

2020
CiViTAS
Cleaner and better transport in cities

DESTINATIONS



Measure Evaluation Result

MAD 3.1 – Innovative solutions for safe and secure public spaces

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Executive summary

This measure aimed at increasing attractiveness in a sought touristic area through the implementation of an innovative walking light system that bridges energetic efficiency and road safety using LED road marks that are enabled when pedestrians are detected. The system also encompasses a public street light system that is powered by renewable sources of energy (solar and wind), CCTV and a remote digital platform that collects data related to public lighting. The system was widely praised by other cities, residents and tourists and was highlighted by Interreg Europe¹ as a good practice within low carbon economy strategies to be pursued. The measure was also targeted at improving accessibility to public transport through the reinforcement of sidewalks and deployment of public transport shelters. The Municipality of Funchal struggled in developing actions to improve the public transport accessibilities, given the spatial limitations, namely narrow roads that made it unfeasible to deploy shelters. Despite the spatial constraints, several interventions were carried out in the areas in which it was possible to improve accessibility.

Given the several features, the evaluation process was outlined in order to ensure a proper impact assessment that included specific indicators that ranged from public transport accessibility level, road safety, urban barriers, and traffic counts system related to non-motorized transportation to perceive impact following the implementation of the measure. Despite the COVID-19 pandemic crisis that affected significantly traffic flow, most indicators were gathered before the lockdown. The evaluation process will be continuously pursued and data will be collected beyond DESTINATIONS to assess at a long-term period the feasibility to replicate these actions to other areas in the city. A driving factor that facilitated the implementation of the measure relates to the SUMP, whose strategic goals implies the pursuing actions that bridges mobility and digital connectivity.

The implementation of this measure, namely the innovative public light system was considered a good practice by Interreg Europe acknowledging that concerted approaches are the path to follow in order to achieve results that are more efficient. To add up, the recognition that this measure brought to Funchal also highlighted the importance of using new technologies to further support sustainable and smart mobility given the possibility to gather a vast array of data to support decision-making process. It also enabled the Municipality of Funchal to pursue additional sources of funding (ERDF) to ensure a wide urban rehabilitation that will be carried out beyond DESTINATIONS to further improve the walkability and cycling conditions in the target area.

The measure was a success considering that it was instrumental in ensuring the CIVITAS LEGACY AWARD 2020 through the implementation of the innovative solutions as well as the accessibilities to foster soft modes in the target area. The interventions carried out achieved the expected outputs, leading to a reduction of road accidents as well as an enlargement of sidewalks in which urban barriers were removed, thus increasing the walkability.

¹ The recognition was part of a task undertaken within Match-Up, a project geared at fostering multimodality. The good practice related to the “intelligent crosswalks” that combines energetic efficiency and road safety is available on the following link: <https://www.interregeurope.eu/policylearning/good-practices/item/2821/intelligent-crosswalks-energetic-efficiency-and-road-safety/>

A Description

In Funchal, the need to implement actions to increase attractiveness, safety and accessibility in urban space, mostly in areas dedicated to public transport and pedestrian circulation, made this measure relevant. This measure encompassed a vast range of actions geared towards specific target groups, including, not only tourists and residents but also people with mobility impairments.

Therefore, the interventions included the installation of an integrated system that combines energetic efficiency and road safety. As for public transport, the activities relied upon the implementation of structural improvements in public transport shelters and rehabilitation of public spaces in order to facilitate accessibility.

In addition, the Municipality of Funchal undertook several awareness campaigns to foster walkability and cycling through conferences, exhibitions and other media tools to disseminate the measure and the actions carried out.

This measure had the cooperation of the following local partners:

- Horários do Funchal, responsible for collecting and sharing the data related to public transport;
- AREAM for participating in meetings, and being responsible for the development of the Covenant of Mayors who goal is to reduce the greenhouse emissions;
- ARDITI, for participating in meetings and supporting the definition of the technical requirements.

A1 Objectives and outputs

City policy level objectives

- Demonstration of the impact of innovative solutions through pilot test in the target area;
- Evaluation of the potential advantages of the solutions and consider their replicability in other areas of the city;
- Ensuring the compliance with the goals established within the SUMP in terms of improving pedestrian conditions within the target area, while reinforcing the cycling path;
- Reaffirmation of the touristic and leisure status of the target area and highlight it as a good practice within the mobility management field.
- Improvement of the urban accessibility and mobility;
- Enhancement of safety and security in urban areas including public transport;
- Creation of more attractive destinations for tourists.



Figure 1: Integrated system implemented in Funchal that links road safety and energetic efficiency

Measure specific objectives

- Improvement of pedestrian, cycling accessibility through the implementation of several actions;
- Identification of a pilot-area in which barriers for people with reduced mobility are removed;
- Improvement of the public transport accessibility in bus stops, especially for tourists and visually impaired people;
- Design of a report focused on the main touristic attractions located in the pilot area, including the safety during the night period;
- Implementation of a more efficient public lighting system in order to improve safety and security.

Outputs²

- 1 accessibility study in the target area;
- 1 road safety monitoring centre involving the Municipality, the PT Operator, the Police and other relevant stakeholders;
- 40 bus stops intervened and improved, with budget allocated from DESTINATIONS as well as from the Municipality;
- 1 surveillance camera installed inside 1 urban bus for testing purposes;
- 52 cameras (24 surveillance and 28 passengers counting cameras) inside 12 urban buses;
- Target street painted with innovative road markings;
- * 5 locations with a system that bridges energy efficiency with road safety (new public light system powered by renewable sources of energy and CCTV along the target street)
- * Promotional Campaigns - Promotion of soft modes and public involvement – European Mobility Week (2016-2019);
- ** Urban rehabilitation in the target area through expansion of bike lane and enlargement of pedestrian network (ERDF);
- ** Dissemination of measure on good practice database (INTERREG EUROPE);
- ** Public exhibition of integrated system that connects energetic efficiency and road safety (INTERREG EUROPE).

