ASECAP DAYS

MILANO 2024

ATLANDES

A63 Salles / St-Geours-de-Maremne

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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)

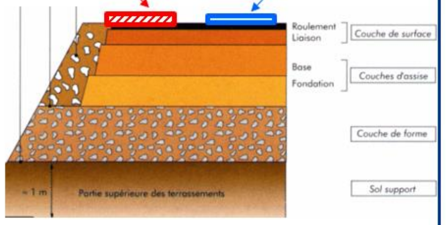
39 weeks of work, divided into **4 phases over 2 years**

Installation of a living base with asphalt mixing plant

Surface course 145 km

planing

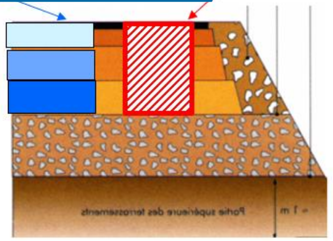
New layer



Restructuring 18 zones (63 km)

2 or 3 new layers

planing



FRAMEWORK OF THE CARBON STUDY

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Objectives: 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)

=

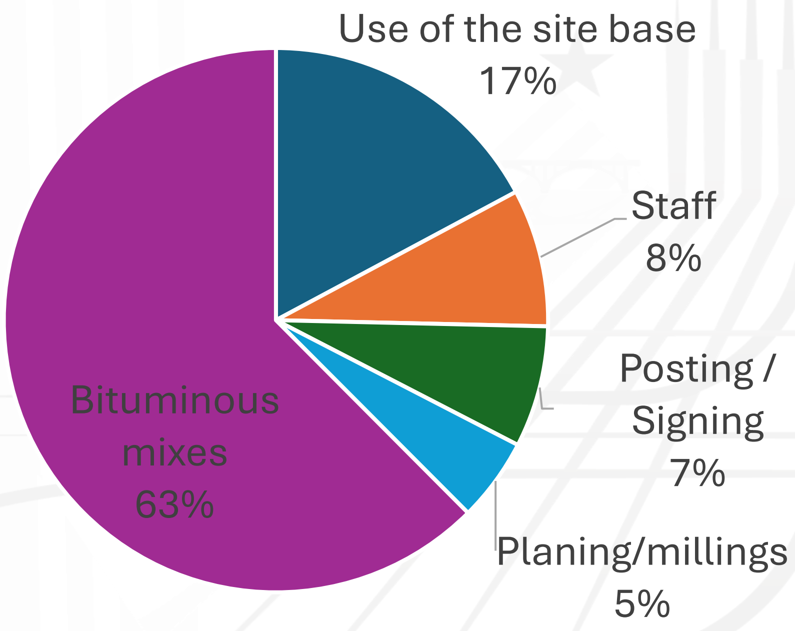
Emissions of Greenhouse gases *in tCO2eq*

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

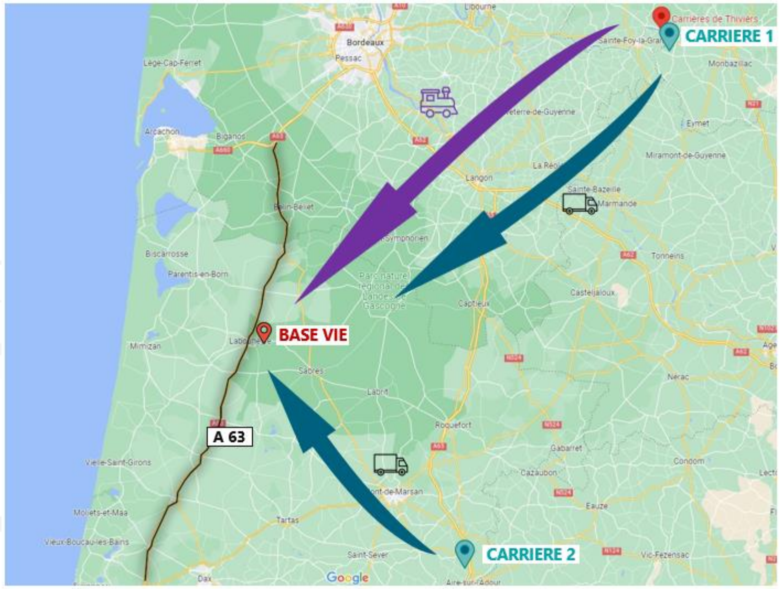
WORKS: Data collection

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

→ **Wide range of data collected in the field :**

Materials quantities (kg)

Distances travelled by type of transport (km)

Fuel consumption (l)

Duration of equipment use (h)

X

Emission factors more ***precise***

Sources of Emission Factors :

→ADEME carbon base

→CEREMA guide (level 3)

