Evaluating the assessment of the Portuguese national plan for climate change transports mitigation measures

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Abstract

This paper evaluates the transport reference and additional measures assessment scheme considered under the Portuguese national plan for climate change (PNAC). Fifteen indicators were used to evaluate both the structure of the assessment scheme and the results achieved with it. Structure evaluation indicators consider the definition of institutional responsibilities, concrete actions, the actions' schedule, the actions' costs, expected results by action, progress indicators by action, measure effectiveness indicators, measure environmental effectiveness indicators and the assessment methodology, measure by measure. Results evaluation indicators look at the progress reports of the first semester of 2007, analysing if action plans, progress reports, progress indicators by action, measure effectiveness indicators and measure environmental effectiveness indicators were presented and if the actions' schedule was accomplished. Both for reference and additional measures the results of most indicators show that the structure has not been able to ensure the desired assessment results. For most measures there wasn't an assessment methodology defined. Regarding information availability for both types of measures most of the indicators have negative results. There are a small number of actions and measures that present their progress and effectiveness indicators. To ensure that the mitigation potential of transport measures considered in the PNAC is achieved, special attention is required in the definition of assessment methodologies and in the presentation of information for the indicators.

Keywords: climate change, mitigation measures, transport policies, evaluation indicators, assessment scheme.

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1 Introduction

The growth in greenhouse gas (GHG) emissions and energy use attributable to the transport sector reflects several factors such as longer journeys, increase in the number of vehicles and the rapid increase in air travel [1].

During the period of 1990-2005 the GHG in the transport sector (the emissions from international aviation and maritime transport are not considered) of the EU-27 increased by 26%, comparatively to 1990 levels. In 2005 they represented 22% of total GHG [2]. In 2010 GHG from the transport sector could be the same as in 2005, if only reference measures are considered. When considering additional measures implemented successfully an on time, GHG emissions from the transport sector could decrease 7-19%, compared to 1990 levels [2]. It should be kept in mind that the transport volume is expected to increase. Facing this reality the reductions of GHG emissions achieved with additional measures and the success of already existent ones are very important to revert the increasing trend of transports emissions.

In line with these concerns, Portugal identified reference and additional measures in the Portuguese national plan for climate change (PNAC) of 2004 and 2006, respectively (Table1) [3].

To ensure that the mitigation potential of these measures is achieved, an assessment scheme was established. It recognizes the importance of an accurate and up to date evaluation for each measure by providing a set of variables,

Table 1: Identification of reference (a) and additional measures (b).

Reference measures	Additional measures
1 - Auto-oil programme - voluntary agreement with the car manufacturing associations (ACEA, JAMA, KAMA)	1 - Reduction of Taxis´ service days
2 - Expansion of the Lisbon Metro - extension of the blue line; extension of the yellow line; red line	2 - Enlargement of the fleet of taxi vehicles powered by natural gas
3 - Construction of the South of the Tagus River Metro	3 - Review of the current tax regime on private vehicles
4 - Construction of the Oporto Metro	4 - Metropolitan Authority of Lisbon Transports
5 - Construction of the Mondego Light Metro	5 - Metropolitan Authority of Oporto Transports
6 - Supply changes (reduction in travel time) between Lisbon- Oporto; Lisbon- Castelo Branco; Lisbon-Algarve	6 - Incentive Programme for the dismantling of End-of-Life Vehicles (further objectives)
7 - Enlargement of the fleet of vehicles powered by natural gas of CARRIS and the STCP	7 - Regulation on Energy Management in the Transport Sector
8 - Incentive Programme for the dismantling of End-of-Life Vehicles	8 - Railway connection to Aveiro Sea Port
9 - Reduction of motorway speeds	9 - Shipping routes
10 - Biofuels Directive	10- Logistical Platforms
	11- Restructuring of supply of CP (national railway) service
(a)	(b)

indicators and evaluation methodologies to achieve these goals. Due to the large number of institutions involved, information dissemination was also identified as an important task to be accomplished. The evaluation scheme proposed under the PNAC consists of an action plan and progress report for each measure.

Action plans define the elements that will be semi-annually reported in the scope of the progress report. The analysis of the progress reports should be able to identify deviations of the measure expected results whenever they occur. The interaction with the action plans, through their several elements, is a way to ensure that the mitigation potential of that specific measure isn't threatened. It is also useful to identify additional measures (Figure 1).