Supporting activities

In order to enhance the impacts of the measure, some complementary activities were carried out, namely:

- Funding application to reinforce the pedestrian network connectivity within the target area;
- Development of awareness campaigns to foster multimodality within the target area, namely pedestrian mobility, public transport, cycling and electric mobility;
- Thematic conferences focused on presenting the integrated system that combines energetic efficiency with road safety, including live display of the equipment that was deployed;
- Discussion session (at a technical and political level) focused on presenting the project “*Monumental Acessível*” that highlights the interventions that were carried on

² *Extra-output with DESTINATIONS budget; **Extra-output during DESTINATIONS with other funds

- Development of a cycling plan to outline the strategic actions to be undertaken at a medium, long-term period.

A2 Inter-relationship with other measures

The measure shares some synergies with other DESTINATIONS WP, namely;

- **MAD 7.2 (Attractive Public Transport)** - Given the similarities between this measure and MAD 7.2 in what regards public transport improvement, a procurement was launched that encompassed the budget from both measures. The type of actions that were undertaken comprised the deployment of public transport shelters, enlargement of sidewalk and removal of urban barriers near public transport access points.

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

The area that was mostly affected by the measure is the western part of the city of Funchal, an area highly sought by tourists as well as people who enjoys sport and leisure activities. Besides tourists and residents, other target groups that were also affected by the intervention were retailers and hotel owners.

A4 Stakeholders involvement

Stakeholder name	Activities description
<i>Polícia de Segurança Pública</i> (law enforcement)	Taking in account that safety plays a key role in this measure, it was necessary to involve local authorities as a supplementary action in order to reinforce their action on the target area.
EEM (Regional Electricity Company)	This company provided several lighting data to support the transition of the public lighting systems towards a more efficient system.

Table 1: Stakeholder's involvement

B Measure implementation

B1 Situation before CIVITAS

The limited accessibility for people with disabilities to the services offered in urban spaces, due to the existence of several urban barriers spread in the built environment, was highlighted as the main problem during the diagnostic stage. This was also supported by the SUMP that pointed out that the road network is primarily tailored for road traffic while the areas that are pedestrianized have a width that is not suitable for walking. Also due to these factors, the areas located in the city core are gradually losing their attractiveness.

In addition, the areas dedicated to public transport are also severely affected by accessibility issues. Several bus stops in Funchal lack a proper accessibility due to the specificities of the road network, since Funchal is characterized by very narrow streets and frequently with bidirectional car flow that greatly limits the spaces devoted to pedestrian. Overall, and

accordingly to what was gathered during the diagnostic stage in which a survey was carried on as well as a technical assessment revealed that some bus stops, outside the city core, lack accessibility due to the inexistence of shelters and sidewalks. Worsening the case, the extremely limited spatial conditions makes it impossible to deploy a shelter and to create a safe route for public transport users. This situation leads, obviously, to a reduction of attractiveness of public transport since users have to wait for the bus on traffic lane and not on a dedicated sidewalk, decreasing their safety.

As for the public lighting in Funchal, the urban renovation plan highlighted that the majority of the public lighting in the target area was not efficient in terms of energetic performance. Aiming to assess the safety in the target area, according to the road safety-monitoring centre it was possible to identify that several road accidents took place prior to DESTINATIONS, near the crosswalks.

B2 Innovative aspects

- **New conceptual Approach** - The sought solutions, individually tailored for specific target groups (tourists, visually impaired and disabled people, public transport users and residents) provided better accessibility and mobility conditions, with a more user-friendly design of the pavement. Therefore, the solution implemented is aligned with the concept of smart city considering that it links energetic together efficiency of public lighting powered using renewable sources and road marks placed on crosswalks that are activated whenever a pedestrian is detected.
- **Use of new technology/ITS** -. The system integrates the use of new technology through several modules, namely video capture, energy performance optimizer, Wi-Fi network, among others that can be integrated in the future as traffic counters, charging for electric vehicles, etc. Since it was implemented, this new physical infrastructure solution was praised including being highlighted on the INTERREG EUROPE platform as a good practice that should be replicated to other sites. Following the successful implementation, the Municipality of Funchal was reached by other sites that intends to implement the same measure, leading to several organizational arrangements and potential partnerships.
- **New physical infrastructure solutions** - In addition, a throughout intervention to improve and/or deploy new bus stops was carried on in order to foster public transport. Although the spatial limitations, it was possible to include the deployment of bus shelters, the improvement of accessibilities through the enlargement of sidewalks and removal of obstacles to pedestrian mobility. Horários do Funchal defined an innovative design for the bus stop information in order to make it more understandable and attractive for passengers.

B3 Technology development

The actions that were implemented followed an exhaustive research that comprised of data collection and a territorial diagnostic. Such preliminary step highlighted and identified some of the challenges but also the driving factors to tackle. An attractiveness plan was also drafted in order to identify issues and outline the intervention actions. Some actions required specific research and technology development, namely the deployment of a surveillance system, comprised cameras, which were tried out for the first time in Funchal. In addition, the public

lighting system sought required specific features in order to improve their energetic efficiency. The resurfacing of specific roads, aimed at visually impaired and disabled people also required a throughout research. In the meantime, the teamwork has already identified, at a first stage, some of the bus stops that require specific interventions. Moreover, some areas were already identified in which pedestrian mobility was improved through the improvement of accessibilities for public transport users as well as the implementation of innovative actions to increase safety and security near pedestrian crossing zones through autonomous crosswalks that are enabled whenever they detect pedestrians.

