

2020
CiViTAS
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Measure Evaluation Result

LIM 5.1 - Limassol city centre Urban Freight Logistic Action Plan

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|---------------------------|---------------------------------------|
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Executive Summary

Before the implementation of the project, Limassol city had the need to develop a Sustainable Urban Logistics Plan (SULP), considering that the city centre was very busy, especially during peak hours. This created a lot of traffic problems such as congestion, noise, and air pollution, as well as hazards for pedestrians due to freight logistic vehicles parking on sidewalks and pedestrian routes for unloading purposes.

A study on economic activities was undertaken based on commerce, services, and tourism sectors within the city centre, including the tourist flow in city areas and the impacts of freight traffic. Moreover, a logistics plan was prepared for mobility management, including type of goods, area, and timetables with limitations. The results of all the above were included in the Sustainable Urban Logistics Plan (SULP), which was approved by Limassol Municipality on 21/01/2019. Tourists can now enjoy their vacations without any hazards and pedestrians can enjoy the city centre of Limassol with less traffic, reduced carbon emissions, and free sidewalks. As the freight logistics services have been reduced in the city centre, the Limassol region will be an even more attractive destination for tourists.

In addition, an online platform for managing freight transportation has been developed within this measure, for a more efficient distribution of goods. This platform provides an access control system for mobility management, suggested timetables, and routes for freight vehicles to reach their destinations, in order to avoid traffic congestion in the city centre.

The identification and the level of involvement of relevant stakeholders to support the SULP was a challenge, while better communication and interaction was needed for its achievement. However, the measure was successfully implemented, and its evaluation was completed. Furthermore, the SULP included strategies to increase the awareness of residents and tourists about the efficient distribution of goods, intended to lead to behavioral change of stakeholders and key actors. Although the measure was focused on the improvement of the Urban Freight Logistics system, the result was an improvement of the whole mobility system, due to reduced traffic jams, noise, pollution, required energy, and of course the increase of safety and free parking spaces.

The implementation of some of the SULP's strategies in Limassol city centre resulted in lower levels of traffic noise (47.8 dB). Moreover, it was noted that 54% of the surveyed people were aware of the activities of the measure, mostly related to the reduction of hazards for pedestrians, and the air and noise pollution related to freight noise. Additionally, there was a significant reduction in traffic congestion which resulted in a decrease of 6.9 t of CO₂ emissions and 65.3 MWh of energy consumption.

In the context of this measure, the development of the online platform facilitated the continuous evaluation of activities that can be reviewed throughout the lifetime of the project. The results of the SULP have been used for the Limassol SUMP. The SULP will last, and after the end of the project, people will be aware of the plan and its proposed actions, changing their mentality and environmental behaviour.

A Description

The SULP has been developed for Limassol city centre and introduced innovative solutions regarding the traffic flow from freight logistics, the efficient distribution of goods, the environmental pollution and noise, hazards for pedestrians due to freight logistics services, and road disturbances.

Among the implemented activities of the measure is the study of the economic activities related to the commerce, service, and tourism sectors, which will include tourist flows in city areas and the impacts of freight traffic. Additionally, a logistic plan has been organized and an on-going access control system for mobility management has been implemented, which includes the type of goods, area, and timetables with limitations. Moreover, an online platform for a more efficient distribution of goods has been developed. This platform provides an access control system for mobility management, allowing relevant stakeholders to review before the distribution of their goods in Limassol (Figure 1). Forums have been set up with the participation of local stakeholders to define the solutions for freight logistics. Finally, efforts have been made to examine the incentive opportunities for transportation companies to renew their fleets with electric vehicles.



Figure 1: Suggested Routes of Freight Vehicles to reach the Study Area

A1 Objectives and outputs

City policy level objectives

This measure is in line with Limassol Municipality's Strategy aiming to promote the Sustainable Urban Logistics Plan in the centre of Limassol, contributing to the below objectives:

- Reduced CO₂ emissions
- Less traffic noise in the city centre/reduce traffic overcrowding in touristic areas
- Less energy consumption/utilization of cleaner energy
- Free sidewalks
- Safety and security of pedestrians
- Urban freight logistic awareness

Measure Specific objectives

- Develop an Urban Freight Logistics Plan for Limassol city centre
- Introduce innovative solutions regarding the traffic flow from urban freight logistics, the efficient distribution of goods, the environmental pollution and noise, hazards for pedestrians due to freight logistics services, and road disturbances
- Evolve the city centre of Limassol
- Change the behaviour of relevant stakeholders and key actors
- Introduce a local policy strategy for the development of the Urban Freight Logistics Plan
- Develop tools according to the needs of the plan to efficiently organize the relevant stakeholders and key actors

Outputs

- A SULP for Limassol city centre
- The development of an online platform for managing freight transportation key actors
- Set up one forum with the participation of local stakeholders (Professional Association, Municipalities, Transport operators, local companies) to define solutions for freight logistics

Supporting activities

Limassol Tourism Board and Limassol Municipality promoted the measure and disseminated the activities. Also, Limassol's city center shops have been involved by promoting the activities.

