

2020
CiViTAS
Cleaner and better transport in cities

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Measure Evaluation Result

MAL 5.1 – Last Mile Delivery of Goods

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Executive summary

The objective of this measure was to develop a Sustainable Urban Logistics Plan (SULP) for Valletta and develop a pilot with private operators to test out the Last Mile delivery of goods concept in Malta, using a shared electric van.

The Valletta Region commonly experiences traffic and congestion problems as a direct result of inefficiencies in goods delivery operations, illegal parking and the use of unsuitably large and high polluting vehicles. These problems lead to high emissions and time losses, which negatively impact the urban fabric and public health. To counteract this, the SULP for Valletta proposes that a clearer regulation of freight transport operation in urban areas is adopted at a local and national level to protect the urban environment, to reduce air pollution, to reduce the incidences of traffic infringements and to reduce congestion on the streets and roads of Valletta, particularly during peak hours.

Collaboration for the pilot test as part of this measure was formalised with the Ta' Qali crafts village, a collection of shops selling local crafts and artisanal products. They supply a number of souvenir shops in Valletta and agreed to test out the use of a shared electric van to deliver their goods from their location in the centre of the island to Valletta. This agreement was secured through the involvement of the General Retailers and Traders Union, a key stakeholder in the success and future development of this measure.

Baseline data was collected through a Log of Transport Movements filled in by the operators participating in the pilot test. However, as a result of the COVID-19 pandemic, the tourism sector came to a complete halt, which meant the ex-post data collection for evaluation had to be postponed. As non-essential businesses were forced to close and there was no tourism as the airport and ports were closed, there were no sales of souvenirs either. Therefore, the ex-post data collection was first postponed to September / October 2020. However, even then the tourism industry was at a near standstill. Therefore, ex-post data had to be estimated using different methods (hypothetical scenarios based on the baseline data) and using a more qualitative approach, by means of an interview with operators participating in the pilot with the e-van.

Even if not all targets could be assessed due to the COVID-19 pandemic, in general the results show a very positive outcome of the pilot. The use of the shared e-van has led to reduced CO₂ emissions and reduced operating costs for the operators involved, and can replace most, if not all, of their delivery trips. The awareness and participation of operators in the pilot exceeded the foreseen ex-ante targets and has created a foundation for future collaboration between the businesses at the Ta' Qali Crafts Village. The pilot has proven successful in creating the conditions for businesses to test out consolidating their deliveries and can be replicated with other businesses in the future.

The pilot with the Ta' Qali Crafts Village was designed to showcase and promote the uptake of good solutions in a voluntary way, by providing evidence and demonstrating the benefits for public and private sector. The research, consultation and development of the SULP as part of the DESTINATIONS project has enabled the creation of a comprehensive plan, which contains action for the short and long term. Transport Malta can, together with other stakeholders, continue working on the identified actions to improve logistics management and sustainable mobility for deliveries. The purchased electric van can be used for future pilots with other private sector operators in order to promote the transition towards a cleaner delivery fleet.

A Description

Valletta is the capital city of Malta and it is found at the centre of the urban agglomeration, right in between the Northern and Southern Harbour districts. It is a walled city built in the 17th century and access in and out of the city is limited. There are three main access points that allow road vehicles to enter and exit the city walls; St Mark's street (1), St Paul's street (2) and Marsamxett street (3) (see Figure 1)¹.

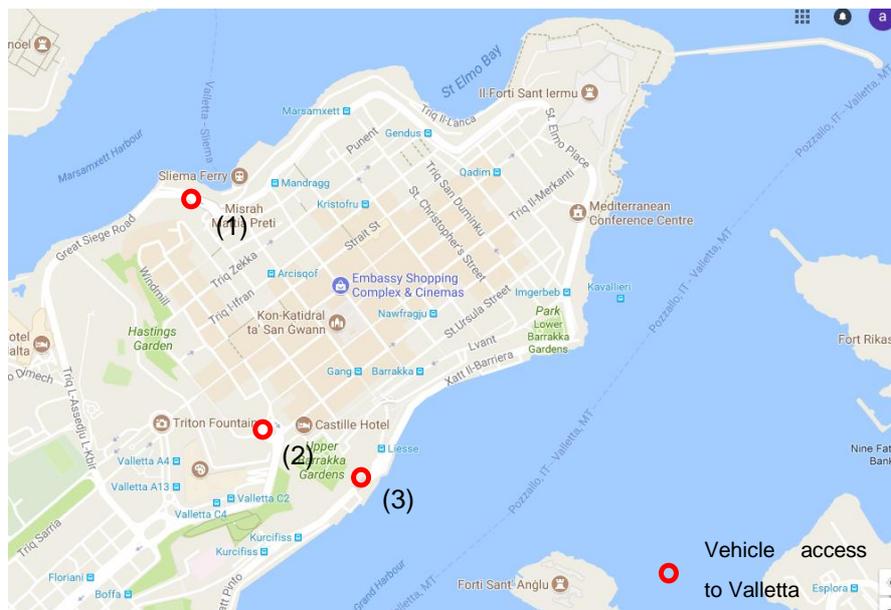


Figure 1: Map of Valletta and its vehicle access points (source: Valletta SULP¹)

Valletta attracts a large number of tourists and visitors, and the presence of hotels and restaurants that need delivery of fresh goods daily leads to an increased morning traffic problem. The narrow streets and limited unloading space make deliveries challenging (see Figure 2). This measure consisted on the elaboration of a Sustainable Urban Logistics Plan for Valletta, as well as a pilot with private operators to test out Last Mile delivery of goods, using a shared electric van.



