



# Summary review

October 2015

IMPROVE LIFE13 ENV/ES/000263



Coordinated by  
idæ<sup>a</sup>  CSIC







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## 1. ACTIVITIES FOLLOW-UP

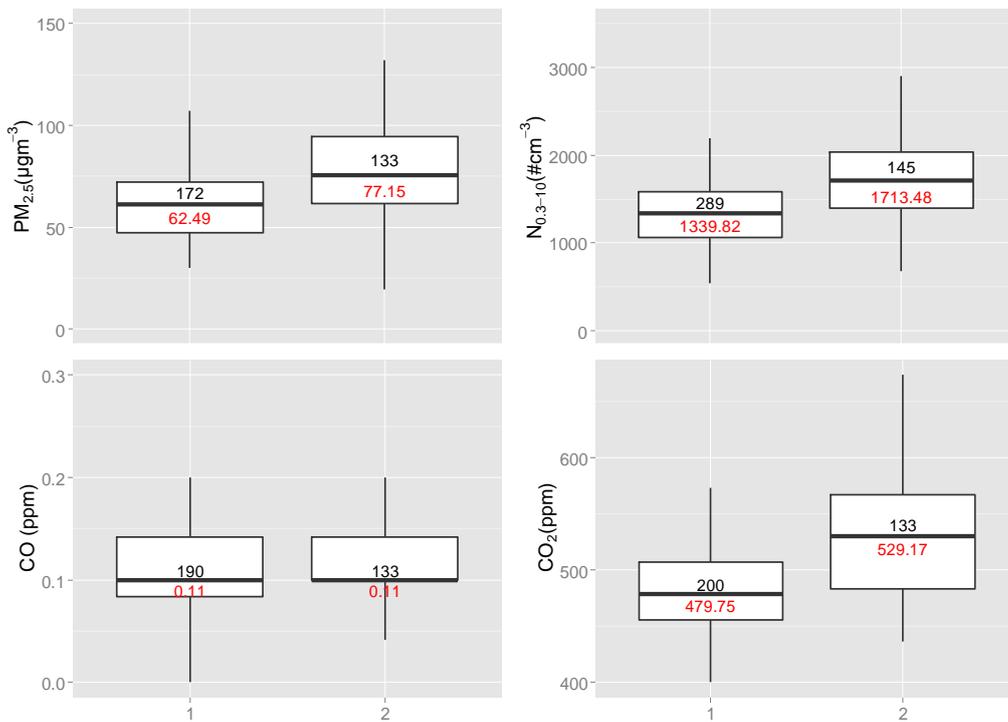
The following summary report covers IMPROVE LIFE13 ENV/ES/000263 activities from **01/07/2015 to 30/09/2015**.

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:

- **Action B1** “Determination of the impact of selected parameters”. In a previous sampling campaign, carried out between 2<sup>nd</sup> April and 3<sup>rd</sup> July, results evidenced a lack of a direct relationship between the service period length of air conditioner filters and variations in air quality **inside trains**. In order to assess the reproducibility of this finding, a second measurement campaign was performed in a different train of L3 (series 3000), following the same methodology. Thus, a DustTrak device was installed inside a train in one of the intermediate driver’s cabins from 10<sup>th</sup> July to 14<sup>th</sup> September to monitor PM mass concentrations. It is important to note that air conditioner filters in the selected train were changed one month before the beginning of the sampling campaign, so by the end of the campaign in mid-September they had not been replaced for three months. An increasing trend of PM concentrations was not observed during this 3-months period, supporting the previous result on a different train. In addition, PM levels were simultaneously measured in a passenger’s cabin of the same train during four 20-30 min trips. The high correlation between PM concentrations at both cabins confirms that the air inside the intermediate driver’s cabin is representative of passenger’s exposure inside the train. A report on the results of measurements done inside trains during this study is being prepared at the moment.