A2 Inter-relationship with other measures

The measure shares synergies and has a strong interaction with **LIM 2.1 - Sustainable Mobility Tourist Action Plan for Limassol city center**, as both measures aim towards the development of a Sustainable Plan that will contribute to the minimization of the environmental footprint in terms of emissions and energy consumption, noise pollution, traffic congestion, the increase of free spaces, safer roads for pedestrians, and increased awareness on the topic. Additionally, the satisfaction level of people moving around Limassol city centre was improved.

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

Tourists and residents moving around the Limassol region will be influenced by this measure.

A4 Stakeholders involvement

| Stakeholder name | Activities description |
|----------------------------|--------------------------|
| Chamber of Commerce | Promotion of the measure |
| Limassol City Centre Shops | Promotion of the measure |

Table 1: Stakeholder involvement

B Measure implementation

B1 Situation before CIVITAS

Before the DESTINATIONS project, there was a lack of a Sulp in Limassol city centre and while also an urgent need for this to be developed. This was due to several traffic problems in the city centre, such as traffic congestion, and noise and air pollution, especially during peak hours. Also, there were hazards for pedestrians due to freight logistics vehicles being parked on sidewalks and pedestrian routes for unloading. Therefore, the development of the Sulp was necessary for Limassol city center in order to reduce the traffic congestion and possible pedestrian accidents.

B2 Innovative aspects

Moving around in Limassol city centre was a challenging issue. Excessive traffic congestion was a major disadvantage, not only for tourists travelling by car but also for tourists visiting the city centre, due to extensive noise, high CO2 emissions, and safety issues. This plan introduced innovative solutions regarding the traffic flow from freight logistics, the efficient distribution of goods, the environmental pollution and noise, hazards for pedestrians due to freight logistics services, and road disturbances.

The plan evolved the city center of Limassol and increased the awareness of people regarding the efficient transportation of urban logistics services, which has changed the environmental behavior of stakeholders and key actors.

- **New conceptual approach** – the development and application of the Sulp, for the first time, can be seen as a solution for issues related to drivers and pedestrians. An on-going access control system for mobility management has been implemented which includes the type of goods, area, and timetables with limitations. The development of the online platform for more efficient distribution of goods provides an access control system for mobility management, allowing relevant stakeholders to review before the distribution of their goods in Limassol. Forums have been set up for the first time with the participation of local stakeholders to define the solutions for freight logistics.

B3 Technology development

One of the activities of this measure was the development of an online platform for managing key actors in freight transportation for more efficient freight distribution. This platform provides an access control system for mobility management, and suggested timetables and routes for freight vehicles to reach their destinations in order to avoid traffic congestion in the city centre.

B4 Actual implementation of the measure

The main goal of the developed Sulp was to introduce innovative solutions regarding the traffic flow from freight transport, the efficient distribution of goods, noise and environmental pollution,

the dangers faced by pedestrians as many freight logistics services block the pavements and park illegally to unload goods in front of the shops, as well as road disturbances facing the central area of the city. The Sulp was developed by STRATAGEM and Limassol Municipality is responsible for carrying out all the actions foreseen in the Sulp in the future.

An **initial study** on economic activities was undertaken based on the commerce, services, and tourism sectors within the city centre including the tourist flow of city area and the impacts of freight traffic. This was followed by the **development of a logistics plan** (included in the Sustainable Urban Logistics Plan – Sulp) which was prepared for mobility management including type of goods, area, and timetables with limitations. The conclusions of the initial study and the logistics plans were included in the Sulp.

For the **development of the Sulp**, the local partners initially had to gather information regarding traffic flow, the type and the number of buildings found in the study area, as well as the working hours of each restaurant, café, shopping centre, etc. This was achieved by involving tourists, shop owners, and citizens who provided this information through the distribution of questionnaires and interviews, and at the same time they were also informed about what would be done in the city centre. At the same time, more specialised information regarding the type and number of buildings found in the study area was provided by Limassol Municipality, while information regarding the road network was provided by the Ministry of Transport Communication and Works of Cyprus. Several forums have been organized with the participation of local stakeholders (Professional Association, Municipalities, Transport operators, local companies,) to define solutions for freight logistics, while incentives opportunities for transportation companies to renew their fleet with electric vehicles have also been examined.

