadmin/DAM/hlm/prgm/urbandevt/Public_Spaces_Geneva_2015/presentations/01_Saliez_Vital_Public_Spaces.pdf. Mainly point 11.7.
[lxxiv] For instance, the case of Urban regeneration as an opportunity to redesign Sustainable Mobility. Experiences from the Emilia-Romagna Regional Call. https://doi.org/10.1016/j.trpro.2021.12.074
[lxxv] https://op.europa.eu/webpub/eca/special-reports/urban-mobility-6-2020/en/, please read the note of the European Court of auditors at point IX "*We found that projects in receipt of EU funding we examined were not as effective as intended, because of weaknesses in project design and implementation. These projects were not always based on sound urban mobility strategies, which often lacked fundamental data and appropriate analyses, relevant targets and coordination with both other plans and neighbouring municipalities*".
[lxxvi] https://www.activecitizenship.net/multimedia/import/files/mobility_good_practices.pdf
[lxxvii] Ramit Debnath, Ronita Bardhanc, David M.Reinera, J.R.Millere Political, economic, social, technological, legal and environmental dimensions of electric vehicle adoption in the United States: A social-media interaction analysis. https://doi.org/10.1016/j.rser.2021.111707

[lxxviii] QiangChen, ChenMinb, Wei Zhang, Ge Wange, XiaoyueMaa, RichardEvans
Unpacking the black box: How to promote citizen engagement through government social media during the COVID-19 crisis. https://doi.org/10.1016/j.chb.2020.106380
s
[lxxix]For a resilient, innovative, sustainable and digital mobility ecosystem - Scenarios for a transition pathway", last release 24.1.23 https://ec.europa.eu/docsroom/documents/48535.
[lxxx] Towards a co-creation framework based on citizens' dreams of future mobility, Esbjorn Ebbesson, 28.4.22 https://doi.org/10.1016/j.trip.2022.100686
[lxxxi] The co-creation pathway for the mobility ecosystem took place in Brussels on 28.11.22. The main outcomes are:
[lxxxii] On 14.7.2021 the EC by the adoption of "Fitfor55" work package declares that: "*In addition, carbon pricing instruments raise revenues that can be reinvested to spur innovation, economic growth, and investments in clean technologies. A new Social Climate Fund is proposed to provide dedicated funding to Member States to help citizens finance investments in energy efficiency, new heating and cooling systems, and cleaner mobility. The Social Climate Fund would be*

financed by the EU budget, using an amount equivalent to 25% of the expected revenues of emissions trading for building and road transport fuels. It will provide €72.2 billion of funding to Member States, for the period 2025-2032, based on a targeted amendment to the multiannual financial framework. With a proposal to draw on matching Member State funding, the Fund would mobilise €144.4 billion for a socially fair transition. The benefits of acting now to protect people and the planet are clear: cleaner air, cooler and greener towns and cities, healthier citizens, lower energy use and bills, European jobs, technologies and industrial opportunities, more space for nature, and a healthier planet to hand over to future generations. The challenge at the heart of Europe's green transition is to make sure the benefits and opportunities that come with it are available to all, as quickly and as fairly as possible. By using the different policy tools available at EU level, we can make sure that the pace of change is sufficient, but not overly disruptive. The European Green Deal, presented by the Commission on 11 December 2019, sets the goal of making Europe the first climate-neutral continent by 2050. The European Climate Law, which enters into force this month, enshrines in binding legislation the EU's commitment to climate neutrality and the intermediate target of reducing net greenhouse gas emissions by at least 55% by 2030, compared to 1990 levels. The EU's commitment to reduce its net greenhouse gas emissions by at least 55% by 2030 was communicated to the UNFCCC in December 2020 as the EU's contribution to meeting the goals of the Paris Agreement. As a result of the EU's existing climate and energy legislation, the EU's greenhouse gas emissions have already fallen by 24% compared to 1990, while the EU economy has grown by around 60% in the same period, decoupling growth from emissions. This tested and proven legislative framework forms the basis of this package of legislation. The Commission has conducted extensive impact assessments before presenting these proposals to measure the opportunities and costs of the green transition. In September 2020 a comprehensive impact assessment underpinned the Commission's proposal to increase the EU's 2030 net emissions reduction target to at least 55%, compared to 1990 levels. It showed that this target is both achievable and beneficial. Today's legislative proposals are supported by detailed impact assessments, taking into account the interconnection with other parts of the package.

