



TOWARDS SMART ZERO CO₂ CITIES ACROSS EUROPE
VITORIA-GASTEIZ + TARTU + SONDERBORG

Deliverable 3.7: Last mile logistic electric infrastructure deployed and in operation

WP3, Task 3.6

31/01/2019 (M36)

Deliverable Version:	D3.7, V.1.0
Dissemination Level:	PU ¹
Author(s):	FAGOR EDERLAN (FED), EDERMOBILITY SERVICES (EDS)

¹ PU = Public

PP = Restricted to other programme participants (including the Commission Services)

RE = Restricted to a group specified by the consortium (including the Commission Services)

CO = Confidential, only for members of the consortium (including the Commission Services)



Document History

Project Acronym	SmartEnCity
Project Title	Towards Smart Zero CO2 Cities across Europe
Project Coordinator	Francisco Rodriguez Tecnalia francisco.rodriguez@tecnalia.com
Project Duration	1 st February 2016 - 31 st July 2021 (66 months)

Deliverable No.	D3.7. Last mile logistic electric infrastructure deployed and in operation		
Diss. Level	Public		
Deliverable Lead	EDS		
Status		Working	
		Verified by other WPs	
	X	Final version	
Due date of deliverable	31/01/2019		
Actual submission date	31/01/2019		
Work Package	WP3: Vitoria-Gasteiz Lighthouse Deployment		
WP Lead	VIS		
Contributing beneficiary(ies)	FED, EDS, MON		
Date	Version	Person/Partner	Comments
25/01/2019	V0.0	Igor Ezpeleta / FED	Draft version
28/01/2019	V0.1	Irantzu Murguiondo / MON	Draft Version
29/01/2019	V0.22	Igor Ezpeleta / FED	Consolidated Dreft for External review
30/01/2019	V1.0	Igor Ezpeleta / FED	Final versión for submission

Copyright notice

© 2016-2018 SmartEnCity Consortium Partners. All rights reserved. All contents are reserved by default and may not be disclosed to third parties without the written consent of the SmartEnCity partners, except as mandated by the European Commission contract, for reviewing and dissemination purposes.

All trademarks and other rights on third party products mentioned in this document are acknowledged and owned by the respective holders. The information contained in this document represents the views of SmartEnCity members as of the date they are published. The SmartEnCity consortium does not guarantee that any information contained herein is error-free, or up to date, nor makes warranties, express, implied, or statutory, by publishing this document.



Table of content:

- 0 Publishable Summary 7
- 1 Introduction 8
 - 1.1 Purpose and target group..... 8
 - 1.2 Contributions of partners 8
 - 1.3 Relation to other activities in the project 8
- 2 Objectives and expected Impact.....10
 - 2.1 Objective10
 - 2.2 Expected Impact11
- 3 Overall Approach.....12
- 4 Deviations to the plan19



Table of Tables:

Table 1: Abbreviations and Acronyms6
Table 2: Contribution of partners8
Table 3: Relation to other activities in the project9



Table of Figures:

Figure 1: Light truck.....10

Figure 2: Light car for touristic routes.....11

Figure 3: The two electric vehicles used in Vitoria-Gasteiz for the touristic tours.....12

Figure 4: Picture of the hardware & software installed in EV to guide the tourist around the city13

Figure 5: Service Website.....14

Figure 6: Presentation day with hotel managers14

Figure 7: EV adapted for the distribution of local commerce17

Figure 8: Typology of the goods to be moved18



Abbreviations and Acronyms

Abbreviation/Acronym	Description
SmartEnCity	Towards Smart Zero CO2 Cities across Europe
EV	Electric Vehicle

Table 1: Abbreviations and Acronyms

0 Publishable Summary

Fagor Ederlan's objective within SmartEnCity was to purchase new EV vehicles for different types of freight logistics and touristic routes in the lighthouse city of Vitoria-Gasteiz. Different models of EV would be acquired to change 26 diesel vehicles for electric ones to do the same logistic and transport service.

These vehicles were going to be used for 4 different purposes:

- Courier.
- Urban freight delivery.
- Final consumer delivery of supermarket goods.
- Touristic routes around the city.

Design improvements would be implemented in these vehicles with the aim of adapting each vehicle to the specific needs of each business: Cargo trunk adaptations, co-pilot zone, lateral and frontal access.

In addition, the vehicle would be equipped with the necessary tools, hardware & software to complete the operational needs of each business: transport tools, hardware & business management software, telemetry system, specific packaging...

Touristic routes, based on electric vehicles, were implemented in November 2017. This new concept of sustainable and interactive tour driving an electric vehicle caught the interest of the citizens, and has been running since then.

