LIFE Project Number

LIFE16 ENV/FR/000384

Mid-term

Covering the project activities from 01/07/2017[1] to 30/06/2020

Reporting Date[2]

30/06/2020

LIFE PROJECT NAME

LIFE COOL & LOW NOISE ASPHALT

Data Project

Project location:	Paris
Project start date:	01/07/2017
Project end date:	30/06/2022
Total budget:	€ 2,345,126
EU contribution:	€ 1,353,207
(%) of eligible costs:	59.97%

Data Beneficiary

Name Beneficiary:	CITY OF PARIS
Contact person:	Mrs Giulia Custodi
Postal address:	Direction des Espaces Verts et de l'Environnement, 103 Avenue de France, 75013, Paris
Telephone:	0171285051
E-mail:	giulia.custodi@paris.fr sophie.legrand@paris.fr
Project Website:	https://www.life-asphalt.eu/

[1] Project start date

[2] Include the reporting date as foreseen in part C2 of Annex II of the Grant Agreement

This table comprises an essential part of the report and should be filled in before submission

Please note that the evaluation of your report may only commence if the package complies with all the elements in this receivability check. The evaluation will be stopped if any obligatory elements are missing.

Package completeness and correctness check	
Obligatory elements	**✓ or N/A**
Technical report	
The correct latest template for the type of project (e.g. traditional) has been followed and all sections have been filled in, in English *In electronic version only*	✓
Index of deliverables with short description annexed, in English *In electronic version only*	✓
Mid-term report: Deliverables due in the reporting period (from project start) annexed Final report: Deliverables not already submitted with the MTR annexed including the Layman's report and after-LIFE plan Deliverables in language(s) other than English include a summary in English *In electronic version only*	✓
Financial report	
The reporting period in the financial report (consolidated financial statement **and** financial statement of each Individual Beneficiary) is the same as in the technical report with the exception of any terminated beneficiary for which the end period should be the date of the termination.	✓
Consolidated Financial Statement with all 5 forms duly filled in and signed and dated *On paper (signed and dated originals*) and in electronic version (pdfs of signed sheets + full Excel file)*	✓
Financial Statement(s) of the Coordinating Beneficiary, of each Associated Beneficiary and of each affiliate (if involved), with all forms duly filled in (signed and dated). The Financial Statement(s) of Beneficiaries with affiliate(s) include the total cost of each affiliate in 1 line per cost category. *In electronic version (pdfs of signed sheets + full Excel files) + in the case of the Final report the overall summary forms of each beneficiary on paper (signed and dated originals*)*	✓
Amounts, names and other data (e.g. bank account) are correct and consistent with the Grant Agreement / across the different forms (e.g. figures from the individual statements are the same as those reported in the consolidated statement)	✓
Mid-term report (for all projects except IPs): the threshold for the second pre-financing payment has been reached	✓
Beneficiary's certificate for Durable Goods included (if required, i.e. beneficiaries claiming 100% cost for durable goods) *On paper (signed and dated originals*) and in electronic version (pdfs of signed sheets)*	✓
Certificate on financial statements (if required, i.e. for beneficiaries with EU contribution ≥750,000 € in the budget) *On paper (signed original) and in electronic version (pdf)*	✓
Other checks	
Additional information / clarifications and supporting documents requested in previous EASME letters (unless already submitted or not yet due) *In electronic version only*	✓
This table, page 2 of the Mid-term / Final report, is completed - each tick box is filled in *In electronic version only*	✓

**original signature by a legal or statutory representative of the beneficiary / affiliate concerned*

1. Table of contents

2. List of key-words and abbreviations

AEU = Urban Ecology Agency of the City of Paris

AS = Scientific Article

BBphon+ = Phonic Thin Asphalt Concrete

CEE-ONU = United Nations Economic Commission for Europe

CIE = Lighting International Commission

COPIL = Pilotage Committee

COSCI = Scientific Committee

COSTA = Stakeholders Committee

CPR = Professional Congress

CPX = Closed Proximity Method

CS= Scientific Congress

Harmonica = Harmonised noise information for citizens and authorities

ICU = Urban Heat Island

LA10 = Level awaited above 10% of time

LA50 = Level awaited above 50% of time

LA90 = Level awaited above 90% of time

LAeqT = Level awaited equivalent on time

Lden = Level day evening night

LEMVP = Testing and materials laboratory of the City of Paris

PMT = Mean Deep Texture

PPBE = Environmental Noise Action Plan

PUMA = Porouse Urban Mastic Asphalt

SMAphon = Phonic Stone Mastic Asphalt

SRT = Skid Resistance Tester

UTCI = Universal Thermal Climate Index

3. Executive Summary

3.1. The project objectives, key deliverables and outputs

The European LIFE project "COOL AND LOW NOISE ASPHALT" piloted by the City of Paris aims to test, on three Parisian sites highly exposed to road noise, three innovative pavement formulas to fight against noise pollution and global warming. The City of Paris is the beneficiary coordinator and it is in partnership with the companies Colas SA and its affiliate Colas IDFN, Eurovia Management and the Bruitparif association as associated beneficiaries. Since 2018, three formulas, two bituminous mixes and a pavement asphalt, have been tested on three pilot sites each 400 meters long (600 m of innovative covering (3x200m) and on each site: 200m reference + 200 innovative). These formulas combine sound and thermal properties while retaining good mechanical durability. Each site is equipped with numerous sensors and is coated for half with an experimental coating and for the other half with the standard Parisian coating. In total, 1,200 meters of intramural roadway are therefore coated with new pavement. OBJECTIVES :

- **Acoustics** → to reduce the noise pollution generated by road traffic on urban roads thanks to these new coatings, by reducing the rolling noise emitted by the contact of vehicle tires with the coating.
- **Thermal** → to mitigate the effect of Urban Heat Islands (ICU), by increasing the water retention capacities on the surface of the coatings, thus the microclimatic impacts generated by their spraying of non-potable water during periods of high heat, and by the effects of their color (albedo) on the return of heat. The new coatings tested have a micro-granularity to retain a film of water that will cool the air as it evaporates.
- **Coatings durability** → to reinforce the durability of these coatings with regard to their sound and thermal properties while retaining good mechanical durability and limiting their additional cost compared to conventional coatings, in order to allow the reproducibility of these solutions in urban areas.

The **action C1 – environmental impact monitoring and measurement –** contains the key deliverables for the long-term monitoring, which makes it possible to document the evolution of acoustic and thermal performance over time. To ensure the replicability of the coatings to other Parisian sites and others urban areas, communication, dissemination and promotion actions (D1 Action) are gathering the scientific results in order to disseminate them. The **action B3 – replicability and transferability strategy –** will start at the end of 2020 and the results will be on the key deliverable related at the end of the project in 2022.

Based on the first results of the experimentation, the City of Paris has already included the two bituminous mixes to its maintenance contract. The action C2 – monitoring of socio-economic impact – has started in October 2019 and the results will be on the key deliverable related at the end of the project in 2022.

3.2. General progress

ACHIEVEMENTS

The main challenges met during the first 18 months (from 06/2017 to 12/2018) of the LIFE COOL & LOW NOISE ASPHALT project were: selecting the pilot sites; monitoring before (état initial); creating road surface overlay formulas (prototypes) and implementing them on pilot sites; monitoring after the laying of the prototypes (état zero); launching the project's first communication and dissemination actions. For the succeeding 18 months (from 01/2019 to 06/2020) the main challenges were: to manage the pilot sites, to ensure measurements on acoustic and thermal fields and the sparkling action during summer heat peaks, to fix some

administrative problems concerning internal contracts of Eurovia and Colas regarding the rules of the LIFE projects, to update on the website the communication and dissemination actions such as the COSCI&COSTA events, congress and articles.
On the phonic aspect, the main objective is to reduce noise pollution from the initial state of -5 dB(A) for rolling noise, and -3 dB(A) for the house fronts. All the objectives for reducing tire contact noise and the ambient noise on the house fronts have been achieved for the SMAphon and BBphon +. In addition, a survey of users and residents of Frémicourt Street shows that 63% of those questioned noted a reduction in road noise following the change of road surface. Among them, 67% consider this reduction to be medium or significant.
For the thermal aspect, the aim to mitigate UHI effect is achieved. Indeed, on the three sites, watering allows a reduction in air temperature of about 1 ° C maximum effect and about 0.4 ° C on average. The equivalent UTCI temperature is also reduced to a maximum between 1.9 and 3.6 ° C and on average from 0.4 ° C to 0.8 ° C depending on the site.

DEVIATIONS, IMPORTANT PROBLEMS AND DIFFICULTIES
Deviations from the technical objectives for thermal assessment: the City of Paris was late in finding the 3 pilot sites because the criteria were many (thermic conditions, acoustic conditions, integration to maintenance works budgets, absence of development project during the 4 years period…). The initial thermal state (before works) of Lecourbe and Frémicourt streets could not be characterized during the summer before the implementation. Therefore, only the sparkling of the pavements can be assessed on these two sites. This has an impact on the microclimatic survey, because only Courcelles street could be characterized at the initial state, but this has no impact on the thermal survey for the other streets. For the microclimatic survey in Frémicourt and Lecourbe streets, additional laboratory tests have been performed; this is a simulation which does not replace the initial state, but tries to compensate for this lack with a characterization of the material in the laboratory. This problem has been treated also in the evaluation plan, which has been updated consequently.
Other delays occurred: important site-works in Frémicourt street delayed CPX measurements of 6 month from the "zero state". This discrepancy does not call into question the results of the measurements which may well be considered as those of the Zero State.The annual monitoring measures will be postponed to this same period (March - April) to keep a gap of around twelve months between the measures and also to be able to have a more favorable period vis-à-vis the weather conditions (risk of cancellation of nights).
For the PUMA, an absence of reduction is observed in comparison to the reference. It is due to a default of the reference pavement, which is not compliant with usual formula. Its surface is too smooth, which is favourable in terms of acoustic performance but makes it too slippery. The reference poured asphalted will therefore be replaced during the summer 2020, in order to allow a good comparison with the PUMA.
We had to face important problems due to unplanned roadworks or building work on the pilot sites (i.e. works independent of the LIFE project), acts of vandalism causing damages to some thermal measuring stations.
The project had communication difficulties because of municipal elections. The rule on the electoral restrictions period in France prohibits public authorities from carrying out communication actions during the six months period preceding an election. Therefore, we were in fact limited for communicating on the project for all that concerns valorization actions from the City of Paris. This period has started on mid-september 2019, 6 months before the initially planned municipal elections in March 2020, postponed to the end of June 2020 because of the sanitary crisis.

COVID-19 health crisis. In addition to electoral reserve, we had to face a national quarantine from March 17, 2020. This period had several consequences on the project (technical, administrative, events, dissemination). The lack of precise information on the resumption of activity does not allow us to have a clear idea on the possible events in 2020, namely when will it be possible to create events, how many maximum people would be possible welcome, what sanitary measures will be mandatory.
Participation in conferences for the year 2020 is also limited due to the reschedule of many scientific and technical events.
The refection of the reference poured asphalt (for comparison with PUMA) was planned for spring 2020 and had to be postponed. However, this work remains scheduled in the COOL & LOW NOISE ASPHALT project program for the year 2020.

The totality of these problems has a medium-high impact on the global delay of the project, which means that the management team is monitoring the next 18h month in order to study the possibility for an extension. By now a 6-month is suggested to finalize the project.

4. Introduction

4.1. Description of background, problems and objectives

Nowadays, most of the environmental challenges that are facing our societies are located in cities. Among these challenges are those related to noise and climate change, which have major consequences on city dwellers's health.
An evaluation of the European environmental agency indicates that 37 million of European citizens are exposed to transport-related noise at levels considered as dangerous for their health. In Paris, about 22% of the population is affected by noise pollution, mainly due to noise from road traffic.
Climate change is also a major concern of densest European cities. Studies have shown that for 30 years, heat waves are increasingly intense and longer in Europe. These studies have also revealed that health impact is higher in urban areas. This can be explained by the so-called "urban heat islands" phenomenon (UHI), happening in dense urbanized areas where air and surfaces temperatures are higher than those of the rural periphery, especially at night.
Our LIFE COOL & LOW NOISE ASPHALT pilot project aims to tackle these 2 environmental challenges, by developing three innovative forms of asphalt concrete pavements. The goal is to devise these asphalt surfaces with both phonic and thermal properties, while keeping acceptable durability and extra cost, in order to create practical tools to directly improve city dwellers's quality of life.
The project seeks to improve the properties of three widespread types of asphalt in Europe (2 compacted asphalt mixes, and 1 hot poured asphalt mix), allowing not only replicability all over Paris, but also all over Europe.
On the phonic aspect, the main objective of our project is to reduce noise pollution generated by road traffic in urban areas, by lowering the rolling noise. On the thermal aspect, the aim is to mitigate UHI effect by testing the effect of the water retention capacities of pavements on micro-climatic impacts generated by sprinkling during summer heat peaks and the effects of their color (albedo) on the heat restitution during the night.
Finally, our third objective is to enhance the durability of these asphalt mixes regarding their phonic, mechanical and thermal properties while limitating their extra-cost compared with traditional road pavements, to promote the replicability of these solutions in cities.
Coordinated by the City of Paris, LIFE COOL & LOW NOISE ASPHALT involves 3 associated beneficiaries: Colas and Eurovia, specialized companies for asphalt surfaces, have

designed and implement the best solutions matching with the objectives of the project and the characteristics of pilot sites (Action B). Moreover, Bruitparif, is adding its expertise to the consortium by coordinating and participating to the environmental and socio-economic assessment of our solutions (Action C).
Preparatory action A is dedicated to the analysis of the latest publications on topics related to our project (A1), and to the design of the evaluation plan (A2). This requires tracking the latest achievements in low-noise asphalt surfaces in order to adapt solutions tested in our project with existing technical advances (B1 and B2). The evaluation plan sets the monitoring conditions of the project, in order to collect measurement data for assessing the environmental performances and socio-economic impacts (Action C).
Action B concerns pilot implementation. First step was to formulate the new prototypes of asphalt mixes (B1). They have been implemented on 3 pilot sites, selected in 3 densely populated areas, over a 400-meters distance, simultaneously with standard asphalts implemented on the same distance (B2).
Action C focuses on monitoring and measuring the environmental impact of the experimented asphalt mixes. It is a key element to our project and will be useful to develop a replicability and transferability strategy, adjusted to our results (B3). The monitoring of phonic, thermal and durability performances of the new asphalt will be conducted over 4 years (C1) until the end of the project and five years later. An assessment of socio-economic impacts (C2) will feed the replicability strategy.
Action D targets communication and dissemination of our project results. Our communication plan aims to enhance synergies with other ongoing projects, and to share our data at national and European scale.
Action E is intended to ensure effective project management in compliance with Life program rules.
If LIFE COOL & LOW NOISE ASPHALT is successful, a large part of Paris roads (1600 km) will benefit from the new "environmental" asphalt mixes, with enhanced phonic and thermal properties, and set an example for European local authorities and professionals.
LIFE COOL & LOW NOISE ASPHALT is testing the environmental performances of 3 new types of asphalt mix gathering both phonic and thermal properties, while maintaining acceptable durability and cost.
On the acoustic aspect, the state of the art we made led us to find a compromise by making:

- A more resistant phonic asphalt mix even if it loses a bit of acoustic efficiency;
- 2 more acoustical resistant asphalt mixes even if they lose some mechanical strength.

Our project will enrich this state of art, especially on the experienced prototypes performances, compared to reference asphalt mixes, which are widely used in Europe.
We expect to reduce the rolling noise by at least 5 dB compared to the measures made before the experimentation, which is equivalent to a division by 3 of noise power. This would lead to a reduction by at least 2 dB of ambient noise levels, coming from vehicle rolling noise, engine noise and other sources of noise in the street, measured in front of neighbouring residencies.
On the thermal aspect, we expect, during summer peaks, after sprinkling pavements with non-potable water, a drop of 0.5 °C measured and -1.5 ° C in felt. The products should be ease of installation, maintenance and resistance facilities. The additional cost of asphalt should be less than 10% compared to a conventional one.
5 years after the end of the project, a lower noise level of at least 2 dB in comparison with the reference asphalt, with maintenance of geometric quality and adhesion, of colorimetry and of water retention capacity.

4.2. Expected longer term results

Regarding sustainability, the expected results for the phonic aspects are to exceed the 4 years noted on average for the life of this type of coating and maintain, for at least 5 years after the end of the project, an acoustic level lower by at least 1 decibel compared to the reference coating; for the mechanical aspects to maintain the geometric qualities and grip; for the thermal aspects the maintenance of colorimetric, clarity and water retention capacities.
We expect that, if this scientific objectives of the project will be achieved, in addition to the economic advantages, the replicability and transferability will be possible, and consequently this formulas could be integrated in the European Union environmental policy and legislation strategies as a demonstrated technology.
The European strategy for adapting to climate change evokes the need to anticipate the effects linked to global warming, which risks gradually deteriorating the quality of urban life. It is indeed the health of citizens that is placed at the center of the concerns raised by this project..
In addition, as stated in the European roadmap for management resource efficient, the issue of resource management in urban areas, particularly water and energy, is important in the fight against climate change. Life CLOW-N ASPHALT contributes to the rational use of resources by using non-potable water for asphalting asphalt and by choosing lighter materials for urban pavement coatings, which would have the effect of modulating the long-term design of public lighting if this practice were generalized.

5. Administrative part

5.1. The project management process

The 1st LIFE project manager (Ornella Zaza), who worked part-time on the project, took up her position on February 2018, 8.5 months after project launch. The delay was due to the time needed to complete the City of Paris's recruitment process.
While waiting for her to take up her position, the City of Paris organised for the project to be coordinated internally: the technical service manager for the project (Olivier Chrétien), the hydrology engineer (Kevin Ibtaten) and the coordinator for administrative and financial monitoring (Sophie Le Grand) took responsibility for the actions and procedures for coordinating the project (COPIL, administrative monitoring procedures etc.).
In March 2019, a 2nd LIFE project manager (Giulia Custodi) was recruited, after Ornella Zaza departure in February 2019. She also has a part-time work contract (50%), fully dedicated to LIFE C-LOW-N Asphalt project. This change after a year and a half from the project start had an impact mostly on some delays concerning the communication, dissemination and networking activities (action D1).
For the financial management, in addition to the administrative and financial coordinator who also provides technical assistance to partners in their financial reporting, the team is supported by Nicolas Rougier in charge of purchase and reporting of expenses.
For the technical coordination, the project manager is supported by:

- Olivier Chrétien for all the strategic aspects, links with city's elected representatives and technical coordination between city's departments,
- Kevin Ibtaten, specialist for the noise prevention plan PPBE, for all the technical aspects.

During the 1st COPIL meeting, the partnership agreed to report on project progress and spending every six months. Technical and financial rules have been explained, reporting procedures and templates (letters of assignments, timesheets) have been sent to the partnership at the beginning of the project. The visits by Neemo in 2018 and 2019 enabled all the partners to discuss the rules for administrative and financial monitoring. Despite this,

some difficulties occurred on financial reporting like filling the time sheets. On this issue, we would like to point out that this is the 1st LIFE project for VDP, Colas and Eurovia, and some rules were misunderstood by employees working on the project. In accordance with EASME and Neemo, the administrative and financial coordinator has done her best to correct these errors. Now rules are clear for all and respected by all partners.

The management team is constantly in touch to ensure the coordination of the project progress and achievements through the organisation of the biannual Steering Committees (COPIL), Neemo and other EASME visits. It also assures a continuous flux of information among all the partners which have assured the constant progress of the scientific actions (A, B, C, D).
The management team is in charge of reporting on the project progress and issues to Neemo and EASME, provides technical assistance to partners in their technical and financial reporting as their administrative issues, such as amendment. Since July 2017, the management team spent approximately 260 days on project coordination and management (E1 action).

5.2. Communication with the EASME and Monitoring team

Since the beginning of the project, we have a good communication with the EASME team, contacting them when it's necessary.
There is also a good, smooth and regular communication with the Neemo monitoring team, who had led on-site visits 3 times in April 2018, June 2019 and a visio-meeting on April 2020.
After the first report in December 2018, EASME emailed its feedback in February 2019, with several questions regarding the report. The explanations requested were the subject of an in-depth discussion during the second visit of the NEEMO monitoring team in April 2019. The answers to all the questions raised by EASME following the first report, as well as the questions dating from May 2018 following the first NEEMO visit, are the subject of the annex 9.2 to this report.
The EASME on-site visit was planned to coincide with the third COSCI & COSTA, initially scheduled for October 23, 2020. However, the exceptional conditions of 2020 caused by the covid-19 and the delays previously explained in 3.2 "deviations" made the event drag in the first quarter of 2021. We already communicated these changes to NEEMO and EASME will be able to take part. Furthermore, the agenda of the meeting will be richer, with the acoustic and thermal results of the full year 2020.