The campaign to characterise and quantify the effect of changes in the ventilation of the **Tarragona station (L3)** was finalised on the 1<sup>st</sup> July, after three weeks measurements. A report has been now produced with the following conclusions: “Based on these new, detailed data, it can be concluded that during operation hours key parameters related to indoor sources within the subway station (motion of the trains and human respiration), increased when the air circulation was modified from standard conditions. Results showed that PM<sub>2.5</sub> and N<sub>0.3-10</sub> levels increased by 20% and CO<sub>2</sub> levels by 10%. Furthermore, the increase in the levels could be observed immediately after the change of the ventilation conditions from impulsion to extraction. It is interesting to note that levels did not show an increasing trend during the week, but the percentage of increase over standard conditions was maintained. The study of the particle number size distribution showed that major differences were recorded for the highest mean particle sizes, indicating that the impulsion of outdoor air at platforms is particularly efficient in removing the largest particles. Changes in the ventilation settings in the tunnel during the night did not seem to strongly influence the air quality in the station, although further research is needed. It is planned to perform a second monitoring campaign under the same ventilation conditions

in order to validate the obtained results, but from the results so far it seems likely that subway ventilation by impulsion of outdoor air is to be recommended over the extraction of indoor air from the platforms and tunnels.” The report has been sent to TMB Barcelona’s subway personnel and will be presented formally in a meeting with TMB workers next month.



*Action B1. Box plots of PM<sub>2.5</sub>, N<sub>0.3-10</sub>, CO, and CO<sub>2</sub> concentrations during subway operation hours by ventilation settings (1: standard settings, 2: Not standard settings). The number of data points is indicated in black, while the median concentrations are indicated in red.*

- Action B2** “Testing mitigation measures and development of mitigation strategies”. Due to the variability in the subway system calendar for night work activities, highly dependent on the availability of machinery due to extra activities such as incidents or main reparations, it was discussed and agreed the benefits of starting the measuring campaigns for this action earlier than originally planned. Therefore action B2 started on April 2015 (instead of July), maintaining the final date as September 2016. This is not a problem for the project and does not affect any other action. Within this action measurements carried out from July to September 2015 followed the characterisation of the effect of the addition of new ballast to tunnels in the Palau Reial and Maria Cristina stations, both in line 3, which and finished on 10<sup>th</sup> June. The equipments used for these campaigns were the same as in Action B1. Results are being analysed to determine if an effect on the air quality can be detected if the dust suppressant is applied.

To quantify the effect of mitigation measures complete chemical analyses of the PM<sub>2.5</sub> samples collected by the high volume sampler were planned. This will allow the determination of the variations in chemical composition driven by the influence of the different activities performed. The chemical analysis includes: acid digestion followed by ICP-AES and ICP-MS analysis for the determination of major and trace elements; water leaching followed by IC analysis and selective electrode analysis for the determination of anions (sulfate, nitrate and chloride) and ammonium, respectively; and elemental analyzer for the determination of total carbon. ICP-AES, ICP-MS, IC and selective electrode analyses are carried out at IDAEA-CSIC, whereas total carbon analyses are carried out at CIEMAT. A total of 115 samples (each corresponding to one day air quality monitoring) have been completely analysed (71 samples from Sagrera station and 44 samples from Palau Reial station). Moreover, 48 additional samples (27 from Maria Cristina station and 21 from Tarragona station) have been already analysed for TC. Additionally, 62 samples, among the aforementioned 163, have been selected for organic species analysis. The selection has been done based on the activities carried out at the stations (including reference days, i.e. without any special activity, and activity days, i.e. when special operations were carried out at the stations) and considering the PM<sub>2.5</sub> concentrations, so that the selection of samples is representative of all the samples, at least in terms of bulk PM<sub>2.5</sub> concentrations. Once chemical analyses are finalised for all samples a report on the efficiency of mitigation measures will be elaborated.

- **Action C1** “Effectiveness of the project actions”. An external committee was nominated to evaluate the progress of the IMPROVE LIFE in June 2015, as shown in the previous summary report. The impact of the implementation actions of IMPROVE will be evaluated once they have been completed (December 2016).
- **Action C2** “Assessment of the socio-economic impact of the project”. This action will officially start on July 2016. However, benefiting from the questionnaires that TMB carries out annually among the subway travellers, a first series of questions related to the IMPROVE project have been elaborated this September. The questions that will be formulated are:

