The coherence between european, national and regional policies for a more sustainable urban mobility – Lisbon Region as case study

Eduarda Marques da Costa, Nuno Marques da Costa, Ana Louro, Patrícia Abrantes
Center for Geographical Studies, University of Lisbon

1. Introduction

Mobility have a crescent importance in the context of a Sustainable Development, especially in urban areas, reflected on the efforts of several entities, at several territorial scales, to create and develop a collection of policy guides, according to the territorial diagnosis previously elaborated. Mobility is part of the complex system that represents the territorial dynamics, influencing and influenced by those, and being part of other subjects as the economy, environment or society. To contribute to this large investigation in the last decades, not only academic but by several institutional entities too, as European Union, national governments or sectorial ministries, are working together to develop this subject, searching for a better and more sustainable mobility.

Portuguese policy programmes and plans have been incorporating EU orientations, with particular relevance in "National Spatial Planning Strategy" (PNPOT, 2007) and "Sustainable Development Strategy" (ENDS, 2006), two top-down documents with structural implications in national and regional territorial models of development. At a regional scale, some instruments have been working to address for a sustainable development, highlighting this intention in the main objectives. In this context, considering EU policy orientations as well as Portuguese territorial frameworks as starting points, the SPOTIA Project (PTDC/CS-GEO/105452/2008)[1] is structured on a specific and updated policy issue: the assessment of the coherence and relevance of the Portuguese territorial and sectoral frameworks (policy programmes and plans) and to evaluate the impacts of these policy orientations in territorial development, especially in three case studies (new Lisbon Airport; Portuguese high speed train and the EFMA project linked to Alqueva Dam). A large discussion about territorial issues as "coastal economic and demographic concentration" versus "inland positive investment discrimination", "polycentric urban structure" versus "metropolitan concentration", and "regional equity" versus "Lisbon Metropolitan Area concentration" is still open in Portugal. To present an operational component of this project, it was chosen the "Mobility" subject in particular.

This paper is organized in five main parts: the first one is an approach to the main trends and challenges faced in mobility nowadays. The second aspect is a brief focus abou the concept of sustainable mobility, relating it with some quantification of it. In this case it will be focus the Eurostat indicators about sustainable transport. The third part is an extensive presentation of the several territorial and sectorial policies, at several scales, focusin on the mobility thematic. Before the conclusions, the fourth part is a reflexion about all these topics

[1] Project Coordinator – Eduarda Marques da Costa, Associate Professor of IGOT-UL, Investigator in CEG-UL and coordinator of Nucleus Research – Modeling, Spatial and Territorial Planning

in two axes: one presents a counting exercise with the national policies based on the objectives of a sustainable mobility, and the second aimed to relate the proposed actions in each policy to solve, minimize or maximize some trends or mobility impacts (in this case it will be referred the urbanization and the environmental changes). The last part is the conclusion.

The two main objectives in this paper is, first, to understand if there is any relationship between several documents that have focus mobility, accessibility and transports aspects, at several territorial scales, as european, national (focused in portuguese case) and regional (focused in Lisbon region case), and, second, understand how can this set of documents answer to the objectives that promotes sustainability. As a result, it`s possible to identify two main aspects: the question of multi-scale governance, because polycentric urban structures demands multi-municipal entities for transports and mobility sustainable policies; and the question of the need for an intersectorial approach, where is extremely relevant to combine several policies crossing spheres as environment, economy and society.

2. The relevance of mobility – trends and challenges nowadays

Some trends and challenges are evident in the most of european cities influencing the mobility, accessibility and transports (CE, 2009, 13-15). With the **population ageing**, people generally travel less, however, actually, people tends to travel more than in the last decades, reinforced by a better health, a crescent travelling options, among others factors. For an ageing society, it`s important to create new mobility solutions, concerning security and reliability. As nowadays, **migration** of non-EU members to EU could be an important factor to mitigate the effects of ageing on labour market. Is expected a bigger mobility within EU, reducing the legal and administrative barriers for workers. Transport sector have a strong negative impact in the **environment**, with the gas emissions or the excessive land use for accessibility rather than use for other functions. An actual reality in Portugal as in Europe, the prices of fuel are increasing, especially the **oil and fossil fuels**, accumulating the problem that these kind of fuels are very polluents. The need of search for a cheaper and cleaner energy is related too with the need of creates new infrastructures or adapts the existents, for example, for vehicles. In Europe the trend of **urbanization** continues to grow, growing the percentage of urban population. If, in one hand, this concentration allows a major proximity between people and activities, in another hand, the need of habitation and mobility can promote urban problems as the traffic congestion and the gas emissions especially due to the use of private car. Despite the huge concentration of buildings in the cities, the urban sprawl is a verified urban trend too, acting as a challenge for the mobility management. **Globalization** and liberalization associated with the transports and communication technologies reduced distance and time barriers in all World. Beyond Europe, it`s expected that the transport will increase much more outside Europe than inside Europe. The increasing of global population will affect the needs of resources, some of them non-renewable, and in the sphere of mobility, the number of private car it will cause serious problems for the sustainability in general and for a sustainable mobility.

3. The “sustainable mobility” – brief approach to the concept

The report “Developing Sustainable Urban Land Use and Transport Strategies – A Decision Makers` Guidebook” (2003, 13), coordinated by the Institute for Transports Studies, University of Leeds (UK), present a set of the main objectives that are relevant to pursuit of sustainability (Table 1), which includes: Economic efficiency, Protection of the environment, Liveable streets and neighbourhoods, Safety, Health, Equity and social inclusion, Contribution to economic growth, Intergeracional equity. This topics will be useful to analyses the sustainability according to the mobility scope. However, there are two items that are recurrent in the study if sustainability: the infrastructuration and the influence of planning and policy instruments.

Objectives to pursuit of sustainability	
Economic efficiency	Economic efficiency involves maximizing the benefits which users can gain from the transport system, after taking account of the resource costs of provision and operation of the transport system.
Protection of the environment	e involves reducing a number of adverse impacts of the transport and land use system: regional pollutants such as NOX and SO2; local pollutants such as particulates, and their impacts on health; noise and vibration; visual intrusion; fragmentation and severance of settlements and biodiversity; urban sprawl; and loss of cultural heritage and natural habitats.
Liveable streets and neighbourhoods	This objective is focused on streets and outdoor conditions in residential areas. It includes the positive external effects on social, cultural and recreational activity in neighbourhoods, increased freedom of movement on foot and bicycle, and reduced sense of danger for these modes. It is linked to, but separate from the environmental and safety objectives.
Safety	This objective straightforwardly involves reducing the numbers of accidents for all modes, and reducing the severity of those which occur. However, since some locations, age groups and modes have higher accident rates than others, the safety objective also has equity implications.
Equity and social inclusion	Under equity the principal concerns are the need for reasonably equal opportunities to travel, costs of travel and environmental and safety impacts of travel. Within social inclusion we include accessibility for those without a car and accessibility for those with impaired mobility. True equality of opportunity will never be feasible, but consideration needs to be given to compensating those with the fewest opportunities or the greatest costs.
Contribution to economic growth	Land use and transport policies should support economic growth. Transport improvements which improve access or enhance the environment can lead to increased economic activity and possibly to sustained economic growth.
Intergeracional equity	While all of the above objectives are important for today`s cities, many of them will have implications for future generations also. But three impacts of today`s activities will particularly impact on future generations: greenhouse gas emissions, and particularly CO2, which will affect longer term climate change; consumption of land; and depletion of non-renewable resources, of which oil is perhaps the most important.

Table 1 - Objectives to pursuit of sustainability. Source: Developing Sustainable Urban Land Use and Transport Strategies – A Decision Makers` Guidebook” (2003, 13)

According to the Glossary of Mobility Package (2011), a “Sustainable Mobility” is "a set of processes and actions aimed to people and goods moving, with a reasonable economic cost and simultaneously minimizing the negative effects on the environment and the quality of life, bearing in mind the principle of meeting current needs without compromising future generations." The concept of “sustainable mobility”, is present in regional policies and strategies of the European Union, requires that citizens living in cities, towns or villages, have choices and conditions of accessibility and mobility providing a safe, comfortable,

with times acceptable and affordable travel. It also implies that mobility is made attending to energy efficiency and reduced environmental impacts.

Reflecting the importance of this subject for EU for a Sustainable Development, some data are available, formalized by the Sustainable Development Indicators (SDIs), produced by each country and organized by Eurostat, used to monitoring the EU Sustainable Development Strategy. The SDIs are organized in ten themes, with a collection of more than 100 indicators, structured by a headline indicator for each theme. These themes pretend to cross several areas as "Socio-economic development", "Sustainable consumption and production", "Social inclusion", or "Climate Change and Energy", among others. This data collection pretends to analyze not only at a European scale, country by country, the objectives and targets defined by the referenced strategy, but the evolutions of these indicators too. This is one of the moments that we can understand that the mobility, accessibility and transports are a relevant matter for a Sustainable Development, due to the existence of one axe totally related with this: "Sustainable Transport". Citing the EC, this is a "key challenge of the EU Sustainable Development Strategy (…) objective is to ensure that our transports systems meet society`s economic, social and environmental needs whilst minimizing their undesirable impacts on the economy, society and the environment.". As we can see in Table 2, the indicators system for the Theme 7 – Sustainable Transport, have one headline indicator – "Energy consumption of transport relative to GDP", one contextual indicator – "Price indices for transport", and presents two operational objectives – "Transport and mobility" and "Transport impacts", which have some associated indicators, and several indicators related to actions or explanatory variables.

