



**Innovative Financing for Transport  
Schemes:  
A European reference resource**

**Briefing Paper 8  
Public Levies -  
Congestion Pricing  
September 2015**





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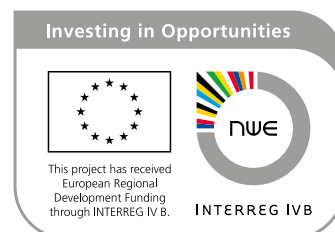


## Sustainable transport for North-West Europe's periphery

Sintropher is a five-year €23m transnational cooperation project with the aim of enhancing local and regional transport provision to, from and within five peripheral regions in North-West Europe.

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### INTERREG IVB



INTERREG IVB North-West Europe is a financial instrument of the European Union's Cohesion Policy. It funds projects which support transnational cooperation.



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Authors: Charles King, Giacomo Vecia, Imogen Thompson, Bartlett School of Planning, University College London. The paper reflects the views of the authors and should not be taken to be the formal view of UCL or Sintropher project.

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## Background

This briefing paper is one of a series that together comprise a European reference resource for innovative approaches to financing transport schemes (capital costs) with particular reference to light rail and tram-based schemes in cities and regions. The approaches are also relevant to capital financing of transport schemes generally.

The resource is one of the Investments undertaken for the Sintropher project funded under the INTERREG IVB North West Europe Programme for transnational co-operation. The overall aim of Sintropher project is to develop sustainable, cost-effective solutions to improve connectivity to, from and within poorly connected regions in North-West Europe - to use innovative transport links to connect peripheral regions of NWE with the core European transport network of high-speed trains, via effective interchange hubs.

There has been a particular focus on tram-train systems which allow local trams to run on to national rail networks, pioneered in Germany, firstly in Karlsruhe and developed in Kassel, which allow urban tram systems to extend over national rail tracks to serve extensive city regions. The project has also looked at other innovative forms of tram systems such as single-track tramways, as well as high-quality transport interchanges that link such systems to major national or transnational rail or air hubs.

The project began in late 2009, with fourteen partner agencies in five EU Member States, and lead partner University College London (UCL): Valenciennes (France); the Fylde Coast (UK); West Flanders (Belgium); North Hesse (Germany); and Arnhem-Nijmegen (Netherlands). Participants included public transport operators, local authorities, regional transport agencies, and universities.

They have worked together on a series of feasibility evaluations, pilot investments and demonstration projects, as well as comparative analyses of EU best practice. The total budget is more than €23m, with funding part-financed by the EU's INTERREG IVB Programme.

A €1.5m project extension in 2014, covers follow-on work to capitalise on results from the initial project, and added a fifth objective: to test technologies for low cost transport links in different territorial contexts, plus integrated territorial corridor plans that help these links unlock wider economic and regeneration benefits; and better recognise these in business cases. This included two new partners (total now 16) and two extra demonstration regions (total now 7) in West Flanders Brugge-Zeebrugge (Belgium) and Saar-Moselle (a cross-border region France-Germany).

## Innovative financing for transport schemes - increasingly important

Results in the European demonstration regions, plus topics at Sintropher Conferences and Workshops indicate that new tram-based or tram-train proposals are usually technically feasible and can often offer a reasonably positive investment case - especially if the case goes wider than conventional cost-benefit analysis (CBA) to include realisation of territorial objectives and benefits, such as economic growth and social opportunities.

But implementation can be impeded by lack of available funding due to cuts in public expenditure following the European economic crisis of 2008 and subsequent recovery efforts by national governments. Regions that are weaker in population or economic terms have even more difficulty in justifying an investment case in terms of public expenditure, so innovative financing is of growing importance - and much can be learned from approaches in different European countries.

## Congestion Pricing/Congestion Charging

Congestion pricing or congestion charging is a system of dealing with congestion on public services as a result of excess demand by passing on the cost to users. This might be in the form of higher peak charges for use of bus services, electricity, metros, railways, or road pricing to reduce traffic congestion. This strategy helps to manage demand, making it possible to control congestion without increasing the supply. The theory that congestion charging is based on (Market Economics Theory) believes that users will be forced to pay for the negative results related to their use of a particular good (for example, traffic on roads). This makes the users aware of the costs when consuming during peak demand.

Four general types of systems are in use: a cordon area around a city centre, with charges for passing the cordon line; an area-wide congestion price, which charges for being inside an area; a city centre toll ring, with toll collection surrounding the city; and corridor or single facility congestion pricing, where access to a lane or a facility is priced.

The implementation of congestion pricing tends to reduce congestion in urban areas, but has undergone much criticism and public discontent. Critics of congestion charging maintain that congestion pricing is not equitable, and places an economic burden on neighboring communities. They also argue that a congestion charging scheme has a negative effect on retail businesses and on economic activity in general, and represents another tax levy.