The EU's long-term budget for the next seven years will provide support to the green transition. 30% of programmes under the €2 trillion 2021-2027 Multiannual Financial Framework and NextGenerationEU are dedicated to supporting climate action; 37% of the €723.8 billion (in current prices) Recovery and Resilience Facility, which will finance Member States' national recovery programmes under Next Generation EU, is allocated to climate action".

[lxxxiii] https://transport.ec.europa.eu/transport-themes/sustainable-transport/sustainable-transport-studies_en

[lxxxiv] https://digital-strategy.ec.europa.eu/en/news/cef-digital-operational-digital-platforms

[lxxxv] Stefano Gori, Marialisa Nigro & Marco Petrelli. The impact of land use characteristics for sustainable mobility: the case study of Rome, Highlights from TRA 2022 Lisbon "Moving together – reimagining mobility worldwide", https://doi.org/10.1007/s12544-012-0077-6

[lxxxvi] https://www.uitp.org/news/business-models-for-better-integrated-mobility/

[lxxxvii] Please, note the scenario in https://www.iea.org/reports/global-ev-outlook-2019

[lxxxviii] Please, see the funding scheme approved for E-MOBILITY - HIGH POWER CHARGING STATIONS https://www.eib.org/en/registers/all/126064557
[lxxxix] https://cordis.europa.eu/project/id/723977
[xc] For readers convenance we link to the USER-CHI involved countries:
Spain: https://commission.europa.eu/business-economy-euro/economic-recovery/recovery-and-resilience-facility/spains-recovery-and-resilience-plan_en
Germany:
https://www.bundesfinanzministerium.de/Content/DE/Standardartikel/Themen/Europa/DARP/deutscher-aufbau-und-resilienzplan.html
Italy: https://www.mef.gov.it/en/focus/The-National-Recovery-and-Resilience-Plan-NRRP/
Sweden: https://www.regeringen.se/rapporter/2021/05/sveriges-aterhamtningsplan/
[xcii]https://webgate.ec.europa.eu/funding-tenders/opportunities/content/can-projects-field-electric-mobility-such-innovative-and-efficient-recharging-stations-be_en
[xciii] https://urban-regeneration.worldbank.org/about
[xciv] Brussels, 24.1.2022 SWD(2022) 16 final COMMISSION STAFF WORKING DOCUMENT For a resilient, innovative, sustainable and digital mobility ecosystem Scenarios for a transition pathway
[xcv]https://www.transportenvironment.org/wp-content/uploads/2021/07/Emobility%20Platform%20AFID%20analysis.pdf
[xcvi] Please, see page 24, BM3, Del. 8.8.
[xcvii] https://alternative-fuels-observatory.ec.europa.eu/consumer-portal/electric-vehicle-recharging-prices
[xcviii] https://www.iea.org/reports/global-ev-outlook-2022/executive-summary
[xcix] Please, see https://www.europarl.europa.eu/news/en/press-room/20221003IPR42118/fit-for-55-transport-meps-want-car-recharging-stations-every-60-km approved on 4.10.22.
[c] https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:52020DC0789
[ci] "In conclusion, the interoperability of the charging infrastructure for EV across the EU can only be guaranteed if all member states integrate the described minimum requirements (from the global and the specific layers) in their legal framework and all involved stakeholders across the EU comply with them. For this to happen in a uniform way (also in terms of timing), the establishment of these minimum requirements needs to be pursued at the highest levels of the EU decision making instances. Thereafter, the interoperability requirements of the specific layers (technical and semantic) need to be included in the EU legal framework. Interoperability requires, for example, that the necessary data for a better use of EVs is generated and exchanged uniformly. To ensure a convenient use of EV (enabled by the complete interoperability of the charging infrastructure) the accessibility issues (e.g., of data, hard- and software) need to be addressed uniformly by all member states of the EU. If these requirements are not implemented, achieving interoperability of the EV charging infrastructure in the EU (apart from those countries that are included in European projects) is going to be a challenge. Additionally, and because of the continuous technological developments, regulation must have the right scope to allow innovations, e.g., new technology solutions but as well-set relevant standards. Within the legal layer, there are currently two main aspects that are hindering the interoperability of the charging