B4 Actual implementation of the measure

The implementation of this measure relied on the following tasks:

Accessibility study in the target area

The urban renovation plan, entitled “Enhancement of Attractiveness in the Western Area of Funchal: Road Safety and Energetic Efficiency” was developed and concluded in 2017 and supported and guided the process of the equipment acquisition. The renovation plan focused on a territorial, demographic, sectorial and accessibility/mobility overview of the target area, including also an assessment in terms of public lighting efficiency and road accidents and interventions to tackle these problems. The plan was crucial in order to gather the baseline data, identify the main issues under discussion and outline the strategy to implement.



Figure 2: Urban renovation plan that supported the type of equipment to be purchased

Road safety monitoring centre

During CIVITAS DESTINATIONS, the Municipality of Funchal developed a road accident GIS database based on the sharing protocol with the Police authority (PSP). This information was crucial for the identification of the places that requires a safety improvement. The monitoring is updated through data that is submitted to the Municipality every six months. This information was also used to support the evaluation process. The data refers to run overs, collisions and overturning. The road accident GIS database was firstly developed in 2016.

DESTINATIONS, through **this monitoring centre**, has **enabled the mapping of road accidents** and the publishing of **heat maps and other spatial analysis tools** while reinforcing **the role** of having this information to assess the impact of implementing traffic calming measures in the critical areas.



Figure 3: Road safety GIS database

Improved accessibility near PT stops



Figure 4: Example of accessibility improvement for public transport

The measure implied carrying out several interventions, namely public works to improve the pedestrian conditions within the area as well as the accessibility to public transport shelters.

Horários do Funchal, along with the Municipality of Funchal, assessed the accessibility conditions at the bus stops and inside the bus. Following this analysis, a diagnostic study of bus stops in Funchal was developed in 2017 to assess safety, security, accessibility and walkability conditions. It should be noted that most of the bus stops couldn't physically be improved, due to the specificities of the road network (very narrow streets, bidirectional traffic flow that greatly limits the range of action).

Nevertheless, the Municipality of Funchal launched a procurement in 2018 geared at the deployment of 4 public transport shelters, improvement of pedestrian accessibility with new sidewalks (with a total extension of 515,5 m²). These public works were already subcontracted and are being implemented. The improvement works for pedestrians were completed by November, 2019. These subcontracted works are jointly connected with MAD 7.2, given the similar scope.

In parallel, *Horários do Funchal*, analysed the needed improvements for the several types of buses stops (40 buses stops). This work was related to measure MAD 7.2, which includes the renovation of the 40 buses stops. A new design was defined for the bus stops, including information in Portuguese and English, providing a series of relevant information for both, tourists and residents. It was defined the requirements and is under tender definition, to be implemented soon.

Extra Outputs

The intervention area was also the focus of, not only, MAD 3.1 actions, but also an accessibility project, co-funded by ERDF, that greatly increase the mobility conditions for soft modes, namely pedestrian and cycling. With a total extension of 2,5 km, the civil works costed 1.3 million in which the procurement was concluded in 2020. As of May, 2021, the first stage of the bike path was concluded (545 meters).

Video Surveillance and Passenger Counting System

Horários do Funchal, initiated a CCTV system test inside 1 bus for surveillance, safety and passenger counting purposes in September 2017. The system shown to be beneficial since it



Figure 5: Example of accessibility and safety improvement in Funchal for

allowed real time surveillance inside the bus, and passengers counting (in an out), a statistic that was important for HF. These tests were related to measure MAD 2.2.

Initially, it was decided to install the cameras inside a bus that operated on a long urban bus route (48-Nazaré/Monte). Each bus stop's geographic coordinates were included in the system. Even though the urban public transport service is geo-referenced, it was necessary to fine tune each bus stop location to allow the system identification, or if it was necessary to adjust the coordinates.

After several tests, the results were analysed and the system shown to be very accurate and beneficial, once the system allowed real time surveillance and to count passengers' movement in and out.

Following the successful tests performed in 2017, Horários do Funchal decided to proceed with the purchase of a new Video Surveillance and Passenger Counting System in October 2020. The system collects images of the interior of the bus for surveillance purposes, and simultaneously counts the passengers entering and leaving the bus, screening the movement of passengers through the doors. The final solution comprises 52 cameras (24 surveillance cameras and 28 passengers counting cameras) that were installed in 12 urban buses.

It was decided to install the equipment in two different bus models, 8 buses with two doors (one back door and one on the front) and 4 buses with three doors (two back doors and one on the front).

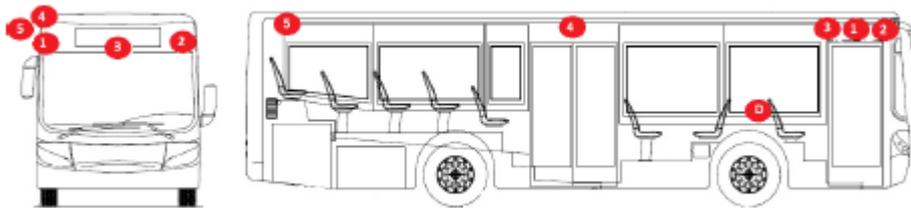


Figure 6: Surveillance and passengers counting cameras locations

Complementarily, to analyse the collected data, a monitoring and data query software was tested. The collected data as well as the images and GPS position gathered by the system are available online in a protected platform. The system allows access over the network through a dedicated client session and with the respective authentication as it allows also the consultation of passenger movements. In addition, to allow a proper service evaluation, the new system has a connection with the Exploitation system in order to identify relevant service data such the stop, career, vehicle, and others data that is necessary.

