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# TOWARDS AN ECO-COMPARATOR FOR ROAD WORKS STEALTH

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# WHY AN ECO-COMPARATOR?

## The stake

- 20% of the French total road congestion are due to road works (4 billion Euros/year or 0.2% of the GNP)
- 20% of this cost correspond to environmental costs (greenhouse gas, pollutants, noise...)

## **PROPICE** – *Stealthy Road Works* project

- Partners from road construction, motorway operation, research and academic areas; coordination: Egis
- Issues investigated: pavement lifecycle increase, road works duration decrease through optimised procedures and processes, contract innovation, road works traffic impact minimisation...



### The RWOT (Road Works Optimising Tool)

- **PROPICE** developed a Road Works Optimising Tool called **OPTRA** (OPTimisation des TRAvaux)
- The **RWOT** is able to provide help for the minimisation of the final disturbance to traffic during the various steps of a road works project: design, planning and field realisation
- The **RWOT** can address the needs of the various actors of road works performance: infrastructure owners, designers, contract managers, building companies and traffic operation teams



## The RWOT: examples of use

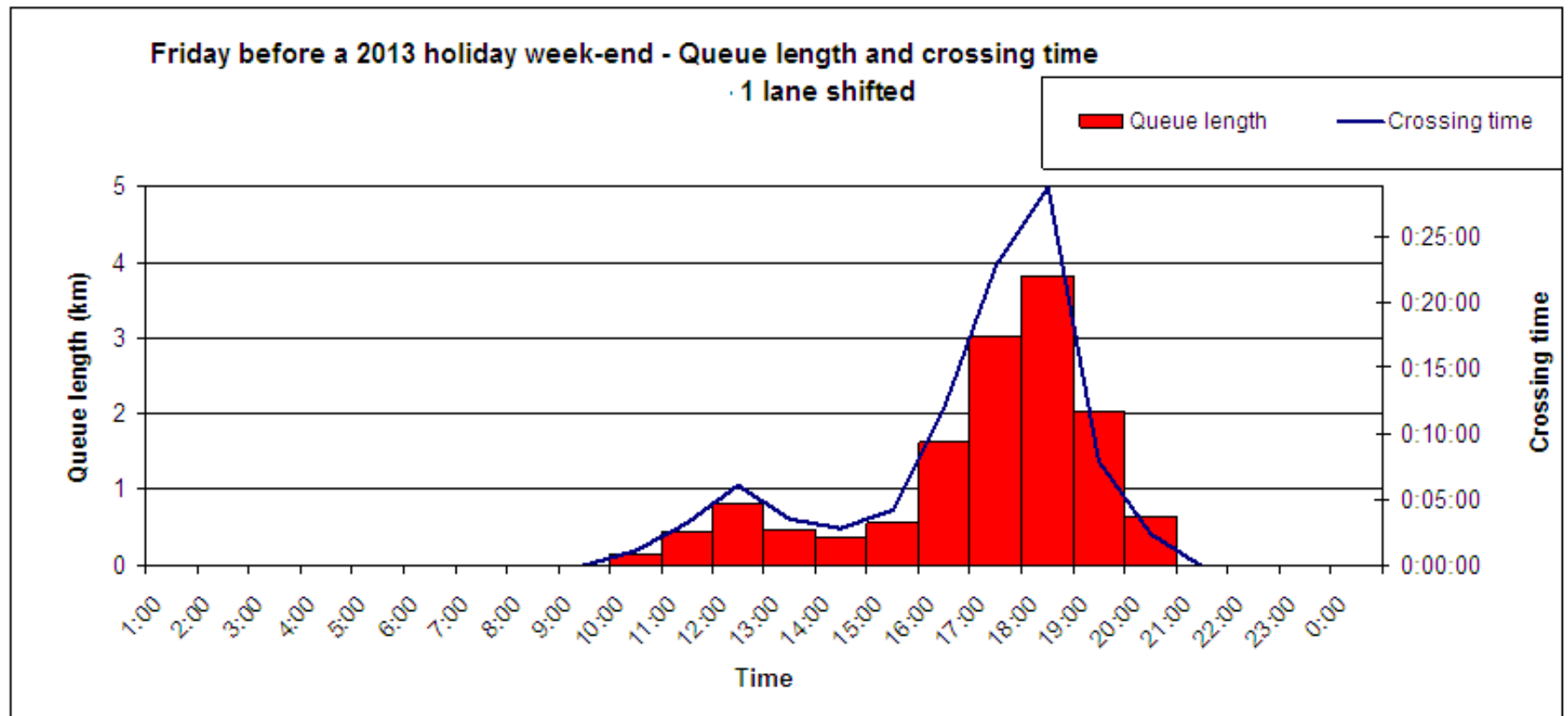
- Design phase
- Planning phase
- Field operation phase