→REX EGIS on similar sites

=

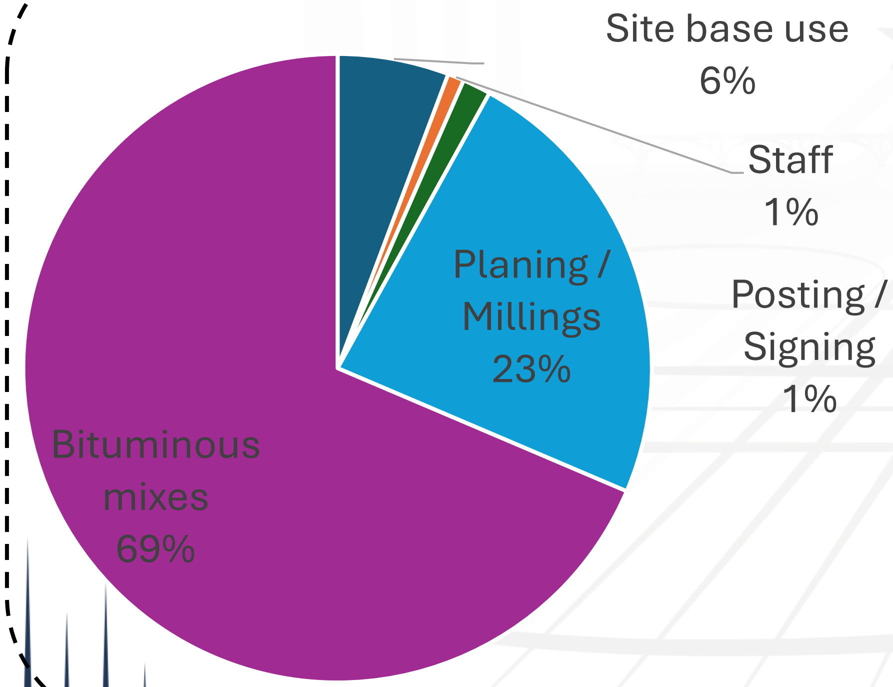
Emissions of Greenhouse gases *in tCO2eq*

Results obtained from real quantitative data

WORKS: Results

Carbon footprint of the site calculated on actual quantities: 9812 tCO_2eq

Breakdown of emissions by category



The manufacture and laying of **bituminous mixes is the** item with the highest impact, accounting for **69%** or 6730 tCO_2eq.

Two other items make a significant contribution to GHG emissions:

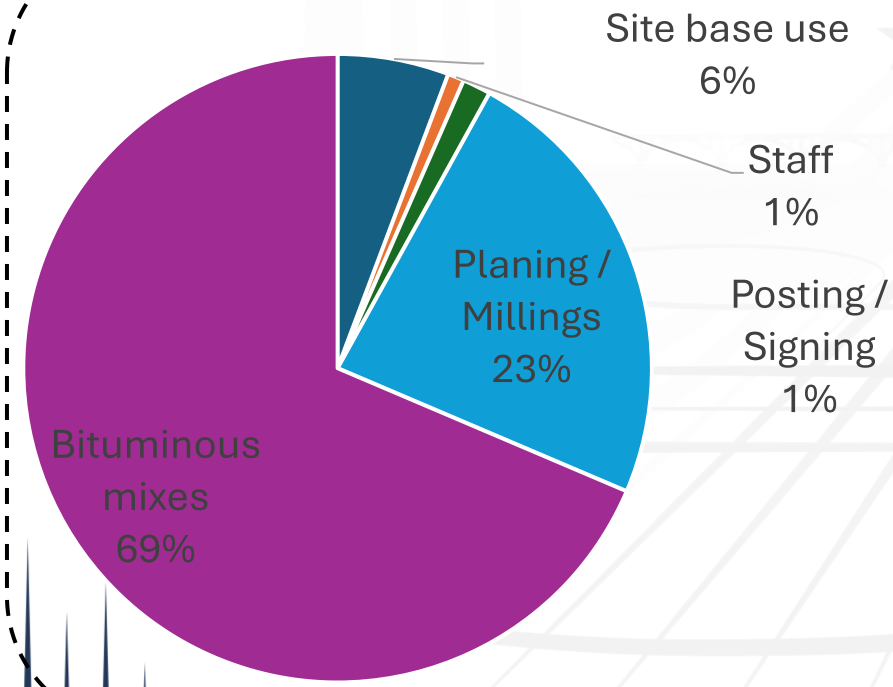
→ Milling / Planing

→ Use of the site base

WORKS: Impact of optimisations implemented

Carbon footprint of the site calculated on actual quantities:
9812 tCO_2eq

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

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

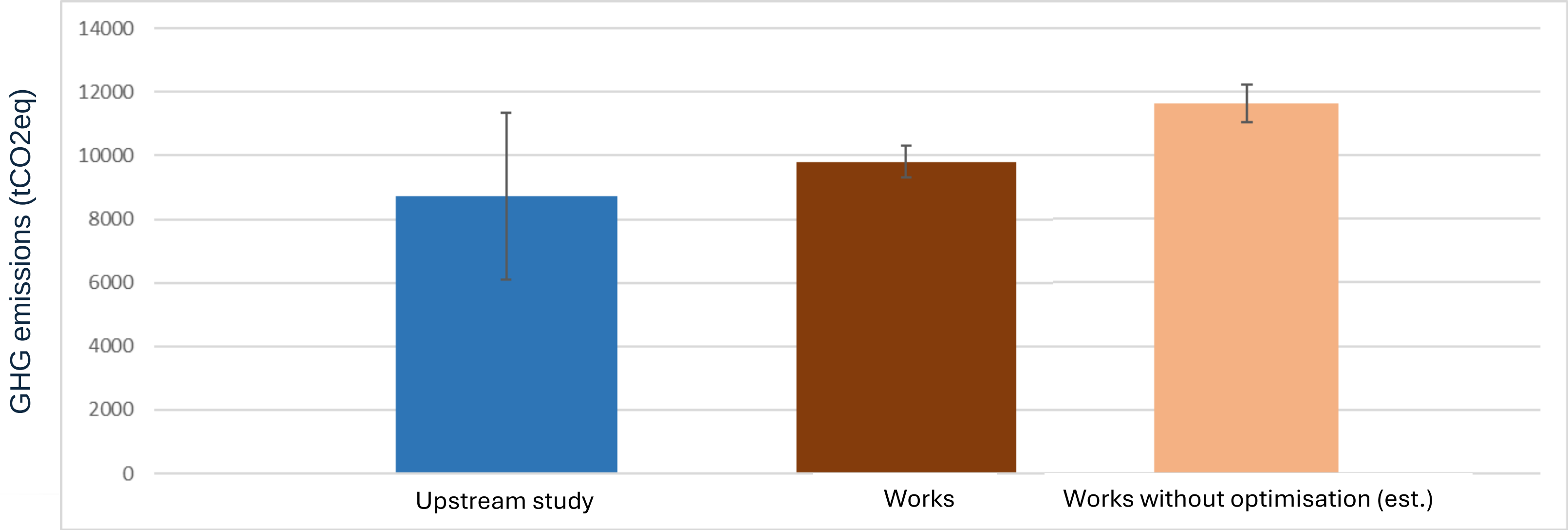
Replacing the oil-fired asphalt mixing plant with a gas-fired plant
allowing a reduction of
717 tCO2eq
(despite additional emissions due to the use of road aggregate)

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)

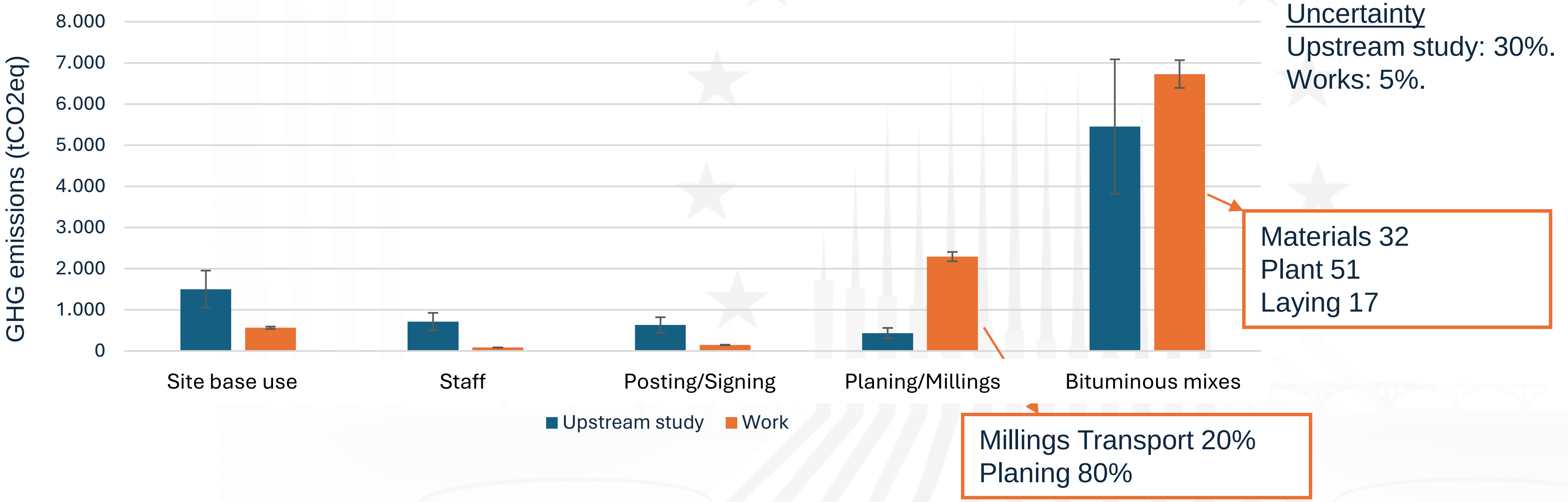
COMPARISON OF RESULTS: preliminary study / works

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).



<u>Uncertainty</u>
Upstream study: 30%.
Work: 5%.

COMPARISON OF RESULTS: preliminary study / works



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

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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THANK YOU

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