At operational level such system proved to be is beneficial as it allows real time surveillance and accurate data collection regarding passengers entering and exiting the buses. Finally, the system also provides a safer environment inside the buses to passengers.

Target street painted with innovative road markings

The integrated system that was implemented in March 2019 near the crosswalks it comprised public light that is powered using renewable sources of energy. As for the public lighting, it is connected to the crosswalks through LED sensors that are activated when pedestrians are detected. These road markings have the purpose to warn drivers that pedestrians intends to cross and can be remotely configured to what regards the brightness, activation time, among other parameters. The system is only active during night, and it was deployed in the busiest areas within the target zone, namely near restaurants, pubs and hotels.

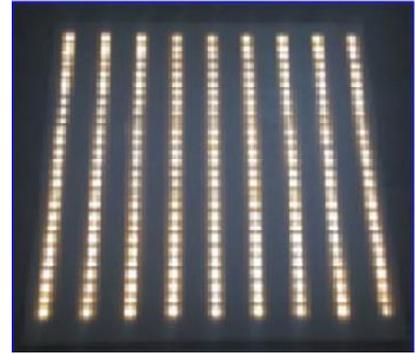


Figure 7: Example of innovative road markings comprised of LEDs

System that links energy efficiency with road safety

A throughout analysis, focusing on the issues identified in the target area, come first the implementation of the system. For that reason, an attractiveness plan was drafted, pointing out the barriers and the driving factors. From such preparatory study, the integrated system proved to be the most adequate choice given the scope of WP3. The tender preliminary proposal has to follow the national guidelines related to procurement in which a tender it has to be launched to at least to three interested parties.

As for the selected equipment, a state-of-the-art public light system powered by renewable energies was purchased combining energetic efficiency with road safety to reinforces safety near crosswalks. The system started in operation on April 2019 and was installed in 5 places.

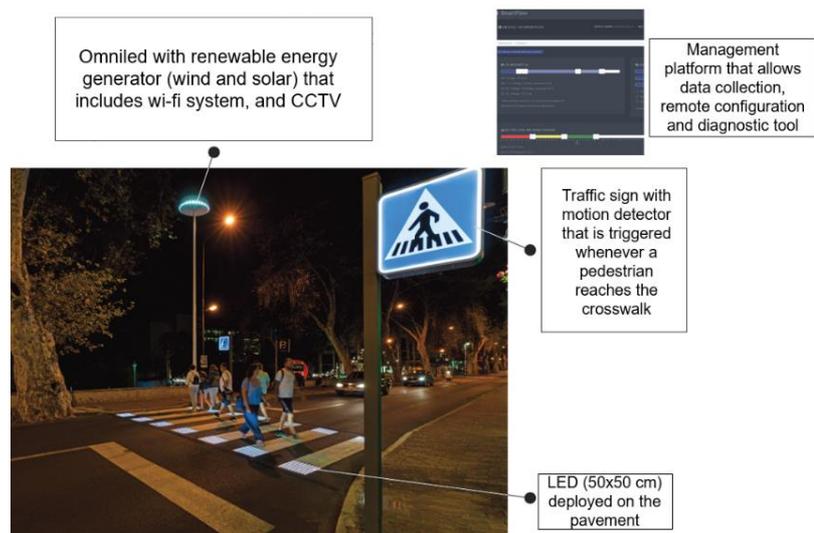


Figure 8: Overview of components that supports the integrated system

The solution consists of deploying LED strips into the ground at a pedestrian crossing, close to the public transport interface as well as being near to a sought area by pedestrians and tourists. The measure aims to reinforce road safety especially for pedestrians who are too distracted by their smartphones to bother looking at the road, telling them when to cross and when not to cross by either glowing green or red, depending on the traffic light signals. It also allows safe and smooth access to the downtown. The system was introduced next to a few pedestrian crossings, allowing also the reinforcement of the pedestrian safety in the crossing by incorporating intelligent lighting, that is, when detecting a pedestrian that intends to cross, the light on the floor and the upper illumination are automatically activated, increasing the visibility

of pedestrian crossing for drivers. As of October, 2020, there was necessary to replace and upgrade some of the components due to technical issues.

Promotion of soft modes and public involvement through awareness campaigns

Communication campaigns were carried out during the Mobility Week 2017, 2018 and 2019 among the general public to foster the use of soft modes, namely pedestrian mobility, Public Transports and bicycle.



Figure 9: Awareness campaigns to foster walkability and cycling

On the 2019 edition of the European Mobility Week, a public display was outlined and it was included information related to multimodality, with an emphasis on accessibilities to public transport based on the public works already carried on for MAD 3.1 and MAD 7.2. These communication initiatives contained the development of awareness materials (brochures and leaflets) related to soft modes and the SUMP strategy. More additional campaigns were developed to foster the use of soft mobility modes.

C Impact evaluation

C1 Evaluation approach

Expected impacts and indicators

Impact category	Impact indicator	Unit of Measure
Transport System	1 - Public transport accessibility level	Nº bus stop with no Shelter
		Nº bus stop with no bench
		Nº light up bus stops
		Nº bus stop with no information on shelter
		Nº bus stops with no road marks
Transport System	2 - Road Safety	Nº bus stop without sidewalk
		Nº Run over
		Nº Collision (all vehicles)
Society	3 - Perception of Accessibility level of service (perceived)	Nº Overturning (all vehicles)
		% Good Accessibility level to the bus stop
Transport system	4 - Mobility barriers in the built environment	% Good Perception about safety conditions at the shelter/bus stop
		Nº Accessibility incidents (sidewalk, stairs, ramp, crosswalk, other)