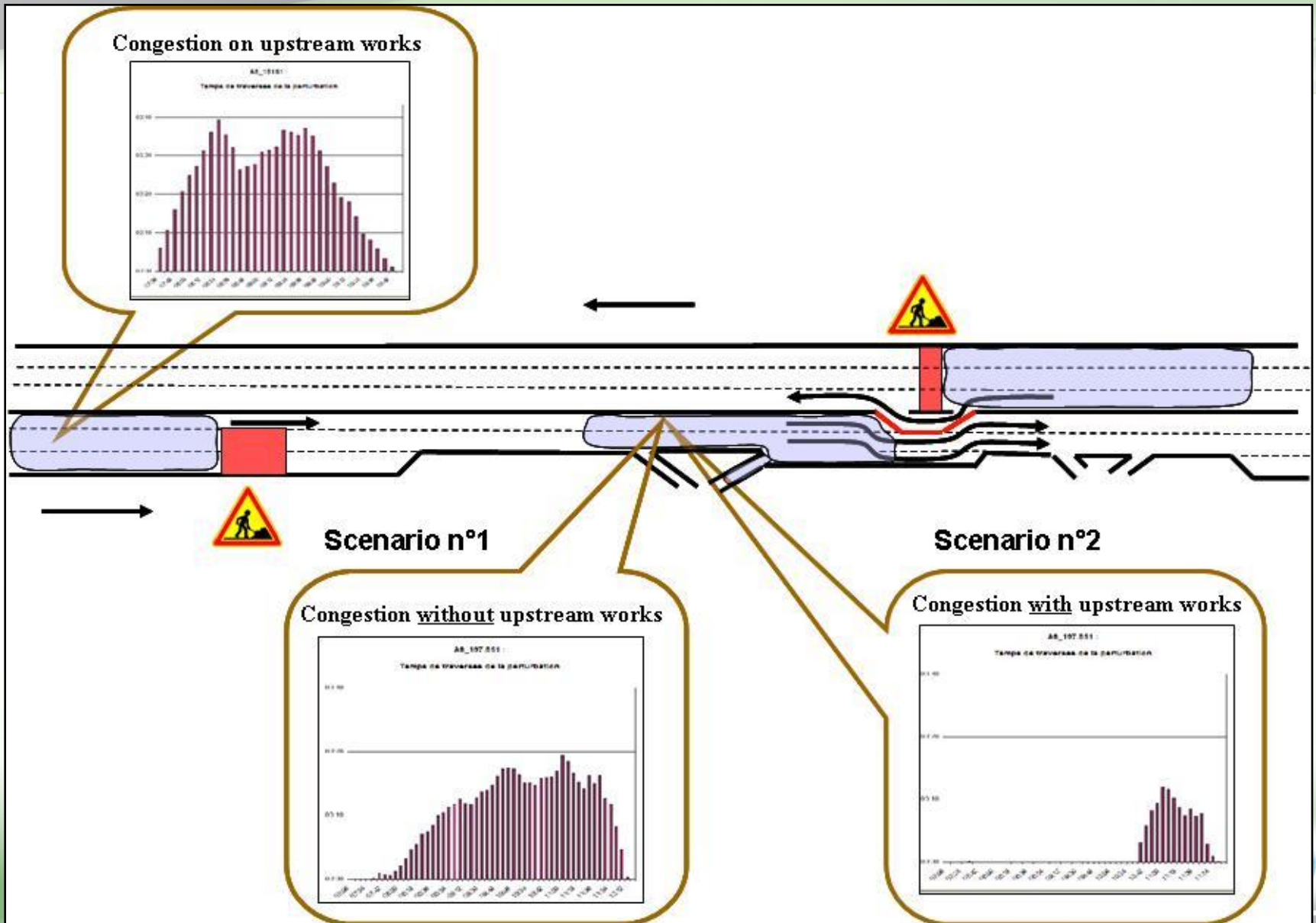
# WHEN TO USE IT?