5.3. The changes due to amendments to the Grant Agreement

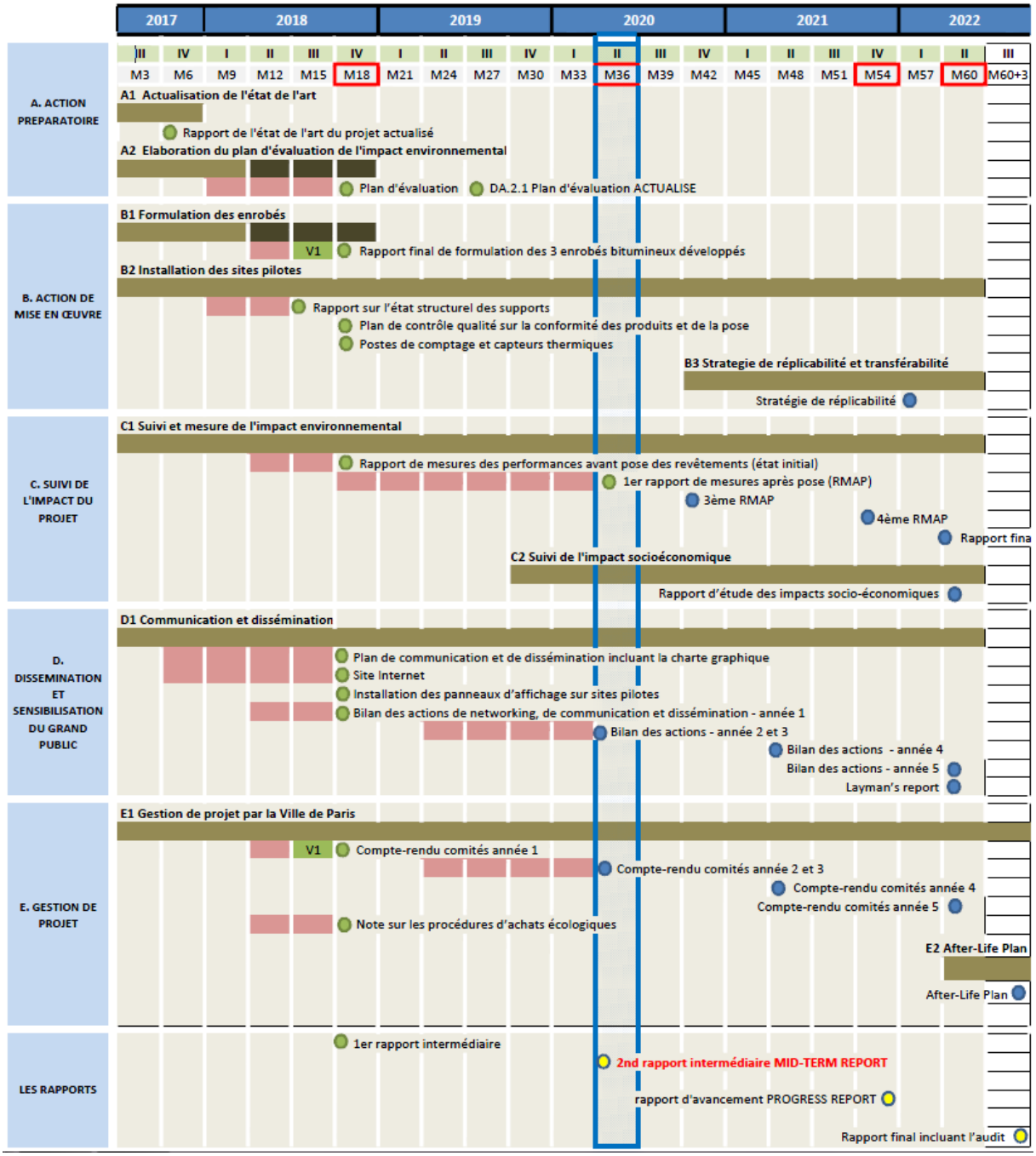
A 1st amendment has been sent by EASME on August 2018 concerning a modification of the definition of conditions for natural persons, submission of VAT certificate and threshold for submission of the certificate on the financial statements.

It was planned to proceed to an administrative amendment in order to involve Eurovia IDF as a project partner in charge of asphalt production and installation before the submission of the mid-term progress report. Initially forecasted for the end of 2019, we had to postpone to beginning of 2020 because of other internal issues to manage. Due to the sanitary crisis, it was not possible to do it and we have to postpone it once again to later in 2020.

6. Technical part (maximum 25 pages)

6.1. Technical progress, per Action

PLANNING DETAILED WITH DELIVERABLES



A. PREPARATORY ACTIONS

A1. STATE OF THE ART UPDATE

ACTUALISATION DE L'ÉTAT DE L'ART

RESPONSABLE : **City of Paris**

STATUS of the action : **COMPLETED**

FORESEEN START date : **07/2017**	ACTUAL START date : **07/2017**
FORESEEN END date : **12/2017**	ACTUAL END date : **12/2017**

PROGRESS TIME SCHEDULE

Actions/sub-actions		2017		2018				2019				2020				2021				2022			
		1t	2t	1t	2t	3t	4t	1t	2t	3t	4t	1t	2t	3t	4t	1t	2t	3t	4t	1t	2t	3t	4t
Action A1	Proposed	■ ■ ■	■ ■ ■																				
	Actual	▬ ▬ ▬	▬ ▬ ▬																				

PROGRESS DESCRIPTION & RESULTING OUTPUTS

As part of this action a large quantity of scientific articles, other LIFE projects in the same field, French and European regulations, and patents were to be examined.

The updating of the "état de l'art" or State of the Art Report primarily focused on 3 sections: low noise road surfacing (LNRS, or quiet pavements), the albedo effects of road-building materials (cool pavements), and road watering as a countermeasure to the heat island effect.

A summary report was created as a result of this action and annexed to the first report in December 2018.

The new State of the Art Report confirmed certain hypotheses included in the initial project proposal and shed light on the main challenges to be considered (sub-action A1.1). It endorsed the objective of testing road surface overlays, some of which are already used in Paris (with good mechanical properties for a dense urban area), while improving their noise-reducing properties (sub-action A1.2).

Concerning the albedo effect, the study of different techniques used in urban areas showed the potential, as well as the limits, of overly reflective overlays (which result in dangerous blinding effects) and of overly costly solutions (such as systematically painting dark road surfaces a lighter colour). The State of the Art Report thus endorsed the decision to look for a balanced solution: finding overlays that are light-coloured but not too white while managing costs and thus excluding high maintenance techniques whose costs rise over time.

Concerning road watering, the updated State of the Art Report set out the real impact it can have on the heat island effect. For the LIFE project, the challenge is primarily to calculate and control the costs (workforce) and resources (non-potable water) available for watering, in terms of the project's initial objectives.

Overall, the updated State of the Art Report confirmed the innovative nature of this project, because there is no other project seeking to improve noise-reducing, thermal and mechanical performance at once.

The completion of this action thus enabled progress to be made on other actions, notably on the overlay formulas and their roll out (actions B1 and B2).

PROBLEMS & RISKS

The action met with no particular problems and no delays.

DELIVERABLES	FORESEEN DEADLINE	ACTUAL DEADLINE	OTHERS
D-A1.a Rapport d'état de l'art du projet actualisé	**09/2017**	**09/2017**	**ANNEXE 1 of the 1st progress report (2018)**

A. PREPARATORY ACTIONS

A2. EVALUATION PLAN-ACTUALIZED IN 2019

ÉLABORATION DU PLAN D'ÉVALUATION DE L'IMPACT ENVIRONNEMENTAL – ACTUALISÉ EN 2019

RESPONSABLE : **City of Paris**

STATUS of the action : **COMPLETED**

FORESEEN START date : **07/2017**	ACTUAL START date : **07/2017**
FORESEEN END date : **03/2018**	ACTUAL END date : **11/2018**

PROGRESS TIME SCHEDULE

Actions/sub-actions		2017		2018				2019				2020				2021				2022			
		1t	2t	1t	2t	3t	4t	1t	2t	3t	4t	1t	2t	3t	4t	1t	2t	3t	4t	1t	2t	3t	4t
Action A2	Proposed	▪▪▪	▪▪▪	▪▪▪																			
	Actual	▬▬	▬▬	▬▬	▬▬	▬▬	▬▬																

PROGRESS DESCRIPTION & RESULTS OUTPUTS

This action aimed to define the measuring methods and sampling frequency to be used to evaluate the project's relevant indicators, in particular noise levels, thermal impact, and the durability of the materials (Plan d'instrumentation - sub-actions A2.1 and A2.2). The aim was then to define the methodology for cross-referencing and analysing the data collected (Plan d'exploitation - sub-action A2.3). The action led to the creation of a summary report which includes the Plan d'instrumentation and the Plan d'exploitation (deliverable D-A2.a Plan d'évaluation - sub-action A2.4).

This action defined the measuring materials and frequency. All the measurements aim to assess the new road surfaces against a reference road surface:

- **CPX measurements for roadway noise:** the Renault ZOE Life electric vehicle equipped with microphones and an optical speed sensor, meteorological station. Method: Measurements to be taken every year during summer in both traffic directions at speeds of 30 and 50 km per hour.
- **Façade noise measurement:** sonometer class 1, brand RION, model NL52; transfers the date to the Bruitpartif servers by mobile network. Method: station installed on poles 4m above ground, continuous measurement; calculation of sound levels LAeqT; indicators: Lden, LA90, LA50, LA10; Harmonica index.
- **Other audio-digital recordings:** Head Acoustic Squadriga binaural recording system. Method: measurements taken inside the vehicle once per year under equivalent climatic and traffic conditions.
- **Thermal and microclimatic measurement:** thermal measuring stations (temperature, wind, humidity, black globe temperature, net radiation). Heat flux sensors in the road surface (flux and temperature) Albedo measurements of the road surface overlay. Method: continuous measurement at 1.5m and 4m throughout the year; UTCI index. Continuous measurement at a depth of 5cm on road surfaces.
- **Durability measurement:** macrotexture (PMT) and microtexture (SRT) measurement every year; ROMEO deterioration index.

The completion of this action primarily means that the instruments on the pilot sites can be managed effectively, in particular, in terms of locating the measuring stations (action B2). The action also underpins the reasoning behind the replication strategy (action B3, not yet begun). Lastly, it is an indispensable action, and is the operational and methodological basis for monitoring the environmental impact (action C1). The action is also important for monitoring the socio-economic impact (action C2, not yet begun).

PROBLEMS & RISKS

There were no particular issues encountered in drawing up the Plan d'instrumentation and it was finished on schedule.

However, the Plan d'exploitation was significantly delayed, notably due to:

- the delay in making a final choice of pilot sites (for details see action B2)
- the departure of one person linked to the project employed by the City of Paris (L. Chaventon) who worked at the LEM and determined some methodology aspects.

The late completion of this action did not cause any particular delays on other actions. On the contrary, delays on this action were caused by delays on other actions (notably action B2).

The risk raised for the action falls under RISK 7 (risk related to respecting project schedule) was identified in the original application, which allowed a possible delay during year 1 of the project. However, the original risk cited reasons that were almost exclusively technical (e.g. the completion of roadworks) and did not expect an "administrative risk" related to a change in staff (e.g. departure of staff members working on the project). However, this ultimately proved to be a major risk here, as it did other actions.

Several problems occurred on the sites Lecourbe and Frémicourt regarding the thermal and microclimatic monitoring, due to climatic risks (RISK 1) and public works problems:

- Frémicourt: after the station break at the end of July 2017, the weather was bad and the summer of 2018 was devoted to public works on the street.
- Lecourbe: the station could be put up only a week before the beginning of the works. Unfortunately there was a problem of battery and few data were obtained that week

Consequently, for these 2 sites, the initial state could not be studied.

In the absence of an initial state, only the cooling effect of watering can be determined for Lecourbe and Frémicourt streets by a statistical test.

On the other hand, for rue de Courcelles, using the initial condition and the measures acquired after the works, the impact of the new pavement itself can be determined. If the roadway is watered, we can then determine the cooling effects of watering together with the effects of the new material. Using only post-work measurements for rue de Courcelles, a comparison of watered and non-watered days will allow us to isolate the effects of watering alone, like Lecourbe and Frémicourt streets. Statistically significant maximum and average impacts in terms of reduction in temperature and thermal stress can then be estimated.

Finally, since the implementation of the innovative coating took place during the summer of 2018 for each of the sites, no zero state could be measured for the thermal part, the measurements taking place exclusively in summer. The first measurements therefore took place during state "1". However, regarding the microclimatic evaluation, this is not annoying, because the life of the materials is about 20 years. This means that they can still be considered "new". Furthermore, this period of time will allow the coatings to become "dirty", which will make the measurements more representative of the actual action of the coatings. Finally, a beneficial impact is expected due to the light color of the coatings, the latter only appearing after slight surface wear of the materials.

Therefore, the "plan d'évaluation" has been updated in august 2019 in order to take into account the major deviations from the original methodology and annexed to this report.

DELIVERABLES	FORESEEN DEADLINE	ACTUAL DEADLINE	OTHERS
D-A2.a **Plan d'évaluation actualisé**	**03/2018**	**11/2018**	**Update : 08/2019** **Deliverable annexed to this mid-term report**

B. IMPLEMENTATION ACTIONS

B1. FINAL FORMULATION REPORT

FORMULATION DES ENROBÉS

RESPONSABLE : **Colas**

STATUS of the action : **COMPLETED**

FORESEEN START date : **07/2017**	ACTUAL START date : **07/2017**
FORESEEN END date : **04/2018**	ACTUAL END date : **11/2018**

PROGRESS TIME SCHEDULE

Actions/sub-actions		2017		2018				2019				2020				2021				2022			
		1t	2t	1t	2t	3t	4t	1t	2t	3t	4t	1t	2t	3t	4t	1t	2t	3t	4t	1t	2t	3t	4t
Action B1	Proposed	■	■	■	■	■	■																
	Actual	▬	▬	▬	▬	▬	▬																

PROGRESS DESCRIPTION & RESULTING OUTPUTS

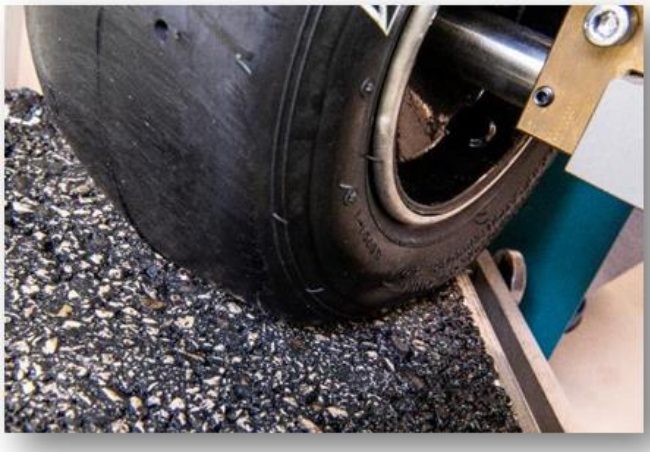
This action involved studying road surface formulas for use on the pilot sites. As such, the action consisted of:

- a period of laboratory tests carried out by the companies Colas and Eurovia with the cooperation of LEMVP (sub-actions B1.1, B1.2 and B1.3);
- several Technical Committee meetings on formulas (see deliverable D-E1.a "Compte rendu des comités - année 1");
- three days dedicated to industrial manufacturing and the implementation of the pre-selected formulas (sub-action B1.3).

The action resulted in the creation of a summary document (deliverable D-B1.a "Rapport final de formulation des trois enrobés bitumineux développés", sub-action B1.4).

The formulas selected and used as a result of this work were:

- **Formula BBphon+** (Colas): Increases the mechanical effectiveness of low noise road surfacing (LNRS), despite some loss in the quality of noise reduction. The formula chosen was number F16 with light-coloured aggregates, a hydrated lime filler and the highest acoustic absorption coefficient for the thickness applied.
- **Formula SMAphon** (Colas): Reduces noise on an existing mechanically resistant overlay, despite some loss in durability. The formula selected was number F9, which includes light-coloured aggregates, but in a reduced proportion of 6/10 to enhance the overlay's homogenous aspect.



- **Formula PUMA** (Eurovia): Improves surface water retention while limiting the creation of contact noise by working on the asphalt's texture. The formula selected was number F10 which includes light-coloured aggregates, notably granusil and puzzolana, which are able to retain water. This solution is durable thanks to the anti-

rutting BB0/6 agent + PUMA system.

The completion of the formula studies for the new overlays was a fundamental milestone in the project. From an operational point of view, the completion of this action enabled action B2, in particular, to start, which involved laying the overlays on the pilot sites. The action's results also underpin the arguments in the replication strategy (action B3, not yet begun) and the After-Life Plan (action E2, not yet begun).

PROBLEMS & RISKS

The action fell behind schedule as a result of the technical committee's decision to carry out complementary ICU tests to improve the choice of the formulas at the LEMVP from June to July 2018. This was a considered decision, regarding the delays in setting up the pilot sites.
Late completion of this action did not cause any particular delays on other actions (action B2 concerning the setting up of the pilot sites was already behind schedule for other reasons). A RISK 2 (technological risk) has not yet, therefore, been flagged.

DELIVERABLES	FORESEEN DEADLINE	ACTUAL DEADLINE	OTHERS
D-B1.a **Rapport final de formulation des 3 enrobés bitumineux développés**	**04/2018**	1st VERSION : **07/2018** 2nd VERSION : **11/2018**	**ANNEXE 3 of the 1st progress report (2018)**

B. IMPLEMENTATION ACTIONS

B2. PILOTE SITES INSTALLATION

INSTALLATION DES SITES PILOTES

RESPONSABLE : **City of Paris**

STATUS of the action : **IN PROGRESS**

FORESEEN START date : **07/2017**	ACTUAL START date : **07/2017**
FORESEEN END date : **06/2022**	ACTUAL END date : **06/2022**

PROGRESS TIME SCHEDULE

Actions/sub-actions		2017		2018				2019				2020				2021				2022			
		1t	2t	1t	2t	3t	4t	1t	2t	3t	4t	1t	2t	3t	4t	1t	2t	3t	4t	1t	2t	3t	4t
Action B2	Proposed																						
	Actual																						

PROGRESS DESCRIPTION & RESULTING OUTPUTS

This action involved choosing and setting up the pilot sites. To date, this involved:

- the key action of identifying the urban development operations and roadworks already underway in the City of Paris;
- selecting feasible sites according to the technical criteria set out in the application (sun exposure, absence of vegetation, slope of the road, noise levels, absence of asbestos, etc);
- negotiating between the various departments of the City of Paris, elected offices and district mayors to make a definitive choice of sites; and
- the major work of coordinating roadworks, taking the LIFE project forward, fitting the measuring instruments and laying the road surfaces.

This action resulted in the creation of a document on the structural condition of the initial road supports (deliverable D-B2.a "Rapport sur l'état structurel des supports", sub-action B2.1), a document concerning the road surfacing options and laying them (deliverable D-B2.b "Plan de contrôle qualité sur la conformité des produits et de la pose", sub-actions B2.3-4), the creation of measuring stations (deliverable D-B2.c "Postes de comptage et capteurs thermiques", sub-action B2.2).

The action resulted in the equipment of the following 3 sites being selected:

- **Rue de Courcelles**, 8th district: laying of overlay BBPhon+ (Colas) ; site works from 18 to 24/10/ 2018;
- **Rue Frémicourt**, 15th district: laying of SMAPhon (Colas) ; site works from 8 to 11/10/2018
- **Rue Lecourbe**, 15th district: laying of PUMA (Eurovia) ; site works from 10/09 to 26/10/2018

We made some analysis to make sure that the pavement structure won't modify the performance of durability of the innovative asphalt mixes. Therefore, we had to know which materials were in place to decide if each site was able to be choosing for the project and if some road works were necessary. The results of the analysis let us defining the follow road works:

Courcelles street (8th district)

- 1st Zone (from Daru street to Hoche street): no additional road works needed.
- 2nd Zone (from Murillo street to Lisbonne street): no additional road works needed.
- 3rd Zone (from Lisbonne street to Monceau street): Pouring areas in concrete foundation.