infrastructure for EV across the EU. The first is that there are still some important gaps in the EU legislation on the charging infrastructure of EV. Thus, some aspects like the use of a specific or interoperable data sharing protocol, bi-directional charging, smart charging points or the cybersecurity of the charging pints, consumer devices or grid systems have not found their way into the EU´s legislation yet (some of the might when and if the AFIR is enacted). The second is that, even though some aspects have already been included in the EU legislation, they have not been adequately transposed into the national legal frameworks of some of the member states. This causes wide disparities between countries. In this sense, the AFIR proposal is a step forward to overcome the current obstacles hindering the achievement of interoperability since no transposition into the national legal systems will be necessary and it is directly applicable. However, the AFIR proposal falls short in relation to some aspects, e.g., regarding the missing obligations in relation to interoperable data sharing protocols. Available at the following link: https://open-research-europe.ec.europa.eu/articles/2-65, published on 25.5.22.

[cii] Please, see, Del. 8.8 page 26.

[ciii] https://op.europa.eu/webpub/eca/special-reports/electrical-recharging-5-2021/en/

[civ] I.e Sustainable Business Models for Electromobility, Rudolf Schnee, University Bourgogne Franche-Comté, UTBM, CNRS, Belfort, France · FEMTO-ST, Doctor of Philosophy https://www.researchgate.net/publication/358618476_Nachhaltige_Geschaftsmodelle_fur_die_Elektromobilitat_Wie_konnen_Unternehmen_mit_Geschaftsmodellinnovationen_den_Wandel_in_die_Elektromobilitat_erreichen

[cv] I.e.https://ec.europa.eu/research/participants/documents/downloadPublic?documentIds=080166e5c7fd6c02&appId=PPGMS, Hypernemo.

[cvi] https://www.transportenvironment.org/discover/how-implementing-clean-energy-package-can-foster-electromobility/

[cvii] https://epomm.eu/about/main-goals

[cviii] https://cordis.europa.eu/project/id/723977

[cix] The experience carried out in Alberta, Canada is a tool kit for USER-CHI. https://mccac.ca/programs/electric-vehicles-for-municipalities-program/

[cx] RFCS, mainly point 5 and 6 http://rfsc.eu/european-framework/.

[cxi] https://www.iea.org/commentaries/how-global-electric-car-sales-defied-covid-19-in-2020

[cxii] https://www.eea.europa.eu/publications/trends-and-projections-in-europe-2022

[cxiii] https://www.iea.org/commentaries/as-the-covid-19-crisis-hammers-the-auto-industry-electric-cars-remain-a-bright-spot

[cxiv] https://www.iea.org/reports/global-ev-outlook-2021/trends-and-developments-in-electric-vehicle-markets

[cxv] https://www.eea.europa.eu/ims/new-registrations-of-electric-vehicles

[cxvi]https://www.acea.auto/publication/european-electric-vehicle-charging-infrastructure-masterplan/#:~:text=Up%20to%2014%2C000%20public%20charging,will%20be%20in%20fleet%20hubs.

[cxvii] https://www.mckinsey.com/industries/automotive-and-assembly/our-insights/europes-ev-opportunity-and-the-charging-infrastructure-needed-to-meet-it