## The RWOT: examples of use

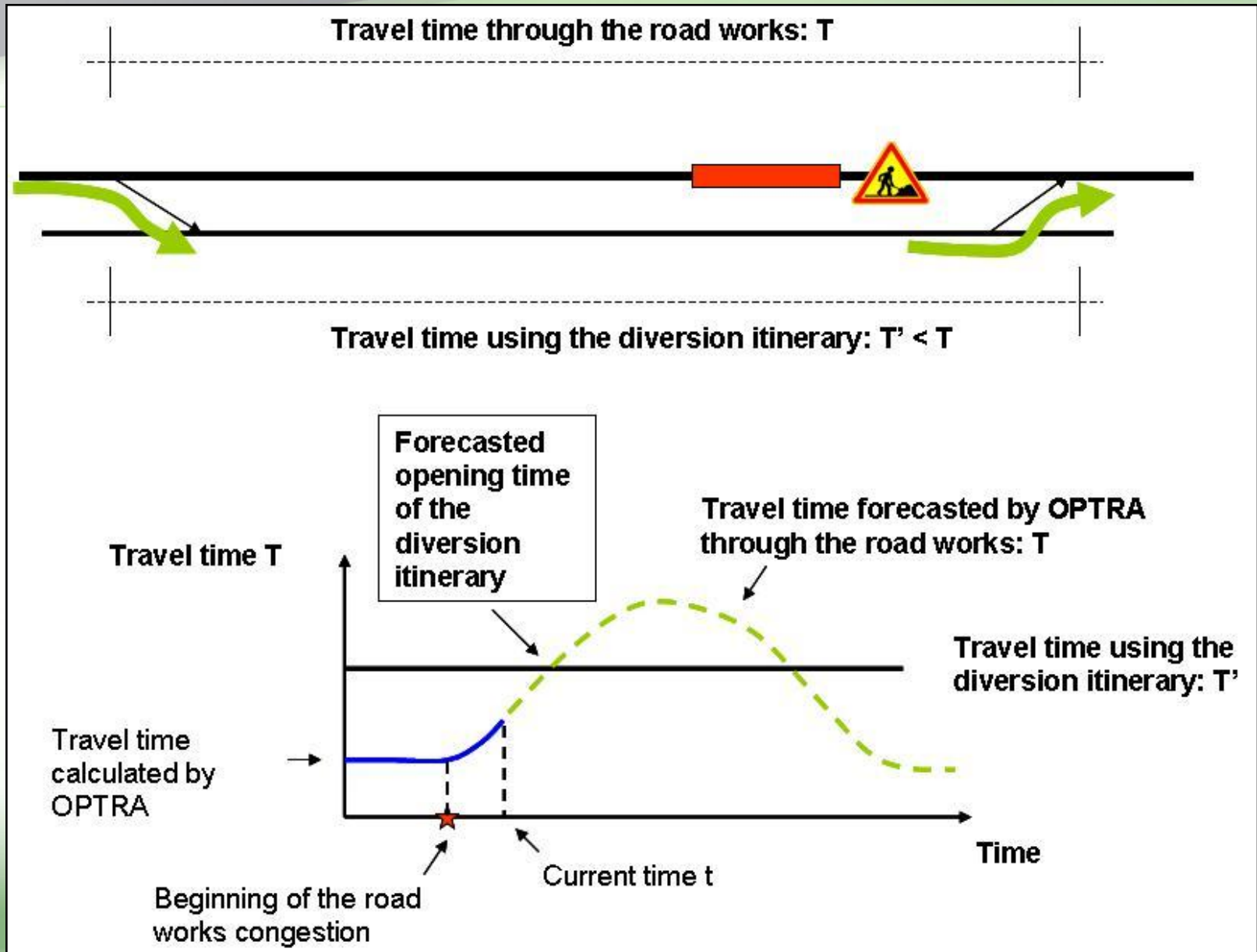
- Design phase: An example of forecast simulation for road works design phase