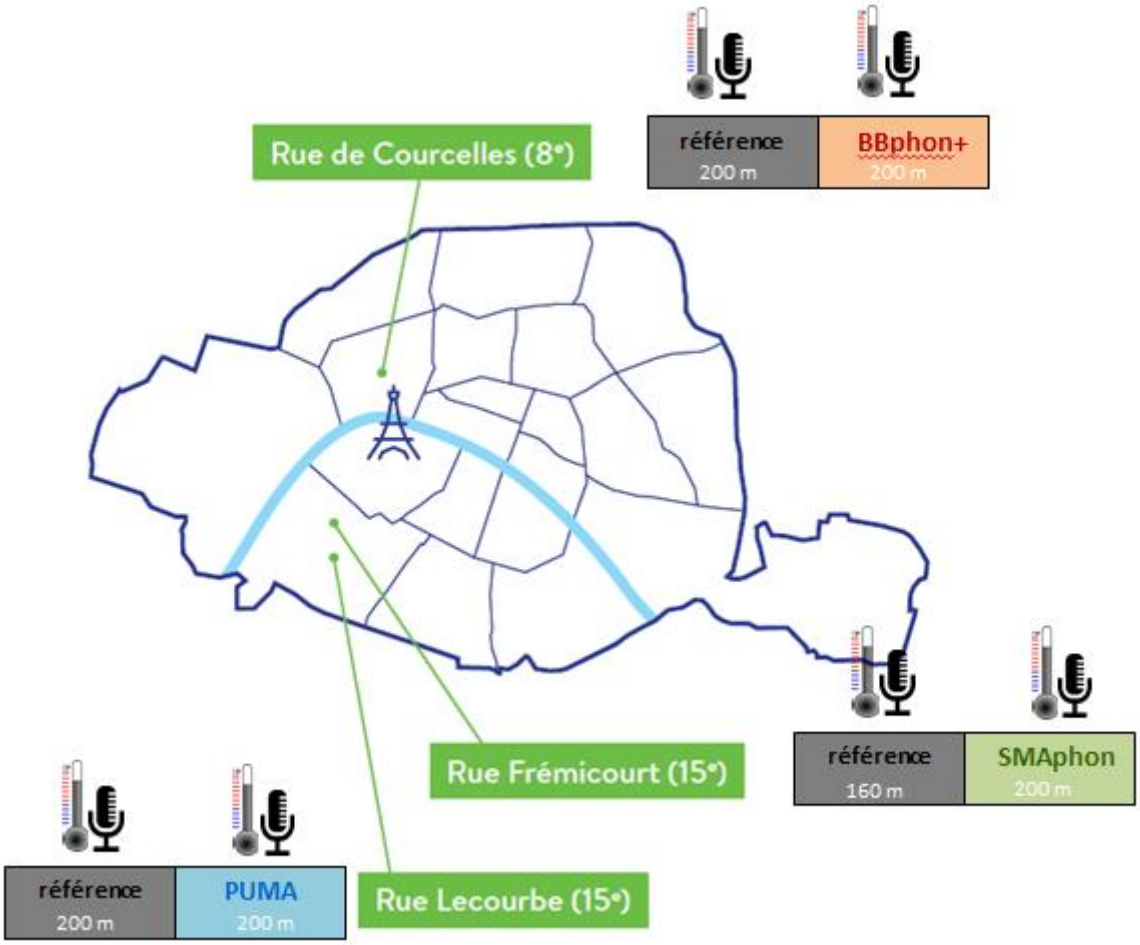
Frémicourt street (15th district)

- 1st Zone (from Commerce street to Letellier street): no additional road works needed.
- 2nd Zone (from Letellier street to Cambronne Square): Complete restructuring of the street, planned during the general urban planning.

Lecourbe street (15th district)

- 1st Zone 1 (from Javel street to Convention street): no additional road works needed.
- 2nd Zone (from Lecocq street to Convention street): Crack bridging if necessary.
- 3rd Zone (from Abbé Groult street to Lecocq street): Pouring areas in concrete foundation.

These 3 sites have now been fully installed. For each, a new overlay and the classic reference road surface have both been laid and measuring stations created.
In addition to the experimental monitoring carried out during the measurement campaigns, we decided to add thermal cameras to counting continuously the number of vehicles and their real speed. The Thermicam solution has the advantage of allowing any modification of the counting zones in an easier way (especially in the case there are some subsequent recalibrations of the roadway to do). Moreover, to control the thermal performances of the new asphalts, 5 thermal sensors are installed directly in the road pavement (2 for Courcelles street, 2 for Lecourbe street, 1 for Frémicourt street).
This action is a fundamental step that underpins the completion of the entire project. The completion of this action notably allows any environmental impact to be monitored through measurement reports created after laying (action C1), and through the monitoring of the socio-economic impact of the final study report (action C2, not yet begun). It also influences the schedule and content of the communication dissemination and networking strategy of the project (action D1).



PROBLEMS & RISKS

The action was subject to fairly significant delays due to the difficulty in finding the 3 definitive sites. This was mainly due to:

- difficulties in finding urban development or large maintenance operations on sites that met all the criteria at once in terms of work schedule, technical characteristics and commitment of the district mayors;
- the occurrence of additional technical problems once a site was selected (for example: unanticipated presence of asbestos; unanticipated delays in the planned roadworks, cancellation of a urban development operation meant to support one site)
- delays in recruiting a project manager within the City of Paris;

The delays on this action caused delays for other actions (actions A2, C1, D1).

Delays to this action led to several risks.

RISK 2 (technological risk) occurred: however, it did not concern the formula of overlays but the difficulty in finding pilot sites that met all the relatively demanding criteria.

The thermo-fluxmeter sensor in Frémicourt street has been vandalized at the beginning of 2019, which means repercussions on the data of the action C1, because no reliable data was measured during the summer of 2019 for heat flow and pavement temperature.

RISK 3 (political risk) occurred: however, while the risk was largely focused on anticipating the reticence of local district mayors, in reality, it was caused by a complex two-way negotiation between the City of Paris and the district mayors.

RISK 7 (risk related to respecting project schedule) occurred, primarily due to the obligation to adapt to existing urban development operation schedules for planned roadworks.

Lastly an "administrative risk", that the project had not initially anticipated, occurred: the delay in recruiting a project manager within the City of Paris contributed to an accumulated delay on this action, as well as on others.

Significant negotiation work with the district mayors, effective teamwork between different departments in the City of Paris and the recruitment of a project manager, ultimately enabled the 3 sites to be set up. However, some urban development works (building sites, public work for network connections…) external to the LIFE project that may still be underway on the 3 sites and result in further delays or difficulties the assessment part. To anticipate and manage possible delays on the action, the LIFE project must adapt as far as possible to the urban development work planned on the sites.

DELIVERABLES	FORESEEN DEADLINE	ACTUAL DEADLINE	OTHERS
D-B2.a **Rapport sur l'état structurel des supports**	**03/2018**	**07/2018**	**ANNEXE 4 of the 1st progress report (2018)**
D-B2.b **Plan de contrôle qualité sur la conformité des produits et de la pose**	**12/2018**	**12/2018**	**ANNEXE 5 of the 1st progress report (2018)**
D-B2.c **Postes de comptage et capteurs thermiques**	**12/2018**	**12/2018**	**ANNEXE 6 of the 1st progress report (2018)**

B. IMPLEMENTATION ACTIONS	
B3. REPLICABILITY AND TRANSFERABILITY STRATEGY *STRATÉGIE DE RÉPLICABILITÉ ET TRANSFÉRABILITÉ*	
RESPONSABLE : **Eurovia**	
STATUS of the action : **NOT STARTED YET**	
FORESEEN START date : **10/2020**	ACTUAL START date : **NOT STARTED YET**
FORESEEN END date : **06/2022**	ACTUAL END date : **NOT STARTED YET**

C. MONITORING OF THE IMPACT OF THE PROJECT ACTIONS

C1. MONITORING AND MEASURING THE ENVIRONMENTAL IMPACT

SUIVI ET MESURE DE L'IMPACT ENVIRONNEMENTAL

RESPONSABLE : **Bruitparif**

STATUS of the action : **IN PROGRESS**

FORESEEN START date : **07/2017**	ACTUAL START date : **07/2017**
FORESEEN END date : **06/2022**	ACTUAL END date : **06/2022**

PROGRESS TIME SCHEDULE

Actions/sub-actions		2017		2018				2019				2020				2021				2022			
		1t	2t	1t	2t	3t	4t	1t	2t	3t	4t	1t	2t	3t	4t	1t	2t	3t	4t	1t	2t	3t	4t
Action C1	Proposed																						
	Actual																						

PROGRESS DESCRIPTION & RESULTING OUTPUTS

This action involves implementing operational monitoring of the various performance indicators defined for the project (noise level, thermal performance, physical and geometrical durability, energy savings and water consumption) in order to evaluate the environmental benefits of the project. The monitoring is possible because of the creation of several measuring stations and the specifications set out in the Plan d'évaluation (action A2, **deliverable D-A2.a**).

The analysis of the various data from the sensors was consolidated between September and November 2018 resulting in the deliverable D-C1.a Rapport de mesures des performances avant pose des revêtements (état initial, sub-action C1.1).

Indicator monitoring is to be carried out in relation to two references:

- monitoring over time with reference to the initial conditions (comparison of indicators taken on the sector with the new overlays as compared to the existing road surfaces before they were laid)
- relative monitoring that compares indicators from the new overlays to indicators from the reference surfaces over the same period.

The action began by defining the initial conditions: indicator measurements were taken for the road surface before the overlays were laid. Various sensors (meteorological stations, thermal sensors, fixed noise monitoring stations) had to be installed beforehand as did embedded CPX controllers for measuring roadway noise, for audio-digital recording and for measuring the mechanical properties on site.

The periods of analysis for defining the initial conditions varied from site to site (sub-action C1.2). The parameters to be measured also varied. This was caused by the time required to select the pilot sites, the progressive fitting of the sensors and the launch dates for the work of laying the overlays, which differed for each site. There were no major obstacles in defining the initial conditions for noise and mechanical measurements. However, the thermal and microclimatic measurements were more complex.

For rue de Courcelles, many usable measurements were taken during summer 2018.

For rue Frémicourt, measurements were taken during August 2017, but not during summer 2018 (the measuring station had to be replaced because of urban redevelopment work being carried out). For this site, therefore, data for the year 2017 will have to be used as reference (unfortunately, August 2017 was particularly overcast and rainy in Paris, so only two days' data can be used).

Lastly, no measurements were taken for rue Lecourbe, due to the delays in choosing this pilot site and a further delay in fitting the meteorological stations. To overcome these problems and define the initial conditions regardless, we have carried out supplementary laboratory analysis (deliverable D-A2.a "Plan d'évaluation actualisé").

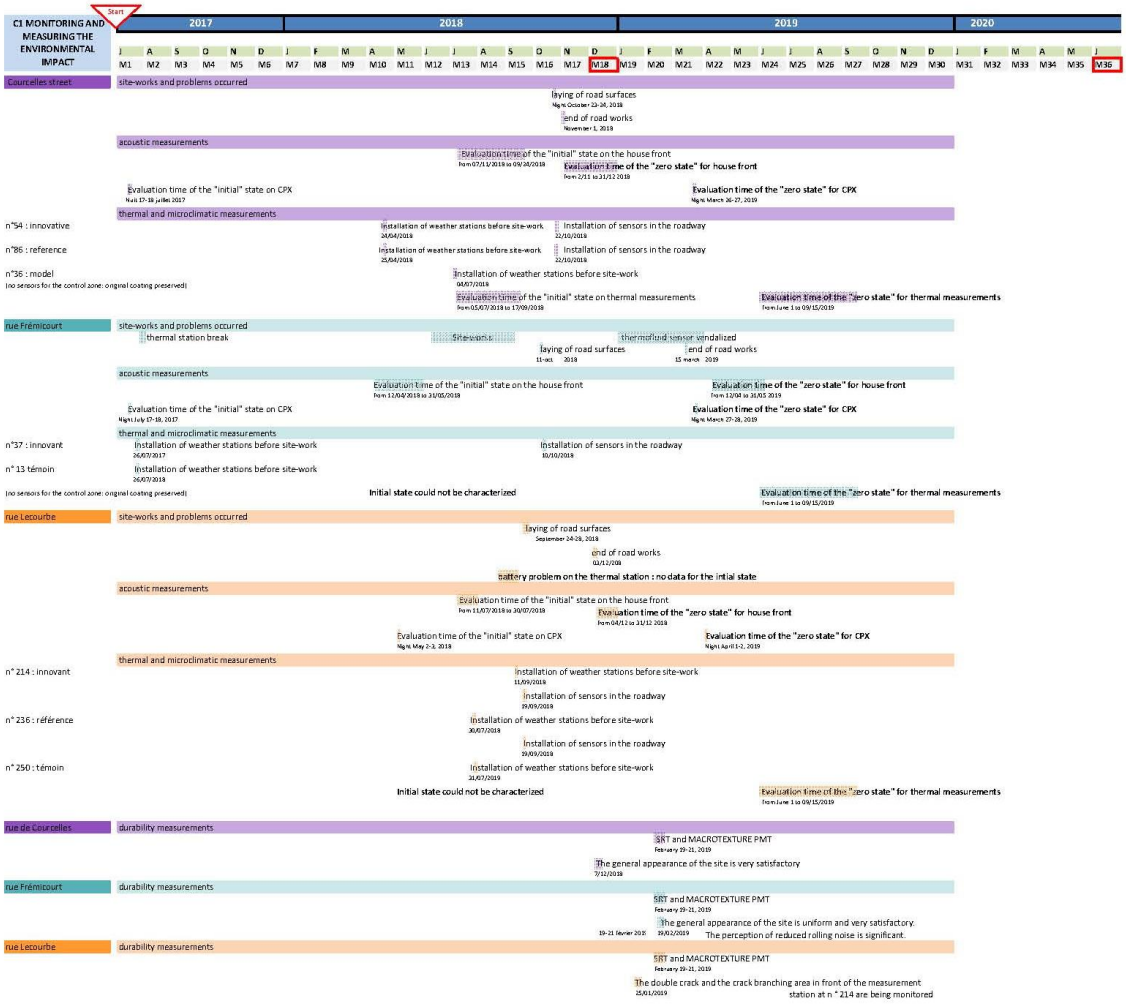
Because of the delay in completing the D-C1.a Rapport de mesures de performances avant pose des revêtements (état initial), the D-C1.b Premier rapport de mesure après pose des revêtements (état zéro) (i.e. the measurements taken immediately after the laying of new road surfaces) has also been delayed and modified (sub-action C1.3). The choice of the sites was behind schedule, so they were fully installed in October 2018. This means that assessing the performance of the overlays just after laying ("état zéro" or initial conditions), initially planned for the summer period, was not fully possible. The winter meteorological conditions do not allow acoustic CPX measures to be taken (due to rain and wet road surfaces), and thermal measurements cannot be taken either (as the summer period is over). Only noise measurements on housing façades will give us genuine initial conditions.

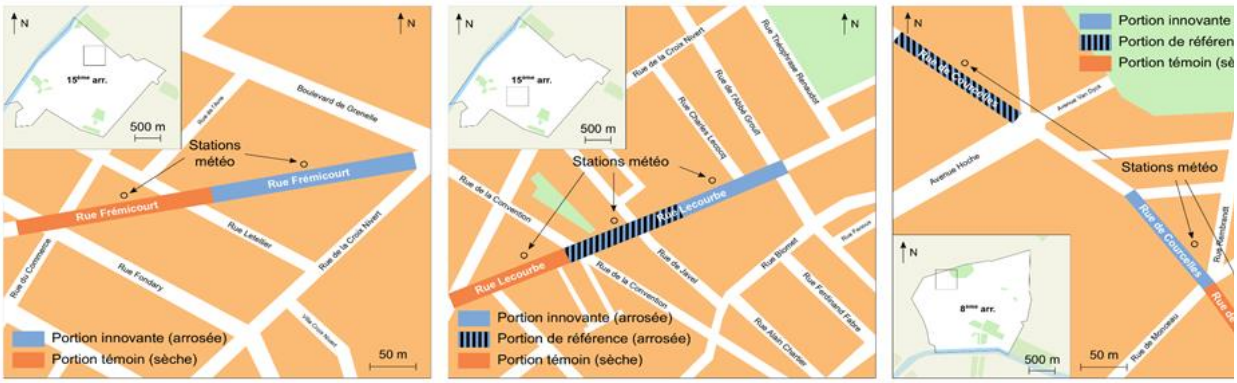
For these reasons, we decided to merge the initial deliverables D-C1.b and D-C1.c in the "Premier rapport de mesure après pose", finalized in march 2020 D-C1.b.
This deliverable presents exclusively the results of the evaluation of the "zero state", corresponding to the situation just after the installation of the new asphalt mix and the standard asphalt mix : it collects evaluations carried out in spring/summer 2019, i.e. just a few months after the overlays were laid. During the day, the acoustic performance of the road surfaces is hidden by other acoustic sources, that doesn't mean that it doesn't exist.

Evaluation of performances

Pilot site	Rolling noise reduction in dB(A) (* with temperature correction)			Microclimatic impact of watering					Thermal impact of watering		Mechanical	
	Δ	Facade (LA10 night)	CPX (50 km/h)	Zone	Air temperature at 1,5m (°C)		UTCI At 1,5m (°C)		Average reduction of the temperature amplitude at - 5 cm (°C)	Drying time (min)	SRT	MTD
					Mean	Max	Mean	Max				
Frémicourt (SMAphon)	Compared to initial	-4,3*	-4,4	SMAphon	-0,4	-1,1	-0,8	-3,0	-	-	67	0,49
	Compared to reference	-2,3	-3,5									
Lecourbe (PUMA)	Compared to initial	-1,2*	-2,1	PUMA	-0,4	-0,8	-0,4	-1,9	- 1,2	22	61	0,57
	Compared to reference	0	-0,1	Reference	-0,4	-1,0	-0,5	-2,0	-2,7	19		
Courcelles BBphon+	Compared to initial	-3,5*	-4,7	BBphon+	-0,4	-1,1	-0,6	-2,9	-4,3	29	68	0,55
	Compared to reference	-2,8	-3,3	Reference	-0,4	-1,2	-0,6	-3,6	-2	26		

Overall, this action primarily serves to enable the entire project to be evaluated (together with action C2 concerning the socioeconomic impact) and thus feeds into action B3 concerning replication strategy (not yet begun).





Rue Frémicourt (15ème arr.) | Rue Lecourbe (15ème arr.) | Rue de Courcelles (8ème arr.)

PROBLEMS & RISKS

This action was very late in starting due to the delays in the pilot-site selection and then in fitting the instruments for the pilot sites (action B2).

Furthermore, issues arose when taking thermal measurements to define the initial conditions on two sites: rue Frémicourt and rue Lecourbe.

Several risks were raised because of this action falling behind schedule.

RISK 1 (climate risk) occurred for the thermal section of rue Frémicourt: while the meteorological stations were fitted as early as July 2017 in rue Frémicourt, practically none of

the data from the site is usable. Indeed, the weather in August in Paris in 2017 was generally rainy and well below normal seasonal levels.
RISK 2 (technological risk) occurred: issues with finding pilot sites according to relatively demanding criteria, issue connecting the noise measuring stations to the electricity network.
RISK 7 (risk related to respecting project schedule), primarily due to existing urban development operation schedules for planned roadworks. In terms of fitting of meteorological stations: the project was behind schedule, notably due to delays in choosing pilot sites, which led to these stations being fitted late in the summer 2018 (August) in rue Lecourbe, however the thermal measuring campaigns should theoretically have begun in July. What is more, the existing roadwork schedules meant the stations had to be removed from rue Lecourbe roughly one week after fitting. None of the data collected during this short period is usable. Similarly, the existing roadwork schedules meant that the equipment in rue Frémicourt had to be removed in June 2018, compromising the thermal campaign planned for summer 2018.
Just as they impacted thermal measuring, the delays in choosing the pilot sites reduced the period for evaluating the initial conditions for housing façade noise, in particular for rue Lecourbe (only 20 days of available usable data). Due to roadworks, the removal of a noise measuring station at 37 rue Frémicourt at the beginning of June 2018 also affected the evaluation of initial conditions for the site.
Some urban development works outside the LIFE project are still underway: to anticipate and manage possible delays on this action, the LIFE project must be adapted as well as possible to the urban development work planned on the sites.

For the watering in summer 2019 the main problems was to find enough workforce and washer machines to assure the scheduled procedure. The solution, agreed with EASME monitoring team NEEMO during their visit in 2019 was to contract a private service. No results concerning the thermal impact of watering at Frémicourt are available. Indeed, the sensor allowing this study was vandalized in spring 2019, preventing us from collecting data in summer 2019.