Transport system	5 - Non-motorized transportation	Nº Record point 1 - Pedestrian (Area that connects the western part of the city to the city core)
		Nº Record point 2 –Pedestrian (Extensive horeca)
		Nº Record point 3 - Pedestrian (Several habitational buildings and a shopping centre that further connects the western part of the city to the adjoining municipality)

Table 2: Expected impact and indicators**Method of measurement**

Impact indicator	Method*	Frequency			Target Group	Domain (demonstration area or city)
		Bef.	Dur.	Aft.		
1 - Public transport accessibility level	DC	M14	n.a.	M41	Area dedicated to public transport stops	22 bus stops that are located in the target area
2 - Road Safety	DC	2010	n.a.	M41	Pedestrians, cyclists and drivers involved in accidents	Funchal
3 - Perception of accessibility level of service	S	M14	n.a.	M54	Respondents standing at bus stops and key agents responsible for mobility management in Funchal	60 bus stops (including the 22 in the target area)
4 – Mobility barriers in the built environment	DC	M14	n.a.	M41	Pedestrians and citizens with physical and sensory disabilities	Funchal: Sidewalk, Stairs, Ramp, Crosswalk and other
5 - Non-motorized transportation	DC	M14	n.a.	M41	Pedestrian volume per gender, cyclists and people with disabilities, both physical and sensorial	Three segments: 1 - Area that connects the western part of the city to the city core; 2 - Extensive horeca, 3 - Several habitational buildings and a shopping centre that further connects the western part of the city to the adjoining municipality.

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

Table 3: Method of measurement

Detailed description of the indicator methodologies:

1 - Public transport accessibility level - Data to perceive bus accessibility and safety was collected through data collection. The spatial audit assessed the quality and maintenance status regarding the bus stops, accessibility level to the shelter/stop and availability of information at stops about schedules and services and conditions at the shelter/stop. The data was gathered before (2017) and after the implementation of civil works (2020).

2 - Road Safety - Data was provided by local authorities (police records) namely road accidents by type that occurred in the target area. Data was initially gathered on 2010 and specifies the type of accident, namely collision, overturning and run over. The latest data collection took place in 2020, following the implementation of the integrated system.

3 - Perception of accessibility level of service - Data to perceive bus accessibility and safety (survey, Likert scale) - the survey assessed several perception patterns such as the quality and maintenance status regarding the bus stops, accessibility level to the shelter/stop, availability of information at stops about schedules and services and safety perception about conditions at the shelter/stop (S). Demonstration area - the indicator was applied in 50 bus stops (including the 22 in the target area). This indicator was calculated considering the 5 points Likert scale ranking options: Very easy; Quite easy; Neither easy nor difficult; Quite difficult; Very difficult. The survey to gather the baseline was carried on during 2017. Due to the COVID-19 pandemic crisis, the conditions were not suitable to carry out a post-implementation survey. To overcome the COVID-19 restrictions, and to at least provide an impact analysis, a short interview was outlined and geared to key agents within the field of mobility management in Funchal.

4 - Mobility barriers in the built environment - The data collection was performed based on accessibility law 163/2006, by direct observation, considering barriers that affects pedestrian mobility according to the national framework for accessibilities (163/2006) and the traffic road national legislation (D). Urban barriers that hamper not only pedestrian's circulation but also citizens with physical and sensory disabilities. To enhance the impact of the measure a procurement, co-funded by ERDF was launched to promote multimodality through the improvement of pedestrian and cycling conditions. The data was gathered in 2017. As of May, 2021, the urban rehabilitation operation has led to the suppression of mobility barriers as well as an enlargement of sidewalks.

5 - Non-motorized transportation - Counting of non-motorized traffic (D). The data encompasses the pedestrian volume per gender, cyclists and people with disabilities, both physical and sensorial. As for the counting period, it was collected during morning (10h00 am to 12h00 am), afternoon (14h00 to 16h00) and at evening (18h00 to 20h00). The data was gathered initially in 2017. Although the COVID-19 pandemic crisis changed the mobility patterns in Funchal, it was possible to gather data prior to the crisis (February 2020) through a pilot project comprised of sensors that records the pedestrian flow in several areas in Funchal, including the target area.

The Business-as-Usual scenario

Considering the type of indicators mostly comprised of surveys and indicators, whose information was gathered for the first time, a BAU analysis was not possible for most of the indicators, except for the indicator 2 - Road Safety, in which the data is available since 2010 and indicator 1 - Public transport accessibility level.

For the indicator 1 - Public transport accessibility level, without the DESTINATIONS implementation, the bus stop conditions would remain the same, no improvements on the existent conditions. As for the Transport System, it wasn't expected further deterioration of the mobility conditions. The current scenario wouldn't suffer any changes.

The BAU analysis for indicator 2 - Road Safety was forecasted considering the data provided by local authorities (police records), namely road accidents, that occurred in the target area, between 2010 until 2020, according to the mean values calculated on the previous years.

For the BAU analysis, a mid-measurement would be necessary and was not considered, since most indicators despite being new, are going to be gathered twice throughout the DESTINATIONS (before and after the implementation).

Regarding Road Safety, the non-implementation of CIVITAS measures would have led potentially to an increase of road accidents within the target area.