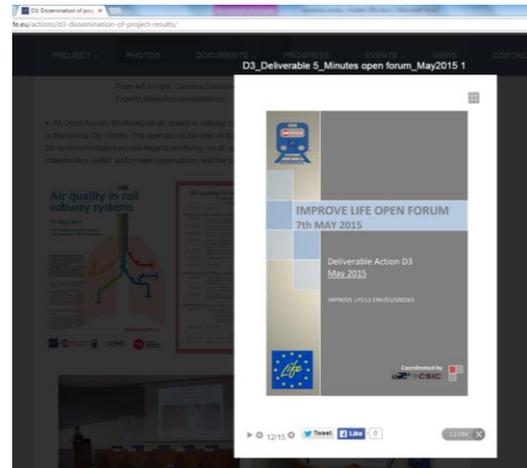
*Q1 . Have you ever thought about how is the quality of the air we breathe in the subway environment? < Yes, No, Doesn't know.>*

*Q2. Could you assess the quality of the air we breathe in the premises of the subway on a scale : very good, good, fair, bad or very bad? < Very good, good, fair, bad, very bad, Doesn't know >*

*Q3 . Do you know the work that TMB and CSIC are doing to improve air quality in the subway? < Yes, No, Doesn't know >*

These questions will be asked to 624 subway passengers during autumn 2015.

- **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. The IMPROVE web page has had so far an average number of visits 1.560 per month.
- **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 board 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 the end of September 2015 hard information boards on the project have been placed at Sagrera, Palau Reial, Maria Cristina and Tarragona 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 July-September period.
- **Action D3** “Dissemination of project results”. During this period the following activities to disseminate IMPROVE LIFE results have been carried out:
  - ✓ Publication in the web of the outcomes of the **Open Forum** on air quality in subway systems celebrated on the 07/05/2015, and organised by CSIC-TMB.



*Action D3. Open Forum Discussion panel (left) and published report (right) celebrated in Barcelona.*

- ✓ **Technical publications** on the project results in international scientific journals and presentations in scientific conferences acknowledging the LIFE+ financial support during this period:

- T. Moreno, C. Reche, I. Rivas, MC. Minguillón, J. Parga, V. Martins, M. Pandolfi, M. Brines, M. Ealo, A. Godinho, F. Amato, G. Sosa, M. Capdevila, E. de Miguel, C. Vargas, G. Buonanno, W. Gibbons, X. Querol. 2015. Air pollution and city travel: choices in commuter exposure to inhalable particulates. *Journal of Transport & Health*, Volume 2, Pages S41-S42
- T. Moreno, V. Martins, MC. Minguillón, F. Amato, M. Capdevila, E. de Miguel, S. Centelles, X. Querol. 2015. Key factors influencing air quality in rail subway systems. *Journal of Transport & Health*, Volume 2, Page S57.
- T. Moreno, V. Martins, Mc Minguillón, F Amato, M. Capdevila, E. De Miguel, S. Centelles, X. Querol. Key factors influencing air quality in rail subway systems. ORAL presentation. 1st International Conference on Transport and Health. London, UK. July 2015.
- T. Moreno, C. Reche, I. Rivas, Mc Minguillón, J. Parga, V. Martins, M. Pandolfi, M. Brines, M. Ealo, As Godinho, F Amato, G. Sosa, M. Capdevila, E. De Miguel, C. Vargas, G. Buonanno, W. Gibbons, X. Querol. Air pollution and city travel: choices in commuter exposure to inhalable particulates. ORAL presentation. 1st International Conference on Transport and Health. London, UK. July 2015.
- V. Martins, T. Moreno, M.C. Minguillón, B.L. Van Drooge, X. Querol. Chemical composition and source apportionment of PM<sub>2.5</sub> in subway stations of Barcelona, Spain. ORAL Presentation. 2015 European Aerosol Conference (EAC 2015). Milan, Italy, September 2015.



*Action D3. Oral presentation by V. Martins in EAC2015 in Milan acknowledging IMPROVE project.*

- V. Martins, T. Moreno, M.C. Minguillón, X. Querol, M. Lazaridis. Particulate matter personal dose in a subway microenvironment . Poster presentation. 2015 European Aerosol Conference (EAC 2015). Milan, Italy, September 2015.