Watering on Courcelles street, summer 2019

2020 problems are related to the covid-19 crises:
For the acoustic CPX monitoring, a considerable delay RISK 7 (risk related to respecting project schedule) occurred: initially scheduled in march 2020, the test is now planned for

august 2020.
For the acoustic measurements on the facade: data were not representative of normal Parisian road traffic noise during the months of confinement.
Therefore, when calculating the acoustic measurements on the facade in order to extrapolate the advantages due to the innovative coatings, it will be necessary to exclude the abnormal traffic conditions which characterized the sound environment during confinement.

- The months of March, April and May will be excluded from the 2020 annual balance sheet.

However, the acoustic data for these three months will be kept, as data over an exceptional period. They could be useful from a broader perspective. Indeed, these data could be considered valid in circumstances of a city with less dense road traffic with higher traffic speeds (due to less dense traffic) and therefore usable in a view of replicability for the promotion of the LIFE Cool & Low Noise Asphalt project.
Regarding the differences in measurement conditions between the 2019 and 2020 annual reports (with 3 months cut in 2020), it will be necessary to take into account the temperature and road traffic conditions due to seasonality:

- It will be necessary to correct the differences in temperature and traffic through the meteorological and road traffic count data available.

For the thermal and microclimatic survey, depending on the uncertainties for the on-site work of the number of teams sufficient to guarantee watering, two scenarios were planned:

- Scenario 1: Normal watering campaigns
- Scenario 2: Degraded watering campaigns: favor a single site (rue de Courcelles)

A third scenario in the total absence of watering was raised because of the problematic question of the use of drinking water. In this extraordinary situation, to guarantee health in the presence of traces of Covid-19 in non-potable water, any street cleaning activity is currently and necessarily carried out with drinking water. In order not to lose a year of measures for the project, it was unanimously decided that the use of drinking water for watering a route this summer was exceptionally possible. Indeed, the ecological and economic impacts remain minimal, given the small amount of water used for experimental purposes.

Concerning scenarios 1 and 2, coordination between private and public remains a point of vigilance. To reconduct the organization of 2019, we must consider :

- The availability of private road washers and drivers
- The availability of cleaning agents from the City of Paris

For the year 2020, in order to overcome the difficulties caused by the Covid-19 health crisis (workers' availability, extra work of disinfection, safety procedures…), it is planned to draw up specifications for a complete outsourcing. It is also agreed that because of the summer overload of cleaning agents from the City of Paris, we have to find a lasting solution for the next years:

- After further verification, the existing contract for the provision of pavement cleaning equipment also makes it possible to provide a cleaning agent.
- The service for 2020 (and subsequent years) will therefore be fully entrusted to a private company.

A full analysis of the covid-19 impact on the project can be found in deliverable E1.2-3 which report all the Steering committee reports, included the last one "COPIL 6.5 extraordinaire" dedicated exclusively to this.

DELIVERABLES	FORESEEN DEADLINE	ACTUAL DEADLINE	OTHERS
D-C1.a **Rapport de mesures des performances avant pose des revêtements (état initial)**	**04/2018**	**11/2018**	**ANNEXE 7 of the progress report (21/12/2018)**
D-C1.b **1er rapport de mesures après pose des revêtements**	**12/2018**	**03/2020**	**Annexed to the present report**
D-C1.c **2ème rapport de mesures après pose**	**10/2020**	**10/2020**	
D-C1.d **3ème rapport de mesures après pose**	**10/2021**	**10/2021**	
D-C1.e **Rapport final**	**06/2022**	**06/2022**	

C. MONITORING OF THE IMPACT OF THE PROJECT ACTIONS

C2. MONITORING THE SOCIO-ECONOMIC IMPACT

SUIVI DE L'IMPACT SOCIO-ÉCONOMIQUE

RESPONSABLE : **Bruitparif**

STATUS of the action : **IN PROGRESS**

FORESEEN START date : **10/2019**	ACTUAL START date : **10/2019**
FORESEEN END date : **06/2022**	ACTUAL END date : **06/2022**

PROGRESS TIME SCHEDULE

Actions/sub-actions		2017		2018				2019				2020				2021				2022			
		1t	2t	1t	2t	3t	4t	1t	2t	3t	4t	1t	2t	3t	4t	1t	2t	3t	4t	1t	2t	3t	4t
Action C2	Proposed																						
	Actual																						

PROGRESS DESCRIPTION & RESULTING OUTPUTS

Part 1: **Comparative analysis of the cost of new mixes for a building owner or a road manager compared to other types of coatings** (Colas, Eurovia, City of Paris)
Starting October 2019

- Estimate of the additional economic cost of producing innovative asphalt
- Estimated additional cost or savings in maintenance / renewal over a period of 30 years

Part 2: **Determination of the benefits observed in connection with the reduction of noise** (Bruitparif)
Starting October 2020

- Health impact linked to the reduction in exposure to road noise (estimate of the DALY indicator)
- Indirect economic impact linked to improved quality of life (DALY cost)
- Estimated generalization at 5% and 100% of Parisian roads
- Direct economic impact in terms of real estate valuation
- Improved productivity at work
- Attractiveness for soft mobility (travel on foot or by bike) → reduction of air pollution, development of commercial activities
- Cost / efficiency compared to other solutions (soundproofing of glazing, etc.)

Part 3: **Determination of the benefits observed in connection with the reduction of the urban heat island phenomenon and adaptation to heat waves** (City of Paris)
Starting October 2020

- Indirect economic impact linked to the improvement of the comfort of residents, workers and passers-by as temperatures rise, in connection with the albedo effect of new coatings
- Health impact (discomfort, sleep disturbances, etc.)
- Estimated generalization at 5% and 100% of Parisian roads
- Improved productivity at work
- Reduction in the operation of air conditioning systems
- Indirect economic impact on energy consumption on public lighting (clarity of coatings)
- Attractiveness for soft mobility (travel on foot or by bike) → reduction of air pollution, development of commercial activities
- Cost / efficiency compared to other solutions (increased vegetation in the city, shade created by mobile structure, etc.)

PROBLEMS & RISKS The start of part 1 was slowed down because of the priority occurrences concerning action B1 (studding rue Lecourbe) and C1 (first year of measurements after installation), as well as because of the difficulty in organizing meetings during the covid-19 crisis. The action has no other particular problems or delays.

DELIVERABLES	FORESEEN DEADLINE	ACTUAL DEADLINE	OTHERS
D-C2.a **Rapport d'étude des impacts socio-économiques**	**06/2022**	**06/2022**	

D. PUBLIC AWARENESS AND DISSEMINATION OF RESULTS

D1. COMMUNICATION AND DISSEMINATION

COMMUNICATION ET DISSÉMINATION

RESPONSABLE : **City of Paris**

STATUS of the action : **IN PROGRESS**

FORESEEN START date : **07/2017**	ACTUAL START date : **07/2017**
FORESEEN END date : **06/2022**	ACTUAL END date : **06/2022**

PROGRESS TIME SCHEDULE

Actions/sub-actions		2017		2018				2019				2020				2021				2022			
		1t	2t	1t	2t	3t	4t	1t	2t	3t	4t	1t	2t	3t	4t	1t	2t	3t	4t	1t	2t	3t	4t
Action D1	Proposed	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■		
	Actual	■	■	■	■	■	■	■	■	■	■	■	■										

PROGRESS DESCRIPTION & RESULTING OUTPUTS

This action aims to widely communicate and disseminate the project.

Since the project launch :

- several communication tools have been created, notably the logo and project's graphic identity and style guide, explanatory panels in the public areas (sub-action D1.2.1-2);
- the website has been activated and is updated regularly: https://www.life-asphalt.eu (sub-action D1.2.3);
- A biannual newsletter brings together the news in a mail distributed to the contact list (sub-action D1.2.3);
- The partners have already participated in several events (professional conferences and scientific symposiums) and many others are being planned (conferences and scientific articles) (sub-action D1.1);
- the project was publicly launched on the 15th October 2018;
- the first meeting of the Scientific Committee (COSCI) and Stakeholder Committee (COSTA) was held on the 18th October 2018
- the second meeting of the Scientific Committee (COSCI) and Stakeholder Committee (COSTA) was held on the 18th October 2019
- in order to expand the national and international project network, we have a list of exchanges with similar projects, and consider the advisability of including technical and scientific managers during our events.

To meet the objectives, the City of Paris launched 2 public consultations, and appointed 2 partners to assist with communications actions (for graphic design and organising events). The action led to the creation of an annual report, the **Bilan des actions de networking, dissémination et communication**, which describes the progress of these actions per year. For this mid-term report, we decided to merge the deliverables D-D1.e (year 2) and D-D1.f (year 3) in order to deliver a more organic document clearly updated until May 2020. Other actions (actions A1, A2, B1, B2, C1, C2) all feed into this action, highlighting the key milestones of the project at different times and to different audiences. The smooth implementation of this action will help in preparing the After-Life Plan (action E2, not yet begun).

The 3 main events were successfully carried out, and in particular inauguration event had a strong impact on French newspapers, and reached a mainstream public. Second COSCI&COSTA event was satisfactory for the scientific and technical discussion with the project international partners, and a video was produced in order to be diffused on the website.

7 national and 4 international conferences were done from the project start, while 7 national and 6 international conferences are foreseen for the next years; 8 scientific articles have been published. Furthermore three main networking track have been detected: with the Parisian Oasis schoolyards project in order to reinforce internal municipal activities; with the HEATLAND project in order to organize mutual visits on each project and discuss our respective results; with Barcelona municipality and the 'Cool Towns' Interreg 2seas, which are both highly interested in our results, respectively on acoustic and thermal aspects.

PROBLEMS & RISKS

The action was subject to quite significant delays because of:

- the recruitment of a project manager within the City of Paris, which delayed the production of the main communication tools (including the website)
- delays in the choice of pilot sites (action B2), which led to a significant delay in the creation of explanatory panels on the pilot site, the public inauguration of the sites and the first meetings of COSCI and COSTA.

The delays on this action did not cause any particular delays to other actions.

RISK 7 (risk related to respecting project schedule) occurred, but more for reasons linked to the "administrative risk", including the delays in recruiting a project manager.
At this stage, all the communication tools have been produced.

Municipal elections 2020:
Following the rule on the electoral reserve period in France, which prohibits public authorities from carrying out communication actions during the six months preceding an election, we are in fact prevented from communicating on the project for all that concerns actions' valorization.

COVID-19 health crisis :
In addition to the electoral reserve period, we had to face a state of national quarantine from March 17, 2020. During this period several consequences impacted the project (technical, administrative, events, dissemination). The lack of precise information on the resumption of activity still does not allow us to have a clear idea on the possible events in 2020, namely when will it be possible to create events, how many maximum people would be possible welcome, what sanitary measures will be mandatory.

Participation in conferences for the year 2020 is also limited due to the reschedule of many scientific and technical events.

However, several networking, communication and dissemination activities were carried out during the 2nd and 3rd year of the LIFE project: media, congress and events have been organized.

We also encountered difficulties in the contract with "Le Bonbon" for events. Indeed, the service provider did not respond to requests from the City of Paris and the deliverables delivered for the supervision of actions over time were of poor quality.
For this, two actions have been implemented:

- a formal letter to Le Bonbon to notify their default;
- a positive assessment of the possibility of internalizing communication.

The option of handling directly communication for events and the event itself is discussed in COPIL with all the partners. The internalisation would be taken care of by the City of Paris,

and it would include a valuation in staff expenses.			
DELIVERABLES	FORESEEN DEADLINE	ACTUAL DEADLINE	OTHERS
D-D1.a **Plan de communication et de dissémination incluant la charte graphique**	**12/2017**	**10/2018**	**ANNEXE 8 of the progress report (21/12/2018)**
D-D1.b **Site internet**	**12/2017**	1st VERSION (landing page) : **10/2018** 2nd VERSION : **12/2018**	
D-D1.c **Installation des panneaux d'affichage sur sites pilotes**	**12/2018**	**12/2018**	
D-D1.d **Bilan des actions de networking, de communication et dissémination - année 1**	**06/2018**	**11/2018**	
D-D1.e **Bilan des actions de networking, de communication et dissémination - année 2**	**06/2019**	**05/2020**	• **Merged in D1.5-6** • **Annexed to the present report**
D-D1.f **Bilan des actions de networking, de communication et dissémination - année 3**	**06/2020**		
D-D1.g **Bilan des actions de networking, de communication et dissémination - année 4**	**06/2021**	**06/2021**	
D-D1.h **Bilan des actions de networking, de communication et dissémination - année 5**	**06/2022**	**06/2022**	
D-D1.i **Layman's report**	**06/2022**	**06/2022**	

E. PROJECT MANAGEMENT

E1. PROJECT MANAGEMENT BY THE CITY OF PARIS

GESTION DE PROJET PAR LA VILLE DE PARIS

RESPONSABLE : **City of Paris**

STATUS of the action : **IN PROGRESS**

FORESEEN START date : **07/2017**	ACTUAL START date : **07/2017**
FORESEEN END date : **09/2022**	ACTUAL END date : **09/2022**

PROGRESS TIME SCHEDULE

Actions/sub-actions		2017		2018				2019				2020				2021				2022			
		1t	2t	1t	2t	3t	4t	1t	2t	3t	4t	1t	2t	3t	4t	1t	2t	3t	4t	1t	2t	3t	4t
Action E2	Proposed																						
	Actual																						

PROGRESS DESCRIPTION & RESULTING OUTPUTS

The action allowed for: organising a series of meetings, creating several project monitoring tools (excel tables, Gantt charts etc.), contacting the various members of the committees (excluding Partners on the Steering Committee), communicating regularly with the project Partners, and exchanging information with NEEMO.

The action has resulted in the creation of an annual document summarising the minutes of the various committees (deliverable Compte-rendu comités année 1, 2, 3). For this mid-term report, we decided to merge the deliverables C1.2 (year2) and C1.3 (year 3) in order to deliver a more organic document clearly updated until May 2020.

Since project launch, 7 COPIL meetings have been held at six monthly intervals as planned. The detail of the discussions (minutes) are reported in **the deliverable E1.2-3 annexed to this report**.

Besides the COPIL meetings, other meetings have been organised between on technical aspects and monitoring the progress on specific implementation's actions :

- 17 Technical Committee meetings on overlay formulas (action B.1) ;
- 8 other Technical Committee meetings on other subjects (e.g. sensors);
- 3 days devoted to industrial manufacturing trials;
- 17 Pilot Site Monitoring Committee meetings, once the formulas were defined and installation begun (action B.2);
- 8 meetings on communications strategy (action D.1);
- 2 meetings on the administrative and financial aspects of the project with all the partnerships. Bilateral meetings have also been held several times with each partner to deal with their specific issues on administrative and financial monitoring;
- 5 audit days with NEEMO;
- 2 meetings with COSCI and COSTA.

To ensure good project management, templates of various documents to be completed were created and shared with all partners (e.g.: timesheets, minutes for meetings, lists of those present at meetings etc.).

A shared online space has also been created (GoogleDrive), enabling all the partners to share files and, in particular, allowing a number of partners to work together on the deliverables to be produced.

Milestones were fixed for the partners (including biannual spending reporting), to ensure effective financial monitoring of the project.

The action has enabled progress to be made on all other actions in the project. Project management is currently stable and operating effectively. Methods have now been defined and are being followed by all partners.

PROBLEMS & RISKS

The action was subject to unanticipated and substantial delays and the deliverable Compte-rendu des comités année 1 was produced 4 months late, solely in order to include a detailed schedule up to the date of delivery of the report. This facilitated the inclusion of the latest COPIL meeting and the first meeting of COSCI and COSTA.

RISK 7 (risk related to respecting the project schedule) occurred, but for reasons linked to "administrative risk", including delays in recruiting a project manager. However, officials already working for the City of Paris were able to manage the project pending recruitment of the project manager.

It was deemed preferable to invite the members of COSCI and COSTA once the sites were set up and sufficient progress had been made on content to be communicated and discussed. The second COSCI&COSTA was the occasion to make a video for the website, which contribute to the dissemination actions (deliverable D1.5-6).

The recruitment of the project manager has notably enabled more consistent and centralised project management to be established. It will also enable future issues and delays regarding project management to be avoided.

We faced some difficulties on internal financial reporting in 2017 and 2018 because some partners misunderstood LIFE financial rules, especially on the supporting documents to be provided with the list of expenses, like the timesheets or LIFE requirements on invoices.

This is due to a difficulty for partners not used to European projects, to clearly understand LIFE financial rules. This has been discussed in plenary session during Neemo visits and also several times during bilateral meetings with the concerned partners. Correctives measures have been taken and financial reporting is now on track.

In addition, LIFE rules on invoicing between entities of the same group were not clearly understood by Eurovia, which has to work with Eurovia IDF on the prototypes production and installation. On this issue, we identified the necessity to add Eurovia IDF as a project partner and plan to submit a request for amendment by the end of 2020.

DELIVERABLES	FORESEEN DEADLINE	ACTUAL DEADLINE	OTHERS
D-E1.a **Compte-rendu comités année 1**	**06/2018**	1st VERSION : **07/2018** 2nd VERSION : **10/2018**	**ANNEXE 9**
D-E1.b-c **Compte-rendu comités année 2-3**	**06/2019** **06/2020**	**06/2020**	• **Merged in D1.5-6** • **Annexed to the present report**
D-E1.d **Compte-rendu comités année 4**	**06/2021**	**06/2021**	
D-E1.e **Compte-rendu comités année 5**	**06/2022**	**06/2022**	
D-E1.f **Note sur les procédures d'achats écologiques**	**07/2018**	**10/2018**	**ANNEXE 10 of the progress report (21/12/2018)**

E. PROJECT MANAGEMENT	
E2. AFTER-LIFE PLANS	
RESPONSABLE : **City of Paris**	
STATUS of the action : **NOT STARTED YET**	
FORESEEN START date : **04/2022**	ACTUAL START date : **NOT STARTED YET**
FORESEEN END date : **09/2022**	ACTUAL END date : **NOT STARTED YET**

6.2. Main deviations, problems and corrective actions implemented

The project globally comes back on schedule, however there were several delays and the following major problems:

Technical problems	Delays/Deviations occurred	**Corrective actions**
Action A2 EVALUATION PLAN-ACTUALIZED IN 2019: - public works problems on the sites Lecourbe and Frémicourt; - unanticipated presence of asbestos; - unanticipated delays in the planned roadworks.	- Significant delays which affected actions C1 - Significant deviation in the thermal and microclimatic analysis	- Correction needed: modification of the thermal and microclimatic data process
Action B2 PILOTE SITES INSTALLATION: - difficulties in finding urban development or large maintenance operations on sites that met all the criteria at once in terms of the work schedule, technical characteristics and commitment of the district mayors. - For PUMA, a problem during the production of the reference asphalt results.	- Significant delays which affected actions B1 and B2 - Deviation occurred: a lack of noise reduction	- Replacement of the reference asphalt in the year 2020
Action C1 MONITORING AND MEASURING THE ENVIRONMENTAL IMPACT: - vandalism episodes on the thermal sensors; - difficulties on the thermal and microclimatic measurements; - unanticipated covid-19 crises; - project for a bicycle lane in rue de Frémicourt in 2020.	- Significant delays which affected actions C1, notably the loss of a year of survey (2018) for thermal and microclimatic data	- Replacement of vandalized equipment - The possibility to demand an extension-time is taken into account by the management team
Action D1 COMMUNICATION AND DISSEMINATION: - difficulties with communication service provider; - municipal elections (with postponement of 3 months due to COVID-19); - name change.	- Slight delay on the communication and on the event management occurred	- use of "LIFE COOL & LOW NOISE ASPHALT" instead of C-LOW-N in all communication (for the public and internally)

This problems have caused some important delays, but they did not change the global schedule, unless for the microclimatic evaluation (detailed in the update of the deliverable A2.1 "Plan d'évaluation actualisé"). We are taking into account the possibility to demand a 6 month extension to the scheduled end of the project, in order to be able to better analyse the technical results.

Financial problems

Some additional expenses, not forecasted in the approved budget, were necessary to the project implementation. They concern:

- Watering the pilot sites during summer 2019 (C1 action): due to a consequent workload of internal staff at this period, watering had to be externalise to a private company (18 K€ in external assistance);
- Installation of barriers, signage and traffic management during phonic performance measurements on pilot sites (C1 action) is necessary to neutralize car traffic during the measurement. Due to a consequent workload of internal staff at this period, it had to be externalise to a private company (2 350€ in external assistance);

- Thermicam traffic cameras (33K€ - Consumable) replace the “boucles de comptage” initially forecasted in the approved proposal (actions B2 and C1 – 113 K€ in external assistance). This is due to a change of technology used by the city to count the traffic flow.