C2 Measure results

Impact category	Impact indicator	Unit of Measure	Baseline	Ex-Ante	Ex-Post
Society	1 - Public transport accessibility level	Nº bus stop with no shelter	31	37	24
		Nº bus stop with no bench	34	41	27
		Nº light up bus stops	33	40	40
		Nº bus stop with no information on shelter	23	28	16
		Nº bus stops with no road marks	19	23	2
		Nº bus stop without sidewalk	27	32	20
Transport System	2 - Road Safety	Nº Run over	3	2	0
		Nº Collision (all vehicles)	11	9	4
		Nº Overturning (all vehicles)	2	1	1
Society	3 - Perception of Accessibility level of service (perceived)	% Good accessibility level to the bus stop	33,3%	36.6%	n.a.
		% Good perception about safety conditions at the shelter/bus stop	26,7%	29.4%	
Transport system	4 - Mobility barriers in the built environment	Nº Accessibility incidents (sidewalk, stairs, ramp, crosswalk, other)	136	109	0
Transport system	5 - Non-motorized transportation	Nº Record point 1 - Pedestrian	3.556	3.912	12.508
		Nº Record point 2 - Pedestrian	2.174	2.391	5.072
		Nº Record point 3 – Pedestrian	1.209	1.330	2.640

Table 4: Measure results

C2.1 Transport System

2 - Road Safety

Comparing the baseline, since the implementation of the innovative system that bridges energy efficiency with road safety, it was possible to perceive a decrease. Following the implementation of the system, that took place in March, 2019, according to the road safety database no run overs were registered near the crosswalks while the number of collisions decreased significant in the target street. This proves that the system is indeed efficient and contributed positively to reinforce road safety.

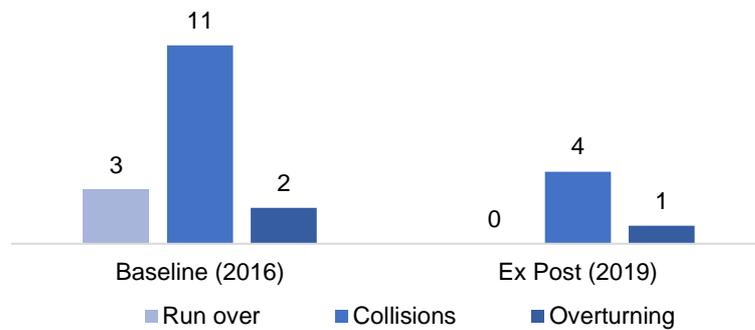


Figure 11: Road safety before and after the implementation

In order to provide a clear impact of the implementation as well as the dissemination campaigns to promote road safety, a chart was drafted considering a non-implementation scenario. Without DESTINATIONS, it was envisioned a worst-case scenario in which road accidents would suffer an increase. Considering the joined efforts of the implementation of the intelligent crosswalks and the several awareness campaigns undertaken throughout DESTINATIONS lifespan, the police records showed a noticeable decrease in the number of accidents in the target area. It is expected an even lower number of accidents in the upcoming years following the implementation of traffic calming measures and restriction policies that will be carried out using the ERDF funding.

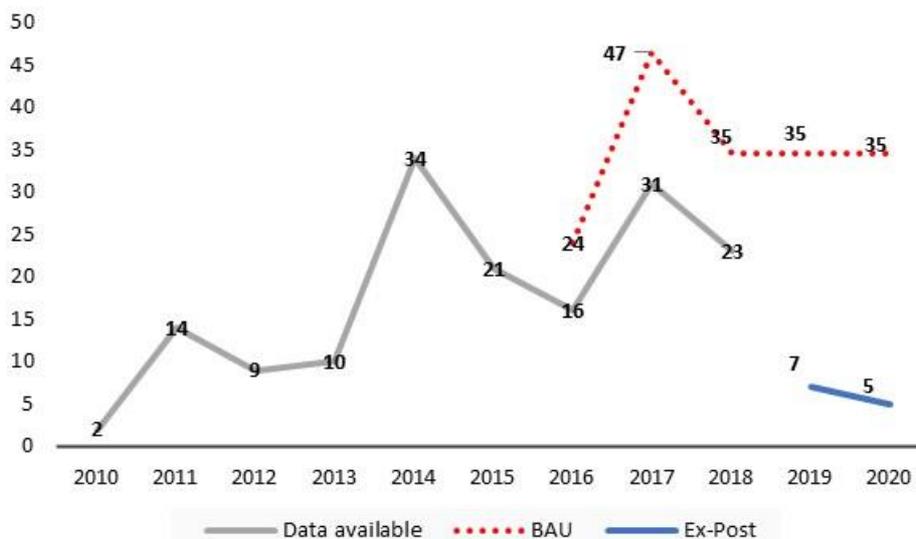


Figure 12: Before, Ex-post and BAU assumption for road accidents in the target area

4 - Mobility barriers in the built environment

Following the accessibility assessment in Funchal as well as the urban renovation plan, several urban barriers were identified. As of May, 2021, the civil works have already led to an improvement of the mobility conditions for soft modes, namely pedestrian and cycling. The launch of the civil works was carried out with ERDF funding.

5 - Non-motorized transportation

The traffic counts undertaken to assess pedestrian flow showed a significant increase. Although the interventions carried out also contributed for this increase, this is primarily due to the several touristic events that took place during the ex-post evaluation as well as the high demand for the accommodation units scattered throughout the area. The high demand is further corroborated by the official regional touristic statistics for February, 2020, that states an increase of 8,4% in tourism accommodation. This data was obviously gathered before the Covid-19 pandemic and the restriction measures. With the reinforcement of the pedestrian and cycling lanes, it is expected an increase in the following years, especially for bike use.

C2.2 Society

1 - Public transport accessibility level

With regard to interventions to improve accessibility to public transport, that combined the funds from MAD 7.2 (OGS), MAD 3.1 (subcontracting) and the municipal budget, the interventions carried out led to the improvement of pedestrian accessibility conditions in the areas and in the areas surrounding the dedicated stops for public transport.

Despite the spatial barriers, it was possible to improve the accessibility conditions through the deployment of shelters and implementation of sidewalks. Therefore, with DESTINATIONS, the public transport has less accessibility problems (decrease of 23% of public transport stops without shelters and decrease of 26% of stops without sidewalks).