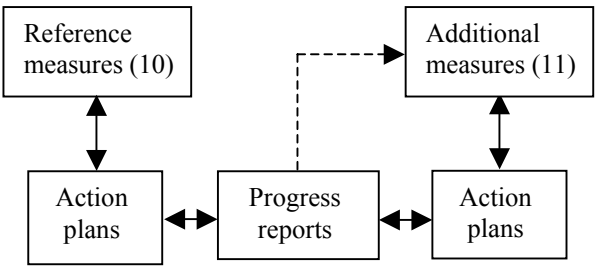

Figure 1: Assessment scheme proposed by PNAC.

The evaluation of the assessment scheme is an exercise to identify what could be compromising the GHG reduction expected with the transport measures considered so far. It also tries to improve the quality of the assessment scheme and consequently decision making.

2 Methodology

Fifteen indicators were used to evaluate both the structure of the assessment scheme and the results achieved with it for reference and additional measures. Nine structure evaluation indicators (SEI) assess if key information, variables and indicators were properly defined in the action plan made for each measure. Table 2 presents the rating system and the application scope for each indicator. It was not possible to keep the same rating system across all the SEI because some of them evaluate simply yes or no questions, while others are applied under a quantifying scope. To facilitate the analysis of the results and the discussion each indicator corresponds to a letter.

To evaluate the results achieved with the structure of the assessment scheme, six results evaluation indicators (REI) were identified as well as their rating systems and application scope (Table 3).

Structure indicators evaluate the information available in action plans while the results indicators evaluate the information available at the progress report of the first semester of 2007.

Table 2: Structure evaluation indicators, their scope of analysis and rating system (bad; reasonable; good). SEI were applied to each measure.

	Structure evaluation indicators	Application scope	"Bad"	"Reasonable"	"Good"
A	Institutional responsibilities identified	Check if the three institutions that ensure supervision, assessment and implementation were identified (n – number of institutions identified)	n≤1/3	1/3 < n < 2/3	n≥2/3
B	Concrete actions identified	Check if concrete actions were identified	no	-	yes
C	Action schedule defined	Check the number of actions with schedule defined (n – number of actions with schedule)	n≤1/3	1/3 < n < 2/3	n≥2/3
D	Action costs defined	Check the number of actions that have costs defined (n – number of actions with costs defined)	n≤1/3	1/3 < n < 2/3	n≥2/3
E	Action expected results defined	Check the number of actions that have their expected results defined (n – number of actions with expected results defined)	n≤1/3	1/3 < n < 2/3	n≥2/3
F	Action progress indicators defined	Check the number of actions that have progress indicators defined (n – number of actions with progress indicators defined)	n≤1/3	1/3 < n < 2/3	n≥2/3
G	Measure effectiveness indicators defined	Indicator(s) defined	no	-	yes
H	Measure environmental effectiveness indicators defined	Indicator(s) defined	no	-	yes
I	Assessment methodology defined	Check the number of elements with assessment methodologies defined (n – number elements with assessment methodologies defined)	n≤1/3	1/3 < n < 2/3	n≥2/3

3 Results

Although the action plans and progress reports should be presented for each measure, this did not happen in all cases. The non existence of such documents has direct consequences for the evaluation performed. Whenever the action plan was not available for one measure, it wasn't possible to apply the SEI to it. The same happened regarding the REI when the progress report of a measure wasn't available.

There are more action plans available than progress reports. The only action plan that wasn't delivered is of reference measures. There are four unavailable progress reports for reference measures and three for additional measures. Some SEI and REI indicators are highly correlated. Very often SEI look for the definition of an element and REI look if that element was presented.

Table 3: Results evaluation indicators, their scope of analysis and rating system (bad; reasonable; good). REI were applied to each measure.

	Results evaluation indicators	**Application scope**	**"Bad"**	**"Reasonable"**	**"Good"**
J	Action plan delivered	Action plans exist?	no	-	yes
K	Progress report delivered	Progress report exists?	no	-	yes
L	Action schedule accomplished	Check the number of actions in which the defined schedule is being accomplished (n – number of actions that are accomplishing the defined schedule)	n≤1/3	1/3 < n < 2/3	n≥2/3
M	Action progress indicators presented	Check the number of actions in which the progress indicators defined were presented (n – number of actions that presented the progress indicators defined)	n≤1/3	1/3 < n < 2/3	n≥2/3
N	Measure effectiveness indicators presented	Number of indicator(s) defined that was(were) presented	n≤1/3	1/3 < n < 2/3	n≥2/3
O	Measure environmental effectiveness indicators presented	Number of indicator(s) defined that was(were) presented	n≤1/3	1/3 < n < 2/3	n≥2/3

