



Summary review

July 2016

IMPROVE LIFE13 ENV/ES/000263



Coordinated by
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1. ACTIVITIES FOLLOW-UP

The following summary report covers IMPROVE LIFE13 ENV/ES/000263 activities from **01/04/2016 to 30/06/2016**.

Activities were launched on time and the project progresses according to the proposed timetable. The main tasks initiated or accomplished at each action in progress were as follows:

- **Actions B1 and B2** Determination of the impact of selected parameters and Testing mitigation measures and development of mitigation strategies".
 - i) Measurements progressed at Tarragona station (L3) from 29th of February until 11th of May. The initial schedule was extended three weeks in order to complete all the proposed tests. The main goal of the measurements was to assess the repeatability of the results on air quality variations obtained in this station in summer 2015, when the ventilation regime was changed from the normal conditions, introducing outdoor air into the tunnel (impulsion), to an experimental scenario removing indoor air towards the outdoor environment (extraction). On the other hand, tests were carried out at Tarragona in order to check the effectiveness of air purifier equipments in reducing ultrafine and fine particles, and NO₂ concentrations.

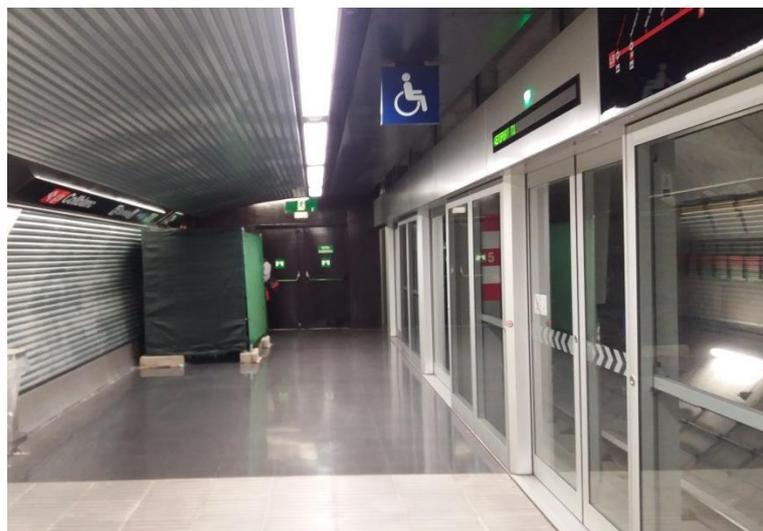
The final schedule of the measurements performed at Tarragona station was then as follows:

| Date | Normal ventilation | Air purifier PUREAIR | Change in ventilation | Air purifier GINSA |
|----------------|--------------------|----------------------|-----------------------|--------------------|
| 29-10 March | | | | |
| 11-21 March | | End of platform | | |
| 22-27 March | | | | |
| 28-3 April | | | | |
| 4-10 April | | | | |
| 11-20 April | | | | |
| 21-25 April | | | | |
| 26 April-3 May | | Middle of platform | | |
| 4-10 May | | | | |

The effect of air purifiers manufactured by two different companies (PureAir and GINSA) was compared against the air quality in the platform under normal conditions. An average reduction on PM_{2.5} concentrations of 30% was recorded when PureAir purifiers were functioning closed to the air quality instrumentation. This finding promoted the completion of an additional test to assess how the effectiveness varies with the distance. During these tests, purifiers were placed in the middle of the platform and a portable automatic PM monitor was used to measure in 8 different positions, approximately equidistant, along the platform; the first measurement being located at the air quality sampling site, at one end of the platform. Conversely, GINSA purifiers did not show an

improvement in any air quality parameter, as the features of the instrument were not suitable to deal with the metro environment conditions (air volume and PM load). Manufactures are now working on a new improved design, which will be tested in the metro system by October 2016.

Sampling instrumentation was afterwards deployed at the station of Collblanc (L9) from 11th May to 11th July. This station belongs to the newest metro line of the city, opened in February 2016. The architecture of the station is characterized by a single tunnel with one rail track separated from the platform by a wall with platform screen doors (PSD), and it is characterized by an advanced ventilation setup. From 11th May to 27th June, measurements were performed at an in-use platform of the station and tests aimed to assess differences in air quality parameters related with changes in the standard ventilation protocols. Periods with different ventilation settings lasted for a week, followed always for a week under normal conditions. Details of the different settings are still not available.



