

6<sup>th</sup> February 2024  
Online Meeting

COOL  
& LOW NOISE  
ASPHALT PROJET  
LIFE

Networking Meeting  
Solutions for Low Noise  
Road Surfaces



Ce projet est financé  
par le fond européen Life  
LIFE16/ENV/FR/000384

Paris' experience of 3  
innovative asphalt  
formula :

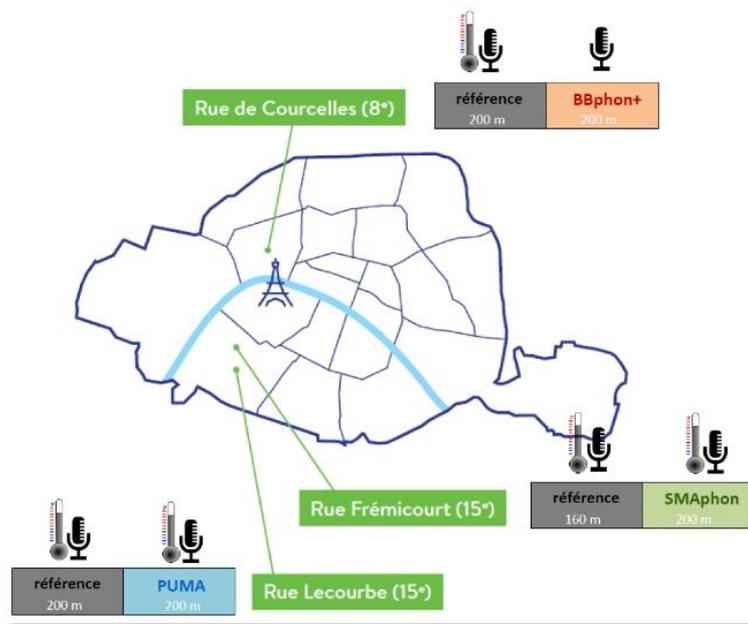
the LIFE ASPHALT  
project

speaker Giulia Custodi, project manager  
(Environmental policy – Paris municipality)



## PARIS' EXPERIENCE OF 3 INNOVATIVE ASPHALT FORMULA : THE LIFE ASPHALT PROJECT

- > Ville de Paris
- > Bruitparif
- > Mairie du 8e
- > Mairie du 15e
- > Université Paris Cité  
Lied Pieri
- > Colas
- > Eurovia



## PROJECT IDENTITY CARD

### Project location :

Paris - 3 pilot sites  
(rue Frémicourt, rue Lecourbe and  
rue de Courcelles)