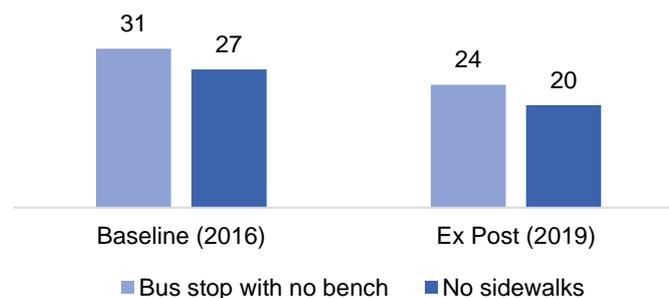


Figure 10: Public transport accessibility level before and during the implementation

Following the DESTINATIONS, the regional media highlighted the additional investment of 40 000,00 € using the municipal budget, for the installation of 18 bus stop shelters. Afterwards, it is expected that the accessibility levels will be improved.

3 - Perception of Accessibility level of service (perceived)

The Municipality of Funchal carried out several actions that contributed to suppress the issues stressed by the public transport users during the survey that was carried out prior to the

implementation. As pointed out in the previous sections, these includes the lack of shelters, inadequate conditions for standing in bus stops and the lack of traffic signs and road markings in the vicinity to strengthen road safety. Following the implementation of the actions, the Municipality was expected to launch a survey to assess the impact. Nevertheless, due to the COVID-19 restrictions, the evaluation methodology was revised and instead of a survey, the Municipality carried out an interview aimed at various key agents related to traffic and mobility in Funchal, namely an external consultant that supported the development of the SUMP and the head of the traffic and mobility division in Funchal. The scope of the survey was to assess the following:

- Policy strategy regarding urban rehabilitation and accessibility to public transport;
- Impact assessment of the interventions carried out;
- Importance of DESTINATIONS to improve the accessibility within the public transport catchment areas;
- Other advantages and envisioned strategy at a medium and long-term period.

Questions	Respondents	
	Consultant for SUMP development	Head of the Traffic and Mobility Division
What is the policy strategy regarding urban rehabilitation and accessibility to public transport?	Within the SUMP, the Municipality of Funchal outlined several important actions to improve the public transport that are comprised of improving accessibilities, assessing the possibility of implementing bus corridors and evaluate the feasibility to implement a bus terminal.	The strategy aims at providing better accessibility conditions for the public transport users, ensuring comfortability whilst reinforcing the road safety near the public transport areas to avoid conflicts between public transport users, individual motorized vehicles and buses.
What was the impact assessment of the interventions carried out?	Although the spatial constraints hampered a wider intervention, the Municipality was still able to improve safety and accessibility in several public transport stops.	It was possible to achieve several positive results such as the enlargement of sidewalks, downgrade of curbs to facilitate inclusive mobility, marking of crosswalks, shelters and traffic calming measures.
How important was the role played by DESTINATIONS to improve the public transport in the catchment areas?	Unlocking funding is crucial to ensure the implementation of actions related to mobility. DESTINATIONS in overall contributed, not only to promote the use of public transport but supported the Municipality in implementing other relevant actions.	The funding allocated within DESTINATIONS was important since it allowed the Municipality to not only implement these actions but also to support the development of awareness events and communication materials to promote public transport.
What other advantages can you point out and what is the envisioned strategy at a medium and long-term period?	Within the SUMP and beyond DESTINATIONS, the Municipality of Funchal is expected to further improve the public transport conditions through the implementation of shelters and enlargement of sidewalks near the catchment areas.	The actions implemented were awarded with the CIVITAS LEGACY 2020 which was the highest point for the Municipality of Funchal in terms of mobility and a recognition of all the efforts carried out. The Municipality will continue to seek other innovative actions to promote the use of public transport.

Table 7: Questions placed and answers collected during the Process Evaluation



Figure 13: Interview session with key agents

C3 Quantifiable targets

No	Target	Rating
1	At least 80% improvement of satisfaction among citizens and tourists	NA
2	Increase of 10% citizens and tourists circulating daily in the target street	***
3	Decrease of 5% of traffic accidents in the target area	***
4	Decrease security problems in the target area, at least 20%	***
5	* Improvement of accessibility in bus stops, at least 20%	**
6	* Improvement of safety in bus stops, at least 20%	**
7	* Decrease in mobility barriers (at least in 20%)	***
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

The targets from 1 to 4 were planned in the grant agreement, and the targets 5 to 7 were defined during the measure development.

Target 1 was not assessed since it would have implied to carry on surveys to the same inquiries before and after the implementation that only took place in March, 2019 (intelligent crosswalks) and throughout 2019 (improvement of accessibilities for public transport). Although it was not assessed, the level of satisfaction was inferred accordingly to indicator 2, and was achieved taken in consideration the increase of citizens and tourists circulating daily in the target area.

Despite the Target 1 not being possible to be assessed due to the COVID-19 that jeopardized a proper post implementation evaluation, there was a noticeable improvement in the indicators that the Municipality was able to gather. Firstly, according to the pedestrian counters installed by ARDITI, it was possible to perceive a mean increase 191,4% of pedestrians circulating in the three areas (Target 2). As for Target 3, the traffic accidents exceeded the GA target, it was possible to perceive a decrease of 68,75% road accidents in the target area.

As for Target 4, considering the mobility scope of DESTINATIONS, run overs were used to assess security in the area, given the pedestrian flow and the fact that the interventions had the purpose to improve road safety for pedestrians, especially in crossing. Considering that prior to the interventions, there were 3 run overs registered in pedestrian crossing, there was a decrease of 100% in security problems in the areas in which the intelligent crosswalks were implemented.