<table>
<tr><th>Headline indicator</th><th>Operational objectives and targets</th><th>Actions/explanatory variables</th></tr>
<tr><td rowspan="9">Energy consumption of transport relative to GDP</td><td colspan="2">Transport and mobility</td></tr>
<tr><td rowspan="2">Modal split of passenger transport</td><td>Volume of freight transport relative to GDP</td></tr>
<tr><td>Volume of passenger transport relative to GDP</td></tr>
<tr><td rowspan="2">Modal split of freight transport</td><td>Energy consumption by transport mode</td></tr>
<tr><td>Investment in transport infrastructure by mode</td></tr>
<tr><td colspan="2">Transport impacts</td></tr>
<tr><td>Greenhouse gas emissions by transport mode</td><td>Emissions of nitrogen oxides from transport</td></tr>
<tr><td rowspan="2">People killed in road accidents</td><td>Emissions of particulare matter from transport</td></tr>
<tr><td>Average CO2 emissions per Km from new passenger cars</td></tr>
<tr><td>Contextual indicator</td><td colspan="2">Price indices for transport</td></tr>
</table>

Table 2 – Sustainable Development Indicators, Theme 7 – Sustainable Transport. Source: Eurostat

In the site of Eurostat is systematized the main trends related to this indicators system, since 2000 until 2011:

- Energy consumption of transport has grown slightly slower than GDP;
- Increased share of road in freight transport;
- Absolute decoupling between freight transport and the economy. Relative decoupling of passenger transport and GDP;
- Road still takes the major share of infrastructure investment;
- Prices for road and rail transport services have grown faster than air transport;

- Growth in greenhouse gas emissions from transport has slowed down;
- Progress in reducing average CO2 emissions of new car fleet;
- The steady decrease of air pollutants accelerated in 2008;
- Deaths due to road accidents continue to fall.

However, these facts within Europe have some discrepancies. As some examples (Fig. 1), it`s possible to see that is a clear division line between Atlantic and east mediterrain countries and the northern and central european countries respecting to the average CO emissions per kilometer from new passenger cars, being the first one the less polluent cars. According now to the "People killed in road accidents" (Fig. 2), related specifically with fatalities caused by road accidents include drivers and passengers of motorized vehicles and pedal cycles as well as pedestrians, killed within 30 days from the day of the accident, there is a huge difference between countries: Malta, Luxembourg and Cyprus have less than 100 people killed, against Poland, France, Germany and Italy, all with more than 4000 people killed in these conditions.

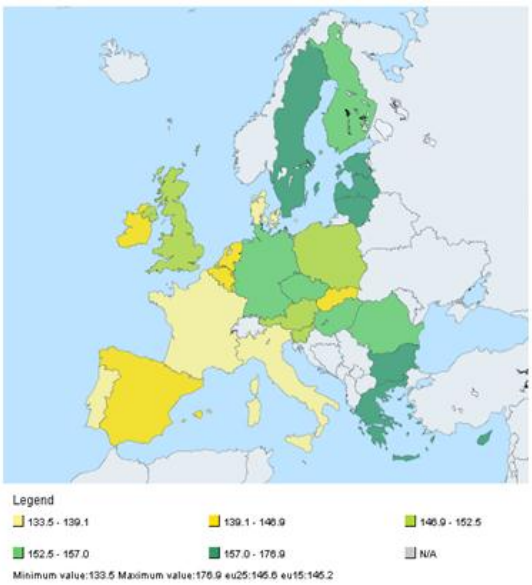

Figure 1 – Average carbon dioxide emissions per km from new passenger cars, 2009

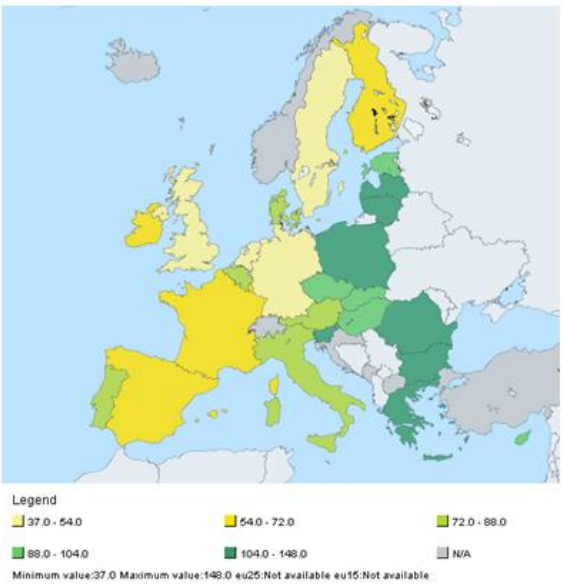

Figure 2 - People killed in road accidents – Number of deaths per million inhabitants, 2009

The greenhouse gas emissions are, in part, due to the transports. The indicator of Figure 3 reflects the emissions from all modes of transportation - road, rail, inland navigation and domestic aviation - of the greenhouse gases regulated by the Kyoto Protocol, summing three gases - carbon dioxide, methane, and nitrous oxide. One more time, we can see different patters within EU countries, highlighting the huge difference between countries: 85.000, 542.000 and 947.000 tonnes of greenhouse gas emissions in Liechtenstein, Malta and Iceland, respectively, and in the opposite side, as the countries that emit more greenhouse gas are UK, Italy, France and Germany, between 120.000 and 153.000 tonnes. As a last example, we will focus the "Modal split of passenger transport" (Fig. 4), having one indicator as the percentage share of each mode of transport in total inland transport, expressed in passenger-kilometres (pkm), based on transport by passenger cars, buses and coaches, and trains.

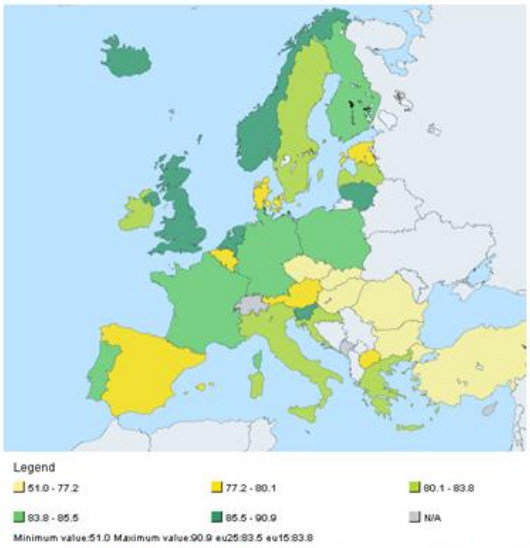

Figure 3 – Modal split of passenger transport, % in total inland passenger, Km, 2008 – Passenger cars

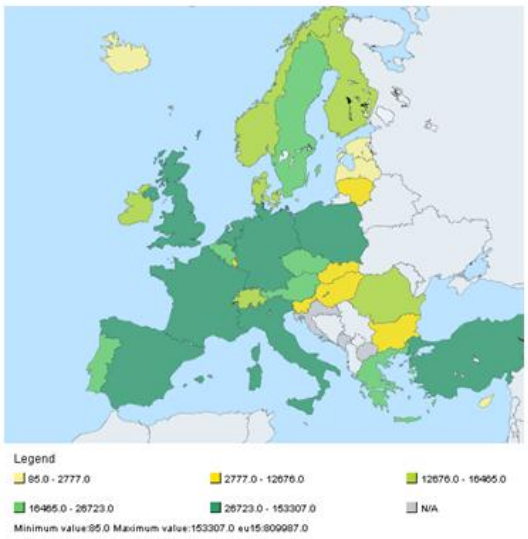

Figure 4 – Greenhouse gas emissions from transport, 1 000 tonnes of CO, 2009

To finish this quantitative information provided by CE, It`s relevant to analyse the progress, in this case, of Portugal, since the beginning of the 1990`s until now, compared with the EU27 whenever is possible (Table 3). The headline indicator have a contradictory behaviour when we compare the EU27 to Portugal: while in Portugal the energy consumption of transport relative to GDP has increased between 1995 and 2009, overall EU-27 this value has decreased, the value of the 2000 code (index = 100). Relative to the modal split of passengers transport, both in EU27 and Portugal the car is the main used transport, in Portugal there is a growing trend over the use of train or other public transport, which have declined as a mobility option for people. Focusing the modal split of freight transport, the use of road is crescent in both areas, highlighting the complete domain in Portugal (in 2009 this indicator cover 94% on the total inland freight tonne). Focusing the energy consumption of transport by mode, Portugal represents between 1,3% and 2% (1990 and 2010) of all EU27. Despite that, while in EU27 this values increased 30% in 20 years, in Portugal this percentage is higher than 96%. The energy spent in road transports both for Portugal and EU27 have the largest share. Analyzing now some indicators related with the transport impacts, it`s possible to confront the dynamic of greenhouse emissions from transports: in in EU 2007, and between 1990 and 2009, this indicator increases 21%, in Portugal almost doubled (87% of growth). However Portugal within EU27 only represents 2% of the greenhouse gas emissions from transports. About people killed in road accidents, the indicator has a relative success since the numbers are decreasing: between 1995 and 2009, the number of killed people decreases 45% in EU27 and 69% in Portugal. This numbers per million inhabitants reveals a similar behaviour (78 in EU27 and 83 in Portugal, in 2008). Analyzing the contextual indicators of this indicators set, the importance of mobility and the use of transports is reflected in numbers. The number of passenger transport by railway, by road, by air and by sea and inland waterway, having 2005 as the index (index=100), increased in all transports.

To conclude this topic and linking with the next one, it`s really important to have a good diagnostic, especially if it could be supported by an actualized indicators system that can demonstrate not only the actual situation but the evolution along the years, the main trends.