Figure 2: A variety of delivery services in the streets of Valletta, showcasing some of the challenges (illegal parking on sidewalks, lack of available unloading bays, need for deliveries on foot)¹.

¹ Information and images from 'Valletta Sustainable Urban Logistics Plan (SULP)' developed as part of the CIVITAS DESTINATIONS project (Leonardi, Attard & Maas, 2019)

A1 Objectives and outputs

City policy level objectives

- Reduce the congestion caused by freight transport in the Valletta Region
- Reduce the impact on air quality caused by heavy goods vehicles within the Valletta Region

Measure specific objectives

- Developing a Sulp for Valletta
- Testing the feasibility of last mile delivery of goods within the local context

Outputs²

- The compilation of a Sulp for Valletta
- Purchase of 1 energy-efficient electric van
- 7 operators participating in the pilot
- **Provision of EV Charging Point at Ta' Qali crafts village

Supporting activities

- First stakeholder meeting in February 2018 to discuss the possibility of creating an Urban Consolidation centre and a last mile delivery service with private operators
- Freight and Service Logistics were explicitly included as topics in the first stakeholder consultation meeting organised for the Sump process under MAL2.1.

A2 Inter-relationship with other measures

The data gathered during the pilot is integrated in the Sulp document, as well as an example of a measure in the final Sump document as part of WP2 (measure MAL 2.1).

A3 Target groups and/or affected part of the city or region

Target groups: private delivery/logistics operators

Areas: Valletta Local Council, including the main pedestrian and commercial zone

A4 Stakeholders: CIVITAS project partners and other important actors

Stakeholder name	Activities description
Main suppliers who distribute goods within the city	Key stakeholders and operators
Key businesses within the city	Stakeholder Forum, Stakeholder Consultation
General Retailers and Traders Union	Stakeholder Forum, Stakeholder Consultation

² ** Extra-output, funded by the ERDF SMITHS project, as part of the National EV Network Extension

Malta Hotels and Restaurants Association	Potential stakeholder in the pilot
Transport Malta's Land Transport Directorate	Stakeholder Forum, Stakeholder Consultation
Valletta Local Council	Stakeholder Forum, Stakeholder Consultation
Lands Department	Stakeholder Forum, Stakeholder Consultation
Malta Tourism Authority	Stakeholder Forum, Stakeholder Consultation
Ministry for Transport and Infrastructure	Stakeholder Forum, Stakeholder Consultation
Ministry for Finance and Investment	Stakeholder Forum, Stakeholder Consultation
Ministry for Sustainable Development, the Environment and Climate Change	Stakeholder Forum, Stakeholder Consultation
Integrated Transport Strategy Directorate (TM)	Stakeholder Forum, Stakeholder Consultation
Traffic Management Unit (TM)	Stakeholder Forum, Stakeholder Consultation
Licensing and Testing Directorate (TM)	Stakeholder Forum, Stakeholder Consultation

Table 1: Stakeholders involvement

B Measure implementation

B1 Situation before CIVITAS

In 2016 the region of Valletta generated 18.076 trips/km²/hour inbound and 12.709 trips/km²/hour outbound during the morning peak only. Congestion within the region was worsened by the fact that deliveries to hotels, shops and restaurants coincided with the peak hours of morning traffic. Negative effects were felt by commuters who were hampered by heavy goods vehicles on the road, as well as by the distribution chain which was delayed by congestion and lack of parking spaces for unloading.

Main distributors have shown interest in the concept of last mile delivery in recent years, however there has yet to be the right opportunity to give impetus to the concept locally, and that is why this measure is of such value.

B2 Innovative aspects

Last mile delivery using energy-efficient vehicles has not been tested in Malta; nor has the transport of goods been given much attention. The Sulp was therefore a very important tool in understanding the state of affairs and to propose ways how to make freight transport more sustainable.

B3 Technology development

This measure includes the data collection and research into the feasibility of logistics planning for the City. The implementation of the electric shared van between different operators to perform their deliveries to the capital Valletta and the wider Valletta Region is the first application of a shared delivery concept on the islands.

B4 Actual implementation of the measure

Data from previous studies combined with data collected during a fact-finding mission in late 2017, to determine entry and exit points for deliveries to Valletta, freight movements in the city, and the location and use of unloading bays in the city, formed the basis for the SULP Baseline document, which was finalised in February 2018. The final version of the SULP was delivered in 2019.