Actions B1-B2. Location of IMPROVE LIFE air monitoring equipment in one of the platforms of the new Collblanc station equipped with a screen-door system.

From 27th June to 11th July, instruments were moved to an out-of-service platform, located at a lower depth, to investigate on the factors affecting air pollutants in the absence of in-motion trains and passenger's occupancy.

All the campaigns involve the deployment of several equipments at one end of the platform of the selected stations fulfilling all the necessary safety conditions. The monitoring equipment includes a high volume PM_{2.5} sampler (for daily sampling particulate matter below 2.5 microns), passive samplers for NO₂ monitoring, and automatic equipments registering continuously concentration levels of i) PM in 3 sizes (1, 2.5 and 10 microns); ii) particle number concentrations in 16 size ranges; and iii) CO, CO₂, temperature and relative humidity every 5 minutes.



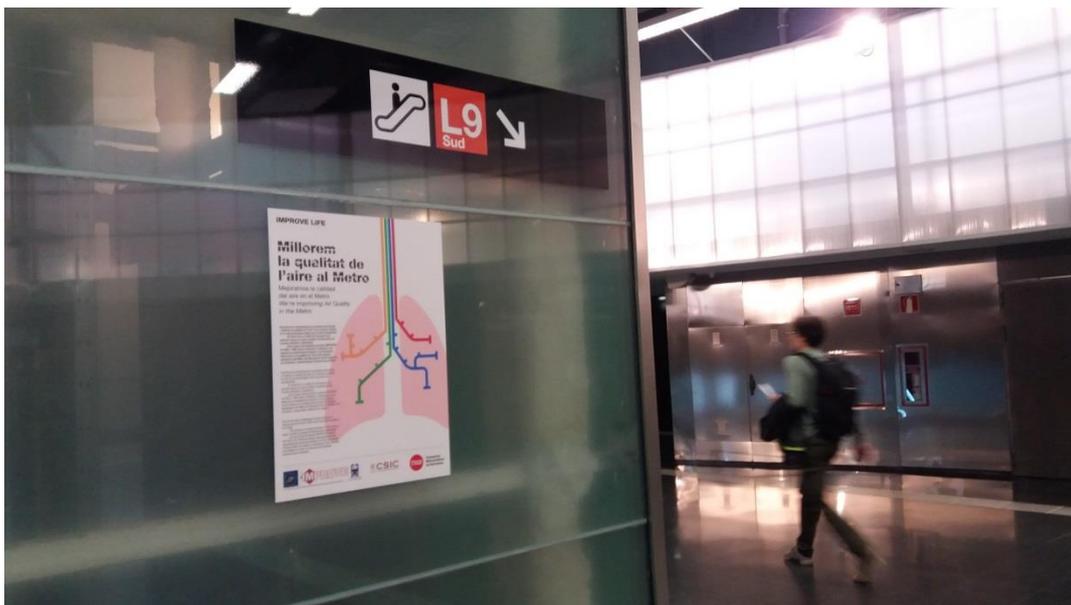
ii) Complete chemical analyses of all the PM_{2.5} samples collected by the high volume sampler were planned in order to determine the variations in chemical composition driven by the influence of the different activities performed. Up to June 2016, a total of 242 samples had been completely analysed (71 samples from Sagrera station, 44 samples from Palau Reial station, 27 from Maria Cristina station and 21 from Tarragona station). Moreover, 33 samples from Santa Coloma and 46 samples from Joanic station have been chemically analysed completely except for the ion chromatography analyses. During this period (April to June 2016), 16 samples from Sant Ildefons station and 39 samples from Tarragona station (a different campaign from the one stated about with 21 samples) have been chemically analysed completely, including acid digestion followed by ICP-AES and ICP-MS analyses and Total Carbon determination, and only the ion chromatography and ammonium analyses remain to be carried out.

