# ASECAP DAYS

MILANO 2024

ATLANDES

A63 Salles / St-Geours-de-Maremne

ORGANIZED BY

ASECAP

HOSTED BY

Aiscat

milanoserravalle

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# Detailed assessment of GHG emissions from pavement renewal works

**A63 motorway - France**

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# The project: pavement renewal on the A63 motorway

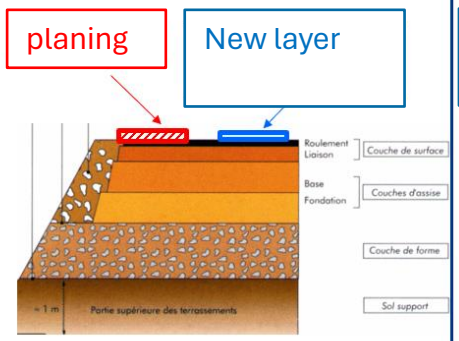
## Key figures

Road repairs (right lane) on **104 km** in both directions:
- Surface course (145 km)
- Restructuring (63 km)

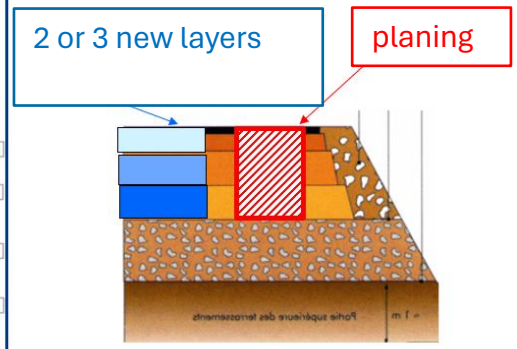
39 weeks of work, divided into **4 phases over 2 years**

Installation of a living base with asphalt mixing plant

**Surface course 145 km**




**Restructuring 18 zones (63 km)**




# FRAMEWORK OF THE CARBON STUDY

**<u>Objectives</u>: evaluate the GHG emissions generated by the worksite by carrying out two carbon assessments:**

- → **Pre-project phase:** based on estimated data
- → **During the construction phase: based on** actual data collected from site contractors

## Scope of the study

All direct emissions (scope 1) and indirect emissions (scope 2 and 3):

- → **Transport:** *of machinery, materials, drinking water, employees inside and outside the worksite*
- → **Materials manufacturing:** *asphalt mixes, aggregates, bitumen, etc.*
- → **Laying:** *consumption of asphalt mixing plants, generators, site machinery, etc.*
- → **Waste:** *rubble, building waste, etc.*

# UPSTREAM STUDY: Estimated data and ratios

**Estimated quantities**

**Data source :**
Lump-sum items taken from the project estimates in the design study

| Category | Emissive stations | Unit |
|---|---|---|
| Road repairs | Planing | $m^3$ |
| | Bituminous mixes | $m^3$ |
| | Posting | km of track |
| | Horizontal signs | km of track |
| Staff/Living base | Staff | people |
| | Base Vie | $m^2$ |

X

**Ratios /**
***Emissions* factor**

**Emission Factors sources:**

→ ADEME carbon base

→ REX EGIS on similar sites

→ CEREMA guide
(FE aggregates level 2 )


=

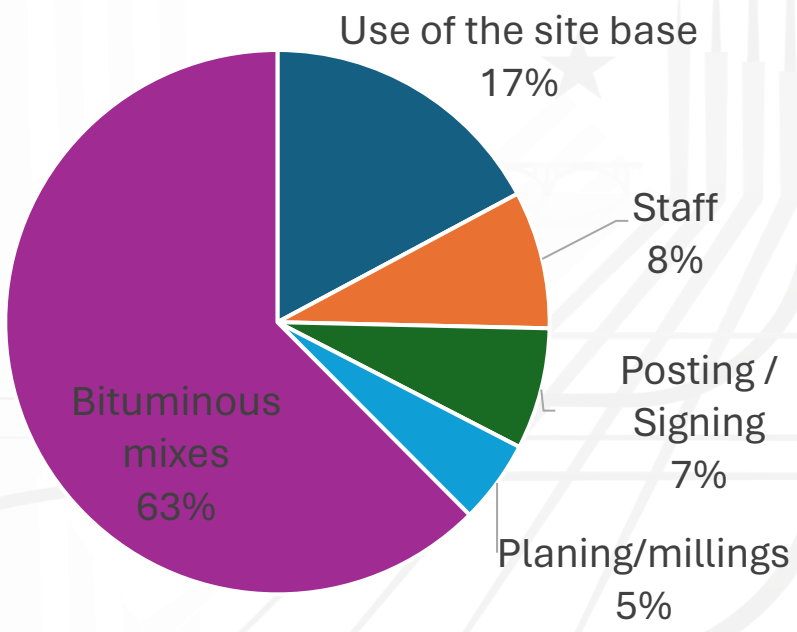
**Emissions of Greenhouse gases**
*in tCO2eq*