The possibility of creating an Urban Consolidation Centre combined with Last Mile delivery to facilitate more efficient and clean deliveries to Valletta city centre, including the pedestrian zone, using electric vehicles (vans, cargo-bikes, and/or electric carts) was discussed in the stakeholder forum held in February 2018 with private operators, and has led to the proposal for a voluntary agreement with private operators to further explore this idea.

Collaboration for the pilot test as part of this measure was formalised with the Ta' Qali Crafts Village, a collection of shops selling local crafts and artisanal products. They supply a number of souvenir shops in Valletta and agreed to test out the use of a shared electric van to deliver their goods from their location in the centre of the island to Valletta. The van, a Renault Master Z.E., with a 35 kWh battery and a range of 200 km (NEDC³), was imported and arrived in the summer of 2019 (see Figure 1).



Figure 1: 'Village to Valletta' shared e-van being charged at the newly installed electric charging point at Ta' Qali crafts village parking.

Seven operators (craft companies) at the Ta' Qali Crafts Village (organized within the Ta' Qali Tenants Association) confirmed their participation in the pilot, and have participated in data collection for the baseline in September 2019, during which producers logged their deliveries for a period of a week. They logged the total kilometers driven (vkm), the type of vehicle used, the number of trips made, including whether or not these were to the capital city Valletta, as well as how full their vehicle was, and the number of parcels carried.

In October 2019 a charging pillar was installed at the premises of Ta' Qali Crafts Village, with funding from ERDF SMITHS Project for the creation of National EV Charging Infrastructure; as a cross-collaboration and fertilization between two projects. The agreement between the Ta' Qali Tenants Association and Transport Malta was signed in December 2019, after which the pilot started its implementation phase.

It was planned that, after an initial phase during which the use of the shared van was tried and tested, the participating operators would be asked to fill in the data collection log in order to determine the savings and optimization in terms of time, space and emissions, compared to the baseline data. However, due to the COVID-19 partial lockdown this ex-post data collection was postponed to later in the year (October 2020) as business had slowed down to an almost complete halt due to the lack of visiting tourists.

³ NEDC: New European Driving Cycle (European measurement standard for emissions and consumption)



Figure 2: Signing of the agreement with the Ta' Qali crafts village Tenants Association.

Unfortunately, in October 2020 it appeared that even though the airport opened to visitors again in July 2020, the impact of the pandemic on the tourism industry was still heavily felt, with an 84% decrease in visitor numbers in July 2020 compared to the previous year⁴. Therefore, the ex-post data collection approach had to be adapted, based partially on estimations using the baseline data as guidance, and partially through a qualitative interview with the participating operators.

C Impact evaluation

C1 Evaluation approach

Expected impacts and indicators

Impact category	Impact indicator	Unit of measure
Transport System	1- Freight movements: replacement of trips	N° trips / week
Transport System	2-Freight movements: replacement of trips (to Valletta)	N° trips / week
Economy	3-Capital cost	€
Economy	4-Average operating costs	€ / vkm
Environment	5-CO ₂ emissions	g / vkm
Transport	6-Goods carried	% of van full
Society	7-Awareness level: operators participating in pilot	N°

Table 2: Expected impact and indicators

⁴ Inbound Tourism: July 2020: https://nso.gov.mt/en/News_Releases/Documents/2020/09/News2020_146.pdf

Method of measurement

Impact indicator	Method*	Frequency (Months)			Target Group	Domain (demonstration area or city)
		Bef.	During	After		
1-Freight movements: replacement of trips	DC	38	n.a.	49	Transport Operators	Valletta
2-Freight movements: replacement of trips (to Valletta)	DC	38	n.a.	49	Transport Operators	Valletta
3-Capital cost	DC	35	n.a.	49	TM	N/A
4-Average operating costs	DC	38	n.a.	49	Transport Operators	Valletta
5-CO ₂ emissions	DC	38	n.a.	49	Transport Operators	Valletta
6-Goods carried	DC	38	n.a.	49	Transport Operators	Valletta
7-Awareness level: operators participating in pilot	DC	35	n.a.	49	Transport Operators	Country wide

* (Data collection (DC), Estimation (E), Survey (S))

Table 3: Method of measurement

Detailed description of the indicator methodologies:

1 and 2 Freight movements: Data collected by University of Malta through a Log of Transport Movements filled in by the operators participating in the pilot test. Operators were asked to fill a table indicating how many trips they made in one week (and how many of those trips were to Valletta).

3 - Capital cost: Data collected by University of Malta from Transport Malta, who have acquired the electric van. Data was obtained from the procurement documentation of the electric van.

4 - Average operating costs: Data collected by University of Malta through a Log of Transport Movements filled in by the operators participating in the pilot test. The operating costs included fuel costs, which were calculated based on the average of the recorded vehicle kilometres and vehicle types.

5 - CO₂ emissions: Data collected by University of Malta through a Log of Transport Movements filled in by the operators participating in the pilot test. CO₂ emissions were calculated based on recorded vehicle kilometres and average CO₂ emissions for the recorded vehicle types.