Some costs are finally higher than estimated in the approved budget:

- Costs for laboratory tests (B2 actions) increased of 300€ due to the price annual revision;
- The floating car-data will finally be more expensive than expected in the proposal, due to a specific development from the provider to respect the specifications of the experimentation. Costs for 2018-2019 are 19,8K€ whereas we estimated 22.5K€ for 2018-2022.

Additional and higher costs of external assistance (approximately 55K€) are covered by the economy made on the “boucle de comptage”. Additional cost on consumable is below the 20% budget flexibility rule.

All those deviations are described in the comments of the financial report.

6.3. Evaluation of Project Implementation

The methodology applied to the project proved to be very successful when the initial conditions for the implementation of the pavements were respected. We can affirm that the results obtained for the first year of the acoustic measurements respect the initial forecasts for the Frémicourt and Courcelles sites, while the reference coating of the Lecourbe site proved to be not representative of reality.

The specific contingencies of each site also mean that laboratory tests must adapt to reality, such as the difficulty in having two similar road sections, or the lack of a third control section for thermal and microclimatic, or even the problems of spraying logistics, and finally external problems such as vandalism or road works independent of the project (cycle paths etc.).

In particular the lack of a third control section for the thermal and microclimatic prevents us from evaluating the microclimatic apart from watering nor from comparing the effectiveness of watering on the new experimental coatings against the reference.

During the first year of post-installation measurements, the satisfaction survey addressed to local residents revealed a very positive perception regarding the reduction of noise experienced.

Action	Foreseen in the revised proposal	Achieved	Evaluation
A1STATE OF THE ART UPDATE	Objectives: To find an examine a relevant and sizeable amount of scientific articles, other LIFE projects in the same field, French and European regulations, and patents. Expected results: To confirm certain hypotheses included in the initial project proposal and shed light on the main challenges, such as testing road surface overlay while improving their noise-reducing properties.	YES	The State of the Art Report endorsed the decision to look for a balanced solution in each aspect of the project. For the noise effects the immediate objectives are achieved, but it is too early to clearly quantify the long term results (maintaining acoustic and structural properties over time). For the albedo effect, the decision of finding overlays that are light-coloured but not too white will be evident when the bituminous film of the new coating will disappear by time. The control of costs (workforce) and resources (non-potable water) available for watering, in terms of the project's initial objectives are achieved. Overall, the updated State of the Art Report confirmed the innovative nature of this project, because there is no other project seeking to improve noise-reducing, thermal and mechanical performance at once.
A2 EVALUATION PLAN-ACTUALIZED IN 2019	Objectives: To define the measuring methods and sampling frequency to be used to evaluate the project's relevant indicators, in particular noise levels, thermal impact, and the durability of the materials. Expected results: To define the methodology for cross-referencing and analysing the data collected.	YES	This action defined the measuring materials and frequency. All the measurements aim to assess the new road surfaces against a reference road surface • CPX measurements for roadway noise • Façade noise measurement • Thermal and microclimatic measurement • Durability measurement This was an indispensable action, because it sets the operational and methodological basis for monitoring the environmental impact (action C1).
B1 FINAL FORMULATION REPORT	Objectives: To study several road surface formulas for use on the pilot sites. Expected results: To find the three best formulas for use on the pilot sites.	YES	The completion of the formula studies for the new overlays was a fundamental milestone in the project: • Formula BBphon+ (Colas) • Formula SMAphon (Colas) • Formula PUMA (Eurovia)
B2 PILOTE SITES INSTALLATION	Objectives: To choose, set up and monitoring the pilot sites. Expected results: To find the most feasible sites according to the technical criteria set out in the application (sun exposure, absence of vegetation, slope of the road, noise levels, presence of asbestos etc)	ON GOING	3 sites were selected and fully installed • Rue de Courcelles, 8th district: laying of overlay BBPhon+ (Colas) • Rue Frémicourt, 15th district: laying of SMAPhon (Colas) • Rue Lecourbe, 15th district: laying of PUMA (Eurovia) Significant negotiation work with the district mayors affected the initial choices. By now the monitoring of these three pilot sites is positive, even

			if several contingent site-works and other hazards (i.e. vandalism) need to be carefully taken into account case by case.
B3 REPLICABILITY AND TRANSFERABILITY STRATEGY	Objectives: To analyse the conditions of local replicability and the conditions of national and European scale of replicability and transferability; to develop a replicability / transferability strategy. Expected results: To define geographic targets; to define the commercial conditions and the means of replicability; to identify barriers and possible solutions.	NOT STARTED YET	
C1 MONITORING AND MEASURING THE ENVIRONMENTAL IMPACT	Objectives: To monitor the various performance indicators defined for the project (noise level, thermal performance, physical and geometrical durability, energy savings and water consumption). Expected results: To evaluate the environmental benefits of the project.	ON GOING	The achieved results of the monitoring are fully satisfactory so far. Nevertheless, some major entanglements (i.e. bad weather, vandalism, technical delays etc.) caused the postponement of thermal and microclimatic measurements: therefore, we are studying the possibility to extend the project evaluation period.
C2 MONITORING THE SOCIO-ECONOMIC IMPACT	Objectives: To assess the socio-economic impacts of asphalt mixes developed within the framework of the project. Expected results: To improve the dissemination of results and their replicability / transferability (Actions B.3 and D1)	ON GOING	This action started in October 2019, it is therefore too early to evaluate it.
D1 COMMUNICATION AND DISSEMINATION	Objectives: To ensure a wide communication and dissemination of the project, creating synergies with other ongoing projects and to share the results, on a national and European scale. Expected results: To provide a visibility on the project, in order to spread the results and replicate them, whereas the environmental, social and economic benefits will be achieved.	ON GOING	The communication and dissemination goals are carried on so far, with successful feedbacks on networking aspects. The creation of the inauguration event was successful, and we are planning the other programmed events with no particular delays, despite some important barriers such as the municipal elections and the covid-19 crises.
E1 PROJECT MANAGEMENT BY THE	Objectives: To coordinate all planned actions, supervise tasks, ensure a sound financial management, to verify	ON GOING	This action is fully satisfactory, the relations between the management and technical teams are regular and stable, assuring the reciprocal dialogue

CITY OF PARIS	the production of deliverables and to draw up technical execution reports as part of the implementation schedule established and required by Life. Expected results: To ensure an effective project management in accordance with the rules of the Life program and conditions of the grant agreement signed with the EU.		regarding all the project aspects in order to achieve the objectives and maintain an high level of results.
E2 AFTER-LIFE PLAN	Objectives: To define the conditions for sustainability, exploitation and deployment of the project. Expected results: The actions to be implemented in the post-project period, over a 5-year horizon; the identification of responsibilities and actors; the After-LIFE Communication plan.	NOT STARTED YET	

Some project results have been immediately visible, such as noise reduction and noise perception (as pointed out in the social enquire in action C1) and the microclimatic enhancement.
On the other side some results will only become apparent after a while. The resistance of the coatings and the maintenance of the phonic properties over time will be evaluated over a long period which will exceed the time of the project. With the after-life plan we will reassess the coverings ten years after installation, in 2027.
The reduction of heat island is subject to the improvement of the watering protocol, whereas the appearance of the light-colored granular component, which should increase the albedo, will be more obvious at the end of the project, because of the bituminous film that covers it now, and this will make possible the evaluation of albedo related to the clarity of the aggregate.
It is still too early to say what will be the replicability impact, on what scale and at what socio-economic impact, but dissemination and communication are satisfactorily and today we can consider as an important step the fact that these coatings are effectively recognized as a benchmark for the City of Paris, and that other municipalities show us their interest (i.e. the municipality of Barcelona, as mentioned in the deliverable D1.5-6).

Policy impact and development resulted from the project activity

- EU noise directive 2002/49 is prescribing to draw noise strategic map estimating the exposure of the population to road transport and noise action plans to reduce the exposure when superior to thresholds set at national level.
- Big European cities have an important part of their population exposed to high levels of road noise (10% of the Paris population is over the French threshold of 68 dB(A) for the Lden indicator).
- In urban situation, the tools for lowering noise are lacking, and the isolation of the buildings' facades is not sufficient, knowing that dwellers should be able to open windows at night, especially when the weather is getting warmer every year in summer.

- LIFE COOL & LOW NOISE ASPHALT is offering new tools for municipalities trying to improve the sound environment of the population and reach the threshold for a greater part of its dwellers.
- In France, it can also help them to respect French legislation, which contains rules for new road infrastructures or significant modifications of road infrastructure (night and day levels thresholds according to the pre-existing situation).

There are no main barriers in the policy contest, on the contrary these actions are very welcomed as concrete measures to improve the environment of citizens.
Nevertheless is still relevant the question of bituminous materials as such, that can be mistaken because it is based on petroleum resources even if the bituminous component is only a few percent of the mix formulation
The city of Paris will use, up to 2020, the LIFE COOL & LOW NOISE ASPHALT for the large maintenance works on its road network.

Added value of the project and its actions

LIFE C-LOW-N ASPHALT aims to demonstrate that a global solution both against noise pollution and against ICUs exists. This project reflects the objectives of the Life program on issues related to urban road traffic, from a health and environmental point of view, by allowing to deepen the knowledge already acquired on urban pavements, as well as by generating best practices for major European cities. The assessment of the environmental impact of each of the solutions will be carried out for 4 years in the part of the project, and 5 years after the end of the Life contract. Evaluation reports and the dissemination of formulations developed in the project will allow European cities to have new concrete tools to combat noise pollution and ICUs, at an acceptable cost, so as to promote their multiplication.
A reduction of at least 5 dB in road noise is expected, as well as a reduction of 3 dB on the noise on the facade, after the installation of the coverings compared to the existing one. With an impact estimated at 50% change from the initial state, approximately 1000 inhabitants will be able to perceive an improvement in their exposure to noise. The impact of the project on city dwellers will therefore be concrete and direct, as recommended by the "Environment" sub-program.
Conducted in an ultra-dense urban context, LIFE C-LOW-N ASPHALT thus fully contributes to specific objectives of the "Environment" sub-program, to reduce road noise in the environment heavily populated urban area. In addition, it will specifically facilitate the implementation of the directive European 2002/49 / EC by achieving noise levels that no longer cause negative impacts on human health.

6.4. Analysis of benefits

1. Environmental benefits

The reduction of at least 5 dB in road noise is achieved, as well as a reduction of 3 dB on the noise on the facade, after the installation of the coverings compared to the existing.
On a on a qualitative level around 1 000 inhabitants (estimation of the population leaving near the sites) are able to collect an improvement in their exposure to noise. The project's impact on city dwellers is concrete and direct, as recommended by the "Environment" sub-program.
It is still too early to estimate the environmental benefits for thermal and microclimatic aspects.

2. Economic benefits

It is still too early for a detailed analysis of the economic benefits, it can nevertheless be said that the additional cost of asphalt mix is actually 10% lower compared to a conventional asphalt mix.

3. Social benefits

It is still too early for a detailed analysis of the social benefits.

4. Replicability, transferability, cooperation:

The City of Paris did not wait for the end of the LIFE "Cool & Low Noise Asphalt" experiment to put in its catalog of road surfaces, during the renewal of the maintenance market for surface layers of Parisian pavements at the end of 2019, the 3 coatings studied in this experimentation program. In this invitation to tender, for the 3 coatings, we imposed the formulas retained at the end of the study phase. The contract was notified to the successful candidates in February 2020. The financial result is within the limit of additional cost set 10% in the LIFE program compared to our classic reference products. For the BBphon + coating we note an additional cost of 2% compared to the reference in BBM0 / 10, this additional cost is 8% for the SMAphon and for PUMA, it is 5% compared to the reference in AC2.

Given the acceptability of the additional costs obtained during this consultation regarding the phonic and thermal improvements noted on the first results, it was decided that these LIFE coatings would become the benchmark.

5. Best Practice lessons:

The cohesion of the working team makes the exchanges fluid and rapid, the reactivity of each partner works for the success of the project. The semi-annual meetings of the steering committee (COPIL), accompanied by field monitoring (COSUI) provide the basis for the teamwork. Project management is following the indications of the Grant Agreement and this ensure the global coherence, the respect of the initial criteria guarantees the project consistency. Taking into account the possibility of expanding target audiences in terms of communication and dissemination is a matter of elasticity and conviction about the quality of the project.

6. Innovation and demonstration value:

The level of innovation is assured by EU co-funding at the national and the international level thanks to the network based on it, and the added value of scientific and technical exchange on several aspects of the project. For instance, COSCI&COSTA network allowed an important exchange on the noise level evaluation (choice of La10 indicator for the measurements on the façades).

7. Policy implications:

PPBE 2019-2024 of Greater Paris: The results of the project will be communicated in the PPBE 2019-2024 of the Métropole du Grand Paris (MGP or Greater Paris), which will follow on from the Parisian PPBE. Several of the 131 communes that make up Greater Paris, have already expressed interest in testing the new generation of road surfacing. An action devoted to laying low noise road surfacing (LNRS or quiet pavements) and heat-reducing road surfacing (cool pavements) should therefore be included within the MIEUX AGIR (improving actions), programme within the BONNES PRATIQUES (good practice) section of the city's PPBE.

PPBE 2015-2020 of the City of Paris: The project implements in its entirety action n°19 of the City of Paris's plan for preventing noise pollution in the environment (PPBE) 2015-2020. The

Parisian PPBE corresponds to the action plan set out in the **European environmental noise directive n°2002/49/EC.**
Without the LIFE project, action n°19, entitled "The study of experiments in low noise road surfacing on the noisiest main traffic routes at 50 km per hour" would undoubtedly not have been able to provide an experiment offering so much added value in terms of the quality of the road surfacing tested and the rigorous nature of their monitoring over time. When 2020-2026 new PPBE will be in place it will integrate the innovations of the LIFE COOL & LOW NOISE ASPHALT project.

2018 Paris Climate Plan: The section "strengthening solidarity and resilience in the face of heat waves", of the *plan climat air énergie territorial 2018* (area Energy Air Climate Plan) for the City of Paris plans to identify, design and communicate to the greater public on heat islands and accessible cool routes each summer in Paris. The LIFE project will therefore contribute to creating the routes mentioned in this objective.

Paris 2015 adaptation strategy: The City of Paris's adaptation strategy is cited in the 2018 Paris Climate Plan and the Plan thus endorses its objectives. The LIFE project is working towards achieving the objective 4, entitled "Cooling the city during heat waves" which notably includes watering public spaces with non-potable water.

2017 Paris Resilience Strategy **:** This strategy operates in complement to the adaptation strategy and the Paris Climate Plan, action 15, which states "Utilise integrated logic, innovation and develop nature in the city to make the public space a vector for social inclusion and well-being", thus indicating that the City of Paris will develop a resilient frame of reference for roadways: materials adapted to various risks (low-noise bitumen, overlays that fight the heat island effect etc.) The LIFE project fully complies with this policy.

Regulations regarding noise pollution from two-wheelers: The LIFE project could influence regulations limiting the motorcycle noise pollution by providing proof that infrastructure, which falls within the remit of local government, cannot combat road noise alone - in particular that of motorised two-wheelers, which represent the biggest nuisance to the public. The regulations could be improved are regulation n°41 of the CEE-ONU, regulation n°168/2013 of the European Parliament and Council and the regulation n°134/2014 of the Commission which completes regulation n°168/2013.

"Circular economy plan" 2017-2020: at the moment we are far from the use of reusable or recycled materials, this leads us to question the possibility of working on coated materials made from recycled aggregates. Moreover, covid-19 obliged us to face the problem of the use of potable water, because of virus DNA traces in the non-potable water (detailed in deliverable E1.2-3).

7. Key Project-level Indicators

The project's progress respect the Key Project-level Indicator (KPI) targets. There are no significant deviations from the targets set initially. The "Indicator Values - 5.2.1. Noise level/frequency terrestrial" is successfully met (begin value 92, end value 89, beyond 5 years value 91 foreseen). The "Indicator Values - 10.2. Involvement of non-governmental organisations (NGOs) and other stakeholders in project activities" reached the value 5/10, "11.1. Website" n° of visits, individuals, downloads and average visit are still in progress, which is normal; "12.1. Networking" n° of individuals are still in progress and we need to focus on the improvement of this value. The "14. Contribution to Economic growth"

indicators concern expectations in case of continuation/replication/transfer after the project period and future funding, not possible to predict yet. These targets will be monitored until the Final report, when we will enter the final actual values of the KPIs, which will be justified and consistent with the environmental, economic and social benefits reported in the preceding section.

8. Comments on the financial report

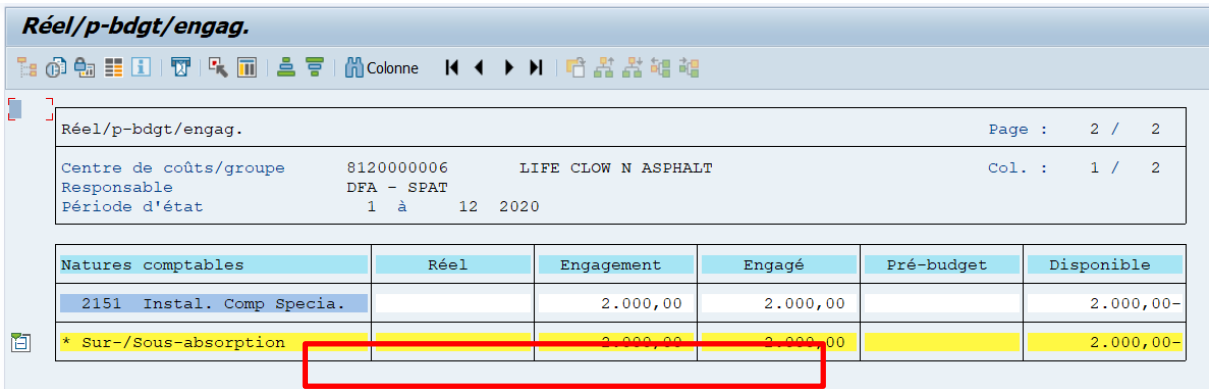
8.1. Summary of Costs Incurred

PROJECT COSTS INCURRED				
	Cost category	Budget according to the grant agreement in €*	Costs incurred within the reporting period in €	%**
1.	Personnel	1 213 163€	622 534,92€	51%
2.	Travel and subsistence	135 944€	15 116,20€	11%
3.	External assistance	436 540€	147 726,13€	34%
4.	Durables goods: total non-depreciated cost			
	- *Infrastructure sub-tot.*			
	- *Equipment sub-tot.*	78 708€	24 100,11€	31%
	- *Prototype sub-tot.*	154 700€	30 959,20€	20%
5.	Consumables	25 248€	39 286,19€	156%
6.	Other costs	64 500€	11 019,04€	17%
7.	Overheads	147 615€	62 350€	42%
	TOTAL	**2 256 418€**	**953 091,79€**	**42%**

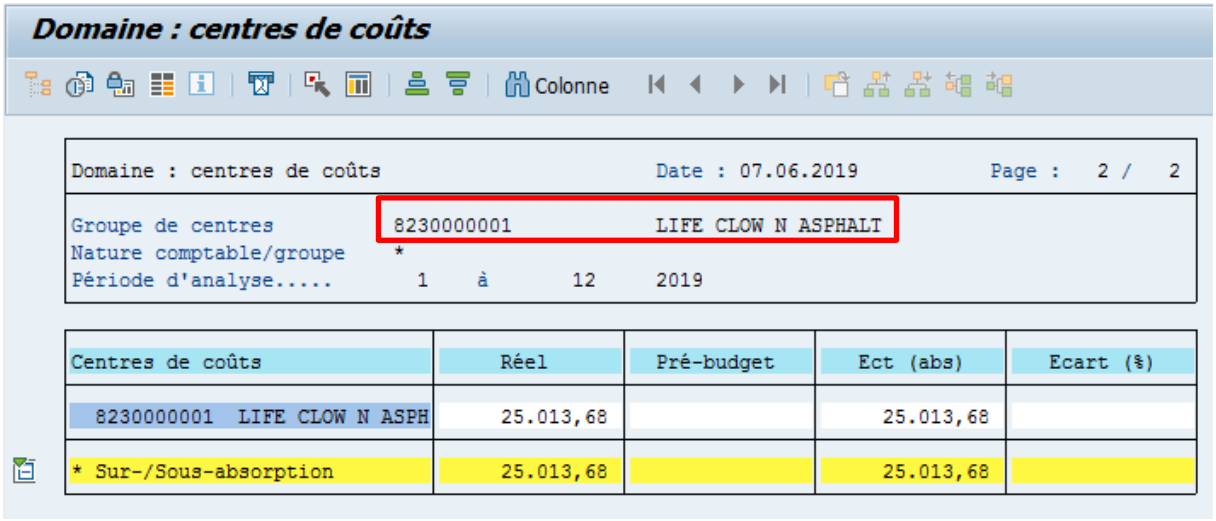
8.2. Accounting system

- Brief presentation of the accounting system(s) employed and the code(s) identifying the project costs in the analytical accounting system

Beneficiaries Bruitparif, Colas and Eurovia are private organisations and their accounting system corresponds to the private accounting rules applying in France, whereas the City of Paris accounting system is ruled by the public accounting principles.
Each beneficiary uses a specific code to identify the project expenses, apart for staff costs (including for some beneficiaries travel & subsistence costs) which are generally dealt with the payroll system.
VDP has created two specific cost centres for LIFE C-LOW-N Asphalt expenses in its accounting information system. N° 8230000001 is related to the main general budget of the city (VAT not-recoverable) and n° 8120000006 concerns the "Sanitation" annexe budget on



which VAT is recoverable. An annexe budget, distinct from the main general budget, must be established by local authorities for certain specialized local services (water, sanitation, etc.). Meteorological measurement stations are ordered through a public procurement which has been contracted on the sanitation budget. That is why VDP has 2 specific accounting codes.