[cxviii] https://ec.europa.eu/commission/presscorner/detail/en/ip_22_6462

[cxix] https://www.europarl.europa.eu/news/en/headlines/economy/20221019STO44572/eu-ban-on-sale-of-new-petrol-and-diesel-cars-from-2035-explained
[cxx] The Strategy draws on existing mechanisms and funds. President Juncker's Investment Plan for Europe plays a very important role, with significant progress already made with projects that are in the pipeline for funding under the European Fund for Strategic Investment. In addition, EUR 70 billion is available for transport under the European Structural and Investment Fund, including EUR 39 billion for supporting the move towards low-emission mobility, of which EUR 12 billion for low-carbon and sustainable urban mobility alone. Under the research programme Horizon Europe, EUR 6.4 billion are available for low-carbon mobility projects. https://climate.ec.europa.eu/eu-action/transport-emissions/road-transport-reducing-co2-emissions-vehicles_en, 4.11.22
[cxxi]https://www.iea.org/policies/15027-france-2030-investment-plan-clean-transport-investment. The French government provides up to 10,000€ to shift to EV's and 4,000€ to e-bikes by 2023.
[cxxii] https://single-market-economy.ec.europa.eu/sectors/raw-materials/areas-specific-interest/critical-raw-materials_en
[cxxiii] https://ec.europa.eu/environment/circular-economy/pdf/new_circular_economy_action_plan.pdf
[cxxiv] Please, read Del. 8.8 page 25.
[cxxv] https://wattlogic.com/blog/esg-reporting/ "How How EV Charging Can Accelerate Your ESG Scores" page
[cxxvi] https://www.ifrs.org/content/dam/ifrs/meetings/2022/november/issb/ap3a-and-4b-current-and-anticipated-financial-effects-and-connected-information.pdf
[cxxvii] https://www.ifrs.org/content/dam/ifrs/project/climate-related-disclosures/industry/issb-exposure-draft-2022-2-b32-electric-utilities-and-power-generators.pdf
[cxxviii] https://alternative-fuels-observatory.ec.europa.eu/transport-mode/road/european-union-eu27/country-comparison
[cxxix] Beinot Marcoux – ChargeHub Central - 2020
[cxxx] www.nationalgrid.co.uk
[cxxxi] Raphaela Pagany, Anna Marquardt and Roland Zink Electric Charging Demand Location Model—A User- and Destination-Based Locating Approach for Electric Vehicle Charging Stations - 1 https://www.mdpi.com/2071-1050/11/8/2301
[cxxxii] Please, read Del 2.1 USER-CHI for CLICK
[cxxxiii] Please, see the minutes of Barcelona per visiting WG outcomes of 9.11.22.
[cxxxiv] https://www.transportenvironment.org/challenges/cars/charging-stations/
[cxxxv] https://alternative-fuels-observatory.ec.europa.eu/general-information/recharging-systems
[cxxxvi] Tianyu Yang, Xiangxiang Xu, Qinglai Guo, Lin Zhang, Hongbin Sun, EV charging behaviour analysis and modelling based on mobile crowdsensing, 2017doi: 10.1049/iet-gtd.2016.1200 www.ietdl.org
[cxxxvii] Narjes Fallah, Ali Farahani, Colin Fitzpatrick University of Limerick - A Big-data Analysis of the Potential Rebound Effect of Electric Vehicles on Vehicle Kilometers Travelled, 15.11.2022

https://assets.researchsquare.com/files/rs-2255887/v1/052ce834-d2e0-4c77-85c0-05a61491051c.pdf?c=1668483712

[cxxxviii] Wokje Abrahamse, in Encouraging Pro-Environmental Behaviour, 2019, https://doi.org/10.1016/B978-0-12-811359-2.00010-X

[cxxxix]https://ec.europa.eu/commission/presscorner/detail/en/ip_22_7668

[cxl]Last report issued on 23.1.2023. https://www.statista.com/statistics/1167538/electricity-prices-charging-stations-electric-cars-by-provider-germany/. Please note that report shows only the data related to private providers.

[cxli] https://www.iea.org/reports/world-energy-outlook-2022/energy-security-in-energy-transitions, published on 22.10.22.

[cxlii] EEA Data: Monitoring of CO2 emissions from vans – Regulation 510/2011 provided by European Environment Agency (EEA)

[cxliii] https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32018R0858

[cxliv] Review of the CO2 emission standards for heavy-duty vehicles In "A European Green Deal", issued on 15.12.22

[cxlv] https://www.truckinginfo.com/321715/daimler-delivers-electric-em2-truck-to-penske-truck-leasing

[cxlvi] https://ec.europa.eu/info/law/better-regulation/have-your-say/initiatives/13168-Reducing-carbon-emissions-review-of-emission-standards-for-heavy-duty-vehicles/feedback_en?p_id=27600689

[cxlvii] https://www.acea.auto/fact/overview-electric-vehicles-tax-benefits-purchase-incentives-in-the-european-union/

[cxlviii] https://iea.blob.core.windows.net/assets/e0d2081d-487d-4818-8c59-69b638969f9e/GlobalElectricVehicleOutlook2022.pdf, please read mainly pages 34, 58 and 71.