Dedicated to reducing traffic congestion and air / noise pollution in the centre of Limassol, a series of actions have been identified and detailed within the Sulp. First, the need to widen the roads so that transport vehicles do not cause traffic jams was identified. This problem is caused due to the narrow roads and the lack of loading and unloading areas in the centre of Limassol, in combination with the insufficient logistics processes which produces negative results due to the small scale of Limassol. Secondly, the need to implement a strategic Sustainable Urban Mobility Plan (Sump) was stressed, which aims to meet the mobility needs of citizens for a better quality of life. Additionally, the Sulp highlights the need to reconsider the timetable of freight transportation to avoid peak hours. Furthermore, the development of an online platform for the management of key freight forwarders for the more efficient distribution of goods will contribute to reducing Limassol's air and noise pollution. The last action proposed within the Sulp is the reduction of traffic congestion, through the use of alternative sustainable means of transport in Limassol city, which was achieved through the implementation of measures LIM 3.1, 3.4, 4.2, 6.4, 7.1, 7.3, and 7.4.

The Sulp was officially concluded and approved by Limassol Municipality on 21/01/2019. Although the Sulp is a strategy, planned to be developed by Limassol Municipality, some important actions have already been carried out during DESTINATIONS in order to successfully implement LIM 5.1. The implementation of the aforementioned measures (LIM 3.1, 3.4, 4.2, 6.4,

7.1, 7.3, and 7.4.) which were pointed out in the Sulp as very important actions, have been completed successfully.

The online platform (included in the Sulp) has been developed and was finalized in August 2019, with the aim to manage freight transportation key actors for more efficient freight distribution of goods. The new platform provided an access control system for mobility management, suggested timetable, and routes for freight vehicles to reach their destinations in order to avoid traffic congestion in the city centre (<http://freightlimassol.com/>). In more detail, this platform provides information such as opening hours and peak hours of shops / buildings / companies located in the centre of Limassol and peak hours for freight vehicles, in order to reduce traffic congestion in the city center and decrease the noise pollution. The survey conducted from March to July 2018 for the Sulp needs revealed that the peak hours of the shops / buildings / companies located in the study area coincide with the peak hours of the freight vehicles that were located and / or crossed the study area in specific periods of time. The peak hours recorded were between the hours of 08:00 - 10:00 a.m. and 12:00 - 14:00 p.m.

The other important action carried out (during 2019, and after considering the peak hours) was the reconsideration of the itineraries of the freight transport companies to pass through the centre of Limassol at certain hours of the day. This was implemented by avoiding the distribution of goods between the hours of 08:00 - 10:00 am. and 12:00 - 14:00 pm, so as to avoid traffic jams during peak hours. Alternative freight hours can be between 05:00 - 06:00 am. and 15:00 - 17:00 p.m. For this reason, several meetings and phone calls took place to inform the transportation companies but also the shops/companies (coffee shops, supermarkets, food shops etc.) which were waiting for their goods to be transported by the freight companies.

All the aforementioned activities are part of the Sulp and have been reviewed and approved by Limassol Municipality on 21/01/2019. The Sulp is a long-term plan and Limassol Municipality will continue working on this in the coming years.

C Impact evaluation

C1 Evaluation approach

Expected impacts and indicators

| Impact category | Impact indicator | Unit of measure |
|-----------------|---|-----------------|
| Environment | 1-CO ₂ emissions | ton |
| Environment | 2-Traffic noise | dB |
| Energy | 3-Energy consumption | MWh |
| Transport | 4-Free sidewalks | % |
| Society | 5-Awareness level about the actions to decrease the freight traffic | % |

Table 2: Expected impact and indicators

Method of measurement

| Impact indicator | Method* | Frequency (Months) | | | Target Group | Domain (demonstration area or city) |
|---|---------|--------------------|--------|-------|--|-------------------------------------|
| | | Bef. | During | After | | |
| 1-CO ₂ emissions | DC/E | 10 | 26 | 45 | Logistic vehicles in demonstration area | Demonstration area |
| 2-Traffic noise | DC/E | 10 | 26 | 45 | Inhabitants and visitors | Demonstration area |
| 3-Energy consumption | E | 10 | 26 | 45 | Logistic vehicles in the area | Demonstration area |
| 4-Free sidewalks perception | S | n.a. | 21-26 | 34-41 | Logistic vehicles in the area | Demonstration area |
| 5-Awareness level about the actions to decrease the freight traffic | S | n.a. | 21-26 | 34-41 | General public, operators (residents and visitors), PT customers | City |