6 - Goods carried: Data collected by University of Malta through a Log of Transport Movements filled in by the operators participating in the pilot test. Operators were asked to fill a table indicating how many trips they made in one week, including how full their van/car was (in %) to get an estimation of volume carried.

7 - Awareness level: operators participating in pilot: Data collected by University of Malta through a Log of Transport Movements filled in by the operators participating in the pilot test. Awareness level was defined as the number of operators agreeing to participate in this pilot test for the last mile delivery of goods.

The Business-as-Usual scenario

In a business-as-usual scenario, there would not be expected to be a significant change in terms of the number of trips, or the associated emissions of the operators participating in the pilot. As shifting to the use of a shared electric van requires a change in mind-set and behaviour, the pilot has certainly incentivised the operators to test this out in a real-life context and encourage them to consider the switch to EV. As a result of the project outputs and extra-outputs, there is now an EV charging pillar installed at the Ta' Qali Crafts Village, and there are government grants available to encourage businesses to change their fleet to EV.

C2 Measure result

Impact category	Impact indicator	Unit of measure	Baseline	Ex-Ante	Ex-post
Transport System	1 -Freight movements: replacement of trips	Nº trips/ week	0	3	N/A*
Transport System	2 - Freight movements: replacement of trips to Valletta	Nº trips / week	0	2	N/A*
Economy	3- Capital cost	€	N/A	€ 27.880	€57.995
Economy	4 - Average operating costs	€ / vkm	€0.10	€0.05	€0.00
Environment	5 - CO ₂ emissions	Kg/week	234.18	223.68	228.98
Transport System	6 - Goods carried	% of van full	Total trips / week: 45 trips (100%) Trips full (>90%): 7 trips (16%) Trips medium full (20-90%): 20 trips (44%) Trips rather empty (<20%): 18 trips (40%)	80% full	N/A*
Society	7 - Awareness level: operators participating in pilot	Nº	N/A	2	7

Table 4: Measure results

* Data collection was first delayed due to COVID-19 partial lockdown and ultimately not possible to collect in the same manner due to heavily decreased business (tourist arrivals in July 2020 -84% compared to previous year).

As a result of the COVID-19 pandemic in 2020, not all ex-post data collection was possible as planned and foreseen. Asking the operators to fill data collection logs while business was at a near standstill due to very low visitor numbers in the country was not feasible. The approach to

the calculation of ‘Average operating costs’ and ‘Avoided CO₂ emissions’ had to be changed. They have been calculated based on actual usage, but also include estimated figures for potential future usage based on the average km travelled in the baseline scenario. The ex-post data for ‘Freight movements’ and ‘Goods carried’ could not be calculated. However, in order to understand the experience with the use of the van and to qualitatively assess the potential trips replaced, an interview was held with three of the operators involved in the pilot instead. Relevant quotes (in *italics*) are included in the discussion of the results below.

C2.1 Transport System

1 - Freight movements: replacement of trips and 2 - Freight movements: replacement of trips to Valletta

Replacement of trips was planned to be assessed through the difference between the baseline and ex-post data collection. However, due to limited business during the COVID-19 pandemic, this was instead assessed through an interview with the operators. The operators state that: *“If it wasn’t for COVID, we would use the van every day. Between all of us. Even in the current situation we’ve managed to use it quite a bit for our business deliveries, pretty much every day someone uses it. Sometimes in a day it serves 2 or 3 people; someone uses it in the morning, then someone else in the afternoon”*. The odometer shows that thus far, they have a mileage of 4.188 km with the van, from mid-January until mid-October 2020. However, one of the operators goes on to explain that *“Valletta is dead though. Before, I used to go twice a week, now I go once a month”*. While they have some deliveries on-going, their main avenue for sales – souvenirs for the tourist market, focused on shops in Valletta – has come to an almost complete halt. When asked about the hypothetical situation that business was as usual, one of the operators explains that *“they would be able to replace all the trips they would usually make with their private vehicle with the shared e-van”*, as the van is more economical (no fuel costs) and more presentable, marketed as the ‘Village to Valletta’ van.

6 - Goods carried

The amount of goods carried in the shared e-van was planned to be assessed through the difference between the baseline and ex-post data collection. However, due to limited business during the COVID-19 pandemic, this was instead assessed through an interview with the operators. The operators state that: *“For us here at Ta’ Qali Crafts Village the van is very useful. Usually we make a lot of deliveries, a lot of trips. We have our cars, but now we can share and use one large van. It is large enough for our deliveries. It’s bigger than our private vehicles so we can deliver more items, even bulky items that otherwise we would have had to rent or borrow a van for”*. As an example, one of the operators (a producer of wooden souvenirs and furniture) explains that the van is also more presentable and suitable for certain deliveries, for example a large sculpture that they would not have been able to deliver in one piece in their private vehicle (see Figure 4). Furthermore, they explain that *“the shared e-van is also more presentable and suitable to deliver items of a certain class, for example this sculpture, it would not look nice if I deliver it with my old diesel van, it looks much better in our shared branded ‘Village to Valletta’ van”*. The operators further added that the shared e-van is a positive asset for the image of the Ta’ Qali Crafts Village: *“People are very impressed when they see us doing a delivery with the van. Everyone comes out to look at it. They are very surprised to see that it is an electric van”*.