### Project start date :

2017

### Project end date :

2023

### Total budget :

2.3 M€ invested including 1.3 M€  
of European funding

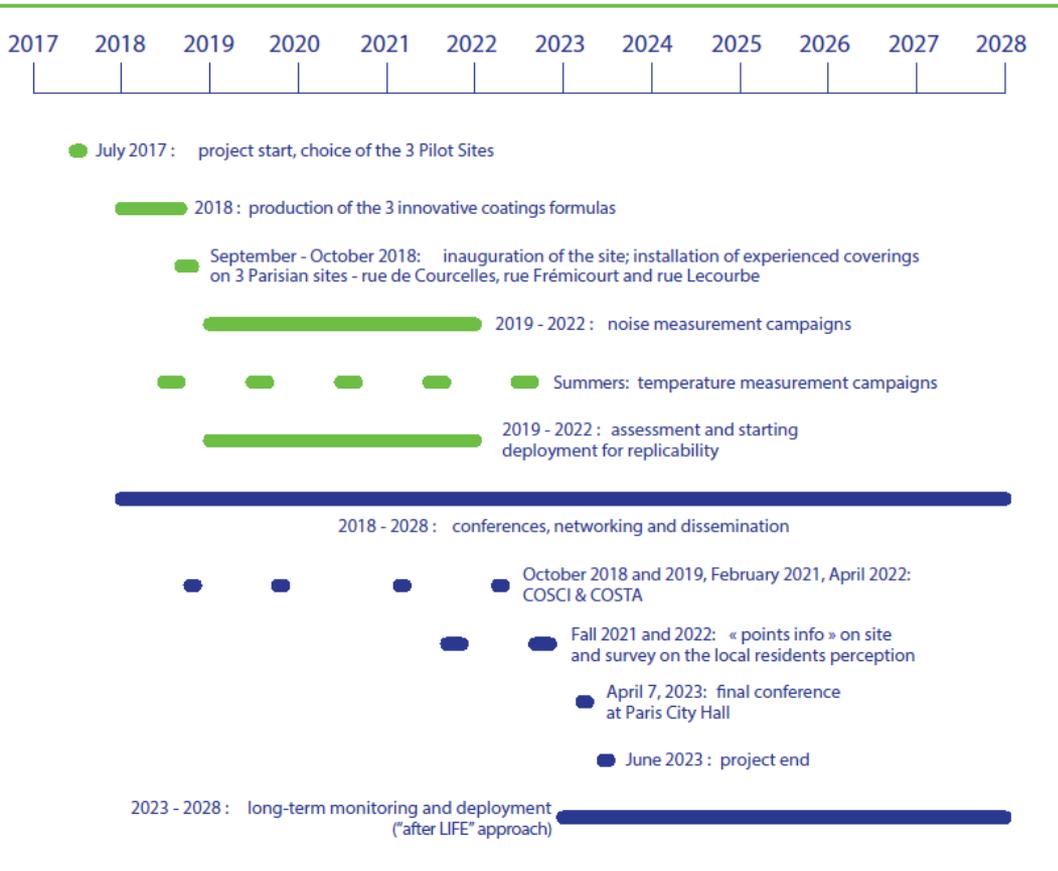
### Financial partners :

LIFE fund LIFE16/ENV/FR/000384  
and the City of Paris

### Immediate beneficiaries :

1000 Parisians impacted

# The project agenda



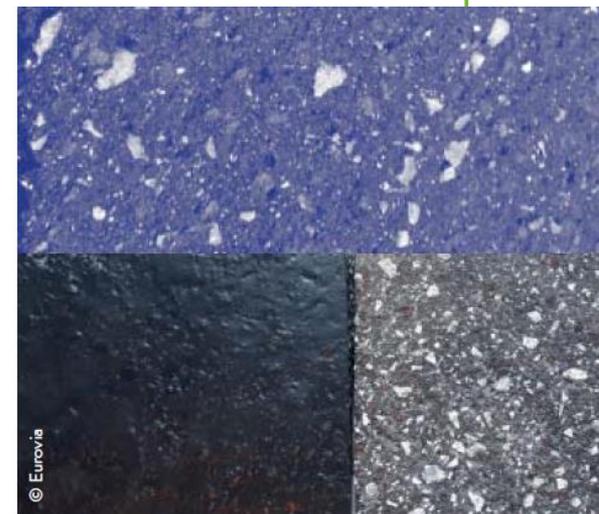
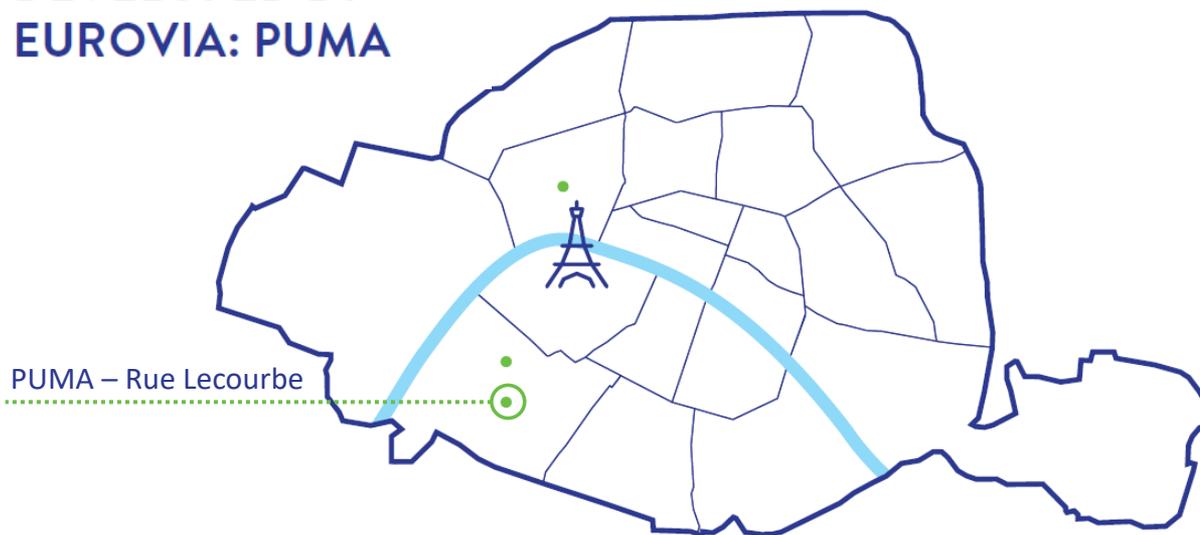
EXPERIMENTATION AND EVALUATION