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

Table 3: Method of measurement

Detailed description of the indicator methodologies

1 CO₂ emissions and 3 energy consumption – These indicators were estimated using the data extracted by the environmental sensors installed in the main areas in the city. Estimations were made considering the kilometres that each freight vehicle avoided every month and the number of vehicles moving around Limassol city centre. Additionally, it was estimated that for every 100 km, a vehicle consumes 8 L of fuel. The estimations and data collections were assessed and provided in cooperation with Limassol's city centre shops, Limassol Municipality, as well as Limassol Chamber of Commerce, which have been involved in the process and development of the SULP and the measure promotion.

2 Traffic noise – This indicator was obtained based on environmental sensors collected from 6 areas in the city centre.

4 Free sidewalks perception – The indicator was assessed through surveys (350 people were surveyed in 2018, 172 tourists and 3 locals, and 2019, 175 tourists) which aimed to assess tourists and resident's perceptions towards the free sidewalks across Limassol city centre. Survey findings related to questions about the current situation of the free sidewalks as well as their satisfaction regarding how safe and secure they feel while walking.

5 Awareness level about the actions to decrease the freight traffic – This indicator was evaluated through 350 surveys in 2018 (172 tourists and 3 locals) and 2019 (175 tourists) applied to tourists and residents, intended to assess if people were aware of the efforts carried out to decrease the freight traffic in Limassol city centre.

The Business-as-Usual scenario

Considering the type of indicators, mostly comprised of surveys and indicators whose information was gathered for the first time, carrying out a BAU analysis was not possible for most of the indicators, except for the indicator “CO₂ emissions”, in which the data was available until 2014 (data from eurostat).

Considering that information regarding CO₂ emissions was only available until 2014, the local partners carried out a BAU projection for the period between 2014 and 2020, **using a trend line**. The thousands of Tons of CO₂ equivalent of the road transportation was estimated, which was assumed to be the freight transportation of Limassol city. However, it was not possible to find the exact number of freight transportation vehicles for only Limassol city, and therefore the freight transportation of Cyprus was adjusted to fit the population of Limassol as the only way to approach the BAU analysis.

C2 Measure results

| Impact category | Impact indicator | Unit of measure | Baseline | Ex-Ante | Ex-Post |
|-----------------|---|-----------------|----------|---------|---------|
| Environment | 1-CO ₂ emissions | ton | 10.2 | 3.7 | 3.30 |
| Environment | 2-Traffic noise | dB | 93.9 | 68.9 | 47.8 |
| Energy | 3-Energy consumption | MWh | 172.8 | 146.9 | 107.5 |
| Transport | 4-Free sidewalks | % | 0 | 2 | 4 |
| Society | 5-Awareness level about the actions to decrease the freight traffic | % | 0 | 40 | 54 |

Table 4: Measure results

1 - CO₂ Emissions

The Sulp actions implemented under this measure significantly reduced the unnecessary traffic congestion and increased the parking spaces and, as a result, unnecessary driving from cars was avoided once the freight logistics were following specific routes. As a result, a decrease of 6.9 tCO₂ was achieved, to 3.30 tCO₂ compared to the baseline scenario (10.2 tCO₂).

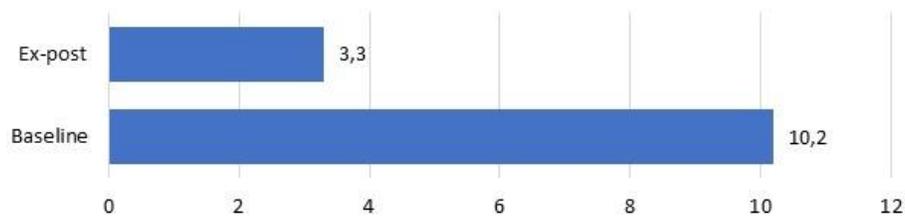


Figure 2: Levels of CO₂ Emissions (tCO₂)

Under a BAU projection scenario, Limassol city would have continued to assist an increase in CO₂ emissions over the coming years. Despite that between 2011 and 2014 Limassol registered a yearly reduction of CO₂ emissions, the trend would be of a gradual increase of the pollutant emissions during and after DESTINATIONS.