The diagnostic is the main basis for the elaboration of the policies, either territorial or sectorial policies, the operational objectives, measures and actions, and to evaluate all the policies cycle, the results and, in a long term, the impacts.

				1990	1995	2000	2005	2008	2009	2010	2011
Headline indicator	**Energy consumption of transport relative to GDP**		**EU27**	:	102.2	100.0	98.0	94.3	95.8		
			PT	:	91.5	100.0	104.4	104.6	106.4		
Transport and mobility											
Operational objectives and targets	**Modal split of passenger transport**	Passenger cars (% in total inland passenger - km)	**EU27**	:	:	83.1	83.6	83.3			
			PT	71.7	76.5	81.9	85.1	85.2			
		Trains (% in total inland passenger - km)	**EU27**	:	:	7.1	6.9	7.3			
			PT	10	7.1	4.4	3.8	4.1			
		Motor coaches, buses and trolley buses (% in total inland passenger - km)	**EU27**	:	:	9.8[e]	9.5[e]	9.4[e]			
			PT	:	16.5[e]	13.6[e]	11.1[e]	10.7[e]			
	Modal split of freight transport	Railways (% in total inland freight tonne - km)	**EU27**	:	:	19.7[s]	17.7[s]	17.9[s]	16.5[s]		
			PT	:	9.7	7.5	5.4	6.1	5.7		
		Roads (% in total inland freight tonne -km)	**EU27**	:	:	73.7[s]	76.4[s]	76.2[s]	77.5[s]		
			PT	:	90.3	92.5	94.6	93.9	94.3		
		Inland waterways (% in total inland freight tonne - km)	**EU27**	:	:	6.6[s]	5.9[s]	5.9[s]	5.9[s]		
			PT								not applicable
Actions/ explanatory variables	**Volume of freight transport relative to GDP Index 2000 = 100**		**EU27**		100.8[s]	100	105.1[s]	103.8[s]	96.4[s]		
			PT		87.6	100	148.6	133	124.6		
	Volume of passenger transport relative to GDP Index 2000 = 100		**EU27**		:	100.0	96.3[s]	93.5[s]			
			PT		96.8[s]	100.0	110.4[s]	109.3[s]			
	Energy consumption of transport, by mode 1 000 toe -	Final Energy Consumption	**EU27**	281410	302674	341381	366715	377575	366895	365218	
			PT	3746	4869	6542	7107	7396	7340	7373	
		Rail	**EU27**	8151	8195	8078	7829	7729	7308	7358	
			PT	83	81	88	66	67	60	57	
		Road	**EU27**	235771	252537	279671	299080	305639	300473	299715	
			PT	3037	4119	5617	6105	6165	6120	6151	
		International aviation	**EU27**	24072	29473	38487	43440	47283	43796	43181	
			PT	502	503	569	744	875	819	888	
		Domestic aviation	**EU27**	5389	4754	7038	7090	7310	6576	6620	
			PT	80	119	224	173	152	145	155	
		Domestic Navigation	**EU27**	6153	5919	5934	6528	6629	6174	5915	
			PT	44	47	44	17	137	197	122	

				1990	1995	2000	2005	2008	2009	2010	2011
Transport impacts											
Operational objectives and targets	**Greenhouse gas emissions from transport (source: EEA) 1 000 tonnes of CO2 equivalent**		**EU27**	771485	832359	912415	962994	958501	932135		
			PT	10075	13271	19115	19610	18965	18862		
	People killed in road accidents	Number of killed people	**EU27**		63155	56427	45346	38875	34500[e]		
			PT		2711	1877	1247	885	840		
		Number of deaths per million inhabitants	**EU27**		132	116	92	78	:		
			PT		271	184	118	83	:		
Actions/explanatory variables	**Emissions of nitrogen oxides (NOx) from transport Tonnes - Road transport (NFR 1A3b)**	Road transport (NFR 1A3b)	**EU27**	6820465	6358756	5542009	4627862	4285670	3953963		
			PT	77610	85785	120245	112426	101112	98628		
		Non-road transport (NFR 1A3a, c, d and 1A4ciii)	**EU27**	673377	628272	635484	625926	624781	624093		
			PT	8223	7697	7852	7052	7294	6621		
	Average carbon dioxide emissions per km from new passenger cars - Gramme of CO2 per kilometre		**EU27**		:	:	:	153.6	145.7		
			PT		171,7	169,2	144,9	138,2	133,8		
Contextual indicator	**HICP - annual average indices for transport prices 2005 = 100**	Purchase of vehicles	**EU27**			96,04	100,00	101,29	101,17	101,73	102,36
			PT			85,55	100,00	99,22	98,39	97,17	100,00
		Fuels and lubricants for personal transport equipment	**EU27**			84,17	100,00	119,04	105,07	120,25	136,66
			PT			72,13	100,00	124,38	107,32	121,02	139,13
		Maintenance and repair of personal transport equipment	**EU27**			81,61	100,00	112,82	117,10	120,16	123,72
			PT			70,13	100,00	112,93	116,92	119,58	129,11
		Passenger transport by railway	**EU27**			87,10	100,00	112,47	117,62	123,54	128,21
			PT			70,50	100,00	116,05	117,95	120,24	133,71
		Passenger transport by road	**EU27**			80,20	100,00	113,34	117,93	120,95	125,74
			PT			79,36	100,00	118,89	122,88	124,28	131,67
		Passenger transport by air	**EU27**			84,54i	100,00i	110,85i	109,98i	112,17i	120,34
			PT			95,58	100,00	114,44	102,81	101,43	113,38
		Passenger transport by sea and inland waterway	**EU27**			90,80	100,00	117,82	127,99	128,84	140,33
			PT			85,24	100,00	120,38	125,94	127,77	144,3
		All-items HICP	**EU27**			88,45i	100,00	108,56	109,63	111,91	115,38
			PT			85,46	100,00	108,34	107,36	108,85	112,72

Table 3 - Sustainable Development Indicators (SDIs), Theme 7. Source : Eurostat (http://epp.eurostat.ec.europa.eu/portal/page/portal/sdi/indicators/theme7)

4. Multiscale crossing of territorial and sectorial policies focusing "mobility" – Is there any relation between them?

In this part of the paper, the focus goes to a collection of several policy documents, both territorial and sectorial basis, according to three geographical scales – Europe, Nation/ Country and Region, having the work of EU, Portugal and the Region of Lisbon as case studies. Our starting premise is to check if there is any influence of the European Comission`s work, done in the last decade, in the national and regional documents now in focus. But, before answer this question, is important to highlight some of the documents in study and systematize the main conclusions or suggestions.

4.1. The effords of European Comission

According to the "Mobility and Transport" area in the European Comission site, there we could find a set of guiding documents about mobility and transports policies, which are part of the European strategies. In this context, subjects as "urban mobility" or "sustainable transport" are highlighted and discussed, resuming some relevant ideas or main trends and/or proposed some actions, especially to the national governments, to import them to national and regional policies. In this paper, we highlight some of the major sources:

- White Paper 'European transport policy for 2010: time to decide' (2001);
- Communication "Keep Europe moving – sustainable mobility for our continent" (2006);
- Green Paper "Towards a new culture for urban mobility" (2007);
- Communication "A sustainable future for transport: Towards an integrated, technologyled and user friendly system" (2009);
- Action Plan on Urban Mobility (2009);
- White Paper "Roadmap to a Single European Transport Area – Towards a competitive and resource efficient transport system" (2011).

Other kind of publications were done through investigation and research projects as "Developing Sustainable Urban Land Use and Transport Strategies – A Decision Makers` Guidebook" (2003), coordinated by the Institute for Transports Studies, University of Leeds (UK).

After the Green Paper on Urban Mobility that the Commission adopted on 25 September 2007, in 2009 was adopted an Action Plan on Urban Mobility. This action plan is organized in 5 themes and 20 actions (Table 4). In the same year, attending the EC`s Communication "A sustainable future for transports – Towards an integrated, technology-led and user-friendly system" (EC, 2009), were identified a set of policy objectives for sustainable transport and a set of policies for sustainable transport that could be included in the policy instruments (Table 5).

Theme 1 — Promoting integrated policie	
	Action 1 — Accelerating the take-up of sustainable urban mobility plans
	Action 2 — Sustainable urban mobility and regional polic
	Action 3 — Transport for healthy urban environments
Theme 2 — Focusing on citizens	
	Action 4 — Platform on passenger rights in urban public transport
	Action 5 — Improving accessibility for persons with reduced mobility
	Action 6 — Improving travel information
	Action 7 — Access to green zone
	Action 8 — Campaigns on sustainable mobility behaviou
	Action 9 — Energy-efficient driving as part of driving educatio
Theme 3 — Greening urban transport	
	Action 10 — Research and demonstration projects for lower and zero emission vehicles
	Action 11 — Internet guide on clean and energy-efficient vehicles
	Action 12 — Study on urban aspects of the internalisation of external costs
	Action 13 — Information exchange on urban pricing schemes
Theme 4 — Strengthening funding	
	Action 14 — Optimising existing funding sources
	Action 15 — Analysing the needs for future funding
Theme 5 — Sharing experience and knowledge	
	Action 16 — Upgrading data and statistics
	Action 17 — Setting up an urban mobility observatory
	Action 18 — Contributing to international dialogue and information exchange
Theme 6 — Optimizing urban mobility	
	Action 19 — Urban freight transport
	Action 20 — Intelligent transport systems (ITS) for urban mobility

Table 4 - Themes and Actions. Source: Action Plan on Urban Mobility – State of play, 2012, 2-15.