ANIMATION AND COMMUNICATION



# 2018 : the formulation of innovative asphalt mixes

THE FORMULATION DEVELOPED BY EUROVIA: PUMA



As part of this project, EUROVIA has developed an innovative formula for hotcast asphalt road surfacing.

➤ **The product formulation was carried out on PUMA asphalt pavement.**

The mechanical study was carried out on the PUMA bonding coat/asphalt complex in order to solve the constraints of the pilot site (implementation of a thin layer of coated material then the PUMA coating without reworking the foundation).

# 2018 : the formulation of innovative asphalt mixes



THE 2 FORMULATIONS DEVELOPED BY COLAS: BBPHON+ AND SMAPHON



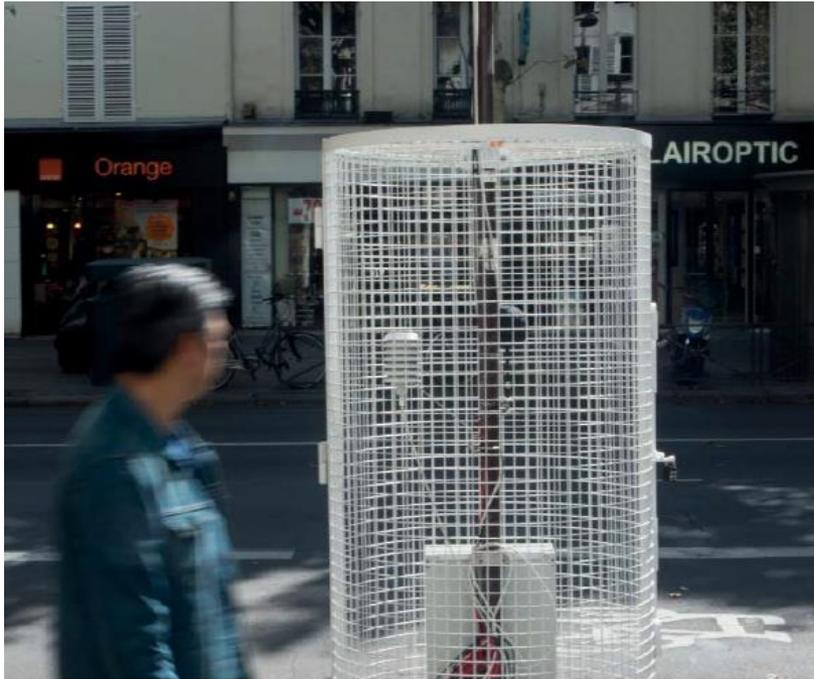
> **BBphon+ (BB 0/6)** with high acoustic quality. This formula was developed in order to reduce significantly the level of traffic noise.

> **SMaphon (BB 0/10)** allows acoustic gain in the most restrictive urban areas.

The pale aggregates used in the design of these two coverings contribute to reducing the absorption of incident solar radiation. Stripping the black bituminous binder due to traffic reveals the natural color of the aggregates.

These mix formulas have been validated under the most severe conditions used to date at European level.

