



ECOTALE GUIDELINES

1. CONGESTION CHARGING

Policy summary

Congestion charging is a way of tackling congestion by reducing the level of traffic in the congested areas of the cities during peak hours. A fee to be paid when entering the delimited zone (cordon-based charges) or based on the travelled kilometres within the area (area-based charges) is applied. The primary goal of charging is reducing congestion by enhancing the modal shift from private cars to public transport. In addition, it improves the journey time reliability for car users and bus services and it pursues efficiency of the distribution of goods and services. Due to the reduced traffic volumes in the charging zone, also the number of accidents is expected to decrease, as well as air pollution and CO₂ emissions. In order to reach a good level of effectiveness and fairness of the measure, specific technological and organizational settings are requested for fee collection (user friendliness and ICT interoperability are key factors) and the necessary enforcement. Nonetheless, incomes of a properly defined charging scheme should exceed the investments and operating costs, thus generating net revenues which can be used to fund complementary and consistent sustainable transport actions.



SWOT Analysis

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| <p>Strengths</p> <ul style="list-style-type: none"> • Reduction of congestion and related issues • Revenues • Air quality improvement • No significant adverse social impacts | <p>Weaknesses</p> <ul style="list-style-type: none"> • Efficient public transport required: investment in complementary transport are mandatory • Re-routing of traffic flows on external road network (possible traffic increase outside the charged area, especially at the beginning) • Technological investments and operating costs • Need to define exemptions for some vehicles and citizens categories • Possible negative economic impacts in the short term • Need of maintenance programs and dedicated staffs |
| <p>Opportunities</p> <ul style="list-style-type: none"> • Improvement of public transport efficiency • Targeted investments with the revenues • Possibility to be applied in combination or within a LEZ/LTZ | <p>Threats</p> <ul style="list-style-type: none"> • Legislative framework, legal controversies • Public acceptance • Social equity: perceived to benefit a 'privileged' client base |

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





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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 length for passenger trips; mode of transport and commodity type for freight) | 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 | | | |
| | | disamenity | kind of network (urban,interurban, metropolitan - n° lanes) | WTP to estimate costs due to scarcity | demand elasticity | value of time |
| | | depreciation | | | | |
| | | additional fuel costs | capacity level over time | | | |
| | | environmental costs | | | | |
| | | direct and induced delay | cost increases marginally with traffic and depending on the situation (time-place) | level of traffic | opportunity cost | |
| 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 |
| | | loss of productivity | risk attitude | | | |
| | | loss of human life | type of infrastructure | WTP/WTA to estimate the value of statistical life | | externalities |
| | | | speed distribution | | | |
| Air pollution | "Air pollution costs are caused by the emission of particulate matter (PM), NOx, SO2 and VOC. Air pollution costs arise also from industry, agriculture and private households." | damages to buildings | traffic level | repair cost | vehicle mix | damages quantification |
| | | damages to agriculture | location - exposure | | | |
| | | damages to human health | population and settlement density | | | |
| | | damages to ecosystems | kind of engine - alimentation driver characteristics | | | |
| Noise | Noise can be defined as the unwanted sound that causes physiological or psychological harm to humans. It is recommended to take vulnerable groups, like children and elderly, into account. | annoyance | the annoyance depends on the traffic level | WTP hedonic price for noise reduction | noise exposure data | noise indicator |
| | | effect on health | resident population and density | | | |
| | | property value loss | noise indicators time of exposure | | | evaluation of annoyance |
| Climate change | "Climate change is a long term and global risk. A differentiated approach (looking both at the damages and the avoidance strategy) is necessary. In addition long term risks should be included. Impacts of transport are mainly caused by emissions of the greenhouse gases CO ₂ , N ₂ O, CH ₄ ." | preventive measures | emission level dependent on traffic level and kind of propellant | avoidance cost approach or damage cost approach | emission data per kind of pollutant | damages quantification over time |
| | | | type of vehicle and equipment in use | | | |
| 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 decency increase/decrease | compensation cost approach to compute scarcity | | |

Recommendations / Comments

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|-----------------------|------|-------------------|-----------|--------|------|
| Technical feasibility | Easy | Public acceptance | Difficult | Equity | Poor |
|-----------------------|------|-------------------|-----------|--------|------|

A congestion charge is a mechanism able to reduce traffic congestion and to provide a wide range of potential benefits. The congestion charge mechanism influences the behaviour of road users under different points of view: whether to take a particular trip, which mode of transport to use, and when to travel. At the same time, the congestion charge produces a significant reduction in traffic congestion, mainly reflecting in a decrease of travel time and queuing time in urban roads. Under financial point of view, the balance between costs and benefits is a critical aspect of the scheme. Actual revenues are hardly predictable, due to a large number of factors: an excessive reduction of traffic; a higher-than expected number of discounted vehicles; the level of noncompliance. At the same time, there are high operation and compliance costs with a complex amortization mechanism, that could potentially affect the efficiency of the mechanism on the whole. Net benefits can be positive, but usually less than predicted. In cities with little traffic congestion problems with poor performing public transport systems, congestion charges might not function properly. Moreover, any city considering congestion charge schemes must face the practical problems of how to set and manage charges and collect payments and then evaluate the benefits of any scheme given their particular circumstances.

Related Good Practices

- London congestion charge