*Estimated results to give an initial order of magnitude*

# UPSTREAM STUDY: Results

First estimate of carbon footprint: 8730 tCO2eq

## Breakdown of emissions by category




The manufacture and laying of **bituminous mixes is the** item with the highest impact, accounting for **63%** or 5453 tCO2eq.

Three other items make a significant contribution to GHG emissions:

- → Use of the site base
- → Staff (commuting)
- → Works posting and signing

# WORKS: Data collection

Data collection requires :

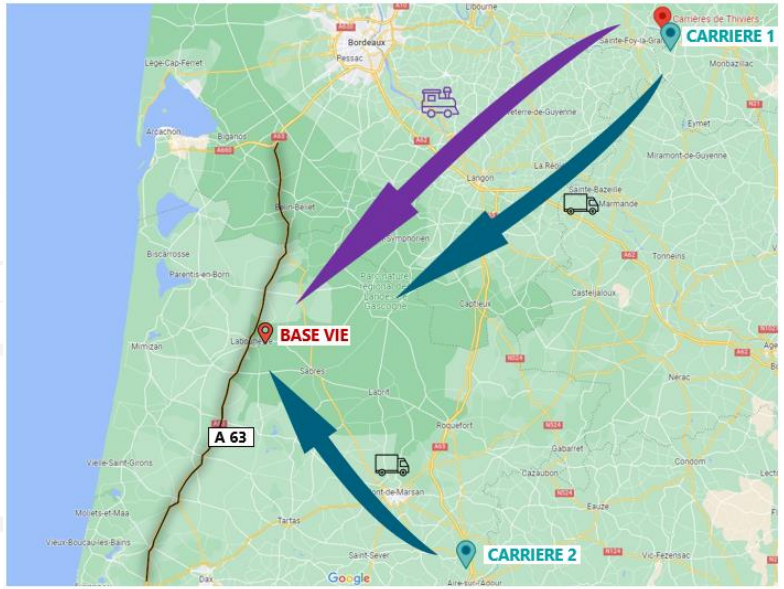
- **Strong collaboration between** contractors
- A framework and good communication on the type of data expected
- Anticipation and close monitoring (weekly basis)

→ Three actions to reduce emissions were implemented during the works:

**Replacing the oil-fired asphalt mixing plant with a gas-fired plant**

**Increased reuse of asphalt millings**

**Transporting aggregates by rail**




Aggregates sourced from **2** local **quarries**:

Quarry 1 > Base Camp: 260 km rail + 25 km road

Quarry 1 > Remote site: 219 km of road
Quarry 2 > Base Camp: 85 km by road

# WORKS: Data collection

**Actual quantities**

→**<u>Wide range of data collected in the field :</u>**

Materials quantities (kg)

Distances travelled by type of transport (km)

Fuel consumption (l)

Duration of equipment use (h)

X

**Emission factors more *precise***

**<u>Sources of Emission Factors :</u>**

→ADEME carbon base

→CEREMA guide (level 3)