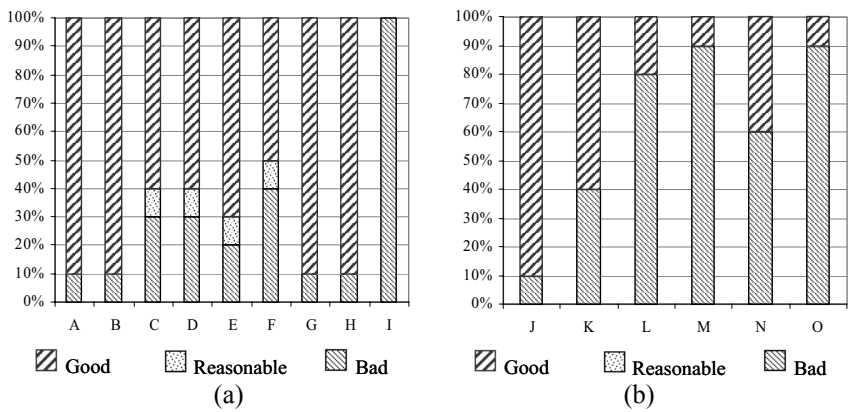

Figure 2: Results of SEI (a) and REI (b) when applied to reference measures.

3.1 Reference measures

The SEI *A*, *B*, *G* and *H*, have "good" results for more than 90% of the reference measures identified (Figure 2a). There was no assessment methodology defined for reference measures (indicator *I*).

There is one reference measure whose action plan wasn't available and therefore 10% of all SEI "bad" results reflect that. Excluding indicator *I*, among the other SEI, *C*, *D*, *E* and *F* indicators are those which present "bad" results.

The analysis of the REI results (Figure 2b) shows that *J* was the indicator with the best results. 40% of the "bad" results of indicators *K*, *L*, *M*, *N* and *O* are explained because four progress reports weren't presented for four reference measures.

The indicators that evaluate the progress of actions weren't presented very often (90% of "bad"results of *M*). However, it should be taken into account that these results represent either the lack of definition or of presentation of action progress indicators. Three REI (*L*, *M* and *O*) have "bad" results for more than 80% of the reference measures.

3.2 Additional measures

Four SEI (*A*, *B*, *G* and *H*) have exclusively "good" results for all additional measures (Figure 3a). Similarly to reference measures, assessment methodologies were not defined for any additional measure. There are almost 65% of additional measures whose action costs were not identified. For three measures, progress reports were not presented. Consequently, it was not possible to apply *L*, *M*, *N* and *O* indicators to these measures. Action progress indicators were not presented for any measure.

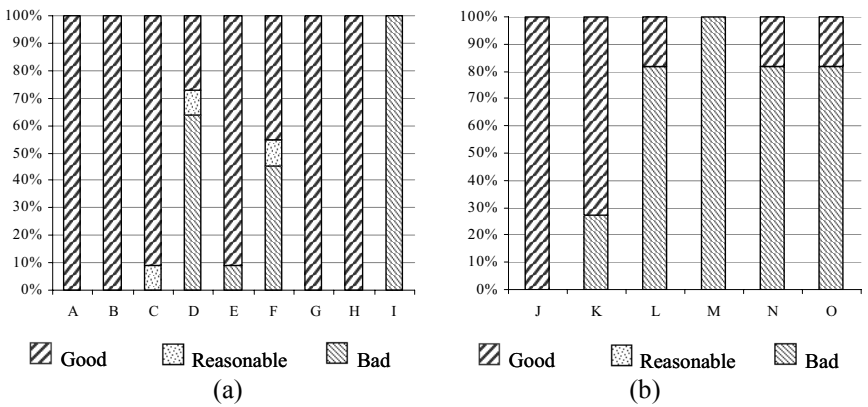

Figure 3: Results of SEI (a) and REI (b) when applied to additional measures.

4 Discussion and conclusion

An overview shows that both reference and additional measures have 38% of "good" results and 62% of "bad" results for REI. This demonstrates the poor quality of the results achieved with the assessment structure created. The interpretation of REI results by itself allows to infer that the structure has

not been able to ensure the desired assessment results. Therefore SEI results (63% "good", 8% "reasonable" and 28% "bad" for reference measures and 73% "good", 3% "reasonable" and 24% "bad" for additional measures) that are "good" for most of the measures when interpreted in conjunction with REI results demonstrate that the structure is not achieving it purpose.