Due to relevant events, which make it extremely difficult to advance the objectives envisaged in SmartEnCity, as of June 30th 2018, Fagor Ederlan adopted the decision to abandon its smart mobility business development strategy, as derived from the initiative of Edermobility Services and, consequently, its participation in the SmartEnCity project, considering the achievement of the strategic objectives as unfeasible. This is why implementations made in different business are no longer working in the city.

Through this report, it is intended to document the whole process, detailing the steps taken and the lessons learned through the project.



1 Introduction

1.1 Purpose and target group

The objective of this document is to detail the steps taken by Fagor Ederlan both to replace combustion vehicles in last mile logistic businesses and in the implementation of new business models of electric mobility in the city of Vitoria-Gasteiz, such as the self-guided tourist routes.

The target audience of these actions are the urban transport companies that already operate in Vitoria-Gasteiz, the City Council and the tourism companies of the city.

1.2 Contributions of partners

The following Table 2 depicts the main contributions from participant partners in the development of this deliverable.

Participant short name	Contributions
EDS	Overall content to sections.
FED	Overall content to sections.
MON+TEC	Content review.

Table 2: Contribution of partners

1.3 Relation to other activities in the project

The following Table 3 depicts the main relationship of this deliverable to other activities (or deliverables) developed within the SmartEnCity project and that should be considered along with this document for further understanding of its contents.

Deliverable Number	Contributions
D2.2 & D2.3	Identification of regulatory barriers against planned mobility actions. Analysis of existing standards and opportunities for new ones.
D3.2	<i>Smart Mobility</i> section development. Explanation of future deployments in Vitoria-Gasteiz.
D6.6	Contributions regarding added value services related to smart mobility actions.



D7.7	Definition of specific KPIs for mobility actions.
D9.1, D9.2 & D9.3	Identification of mobility solutions and analysis of their potential business models.
D9.2 & D9.5	Collection of specific dissemination activities.

Table 3: Relation to other activities in the project

2 Objectives and expected Impact

Vitoria-Gasteiz is committed to a change in urban mobility, both of goods and people. Fagor Ederlan aims to improve and electrify existing businesses such as creating new mobility businesses, replacing combustion vehicles and optimizing current operations.

2.1 Objective

The objective of Fagor Ederlan in the project is to improve, optimize and electrify urban transport businesses already implanted in the city as well as to implement new business models of electric mobility, with the aim of reducing the carbon footprint of last mile transport as create new electric mobility initiatives.

After an exhaustive analysis of the city, we intended to work on the following types of business:

- **Last mile logistics:** courier/parcel service, delivery of urban goods and final delivery to the consumer of supermarket products.
- **Tourist routes** through the city.

For this, the following vehicles were to be implemented:

- 8 electric light trucks
- 7 electric light car/vans
- 11 electric cargo-bikes



Figure 1: Light truck



Figure 2: Light car for touristic routes

2.2 Expected Impact

CO₂ EMISSIONS SAVING:

By replacing combustion vehicles with electric vehicles, improving the operation with the implementation of new software & hardware was intended to achieve an average annual emission saving of 36-ton CO₂/year.

This reduction of CO₂ is achieved on the one hand due to the substitution of the combustion vehicle by electric vehicle and on the other for the optimization of the routes to be covered:

Currently vehicles dedicated to last mile logistics run an average of 18.000 km/year/vehicle but the estimated average annual distance with software would be 10.900 km/year/vehicle (40% less).

NEW CONCEPT OF SUSTAINABLE TOURISM FOR THE CITY

On the other hand, it is important to mention that there is a second impact that is intended to be obtained due to the creation of tourist routes: **Implementing a new concept of sustainable and interactive tour driving an electric vehicle**. The tourist would meet unique and fun stories of the city driving zero-emission, easy-to-drive cars with room for up to 4 people. Driving an electric vehicle would allow the visitants to access places where normally the traditional vehicle cannot reach

3 Overall Approach

It is necessary to differentiate the two work blocks that constitute the work carried out by Fagor Ederlan in the project:

- 1- Sustainable Tourist routes
- 2- Last mile logistics

Touristic routes around the city

Fagor Ederlan implemented a new concept of sustainable and interactive tour driving an electric vehicle. Running since 30th November 2017, the tourist had the opportunity to meet unique and funny stories of the city driving zero-emission, easy-to-drive cars with room for up to 4 people. Driving an electric vehicle allowed the visitants to access places where normally the traditional vehicle could not reach.



Figure 3: The two electric vehicles used in Vitoria-Gasteiz for the touristic tours

The tourist could choose between four types of tours:

- **City tour:** Approximately 2 hour's journey. The tourist would visit the medieval center of the city and its surrounding areas. The virtual guide would guarantee a tour filled with interesting stories, funny anecdotes, and the most intimate secrets kept in the cities.