Figure 4: Using the shared e-van to transport large and valuable goods.

C2.2 Economy

3 - Capital costs

The capital costs for the purchase of the electric van was higher than foreseen. Transport Malta put out a tender twice, but failed to attract bidders, after which it was agreed and approved to opt for a direct order.

The operators that took part in the pilot explained that this was not an investment that they could ever have made privately: *“We are small businesses, so we don’t individually have a need for a van like that, nor do we have the money to invest in one. But in this way, together, it works: we don’t need to invest each of us individually in a van”*. The pilot thus enabled them to test out the use of an electric van, shared between multiple small businesses. The experience, even though the actual use was hampered by the COVID-19 pandemic, was a very positive one. In fact, the Ta’ Qali Crafts Village Tenants Association is aiming to apply together with the Local Council for a grant to support the purchase of electric vehicles made available through Transport Malta⁵.

4 - Average operating costs

In the baseline scenario, the average operating costs (including only fuel costs) for operators was around €0.10/km (Table 5). In the pilot with the e-van, the operators were able to utilise electricity from the grid at no cost to them (the installation and electricity costs of the charging station are covered by funding from the ERDF SMITHS project as part of the creation of National EV Charging Infrastructure). Therefore, the use of the shared e-van has enabled them to save on their operating costs. As the operators explain in the interview: *“The van enables us to save money. You don’t have any expenses on fuel”*. However, even in the case that they would be paying for the electricity, they would be saving costs. The price per kWh in Malta for non-household users is €0.1328 per kWh, which would translate into a cost of ~ €0.02/km for the cost of charging the e-van (Table 6). This would result in operating costs savings of ~€0.08/km.

The operators also explained in the interview that the sharing of deliveries could result in reduced operating costs: *“Several times we managed to split the deliveries; combining and taking care of each other’s deliveries. However, this did not happen as much as we would have*

⁵ Government grants for the purchase of electric vehicles: <https://www.transport.gov.mt/land/schemes/transport-schemes-2020/ev-local-councils-and-registered-non-government-organisation-ngo-s-3708>

hoped, because of the pandemic". The shared e-van also enabled the operators to deliver larger goods that previously they would have to transport using a rented van, at an extra cost.

Operator	Vehicle	Average fuel economy ⁶ (L/km)	Average CO ₂ emissions ⁵ (g/km)	Total vehicle km vkm/week	Total fuel costs ⁷ (€) for total vkm/week	Total CO ₂ emissions (kg) for total vkm/week
Operator 1	Peugeot Expert	7.2L/100km	189.9g/km	220vkm	€21.38	41.78 kg
Operator 2	Isuzu KB	12.4L/100km	308.7g/km	185vkm	€30.97	57.11 kg
Operator 3	Citroen Berlingo	6.0L/100km	151.9g/km	307vkm	€24.87	46.63 kg
Operator 4	Citroen Cactus	4.0L/100km	97.6g/km	180vkm	€9.72	17.57 kg
Operator 5	VW Caddy	6.4L/100km	164.7g/km	230vkm	€19.87	37.89 kg
Operator 6	Peugeot Partner	6.0L/100km	150.8g/km	106vkm	€8.59	15.98 kg
Operator 7	LR Range Rover	11.1L/100km	273.4g/km	63vkm	€9.44	17.22 kg
Total / week				1,291 vkm	€124.84	234.18 kg
Average / km				-	€0.10/km	181.4g/km

Table 5: Vehicle km, fuel use/costs and CO₂ emissions in baseline scenario for one week of operation (September 2019)

Vehicle	Average fuel economy (kWh/km)	Average cost of electricity ⁸ (€/kWh)	Operating costs of van (€/ kWh/ km)	Average operating costs (€/km)	Avoided costs (€/km) ⁹
Renault Master Z.E.	35 kWh/200 km	0.1328 €/kWh	4.648 €/ kWh/200 km	0.02 €/km	0.08 €/km

Table 6: Average actual and avoided fuel use and costs from use of the e-van (2020)

C2.3 Energy

5 - CO₂ emissions

Between mid-January and mid-October 2020 (roughly 9 months) the van was used for a total of 4.188 km. Based on this total mileage, the fuel economy of the van (obtained from the vehicle

⁶ Average fuel efficiency and CO₂ emissions based on vehicle type: <https://car-emissions.com/cars/model>

⁷ Average fuel costs in Malta: €1.35/L (average between petrol €1.41/L and diesel €1.28/L):

https://www.globalpetrolprices.com/Malta/gasoline_prices/ / https://www.globalpetrolprices.com/Malta/diesel_prices/

⁸ Electricity price for non-household users in 2020: <https://ec.europa.eu/eurostat/web/energy/data/main-tables>

⁹ Compared to the Average fuel costs per km in Table 5.

logbook) and the calculated avoided CO₂ equivalent (CO₂e) emissions in Table 7, the total avoided emissions over this period amounts to ~201.9 kg CO₂e. This would amount to ~269.1kg CO₂e avoided emissions over the period of a year (12 months), or ~5.2kg CO₂e avoided emissions on a weekly basis, based on the same usage.