PARIS' EXPERIENCE OF 3 INNOVATIVE ASPHALT FORMULA :  
THE LIFE ASPHALT PROJECT



Rue de Courcelles  
© COLAS - Joachim Bertrand



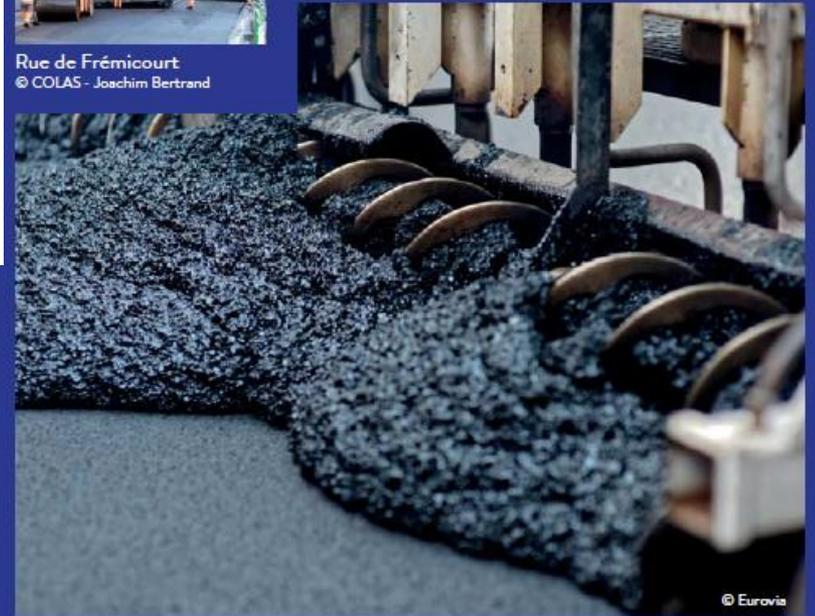
© Eurovia



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Rue de Frémicourt  
© COLAS - Joachim Bertrand