- **Gastro & Culture Tour:** This journey was about 4 hours, allowing to visit the most emblematic areas of the city as well as knowing the gastronomic offerings in Vitoria-Gasteiz. The tourist would be able to taste the most appetizing dishes of the town.

All in one: In this 6-hour tour the tourist would enjoy the most complete tourist experience as they would tour the most emblematic points of the city. They would get to know its historical center, its gastronomic offer and they would be able to shop in a local market, all in one.

- **The Green tour:** This tour would last 3 hours and a half. It would give the tourists the opportunity to visit the green ring of the city together with a local driver. The driver would make sure that the tour is fun as well as safe and 100% sustainable.



Figure 4: Picture of the hardware & software installed in EV to guide the tourist around the city

For the advertising and sale of the service a website was designed and an official presentation was made for all the hotel owners of the city.

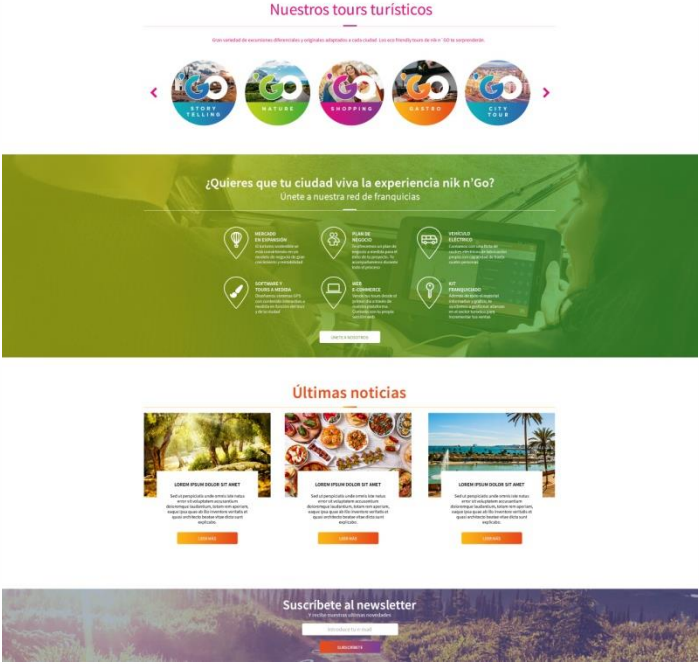


Figure 5: Service Website



Figure 6: Presentation day with hotel managers

After several months in operation, *Artea Guías Turísticas, S.L.* the company with which we had signed a marketing contract to provide de service, had to finish the contract due to internal problems. Due to this circumstance the route service was cancelled.



Last mile logistics

Instead of working on the implementation of new business models, in the case of last mile logistics services, we have worked on the signing of collaboration agreements with active logistics operators in the city of Vitoria-Gasteiz.

The objective of this collaboration would be to electrify, optimize and, if possible, diversify and innovate their current operations.

3 types of business have been worked:

- *COURIER*: Withdrawal of the project from Koiki Home, S.L., with whom we had signed an agreement of intentions for the development of a parcel delivery business model based on the contract of people in need of social reinsertion. The reason is the obtaining of funds by this company that enabled it to develop the project alone.
- *DELIVERY OF URBAN GOOD*: We intend to sign collaboration agreements with merchandise companies to substitute the vehicles used by electric vehicles and optimize the operation through the implementation of the software. Collaborations were not possible.
- *FINAL DELIVERY TO THE CONSUMER OF SUPERMARKET PRODUCTS*: A collaboration agreement was signed with an important brand of supermarkets and a logistics operator with the aim of improving the current operation and the design and testing of new last mile urban delivery business models.

Final delivery to the consumer of supermarket products

A collaboration agreement is signed with a supermarket brand that has more than 20 stores in Vitoria-Gasteiz and a logistics operator with a national presence.

This project aims to replace the vehicles used for the delivery (combustion vans) by electric vehicles and optimize the delivery process at home by implementing management software, allocation and optimization of routes.

Currently, the distribution is made with combustion vehicles and with an average of more than 170kms daily per vehicle/day. It is intended to replace these vehicles with electric vehicles and reduce the kilometres to be carried out by each vehicle.

Improvements would be implemented in these vehicles with the aim of adapting each vehicle to the specific needs of each business: Cargo trunk adaptations, co-pilot zone, lateral and frontal access.



In addition, the vehicle would be equipped with the necessary tools, hardware & software to complete the operational needs of each business: transport tools, hardware & business management software, telemetry system and specific packaging.