Policy objectives for sustainable transport	Policies for sustainable transport
• Quality transport that is safe and secure • A well-maintained and fully integrated network • More environmentally sustainable transport • Keeping the EU at the forefront of transport services and technologies • Protecting and developing the human capital • Smart prices as traffic signal • Planning with an eye to transport: improving accessibility	• Infrastructure: maintenance, development and integration of modal networks • Funding: finding the resources for sustainable transport • Technology: how to accelerate the transition to a low-carbon society and lead global innovation • The legislative framework: further promoting market opening and fostering competition • Behaviour: educate, inform and involve • Governance: effective and coordinated action • The external dimension: the need for Europe to speak with one voice

Table 5 – Policy objectives for sustainable transport and policies for sustainable transport. Source: "A sustainable future for transports – Towards an integrated, technology-led and user-friendly system" (EC, 2009, 16-26)

4.2. The effords of Portuguese Government in policies with focus on mobility`s subjects

In Portugal, the subject of "Mobility" have a crescent relevance in the context of the national policies, whether territorial or sectorial basis. In this analysis, two orientations are central to the rest of the policies: the National Strategy for Sustainable Development (ENDS) and the National Plan for Management of Territory (PNPOT). In both are found measures to develop this subject, transversely with others sectors, and several times, pursuing the values of a sustainable development (Fig. 5). Alongside ENDS and PNPOT, we can list a group of sectorial documents, with specific orientations to society, environment or economy (Table 6).

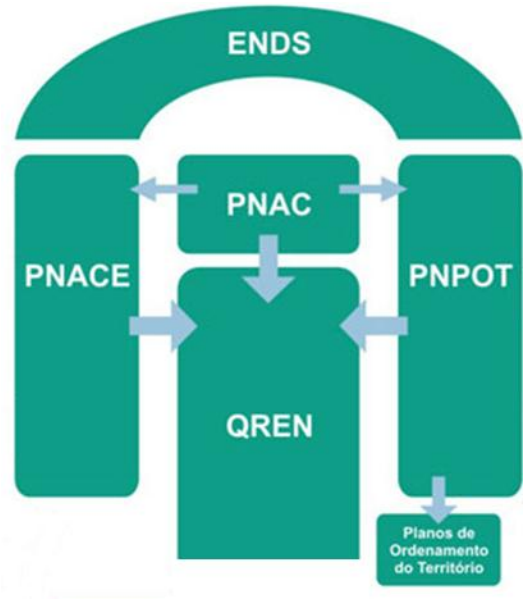

Figure 5 – Mosaic of national policies. Source: PIENDS (2007, 68)

National policies about several spheres of "mobility"
PET – Strategic Plan for Transport – Sustainable Mobility – 2011-2015
PNAI – National Action Plan for Inclusion
PNPA - National Plan for the Promotion of accessibility
PAIPDI – Action Plan for Inclusion of People with Disabilities
ENDEF – National Strategy on Disability
PNAEE - National Action Plan for Energy Efficiency
PNAC - National Programme for climate Change
PTEN - Program for the National Emissions
PPar - Plans and programs to improve air qualityin the region of Lisbon and Tagus Valley and Northern Region
ENSR - National Road Safety Strategy 2008-2015

Table 6 – National policies related with mobility. Source: Mobility Package. National Guidelines for Mobility (2012, 5)

Since 2007, Portugal has a national territorial strategy plan – **PNPOT -** approved by the law nº 58/2007, where was studied the role of Portugal in the World, in Europe and in Iberia, the main trends about several spheres, as "Natural resources and environmental sustainability", "Population and urban system" or "Economy, employment and competitiveness of territories", among others, defining a collection of 6 strategic objectives, 36 specific objectives and 197 measures with an integrative and inter-sectorial approach, where mobility, accessibility and transports are present. In this action plan, there are some items directly and generally dedicated to accessibility, mobility and public transport. Related with the studied thematic, in the specific objectives of PNPOT it`s highlighted the relevance of promoting not only the territorial competitiveness of Portugal, but develop a polycentric system to reinforce the territorial and social cohesion and equity. However, when we attend to the specific objectives of PNPOT there are two lines directly related with the theme:

- Design and develop the infrastructure network to support accessibility and mobility, favoring the consolidation of new urban centralities and more polycentric urban

systems;

- Develop infrastructure networks, equipment and support services to the accessibility and mobility, enhancing safety, quality of service and conditions of territorial equity and social.

At a more operational level, some measures, more precisely 19, are directly focused on mobility, accessibility and transports in several spheres (Table 7).

The **National Strategy for Sustainable Development** (ENDS) and its Implementation Plan (approved by Resolution of the Council of Ministers nº 109/2007, of August 20) was prepared in a consistent manner with the principles of the European Sustainable Development (ESD), and is an instrument of political orientation of the development strategy of the country until 2015 and a reference for the implementation of EU funds in 2007-2013 period. The Implementation Plan is organized by strategic objectives, strategic priorities, vectors, measures, indicators and goals. In this context, the accessibility, mobility and transports themes are present. As example, in the strategic priorities we highlight two of them: "Accessibilities that contribute to territorial cohesion and for a more polycentric territorial model" and "Attractive, affordable and sustainable cities".

Following this strategy, there are several vectors that reinforce the importance of the accessibility and mobility related with other spheres as the pollution, noise or the connection to international territories, among others. However, only two vectors express direct intentions for urban mobility: "A more sustainable mobility contribute to reducing emissions of air pollutants and noise, particularly in urban centers" and "Regulatory and financial conditions to planning with a favorable accessibility and a sustainable mobility". In the following table are listed the measures that operationalize all topics previously refereed (Table 8).

Despite all the policies' documents presented before – PNPOT and ENDS - or just mentioned (Table 6), one fact is important to highlight in the context of this study. Given the crescent importance of a sustainable mobility, found not only in the European policies orientations but all over the world, in Portugal the Institute of Mobility and Land Transports (IMTT) wanted "contribute with objectivity to clarify technical, scientific and institutional plans already existents, giving them a conceptual and methodological framework and insert them in an operational logic." (IMTT *site*). Started in 2010, with a huge conference – Land Use, Accessibility and Mobility Management (April 12th-14th 2010), the process culminates with the production of the **"Mobility Package"** (2012), developed by IMTT and GPIA (Directorate for Planning, Innovation and Evaluation), where were done a collection of documents, publicly discussed by consultants, experts and technicians in the mobility area, and others stakeholders as enterprises or the civil society, with the main goal of be approved by the Portuguese Government, working as a national guide, with resolutions at a regional and municipal geographical scales.

PNPOT Measures	Domains							
	A	B	C	D	E	F	G	∑
Develop sustainable urban transport plans, aiming to enhance the use of public transport and non-motorized mobility and improve air quality, particularly in areas of high population density.	x				x			
Regulating the use of vehicles in urban areas, both public and individual transport of passengers or goods and mixed by defining the allow able emission rates, through measures addressing the car acquisition and use	x							
Promote environmental certification of public transport companies of goods	x							
Building the New Lisbon Airport in proper operating condition in terms of safety and environment, adjusted to the development of strategic business segments of passengers and cargo and to promote connections and interfaces of air transport with land transport, in order to ensure a greater coherence, integration and competitiveness of the whole transport infrastructure as a key determinant of economic and social development of the country, and fostering the integration of the country in the global air transport, through the uptake / distribution of traffic on routes between Europe, Africa and South America	x	x	x	x				
Review the institutional design of transport in metropolitan areas, implementing metropolitan transportation authorities and improving both the efficiency and coordination of transport policies, or its articulation with the policies of spatial planning and environment	x	x						
Ensure the planning of High Speed Rail Network of the mainland, the articulation with the strengthening and modernization of lines and services of the railway and the rest conventional public transport and in the case of stations located outside of urban perimeters, the connection fundamental to the road network (main and complementary routes)					x			
Restrict the government's support for the complementation of stations trucking interfaces (road) to cases where there are mobility plans, allowing in particular an easily accessible pedestrian and an efficient matching with the careers of the existing urban public transport					x			
Review the National Road Plan on the mainland, with a view to integration into existing land management					x			
Promoting investment in the joint between the top-level road network (primary and secondary routes)and the lower hierarchy of networks, through the process with appropriate characteristics to function as intended, consolidating a network of regional routes and integrating the programs of variants and circular urban centers					x			
Integrating the financial dimension of transport systems and mobility in municipal and inter-municipal planning, programming investments, subsidies and capturing value from the indirect beneficiaries to ensure proper management and a sustainable exploitation of these systems		x			x			
Promote the development of intercity mobility plans that contribute to strengthen the complementarity between neighboring towns and cities of greater integration with its surroundings and that address accessible transportation for all					x	x		
Review the legal framework for the metropolitan areas of Lisbon and Porto and in larger urban agglomerations there is greater interaction between the development of new housing developments and the transport system, particularly through conditioning the approval of detailed plans and licensing of blends to assess their impact on the mobility system					x			
Encourage the creation of integrated transport systems that ensure, in rural and urban areas, accessibility to educational establishments including by students with special needs in mobility					x	x		
Integrate in plans for road infrastructure, the issues of transport safety and mobility for all segments of the population, encouraging accessible transportation, either rail (train or metro) or in road public transport, urban or suburban, and promote the elimination of physical barriers in the infrastructure of rail and road transport, facilitating the mobility of persons with disabilities				x	x	x		
Implement a Metropolitan Transportation Policy on the mainland, as support for sustainable mobility in the framework of organization and management of the public transport system, promoting less polluting transport modes and more attractive to users					x			