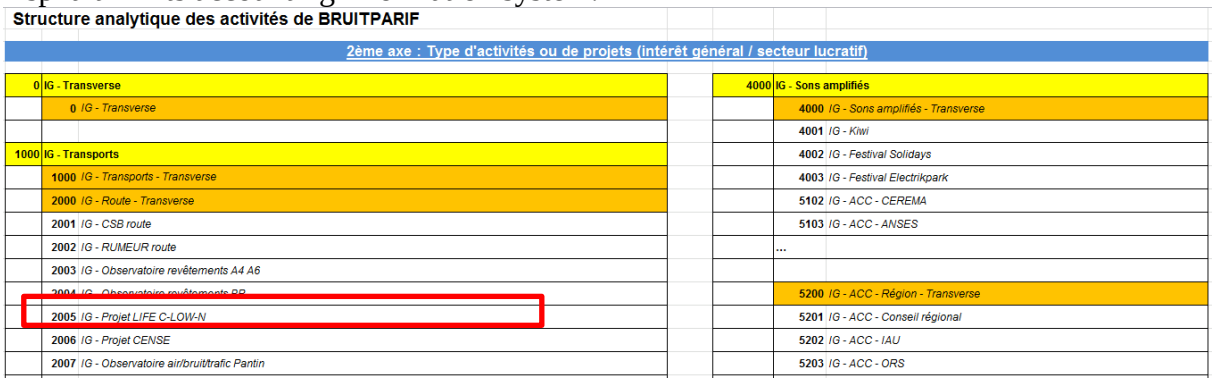
Domaine : centres de coûts

Colonne

Domaine : centres de coûts		Date : 07.06.2019	Page : 2 / 2
Groupe de centres	8230000001	LIFE CLOW N ASPHALT	
Nature comptable/groupe	*		
Période d'analyse.....	1 à 12	2019	

Centres de coûts	Réel	Pré-budget	Ect (abs)	Ecart (%)
8230000001 LIFE CLOW N ASPH	25.013,68		25.013,68	
* Sur-/Sous-absorption	25.013,68		25.013,68	

Bruitparif: the analytical accounting code associated is "2005 - Projet LIFE C-LOW-N Asphalt" in its accounting information system.

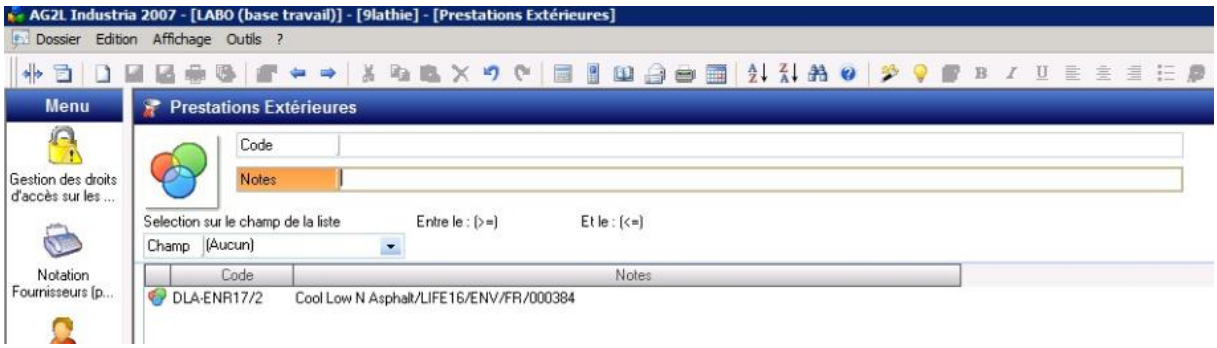


Structure analytique des activités de BRUITPARIF

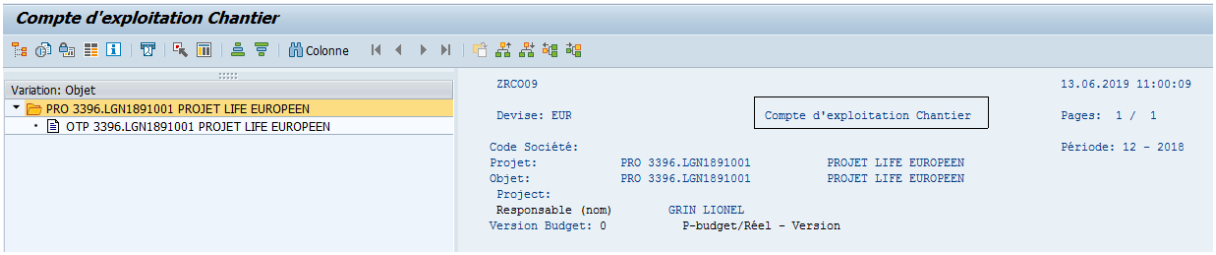
2ème axe : Type d'activités ou de projets (intérêt général / secteur lucratif)

0 IG - Transverse	
0 IG - Transverse	
1000 IG - Transports	
1000 IG - Transports - Transverse	
2000 IG - Route - Transverse	
2001 IG - CSB route	
2002 IG - RUMEUR route	
2003 IG - Observatoire revêtements A4 A6	
2004 IG - Observatoire revêtements RR	
2005 IG - Projet LIFE C-LOW-N	
2006 IG - Projet CENSE	
2007 IG - Observatoire air/bruit/trafic Pantin	
	4000 IG - Sons amplifiés
	4000 IG - Sons amplifiés - Transverse
	4001 IG - Kiwi
	4002 IG - Festival Solidays
	4003 IG - Festival Electrikpark
	5102 IG - ACC - CEREMA
	5103 IG - ACC - ANSES
	...
	5200 IG - ACC - Région - Transverse
	5201 IG - ACC - Conseil régional
	5202 IG - ACC - IAU
	5203 IG - ACC - ORS

Colas: a specific code “DLA-ENR17/2” has been created in its administration software (to generate order forms) to identify the expenses of the project.



Eurovia has created the code “PRO 3396.LGN189100”1 in its accounting information system.



- Brief presentation of the procedure of approving costs

- VDP: each directorate involved in the project certifies its paid expenditures. For staff costs, salaries and charges are certified by the Human Ressources Directorate.

Then, all the costs are approved by the “Direction Régionale des Finances Publiques”, public accountant of the City of Paris.

- Bruitparif: the director approves all expenses and they are also certified by a chartered accountant.
- Colas & Eurovia: HR departments approve the salaries and charges and financial responsibles approve other expenses. The companies’ annual accounts are certified by an auditor.

- Type of time recording system used, i.e. electronic or manually completed timesheets

For staff members not entirely dedicated to the project or who work more than 2 days/month, electronic completed monthly timesheets are used.

- Brief presentation of the registration, submission and approval procedure/routines of the time registration system

Each personnel employee has to complete its monthly time sheet and to make it signed by its manager within 10 days after the end of the corresponding month, in accordance with LIFE requirements.

Then, each partner has to send all the timesheets signed to the coordinator every 6 months, for internal financial reporting and monitoring on the project.

There was a misunderstanding from some personnel of beneficiaries on the timesheets filling, in particular on the total time worked to be completed, despite many explanations from Neemo and the Financial coordinator. Therefore, in accordance with the Neemo visit report sent in July 2019, the incomplete timesheets have been corrected with the time worked on other activities and absences. Timesheets of Florent Gazaniol (EUR-PE-FG-FDT 2018 - Eurovia) and Jérôme Lefebvre (VDP-PE-JL-FDT-2018 - VDP) are annexed as examples.

- Brief explanation on how it is ensured that invoices contain a clear reference to the LIFE project showing how invoices are marked in order to show the link to the LIFE project

For beneficiaries VDP, Colas and Eurovia, it’s not possible to modify budgetary and accountancy procedures. Most of the time, purchases are ordered by personnel not involved in the project. Despite the instructions given by each LIFE-C-LOW-N Asphalt responsible to mention the reference “LIFE16ENV/FR/000384” on purchase orders and invoices, instructions were sometimes not followed by the persons responsible of purchase order or by

the service/furniture providers. In those cases, the LIFE16ENV/FR/000384 reference was added with a handwritten note.
In other cases, only “LIFE” was mentioned and not the complete reference.
In any case, all documents enabling to link the invoices to LIFE C-LOW-N Asphalt project have been archived (mention on quote requests, proof of the LIFE C-LOW-N Asphalt display during conferences, etc) and related expenses are recorded with the analytical code on each beneficiary accounting system.
Instructions to mention the reference “LIFE16ENV/FR/000384” will be repeated to all partners to correct this error.
For Bruitparif, the complete reference appears on all invoices and purchase orders.

8.3. Partnership arrangements (if relevant)

Except for the payment of the prefinancing 1 from the coordinating beneficiary to the associated beneficiaries, there is no financial transaction between them.

However, there is an exception concerning COLAS SA and its affiliate. COLAS IDFN did actually not bear all the extra-costs linked to the installation of the asphalt mixes. This issue was not clearly explained at revision stage when COLAS IDFN was added as an affiliate entity. This is visible in answers to the revision questions, which included contradictory statements. They claimed that there would be no internal invoices, and then they mention that "The procedure « achat interne » corresponds to an internal invoicing between entities within the same group. Colas and Eurovia have no possibility to outsource asphalt prototypes production and installation."

Therefore these costs, planned in prototype costs, were in fact re-invoiced by COLAS IDFN to COLAS SA. COLAS SA ensured that only extra-costs linked to the installation of the innovative asphalt are declared to the LIFE project, hence all elements of profit, VAT and overheads are excluded, in compliance with the annex X of our Grant agreement.

8.4. Certificate on the financial statement

Not applicable, considering the letter of amendment N°1 sent by EASME on 20/08/2018.

8.5. Estimation of person-days used per action

Action type	Budgeted person-days	Estimated % of person-days spent
All projects when applicable Action A: Preparatory actions	A1 : 41 A2 :198	A1 : 18% A2 : 30%
ENV projects Action B: Implementation actions	B1 : 370 B2 : 127 B3 : 193	B1 : 89% B2 : 137% B3 : 0.2%
ENV and GIE projects Action C: Monitoring of the impact of the project action	C1 : 1,160 C2 : 394	C1 : 22% C2 : 0.26%
ENV and GIE projects Action D: Public awareness/communication and dissemination of results	D1 : 418	D1 : 32%
ENV and GIE projects Action E: Project management	E1 :761 E2 : 18	E1 : 65% E2 : 0%

TOTAL	**3,680**	**40%**

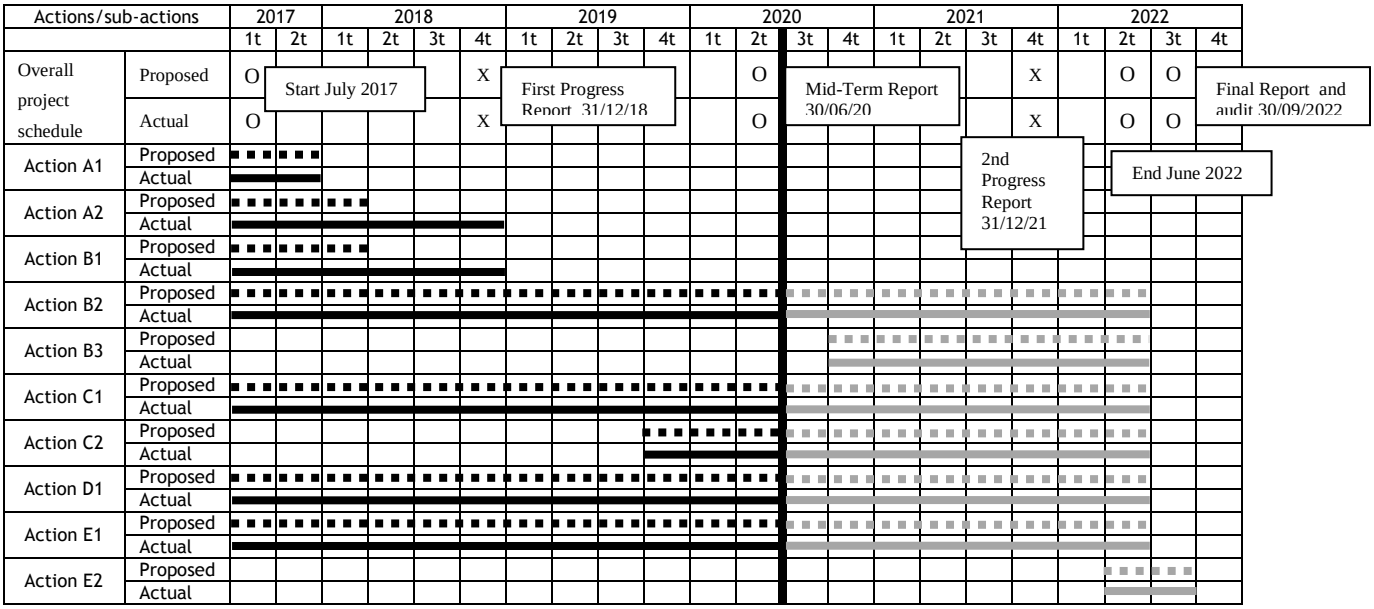
Explanation of deviations

Clarification: In the 1st progress report, we took into account time worked by Eurovia IDF as we thought we would be able to submit the request for amendment before the mid-term report. As we can't, time spent by Eurovia IDF is not taken into account in the figures above.
A1: Time allocated to this action was over-estimated during the application and revision phase.
A2: Time allocated to this action was over-estimated during the application and revision phase.
B1: This action was delayed because of the difficulties to select the final pilot sites. Moreover, Colas and Eurovia had to conceive and test multiple asphalt formulas in order to find, for each prototype, the best compromise according to our environmental objectives (phonic, thermal and durability) and the pilot site selected. Besides:
- Technical committees were implemented to monitor the work done on the asphalt formulas,
- Additional tests had to be done, as explained in the narrative report for B1 action, which explain overtime spent on this action.
Therefore, unlike the preparatory actions, time allocated was certainly under-estimated.
B2: Overtime is due to the complexity and delay in selecting the pilot sites. The partnership spent a lot of time to make the analysis and the different tests needed to select the final pilot sites, which explain the deviation.
Here again, time allocated was under-estimated.
B3: Action has not started yet.
C1: As the prototypes had been implemented on the pilot sites (B2) later than initially expected, there is a delay in C1's implementation. However, this action will occur during all the duration of the project. Therefore, as the pilot sites are now installed, C1 will pursue according to the application form.
C2: Action has not started yet.
D1: Delay in implementing communication and dissemination action at the beginning of the project explains this consumption rate.
E1: This 1st phase of the project was needed to implement qualitative, administrative and financial processes and formalizing the partnership agreement. As everything is in place, we'll proceed according to the application form.
E2: Action has not started yet.

9. Envisaged progress until next report

The period between July 1, 2020 and December 31, 2021 will include:
• The continuation of action B2, in particular in sub actions B2.4 and B2.5
• The completion of the last MILESTONE of action B2 "end of maintenance sequences for compacted asphalt" scheduled for December 2021 (under action B2.5)
• The start of action B.3 - Replicability strategy
• The completion of MILESTONE of action B3 "3rd measurement campaign - launch of the development of the strategy" initially scheduled for October 2020
• Continuation of action C1, with monitoring of acoustic, thermal and microclimatic measurements, as well as monitoring of mechanical characteristics (under action C1.2)
• Drafting of deliverables D-C1.d and D-C1.e (2nd and 3rd measurement reports after installation), planned for October 2020 and October 2021 respectively (under action C1.3)
• Completion of MILESTONEs from action C1, characterizing the “end of the 2nd and 3rd measurement campaign” (October 2020 and 2021)
• The continuation of the C2 action started in October 2019, with the consolidation of the C2.1 sub action on the analysis of the 3 components (comparative cost analysis, determination of acoustic benefits, determination of thermal benefits)
• The completion of the MILESTONEs of action C2 characterizing the "start of components 2 and 3" (October 2020) as well as the "finalization of component 1 and start of the economic quantification work of components 2 and 3" (October 2021)
• Continuation of action D1, with the development of networking (under action D1.1) through dissemination to professional days, congresses, conferences, and the implementation of events planned for the general public in October 2020 and June 2021, as well as the organization of the closing event planned between June and September 2022 (under action D1.2). The COSCI & COSTA 2020 and 2021 scientific dissemination days will be organized with the participation of partners and guests from networking actions, in order to maximize the dissemination and technical and scientific exchange on the project (under action D1.1 and D1.2) .
• Drafting of the deliverable D-D1.g - assessment year 4, planned for June 2021
• Continuation of action E1 in its sub actions E1.1- governance and overall coordination of the project and E1.2 - administrative and financial management.
• Drafting of deliverable D-E1.d - year 4 committee report, scheduled for June 2021
• The completion of the MILESTONEs of the E1 action concerning the "COPIL validation of years 3 and 4" meetings

Planned actions in the Gantt chart illustrating progress:



10. Annexes

10.1. English summaries of the deliverables annexed to this report

1. Summary of the deliverable D-A2.a update
   - Title : EVALUATION PLAN actualized
2. Summary of the deliverable D-C1.b
   - Title : FIRST MEASUREMENT REPORT AFTER INSTALLATION
3. Summary of the deliverable D-D1.e-f
   - Title: Networking, communication and dissemination activities review – 2nd and 3rd years
4. Summary of the deliverable D-E1.b-c
   - Title : Committees report 2nd and 3rd years

10.2. Answers to EASME letters

LIFE16 ENV/FR/000384 - LIFE COOL & LOW NOISE ASPHALT - Your progress report
Brussels, 17/04/2019
EASME B3/MM/cl/D(2019) 3023575

Reporting

1. In your next reports, please add an annex with your answers to all questions or comments raised in my previous letters, which are still relevant and pending.

- In this present report we managed to put in annex 10.2 the answers as requested. We treated letters 17/04/2019 and 04/05/2018 by EASME.

2. When describing the project activities, please refer to the sub-actions or tasks listed in your Grant Agreement (G.A.), and mention the dates/periods of time when the actions were performed. Your progress reports should not only present the action results, but also the activities carried out to achieve these results, in line with your technical proposal. This is necessary for us to assess the project results and expenses.

- In this report we re-write some passages of the former actions in order to present not only the results of the actions but also the activities carried out to complete them, referring to sub-actions.

3. For the dissemination tools, such as the leaflet or the notice boards, please give the exact number of copies printed or produced, so that we can assess if it is in line with what was planned and if the corresponding expenses are reasonable.

- 3 totems, i.e. the three metal structure display panels printed and installed in each of the three sites (a photo of each is presented in the deliverable D1.5-6 annexed to this report)
- 2 communication support kakemonos during conferences and events
- 500 4-page brochures
- 250 booklets (16 pages each)
- 8 Posters with the first acoustics results, for conferences use (Abu Dhabi, etc.)

