7. HOV LANES

Policy summary

High occupancy vehicle lanes (or carpool lanes) are introduced to privilege vehicles carrying more people (usually at least one or two passengers along with the driver) thus encouraging a more efficient use of private cars.
Suitable for highways or main peri-urban roads, HOV reserved lanes can be operated at peak hours or continuously. Other concept and operation variants include bypass lanes, reversible lanes and separate HOV roadways.
Combining other environmental criteria, access to HOV lanes can be allowed also to low emission or hybrid vehicles (regardless of the number of occupants)
Due to travel-time savings and reliability, HOV lanes are an effective incentive to carpooling and public transport Their appeal and success is related to the extension and connection of the available sections and on the enforcement system.

SWOT Analysis

Strengths	Weaknesses
• Highly visible promotion of collective car usage (energy and environmental efficiency) • Low investments needed (where large platforms already available) • Flexibility and reversibility of lanes allocation • Carpoolling as viable and flexible alternative to public transport	• Hard adaptability to traffic dynamics (short period) • Lack of continuity of the lanes • Access/egress design • Control system implementation and management • The adjacent highway mainline lanes could reach congestion during peak periods • Risk of underutilization
Opportunities	**Threats**
• Strong component of individual private transport in total traffic • Mitigation of public transport weakness • Possible implementation in combination with LEZ/LTZ or congestion charge of central areas or parking policies	• Unsuitable or inhomogeneous infrastructure design (number of lanes, geometry…) • Public perception and acceptance

Policy topic

- Air pollution or GH gas
- Land-use/urban planning/ landscape
- Traffic noise
- **Congestion**
- Traditional fiscal instruments
- **Accidents, transport safety**
- Public transport subsidies/ support
- **Infrastructure investment**
- **Users' behaviour**

Level of application

- National
- **Regional**
- **Provincial/Metropolitan area**
- **Municipal**

External costs

• Congestion and scarcity	+
• Accidents	+
• Air pollution (human health, material damages, nature)	+
• Noise	
• Climate change	
• Urban space	+/–
• Nature and landscape	–

Methodological suggestions

Cost component	External cost	Cost elements	Cost function/ drivers	Suggested estimation techniques	Data needed	Critical valuation issues
Congestion and scarcity	increase in travel time x value of time x traffic volume	travel time (purpose, mode of transport lenght for passenger trips	type of infrastructure	WTP/WTA to estimate the value of time in case of congestion	relation speed/flow	speed/flow relation
		safety	amount and composition of traffic flow		demand elasaticity	
		disamenity		WTP to estimate costs due to scarcity		value of time
		depreciation	kind of network (urban,interurban, metropolitan - n° lanes)		marginal social cost	
		additional fuel costs	capacity level over time			
		environmental costs			level of traffic	opportunity cost
		direct and induced delay	cost increases marginally with traffic and depending on the situation (time-place)		capacity	
		opportunity cost				
Accidents	material damages, administrative and medical costs, production losses and estimation of costs induced on friends/ relatives	medical costs	traffic volume	resource cost for health improvement	database of accidents and of their outcomes (heavy/slight injures, fatalities …)	value of human life
			risk attitde			
		loss of productivity	type of infrastructure	WTP/WTA to estimate the value of statistical life		externalities
			speed distribution			
		loss of human life	day/night			
			weather			
Air pollution	damages to buildings	damages to buildings	traffic level	repair cost	emission data per kind of pollutant	damages quantification
		damages to agriculture	location - exposure		vehicle mix	
			population and settlement density			
		damages to human health	kind of engine - alimentation		network data	
		damages to ecosystems	driver characteristics			
Urban space	"Motorised traffic in urban areas has different effects on non-motorised traffic participants (pedestrians, cyclists, etc.)."	separation costs for pedestrians	type of infrastructure	to estimate damages to pedestrian traffic, the additional waiting toime is to be measured	infrastructure network in urban areas database	evaluation process
		costs due to scarcity	level of traffic	compensation cost approach to compute scarcity		
			decency increase/decrease			
Nature and Landscape		cost to enhance bio-continuity	type of infrastructure	repair cost approach for ground sealing and impacts on ecosystem	georeferentiation of infrastructre	valuation approach
		compensation costs to ensure biodiversity		standard price approach for quantifying the negative effects of airborne amissions		
		cost for soil and water pollution	meteo and topography have an influence on pollutants concentration	two stage approach for quantifying biodiversity losses	pollutants concentration in water and soil	definition of reference state, calculation of restoration costs
				two stage approach for habitat loss and fragmentation		

Recommendations / Comments

Technical feasibility	Medium	Public acceptance	Medium	Equity	Partial

HOV lanes, like all traffic engineering measures, are not the automatic solution to any particular type of problem. The major issue concerning the efficiency of HOV lanes is how often they function properly. On the one hand, the number of HOV drivers should be high enough to avoid underutilization of the reserved lane. On the other hand, the number of vehicles using the HOV lanes should stay below a certain limit, since overcrowding of the HOV lane erodes potential time savings and decreases the incentive for car sharing. While proponents of HOV lanes recognize them as a cost-effective solution to manage congestion there are three main areas where HOV lane projects are likely to generate negative results: 1) when implementation has a severe impact on general purpose lanes' LOS; 2) when HOV utilization doesn't meet the expectation and 3) when non-compliance threatens the effectiveness of the operations. Moreover, HOV lanes are created through the conversion of existing lanes or, particularly in the case of dedicated facilities, involving the construction of new lanes and associated infrastructure: in some cases the benefits generated by HOV lanes in terms of generalized transport costs reduction may not compensate the investment costs for planning, design, construction and management of such systems.

Related Good Practices

- **HOV lanes in the main access road of Madrid**