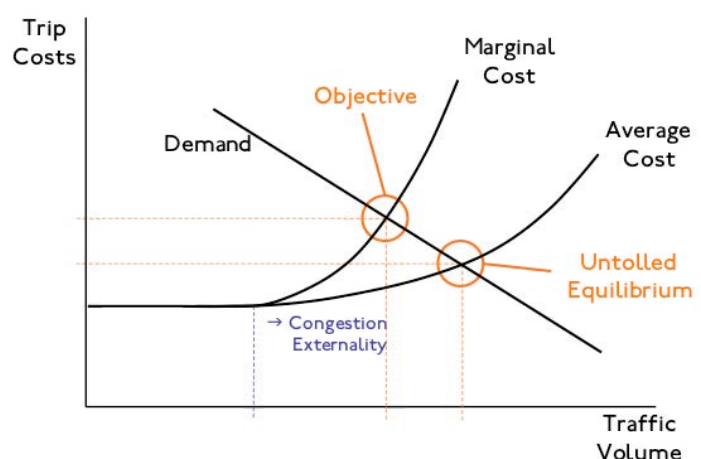
It is also important to note that, while it generates moderate quantities of public income for public investment, congestion charging has not yet been used as a measure to specifically fund public transit improvements. Rather, its primary goal is to act as a general deterrent for drivers. Any income generated is usually put towards a mixture of road repairs, operational expenses of the congestion charging system, and public transport.

### Financial Mechanism

#### Cordon Area and Area-wide

Cordon area congestion pricing is a fee or tax paid by users to enter a restricted area, usually within a city centre, as part of a demand management strategy to relieve traffic congestion within that area.

The economic rationale for this pricing scheme is based on the environmental and social costs of road transport, such as air pollution, noise, traffic accidents, environmental and urban deterioration. It is argued that the extra costs and delays imposed by traffic congestion affect all drivers when additional users enter a congested road.



#### Toll Rings and Urban Corridors

Congestion pricing has also been implemented on urban freeways. Between 2004 and 2005, Santiago de Chile implemented a non-stop urban toll for concessioned freeways passing through a downtown area, charging by the distance travelled. Congestion pricing has been used since 2007 during rush hours in order to maintain reasonable speeds within the city core.

Norway pioneered the implementation of electronic urban road tolling along major corridors. In Bergen, cars can only enter the central area using a toll road, creating an effect similar to that of a congestion charge.

### Exemptions and Deductions

Most congestion charging systems have exemptions for particular types of vehicles, such as emergency vehicles, buses, diplomatic vehicles, disabled persons' vehicles, military vehicles, hybrid or electric cars, motorcycles and mopeds, and foreign-registered vehicles. However, this is dependent on the authority in charge, and can vary.

### Attractiveness

- As a source of new additional revenue, congestion charging can be used to contribute funds for transport initiatives – this requires a specified contribution to public transport, or a government commitment/budget outlining the uses of the congestion charge
- Encourages modal shift and a decrease in vehicle usage within designated boundaries
- Creates a shift from vehicle use towards alternative means of travel, in order to avoid the charge
- Reduces traffic congestion during charging hours, which allows for healthier environments and a safer urban core/region
- Improves environmental situation through reducing the amount of fossil fuels consumed within the congestion charge zone

### Risks

- Requires strong political backing, as this method is generally unpopular with car lobbyists
- In order to generate substantial funds, vehicles need to continue to drive within the congestion charge zone; this counteracts the primary goals of congestion charging, which is to discourage individuals from driving
- As such, congestion charging should be used as a supplementary method of financing, not a main source of funding
- Without specified projects and funding initiatives, congestion charging provides a general source of funds for public projects, rather than public transport-specific initiatives

### Track Record

The application on urban roads is currently limited to a few cities, including London, Stockholm, Singapore, and Milan, as well as a few smaller towns. Other cities have considered congestion charge schemes, but many have been rejected by authorities or by public referendum before implementation. While congestion charging is easy to implement in areas with strong existing public transport systems and successful alternative transport schemes, regions with strong car lobbies tend to struggle with the implementation of the scheme. However, once implemented, these areas have greater returns and notice large impacts on congestion and car use, especially if the scheme is implemented in tandem with transit improvements.

A survey of economic literature on congestion charging finds that some form of road pricing to reduce congestion is economically viable, although there is disagreement on what form road pricing should take: this makes it a unique charge system that should be personalized to each region that considers it. There is no fixed method on how to set tolls, how to cover common costs, what to do with any excess revenues, whether and how "losers" from tolling previously free roads should be compensated, and whether to privatize highways. Thus, the cities that have implemented the financing mechanism have all done so for different reasons, using different methods, and have experienced differing results.