PNPOT Measures	Domains							
	A	B	C	D	E	F	G	∑
Launch programs to fully integrate physical and logical tariff systems, passenger transport on the mainland and with the necessary adaptations to the Autonomous Regions, ensuring accessible information on the various modes of supply ,particularly in large urban areas, promoting inter-modality							x	
Ensure the review of the Municipal Master Plans, in conjunction with the preparation of Municipal Mobility Plan, which transport networks and mobility to respond to their demand and the processes of redefinition of land use, promoting the accessibility of populations to local public transport employment, collective facilities and services in support of productive activities, as well as the movement of goods between places of production and market	x				x	x		
Implement the National Road Safety Plan, aiming to halve every 10 years the number of accidents and road deaths in Portugal and develop inspections and road safety audits for all construction projects and road maintenance, and these audits performed by an independent entity or within the same entity, distinct from the organic unity of the project, aiming to European safety standards				x	x			

Table 7 – Relation between PNPOT measures and the sustainable domains – A – Environmental Protection, B – Economical Efficiency, C – Economical Growth, D – Liveable area, safety and health, E – Planning and instruments, F – Equity and social inclusion, G - Infrastructuration

Objectives – Strategic Priorities - Vectors – References actions (RA) – Complementary Interventions (CI)			Domains							
			A	B	C	D	E	F	G	∑
2nd Objective - Sustained growth and global competitiveness										
Strategic Priority 4 - Economic growth more efficient use of energy and natural resources and less impact on the environment, including climate change										
	Vector - A more sustainable mobility contribute to reducing emissions of air pollutants and noise, particularly in urban centers									
	RA	Implementation of interventions to improve the efficiency and sustainability of mobility in Major Metropolitan Areas in which there are strong commuting, involving the adoption of a program of financial incentives for public transport operators, both private and public, with the aim of in 2013 could make the use of vehicles with hybrid or electric engine, or using cleaner fuels, in providing such services within large cities.	x	x						
	RA	Continuation of ongoing investment in infrastructure mode of transportation and light rail "metro" in the Major Metropolitan Areas, selecting priority those which have economic viability.		x					x	
	RA	Investment in the interfaces of public transport in Lisbon and Porto, in order to overcome the limitations of existing solutions, namely, the multimodality and other facilities to its users, including accessibility, including the implementation of a network of car parks public strategically placed at key points of access to major urban centers of Metropolitan Areas, in order to reduce car use on the inside.							x	
	RA	Construction of logistics platforms in the Metropolitan Areas, as a basis for the deployment of distribution activities and facilitate the rationalization and profitability of freight transport by specialized operators that function, with enhanced intermodality.		x					x	
3rd Objective – Better environment and sustainable management of heritage										
Strategic Priority 1 - Combating climate change										
	Vector - Development of policies and measures recommended in the National Climate Change									
	RA	Policies and measures to reduce emissions of greenhouse gases (GHGs) in the following sectors: - Supply and demand of energy, highlighting the energy efficiency of buildings, the development of demand management programs, promotion of renewable energies such as biofuels in transport, use of solar potential for heating and hot water production electricity, - Transport, highlighting the expansion of the Lisbon subway, the Metro do Porto, increasing energy efficiency in vehicles and promotion of alternative fuels.	x							
5th Objective - Better connectivity and upgrading the country's international balance of territory										

Strategic priority 2 - Accessibility that contribute to territorial cohesion and to a more polycentric territorial model										
	Vector - Structuring the Axis "North - South" in its Strand Railway in Terms of Competitiveness and Complementarity with Other Means of Transportation									
	RA	Construction of a new high speed railway line between Lisbon and Porto, articulating with the conventional network at its terminals and intermediate stations, including in Ota, Leiria, Coimbra and Aveiro, with subsequent extension to the airport Sá Carneiro.							x	
	Vector - Structural Regional Accessibility for Consolidation of a more polycentric territorial model									
	RA	Investment in the joints between the main road network (primary and secondary Itineraries) and networks of local or regional level through pathways with characteristics appropriate to its distribution function by integrating regional programs of urban variants and Circulars							x	
CI	Review of existing railway plans, articulating solutions in high-speed international travel and the Lisbon-Porto-Vigo axe with the implementation of a plan for the conventional network aimed at enhancing interoperability by European standards, especially the migration of the gauge and progressively removing bottlenecks to the movement of passenger trains and freight (2006-2010).									
	Review of National Road Plan with a view to integrating the system of territorial management in place (2006-2010).									
	Defining a hierarchy of modes of public passenger transport (adductors and capillaries) that complements the network of heavier modes from functional interfaces and ensure adequate levels of accessibility to the size of the various clusters. (2006-2010).									
	Incorporate in municipal and inter-municipal planning a financial dimension of transport systems and mobility, programming investments, subsidies and capturing value from the indirect benefit beneficiaries to ensure proper management and sustainable exploitation of these systems (2007 - 2013).									
	Implement the National Road Safety Plan, aiming to halve every 10 years the number of accidents and road deaths in Portugal and develop inspections and road safety audits for all construction projects and road maintenance, and these audits performed by an independent entity or within the same entity, distinct from the organic unity of the project, aiming to European safety standards (2007-2013).									
Strategic Priority 3 – Attractive, Accessible and Sustainable Cities										
	Vector - Incentives for the Development of Sustainable Cities, reclassified cities and with memory									
	RA	Investment support to materialize in the considered cities, to strengthen the sustainability of its operation: - Experimenting new organizational forms of public transport - collective or individual use - car fleets using centralized management and innovative solutions to accessibility and power train and telematics; - Dissemination of new solutions for decentralized energy production and its efficient management, for residential purposes in urban areas, with hybrid solutions combining fossil and renewable energy (including co-generation electricity / heat from natural gas, the equipment of buildings with the latest generation photovoltaic solutions etc.) - Support the creation of ecological corridors and public spaces, "green" cities, such as investment key to improving its environmental quality; - Support for experimenting with new solutions and interventions for rehabilitation of sewer systems in major urban areas in order to maximize the possibility of recycling water for uses other than human consumption.	x	x						
CI	Developing instruments within the Cities Policy, which will encourage urban agglomerations, alone or networked, to adopt a long-term strategic vision that assures them a differentiated positioning and competitive knowledge economy in the national and international level (2007-2013)									
	Encourage the development of strategic programs that enhance the competitiveness of the main areas of internationalization of the national economy, especially the Lisboa and Porto Metropolitan Areas and Algarve, to the metropolitan system of the Center for Coastal and Wood (2007-2013).									
	Implement a Metropolitan Transportation Policy on the mainland, as support for sustainable mobility in the framework of organization and management of the public transport system (2007-2009).									
	Support the residential mobility through greater efficiency of private rental market, the amendment and improvement of management models for public rental of the park and a better fit and flexibility in financing conditions for the purchase of housing (2007-2010).									
	Enforce in Infrastructure Roads Plans the integration of mobility issues for all segments of the population (particularly the more dependent on public assistance), and transport security, ensuring equity of access to public transport (2006-2013).									

	Ensure that the review of the Municipal Master Plans networks of transport and mobility, taking into consideration the Mobility Plans of persons and goods, are considered key elements in the processes of redefinition of land use, particularly by encouraging the greater intensity and location preferred constructive community facilities and services attract strong public areas with better accessibility by public transport, to ensure its sustainability (2006-2010).								
	Development of plans for metropolitan transport and mobility of people and goods and consolidation of the powers of Metropolitan Transport Authorities in Lisbon and Porto to cover strategic decisions relating to all modes of transport, giving them real powers in the definition of obligations of public transport and its contractual agreements (2006-2008).								
	Promotion of pilot projects demonstrating new urban solutions (access to services, mobility, and resource management) and introduction of new technologies in the functioning of the city (2006-2013).								
	Launching programs to fully integrate physical and logical tariff systems of passenger transport, particularly in large urban agglomerations, using a highly comprehensive public information tools and easy to use as a way of promoting the use of public transport (2006 - 2013).								

Table 8 – Relation between ENDS objectives and the sustainable domains – A – Environmental Protection, B – Economical Efficiency, C – Economical Growth, D – Liveable area, safety and health, E – Planning and instruments, F – Equity and social inclusion, G – Infrastructuration. References actions (RA) – Complementary Interventions (CI)

In this package we count six documents, each one with different scopes. For example, the first one – 1.National Guidelines for Mobility – have an orientation aim, identifying a group of orientations to develop a sustainable mobility. Instead, the second and the third documents – 2.Orientation Guide for Accessibility, Mobility and Transport Plans in Municipal Planning and 3.Guide for the elaboration of Plans for Mobility and Transport – reports to the relevance of insert this thematic in regional territorial policies and to have a guide to produce Mobility Plans at a municipal scale. The commuting wasn`t forgotten, having the IMTT the objective of disseminate the application of a plan for the Hubs and enterprises. To help this dynamic, it was produced a collection of brochures to clarify some concepts or techniques about mobility, enhancing the use of the previous resources (Table 9).