© Eurovia



# Measurement methodologies

## A. THERMAL MEASUREMENTS

### HEAT FLOW MEASUREMENT AND TEMPERATURE, ALBEDO EFFECT OF THE COATING, WATERING



Heatwave alert level

$T_{air}^{max} > 31\text{ °C}$

$T_{air}^{min} > 21\text{ °C}$

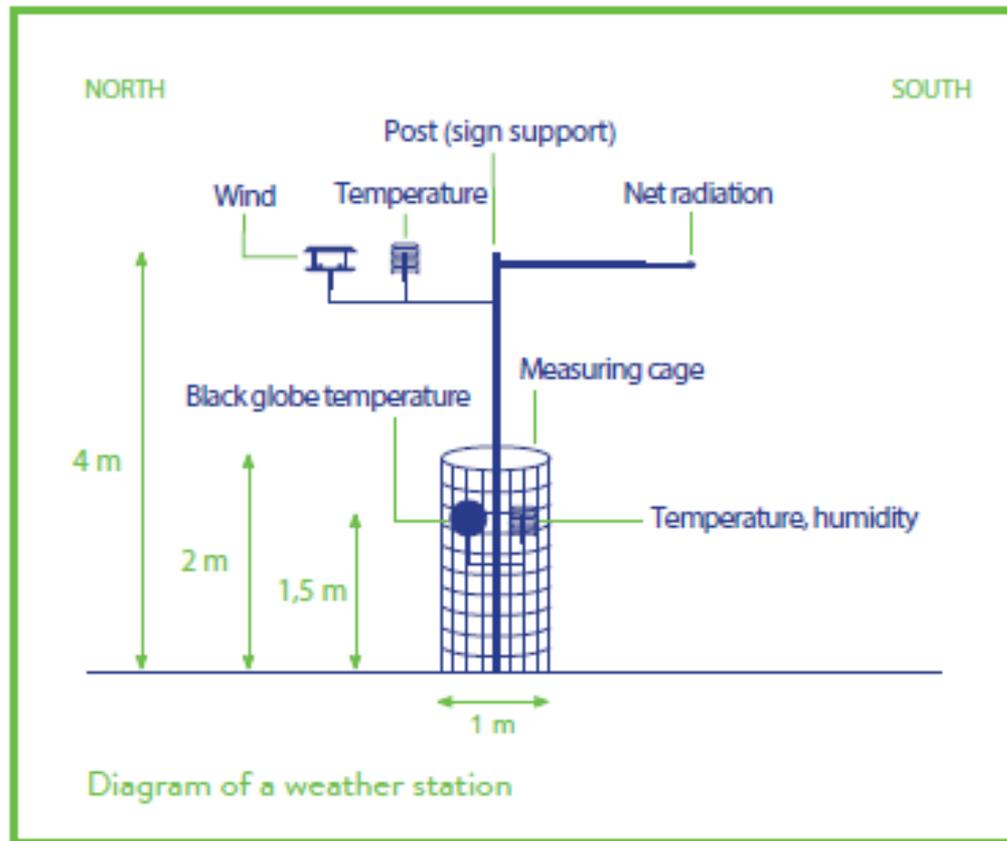
Pavement watering criteria

$T_{air}^{max} > 25\text{ °C}$

$T_{air}^{min} > 16\text{ °C}$

Wind speed < 10 km/h

Cloud cover: sunny



Road thermal sensors

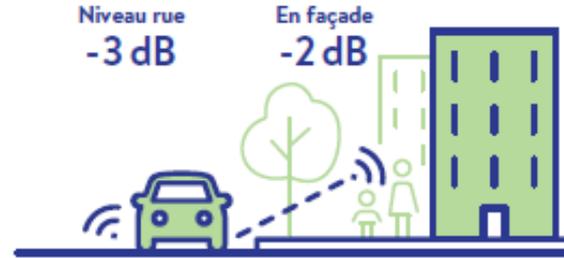
# Measurement methodologies

## B. ACOUSTIC MEASUREMENTS

### 3 YEAR OBJECTIVE

Niveau rue  
-3 dB

En façade  
-2 dB



# Listening to Parisians

## THREE STANDS TO COMMUNICATE THE RESULTS AND COLLECT THE FEELINGS

The LIFE ASPHALT team met on site with residents of the streets affected by the experiment, with information points organized twice on each site in 2021 and 2022.



SEPTEMBER 25, 2021: RUE LECOURBE



SEPTEMBER 18, 2021: RUE FRÉMICOURT



OCTOBER 2, 2021: RUE DE COURCELLES



## SATISFACTION SURVEY\*

Since changing the coating of pavement in the last quarter of 2018

**63%** of respondents noted a reduction in road noise.

### BENEFITS AND PERCEPTION

**- 3 décibels**  
is equivalent to  
dividing the road traffic **by 2**

### AMONG THEM

**32%**  
consider this reduction to be low

**44%**  
consider it average

**23%**  
consider it important

**82%**  
attribute this reduction to the component  
"Rolling noise"

**6%**  
attribute it to the component  
« Engine sound »

\*A satisfaction survey on the perception of road noise was implemented in situ in October 2019 among users and residents of rue Frémicourt. The questionnaire is available on the website.

# THERMAL RESULTS

## THERMAL MEASUREMENTS

*Impact of watering in the three pilot sites in 2019, 2020 and 2021 combined  
LIFE objectives: -1.5 to 2.5 Maximum effect in 2021*

RUE FRÉMICOURT <sup>(1)</sup>				
Impact of watering on the innovative zone				
	Air temperature at 1.5m		UTCI <sup>(2)</sup> at 1,5 m	
Maximal reduction	-0,8 °C		-2,4 °C	
Mean effect	-0,3 °C		-0,7 °C	
RUE LE COURBE				
	Impact of watering on the innovative zone		Impact of watering on the reference zone	
	Air temperature at 1.5m	UTCI <sup>(2)</sup> at 1,5 m	Air temperature at 1.5m	UTCI <sup>(2)</sup> at 1,5 m
Maximal reduction	-0,8 °C	-2,1 °C	-0,5 °C	-1,4 °C
Mean effect	-0,5 °C	-0,9 °C	-0,3 °C	-0,6 °C
RUE DE COURCELLES				
	Impact of watering on the innovative zone		Impact of watering on the reference zone	
	Air temperature at 1.5m	UTCI <sup>(2)</sup> at 1,5 m	Air temperature at 1.5m	UTCI <sup>(2)</sup> at 1,5 m
Maximal reduction	-0,8 °C	-1,9 °C	-0,6 °C	-2,1 °C
Mean effect	-0,4 °C	-0,7 °C	-0,3 °C	-0,7 °C