Recently, environmental concerns regarding fossil fuels and urban transport high emissions of greenhouse gases in the context of climate change have renewed interest in congestion charging, as it is considered one of the demand-targeted mechanisms that could reduce oil usage.

## Congestion Charging Case Study: Stockholm, Sweden



### Financial Specifications

#### Amount(s)

The amount to pay depends on the time of the day the driver enters or exits the congestion tax area. The tax may be paid directly via a website or over the telephone by credit card, or alternatively it can be paid at convenience stores in the city. The tax is not paid on Saturdays, Sundays, public holidays or the day before public holidays, nor during the night time period (18:30–06:29). The maximum charge per vehicle per day is 60 SEK (€6.44, \$8.23, £4.42). If the charge is not paid, an incremental fine is added onto the original charge. After a set amount of

Time of day	Tax	In other currencies <sup>1</sup>
00:00 – 06:29	0 SEK	
06:30 – 06:59	10 SEK	1.21 EUR, 1.58 USD
07:00 – 07:29	15 SEK	1.81 EUR, 2.37 USD
07:30 – 08:29	20 SEK	2.41 EUR, 3.16 USD
08:30 – 08:59	15 SEK	
09:00 – 15:29	10 SEK	
15:30 – 15:59	15 SEK	
16:00 – 17:29	20 SEK	
17:30 – 17:59	15 SEK	
18:00 – 18:29	10 SEK	
18:30 – 23:59	0 SEK	

time, if the charge is not paid then the authorities can automatically remove the amount from offenders' bank account.

### Targeted Groups

Drivers and vehicle users accessing set congestion-charged 'zones', areas, or regions

### Timeline

Introduced as trial in 2006; 2007, implemented permanently

## Why the mechanism was chosen in Stockholm

- To help fund road repairs and construction within and surrounding Stockholm
- To decrease emissions and congestion caused by vehicles

## Financial Specifications of Case Study

The Stockholm congestion charge (Swedish: Trängselskatt i Stockholm), is levied on most vehicles entering and exiting central Stockholm, Sweden. The congestion tax was implemented on a permanent basis on August 1, 2007, after a seven-month trial period between January 3, 2006 and July 31, 2006. Following the trial period, a referendum was held to determine whether the congestion charge would become a permanent installation: while Stockholm municipality voted yes, 14 municipalities voted no to a permanent implementation.

The system infrastructure works through a Q-Free on-board unit and road side technology in combination with an operational system provided and run by IBM. Payment is via a number of channels including by direct debit triggered by the recognition of the on-board electronic tag that is loaned to drivers. Q-Free cameras can also detect and record car number plate images using Automated Number Plate Recognition (ANPR) software to identify those vehicles without tags, and are also used to verify tag readings and provide evidence to support the enforcement of non-payers. The use of the transponders fitted in vehicles means the system has a more reliable capture rate and a more cost-effective back-room operation than congestion charging systems that do not use such devices. It also makes it far easier to operate variable charging with automated direct debit after the passage.

## Benefits

- Reduces vehicle emissions and congestion on Stockholm roads
- Encourages modal shift to public transit

## Drawbacks

- Affects incoming traffic from more car-dependent suburban regions
- Funds produced go into financing pools for road services rather than public transit

## Assessment

Congestion charging in Stockholm has been a successful endeavour as a funding mechanism. It has gained steady flows of money through a consistent and well-implemented program. The technology used has allowed an easy and effective way to ensure that all road users crossing into the congestion charge zone pay the toll. As well, the scheme has generated revenue into public expenditures such as infrastructure upgrades.

However, despite the overall success of funding in Stockholm, the fact remains that this funding mechanism has not contributed solely to public transport upgrades, but has instead been funnelled into a variety of public infrastructure including road improvements. This ultimately reduces the effects of the congestion charge on the original objective of reducing vehicle ridership. Furthermore, a negative reception of the mechanism from the vehicle users within neighbouring suburbs and cities meant that only Stockholm itself was able to pass the congestion charging laws and implement them, rather than it being a whole region-wide initiative.

### Success of Funding Mechanism

As a funding mechanism, congestion charging is a good option. It provides a steady influx of public capital and encourages modal shift. If input directly to public transport upgrades and schemes, congestion charging can be extremely successful. While it will not necessarily fund entire infrastructure projects, the income from congestion charging can help alleviate the financial stress of an increasingly-used public transport system as the charge shifts drivers from vehicles and onto public transport.

### Future Prospects and Transnational Relevance

- Suitable for small to large urban areas, although amount of funding will depend on scale and pricing of congestion charging
- Excellent way to encourage modal shift while gaining funds for transport initiatives
- Must be committed to combined sources of funding in order to finance projects
- Needs strong political will in order to implement
- Excellent for environmental efforts

Congestion charging is quickly becoming a popular means of encouraging modal shift, in order to curb vehicle use. Very few schemes, however, are directed towards funding public transit specifically.

