Asia-Pacific Environmental Innovation Strategies (APEIS)
Research on Innovative and Strategic Policy Options (RISPO)
Good Practices Inventory

Introduction of traffic congestion pricing in Seoul, Korea

Summary of the Practice

Keywords: congestion, pricing, Transport Demand Management (TDM)
Strategy: Development of environmentally sustainable transport systems in urban areas
Environmental areas: Climate change, Air pollution, Urban environment
Critical instruments: Awareness/capacity building, Economic instruments, Regulatory instruments
Country: Korea
Location: Seoul
Participants: City government, private sector, public transportation
Duration: 11 November in 1996–ongoing
Funding: Municipality of Seoul

Background:

Traffic conditions have deteriorated with the rapid growth in car ownership in the Seoul metropolitan area since the 1980s. Although a large number of new transportation facilities, including both roads and subway routes, were built during the last two decades, they were not enough to accommodate the rapid increase in demand for transportation in the city.
Vehicle registrations are increasing at the rate of 15.3 percent annually on average and annual growth in traffic volume is averaging 13 to 15 percent. Coupled with this with the fact that road capacity is increasing at only 6 percent.
Table 1 show the changes of average travel speed on the major arterial roads in Seoul from the year 1990 to 2000. The overall average travel speed on the major arterial roads continued to decline until 1996 and started to bounce back in 1997, but decreased again in 2000. The reasons for the speed changes between 1997 and 2000 will be explained later.

Table 1. Change of average travel speed on the major arterial roads in Seoul (units: km/h).

Classification		1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
Passenger cars	All districts	24.2	24.6	22.6	23.5	23.2	21.7	20.1	21.1	25.4	25.4	22.9
	CBD* only	16.4	17.7	19.3	20.0	20.0	18.3	16.4	16.9	17.7	21.2	18.5
	Other districts	25.8	21.9	22.9	23.8	23.4	21.9	21.2	21.3	25.9	25.7	23.2
Buses		18.8	18.2	16.9	17.0	18.4	18.8	18.4	18.4	20.1	19.2	19.0

Source : Seoul Metropolitan Government, 2000. Traffic Speed Study of Seoul, Seoul.
* CBD means Central Business District.

When one sees these annual statistics, it is not difficult to see that the city is dealing with severe traffic congestion.
Most arterial roads in Seoul are heavily congested throughout the day. It is, however, financially not feasible to build new roadways to an extent that will mitigate the traffic congestion in Seoul, because of insufficient land availability and high land prices.

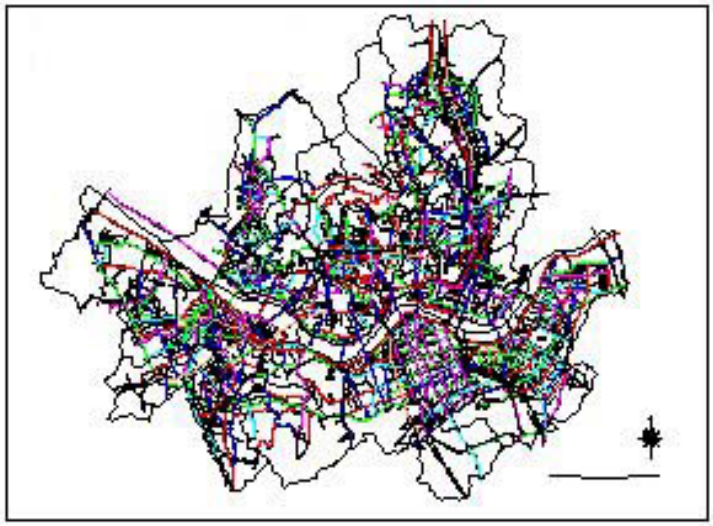

Figure 1. Arterial roads in Seoul.
Source: http://traffic.seoul.go.kr

In its transportation policy the Seoul Metropolitan Government (SMG) has taken several measures to mitigate traffic congestion in the inner city and to shift the transportation modal utilization in favour of public transport, such as through expansion of road railway networks, encouragement for public transport demand by vehicle-related taxation, congestion pricing, parking fees and private car-use restraints. These measures are based on a policy mix that also includes economic instruments.
Among many options for transportation demand management (TDM), congestion pricing is generally considered to be the most effective method to control vehicle usage, as well as to reflect time-space variations of traffic congestion.