Additionally, 63 samples, from Sagrera, Palau Reial, Maria Cristina and Tarragona stations, have been analysed so far for organic species analysis, based on the activities carried out at the stations and the PM_{2.5} concentrations. The analysis consists on: extraction in a solvent mixture of methanol and dichloromethane, and subsequent analysis of the extracts on a gas-chromatograph coupled to a mass-spectrometer (GC-MS). A total of 35 organic species are determined with this methodology.

- **Action C1** “Effectiveness of the project actions”. The impact of the implementation actions of IMPROVE will be evaluated once they have been completed. Actions B1 and B2 are being carried out intensively since January 2015 (B1) and both are very closely related. Action B1 was scheduled to end by the end of June 2016, and although all measurements have been done, the analytical results are still being processed, due to the large number of samples, therefore this action has been proposed to be extended until the end of September 2016. Accordingly B2 would benefit from an extension until June 2017. In this case the extension is suggested due to both i) mechanical problems with the equipment necessary to add ballast to the rail tracks (which has been in reparation for the last 2 months and is not operative again), and ii) a mistake with the original proposed date as finishing the monitoring campaigns in September 2016 is not possible to obtain final results by that same. It is important to consider that the deliverables associated to action B2 (*Elaboration of a technical guide for mitigation measures*) is one of the most important results of IMPROVE LIFE project and therefore should take a reasonable time to be produced accordingly. The modification of the duration of both Implementation Actions was discussed and agreed with the LIFE Monitoring Team from NEEMO EEIG during her visit last June.
- **Action C2** “Assessment of the socio-economic impact of the project”. This action will officially start on July 2016.
- **Action D1** “A Project website designed as a tool to raise the profile of the project and improve the dissemination of its activities”. The web site of IMPROVE LIFE (<http://improve->

life.eu) was launched in December 2014 and is updated in a 2-week basis. Main updates during this period have been on reports, scientific publications and conference presentations of the project, activities and results. A visitor's counter has been added to have a more detailed knowledge of the web views. The page has had an average of 1000 hits per week during June.

- **Action D2** "LIFE+ Information board will be on displayed describing the project at the locations where it is implemented, at strategic places accessible and visible to the public". LIFE+ Information boards are on display since January 2015 describing the project at the locations where it is implemented, at strategic places accessible and visible to the public. By June 2016 hard information boards on the project have been placed at Sagrera, Palau Reial, Maria Cristina, Tarragona, Santa Coloma, Joanic, Saint Ildefons and Collblanc stations where measurements have been performed. Panels are also permanently displayed in IDAEA-CSIC (Palau Reial) and TMB (Santa Eulalia) main offices. No vandalism problems have occurred during the April-June period.



Action D2. IMPROVE LIFE panel displayed in the lobby of the new Collblanc station.

- **Action D3** "Dissemination of project results". During this period the following activities to disseminate IMPROVE LIFE results have been carried out:
 - ✓ An update on the IMPROVE results was presented by T. Moreno to the TMB Health Committee (11 April, Sagrera TMB office).
 - ✓ A meeting with stakeholder, **Transport for London**, was celebrated on the 30th June 2016 when the results and activities of IMPROVE LIFE were presented and discussed. The meeting was attended by Teresa Moreno (CSIC) and Sharon Duffy and Sylvia Quagraine (TfL).



Action D3. IMPROVE LIFE in Transport for London (from left to right: Teresa Moreno, Sharon Duffy and Sylvia Quagraine).

- ✓ Two informative videos, of 10 (to be shown in the web page) and 20 (to be shared with other subway systems) minutes explaining the aims of the IMPROVE LIFE project are in preparation. All recording has been done during these 3 months, in the following weeks the accompanying text will be prepared.
- ✓ **Technical publications** on the project results in international scientific journals and presentations in scientific conferences acknowledging the LIFE+ financial support during this period:
 - V. Martins, T. Moreno, L. Mendes, K. Eleftheriadis, E. Diapouli, C. Alves, M. Duarte, E. de Miguel, M. Capdevila, X. Querol, MC Minguillón. Factors controlling air quality in different European subway systems. *Environmental Research* 146, April 01, 2016, Pages 35-46.
 - Moreno, T., Reche, C., Martins, V., Minguillón, M. C., Capdevila, M., Centelles, S., De Miguel, E., Querol, X. Air pollution exposure while commuting. Invited Oral presentation. 4th Workplace and Indoor Aerosols Conference. Barcelona, Spain. 22 April 2016
 - Reche, C., Moreno, T., Minguillón, M. C., Capdevila, M., Centelles, S., De Miguel, E. Impact of air pollutants from renewal works in tunnels on subway passenger's exposure. Poster presentation. 4th Workplace and Indoor Aerosols Conference. Barcelona, Spain. 21 April 2016
 - Moreno, T. IMPROVE LIFE+: Measures to improve air quality in the subway system. Invited Oral presentation. AIRUSE LIFE Final Conference. Barcelona, Spain. 19 April 2016.