During the project two lines of work have been differentiated:

- Analysis of the current operative in Vitoria-Gasteiz for its electrification and optimization.
- Real testing of a new multi-business delivery model.

Analysis of the current operative in Vitoria-Gasteiz for its electrification and optimization

Different areas of improvement were identified:

1. Purchase execution and delivery service request
2. Pick up of order and load in vehicle
3. Transportation
4. Delivery

In addition, alternative solutions were designed for each of them:

Adaptation of loading area

- That allows access to the entire load at all times.
- Flexible and adaptable to make it possible to adapt to special services (inter-store service).
- Provide adequate storage space for handling means.
- That allows the integration of "intelligent warehouse" software. Internal compartmentalization.

Software and hardware: Software that allows an operational improvement, a greater control and a reduction of the human factor.

- Reception of new order entries in real time.
- Decision making (vehicle assignment and next task to be performed by each carrier) optimized according to internal and external variables (traffic, meteorology, ...) and learning "machine learning".
- Management of valleys and peaks of the operation (prediction and management).
- Information for choosing means of manipulation.
- Confirmation of order picking by tag reading.
- Automated load assignment in "smart warehouse".
- A clustering and flexible configuration of cities.
- A route optimization.
- An automated arrival notice functionality to the end user.



- Useful information for the carrier about parking areas, access to delivery points and precise location of the delivery point.
- A digital delivery confirmation.

Boxes, bags and trolleys: Value a new design of types of cars, boxes and bags to solve the problems detected and adapt to current eco-packaging trends.

- A different design of trolleys could facilitate the purchase through boxes.
- Empty boxes occupy a lot of space both in the establishments and in the vehicles since, due to their design, they are not collapsible or greatly diminish the space they occupy once stacked.
- Fragile load is not protected inside the boxes.
- It is not optimized to use the same box for frozen and non-frozen orders.
- The only way to unload merchandise at home quickly is with plastic bags which means an "improvable" use of plastic bags.
- The transfer of the boxes on foot, both in pedestrian displacement and access to homes with many stairs, is not very ergonomic.
- In many orders the box is not completely filled but the space in the establishment as in the vehicle is equally occupied.

REAL TESTING OF A NEW MULTI-BUSINESS DELIVERY MODEL

With the aim of implementing a new business model a real test of home delivery of local commerce products has been carried out, where local fruit-shops, butchers, bakeries, bars and florists have participated.

The objective of this test was to identify: the keys to the profitability of the business and the adaptation needs of the vehicle, software, hardware and work tools.



Figure 7: EV adapted for the distribution of local commerce

For this, an electric van adapted to business needs has been used: autonomy, speed, access to loads, internal distribution of cargo area for different merchandise, sales and multi-store management software, ...



Figure 8: Typology of the goods to be moved

For almost a year, the delivery service of local products has been carried out and the keys for business profitability have been found:

- Improve the effectiveness of the distribution and therefore reduce costs:
 - or decrease number of kilometers performed. Reduction of fuel and CO₂ emissions
 - or decrease of failed deliveries.
- Have more control over the operation
- Decrease the dependence of the human factor in order to be able to:
 - Reinforce zones / routes with non-habitual employees in said zones / routes in order to face peak situations or incidents.
 - Reduce the learning curve of new delivery drivers
- Optimize the use of vehicles and their loading areas.
- Improve ergonomics in the movement of loads throughout the process.

4 Deviations to the plan

Fagor Ederlan adopts the decision to abandon its smart mobility business development strategy, as derived from the initiative of Edermobility Services and, consequently, its participation in the SmartEnCity project, considering the achievement of the strategic objectives as unfeasible due to:

- Strong financial imbalance that finally leads to a request for bankruptcy for **Comarth**, which finally results in its dissolution. (Comarth is a investee company by Fagor Ederlan focused on the design, manufacture and commercialization of electric work vehicles)
- **SD Logística, SL**, our ally (through a collaboration agreement) for the development of the business model for the distribution of urban supermarkets (sector of which it was the leader in Spain), also entered into bankruptcy.
- Withdrawal of the project from **Koiki Home, S.L.**, with whom we had signed an agreement of intentions for the development of a parcel delivery business model based on the integration of people in need of social insertion.
- Inability to access, under favourable conditions for experimentation, opportunities to develop prototypes of mobility services linked to social transport concepts.
- After several months in operation, Artea Guías Turísticos, S.L. the company with which we had signed a marketing contract to provide de service, had to finish the contract due to internal problems.

Due to Fagor Ederlan has abandoned the project before its completion, only 3 of the 26 electric vehicles proposed have been able to be deployed.