T. Moreno, V. Martins, Mc. Minguillón, C. Reche, F. Amato, M. Capdevila, E. De Miguel, S. Centelles, X. Querol. What are we breathing in rail subway systems, and why? ORAL presentation. 2015 European Aerosol Conference (EAC 2015). Milan, Italy. September 2015

T. Moreno, C. Reche, I. Rivas, Mc. Minguillón, J. Parga, V. Martins, M. Pandolfi, M. Brines, M. Ealo, A.S. Godinho, F. Amato, G. Sosa, M. Capdevila, E. De Miguel, C. Vargas, G. Buonanno, W. Gibbons, X. Querol. Choices in commuter exposure to inhalable particulates. ORAL presentation. 2015 European Aerosol Conference (EAC 2015). Milan, Italy, September 2015.

- **Action E1** “Project Management and Audit”. A letter from the European Commission was received on the 9<sup>th</sup> of September acknowledging receipt of the Inception Report submitted on the 30<sup>th</sup> of June. In the letter the Commission also mentions the visit of Ms Asensio of the external monitoring team on 13<sup>th</sup> May 2015 at CSIC premises. The letter was very positive, stating “I am pleased to hear that the project has already started up, and that the implementation actions are well underway. I found your Inception report of high standard with informative description of project activities carried out.” It also included a series of recommendations that are being undertaken at the moment.
- **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:
  - ✓ Progress on the measuring campaigns inside train carriages in line 3 to observe the effect of air conditioning filters on PM concentrations through time. 01/07/2015 at Vall d’Hebron TMB offices. CSIC: Teresa Moreno, Cristina Reche; TMB: Josep Calvo, Cristian Miguel, Marta Capdevila.
  - ✓ Discussion on the planning of main rail works during the next months to select the station where air quality measurements will be carried out during October 2015. 24/08/2015. TMB offices. CSIC: Teresa Moreno; TMB: Marta Capdevila, David Gomez.
  - ✓ End of the measuring campaign inside train carriages in line 3 to observe the effect of air conditioning filters on PM concentrations through time. 14/09/2015 at Vall d’Hebron TMB offices. CSIC: Cristina Reche; TMB: Josep Calvo, Marta Capdevila.
- **Action E3** “Networking with other European projects (including LIFE+)”. The project has established collaboration with the project LIFE BIOBALE (<http://biobale.com/>) focussed on reducing greenhouse gases.



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

ACTION	DATE	TITLE
<b>2.1. IMPROVE LIFE publications</b>		
D3	08/2015	T. Moreno, V. Martins, MC. Minguillón, F. Amato, M. Capdevila, E. de Miguel, S. Centelles, X. Querol. 2015. <a href="#">Key factors influencing air quality in rail subway systems</a> . Journal of Transport & Health, Volume 2, Page S57.T.
D3	08/2015	T. Moreno, C. Reche, I. Rivas, MC. Minguillón, J. Parga, V. Martins, M. Pandolfi, M. Brines, M. Ealo, A. Godinho, F. Amato, G. Sosa, M. Capdevila, E. de Miguel, C. Vargas, G. Buonanno, W. Gibbons, X. Querol. 2015. <a href="#">Air pollution and city travel: choices in commuter exposure to inhalable particulates</a> . Journal of Transport & Health, Volume 2, Pages S41-S42
<b>2.2. IMPROVE LIFE reports</b>		
B1&B2	30/09/2015	Technical report on Effect of ventilation modes in air quality at a subway platform (Tarragona station, Line 3)
E2	30/09/2015	<a href="#">Summary reviews</a>
<b>2.3. IMPROVE LIFE other dissemination materials</b>		
D1	22/09/2015	<a href="#">Project website (updated)</a>
D3	30/09/2015	<a href="#">Articles general/trade press</a>



### 3. DISSEMINATION ACTIVITIES

ACTION	DATE	TITLE
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#### 3.1. IMPROVE LIFE events