Vehicle	Average fuel economy (kWh/km)	Average CO ₂ emissions of electricity ¹⁰ (kg CO ₂ e /kWh)	CO ₂ emissions of van (kg CO ₂ e /kWh/km)	Average CO ₂ emissions (g/km)	Avoided CO ₂ emissions (g/km) ¹¹
Renault Master Z.E.	35 kWh/200km	0.761 kg/kWh	26.64 kg/kWh/200 km	133.2g/km	48.2g/km

Table 7: Average actual and avoided fuel use and CO₂ emissions from use of the e-van (2020)

The potential use in a normal situation (i.e. as in previous years, not in 2020 during partial lockdown and very limited tourist season) would be much greater. When looking at the total weekly vehicle km in the baseline situation in Table 5, replacing all those trips would result in average avoided emissions of ~62.2kg CO₂e per week. Considering that these are the operators' private vehicles, assuming 100% of trips would be replaced by the shared e-van is not realistic. However, even when assuming only 50% of trips would be replaced, this would mean ~31.1kg/CO₂ of avoided emissions per week; almost triple the amount foreseen in the ex-ante calculations (Table 4).

In the case of this pilot, the electricity used to charge the van comes from the national grid, which is still primarily dominated by fossil fuels and therefore has relatively high CO₂e emissions per kWh. If the e-van was charged using energy from renewable sources (e.g. from a solar PV system) there would be little to no CO₂e emissions, meaning the full amount of the average 181.4g CO₂e/km (Table 5) would be avoided emissions. Based on the weekly use in the baseline scenario in Table 5, this would mean avoided emissions of 234.18 kg CO₂e on a weekly basis, and 12,177.36 kg CO₂e avoided emissions on a yearly basis. This shows that the potential for avoided emissions would be much higher if the energy source for the electricity was from a renewable source.

In the interview, the operators also stress this benefit of the shared e-van: *“Whenever we go to Valletta we’re always stuck in traffic. But when you’re in an electric van you feel better, because at least you know you’re not choking everyone with your exhaust, like you would with a diesel van”*.

¹⁰ CO₂e (equivalent) emissions for electricity from the grid in Malta, based on production mix factor (2018): https://www.carbonfootprint.com/docs/2019_06_emissions_factors_sources_for_2019_electricity.pdf

¹¹ Compared to the Average CO₂ emissions per km in Table 5.

C2.3 Society

7 - Awareness level: operators participating in pilot

Thanks to a positive collaboration between TM, UoM and the Malta Chamber of SMEs (GRTU, the General Retailers and Traders Union), the Ta' Qali Crafts Village was identified as a suitable group of operators to participate in the pilot. Liaison by the GRTU encouraged seven operators to participate in the pilot, which was considerably more than the two operators foreseen in the ex-ante evaluation. The Ta' Qali Crafts Village is currently under re-development (renovation and modernization of the area) and therefore hosts 12 active businesses. The plan is for the Crafts Village to house around 70 businesses, thus offering the potential to further amplify the use and benefits of a shared e-van. The operators also explained during the interview that “as soon as the different operators at Ta' Qali Crafts Village had started liaising between each other, everything came to a halt due to the pandemic. Initially, when we had just gotten the van, people were shy to participate in the pilot. Then the pandemic happened. If we would have more time to test it out in a normal situation we would have managed to exploit the opportunity more and get more businesses to participate in the pilot”.

C3 Quantifiable targets

No	Target	Rating
1	Less CO ₂ emissions 532.95 kg CO ₂ e/annum (10.25 kg CO ₂ e/week)	★
2	Improved air quality levels, with an annual average reduction of PM emissions by 0.023 tonnes and NO _x emissions by 5.38 tonnes	NA
3	Improved satisfaction of users (1.149 residents)	NA
4	Number of trips transferred to energy-efficient mobility: 156 trips	★★★
5	Goods carried: volume of goods delivered: 156 tonnes	NA
6	*Capital cost invested: € 27.880	★★★
7	*Average operating costs reduced by half	★★★
8	*Goods carried: % of van full	NA
9	*Awareness level: at least 2 operators participating in pilot	★★★
NA = Not Assessed O = Not Achieved ★ = Substantially achieved (at least 50%) ★★ = Achieved in full ★★★ = Exceeded		

* New target, not in GA

Table 8: Assessment of quantifiable targets

Targets 2, 3, 5 and 8 were Not Assessed under this measure. The data collection was first delayed due to COVID-19 partial lockdown and ultimately not possible to collect in the same manner due to heavily decreased business (tourist arrivals in July 2020 -84% compared to previous year). The volume of goods carried (Target 5) and the percentage of van full (Target 8) could therefore not be assessed as foreseen. As for Target 2, it was not deemed realistic to

measure actual change in PM levels and NO_x emissions. While for CO₂ emissions certain average values could be researched (e.g. average CO₂ emissions for particular vehicles), this type of information could not be found for PM level and NO_x emissions. The pilot was also too small to expect any difference to be picked up by the air monitoring stations in place in only four fixed locations on the island. Target 3 was replaced by the indicator 'Awareness of operators' (Target 9) in order to better evaluate the impact of the pilot, also considering that the pilot did not directly involve or impact residents, but focused on the use of the van by different operators. However, as can be seen from the interview replies as described in section C2, the operators are using the shared e-van for the majority, if not all, of their deliveries. Despite not being able to directly assess these targets, from the information provided by the usage of the electric van and the feedback from the operators, the actions carried out under this measure did indeed contribute to improved air quality and improved satisfaction.