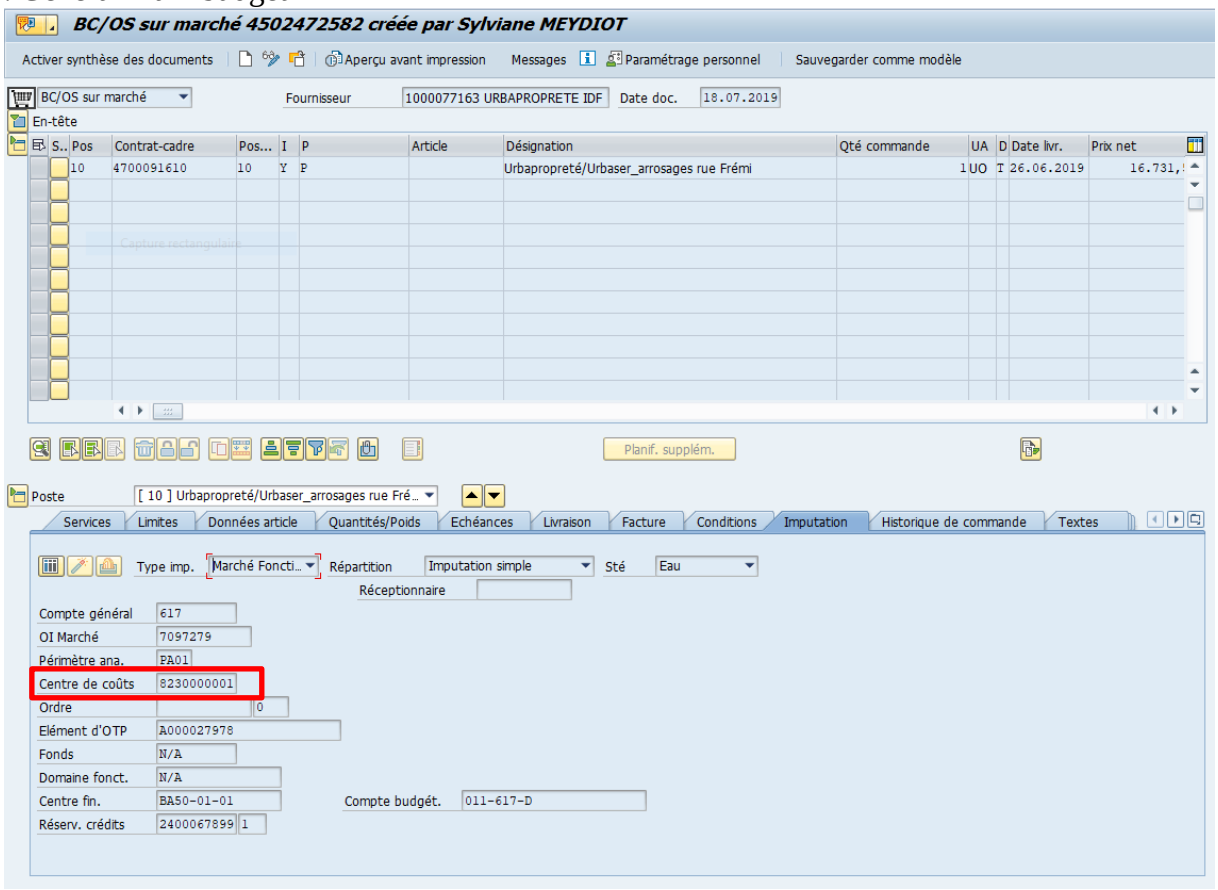
4. financial aspectsllowing the 2nd visit of the external monitoring team (2019)

- Accounting system

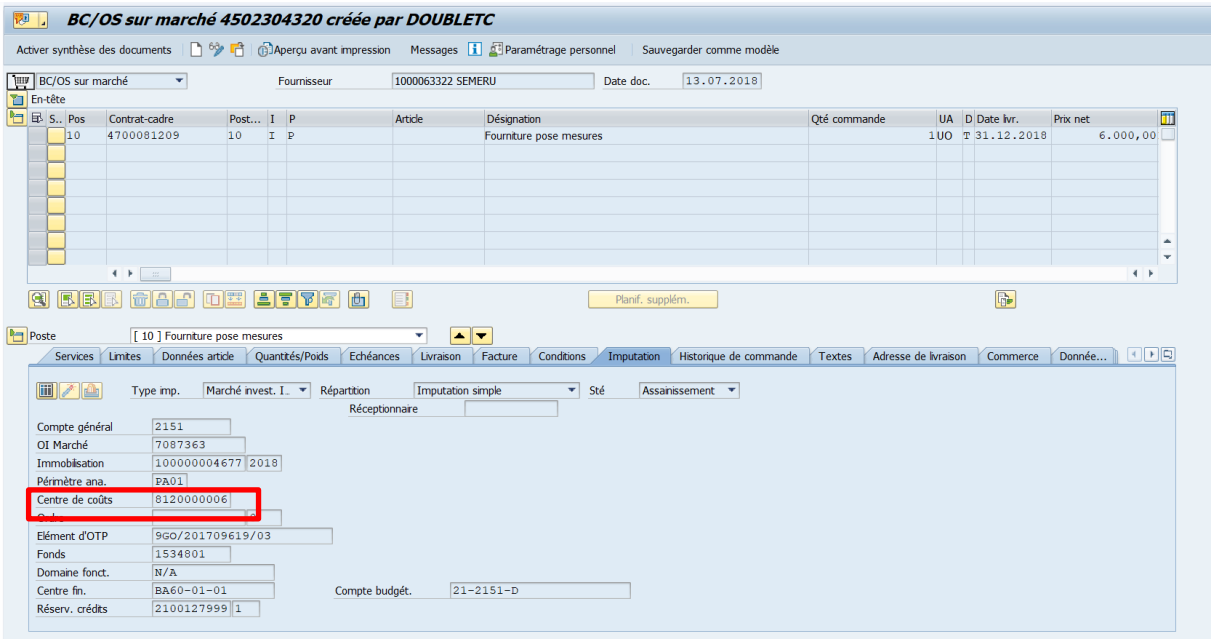
Please include with your mid-term report the list of the codes used for the project in the analytical accounting systems of all the project partners, and for the latter please attach a screen shot of their analytical system showing how the project expenses appear.

⇨ City of Paris (VDP)

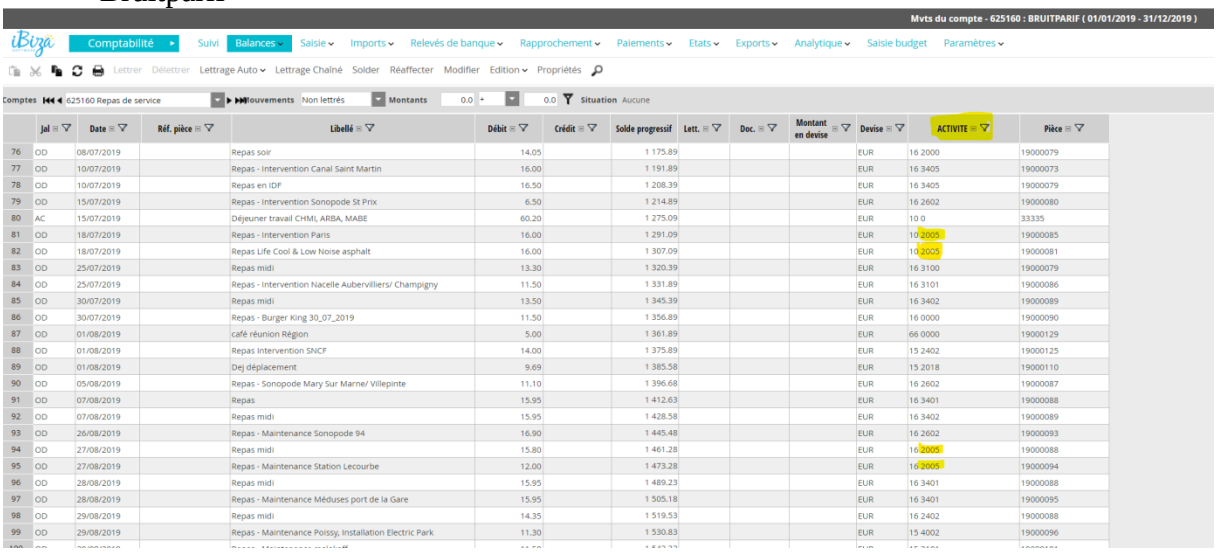
. General main budget



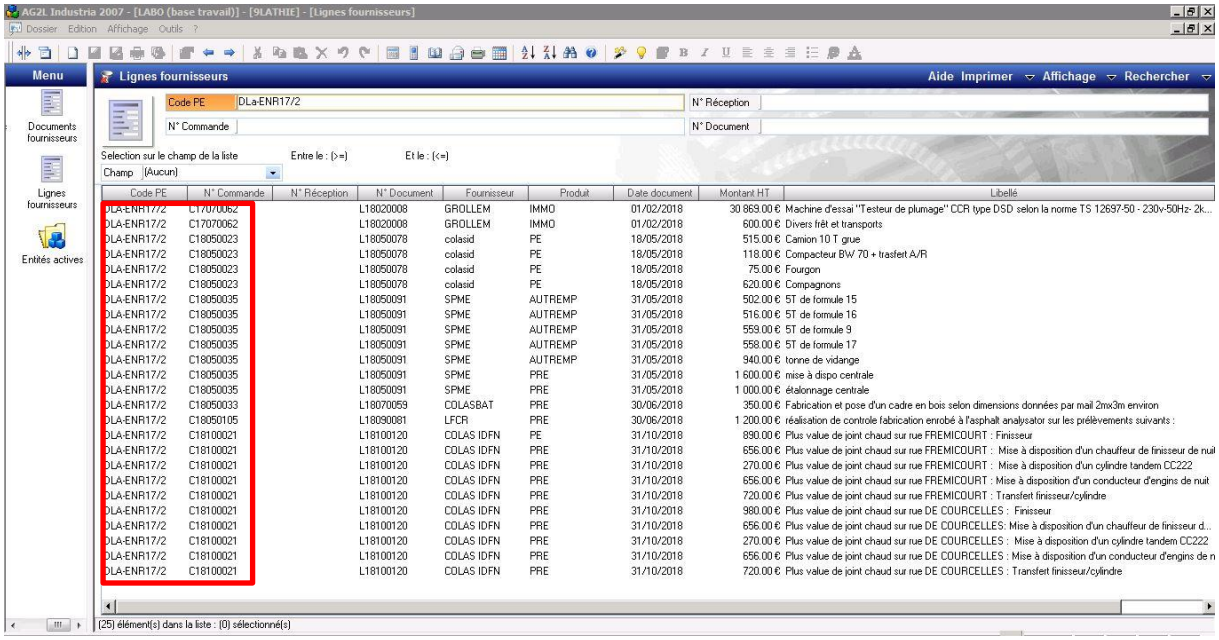
. Sanitation annexe budget



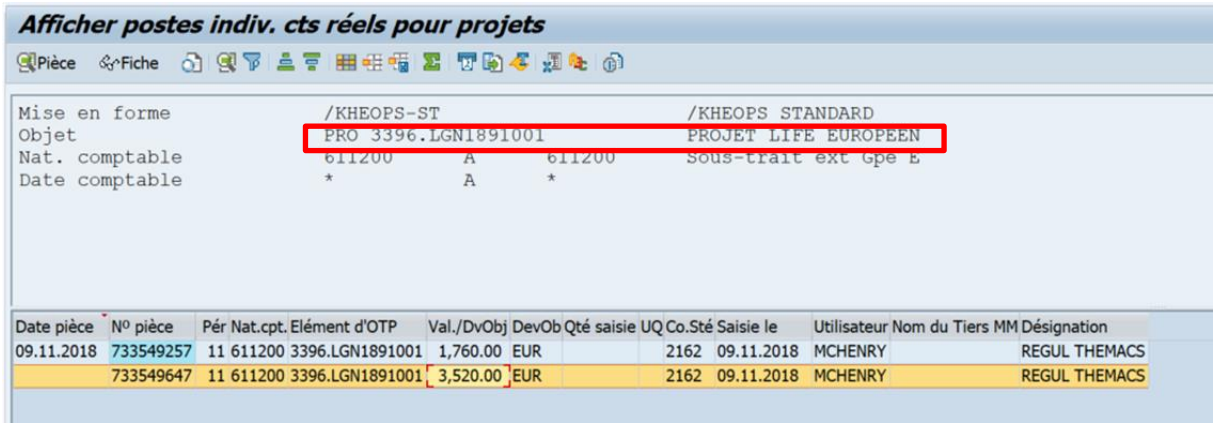
⇨ Bruitparif



⇨ Colas



⇨ Eurovia



- Calculation of personnel costs and use of timesheets

I therefore ask you and your partner EUROVIA to provide with your mid-term report all the timesheets for Jérôme Lefebvre, 2018 (VDP) and Florent Gazaniol (EUROVIA), 2018, for further assessment (including the "normal" timesheets signed every month and the additional timesheets that will be filled in by your respective human resource departments).

⇨ Incomplete timesheets have been corrected with the time worked on other activities and absences. They are approved and signed by their managers. There are annexed to the initial timesheets already signed by employees and managers.

Timesheets of Florent Gazaniol (EUR-PE-FG-FDT 2018 - Eurovia) and Jérôme Lefebvre (VDP-PE-JL-FDT-2018 - VDP) are annexed as examples.

- Personnel non employee

In order to ensure that time spent by Mr. Hirrien can be considered eligible without timesheets, we would need confirmation that Mr. Hirrien is only working for this project under his employment contract. Please submit his employment contract (and possible assignment letter) to EASME at the time of the mid-term report.

- ⇨ Mr. Hirrien only worked on the project as it is mentioned in the contract provided in annexes. Timesheets were also completed and are provided in annexes.

- <u>Internal invoicing</u>

I ask you to provide with your mid-term report a precise justification for the selection of CIFA as subcontractor of EUROVIA IDF for the PUMA asphalt production. Please note that currently EUROVIA IDF is not able to declare any costs to the project as the entity is not part of the grant agreement. You will need to submit an amendment request for this.

- ⇨ As mentioned above (Summary of costs incurred), we were not able to submit the request for amendment to integrate Eurovia IDF in the partnership on time before the mid-term report. Therefore we don't report any expenses occurred by Eurovia IDF.
- ⇨ In addition, we already explained during the revision phase that Eurovia management do not have the possibility to outsource asphalt prototypes manufacturing to an external sub-contractor, as this is a part of their group's activities.
- ⇨ Moreover, there is only 2 manufactures producing hot poured asphalt mix in the Ile de France region, which are CIFA (belonging to Eurovia group) and another one belonging to Eurovia competitor.
- ⇨ Therefore, only extra-costs, which correspond to the difference between new asphalts' manufacturing costs (increased costs of components used for their production such as lighter aggregates, additives) and reference asphalts usually used manufacturing costs, will be claimed. Eurovia is aware that invoicing will exclude all elements of profit, VAT and overheads.
- ⇨ An explanatory note will be provided with the final reporting of Eurovia IDF costs on the project.

Technical aspects

Action A2 - Evaluation plan

5. Please explain why the evaluation plan mentions that the average profile between stations was assessed on each pilot site, using data collected in 2017 and 2018 (on p.20), whereas you mention in your progress report that no initial state measurement is available at all for the site Rue Lecourbe, and no data was collected in 2018 on the site Rue Frémicourt. Shouldn't the evaluation plan be revised accordingly?

Several problems occurred on the sites Lecourbe and Frémicourt regarding the thermal and microclimatic monitoring, due to climatic risks (RISK 1) and public works problems:

- Frémicourt: after the station break at the end of July 2017, the weather was bad and the summer of 2018 was devoted to public works on the street.
- Lecourbe: the station could be put up only a week before the beginning of the works. Unfortunately there was a problem of battery and few data were obtained that week

Consequently, for these 2 sites, the initial state could not be studied.
In the absence of an initial state, only the cooling effect of watering can be determined for Lecourbe and Frémicourt streets by a statistical test.
On the other hand, for rue de Courcelles, using the initial condition and the measures acquired after the works, the impact of the new pavement itself can be determined. If the roadway is watered, we can then determine the cooling effects of watering together with the effects of the new material. Using only post-work measurements for rue de Courcelles, a comparison of watered and non-watered days will allow us to isolate the effects of watering alone, like Lecourbe and Frémicourt streets. Statistically significant maximum and average impacts in terms of reduction in temperature and thermal stress can then be estimated.

Finally, since the implementation of the innovative coating took place during the summer of 2018 for each of the sites, no zero state could be measured for the thermal part, the measurements taking place exclusively in summer. The first measurements therefore took place during state "1". However, regarding the microclimatic evaluation, this is not annoying, because the life of the materials is about 20 years. This means that they can still be considered "new". Furthermore, this period of time will allow the coatings to become "dirty", which will make the measurements more representative of the actual action of the coatings. Finally, a beneficial impact is expected due to the light color of the coatings, the latter only appearing after slight surface wear of the materials.

Therefore, the “plan d’évaluation” has been updated in august 2019 in order to take into account the major deviations from the original methodology and annexed to this report.

I would like you to explain how the thermic performance will be assessed despite the lack of initial state analysis.

- **Microclimatic analysis: Courcelles**

The comparison of the initial state in the summer of 2019 will make it possible to:

1. Study the microclimatic impact of the material itself, using non-watered days for 2019;
2. Study the microclimatic impact of the material and watering at the same time, using watered days in summer 2019;
3. Study the microclimatic impact of watering on coatings.

- **Microclimatic analysis: Lecourbe and Frémicourt**

In the absence of an initial state, only the impact of watering on innovative coatings can be determined.

- **Thermal analysis**

No initial state for any site. In any case, the absence of initial state does not compromise the study of the thermal behavior of materials:

1. temperature at -5cm and heat flow with or without watering, and comparison with the control portions.

- **Preliminary laboratory tests (CIFQ 2019) (Hendel et al. 2018, Parison et al. 2019)**

1. Thermal trend, but not transposable in the state to in situ experiments
2. Doesn't predict pedestrian feeling
3. The manipulation in the laboratory does not allow to take into account the "water retention" aspect of the materials (because no runoff in the enclosure)

Similarly, the evaluation plan does not seem to take into account the late installation of the pilot sites and the impact on the "zero-state" analysis - it is mentioned in the description of action C1 in PR1 that CPX measurements (acoustic performance) and thermal measurements could not be taken because they require summer conditions.
Then I would have expected your evaluation plan to reflect the corresponding changes in the protocol.

- **"CPX" measurements**: all the rolling noise measurements were carried out at the end of March and the beginning of April 2019 in order to have meteorological conditions in accordance with the test operating mode, with a 5-6 months delay from the pilot sites installation. This has little impact on the measured sound levels because former experiences on monitoring of asphalt mixes show a loss of 0.4 to 0.5 dB (A) / year, therefore in our case the loss is 0.2 to 0 , 25 dB (A). We calculated a margin for error on the measurement of our test around 0.4 dB (A), greater than this loss. This discrepancy does not call into question the results of the measurements which may well be considered as those of the Zero State. There is no need to change the evaluation plan for the acoustic measurements. The annual monitoring measures will be postponed to this same period (March - April) to keep a gap of around twelve months between the measures and also to be able to have a more favorable period vis-à-vis the weather conditions (risk of cancellation of nights).

- For information, the monitoring since 2012 of acoustic coatings on the section of the Parisian peripheral boulevard of the Porte de Vincennes shows an average increase in the noise level of rolling about 0.5 dB (A) per year (City Study of Paris, Bruitparif). The various studies available on the subject confirm this order of magnitude (eg: "SETRA, New noise emission guide 2008," Forecast of road noise, Part 1: Calculation of noise emissions due to road traffic ", F. Besnard, JF Hamet, J. Lelong, N. Fürst, S. Doisy, E. Le Duc, V. Guizard, SETRA, June 2009. ").

On this basis, for the LIFE COOL & LOW NOISE ASPHALT project, the difference between the evaluation at "zero" state and that at 6 months is around 0.25 dB (A). It can be reassessed at the end of the project, when we have the annual average increases in dB / year associated with each of the innovative coatings.

Action C1 - Environmental assessment

6. Please explain what additional laboratory analyses were carried out exactly to overcome the lack of field data on thermal and micro-climatic conditions in the two pilot sites of Rue Frémicourt and Rue Lecourbe.

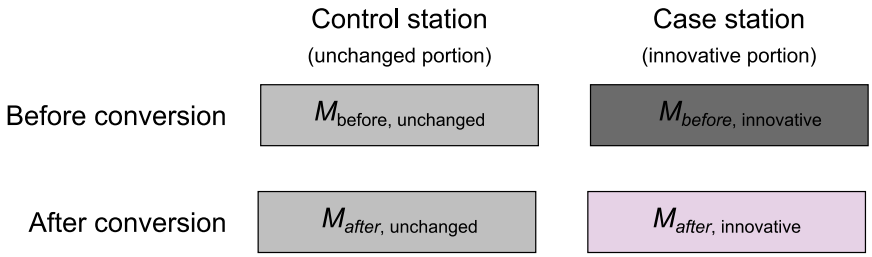
For Frémicourt and Lecourbe streets, the initial state could not be because:

- Frémicourt: after the station break at the end of July 2017, the weather was bad and the summer of 2018 was devoted to works on building site.
- Lecourbe: the station could have been put up only a week before the works. Unfortunately there was a problem of battery on the little data obtained that week

Consequently, for these 2 sites, the initial state could not be determined nor studied.