# Socio-economic impacts of thermal results



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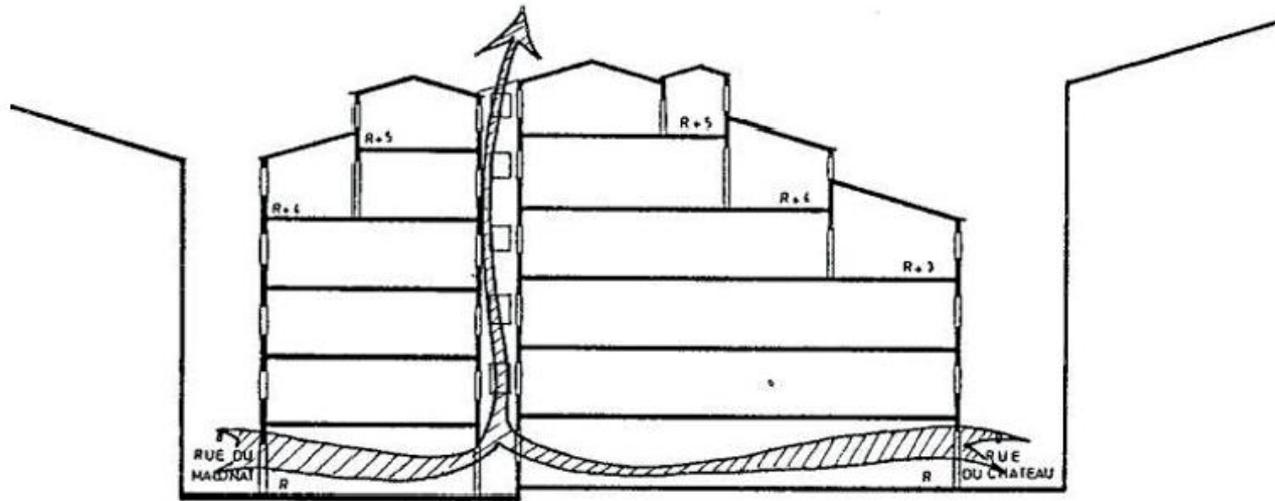


Figure : Section of the natural ventilation system powered by watering the streets and the interior courtyard of a building in Old Nice.

Source : PETITCOLLOT Christophe, « Nice : la cité sous le vent », *Science et avenir*, n°475, 1986, p. 76-79.

# ACOUSTIC RESULTS

Rolling noise $\Delta$ LA10 22h-6h	COMPARED TO THE EXISTING					COMPARED TO THE REFERENCE				
	2018	2019	2020	2021	2022	2018	2019	2020	2021	2022
LIFE objectives	-3	$\leq -2$				-2	$\leq -1$			
Rue Frémicourt (SMaphon)	-4,0	-3,7	-2,0	-2,8	-2,8	-2,3	-1,8	-1,2	-0,9	-0,4
	-4,3*	-3,9*	-2,9*	-3,3*	-3,0*					
Rue de Courcelles (BBphon+)	-2,0	-1,9	-0,7	-0,9	-1,0	-2,8	-2,6	-2,4	-1,4	-1,3
	-3,5*	-2,7*	-2,1*	-2,0*	-1,8*					
Rue Lecourbe (PUMA)	0,7	-0,1	0,6	-0,1	-0,4	--	--	--	2,7**	2,8**
	-1,2*	-1,1*	-1,1*	-1,4*	-1,5*					

Table: Differences observed  $\Delta$ LA10 10 p.m.-6 a.m. (all days combined); \*temperature correction; \*\* roadway distance correction



# ACOUSTIC RESULTS

CPX	COMPARED TO THE EXISTING				COMPARED TO THE REFERENCE			
	2019	2020	2021	2022	2019	2020	2021	2022
$\Delta$ LAeq at 50 km/h								
LIFE objectives after installation in dB(A)	-5		$\leq -3$		-3		$\leq -2$	
Rue Frémicourt (SMAphon)	-4,4	-2,3	-2,0	-1,6	-3,5	-2,2	-2,1	-2,0
Rue de Courcelles (BBphon+)	-4,7	-2,4	-1,8	-1,4	-3,3	-1,5	-1,3	-1,1
Rue Lecourbe (PUMA)	-2,1	-1,9	-1,5	-1,4	--	--	+1,6	+1,8

Table: Results of CPX measurements at 50 km/h; years 2019 to 2022.