Target 1 was Substantially achieved (at least 50%). As can be seen from the listed vkm / week figures in Table 5, the total vkm per week per operator varies quite widely. The assumption that the use of the shared van replaces all of the vkm made by the operators individually in the baseline is probably overstated. Since these are small companies (single owner, family companies and SMEs), most of the operators probably use the vehicle for both private as well as company use, and thus not all vkm can be accounted as being for delivery purposes for the company. Therefore, the potential avoided CO₂e emissions were presented also for the scenario that 50% of baseline trips would be substituted with use of the van. Even in such a case, assuming only 50% of trips would be replaced, this would mean ~31.1kg/CO₂ of avoided emissions per week; almost triple the amount foreseen in the ex-ante target (Table 8, No.1). The average avoided CO₂ emissions based on the use of the van during 2020 (under partial lockdown and heavily reduced business) was ~5.2kg CO₂e on a weekly basis, about half the ex-ante target. In a normal scenario, without lockdown, this measure would have easily met the target.

Target 4 was Exceeded. As can be seen from the interview replies as described in section C2, the operators are very positive about the use of the van and are eager to use it instead of their private vehicles. In the hypothetical scenario that business was as usual, they indicate that they would use it to replace the majority, if not all, of their delivery trips. Therefore, we can realistically assume that the number of trips as targeted (156 trips shifted from private vehicle to shared e-van) would be reached in a normal situation, as during the baseline data collection, the seven operators taking part in the pilot logged 45 trips in just one week.

Target 6 was Exceeded. The capital costs for the purchase of the electric van (57.995€) was higher than foreseen (27.880€). Transport Malta put out a tender twice, but failed to attract bidders, after which it was agreed and approved to opt for a direct order.

Target 7 was Exceeded. The fuel costs indeed decreased as a result of the shared e-van, both in the current scenario (where the electricity is provided free of charge) and also in a scenario where the businesses would pay for the electricity at the non-household tariff. The operational costs include only the fuel costs and not the driver costs, since the deliveries were carried out within existing staff costs. Part of the benefit of switching to the shared van is that operators share the effort of deliveries. Whereas before they each did their own deliveries with their own car/van and spent a certain amount of time on the deliveries, now that effort will be shared. Since there is no exact data available on the amount of time spent on deliveries before and after the use of the shared e-van, it is not possible to accurately quantify the difference. However,

from the insights from the interview with the operators participating in the pilot, as described in section C2, these are tangible benefits of the use of the shared e-van that are recognised and appreciated by the operators.

Target 9 was Exceeded. This target for the awareness level, the number of operators participating in the pilot was exceeded, with seven operators participating in the pilot; considerably more than the two operators foreseen in the ex-ante target.

C4 Up-scaling of results

Not applicable.

D Process Evaluation Findings

D1 Drivers

At the **organizational** level, there has been very helpful collaboration with and assistance provided by key stakeholder GRTU (the General Retailers and Traders Union), which enabled the identification of suitable partners for the pilot. The union brokered an agreement for the pilot test with the Ta' Qali Crafts Village. This contributed to active participation of the operators in the implementation of the pilot. Furthermore, the pilot is not only optimizing operations of logistics for a group of operators, but has the added value of doing so with a group of companies that focus on a specific tourist product (locally made souvenirs), fully fitting within the scope of the project: the promotion of sustainable mobility measures at tourist destinations. The operators explained in the interview that their experience of using the van and sharing it between operators was a very positive one: *“From our experience, no one abuses the van, using it for personal matters for example. When it is not in use, we leave it parked here at Ta' Qali Crafts Village next to the charging pillar, and we use it only for its purpose; to make our deliveries”*. The response from the public was also very positive, with people being impressed with the electric vehicle and the ‘Village to Valletta’ branding, thus making the van a positive asset for the Ta' Qali Crafts Village.

At the **planning** level, there was mutual support in the development of the SUMP and the Sulp at the same time. Certain aspects of the SUMP and Sulp are very similar (such as the baseline data collection; regional profile, stakeholder mapping and engagement). In this regard, initial work necessary for the Sulp has been incorporated in the work being done for the SUMP preparation.

At the **organizational** level, there has been good collaboration between Transport Malta and the University of Malta, as well as with the GRTU and the Ta' Qali Crafts Village, through regular meetings and emails, to follow-up on progress on the implementation of the measures and the evaluation of the impact.