Documents of "Mobility Package"	
1. National Guidelines for Mobility	
2. Orientation Guide for Accessibility, Mobility and Transport Plans in Municipal Planning	
3. Guide for the elaboration of Plans for Mobility and Transport	
4. Brochures collection about techniques and thematics	
Thematics	**Brochures**
1. Ways and means of transport	a1. Types of means and modes of transport
2. Networks and public transport services	c1.Solutions of flexible transport
3. Interfaces passenger transport	a1. Interfaces of passenger transport
4. Planning and management of highway	a1. Road network - Principles of planning and design b1. Traffic counts and surveys
5. Parking	a1. Parking policies
6. Shared Transport	a1. shared transport
7. Transport mild and moderate traffic	a1. Traffic calming b1. Pedestrian Network - Principles of planning and design c1. Cycling network - Principles of planning and design
8. Public information	a1. Information systems to the public
5. Guide for the Preparation of Plans and Business Mobility Hubs	
6. Technical and Financial Support of the State	

Table 9 – Documents within "Mobility Package" (IMTT, 2012)

For this study, only the first document will have relevance for a particular analysis. For IMTT, the "National Guidelines for Mobility" pretend to be an orientation instrument with very specific characteristics: presenting a strategy of mobility according to a sustainable approach, defining the instruments, plans and programs for the execution, presenting the territorial scope and the obligation of elaborate the previous instruments, the respective contends, the elaboration, approval and public participation processes, the period of duration of each instrument and the conditions for monitoring and reviewing. The cited document is organized in three major chapters – 1.Context for the development of the guidelines, 2.National Guidelines and 3.Operationalization of the guidelines, and we will only attend to the second chapter. It`s important to underline that these collection of guidelines are elaborated according the main european and national policy documents and searching for a more sustainable mobility and transports. The guidelines are organized in 11 orientation axes (Table 10) and each one has a group of main objectives. These axes and respective objectives ultimately meet all the objectives of sustainable mobility previously identified, being then an integrative document of the various sectors, given also attention to the instruments of territorial policy. In the background, the set of objectives respond to the

social, economic and environmental challenges that are directly or indirectly related to mobility, accessibility and transport. For example, the equity and social inclusion is present in the intention of develop adequate levels of accessibility by transportation systems for the several groups of citizens, not only related to their geographical location (centers vs peripheries), but according to their needs and limitations (ex. for elder people or families with children). In the economic sphere, it`s highlighted the relevance of promote an efficient accessibility system, according to the potential of existing networks and the real demands. Related with the environment, but being a transversal axe, the importance of promote non-motorized transport modes, developing better conditions for pedestrians and cyclists, is one of the main goals. This action would improve healthier lifestyles for people but also diminish the emission of greenhouse gas.

Orientation Axes and main objectives	Domains							
	A	B	C	D	E	F	G	∑
A - Define and ensure adequate levels of accessibility offered by transportation system for all citizens. It is intended to: - Ensure that the transport system does not exclude some urban areas, categories of users and/or groups of citizens, considering the factors of price, travel time, frequency and hours of service, availability of alternatives and physical accessibility;						x		
B - Establish an efficient configuration of the accessibility system. Looking for solutions that: - Consider the various modes of transport in an integrated way and taking advantage of its potential; - Vary depending on the density of demand; - Adapted to the urban context, the differences in the week and time periods; - Achieved through the proper design of the transport system and the specifications of the offer (eg. parking);		x						
C - Support in ensuring economic stability of supply. The mobility system should contribute to a competitive economy and a rational allocation of financial resources, defending that: - The global funding should be set at the system level of mobility and not each of its components; - Operating budgets must be balanced (public services vs. social services); - The revenue sources of the mobility systems should be differentiated and may include contributions from users, indirect beneficiaries and of public budgets supporting equity policies; - Transparency on costs, financial transfers ,production and results		x	x					
D - Improving the quality of life of citizens by reducing the negative impacts of mobility (social, environmental and economic). Ensure that urban mobility evolves through: - The containment of the overall volume of motorized travel, especially by car with low occupancy rates; - The use of cleaner modes of transport and safer; - Technologies of transport and efficient solutions in infrastructure, in each mode and the articulation between them; - Strengthening of actions to increase the feeling of personal security of passengers; - Reducing the costs of externalities for people, organizations and society arising from congestion, by promoting the diversity of solutions;				x		x		
E - Creating good conditions for non-motorized modes, particularly for pedestrians. It is essential to recognize the importance of modes of non-motorized transport, either as single mode or as a pipeline of others. Should be promoted: - The existence of good conditions of service for pedestrians and cyclists; - The adoption of healthier lifestyles; - An urban system more efficient, with greater accessibility and proximity with less harmful emissions.	x			x		x	x	
F - To promote a rational use of individual motorized modes. Through: - Develop hierarchical road networks that contribute to reducing traffic impacts on quality of life of communities and urban areas; - Promoting a modal shift to more sustainable modes of travel in the short / medium range, - Promote greater independence of school-age children in their home-school courses; - To promote higher vehicle occupancy rates; - To promote eco-driving; - Reveal the real costs of car use;	x	x		x				
G - Ensure a good quality of public transport services and with technical characteristics appropriate to demand. Balancing efficiency and equity implies the availability of Public Transports solutions at affordable prices and with good coverage in space and time: - Considering variables and transport solutions adapted to density levels of demand, time periods or days of the week.		x						
H - Integration of land use policies and transport					x		x	

Promote the adoption of measures in support for interventions in the country and particularly in new urban developments, are planned with a view to: - Development of compact urban solutions and focus on diversity and complementarity of urban functions in order to promote non-motorized modes; - Ensure urban design through the readability of the networks by the various users through its structuring, prioritization and appropriate signage; - Ensure appropriate services (competitive) of Public Transport to both the main attractors /generators and integration of these movements in the urban centers and network of soft modes; - Introduce the needs of the urban distribution of goods in the planning process.								
I - To promote the physical integration, pricing, and institutional logic of the different components of the mobility system. Ensure the existence of a multimodal system of mobility that users of various modes of transport are not penalized by the lack of integration between them, covering: - The operation of the entities planners and managers of mobility; - The reform and modernization of the legal and regulatory framework in the sector of passenger transport; - Ease of use combined transport modes, ensuring an integrated (using the same ticket), physical (interface functionality) and logical (information and integration time) tariff.					x			
J - Improving information to citizens on the transport system and mobility. Ensure that the mobility planning also includes the need for information and public awareness, which involves: - Ensure that there is updated information about the system and integrated transport and mobility; - Adopt information solutions in real time, capitalizing on progress in ICT; - Inform and raise awareness about the real costsassociated with the use of various modes of travel;					x			
K - To ensure public participation in decision-making related to mobility. This guidance aims to ensure that the mobility policy is developed in a transparent and participatory way: - Facilitate the participation of citizens and actors from the earliest planning stages; - Report the basis for the decision in a transparent and understandable by the general population; - Intensify education activities, training and awareness to a new culture of mobility.					x	x		

Table 10 – Relation between Guidelines of "National Guidelines for Mobility" (2011, 23-25) and the sustainable domains – A – Environmental Protection, B – Economical Efficiency, C – Economical Growth, D – Liveable area, safety and health, E – Planning and instruments, F – Equity and social inclusion, G – Infrastructuration.

4.3. The Lisbon Region as case study

The regional plans for land management **(Planos Regionais de Ordenamento do Território - PROT)** pretends to define the regional strategy to the territorial development, integrating the national options set and the local strategies considering local development, being the framework for the development and planning of municipal plans for land use. Besides being a pillar for territorial development, the PROTs are fundamental to the definition of action programs to include in the next programming period of the interventions co-financed by the Structural Funds and Cohesion Funds of the European Union. The powers relating to regional plans for land management are carried out by the Commissions for Coordination and Regional Development (CCDR). For this case study – Lisbon Metropolitan Area – is the CCDR-LVT that control the Regional Plan of Territorial Planning of the Metropolitan Area of Lisbon (PROT-AML) [Resolution of the Council of Ministers 68/2002], currently in the process of actualization and the Regional Plan of Territorial Planning of the West Valleyand Tejo (PROT-OVT) (approved by Resolution of the Council of Ministers no. 64-A/2009).

Lisbon Metropolitan Area (LMA) is an association of municipalities, having now 18 municipalities[2] (Fig. 6). In this area, where is the Portuguese capital, is the major populational and economical concentration in Portuguese context. In about 3% of Portuguese area, there are almost 3 million of inhabitants (25% of Portuguese people), about 25% of the active population, 30% of the national companies and 33% of the employment. LMA is divided in two sides with the Tagus River in the middle.

Figure 6 – Municipalities of Lisbon Metropolitan Area. Source: Atlas da AML

2

Alcochete, Almada, Amadora, Barreiro,Cascais, Lisboa, Loures, Mafra, Moita, Montijo, Odivelas, Oeiras, Palmela, Sesimbra,Setúbal, Seixal, Sintra e Vila Franca de Xira.

This metropolitan area has very distintive areas, with different needs and problems. However, looking as an all, the PROTAML team had produced a SWOT analysis, after a deph diagnosis of several thematics (Table 11).