## TO NOTE

The reduction in sound levels is greatest at night when single vehicles pass, higher speeds and other sources of noise are reduced (works, human activity, etc.).

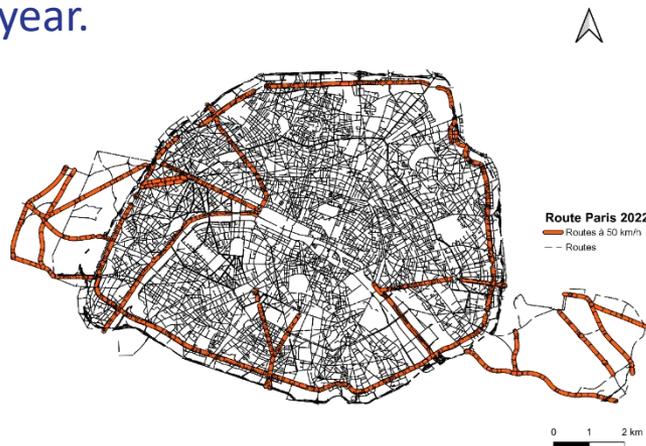


# Socio-economic impacts of acoustic results

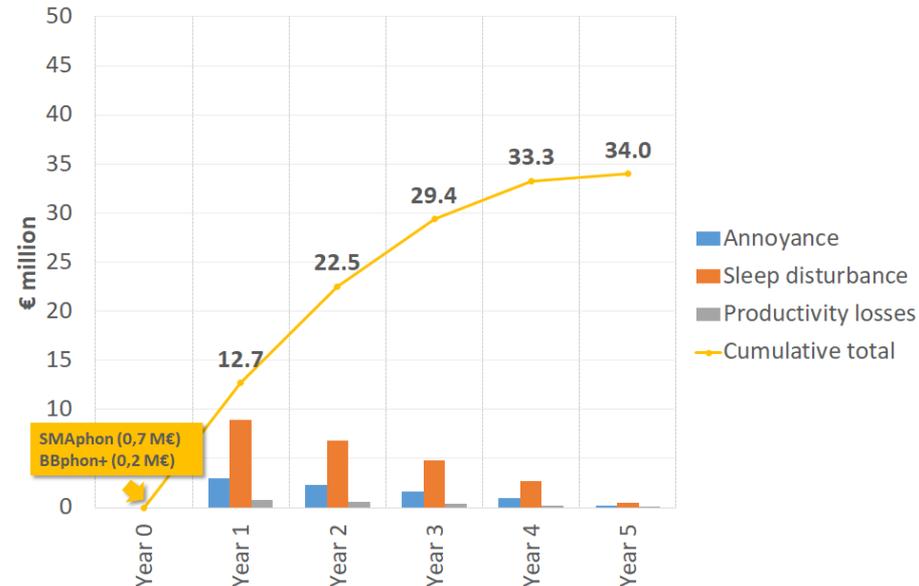


If the 50km/h Paris road network is treated, the savings made by innovative mixes (SMaphon and BBphon+) compared with standard mixes (BBM0/10) are of the order of **€34 million** after 5 years.

The extra cost would be recovered in the first year.



Savings associated with innovative asphalt mixes compared to standard asphalt mixes  
 50 km/h Paris road network