D2 Barriers

At the **institutional** level, there were some setbacks as a result of the delays with the procurement process of the electric van for the pilot test. Two public tenders were published for the procurement of a full electric goods van to be used as part of the pilot, but no bids were received in both cases. This led to a delay in the operational phase of the measure. Following discussions with the Ministry of Finance, Transport Malta was then allowed to place a Direct Van Order. The total capital cost was higher than initially foreseen. In the end the ordered van was delivered in October 2019.

At an **organizational** and **cultural** level, while several operators at Ta' Qali Crafts Village have enthusiastically agreed to participate in the pilot test of using a shared e-van, there were still hurdles to overcome, in terms of how to arrange practically who would drive on which days and where and how to trust another operator with delivery of one's goods. However, they managed to create the necessary working arrangements for deliveries to be successful, with communication through a shared WhatsApp group, while one operator took responsibility for the care and use of the vehicle, keeping record of who is using the van and when it is available.

D3 Lessons Learned

There was no Sulp or other kind of logistics plan yet in Malta, so the creation of a dedicated Sulp for Valletta through the DESTINATIONS project has been a great step forward for the city and for the country, to start considering sustainable mobility in logistics and deliveries.

The research conducted for the Sulp found that it is necessary to modernise the fleet and switch to cleaner vehicles. The existing infrastructure and loading/unloading bays are inadequate and there are not enough available to cover all economic activity needs in Valletta. Further improvements in loading bay design and enforcement are included in the Sulp. In order not to compromise on the safety of pedestrians, the time regimes for goods distribution in Valletta are set to coincide with the least busy periods of the day and when most of the shops in the major commercial area are closed. These timeframes need to be protected and enforced to ensure a pleasant and safe environment for pedestrians. The Sulp proposes clearer regulation of freight transport operation in urban areas at a local and national level to protect the urban environment, to reduce air pollution, to reduce the incidences of traffic infringements and to reduce congestion on the streets and roads of the Valletta Region, particularly during peak hours.

The pilot with the Ta' Qali Crafts Village was designed to showcase and promote the uptake of good solutions in a voluntary way, by providing evidence and demonstrating the benefits for public and private sector. The experiences of the operators participating in the pilot has been very positive and there is opportunity for further developing this type of shared e-van deliveries at the Ta' Qali Crafts Village, as well as for other businesses on the Maltese Islands.

E Evaluation conclusions

The results of the evaluation, even though not all targets could be assessed due to the COVID-19 pandemic, in general shows a very positive picture. The use of the shared e-van has led to reduced CO₂ emissions and reduced operating costs for the operators involved, and has the potential for further CO₂ emission reductions in a scenario where business – and therefore the volume of deliveries – was in a business as usual case (as opposed to the reduced business as a result of the COVID-19 pandemic), as well as if the electricity used to power the van would be generated by renewable energy sources. From qualitative data obtained through an interview with the operators participating in the pilot, the shared e-van can replace most, if not all, of their delivery trips, and has proven useful for the delivery of larger items for which they previously had to rent a van.

The awareness and participation of operators in the pilot exceeded the foreseen ex-ante targets and has created a foundation for future collaboration, with the Ta' Qali Crafts Village Tenants Association intending to apply for a government grant to purchase an e-van for their businesses and potential extension of the pool of businesses participating in the use of a shared e-van as the Crafts Village renovation nears completion. The pilot has proven successful in creating the conditions for businesses to test out consolidating their deliveries and can be replicated between other businesses.

F Additional information

F1 Appraisal of evaluation approach

The operators participating in the pilot with the shared electric van previously used their private vehicles for deliveries, since these are small companies (single owner, family companies and SMEs). Therefore, the information collected for the baseline most likely also includes private trips (at least including trips between home and the Ta' Qali Crafts Village). It was difficult to estimate how much the use of their vehicle was for private use, and how much was for company use.

F2 Future activities relating to the measure

The research, consultation and development of the Sulp as part of the DESTINATIONS project has enabled the creation of a comprehensive plan, which contains an action plans with plans for the short and long term. Transport Malta can, together with other stakeholders, continue working on the identified action to improve logistics management and sustainable mobility for deliveries.

The electric van that has been purchased by Transport Malta for the pilot was on loan to the Ta' Qali Crafts Village for a period of a year. Thereafter, a similar model could be followed by other retailers operating in close proximity, to encourage them to try and get familiar with electric vehicles and with sharing deliveries and experience the benefits.

Over the past few years, Transport Malta has made grants available for individuals and businesses to purchase electric vehicles, including cars, vans, bicycles and cargo-bicycles. There is also a specific grant for companies to change their vehicle fleet from ICE to EV. The Ta' Qali Crafts Village Tenants Association is aiming to apply together with the Local Council for a grant to support the purchase of electric vehicles made available through Transport Malta. Furthermore, as the Ta' Qali Crafts Village is currently being renovated, there are only 12 active businesses. However, the plan is that in the end the Crafts Village will house around 70 businesses, thus offering the potential to further amplify the use and benefits of a shared e-van.