# WHEN TO USE IT?



# WHEN TO USE IT?



# THE RWOT: PRINCIPLES AND FUNCTIONALITIES

## Principles

- Use of the stock method: the number of vehicles  $N$  in the road section is estimated from the upstream volume (demand) and the downstream volume  $C$  (road works capacity depending of the remaining lanes)
- Waiting time =  $N/C$
- Queue length =  $N/D$  ( $D$  = queue density)
- Over-consumption and over-emission of greenhouse gas and pollutants due to the road works are estimated using a set of formulas from the European ARTEMIS project (according to the vehicle class) and a modelling of the national vehicle fleet structure





# THE RWOT: PRINCIPLES AND FUNCTIONALITIES

## Functionalities

- Help to optimal planning design through 2 different modes (*ex ante*) (from predicted demand and road works capacity):
  - Simulation of pre-defined planning (aid-to-decision)
  - Automatic planning optimisation within a given time period
- Reconstruction of the actual traffic disturbance (*ex post*) (from actual demand and road works capacity)
- Help to real-time traffic management (including incidents)



# THE RWOT: PRINCIPLES AND FUNCTIONALITIES

## Examples of RWOT screen displays

- Screen display for road works spatial definition

Saisie d'un chantier - étape 3/3 : Etat des voies

**Identification**

Nom du scénario : Scénario1

Nom du groupe de chantiers : Groupe1

Nom du chantier : A8\_197.8S1

**Etat des voies**

Sens 1						Sens 2					
BAU	V1	V2	V3	V4	V5	V5	V4	V3	V2	V1	BAU
↓	↓	↑	↑					X	X	X	
Largeur des voies (en mètres) :						Largeur des voies (en mètres) :					
2.9	3.00	3.50	3.0	0	0	0	0	0	0	0	0
Capacité résiduelle (en véh./heure) :						Capacité résiduelle (en véh./heure) :					
1520	1560	1250	1220	0	0	0	0	0	0	0	0