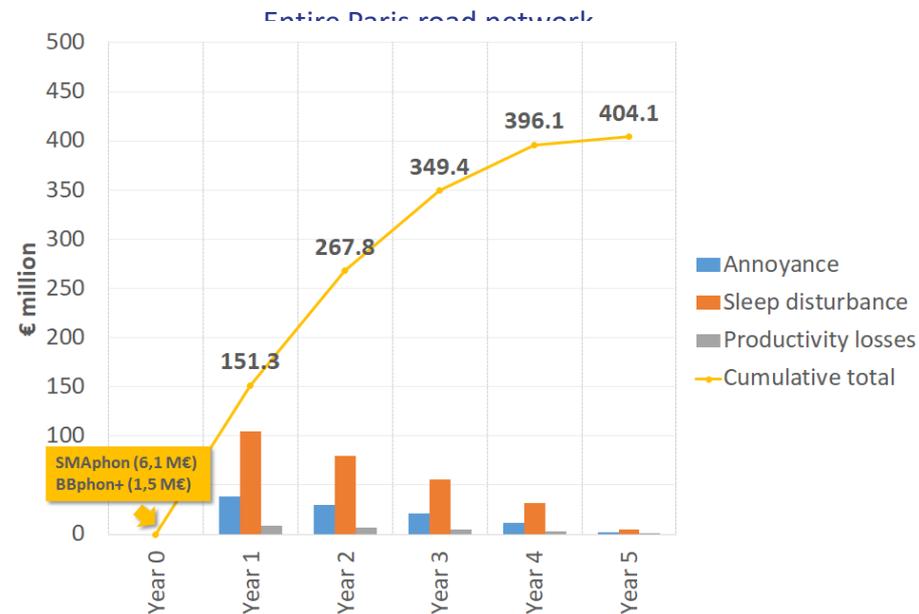
# Socio-economic impacts of acoustic results



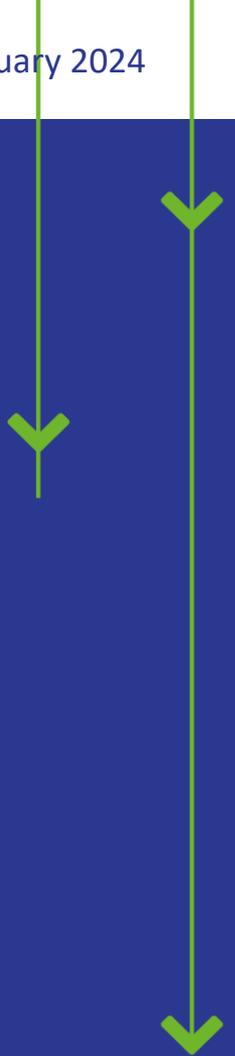
If the entire Paris road network is treated, the savings would be in the order of **€400 million** after 5 years.

The extra cost would be recovered in the first year.

Savings associated with innovative asphalt mixes compared to standard asphalt mixes



# 2023 - 2028 : AFTER-LIFE ACTIONS



# Acoustic performance monitoring

## › One near-field noise measurement campaign (CPX) per year.

- This will allow us to know the durability of sound-proof coatings in terms of acoustic performance.
- These data will complement those already measured on the Paris ring road.

## › Maintaining sound measurement devices on the facade.

- Their use will make it possible to assess the impact of road development on overall noise reduction over time.
- These data will complement those already measured on the Paris ring road.
- Operational maintenance of permanent noise measurement stations.

## › Missions carried out each year :

- Use of facade noise measurement data (LAeq1s).
- Use of meteorological data Météo France (Paris Montsouris).
- Calculation of acoustic indicators LA10 and LAeq on the facade (day/evening/night) per calendar year.
- Updating results on the LIFE project website.

## › Missions carried out every 2.5 years :

- Use of LAeq results on the facade (day/evening/night) per year.
- Assessment of the health impact associated with the noise component (DALY discomfort and sleep disturbances) per year.
- Updating results on the LIFE project website.
- Publication and presentation of results in conferences with a European and/or international dimension.

## MECHANICAL PERFORMANCE MONITORING

- A Monitoring Committee (COSUI) per site and per year.
- An average texture depth (PMT) measurement campaign per site and per year.

## THE COMMUNICATION PLANNING

- COLAS and EUROVIA have written a note including all the information necessary for the production of the products (SMaphon, BBphon+ and PUMA) as a contribution to the replicability of the techniques on a European scale.
  - The dissemination and publication of specifications related to the project will be done via internal channels and the website [life-asphalt.eu](http://life-asphalt.eu)
- The partners commit to participate in conferences, congresses and technical days around the themes of the project, and to publish scientific articles on the experimentation of the project.



# COOL & LOW NOISE ASPHALT

PROJET  
*LIFE*

Thank you for your attention!



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