There is a strong interdependence between some SEI and REI indicators. In fact, the scopes of analysis of *F*, *G* and *H* are almost the same as those of *M*, *N* and *O*, respectively. The former check if some indicators were defined while the latter look if they were presented. Therefore, the "bad" results of the latter could reflect problems of presentation but also in a certain extent absence of definition. Whenever action progress indicators were not defined (*F*), they are not presented (*M*). For reference measures, the "bad" results of *F* reach 40% while *M* has a 90% of "bad" results. There is a 50% difference that reflects only the non presentation of progress indicators. *G*/*N* and *H*/*O* pairs reflect the same pattern. For additional measures, *G* and *H* have 100% "good" results and *N* and *O*, respectively, still present "bad" results.

Even when *M*, *N* and *O* do not reflect the interdependency referred above, they indirectly encompasses the results of several others indicators. They are what could be called final results indicators, because they are the final output of the process of results achievement.

"Bad" results could be explained by several factors. A deeper analysis of indicators with worst results was performed. The results of *L* seem to depend on other factors rather than the definition of actions schedules. Actually it was found that *L* "bad" results could have its roots in unavailable information for a set of other indicators such as *C*, *F* and *M*. For reference measures, 69% of "bad" results for *L* are linked to the non presentation of action progress indicators and that percentage is even higher for additional measures, in which it rises to 75%.

Among all indicators, the one that presents the worst overall results is *I* which evaluates if appropriate assessment methodologies were defined for all elements considered under the action plans. Neither reference nor additional measures have assessment methodologies defined. The results of this indicator could explain a substantial part of SEI and REI results. Defining an assessment scheme is crucial as it allows not only to assess the progress of the established goals but also the necessary steps to achieve them [4]. It also enhances flexible strategies, improves the implementation process and supports decision making [5] by identifying problems at an early stage [6]. An assessment methodology should encompass the establishment of proceedings across the scopes of different indicators. Some of those crossing proceedings are: what information should be delivered, the stage at which it should happen, to whom and by who, who is responsible for assessing each step, who is the supervising entity of the process and expected results. Assessment schemes should also be supported by indicators. However the required data has to be collectable, reliable, consistent and accurate. When the assessment scheme is being defined it should consider the different stakeholders that will participate in it so indicators are user-friendly [7].

Although expected results were defined for most of the measures, the indicators that reflect their achievement are not presented very often, as indicators *M*, *N* and *O* attest. Sometimes the expected results are not measurable and there is no relation with the measure effectiveness indicators. REI "bad" results can be partially explained by the intangibility of some of the expected results as well by the difficulty to collect data. Thus the existent relations between targets, objectives, expected results, actions and indicators should be clearly defined so the indicators are also accurate and translate these relations [5]. Unclear relations could provide unmeasured outputs that may have less weight in decision-making [4]. Tuominen and Himanen [8] refer the necessity of introducing elements that connect policy targets, measures and their implementation in order to intensify the policy process.

The main strengthening element of the assessment structure is the action plan. Thus it should be delivered for all measures. Moreover, it should also clearly include an assessment methodology for all elements as stated above. For most of the measures, action plans were delivered but still do not ensure "good" results.

There were no substantial differences in the REI of reference and additional measures. This might indicate that results assessment has not been as fast as it should. As defined in the assessment scheme proposed by the PNAC, progress reports should be analysed so that they can introduce changes in action plans whenever necessary. This strategic planning should be supported by indicators that provide measurable targets for tangible outcomes [9].

The last available progress reports of transport measures refer to the first semester of 2007. Considering that progress reports should be published semi-annually, there is already a delay of six months in the availability of reports of the beginning of 2008. Several factors such as bureaucracy, coordination difficulties and necessity of improved technical skills could explain this.

In a process known as burden-sharing, Portugal was allowed to emit in the first commitment period of the Kyoto Protocol (2008-2012) an additional 382 Mton CO_2 eq [10] in comparison to 1990 levels [11]. That value was distributed among different sectors. The growth estimate for the transport sector until 2010 motivated the definition of reference and additional transport measures whose assessment was evaluated. So, it should be taken into account that the remaining amount of emissions above the threshold defined for the transport sector needs to be compensated through alternative mechanisms. Calculating the amount of Mton that will be emitted above the threshold (if it happens), it is necessary to understand which measures are achieving their purpose and which are not.

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