Congestion charging is increasingly acknowledged as a great option to encourage modal shift, but has not yet been accessed as a purely-public transport funding scheme. Current proposals for congestion charging systems exist in the United States, Brazil, and China, with primary objectives geared towards decreasing traffic congestion and emissions from private vehicle usage. Despite the seeming popularity of the approach, it is important to note that political will and public opinion plays a large role in a scheme's implementation, and that regions with high personal vehicle usage will require stronger political will in order to successfully bring it about. Examples of failed attempts to pass congestion charging exist in cities such as Hong Kong, New York, Manchester, and Edinburgh (among others); the majority of proposals saw rejection when put to local council vote or to public referendum. This is important to note when choosing congestion charging as a mechanism. As exemplified by cities such as Stockholm and London, the congestion charges were implemented independent of public opinion: this demonstrates a strong political backing of the projects, which tends to be needed for successful uptake of the scheme.

### Transnational relevance: Europe-wide

Funding of major transport schemes is an issue faced by many cities and regions across the North West Europe Programme area and indeed more widely across Europe. Traditionally, in most countries tram-based links have been financed by public funding from national or regional government authorities, sourced from either taxation or borrowing or a combination. (In regimes where there is a national or regional transport infrastructure authority, operating profits may also assist).

But as with Sintropher partners, implementation of such schemes is facing a lack of available funding due to cuts in public expenditure following the European economic crisis of 2008 and subsequent efforts by national (or regional/city) governments, to recover. So innovative financing is of growing importance, and much can be learned from approaches in different European countries.



The financing approaches and city/region case examples on the reference resource are context-specific and reflect:

- the geographical context: the physical scale of the scheme and scale of capital cost. Obviously a major scheme with high capital cost of, say, €50m + may be beyond the resources of a single city or regional authority, and require a national contribution in a “cocktail” approach. The investment case will usually be stronger in a major dense metropolitan area than smaller regions with lower population and (possibly) lower or weaker economic activity.
- the organisational context: which level of government and/or relevant transport authority or agency is the primary initiator of the scheme - national, regional, or city - will influence the financing opportunities and options available.
- the legal context: the nature and extent of the powers and responsibilities of the initiating authority, and the processes/procedures, to actually pursue any of the financing approaches.
- But even though the various approaches and case examples are context-specific, their transnational relevance is strong:
- the approaches offer a stimulus and possibilities for wider thinking by cities and regions in other European countries, about how to assemble capital financing for transport schemes,
- in all countries, the reality of capital finance for transport infrastructure means that a “cocktail” approach is often the most practical way forward - and the approach of mixed public-private sector finance is an increasingly pragmatic basis
- some or all of the various approaches might be potentially adaptable within the particular organisational and governance regime of another country, using similar powers or processes
- the approaches offer possibilities for lobbying by city and regional authorities, in order to secure from national government the powers and competences to utilise new approaches (as has happened in the UK - for example local authorities have in recent years acquired powers to implement tax increment financing (TIF) although subject to safeguards over risk and borrowing; similarly, powers to enact a community infrastructure levy (CIL) on developments in their area, subject to local consultations and examination of viability and fairness for private developers.

The reference resource should be seen from this perspective, as a means to promote knowledge transfer and learning across different NWE countries and regions.

## Further information

This paper was produced by UCL Bartlett School of Planning (Sintropher team members Charles King, Giacomo Vecia, Imogen Thompson) using desk research and expert comment. The paper reflects the views of the authors and should not be taken to be the formal view of UCL or Sintropher project.

The European reference resource can be accessed on the following:

Sintropher project website

<http://www.sintropher.eu/publications>

POLIS website

<http://www.polisnetwork.eu/sintropher> or <http://www.polisnetwork.eu/res/resources>

Contact details:

Mr. Colin Osborne

Project Manager

Tel: 0044 (0) 203 108 9544

Mob: 0044 (0) 7796 258078

[colin.osborne@ucl.ac.uk](mailto:colin.osborne@ucl.ac.uk)

Dr. Robin Hickman

Project Director/Reader in Transport & City Planning

Tel: 0044 (0) 203 108 9531

Mob: 0044 (0) 7720 548849

[r.hickman@ucl.ac.uk](mailto:r.hickman@ucl.ac.uk)

University College London

Bartlett School of Planning

Central House, 5th Floor

14 Upper Woburn Place

London WC1H 0NN

# Partners

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## **Sintropher**

University College London  
22 Gordon Street  
London WC1H 0QB  
United Kingdom

[www.sintropher.eu](http://www.sintropher.eu)