Calcul automatique des capacités résiduelles par voie

Paramètres

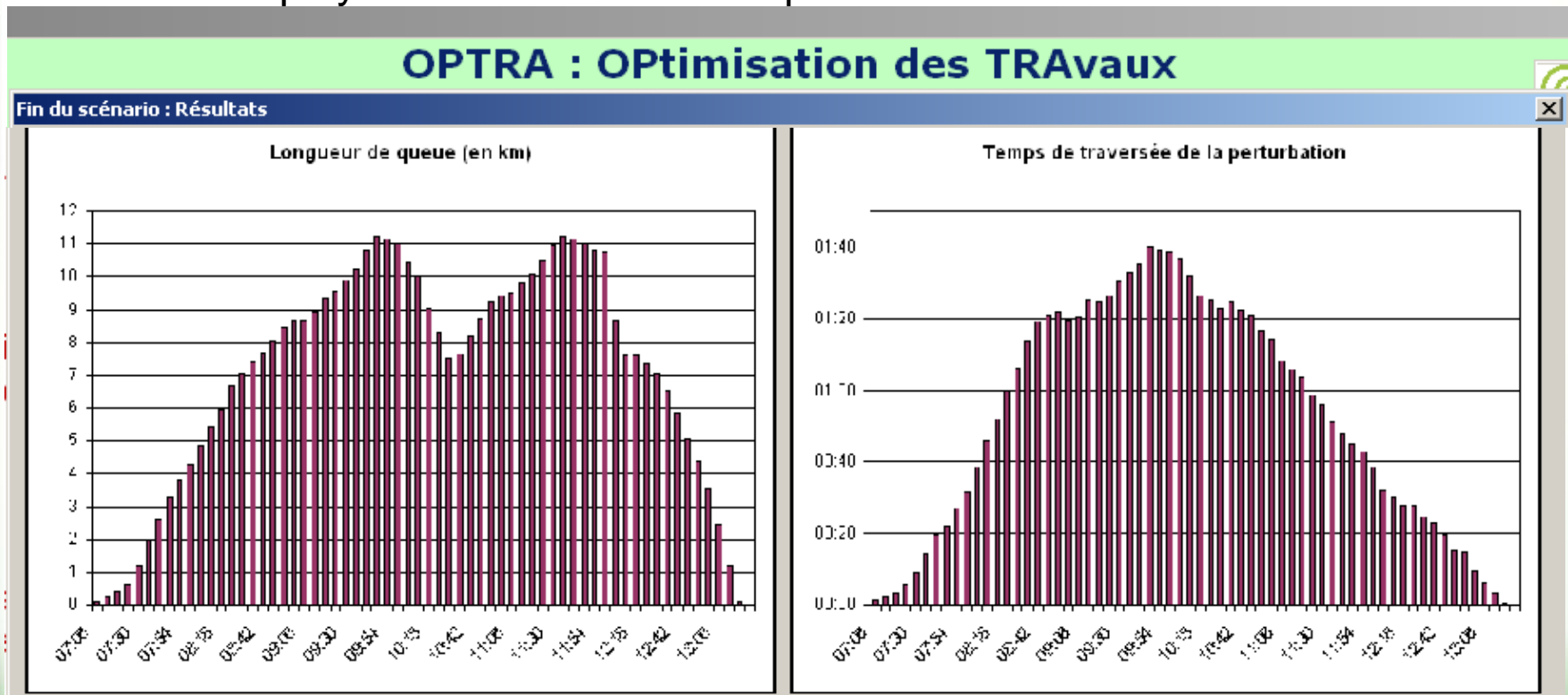
Annuler chantier    Annuler scénario    Chantier suivant    Calcul



# THE RWOT: PRINCIPLES AND FUNCTIONALITIES

## Examples of RWOT screen displays

- Screen display for calculation results presentation



# THE RWOT: PRINCIPLES AND FUNCTIONALITIES

Table with 7 columns: Essence (l.), Gasole (l.), HC (kg), CO (kg), NOX (kg), Particules (kg), and CO<sup>2</sup> (kg). The CO<sup>2</sup> (kg) column is circled in orange.

Essence (l.)	Gasole (l.)	HC (kg)	CO (kg)	NOX (kg)	Particules (kg)	CO <sup>2</sup> (kg)
66,397	507,535	0,351	2,127	0,191	0,191	1 535,930
55,903	440,059	0,305	1,786	0,164	0,164	1 320,009
122,300	947,595	0,656	3,913	0,354	0,354	2 863,940



# CONCLUSION: TOWARDS A STANDARD ECO-COMPARATOR

## Benefits to the various actors

- Infrastructure owners and operators: cost reductions, mastering of level of service to customers (traffic information and control)
- Users: reduced costs, stress and hazards
- Construction companies: competitive advantage in sound variant design and in tenders including stealth constraints
- Public organisations: promotion of sustainable development objectives



# CONCLUSION: TOWARDS A STANDARD ECO-COMPARATOR

## **The added-value of a standard eco-comparator**

- Provides same referential to all actors
- Helps stealth criterion definition and inclusion into contracts
- Helps consistent weighting of the stealth criterion
- Helps bonus-penalty rules setting according to planning compliance
- Introduces the concept of actual impact on traffic accounting compared to the present static lane rental practice

**The way can still be long, however the opportunity now exists to promote new stealth-oriented road works management!**