[cxlix] https://www.transportenvironment.org/discover/e-vans-cheap-green-and-in-demand/

[cl] https://www.acea.auto/files/Electric-Vehicles-Tax-Benefits-Purchase-Incentives-2022.pdf

[cli] https://www3.weforum.org/docs/WEF_Autonomous_Vehicle_Movement_Goods_2021.pdf

[clii] https://www.idae.es/ayudas-y-financiacion/para-movilidad-y-vehiculos/programa-moves-iii/convocatorias-de-las-comunidades-autonomas

[cliii] https://www.bmwk.de/Redaktion/EN/FAQ/Electric-Mobility/faqs-purchase-grant-for-electric-vehicles.html

[cliv]http://www.kozlonyok.hu/nkonline/index.php?menuindex=200&pageindex=kozltart&ev=2020&szam=133

[clv]

https://www.mise.gov.it/images/stories/normativa/Decreto_direttoriale_Guida_CO2_Anno_2022.pdf

[clvi] https://valtioneuvosto.fi/paatokset/paatos?decisionId=0900908f8077f917

[clvii] https://ec.europa.eu/commission/presscorner/detail/en/ip_22_7073

[clviii] https://julkaisut.valtioneuvosto.fi/handle/10024/163260

[clix] Please, see page 29 of Del. 8.8

[clx] PaulaBastida-MolinaDavidRibó-PérezTomásGómez-NavarroElíasHurtado-Pérez What is the problem? The obstacles to the electrification of urban mobility in Mediterranean cities. Case study of Valencia, Spain https://doi.org/10.1016/j.rser.2022.112649

[clxi] Recharge EU trucks: time to act! – Transport&Environment

[clxii] Eurostat, https://ec.europa.eu/eurostat/statistics-explained/index.php?title=File:Road_freight_transport_by_distance_class,_2018-2020_(million_tkm).png&oldid=546477

[clxiii] https://www.volvotrucks.com/en-en/news-stories/insights/articles/2022/nov/long-range-electric-trucks-ready-today.html

[clxiv] I.e. Many countries already have large-scale investments in place to ensure rapid growth of public charging stations for long range electric trucks over the coming years. For example, In Germany, the HoLa project will see new charging stations for heavy trucks being built in four locations on the A2 highway between Berlin and the Ruhr region. https://www.dhl.com/se-en/home/press/press-archive/2021/dhl-freight-and-volvo-trucks-join-forces-to-speed-up-transition-to-fossil-free-road-transport-on-longer-distances.html

[clxv]As pathways in USER-CHI is possible to apply the framework of Memorandum of Understandings like the Mercedes with Canada https://group.mercedes-benz.com/company/news/memorandum-of-understanding-canada.html and Stellantis with Amazon for software.

[clxvi]https://www.iea.org/data-and-statistics/data-tools/electric-vehicles-total-cost-of-ownership-tool

[clxvii]. Ewelina Sendek-Matysiak, Dariusz Pyza , Zbigniew Łosiewicz and Wojciech Lewicki "Total Cost of Ownership of Light Commercial Electrical Vehicles in City Logistics" page 20 and beyond. Energies 2022, 15, 8392. https://doi.org/10.3390/en15228392

[clxviii] https://www.mjbradley.com/sites/default/files/EDFMHDVEVFeasibilityReport22jul21.pdf

[clxix] https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52022XC0204(03)&from=EN

[clxx] In the EU legislator syntax 'Operator' refers to the undertaker of the taxi- or PHV-business, which can be a natural or legal person. The driver of a taxi or PHV can be the operator at the same time (in case of a one-person undertaking) or working for an operator.

[clxxi] https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52022XC0204(03)&from=EN

[clxxii] Plase, see Del 8.8 page 33 and related annex

[clxxiii]Jens Hagman, Joram H.M. Langbroe Conditions for electric vehicle taxi: A case study in the Greater Stockholm region https://doi.org/10.1080/15568318.2018.1481547

[clxxiv] https://www.2zeroemission.eu/wp-content/uploads/2021/12/2021-2Zero-SRIA-FINAL-1.pdf., page 47

[clxxv] https://www.polisnetwork.eu/wp-content/uploads/2020/12/ZEZ-F_How-to-Guide_low.pdf, page 15 and 23.