Objectives:

The objective of introducing congestion pricing in Seoul is to relieve traffic congestion by reducing traffic volume on overloaded roadways.

Description of the activity:

Starting 11 November 1996, the city of Seoul began to charge 2000 won (about U.S.$1.50) as a "congestion toll" for private vehicles carrying only one or two persons (including driver) as they passed through the Namsan #1 and #3 tunnels, linking the southern part of the city to the Central Business District. The two tunnels had been extremely congested before the system was introduced. In 1996, 90 percent of total traffic volume passing the two tunnels consisted of private vehicles—this percent was the highest among all the major corridors linked to the Central Business District. Furthermore, 78 percent of the private vehicles were occupied by only one person.
The toll charges are collected for vehicles travelling in both directions per entry from 7 a.m. to 9 p.m. during weekdays and from 7 a.m. to 3 p.m. on Saturdays. Sundays and national holidays are free of charge. The penalty for violation amounts to 10,000 won (five times the congestion fee). The following vehicles are exempted from the charge: private vehicles occupied by three or more persons, all buses, vans, trucks, taxi, emergency vehicles, handicapped person's vehicles, diplomats' vehicles, reporters' vehicles, government vehicles and ceremonial vehicles for welcoming foreign guest.

Critical Instruments

Overview

Congestion pricing scheme in Seoul is being implemented with relative success. Its success was a result of awareness raising and capacity-building, a policy mix of different economic instruments (including congestion pricing, parking fees and vehicle-related taxation) and regulatory instruments.

Awareness/capacity building

Public hearing and campaigning

By raising awareness and spreading public information in Seoul to promote participation and communication to the public in order to ensure acceptance of the new policies, the number of carpooling vehicles (occupied by three or more passengers) have increased and overall traffic conditions have improved significantly.

This success was suggests that public hearings, information campaigns and efforts to win media support can be helpful to mobilize public support in favor of congestion pricing.

When the system of congestion pricing is transparent and its advantages are apparent to all road users, public support is likely to be higher.

Economic instruments

Congestion Pricing

Implementation of congestion pricing on existing roadways also reduced the need to add new roadway capacity and build parking lots, since road users could reduce their expenses by reducing the total number of car trips into the Central Business District.

In view of the results achieved so far, congestion pricing was effective not only in improving efficiency of road use but also in shifting people toward the use of public transport. These changes provided positive support to the urban economy.

Resident priority parking system

Parking spaces are very short in supply, particularly in the older housing areas that have streets of less than 4 or 5 meters in width. Local streets over 5.5 meters wide in Seoul were converted to one-way roads with car parking provided on one side. One citizen could rent a designated space by paying about 30,000 won (about U.S.$23) per month.

Traffic Induction Charge

The government levied a “traffic induction charge” on more than 1,000 square meters in floor space facilities to efficiently manage traffic volume.

An allotment amounts to 350 won per one square meter and 700 won per one square meter in case of more than 3,000 square meters in floor space facilities.

The method to calculate allotment is as follows:

A total of each floor space × the unit allotment(350 won/ m^2 and 700 won/m^2 in case of more than 3,000 square meters in floor space facilities) × Traffic Induction factor

Regulatory instruments

Enactment of Congestion Pricing Collection Ordinance

In order to implement congestion pricing, proper legislation had to be in place. The relevant congestion pricing collection ordinance in Seoul was enacted in 1996. The ministry of construction and transportation amended the urban traffic readjustment promotion act to enact the congestion pricing collection ordinance. This ordinance can be amended again as the occasion demands.

Impacts

It has been seven years since the congestion-pricing scheme was implemented at the Namsan #1 and #3 tunnels in November 1996. Before the implementation, more than 90,000 vehicles passed through the two tunnels during the 7 a.m. to 9 p.m. period. The traffic volume decreased but started to increase again and then exceeded 94,000 vehicles in the year 2000. The greater proportion of this traffic volume increase consisted of toll-free vehicles such as taxies, trucks, and private vehicles occupied by three or more persons.

Table 2 shows the results for traffic volume and speed changes on the two tunnel corridors.