→REX EGIS on similar sites

=

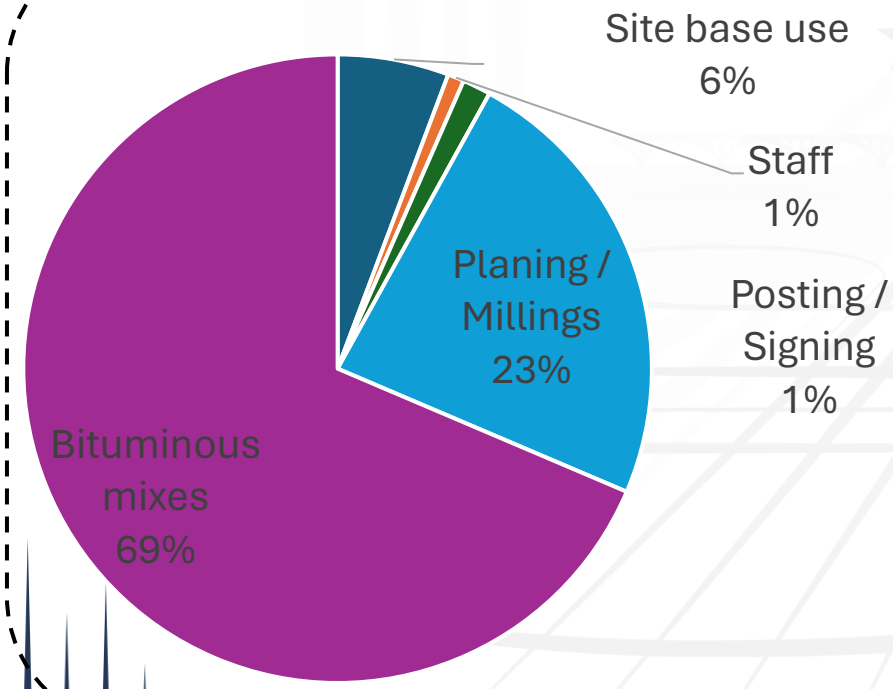
**Emissions of Greenhouse gases** *in tCO2eq*

*Results obtained from real quantitative data*

# WORKS: Results

Carbon footprint of the site calculated on actual quantities: 9812 tCO2eq

## Breakdown of emissions by category




The manufacture and laying of **bituminous mixes is the** item with the highest impact, accounting for **69%** or 6730 tCO2eq.

Two other items make a significant contribution to GHG emissions:

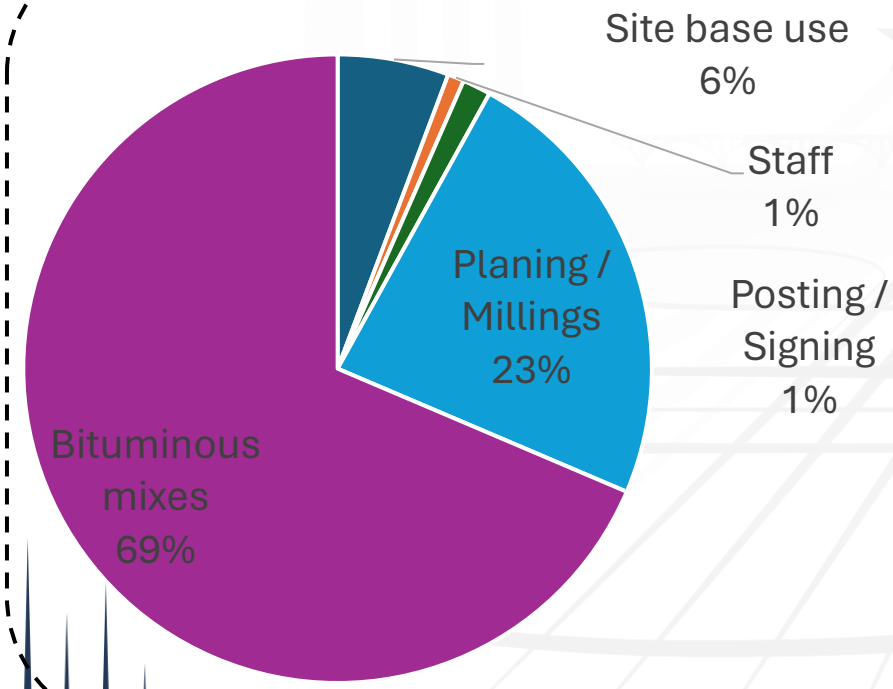
→ Milling / Planing

→ Use of the site base

# WORKS: Impact of optimisations implemented

Carbon footprint of the site calculated on actual quantities:
9812 tCO2eq

## Breakdown of emissions by category

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Two other items make a significant contribution to GHG emissions:

→ Milling / Planing

→ Use of the site base

# WORKS: Impact of optimisations implemented

→ Three reduction actions adopted during the works: 1,833 tCO2eq avoided

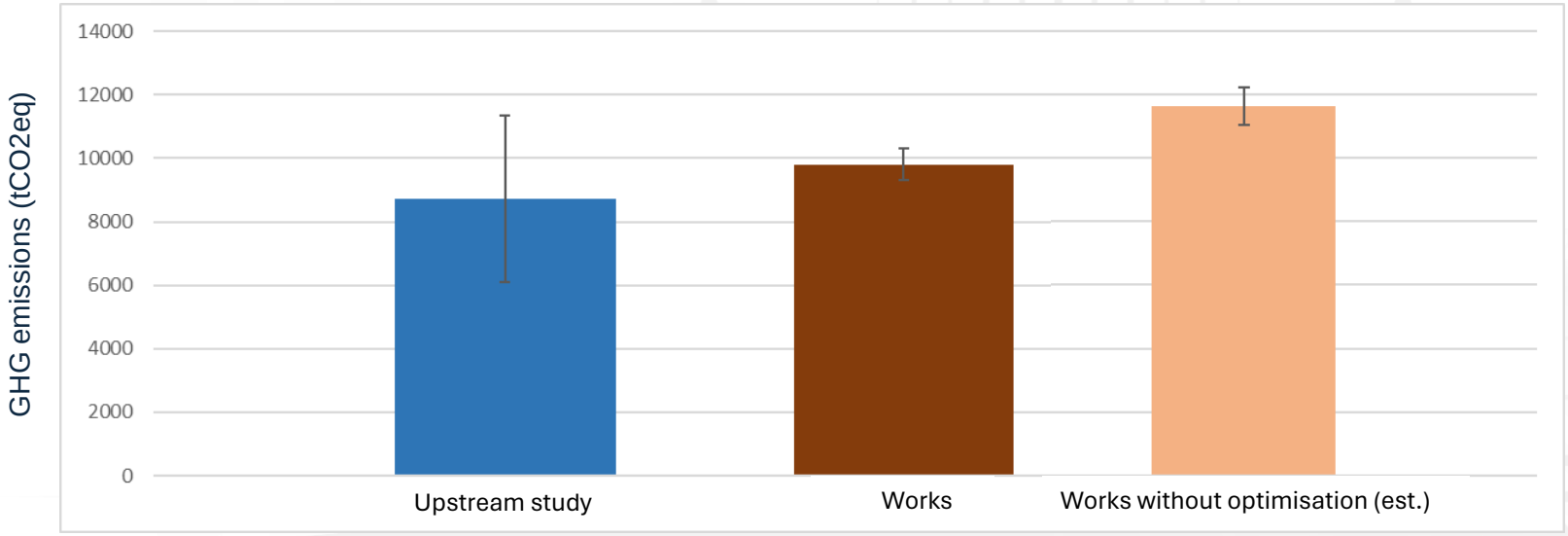
**Replacing the oil-fired asphalt mixing plant with a gas-fired plant**
allowing a reduction of
**717 tCO2eq**
(despite additional emissions due to the use of road aggregate)

**Aggregates transport by rail instead of road**
saving
**928 tCO2eq**
(GHG emissions linked to the transport of 47,000 tonnes of materials by train VS road)

**Increased reuse of** asphalt **millings**
40,500 tonnes of milled material recycled (35% more than forecast), enabling a reduction of **188 tCO2eq** (GHG emissions linked to transport for disposal and treatment at landfill sites)
(but an increase in the plant's energy consumption, offset by the use of a lower-emission gas power plant)