#### 3.2. IMPROVE LIFE presentations in other events

D3	07/2015	Moreno, V. Martins, Mc Minguillón, F Amato, M. Capdevila, E. De Miguel, S. Centelles, X. Querol. Key factors influencing air quality in rail subway systems. ORAL presentation. 1st International Conference on Transport and Health. London, UK. July 2015.
D3	07/2015	T. Moreno, C. Reche, I. Rivas, Mc Minguillón, J. Parga, V. Martins, M. Pandolfi, M. Brines, M. Ealo, As Godinho, F Amato, G. Sosa, M. Capdevila, E. De Miguel, C. Vargas, G. Buonanno, W. Gibbons, X. Querol. Air pollution and city travel: choices in commuter exposure to inhalable particulates. ORAL presentation. 1st International Conference on Transport and Health. London, UK. July 2015.
D3	09/2015	T. Moreno, V. Martins, Mc. Minguillón, C. Reche, F. Amato, M. Capdevila, E. De Miguel, S. Centelles, X. Querol. What are we breathing in rail subway systems, and why? <a href="#">ORAL presentation. 2015 European Aerosol Conference (EAC 2015)</a> . Milan, Italy. September 2015
D3	09/2015	T. Moreno, C. Reche, I. Rivas, Mc. Minguillón, J. Parga, V. Martins, M. Pandolfi, M. Brines, M. Ealo, A.S. Godinho, F. Amato, G. Sosa, M. Capdevila, E. De Miguel, C. Vargas, G. Buonanno, W. Gibbons, X. Querol. Choices in commuter exposure to inhalable particulates. <a href="#">ORAL presentation. 2015 European Aerosol Conference (EAC 2015)</a> . Milan, Italy, September 2015.
D3	09/2015	V. Martins, T. Moreno, M.C. Minguillón, B.L. Van Drooge, X. Querol. Chemical composition and source apportionment of PM2.5 in subway stations of Barcelona, Spain. <a href="#">ORAL Presentation. 2015 European Aerosol Conference (EAC 2015)</a> . Milan, Italy, September 2015.

#### 3.3. IMPROVE LIFE networking with other projects

E3	07/2015	<a href="#">Collaboration with the project LIFE BIOBALE</a> LIFE 13ENV/ES/000923 ( <a href="http://biobale.com/">http://biobale.com/</a> ).
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#### 4. DELIVERABLES AND MILESTONES CHECK-UP (30/09/2015)

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

START	ACTIVITIES FOLLOW-UP	OUTCOMES <a href="#">available on-line at:</a>	DEADLINE
<b>A. PREPARATORY ACTIONS</b>			
<b>A1 Documentation of current status and selection of critical parameters to be tested</b>			<b>31-march-15</b>
<b>1-oct-14</b>	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	<b>Deliverable 2</b> <a href="#">Historical source contribution</a>	31-jan-15
	Elaboration of 1 list of the main parameters identified to be considered in all studies	<b>Deliverable 4</b> <a href="#">Parameters to test</a>	31-march-15
	Prioritisation of air pollution sources in subway systems	Milestone D <a href="#">Main Air Pollution sources</a>	31-jan-15
<b>B. IMPLEMENTATION ACTIONS</b>			
<b>B1 Determination of the impact of selected parameters</b>			<b>30-jun-16</b>
<b>1-jan-15</b>	Organisation and coordination of a campaign program	Campaigns calendar	15-dic-14
	Presentation of Technical reports on the advance of:	<a href="#">Report 1 Campaigns</a>	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		
	- statistical analysis,		
	- results of source apportionment		
	Determination of the impact of main air pollution sources	Milestone G Impact of main air pollution source	31-dic-15
	Identification of the main pollutant tracers	Milestone H Main pollution tracers	31-dic-15
	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	Database 2 Chemical tracers concentration	31-mar-16
	Characterisation of the emission sources	Milestone K Characterisation emission sources	30-jun-16
	Report on the overviewing and comparing the full impacts on air quality of each of the selected parameters	<b>Deliverable 8</b> <b>Report sources contribution</b>	30-jun-16