From summer 2019, after replacing the roadway, ΔM_{after} will be determined in the same way for the reference days.

In the absence of an initial state, only the cooling effect of watering can be determined for Lecourbe and Frémicourt streets by a statistical test on equation :



$$\Delta \boldsymbol{M}_{\text{après}} - \Delta \boldsymbol{M}_{\text{avant}} = \boldsymbol{I}_{\text{mesure atténuation}}$$

7. I note that the zero-state analysis could not be fully completed just after the asphalt mixes were laid down, as initially planned, and that it will be complemented with data collected in spring/summer 2019. Please assess in your next report, and also in your final report, the reliability of the data obtained and prove that this two-step analysis does not jeopardise the assessment of the environmental performance of the asphalt mixes. For the moment, this is not clear enough.

Acoustic measurements

- Evaluation compared to the initial state. Objective -3dB (A)

Rue Frémicourt	Site-works (zero state) -4,3 (state one)
Rue Lecourbe	- 1,2 Puma
Rue de Courcelles	- 3,5 Bbphon+

- **"Front" noise measurements**: the evaluation of the 'zero' state of Frémicourt-site (SMAphon) could not be achieved. This was due to major road repair works on the entire street, in particular on public lighting. Since the noise measurement station had to be installed and electrically connected to a new candelabra, the reinstallation could not be done until March 28, 2019, after the electrical connection work on the public lighting network completed. The results that will be presented in the report dedicated to the "zero" state correspond to the use of data over the period from 12/04/2019 to 31/05/2019 (SMAphon at young age - 6 months - state "one ").

Assessment period	Rue Frémicourt	Rue Lecourbe	Rue de Courcelles
State one	From April 12, 2018 to May 31, 2018 (50 days)	11-30 July 2018 (19 days)	From July 11, 2018 to September 24, 2018 (76 days)

Zero state	from April 12, 2019 to May 31, 2019 (50 days) (young age)	4-31 December 2018 (27 days)	From November 2, 2018 to December 31, 2018 (60 days)

The initial state was imposed by the finalization of the site selection and the start of works. We sought to maximize the number of days for the assessment of the initial state.
The zero state was dimensioned between the end of the works and the end of 2018. This corresponds to an evaluation of one to two months. If we increase the length, we lose the notion of "zero" state (the coating is no longer completely new).

- Assessment compared to reference coating. Objective -2dB (A)

Rue Frémicourt	Site-works (zero state) - 2,3 (state one)
Rue Lecourbe	[- 0,3 ; - 1,3] Puma 0
Rue de Courcelles	- 2,8 Bbphon+

The evaluation period corresponds to the zero and state one for the SMAphon (rue Frémicourt). For Lecourbe Street, the station characterizing the "innovative" section is closer to the traffic lane than that associated with the reference section (approximately 8 m and 12 m respectively). A corrective term must be taken into account. The Δ corresponded to an uncertainty on this corrective term. A specific measurement campaign has since been carried out on site on July 18, 2019 to assess the corrective term (2.4 ± 0.6 dB (A)). The most favorable value of 3 dB (A) has been hold so far.

In house facades, the reductions in noise levels associated with road surfaces are highlighted at night, when road traffic speeds are relatively higher and the other sources of noise reduced (works, human activity, etc.). For the other periods of the day, the acoustic indicators show a reduced or even zero benefit. The LA10 indicator from 10 p.m. to 6 a.m. clearly reflects the noise associated with passing isolated vehicles at night. It is therefore a good indicator for estimating the noise reductions to be attributed to the road surfaces tested. The table below summarizes the results obtained (deviations observed ΔLA10 22h-6h (all days combined); State "zero" for PUMA and BBphon +; State "one" for SMAphon.

LA10 **22h-6h**	**Compared to the existing**	**Compared to reference**
LIFE COOL & LOW NOISE ASPHALT goals After installation dB(A)	**-3**	**-2**
rue Frémicourt (SMAphon)	-4,0 -4,3*	-2,3
rue Lecourbe (PUMA)	0,7 -1,2*	0
rue de Courcelles (BBphon+)	-2,0 -3,5*	-2,8

* temperature correction due to summer changes- winter)

Action D1

8. In your future progress reports, please describe all the activities carried out in link to the tasks mentioned in the G.A., in a synthetic way, and discuss actual versus expected results. I found it difficult to find the information on the progress of certain tasks in your report, because it was scattered between the progress report itself and the annex 8. For instance, you do not mention the leaflet in your progress report, nor the exact number of notice boards (or rolls-up) produced.

- In this report, the networking activities are listed with precision (p. 25-26-27) and not only annexed in deliverable D1.5-6.

9. It seems that only two rolls-up have been produced: the photos in your deliverables show one copy in Rue Lecourbe and another one Rue de Courcelles, but what about the third pilot site? Please also explain what the "totems" are, and where they have been installed.

- The totems are the three metal structure display panels printed and installed in each of the three sites (a photo of each is shown in the deliverable D1.5-6). The rolls-up are the 2 kakemonos, they are used to support communication during conferences and events, the rest of the time they are kept at 103 Av. De France.

10. I noticed that several oral communications are planned in third countries (at least three in 2019, in Canada, India and Abu Dhabi). If you intend to declare the corresponding expenses to the project, please be aware that the value for money of such events for the project will be particularly looked at as well you have to demonstrate that taking part of such events are needed for the achievement of the objectives provide for in the G.A. Therefore, I invite you to make sure that the expenses are reasonable, duly justified and that the added value of the trip for the project is well explained.

- We provide a motivation letter attached to the conference grant request: we are aware that apparently some conferences have a too theoretical status from the concrete impacts of the project to be eligible. Nevertheless, we believe that intellectual and theoretical exchanges are the basis of the sustainability of these types of projects.

11. I invite you to expand the scope of projects you could network with, and include in particular the LIFE project Sustain Euro Road (2014-2017) led by national union of road transport companies Routes de France. The project website is available at http://sustainableroads.eu.

- The search for other partner projects, as well as the contact with those that have been identified is in action and the first results are shown in the deliverable D1.5-6.

Technical aspects

Action A1 Updated state of the art

Regarding water spreading, I encourage you to explore the possibility of re-using water that has already been used to clean the streets, which was mentioned during the visit. Is it technically / financially feasible?

- For the first watering year (2019) the water used was non-potable, the same used to clean the streets. For the second year, problems linked to traces of covid-19 virus in the non-potable water network forced the municipality to use the potable water to clean the streets.

Action B1 Development of the asphalt mixes and laboratory tests

I take note that you are carrying out laboratory tests to simulate the impact of heat waves and water spreading, which will complement the in-situ observations planned in the proposal. This is fully satisfactory and the costs of these additional tests are a priori acceptable.

- The action fell behind schedule as a result of the technical committee's decision to carry out complementary ICU tests to improve the choice of the formulas at the LEMVP from June to July 2018. This was a considered decision, regarding the delays in setting up the pilot sites. Late completion of this action did not cause any particular delays on other actions (action B2 concerning the setting up of the pilot sites was already behind schedule for other reasons). A RISK 2 (technological risk) has not yet, therefore, been flagged.

Action B2 Installation of the pilot sites

Please inform your external monitor about the decision of the municipality regarding the validation of the two pilot sites "Rue de Courcelles" and "Rue Lecourbe".

- The external monitor was informed as soon as the decision was made in summer 2018.

Action D1 Communication

I encourage you to dedicate sufficient resources to communication and dissemination activities, in line with the LIFE requirements and with the grant agreement signed with the contracting authority, EASME. Considering that 250 days are budgeted for the project coordinator on action D1.

- We are managing to dedicate a continuity to communication and dissemination activities, in order to achieve Life requirements.

Financial aspects Following the 1st visit of the external monitoring team (2018)

- Project cost account

COLAS, EUROVIA and Paris: Please confirm in your first progress report that a separate cost account was created for the project, indicate the code used and provide a print out / screenshot of this account.

⇨ No separate bank accounts were created for the project for Colas and Eurovia. As a public administration, the City of Paris bank account is managed by the public accountant and it's not possible for the City to create an additional account.

- Selection of subcontractors/Suppliers

Colas and Eurovia: please give more details on your methods to select subcontractors/suppliers.

⇨ All partners are aware of the obligation of competition procedures for subcontractors/suppliers. However, most of the subcontracts used by Colas and Eurovia for the project concerned the prototypes formulation and testing (B1) and installation of pilot site (B2).

⇨ For B1 action, tests requirements were so specific to the experimentation that few suppliers were able to provide the necessary tests.

For B2 action, we provided the external monitoring team with additional documentation (contract between Ville de Paris and COLAS IDFN signed before the beginning of the project, and technical offer from COLAS IDFN), which prove that COLAS IDFN had no other choice but to use the services of SPME (which is 100% owned by COLAS IDFN) to produce the innovative asphalt. This has been accepted by EASME in its letter dated in 2019 (2nd visit). Details on Eurovia are provided hereafter.

10.3. List of dissemination and networking actions D1

NATIONAL CONFERENCES					
1.	CPR	Journées techniques routières (02/2018)	06-07/02/2018	Nantes	DONE
2.	CPR	14ème congrès français d'acoustique (04/2018)	23-27/04/2018	Le Havre	DONE
3.	CPR	Matinale Technique organisée par « Routes de France IdF »	15/04/2019	Paris	DONE
4.	CPR	Matinée d'information sur les projets de trasport financés par l'EU en IdF	08/07/2019	Saint Ouen	DONE
5.	CPR	Assises de la mobilité en Île-de-France, organisée par Ile-de-France Mobilités	24/09/2019	Paris	DONE
6.	CPR	CEREMA	19/11/2019	Saint Ouen	DONE
7.	CPR	Atelier OID (Green Building Observatory)	30/01/2020	Paris	DONE
8.	CPR	Forum Acusticum 2020- décalé à cause du covid-19	7-11/12/2020	Lyon	ON GOING
9.	CPR	Pollutec	1-4/12/2020	Lyon	ON GOING
10.	CS	~~AIC 2020 - Changement climatique et territoires~~	~~1-4/07/2020~~	~~Rennes~~	CANCELED
11.	CS	Colloque International Franco-Québécois en énergie (CIFQ)	15-18/06/2021	Paris	FORESEEN
12.	CS	FUTUR Days 2020	1-3/12/2020	Marne-la-vallée	ON GOING
13.	CPR	Journées techniques routières (2021)	2021-2022	Paris	FORESEEN
14.	CPR	Assises nationales de l'environnement sonore (2021)	2021	***	FORESEEN
15.	CPR	Salon des maires (2021 ou 2022)	2021-2022	Paris	FORESEEN
INTERNATIONAL CONFERENCES					
16.	CPR	Euronoise - European Conference and Exhibition on Noise Control (2018)	27-31/05/2018	Hersonissons (Grèce)	DONE
17.	CS	Colloque International Franco-Québécois en énergie (CIFQ)	16-20/06/2019	Baie St-Paul (Canada)	DONE
18.	CPR	XXVIe Congrès mondial de la Route de Abu Dhabi (2019)	6-10/10/2019	Abu Dhabi (Émirats arabes)	DONE
19.	CPR	5th International Conference on Countermeasures to Urban Heat Islands (IC2UHI)	2-4/12/2019	Hyderabad (Inde)	DONE
20.	CS	Passive and Low Energy Architecture (PLEA) (2020)	1-3/09/2020	Coruna	ON GOING
21.	CPR	Eurasphalt and Eurobitume Congress ~~(2020)~~ 2021 décalé à cause du covid-19	~~2020~~2021	Madrid	POSTPONED
22.	CPR	~~Transport Research Arena (2020)~~	~~27-30/04/2020~~	~~Helsinki~~	CANCELED
23.	CPR	Euronoise (2021)	21-23/06/2021	Funchal	ON GOING
24.	CPR	ICSV - International Congress on Sound and Vibrations (2021)	22-23/04/2021	Boston	ON GOING
25.	CS	ICU11 2021 - Cities as Living Labs: Climate, Vulnerability and Multidisciplinary Solutions	30/08-3/09/2021	Sydney	ON GOING
26.	CPR	Transport Research Arena (2022)	2022	***	FORESEEN

SCIENTIFIC ARTICLES					
1.	AS	Suivi des performances acoustiques de revêtements de chaussées peu bruyants	**Colloque** : 14ème Congrès Français d'Acoustique (CFA 18)	04/2018	DONE
2.	AS	Monitoring the acoustic performance of lownoise pavements	**Colloque** : Euronoise 2018	05/2018	DONE
3.	AS	Cool and low noise asphalt - des revêtements innovants pour l'environnement à Paris	**Revue** générale des routes et de l'aménagement- RGRA n°960 pp : 66-73	01/2019	DONE
4.	AS	Analyse de flux de chaleur sur des revêtements de voirie classiques et innovants soumis à arrosage urbain	**Colloque** International Franco-Québécois en énergie (CIFQ)	06/2019	DONE
5.	AS	Projet life : Cool & Low Noise	XXVIe **Congrès** mondial de la	10/2019	DONE

		Asphalt à Paris	Route de Abu Dhabi (2019)		
6.	AS	The evaporative cooling and its impact on the urban climate: study of the influence of road covering materials	5th International **Conference** on Countermeasures to Urban Heat Islands (IC2UHI)	12/2019	DONE
7.	AS	Etude du Comportement Thermique et Microclimatique d'UN Revêtement Innovant	**Colloque** AIC 2020 - Changement climatique et territoires	04/2020	DONE
8.	AS	Projet cool & low noise Asphalt à paris - Premiers résultats	**Revue générale des routes et de l'aménagement RGRA** n°972 pp : 14-23	05/2020	DONE

NETWORKING ACTIVITIES			
PROJET	CONTACT PERSON	Type of foreseen exchange	period
OASIS schoolyards	Raphaëlle THIOLLIER Mission Résilience Ville de Paris raphaelle.thiollier@paris.fr David PINTO CAUE75 référent collège Octave Gréard david.pinto@caue75.fr	protocol for a day of exchange with the students	2019-2022
HEATLAND	Francisco Miguel MORAL MORENO Ingeniero Industrial Departamento de Energía y Acústica Centro Tecnológico de la Construcción Región de Murcia Polígono Industrial La Estrella - C/ Sol nº 16 Nave 2 30500 Molina de Segura - Murcia Tfno: 968-35 52 70 Fax: 968-35 52 71 Skype: ctconmurcia fmoral@ctcon-rm.com	Foreseen visits of each project	2020-2021-2022
'Cool Towns' Interreg 2seas	Dr Debbie BARTLETT Principal Lecturer & Programme Leader MSc Environmental Conservation Faculty of Engineering & Science, University of Greenwich Central Avenue, Chatham Maritime, Kent ME4 4TB +44 (0) 208 331 8478 mobile 07974 162045 Programme facebook: Environmental Conservation at the University of Greenwich Twitter: @EnvironConsUofG D.Bartlett@greenwich.ac.uk	Feedbacks on the on-going results	2020
Barcelona municipality	Xavier ROMERO Dep. Qualitat Ambiental Direcció de Serveis Energia i Qualitat Ambiental - Ecologia Urbana Ajuntament de Barcelona c. Torrent de l'Olla, 218-220, 3a planta 08012 Barcelona Telèfon 93 291 48 84 xromero@bcn.cat http://ajuntament.barcelona.cat/ecologiaurbana/	"The City of Barcelona wishes to study the possibility of using acoustic mixes in certain streets. We saw on your website that the three coatings of the project have already been implemented in three Parisian streets and that campaigns to measure noise and temperature have been in progress for over a year. We would be interested in intermediate results of these measures if they can be communicated. "	2020

10.4. Project team

Name and Surname	**Position**	**Time** *(full time, part time, 2 days per month)*	**Period** *(from…to…)*
CITY OF PARIS			
Kévin IBTATEN	Hydrologist engineer - Sound Policy Officer - Urban Ecology Agency	part time until 12/2018, max 2 days per month since 2019	from 2017
Olivier CHRETIEN	Head of the Impacts Health and Environment Division - Urban Ecology Agency	max 2 days per month	from 2017
Nicolas ROUGIER	Financial assistant - Urban Ecology Agency	max 2 days per month	from 2017
Ornella ZAZA	Project Manager - Urban Ecology Agency	full time	from 2018 to 2019
Giulia CUSTODI	Project Manager - Urban Ecology Agency	full time	from 2019
Jérôme LEFEBVRE	Head of Road Materials and Noise Division - Road directorate	part time until 12/2018, max 2 days per month since 2019	from 2017
Khelil MESSAOUDI	Technician - Road directorate	part time until 12/2018, max 2 days per month since 2019	from 2017 to 2019
Laurent CHAVENTON	Technician - Road directorate	part time	from 2017 to 2018
Eric LECOCQ	Technician - Road directorate	part time until 12/2018, max 2 days per month since 2019	from 2017 to 2019
Agathe COHEN	Head of governance and institutional relation unit - Water directorate	part time until 12/2018, max 2 days per month since 2019	from 2017
Sophie PARISON	PHD Student, Climate Measurement monitoring - Water & road directorates	part time	from 2017 to 2019
Sophie LE GRAND	Administrative and Financial Coordinator	max 2 days/months	from 2017

BRUITPARIF			
Fanny MIETLICKI (FAMI)	Director	part time until 12/2018, max 2 days per month since 2019	from 2017
Matthieu SINEAU (MASI)	Senior acoustician engineer and operations manager	part time until 12/2018, max 2 days per month since 2019	from 2017
David GUINARD (DAGU)	Instrumentation and operation technician	part time	2017
Alexandre FOUCHE (ALFO)	Instrumentation and operation technician	part time	from 2017 to 2018
Carlos RIBEIRO (CARI)	Senior acoustician engineer and statistician	part time	from 2017
Antoine PEREZ MUNOZ (ANPM)	Responsible for relations with local authorities and external stakeholders	part time until 12/2018, max 2 days per month since 2019	from 2017
Philippe NGUYEN (PHNG)	Instrumentation and operation technician	max 2 days per month	from 2019
Maxime BERTON (MABE)	Acoustician engineer	max 2 days per month	from 2019
Arthur BANSARD (ARBA)	Instrumentation and operation technician	max 2 days per month	from 2019
COLAS			
Eric GODARD	Technical Director - Colas Project Manager	part time	from 2017
Jean LALO	Director - Finance and Administrative Steering	part time	from 2017 to 2019
Laurent BRISSAUD	Head of Department - surfacing formulation laboratory	part time	from 2017
Caroline LATHIERE	Administrative Manager - Accounting	max 2 days per month	from 2019
Julien VAN ROMPU	Research and development engineer - Senior manager for formulation	part time	from 2017 to 2018
Jean-François GAL	Deputy technical director in charge of quality	part time	from 2017
Sébastien BRUHAT	Deputy technical director in charge of road services	max 2 days per month	2018
Ismael MILI	Laboratory technician (Monitoring Sites)	max 2 days per month	2018
Joseph RAVIER	Technical Assistant	max 2 days per month	2018
Benjamin NOQUET	Laboratory technician (video auscultation)	max 2 days per month	2018

Amandine TERREUX	Head of the "Industries" service (monitoring surfacing manufacture)	max 2 days per month	2018
Abderrazak NMILI	Laboratory Technician (Manufacturing Inspection)	max 2 days per month	2018
Marie-Lou LESTRADE	Junior formulation Engineer (temporary contract)	full time	from 2017 to 2018
EUROVIA MANAGEMENT			
Lionel GRIN (cadre)	Technical Delegate Director	part time until 12/2018, max 2 days per month since 2019	from 2017
Florent GAZANIOL (cadre)	Technical assistant engineer	part time until 12/2018, max 2 days per month since 2019	from 2017
Jérôme BOTTAZZO (ETAM)	Technician superior	part time	from 2017 to 2018
Stéphane FAUCON-DUMONT (cadre)	National technical engineer	part time	from 2017 to 2018
Jacques-Antoine DECAMPS (cadre)	R&D engineer	part time	from 2017 to 2018
Thomas GIANETTI (ETAM)	R&D Technician superior	part time	from 2017 to 2018
André HIRRIEN	Consultant	full time of his contract	from 2017 to 2019