Regarding the improvements in the public transport bus stops (Target 5 and 6) and as stated before, there was a decrease of 23% of public transport stops without shelters and decrease of 26% of stops without sidewalks.

As for the mobility barriers (Target 7), the civil works led to an improvement of the mobility conditions for soft modes, namely pedestrian and cycling. It is expected that they will suppress all the urban barriers identified during the diagnostic stage. Although the initial goals were surpassed, the additional funding was unlocked through ERDF to improve pedestrian and cycling conditions in Funchal. Given the wide scope of this intervention, it will be only possible to fully assess the impact following DESTINATIONS.

C4 Up-scaling of results

The integrated system contributed to increase not only the attractiveness within the area but also to reduce the number of road accidents near the crosswalks. Given its success, the Municipality of Funchal will assess the feasibility to replicate this measure to other attractive areas for pedestrians that has road accidents. In addition, and following DESTINATIONS project, the Municipality will improve, besides the cycling accessibility in Funchal, the public transport through the deployment of 18 shelters. The up-scaling of results envisions the implementation of 3 intelligent crosswalks in a sought touristic area, the extension of bike track connecting the target area to the city centre and the instalment of 18 bus shelters. Below follows a table containing some of the foreseen results for some indicators, tailored to the type of interventions that can be fit into the strategic goals of WP3.

Impact category	Impact indicator	Unit of Measure	Assumptions	Likely results
Transport System	1 - Public transport accessibility level	Number of shelters	If more shelters are deployed, it is expected an increase in perception of safety and security among public transport users	18
Transport System	2 - Road Safety	Number of Run overs	With the implementation of more intelligent crosswalks, it is expected an increase in road safety for pedestrians that intends to cross the road	0
Transport System	Traffic calmed and car-free/pedestrianized streets – CIVITAS CAPITAL	Length of car free/pedestrianized streets (km)	Extension of streets to foster active travel and more environmentally-friendly modes, such as walking and cycling	7 km

Table 8: Up-scaling of results

D Process Evaluation Findings

D1 Drivers

Opportunity at a **political/ strategic** level, once there is a strong political receptiveness for the implementation of smart mobility solutions and shift modal patterns towards sustainability. Also, **financially**, once part of the interventions of the planned actions were intended to be co-funded by other framework programmes.

D2 Barriers

Culture barriers might limit the implementation of the measure, as the lack of awareness regarding accessibility and mobility concepts are unknown to most citizens. In addition, socio-cultural problems may arise due to expected resistance. At a **political/strategic** level, juridical barriers could hamper the implementation of surveillance cameras, although no personal data is gathered. At a **technical** level, it was necessary to outline the necessary specs, given the complexities which led to a delay. The **spatial** barriers, already described above was another factor that prevented the measure from being more impactful in terms of improving the accessibility for public transport.

D3 Main Lessons learned

Connecting the city core to the western part, the intervention area is strongly touristic in which this measure definitely improved the attractiveness while tackling safety issues. The baseline allowed the Municipality to perceive that the main issues within the area were essentially related to accessibility problems and not security. The measure also showcased that actions geared at ITS are more efficient and the Municipality of Funchal will continue to pursue these type of solutions.

E Evaluation conclusions

The measure, in general, was successful, considering that it was possible to achieve the initial goals set during the measure conception, namely the improvement of accessibility of public transport as well as to reduce the road accidents in the target area.

However, the main achievement was related to the innovative integrated system that was implemented near the crosswalks. This system, comprised of intelligent road markings that are activated whenever a pedestrian is detected, CCTV and public lighting powered by renewable sources of energy was praised and was considered a good practice by Interreg Europe. Following the implementation of the measure, the Municipality of Funchal was reached by other cities that intends to replicate a similar solution in their own respective sites.

The measure also enabled the Municipality of Funchal to pursue additional budget to ensure a wider intervention to improve the accessibility in the target area to foster multimodality through extension of bike track and enlargement of sidewalks.

F Additional information

F1 Appraisal of evaluation approach

The indicators chosen to assess this measure proved to be crucial in order to fully grasp the impact of the measure. Taking in account that the measure encompassed several features, ranging from road safety, to public transport and accessibility, it was necessary to readjust the evaluation using specific indicators. While it was possible to measure the impact of this measure, indicators related to pedestrian activity have suffered a setback given the Covid-19 restrictions. Nevertheless, it was possible to overcome this issue given that the Municipality has implemented sensors throughout the city, including the target area in which it was possible to perceive the impact before the pandemic crisis. Unfortunately, this data is unfiltered, therefore it wasn't possible to perceive the number of pedestrians with disabilities and/or cyclists.

F2 Future activities relating to the measure

It is expected to continue the improvements dedicated to the soft modes accessibilities with resource to additional fund resources, namely, ERDF through the Operational Program M14-20.

It is expected that the integrated system, along with the accessibility project, funded by ERDF will contribute decisively to achieve the following:

- Improvement of safety near crosswalks;
- Promotion of soft modes, namely pedestrian mobility, public transport and cycling;
- Contribution to showcase the benefits of an innovative measure linked to CIVITAS DESTINATIONS;
- Pursue in introducing of pioneer solutions, related to the concept of a smart city;
- Improvement of public lighting using renewable sources of energy with a smart energetic measurement;
- Facilitation of urban requalification process with the improvement of the pedestrian network and accessibility;
- Improvement of accessibilities for public transport through the deployment of 18 shelters.

Also, following the tests performed with the CCTV system inside the bus for surveillance, safety and passenger counting purposes, Horários do Funchal decided to purchase more equipment as the system shown to be beneficial once it allowed for real time surveillance and to count passengers entering and exiting. Hence, Horários do Funchal will proceed with the expansion of the buses by planning to purchase more equipment, with the support of other funds.