Even though there was no official data about the CO₂ emissions after 2014, the local partners believe that the project contributed to controlling this trend and contributing to the reduction of overall CO₂ emissions.

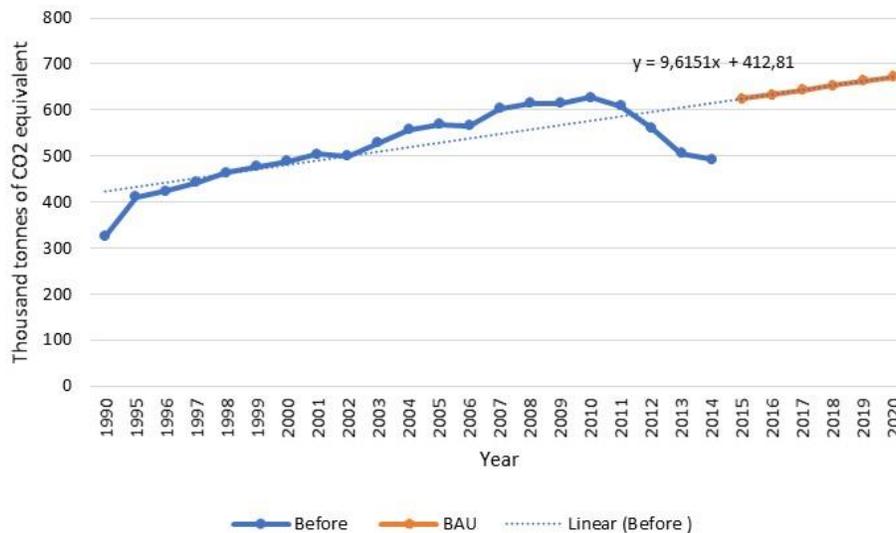


Figure 3: BAU projection for CO₂ Emissions

2 - Traffic noise

The actions carried out under this measure significantly reduced the unnecessary traffic congestion in Limassol city centre, resulting in lower levels of noise pollution. A reduction of 46.1 dB was achieved – a reduction of 49% of traffic noise compared to the baseline situation.

3 - Energy Consumption

All activities carried out in the context of this measure led to a reduction in unnecessary traffic congestion (reduction in kms travelled), but also unnecessary driving from freight logistics. It was possible to assess that the actions allowed for an average reduction of 2 kms per month for the 6,095 freight vehicles involved. Considering that for 100 km, a vehicle consumes 8 L of fuel, it

was possible to achieve an estimation of 65.3 MWh saved, compared to the baseline (172.8 MWh).

4 - Free sidewalks

With the implementation of the actions included in the Sulp and carried out under several DESTINATIONS measures, the local partners were able to reduce hazards for pedestrians, considering that previously the freight logistic vehicles were parking on sidewalks and using pedestrian routes for unloading. As a result of these actions, residents and tourists have at their disposal a city that is safer and more accessible for all.

Following the results of the surveys applied to 350 residents and tourists, it was possible to understand that the measures resulted in an increase of sidewalk space of 3% in 2018 and 4% in 2019. This percentage reveals that with the change of schedule of the freight's logistics, there is now more availability of walking places and therefore people can better enjoy walking in the city centre and feel safer.

5 - Awareness level about the actions to decrease the freight traffic

The survey results showed that the number people aware of the efforts to improve the time schedule of freight transportation in the city has increased, reaching 54% in 2019, compared to an awareness of 1% in 2018. This increase in awareness can be attributed to a reduction in hazards for pedestrians, and in air and noise pollution due to a reduction in freight noise. In 2018 and during the period that the surveys were carried out, people were not yet aware of the efforts to decrease the freight traffic, but became more aware after the approval of the Sulp in January 2019. The atmosphere has become more friendly for citizens and tourists, and therefore people can enjoy commuting in the city centre.

C3 Quantifiable targets

| No. | Target | Rating |
|--|--|--------|
| 1 | Less CO ₂ emissions: 6.5 tCO ₂ | ** |
| 2 | Less traffic noise in the city centre: 25 dB | *** |
| 3 | Increase the awareness level of people regarding the Sulp by 50% | *** |
| 4 | Less energy consumption: 25,920 kWh (25.92 MWh) | *** |
| 5 | Free sidewalks: 2% | *** |
| 6 | More safety and security of pedestrians | N/A |
| <p>N/A = Not Assessed 0 = Not Achieved * = Substantially achieved (at least 50%) ** = Achieved in full *** = Exceeded</p> | | |

*New target, not in GA

Table 5: Assessment of quantifiable targets

Most of the targets have been achieved compared with the targets in the Grant Agreement, either fully achieved or exceeded, allowing data to be collected and analysed on time.