- **Action E1** “Project Management and Audit”. The next report to be delivered is the Midterm report that will be submitted by December 2016.
- **Action E2** “Monitoring of the project progress according to indicators defined by the managing team”. Three-month summary reviews, as the present one, are being prepared since the beginning of the project and published in the web page. Regular meetings every month of all partners to discuss developments, problems and progress of the project have been hold (more frequently than initially programmed), including:
 - ✓ Selection of station to measure in L5. 26 January 2016. Visit to Cornellà station. CSIC: Teresa Moreno; TMB: Ferran Gracia, Josep Sousa.
 - ✓ Selection of station in the new line (9 south) to install monitoring equipments. 3 May 2016. CSIC: T. Moreno; TMB: E. de Miguel.
 - ✓ Discussion on ventilation settings in Collblanc during the measurements done during May and June 2016:
 - ✓ 23 March 2016. TMB offices. CSIC: Teresa Moreno; TMB: Eladio de Miguel, Lluís Baena, Ferran Gracia, Fernando Rego.
 - ✓ 13 May 2016. TMB offices. CSIC: Teresa Moreno; TMB: Eladio de Miguel, Lluís Baena, Ferran Gracia, Fernando Rego.
 - ✓ 25 May 2016. TMB offices. CSIC: Teresa Moreno; TMB: Eladio de Miguel, Lluís Baena, Ferran Gracia, Fernando Rego.
 - ✓ Elaboration of dissemination video about the project. 5th and 12th April. CSIC: Cristina Reche, Rafael Bartolí, Mercedes Cabanas, Teresa Moreno; TMB: Eladio de Miguel, Jorge Gimenez.
- **Action E3** “Networking with other European projects (including LIFE+)”. A list of related projects is continuously updated in the project web page. During these three months IMPROVE LIFE has had meeting with:
 - ✓ AIRUSE. LIFE 11 ENV/ES/000584. Presenting results during the Final Conference (19 April 2016). <http://airuse.eu/event/airuse-final-conference/>
 - ✓ Visit of representatives of the Department of Environmental Development Policy (Ms Terez Krisztina Szabo) of the Ministry of Rural Development from the Hungary Government (13 May 2016). The purpose of this visit was to know how the proposal of the IMPROVE project was prepared and how the project is producing results.



The **second monitor team** visit took place on June the 13th 2016 at IDAEA-CSIC premises in Barcelona. Rosa Ana Asensio Calvo, member of the LIFE+ monitoring team, NEEMO EEIG, attended this annual follow up of the project progress. Members of the three partners presented the project progress: Teresa Moreno, Maria Cruz Minguillón, Cristina Reche, Fulvio Amato and Cristina de Vasconcelos from IDAEA-CSIC; Eladio de Miguel, Marta Capdevila and Michael Pellot from TMB (FMB and TB).

AGENDA

2ª visita del Equipo Monitor LIFE+ (NEEMO)