SWOT analysis	
Strengths	**Weaknesses**
- AML`s population growth higher than national average - Concentration of qualified labour force, financial and technological resources - Regional economic dynamic very diversified - Increasing of community facilities for several areas and people - Centrality of transport networks - Well-developed transport network and good population`s coverage	- Aging population slowly than national average and imbalances between population growth and aging - Lower average income for families and crescent level of poverty - Urban and territorial disordering and fragmentation, disqualified and illegal neighbourhoods - Insufficient phisical and functional joints between centers - High levels of pollutant emissions in air, originated from the fossil fuels, in particular by cars - Disarticulation of public transports modes and excessive use of private transport due to the insatisfaction with mobility to and within the central area of Lisbon
Opportunities	**Threats**
- Revitalization of some consolidated urban areas - Changing the energy paradigm and impacts on transport, enabling the emergence of innovative solutions - Improved public transports network, extending population coverage and promoting intermodalities between soft modes and individual transport	- Inadequate and disjointed social and urban policies - Crescent fragmentation of urban and social metropolitan fabric, conducing to fractures and polarizations - Territorial asymmetries in access to several community facilities, as health, networs and sports equipments - Difficulties in the articulation of antional sectorial policies

Table 11 - SWOT analysis. Adapted of PROT-AML (2009, 46-50)

Especially focus on mobility thematic, and according to the elaborated diagnostic of transport system area, two trends are evident: the first relates to the reversal in the modal choice, where there is a decline in the share of users of pedestrian and public transport modes, while increasing the use of individual transport (especially used with only one occupant - only the driver) across the metropolitan area. The second trend is due to changes in the relationships between the various municipalities in AML: the intra-municipality travel lose weight and increase the number of trips to other municipalities, except Lisbon (the capital city). However, Lisbon is still the great center of attraction of commuting (PROT-AML, 2009, 13-14). Some aspects, some positives some negatives, are highlighted according to dynamics of mobility in AML in this last decade (PROT-AML, 2009, 60-61):

- Greater distance between the place of residence and the workplace;

- Decrease the number of users of the bus, much due to the difficulty of adapting fleets and routes to new needs (need for speed, frequency, territorial coverage and technological adaptations, such as access for wheelchairs or support for people visually impaired);
- Development of road infrastructure of superior rank, allow individuals travel over greater distances in less time, using private transport;

- The allocation of vehicles or payment of a car allowance by companies promoting their use rather than public transport;

- The growth of smooth transport infrastructure (bike lanes);

- The public transport network is well developed, with wide spatial coverage and. However, there is still no response to some urban areas by public transport and the intermodality is insufficient (due to weaknesses in the physical interface and lack of coordination of services);

- Lack of exclusive lanes for public transport, parking problems and the inadequacy of the information system and ticketing for the general public.

- The existence of several public and private actors acting without any coherence between them;

- Absence of metropolitan plans for mobility and transport, which potentiate the integration of agents, services and information.

The document in focus – PROT-AML - with the previously refereed aims, is organized in axes, components, key-objectives and strategically options or actions. Each action has an explicative statement for a better understanding and for an easier operationalization by the several entities. In PROT-AML there is evident the search for a sustainable mobility. Three of the five axes are related with mobility, accessibility or transports, each one presenting one important component in this matter: "Connectivity, competitiveness and cosmopolitanism" and the component "Improving the upper regional and international links", "Polinucleation and urban compaction" relating with the component "Enhance regional connectivity", and "Sustainability and tune with nature" and a specific component "Promote a sustainable mobility". Following the next level – key-objectives – we highlight four topics under this study:

- To improve the coordination of policies, planning and mobility management;
- To support intra-regional mobility in a public transport network more efficient, innovative and safe;
- To increase energy efficiency in transport;
- To integrate the soft modes of mobility in the chain travel.

In a more operational level of PROT-AML, looking for the strategic options, there are several actions to develop the mobility, accessibility and transports, according the three previously selected axes (Table 12). In each of these actions is explained the problematic that we need to solve, but also the guidelines and directives to operationalize the action. Despite this policy document have a regional scope, some actions are beyond this territorial limit, benefiting the national and even the international network (as Lisbon Airport or High-Speed Rail), but others actions are limited to specific areas (for example the "Development of the Metro Sul do Tejo" that covers part of the south merge of the LMA).

Connectivity, competitiveness and cosmopolitanism	Polinucleation and urban compaction"	Sustainability and tune with nature
Lisbon Airport	Articulation of policy, planning and mobility management	Attractiveness of public transport
High-Speed Rail	Priorities for investment in rail network	Discouraging the use of private car
Sea and port systems	Development of the "Metro Sul do Tejo"	Intermediate and innovative transport solutions
Logistics and transports	Links in TPSP	Accessibility of the poles of attraction
	Investment in other structuring modes of transport	
	Investments in the road system	
	Transport interfaces and multimodal stations	
	Investment of soft modes of mobility	

Table 12 – Axes and actions of PROT-AML (2009. 200-377)

In this study, it will be focus only one action more deeply: 1. Attractiveness of public transport (PROT-AML, 2010, 328-331). This action is included in the axe "Sustainability and tune with nature". At first is identified a set of related actions, reinforcing the internal coherence between the actions, and between the actions and the objectives. To express the relevance of the action, is listed the problematic that the action pretends to solve. For example, the "Attractiveness of public transport" aims to promote the use of public transport to consolidate a sustainable mobility policy and to integrate the various public transport networks, promoting more attraction and improve energetic and environment efficiency. To solve these problems, there are identified some orientations: develop an intra and intermodal integration (ex. physical, logical and tariffs), improve circulation and exploration conditions and a better environmental performance, and to develop and promote the image of public transports. In a more operational scope and for this action in particular, there are a set of orientations, related with policy instruments identifying the responsible and participant entities. In this context, it`s relevant to regulate the operation of transport passengers, to ensure compliance with contracts, concessions and commitments and their operating programs, to develop and implement integrated multimodal ticketing and tariffs, to develop a communication and marketing plan, and to expand bus lanes and plans for circulation and parking. To conclude, and having a concern related with the Europe 2020 and Regions 2020, are presented a collection of targets to 2020, as: contribution to modal shift from individual to collective transport (5% of pkm), mobility more efficient in terms of energy and soil consumption and greenhouse gas emissions (gains of 20% every 10 years, per capita), or compliance with the limits of noise and air quality.

To finish the presentation of PROT-AML, there is an important component for evaluation and monitoring the policies – indicators system, goals and the starting point (Table 13). This indicators system cover not only some data about transports, but have some concerns about the influence of the mobility and transports in the environment.

Indicators	Goals	Starting point	Source
Number of air passengers handled	19 million pax (2020)	12 million pax (2006)	NAER
Market share of rail travel in the middle and long distance, to external links	16% (2020) 31% (2030)	11% (2003)	RAVE
Passenger for Km in Public Transportation (pkm)	34% share of pkm in TP (2015)	29% share of pkm in TP (2007)	APA
Average time to travel between urban centers, municipalities centers in public transport	79 Minutes (2020)	88 Minutes (2007)	Transports Operators
Population user of Public Transport	52% (2021)	32.1% (2001)	INE Censos
Emission of greenhouse gases in the transport sector	Less than 8% (2013) Less than 20% (2020)	A avaliar (2007)	APA
Compliance with the limit values of pollutants PM10 and nitrogen dioxide (NO2)	Yes (2015)	Exceedence: 149 VL daily PM10; 49 og/m3 - value of annual average PM10 (2007); 75 og/m3 - value of annual average NO2 (2007)	CCDR-LVT

Table 13 – Mobility indicators of PROT-AML (2009, 399)

5. Policies coherence for a more Sustainable mobility

This last part pretends to relate the documents or policies presented at several geographical scales, according, in one hand, with the main objectives of sustainability, and in other hand, present another perspective, related with the several challenges that influence or are influenced by mobility.

Attending to the national documents in study – PNPOT, ENDS and Mobility Package (Table 14), it`s possible to do this counting exercise, categorizing each item according to the objectives previously presented. It`s easily conclude that the territorial national policy, as PNPOT, have its focus on mobility especially related with the territorial planning and to the policy instruments. In other perspective, the ENDS, having Sustainable Development as key-concept, focus the actions almost all on environmental protection and economic efficiency, highlighting the problems and the resolutions in an infrastucturation scope as the future. At last, in the Mobility Package, and reflecting the transversal approach of mobility, accessibility and transports in this instrument, all the objectives for a sustainable mobility are integrated.

Objectives for Sustainability	PNPOT	ENDS	Mobility Package
Number of items about mobility	**(19 measures)**	**(8 actions)**	**(11 axes)**
A – Environmental Protection	5	3	2
B – Economic Efficiency	3	4	4
C – Economic Growth	1		1
D – Liveable area, safety and health	3		3
E – Planning and instruments	12		4
F - Equity and social inclusion	4		4
G - Infrastructuration	1	5	3

Table 14 – Relation between PNPOT measures, ENDS actions and mobility Package axes with the main objectives for sustainability.

In the second analysis perspective, and now crossing the readings for all policies previously referred at several geographical scales – Europe, Portugal and AML, we will focus only two trends or challenges: urbanization and environmental changes.

The references to the urbanization or urban areas (as a positive or negative way) are almost concentrated in the territorial policies in study, especially at a national and regional scale (in PNPOT and PROT-AML) (Table 15). In this case, if sometimes the urban characteristics appear only to define the context of the places, in other cases the reading is focus on urbanization as a phenomenon that can be positive, promoting the density and the efficiency of the public transport system and the proximity of the workplace, goods and services, or negative if we look for urban problems as traffic congestion or the concentration of greenhouse gas emissions and noise. There are some references too in the Mobility Package, due to the transversatility of this document and the aim of develop a more sustainable mobility for all places, independent of the urbanization rate.

In other example, focus on the environmental changes (Table 14), this topic proves that this topic is a central objective of all policies, having a constant concern in all analyzed documents for their resolution or, at least, reducing its impact. Since the european policies in study, as the Europe 2020, until the regional territorial plans the concerns about reducing gas emissions caused not only by private transports, but by the public transport fleet, a more efficient use of the fuel and, at the same time, the search for different, cleaner and healthier transports, with soft modes of mobility, are some examples of proposed actions.