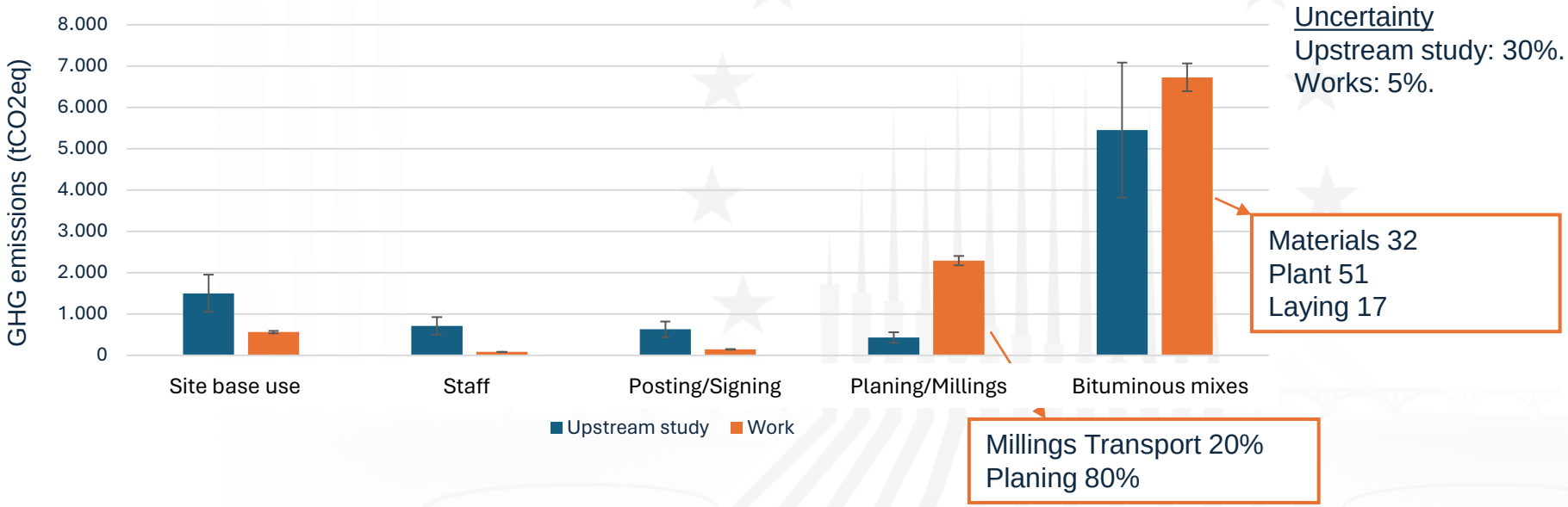
# COMPARISON OF RESULTS: preliminary study / works

**Results at the end of the project are generally of the same order of magnitude as the initial estimate (taking into account the uncertainties associated with each calculation).**




Uncertainty
Upstream study: 30%.
Work: 5%.

# COMPARISON OF RESULTS: preliminary study / works




Uncertainty
Upstream study: 30%.
Works: 5%.

Materials 32
Plant 51
Laying 17

Millings Transport 20%
Planing 80%

**Site base :** Slightly different scope of calculation (site base installation works)

**Staff comuting:** Adjustment of actual quantities

**Posting/ Signing :** Slightly different scope of calculation (installation of road signs upstream / overestimation of equipment required)

**Milling / Planing :** Adjustment of actual quantities (greater distances)

**Bituminous mixes:** Slightly different calculation perimeter (mobile plant / tack coat)

# CONCLUSION: key points

- There are several tools for calculating carbon emissions, but whatever the tool used, the uncertainties, perimeters, etc. must be considered and understood.
- The calculation perimeters must be explicit so that comparisons can be made between phases and/or between objectives and actual results.
- The players involved are increasingly aware of the carbon impact, which makes it possible to carry out works emission assessments, but the need for data must be anticipated and the study must be regularly monitored.
- Integrating carbon performance into tendering documents and monitoring requires carbon expertise (in relation to scope, uncertainties, etc.).

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MILANO 2024

# THANK YOU

## *GRAZIE*


Olivier QUOY
Olivier.quoy@a63-atlandes.fr
+33 6 61 30 71 66

Valérie ROBINET
valerie.robinet@egis-group.com


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A63 Salles / St-Geours-de-Maremne

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