Amendments have been made on the number of freight vehicles involved in the action, which was increased along with the number of shops, allowing all targets to be successfully achieved. Outputs have been implemented on time and data was collected and analysed, allowing the results to be evaluated.

Target 1 was Fully Achieved. Compared to the baseline measurements before the implementation of the measure, the target aimed to reduce CO₂ emissions. After the implementation of the measure, evaluation revealed that 6.9 tons of CO₂ had been saved.

Target 2 was Exceeded. With this measure implementation, it was possible to achieve a reduction of 46.1dB in the city centre, which was a reduction of 49% of the noise pollution compared to the baseline.

Target 3 was Exceeded. During the surveys, it was possible to understand that 54% of the residents and tourists surveyed were aware of the outputs of this measure.

Target 4 was Exceeded. The target was to save 25.92 MWh (compared to the 172.8 MWh baseline measurement). After the implementation of the measure, the evaluation showed that the savings achieved reached 65.3 MWh.

Target 5 was assessed through the surveys applied to 350 people between 2018 and 2019, as it was impossible to quantify the current free sidewalks released due to the improvements in the freight transportation sector. Therefore, the target was Exceeded, as results were increased by 2% more than the expected value, meaning that people have the perception that the free sidewalks had increased.

Target 6 aimed to increase the safety and security of pedestrians, but such an indicator was not able to be measured due to a lack of such statistical data. However, it is expected that the safety and security of people moving around the city centre has been increased as within this measure the reduction of traffic congestion and the increase of free sidewalks was achieved, which consequently led to the achievement of this indicator.

C4 Up-scaling of results

Not applicable.

D Process Evaluation Findings

D1 Drivers

The lack of a Sulp report and the urgent need for developing such a plan were the main drivers to apply this measure. This report is now available, outlining the actions that have been implemented in Limassol city centre, including the implementation of measures related to energy efficient vehicles and cleaner energies, last mile delivery strategies, infrastructure, regulation frameworks, and fostering of partnerships with stakeholders. Also, Limassol city centre shops, Limassol Municipality, and Limassol Chamber of Commerce had high involvement during the development of the Sulp and contributed by promoting all activities of the measure.

D2 Barriers

The main barrier was the difficulty in identifying and involving relevant stakeholders which played an important role in the development of the Sulp. Several meetings have been held to give them incentives in order to participate in the cluster of key actors. However, the measure was successfully completed, and its evaluation was achieved.

D3 Main Lessons Learned

All activities implemented in the context of the measure focused on the improvement of the Urban Freight Logistic system and therefore the improvement of the whole mobility system to reduce traffic jams, noise, pollution, required energy, and the increase of safety and available spaces. The development of the online platform for managing freight transportation upgraded the city's mobility and helped the freight logistics to control their commuting and schedules.

E Evaluation conclusions

Local stakeholders and key actors expressed their interest to be involved in the development of the Sulp, giving relevant information regarding the freight transportation system of Limassol. Therefore, data was successfully gathered and analyzed, providing important results included in the surveys undertaken regarding the efficient transport of goods. From an environmental perspective, the Sulp benefits Limassol city center, by contributing to reduced traffic congestion, and noise and air pollution. Free sidewalks reduce people's anxiety and helps them to enjoy their leisure time by walking around Limassol.

F Additional information

F1 Appraisal of evaluation approach

All outputs included in the Grant Agreement have been successfully implemented (except Target 6), providing all data required to undertake the evaluation of this measure and analysis of the results. Moreover, the evaluation of this measure can be reviewed throughout the lifetime of the project due to the development of the online platform which provides relevant information on suggested routes and timetables, allowing relevant stakeholders to check for their efficient distribution of goods.

Initially it was also planned to increase the safety and security of pedestrians (Target 6), but it was not possible to find such data. However, all the indicators which have been examined in this measure (indicator 1 to 5) led to the conclusion that the safety and the security of pedestrians has been increased. This conclusion is supported by almost all the activities which took place within the DESTINATIONS project in Limassol city.

F2 Future activities relating to the measure

The results of the Sulp have been used for the Limassol Sump. The Sulp will continue after the end of the project, and therefore more people will be aware of the plan and its proposed actions, and changing their mentality and environmental behaviour as a result.