Level	Policy	Targets/Actions/Measures
European	Europe 2020	
National	PNPOT	Regulating the use of vehicles in urban areas, both public and individual transport of passengers or goods and mixed by defining the allow able emission rates, through measures addressing the car acquisition and use
	ENDS	
	Mobility package	Ensure that the transport system does not exclude some urban areas (…), An urban system more efficient, with greater accessibility and proximity with less harmful emissions
Regional	PROT-AML	Polinucleation and urban compaction - Articulation of policy, planning and mobility management

Table 15 – Targets, actions or measures of several policies at several geographical scales to solve problems realted with the urbanization

Level	Policy	Targets/Actions/Measures
European	Europe 2020	Protecting the environment, reducing emissions and preventing biodiversity loss
National	PNPOT	Develop sustainable urban transport plans, (…) and improve air quality, particularly in areas of high population density.
	ENDS	Develop policies and measures to reduce emissions of greenhouse gases (GHGs) in sectors as transport, highlighting the expansion of the Lisbon subway, increasing energy efficiency in vehicles and promotion of alternative fuels
	Mobility Package	Improving the quality of life of citizens by reducing the negative impacts of mobility - The use of cleaner modes of transport and safer
Regional	PROT-AML	Investment of soft modes of mobility, Attractiveness of public transport

Table 16 – Targets, actions or measures of several policies at several geographical scales to solve problems realted with the urbanization

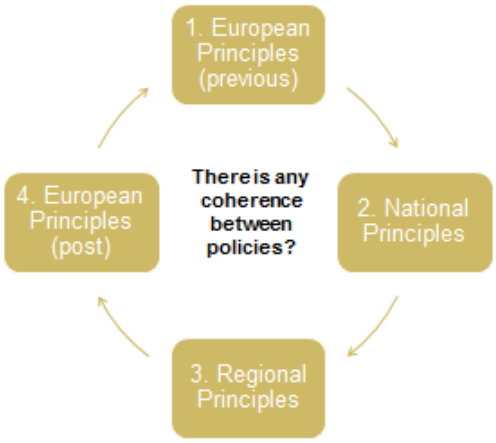

Figure 7 – Scheme about the relation between european, national and regional principles

Concluding this part, and asking if there is any coherence between the policies in focus, it`s possible to understand the existence of a circular relation (Fig. 7). It`s assumed that the european documents, especially those that are prepared by the committees of the EU, and which countries have to pay attention to formulate national and regional policies, present now a strong conceptual basis, but are concern too in developing european and national diagnosis, recurring to indicators sets (Eurostat) and promoting several action plans ("Action plan for urban mobility", 2009), emphasizing the need to each country to adapt these proposals to their national and regional contexts. In the portuguese case, these documents are integrated and are the base for national policies. For example, the ENDS – National Strategy for Sustainable Development, is based on Strategy for sustainable development, or the first document that constitutes the Mobility Package - National Guidelines for Mobility - make reference to several european policy`s documents, as the White Paper – 'European transport policy for 2010: time to decide' (2001); the Communication - Keep Europe moving – sustainable mobility for our continent (2006); the Green Paper - Towards a new culture for urban mobility (2007); or the Action Plan on Urban Mobility (2009). At a regional scale, and have the PROT-AML as the only studied document, this relationship is not so evident, but what

is evident in this regional territorial policy is the integration, in one hand, strategies at a local, neighbourhood or community scale, but some actions that benefit not only the region but all the national context, since the mobility subject doesn`t serve to divide regions but connect them together, and even with Spain, the adjacent country, or other countries of Europe, for example. However, and that`s the reason why european principles are the last phase of this scheme, objectives and targets are now proposed for Europe by EC, and countries have to construct their policies on various scales in a consistent way with each other to achieve the main european objectives and targets.

6. Conclusions

Being a general objective of policies, either territorial or sectorial, and at several scales, the coherence between them is utmost important. In these presented cases, there are some evident positive aspects. For example, both national and regional territorial policies absorbed the principles of superior level policies, and each one of these policy levels are concern with the lowers and higher levels, thus developing a stronger coherence between the policies and a higher level of integration of the several policies. However, and analyzing the action plans of national and regional policies, the actual situation of economic crises in Portugal changed, sometimes drastically the political planned action, especially in major projects as the new airport or the high-speed train (TGV) that would allow a better connection of Portugal to Europe by air or by ground. So, long-term policies have now this new challenge with the limitations to the operationalization of plans and programs. This situation is even worse when it`s difficult to understand the plans and programs national and regional tree and the policy`s dependencies, especially in a moment of review of expired plans and programs and elaboration of new instruments.

In this context, and after the exercises of relationship between several documents that have focus mobility, accessibility and transports aspects, at several territorial scales, as european, national (focused in portuguese case) and regional (focused in Lisbon region case) and understand how can this set of documents answer to the objectives that promotes sustainability, two topics have to be highlighted. The first one is related with the need of have a framework that provide a multi-scale governance, that support the elaboration and operationalization of plans and programs, turning the objectives and the results coherent among them, avoiding the duplication of tasks or human, technical and financial resources allocation, and also distributing the implementation of the actions for the best entities that are able to accomplish. Focusing now the thematic of transports, is extremely important that the entities that are responsible for transportation networks, both public and private, have to work in partnership in order to promote a stronger public transport network, facilitating the assimilation of this service by individuals. The existence of a combined ticket for several companies or for several areas is only one example. The dynamics seen within the Lisbon Metropolitan Area are the reflex of this need, when Lisbon attract a huge commuting, but between the others municipalities the commuting dynamic is starting to rise.

The second aspect is the relevance of promote policies not only focus in the territorial area or in one theme, but that combine several spheres for a more sustainable development, as the environment, economy and society. This intersectorial approach has to be present in all policies, and the policies cannot be seen as the tool to solve only one problem. Focusing on the example of the mobility again, it`s understandable the relationship of this subject and others. As presented in the Sustainable Development Indicators (Eurostat), the theme 7 about sustainable transports addresses links to social scope, with attention to people killed in road accidents, links to the economic scope, focusing for example the counting of the energy consumption of transport relative to GDP or the investment in transport infrastructure by mode, or link with the environment scope, as the greenhouse gas emissions by transport mode or the average CO2 emissions per Km from new passenger cars.

To conclude, and relating this paper to the Spatial Decision Support System (SDSS), that is the ultimate objective of SPOTIA project, the importance of this system is related with some topics: collect all policy`s documents related with the national and regional policy tree, both territorial and sectorial scope; it`s important to balance the "policy language", especially some concepts, promoting a unique conceptual system common to all tools and policies; at, to finish, turn this SDSS useful for the agents so they can search for thematics of actions, problems and solutions, responsible entities or instruments, using the past examples as basis for the future.

Bibliography

- **AML** (2003) Atlas da Área Metropolitana de Lisboa. Access online: http://www.aml.pt/web/webstatic/actividades/smig/atlas/_docs/atlas_01.pdf

- **CCDR-LVT** (2009) Alteração ao PROT-AML. Documento de Trabalho, Julho 2009. Access online: http://protaml.inescporto.pt/biblioteca/proposta-versao-preliminar-integral-2009-07-23/view

- **CCDR-LVT** (2010) Diagnóstico sectorial, Área Sectorial Sistema de Transportes, Access online: http://consulta-protaml.inescporto.pt/plano-regional/relatorio-do-plano/relatorios-sectoriais-de-caracterizacao-e-diagnostico/Diagnostico%20Sectorial%20Sistema%20de%20Transportes.pdf

- **Commission of the European Communities** (2001) White paper – European transport policy for 2010: time to decide. Access online: http://ec.europa.eu/transport/strategies/doc/2001_white_paper/lb_com_2001_0370_en.pdf

- **Commission of the European Communities** (2006) Keep Europe moving – Sustainable mobility for our continent. Mid-term review of the EC`s 2001 Transport White Paper. Access online: http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2006:0314:FIN:EN:PDF

- **Commission of the European Communities** (2007) Green paper – Towards a new culture for urban mobility. Access online: http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2007:0551:FIN:EN:PDF

- **Commission of the European Communities** (2009) Action Plan on Urban Mobility. Access online: http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2009:0490:FIN:EN:PDF

- **DGOTDU** (2007) Programa Nacional da Política de Ordenamento do Território – Programa de Acção. Access online: http://www.territorioportugal.pt/pnpot/Storage/pdfs/PNPOT_PROGRAMA_DE_ACCAO.pdf

- **European Comission – Community Research** (2003) Developing Sustainable Urban Land Use and Transport Strategies - A Decision Makersí Guidebook. Access online: http://www.ivv.tuwien.ac.at/fileadmin/mediapool-verkehrsplanung/Diverse/Forschung/International/PROSPECTS/pr_del15dmgen.pdf

- **European Comission – Directorate-General for Energy and Transport** (2009) Towards an integrated, technology-led and user-friendly system. Access online: http://ec.europa.eu/transport/publications/doc/2009_future_of_transport_en.pdf

- **European Comission - Eurostat** (1990-2009) The Sustainable Development Indicators (SDIs) – Theme 7: Sustainable Transport. Access online: http://epp.eurostat.ec.europa.eu/portal/page/portal/sdi/indicators/theme7

- **European Commission** (2011) White paper – Roadmap to a Single European Transport Area – Towards a competitive and resource efficient transport system. Access online: http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2011:0144:FIN:EN:PDF

- **IMTT** (2010) Pacote da Mobilidade – nota explicativa. Access online: http://www.imtt.pt/sites/IMTT/Portugues/Planeamento/EstudosProjectosCurso/PacotedaMobilidade/Paginas/QuadrodeReferenciaparaPlanosdeMobilidadeAcessibilidadeeTransportes.aspx

- **IMTT** (2011) Glossary of Mobility Package. Access online: http://www.conferenciamobilidade.imtt.pt/pacmob/glossario/Glossario_do_Pacote_da_Mobilidade_Marco_2011.pdf
- **Presidência do Conselho de Ministros** (2007) ENDS 2015 – PIENDS – Plano de Implementação da Estratégia Nacional de Desenvolvimento Sustentável. Access online: http://www.planotecnologico.pt/document/ENDS-PIENDS_2015.pdf