Table 2. Traffic volume and speed changes on Namsan #1 and #3 tunnel corridors during the 7 a.m. to 9 p.m. period.

Classification	Nov.1996 (before)	Nov. 1996 (after)	Nov.1997	Nov.1998	Nov.1999	Nov.2000
Traffic volume (vehicles)	90,404	67,912 (-24.9%)	78,078 (-13.6%)	80,784 (-10.6%)	87,886 (-2.8%)	94,494 (+4.5%)
Speed (km/h)	21.6	33.6 (+55.9%)	29.8 (+38.1%)	31.9 (+47.7%)	30.6 (+42.0%)	37.6% (+74.0%)

Source : Seoul Metropolitan Government, 2000. The report for traffic changes of Namsan #1 and #3 tunnels and alternative routes, Seoul.

Although the traffic volume recovered to the previous level, the average travel speed of the two tunnel corridors steadily improved and has been maintained at over 30 km/h (with the exception of the year 1997). Although the speed was only 21.6 km/h before implementation of policies, it rose to 37.6 km/h in the year 2000. Comparing the changes in traffic volume and speed, it can be said that the congestion pricing scheme at the Namsan tunnels not only helped mitigate traffic congestion in the two tunnel corridors, but also to reduce the use of one- and two-person occupied private vehicles It is noteworthy that 93 percent of drivers passing through the Namsan#1 and #3 tunnels have responded in a survey that they chose the tunnel corridors because they maintained relatively higher speeds than other corridors.[1]

Lessons Learned

-It is possible to influence transport demand by using tolls; they can effectively level-off peak demand and induce substitution in transportation toward trips in off-peak periods and other transport modes.
-Through selective road pricing on a few arterial roads it is possible to reduce traffic volume on the entire road network—the average travel speed of four alternative routes also increased, and the overall traffic volume of the target routes increased, while the overall traffic volume of all routes increased as well.
-Using tollbooths to collect tolls does not cause a net increase in travel time when the average traffic speed is increased due to a reduction in congestion.
-As a part of an integrated transport policy strategy, road tolls do not harm urban economic growth and development.
-It is possible to enhance transportation choices. Congestion pricing increases transportation choices by consideration of additional transportation options by citizens
-Reduced congestion reduces fuel consumption as well as emissions of hydrocarbons, carbon monoxide, and carbon dioxide. If overall trips are reduced, emissions of nitrogen oxides will also be reduced.

Potential for Application

Overall results of these policies are very promising, so the Seoul Metropolitan Government has a plan to extend the scheme to other routes leading into the city center, but these have been placed on hold, due to public opposition and claims of double taxation.

The scheme was not seen by many as a popular alternative. Few cities in Korea adopted congestion pricing, although it has been considered by many major cities around the world.[1]
If cities that want to implement congestion pricing consider marketing, as well as public education and involvement in the project and transparency in terms of toll revenue redistribution, there is a good possibility that the public will give wide support for introduction of such schemes.

[1] B. Son and K.Y. Hwang, Four-year-old Namsan Tunnel Congestion Pricing Scheme in Seoul. IATSS Research Vol. 26 No. 1, 2002.

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References

Kim, G. and J. Rim. 2000. Seoul's Urban Transportation Policy and Rail Transit Plan-Present and Future. *Japan Railway & Transport Review*: 25.

Schwaab, Jan A. and Sascha Thielmann. 2002. Policy Guidelines for Road Transport Pricing. In *A Practical Step-by-Step Approach*. Deutsche Gesellschaft für Technische Zusammenarbeit (GTZ) GmbH and the United Nations Economic and Social Commission for Asia and the Pacific (ESCAP)

SDI, 2001, Improvement Strategies with Electronic Toll Collection System for Congestion Pricing (in Korean). Seoul Development Institute.

Seoul Metropolitan Government. 2000. Report for traffic changes of Namsan #1 and #3 tunnels and alternative routes (in Korean). Seoul: Seoul Metropolitan Government.

Seoul Metropolitan Government, 2000. Traffic Speed Study of Seoul (in Korean), Seoul.

Congestion pricing,
http://www.path.berkeley.edu/%7Eleap/TTM/Demand_Manage/pricing.html

Arterial roads in Seoul http://traffic.seoul.go.kr .

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