Fecha: Lunes, 13 de Junio de 2016

Lugar: IDAEA-CSIC, Calle Jordi Girona, 18 – 08034 Barcelona

| | | |
|--------------|--|---|
| 10.00 | Bienvenida | (Teresa Moreno y Eladio de Miguel) |
| 10:05 | Revisión del estado de ejecución de las acciones según la propuesta aprobada (CSIC, TMB-FMB y TMB- TB). 10:05 - 10:15: Visión general del proyecto según calendario (Teresa Moreno). 10:15 - 10:40: Acciones B1 y B2 (Cristina Reche y Fulvio Amato). 10:40 - 11:00: Acciones B1 y B2 (MariCruz Minguillón). 11:00 - 11:15: Acciones C, D y E (Teresa Moreno). 11:15 - 11:30: Trabajos a desarrollar los próximos 12 meses. Calendario. | |
| 11:30 | Pausa para café. | |
| 11:50 | Revisión del estado económico/administrativo del proyecto (Cristina Vasconcelos y Michael Pellot). | |
| 12:45 | Check-list financiero. BENEFICIARIOS - Rosa Ana Asencio Calvo (NEEMO). | |
| 13:45 | Pausa para comer | |
| 15:15 | Redacción Midterm report (29/12/2016) - Rosa Ana Asencio Calvo (NEEMO). | |
| 15:45 | Visita a las instalaciones (Estación metro de Collblanc, en la nueva línea 9 Sur). | |
| 16:15 | Clausura | |



2. LIST OF THE PROJECT'S OUTCOMES DURING THE PERIOD

| ACTION | DATE | TITLE |
|--|------------|---|
| 2.1. IMPROVE LIFE publications | | |
| D3 | 04/2016 | Martins, V., T. Moreno, L. Mendes, K. Eleftheriadis, E. Diapouli, C. Alves, M. Duarte, E. de Miguel, M. Capdevila, X. Querol, MC Minguillón. 2016. Factors controlling air quality in different European subway systems. Environmental Research 146, 35-46. |
| 2.2. IMPROVE LIFE reports | | |
| E2 | 30/06/2016 | Summary review |
| 2.3. IMPROVE LIFE other dissemination materials | | |
| D1 | 30/06/2016 | Project website (updated) |
| D3 | 04/2016 | Reche, C., Moreno, T., Minguillón, M. C., Capdevila, M., Centelles, S., De Miguel, E. Impact of air pollutants from renewal works in tunnels on subway passenger's exposure. Poster presentation. 4th Workplace and Indoor Aerosols Conference. Barcelona, Spain. 21 April 2016 |



3. DISSEMINATION ACTIVITIES

| ACTION | DATE | TITLE |
|--------|------|-------|
|--------|------|-------|

3.1. IMPROVE LIFE events

| | | |
|----|------------|---|
| D3 | 30/06/2016 | A meeting with stakeholder Transport for London, was celebrated on the 30th June 2016 when the results and activities of IMPROVE LIFE were presented and discussed. The meeting was attended by Teresa Moreno (CSIC) and Sharon Duffy and Sylvia Quagraine (TfL). |
|----|------------|---|

3.2. IMPROVE LIFE presentations in other events

| | | |
|----|------------|---|
| D3 | 11/04/2016 | An update on the IMPROVE results was presented by T. Moreno to the TMB Health Committee (Sagrera TMB office). |
| D3 | 22/04/2016 | Moreno, T., Reche, C., Martins, V., Minguillón, M. C., Capdevila, M., Centelles, S., De Miguel, E., Querol, X. Air pollution exposure while commuting. Invited Oral presentation. 4th Workplace and Indoor Aerosols Conference. Barcelona, Spain. 22 April 2016 |

3.3. IMPROVE LIFE networking with other projects

| | | |
|----|---------|---|
| D3 | 04/2016 | Moreno, T. IMPROVE LIFE+: Measures to improve air quality in the subway system. Invited Oral presentation. AIRUSE LIFE Final Conference. Barcelona, Spain. 19 April 2016. |
|----|---------|---|

4. DELIVERABLES AND MILESTONES CHECK-UP (30/06/2016)

(Shown in green those already completed, and in yellow those in progress)