[clxxvi] The Big Buyers for Climate and Environment' initiative is to enhance the uptake of strategic public procurement in Europe through partnership between big public buyers such as cities, regions, hospitals, central purchasing bodies, utilities, etc. working on concrete projects and

similar challenges. This objective is achieved by promoting collaboration between big buyers in strategic public procurement with a view to driving the market for innovative goods, services and works. It is a pilot process in E-taxi. Flagship 3 https://transport.ec.europa.eu/system/files/2021-04/2021-mobility-strategy-and-action-plan.pdf

[clxxvii] The Sharing Economy in Europe, 2022 pp 89–114Palgrave Macmillan Shared Mobility: A Reflection on Sharing Economy Initiatives in European Transportation Sector: Agnieszka Lukasiewicz, Venere Stefania Sanna, Vera Lúcia Alves Pereira Diogo, Anikó Bernát https://doi.org/10.1007/978-3-030-86897-0_5

[clxxviii] https://www.marketdataforecast.com/market-reports/europe-taxi-market

[clxxix] https://www.eltis.org/mobility-plans/sump-guidelines

[clxxx] Please read the ACEA white paper issued in March 2022 https://www.acea.auto/files/Research-Whitepaper-A-European-EV-Charging-Infrastructure-Masterplan.pdf "*The charging infrastructure remains a critical bottleneck for consumer adoption of electric vehicles. A faster and more timely provision of the public charging infrastructure is essential. For this reason, the implementation of the proposal for private and commercial electric vehicles contained in the General Development Plan will follow a path aimed at satisfying the nascent and growing market demand*". Page 54

[clxxxi] https://www.openaccessgovernment.org/enabling-e-fleets-the-future-of-smart-city-transportation-may-already-be-here/148067/

[clxxxii] https://www.miteco.gob.es/es/

[clxxxiii] Declaration of the Economy Minister Robert Habeck

[clxxxiv] National reform programme of Hungary 2022. https://commission.europa.eu/documents_en

[clxxxv] https://www.mise.gov.it/it/normativa/circolari-note-direttive-e-atti-di-indirizzo/circolare-30-dicembre-2022-ecobonus-incentivi-2023-per-lacquisto-di-veicoli-non-inquinanti

[clxxxvi]Finnish Transport and Communications Agency Traficom: Subsidies for purchasing low-emission vehicles as of 1 January 2022 https://www.traficom.fi/fi/hankintatuet

[clxxxvii] https://www.un.org/en/climatechange/cop26

[clxxxviii] https://www.citibeats.com/center-for-knowledge/explaining-range-anxiety-and-the-future-of-evs

[clxxxix] https://www.iea.org/reports/world-energy-outlook-2022/an-updated-roadmap-to-net-zero-emissions-by-2050

[cxc] Süleyman Çeven, AhmetAlbayrak, RaifBayır Real-time range estimation in electric vehicles using fuzzy logic classifier https://doi.org/10.1016/j.compeleceng.2020.106577

[cxci] https://www.oecd.org/ukraine-hub/policy-responses/environmental-impacts-of-the-war-in-ukraine-and-prospects-for-a-green-reconstruction-9e86d691/

[cxcii] https://www.iea.org/events/iea-at-cop27-e-mobility-and-the-role-of-batteries-in-delivering-carbon-neutrality-in-the-transport-sector

[cxciii] https://www.catholicnewsagency.com/news/46895/vatican-committed-to-net-zero-emissions-by-2050-pope-francis-says

[cxciv] https://unfccc.int/news/cop27-reaches-breakthrough-agreement-on-new-loss-and-damage-fund-for-vulnerable-countries

