Assessing environmental performance of road projects

The recent development of eco-comparators in France

A. DE BORTOLI, Université Paris Est, Laboratoire Ville Mobilité Transport (LVMT), Ecole des Ponts ParisTech, France
anne.de-bortoli@enpc.fr

INTRODUCTION

Transportation is one of the most carbon-emitting sectors in the world, accounting for about 20% of global emissions, and 50% of the new road carbon emissions, of which 90% are from road sector. Considering the stakes of climate change, carbon emissions and energetic consumption, policies have become ever more present in transportation projects, and especially in the road sector, thus enabling a push towards development of environmental assessment tools, especially carbon calculators.

The purpose of this article is to enlighten the evolution of sustainable practices in road construction in France in recent years through the development of eco-comparators — i.e. tools to assess environmental variants of a product or a project. Based on governmental, institutional and academic literatures, and completed with tools manipulation, it traces the political context in which the need for robust environmental assessment tools of road projects appeared, the institutional process that tried to enable the road sector to reach a significant level of agreement about eco-comparators and consistent results in green road construction practices.

Context

Environmental issues have been brought to the political agenda at different scales:

- European “30 by 20” in 2009
- 20% energy saving and 50% of raw materials from energy origins before 2050
- Nationally, committed by European Renewable Energy Council (DVO) to “20% of renewable energy by 2020”

Voluntary Commitment Conventions (CEV)

A CEV = product of a collaboration between public and/or private organizations and governmental authorities. In charge of Sustainable Development (MEDDE) (see Fig. 1).

A CEV includes:

- Focused environmental goals defined in collaboration,
- lead to concrete actions programmed in a work plan and of general interest,
- to be implemented by the MEDDE and the public to follow up evolution of industrial practices, and possibly to adjust final goals

The road transportation voluntary commitment convention (RTCEV)

The convention for actors in design, construction and maintenance of roads and urban areas (ADFD) was signed on March 2009 by:

- the MEDDE
- 6 Ministries of the Public Works
- and the road building sector: the national federation for public works (FPTM), the French professional syndicate of road workers (SPPTF), the union of federations for French road industry (USIRF) and the federation of engineering (Syntec-Ingénierie).

The CEV has also been adopted later and signed at local scales in France - in 2012, more than half French “departments” have signed one [6].

Three main objectives:

- “Innovate and transform the public work on road networks”
- “Promote and develop innovative, green and sustainable construction”
- “Assess performance and best practices”

The French road eco-comparators

Creation of a public-private institute for transport infrastructure — the IDRRIM

In accordance with the last goal of the CEV (Table 1), the IDRRIM, was created in January 2011 to facilitate discussions and common work in order to develop greener practices in transportation infrastructure construction and planning.

It is a non-profit-making association whose the organization is described in figure 2. Each key actor in the field of road transportation joined the IDRRIM in 2010 and /or 2011 and in particular to contribute to promote validated eco-comparators for road construction work.

The operational committee “Avenues” (“Avenues” in French) is in charge of producing technical notices, guides and synthetic documents on road technical subjects, presented by the specialized groups.

In this committee, a group is specialized in the assessment of eco-comparators.

Overview of the eco-comparators

Table 2: General information on the eco-comparators (Created from [3], [4] and [5])

<table>
<thead>
<tr>
<th>Eco-comparator</th>
<th>System parameter</th>
<th>Environmental assessment parameter</th>
<th>Indicators</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eco-comparator 1</td>
<td>Bitumen</td>
<td>Material energy indicator</td>
<td>X</td>
</tr>
<tr>
<td>Eco-comparator 2</td>
<td>Burner</td>
<td>GHG indicator</td>
<td>X</td>
</tr>
<tr>
<td>Eco-comparator 3</td>
<td>Aggregate</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 3: Comparison of reference materials vectors for energetic indicator (in MJ/ton)

<table>
<thead>
<tr>
<th>Material</th>
<th>Average aggregates</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Eco-comparator 1</td>
<td>82.9</td>
<td>19.9</td>
<td></td>
</tr>
<tr>
<td>Eco-comparator 2</td>
<td>82.9</td>
<td>19.9</td>
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Discussion

Achievement assessment of the RTCEV

A popular measure among French departments:

- 87% think the RTCEV is a very positive initiative
- 58% did not encounter difficulties to implement CEV targets despite a tough economic context

Table 4: Partial final results of the RTCEV (created from [1])

<table>
<thead>
<tr>
<th>Objective</th>
<th>Target</th>
<th>Results</th>
<th>Success</th>
</tr>
</thead>
<tbody>
<tr>
<td>To reduce GHG emissions</td>
<td>-20%</td>
<td>-19%</td>
<td>100%</td>
</tr>
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<td>To improve safety &amp; health (management)</td>
<td>-20%</td>
<td>-15%</td>
<td>100%</td>
</tr>
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<td>-20%</td>
<td>-15%</td>
<td>100%</td>
</tr>
<tr>
<td>To reduce water consumption</td>
<td>-20%</td>
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<td>100%</td>
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Table 5: Comparison of reference materials vectors for the energetic indicator (in MJ/ton)

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CONCLUSION

Lessons learned from the French case

IDRRIM has been created to facilitate discussion on environmental performance, and to unify assessment methodologies between road actors. The example of France confirms that joint effort between governments and industry makes emerge better tools.

Nevertheless, despite better communication, two very similar tools have been created. It may introduce conflicts in the choice of variant in a public tender.

In order to fill different actor’s needs, it seems essential to produce software taking several addressed to users with different levels of expertise (expert and basic standards at least).

Besides, there is a need for a LCA-based tool considering the entire life cycle of road or transport road system, which is not possible with current tools.

Indeed, assessing environmental performance of road technical variants on the entire life cycle is important because of the current dominance of the use phase on road life cycle impacts today and the phase between road and vehicles.

Assessing the impacts of pavement maintenance on road global performances

In developed countries, road networks are almost fully deployed, thus making maintenance one of the important levers to enhance road transportation environmental performance. It currently lacks a global tool to holistically evaluate impacts of road maintenance operations on the entire road transportation system, in order to systematically optimize road maintenance policies.

Acknowledgements

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References


Fig. 1 Process to elaborate a Convention (created from [1])

Fig. 2 Observation matrix for current practices (see table 3)

Photo 1: Comparison of reference materials vectors for the energetic indicator (in MJ/ton)

Fig. 3 Comparison of reference materials vectors for the energetic indicator (in MJ/ton)

Table 1: Comparison of reference materials vectors for the energetic indicator (in MJ/ton)