| START | ACTIVITIES FOLLOW-UP | OUTCOMES available on-line at: | DEADLINE |
|---|--|--|-------------------------------|
| A. PREPARATORY ACTIONS | | | |
| A1 Documentation of current status and selection of critical parameters to be tested | | | 31-march-15 |
| 1-oct-14 | Construction of 1 historical database of studies examining the methods used to identify and resolve the contribution of aerosol emission sources and their major results | Deliverable 2 Historical source contribution | 31-jan-15 |
| | Elaboration of 1 list of the main parameters identified to be considered in all studies | Deliverable 4 Parameters to test | 31-march-15 |
| | Prioritisation of air pollution sources in subway systems | Milestone D Main Air Pollution sources | 31-jan-15 |
| B. IMPLEMENTATION ACTIONS | | | |
| B1 Determination of the impact of selected parameters | | | 30-jun-16 |
| 1-jan-15 | Organisation and coordination of a campaign program | Campaigns calendar | 15-dic-14 |
| | Presentation of Technical reports on the advance of: | Report 1 Campaigns | 30-apr-15 |
| | - sampling campaigns works | | |
| | air conditioning in trains (series 2 & 3K) | Report 2 Campaigns | 31-oct-15 |
| | ventilation | | |
| | air conditioning (series 5K) | | |
| | rail change | | |
| | brake pads | | |
| | ventilation | Report 3 Campaigns | 31-mar-16 |
| | graphite pantograph | | |
| | - chemical analysis inorganic PAH in PM filters NO2 samples | | |
| | - results of the chemical analyses | Milestone G Impact of main air pollution source | 31-dic-15 |
| | - statistical analysis, | | |
| | - results of source apportionment | | |
| | Determination of the impact of main air pollution sources | Milestone H Main pollution tracers | 31-dic-15 |
| | Identification of the main pollutant tracers | Database 2 Chemical tracers concentration | 31-mar-16 |
| | Construction of 1 database with concentrations of chemical tracers for pollutant sources in subway systems and the impact of each of them on air quality | Milestone K Characterisation emission sources | 30-jun-16 |
| | Characterisation of the emission sources | Deliverable 8 Report sources contribution | 30-jun-16 30-sep-16 |
| | Report on the overviewing and comparing the full impacts on air quality of each of the selected parameters | | |

| START | ACTIVITIES FOLLOW-UP | OUTCOMES available on-line at: | DEADLINE |
|---|--|---|--------------------------------|
| B2. Testing mitigation measures and Development of mitigation strategies | | | 30-sep-16 |
| 1-abr-15 | Organisation and coordination of a campaign program | Campaigns calendar | 1-dic-14 |
| | Presentation of Technical reports on the advance of: | Report 1 Campaigns | 30-apr-15 |
| | - testing mitigation measures and estimated benefit in metro ambient air quality | | |
| | ballast with water | Report 2 Campaigns | 31-oct-15 |
| | air conditioning in trains (series 2 & 3K) | | |
| | ballast with dust suppressant | | |
| | ventilation | | |
| | air conditioning (series 5K) | Report 3 Campaigns | 31-mar-16 |
| | brake pads | | |
| | ventilation | | |
| | graphite pantograph | | |
| | Proposal of measures for air pollution emission reduction | Milestone I Propose mitigation measures | 31-may-16 |
| | Testing of mitigation measures for emission sources | Milestone J Test mitigation measures | 31-may-16 |
| | Evaluation of mitigation measures | Milestone L Evaluate mitigation measures | 30-sep-16 |
| | Report on the results of mitigation measures in subway systems | Deliverable 9 Report Mitigation measures | 30-sep-16 30-june-17 |
| | Preparation of 1Technical Guidance documentation, identifying and comparing effective strategies for reducing the impact of each selected emission source. | Deliverable 10 Technical guide mitigation measures | 30-sep-16 30-june-17 |
| C. MONITORING ACTIONS | | | |
| C1 Effectiveness of the project actions. | | | 31-mar-18 |
| 1-abr-15 | Definition of (Management Team) a list of parameters/ indicators to assess the impact of the project including: | List 2 Impact indicators | 31-dic-16 |
| | - initial situation regarding PM levels and sources (Action A1) | | |
| | - identification of air pollution sources during the campaigns (Action B1) | | |
| | - contribution of each of the emission sources identified | | |
| | Nomination of an external committee to evaluate the progress of the project after 2 years | Commitment of members | 30-jun-15 |
| | Elaboration of 1 Quality plan for the political effectiveness of the project | Deliverable 12 Report policy effectiveness | 31-dic-17 |
| | Monitor of the impact of the project | Milestone P Monitor the impact of the project | 31-mar-18 |