[cxcv] https://traconference.eu/strategic-session-2-3/

[cxcvi] https://energy.ec.europa.eu/topics/infrastructure/projects-common-interest/funding-projects-common-interest_en
[cxcvii] https://energy.ec.europa.eu/system/files/2023-01/C_2023_217_F1_COMMISSION_IMPLEMENTING_DECISION_EN_V3_P1_2445069.PDF
[cxcviii] https://jaspers.eib.org/LibraryNP/EC%20Reports/Economic%20Appraisal%20Vademecum%202021-2027%20-%20General%20Principles%20and%20Sector%20Applications.pdf, Annex V Transport and page 43.
[cxcix] https://cordis.europa.eu/project/id/723977
[cc] https://evcharging.enelx.com/resources/tags/massachusetts
[cci] Plase, read the outcomes of the USER-Chi Peer visiting in Rome held on 17-18 at Roma Agenzia per la Mobilità where are highlighted the necessity to integrated the data in the MaaS toward pivotal assessments even in the charging stations planning.
[ccii] https://op.europa.eu/webpub/eca/special-reports/electrical-recharging-5-2021/en/, See pint 20-21-26-27.
[cciii] https://www.iea.org/reports/global-ev-outlook-2022/trends-in-charging-infrastructure, page 118.
[cciv] https://www.iea.org/reports/electric-vehicles, Report 2021
[ccv] Afshar, S.; Macedo, P.; Mohamed, F.; Disfani, V. Mobile charging stations for electric vehicles—A review. Renew. Sustain. Energy Rev. 2021, 152, https://doi.org/10.1016/j.rser.2021.111654
[ccvi]https://www.europarl.europa.eu/RegData/etudes/STUD/2018/617470/IPOL_STU(2018)617470_EN.pdf
[ccvii] https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:02014L0094-20211112&from=EN
[ccviii] Jennifer Leijon and Cecilia Boström, Charging Electric Vehicles Today and in the Future- https://doi.org/10.3390/wevj13080139
[ccix] Please, note the SMBC for special events highlighted the flexibility in EV's ecosystem
[ccx] Energy Storage Industry Research Report. Available online: https://mp.weixin.qq.com (accessed on 30 June 2019).
[ccxi] Cui, S.; Zhao, H.; Chen, H.; Zhang, C. The Mobile Charging Vehicle Routing Problem with Time Windows and Recharging Services. Comput. Intell. Neurosci. 2017, 2018, 1–11.
[ccxii]https://www.eba.europa.eu/sites/default/documents/files/document_library/Publications/Draft%20Technical%20Standards/2022/1026171/EBA%20draft%20ITS%20on%20Pillar%203%20disclosures%20on%20ESG%20risks.pdf. Page 10
[ccxiii] Faping Wang , Rui Chen , Lixin Miao,Peng Yang and Bin Ye Location Optimization of Electric Vehicle Mobile Charging Stations Considering Multi-Period http://dx.doi.org/10.3390/su11205841
[ccxiv] See, SBM4 E-trucks herewith provided.
[ccxv] ENEL X provided at this settlement in Rome Fiumicino Airport https://corporate.enelx.com/en/our-commitment/innovation-sustainability/ev-second-life-battery
[ccxvi] "MOBILITY AS A SERVICE FOR ITALY" -MAAS4ITALY is a pilot project financed under the Nataional Recovery Plan
https://presidenza.governo.it/AmministrazioneTrasparente/Sovvenzioni/CriteriModalita/PNNR_maas4Italy/Convenzione%20Cittadi%20Roma%20Progetto%20MAAS%20Roma%20Capitale%20(1).pdf
[ccxvii] https://commission.europa.eu/system/files/2022-06/37th_eerf_conclusions_final.pdf

[ccxviii] Giuseppe Graber, Vito Calderaro, Vincenzo Galdi, Antonio Piccolo "Battery Second-Life for Dedicated and Shared Energy Storage Systems Supporting EV Charging Stations" https://doi.org/10.3390/electronics9060939
by,

[ccxix] I.e Innovation fund scheme: https://ease-storage.eu/news/how-eu-funding-is-driving-energy-storage-innovation/ Priority 5 Research on energy storage in relation to the expected expansion of Electric Vehicles, including vehicle-to-grid services and the use of second-hand EV batteries for stationary applications. Assessing the relative merits of services from stationary vs mobile (aggregated EV) storage facilities, and identifying opportunities for mutual learning could have an added value.

ccxx https://eur-lex.europa.eu/resource.html?uri=cellar:fc930f14-d7ae-11ec-a95f-01aa75ed71a1.0001.02/DOC_1&format=PDF

ccxxi https://ec.europa.eu/commission/presscorner/detail/en/QANDA_22_6229 - Question no.4

[ccxxiii] According to the consolidate version of 23.6.22 https://commission.europa.eu/system/files/2022-06/37th_eerf_conclusions_final.pdf

[ccxxiv] https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32019L0944&from=EN updated consolidated version on 23.6.22 after the approval of REPowerEU act.