START	ACTIVITIES FOLLOW-UP	OUTCOMES <a href="#">available on-line at:</a>	DEADLINE
<b>B2. Testing mitigation measures and Development of mitigation strategies</b>			<b>30-sep-16</b>
<b>1-abr-15</b>	Organisation and coordination of a campaign program	Campaigns calendar	1-dic-14
	Presentation of Technical reports on the advance of:	<a href="#">Report 1 Campaigns</a>	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	<b>Deliverable 9 Report Mitigation measures</b>	30-sep-16
	Preparation of 1Technical Guidance documentation, identifying and comparing effective strategies for reducing the impact of each selected emission source.	<b>Deliverable 10 Technical guide mitigation measures</b>	30-sep-16
<b>C. MONITORING ACTIONS</b>			
<b>C1 Effectiveness of the project actions.</b>			<b>31-mar-18</b>
<b>1-abr-15</b>	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)	Commitment of members	30-jun-15
	- contribution of each of the emission sources identified		
	Nomination of an external committee to evaluate the progress of the project after 2 years		
	Elaboration of 1 Quality plan for the political effectiveness of the project	<b>Deliverable 12 Report policy effectiveness</b>	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 <a href="#">available on-line at:</a>	DEADLINE
<b>C2 Assessment of the socio-economic impact of the project.</b>			<b>31-mar-18</b>
<b>1-jul-16</b>	Monitor of the awareness of the problem (annually <i>not every 6 months</i> ) with a questionnaire to public:	<b>Deliverable 11 Questionnaires for public</b>	<b>31-dic-17</b>
	- 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	<b>Deliverable 18 Report Socio-economic Impact</b>	31-mar-18
<b>D. COMMUNICATION AND DISSEMINATION ACTIONS</b>			
<b>D1 A Project website.</b>			<b>31-mar-18</b>
<b>1-oct-14</b>	Design and maintenance of the project website	<a href="#">Deliverable 1 Project website</a>	31-dic-14
	Monitor of the number of visitors.	6 Summary reviews	31-mar-18
<b>D2 LIFE+ Information boards.</b>			<b>31-mar-18</b>
<b>1-oct-14</b>	Preparation and placing of 10-15 information boards	<a href="#">Deliverable 3 Information boards</a>	31-jan-15
	Maintenance of boards in the metro facilities	<a href="#">13 Summary reviews</a>	31-mar-18
<b>D3 Dissemination of project results</b>			<b>31-mar-18</b>
<b>1-oct-14</b>	Design and elaboration of 300 leaflets.	<a href="#">Deliverable 7 Informative leaflets</a>	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	<a href="#">Deliverable 15 Articles in general/trade press</a>	31-mar-18
	Submission of 6 technical papers/presentations in international journals/conferences	<a href="#">Deliverable 13 Publications journals/conferences</a>	31-mar-18
	Organisation of 1 open-forum Stakeholders (around 80 people) private and public sector	Milestone E <a href="#">Organize open-forum</a>	30-jun-15
	Publication of the forum's outcomes on the project's web site.	<a href="#">Deliverable 5 Minutes of the open Forum</a>	30-sep-15
	Organisation of 1 international conference (200 people) with researchers, governmental institutions, public transport assoc. and public.	<b>Deliverable 17 Proceedings of the conference</b>	31-mar-18
<b>D4 Production of Layman's Report.</b>			<b>31-mar-18</b>
<b>1-jul-16</b>	Production and dissemination of 2.000 copies to the stakeholders	<b>Deliverable 16 Layman's Report</b>	31-mar-18



START	ACTIVITIES FOLLOW-UP	OUTCOMES <a href="#">available on-line at:</a>	DEADLINE
<b>E. MANAGEMENT ACTIONS</b>			
<b>E1 Project Management and Audit.</b>			<b>31-mar-18</b>
<b>1-oct-14</b>	Nomination of the Project Management Team	Milestone A <a href="#">Project management team</a>	31-oct-14
	Elaboration of the Quality assurance plan	Milestone C <a href="#">Quality assurance plan</a>	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
<b>E2 Monitoring of the project progress.</b>			<b>31-mar-18</b>
<b>1-oct-14</b>	Revision the progress of the project, according to its indicators.	Milestone B Indicators of Progress	30-nov-14
	Meeting between partners	<b>Deliverable 19</b> <a href="#">Summary reviews</a>	31-mar-18
	Implementation of corrective recommendations after each meeting if necessary		
<b>E3 Networking with other European projects (including LIFE+).</b>			<b>31-mar-18</b>
<b>1-oct-14</b>	Organisation of 1 expert group workshop	<b>Deliverable 6</b> <a href="#">Minutes of the expert's workshop</a>	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
<b>E4 After-LIFE+ Communication Plan.</b>			<b>31-mar-18</b>
<b>1-jul-16</b>	Preparation of the After-Life communication plan	<b>Deliverable 14</b> <b>After-Life communication plan</b>	31-mar-18