| START | ACTIVITIES FOLLOW-UP | OUTCOMES available on-line at: | DEADLINE |
|---|--|--|------------------|
| C2 Assessment of the socio-economic impact of the project. | | | 31-mar-18 |
| 1-jul-16 | Monitor of the awareness of the problem (annually <i>not every 6 months</i>) with a questionnaire to public: | Deliverable 11 Questionnaires for public | 31-dic-17 |
| | - Number of people participating. | | |
| | Incentive other metro systems, or local authorities to apply measures proposed by IMPROVE | List 3 Replicated measures | 31-mar-18 |
| | Assessment of the socio-economic effect | Milestone M Assess Socio-economic effect | 31-dic-17 |
| | Report on the socio-economic impact of the project | Deliverable 18 Report Socio-economic Impact | 31-mar-18 |
| D. COMMUNICATION AND DISSEMINATION ACTIONS | | | |
| D1 A Project website. | | | 31-mar-18 |
| 1-oct-14 | Design and maintenance of the project website | Deliverable 1 Project website | 31-dic-14 |
| | Monitor of the number of visitors. | 6 Summary reviews | 31-mar-18 |
| D2 LIFE+ Information boards. | | | 31-mar-18 |
| 1-oct-14 | Preparation and placing of 10-15 information boards | Deliverable 3 Information boards | 31-jan-15 |
| | Maintenance of boards in the metro facilities | 13 Summary reviews | 31-mar-18 |
| D3 Dissemination of project results | | | 31-mar-18 |
| 1-oct-14 | Design and elaboration of 300 leaflets. | Deliverable 7 Informative leaflets | 30-jun-16 |
| | Publication of articles (4-6) in local/national press (quantification of their readership), during actions B1 & B2 and at beginning/end of project | Deliverable 15 Articles in general/trade press | 31-mar-18 |
| | Submission of 6 technical papers/presentations in international journals/conferences | Deliverable 13 Publications journals/conferences | 31-mar-18 |
| | Organisation of 1 open-forum Stakeholders (around 80 people) private and public sector | Milestone E Organize open-forum | 30-jun-15 |
| | Publication of the forum's outcomes on the project's web site. | Deliverable 5 Minutes of the open Forum | 30-sep-15 |
| | Organisation of 1 international conference (200 people) with researchers, governmental institutions, public transport assoc. and public. | Deliverable 17 Proceedings of the conference | 31-mar-18 |
| D4 Production of Layman's Report. | | | 31-mar-18 |
| 1-jul-16 | Production and dissemination of 2.000 copies to the stakeholders | Deliverable 16 Layman's Report | 31-mar-18 |



| START | ACTIVITIES FOLLOW-UP | OUTCOMES available on-line at: | DEADLINE |
|--|--|--|------------------|
| E. MANAGEMENT ACTIONS | | | |
| E1 Project Management and Audit. | | | 31-mar-18 |
| 1-oct-14 | Nomination of the Project Management Team | Milestone A Project management team | 31-oct-14 |
| | Elaboration of the Quality assurance plan | Milestone C Quality assurance plan | 30-nov-14 |
| | Submission of the Inception Report | Inception Report | 30-jun-15 |
| | Submission of the Mid-term Report | Mid-term Report | 31-dic-16 |
| | Submission of the Final Report | Final Report | 30-jun-18 |
| E2 Monitoring of the project progress. | | | 31-mar-18 |
| 1-oct-14 | Revision the progress of the project, according to its indicators. | Milestone B Indicators of Progress | 30-nov-14 |
| | Meeting between partners | Deliverable 19 Summary reviews | 31-mar-18 |
| | Implementation of corrective recommendations after each meeting if necessary | | |
| E3 Networking with other European projects (including LIFE+). | | | 31-mar-18 |
| 1-oct-14 | Organisation of 1 expert group workshop | Deliverable 6 Minutes of the expert's workshop | 30-sep-15 |
| | Organisation of 1 workshop with other European projects | Milestone F Workshop with LIFE+ projects | 30-jun-17 |
| | Participation in other LIFE+ project's meetings | Presentations of IMPROVE | 31-mar-18 |
| E4 After-LIFE+ Communication Plan. | | | 31-mar-18 |
| 1-jul-16 | Preparation of the After-Life communication plan | Deliverable 14 After-Life communication plan | 31-mar-18 |