
2. Seoul's Transportation Demand Management Policy

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Policy Area: Transportation Outline

Outline

In the past, South Korean transportation policy was tuned to the supply side, with much emphasis on construction and expansion of road networks to make up for the absolute shortfall in capacity. Beginning in the 1990s, economic growth and the popularity of owning a car led the number of personal cars on the road to soar and consequently to ever more serious traffic congestion. Naturally, travel speeds decreased. In this context, transportation demand management (TDM) is effective in changing the elements that affect people's travel patterns to influence their choice of transport and to mitigate traffic congestion.

In this era of low carbon/green growth, sustainable economic development is becoming more important, with much focus on environmental preservation and reduction of greenhouse gases. Incidentally, TDM is also considered increasingly significant. "TDM" generally refers to a set of policies that help influence the choice of transport, the number of trips, and efficient use of vehicles. TDM is defined in the Urban Traffic Readjustment Promotion Act as a policy designed to mitigate traffic congestion by reducing car travel, dispersing trips in terms of time and space, and encouraging people to utilize forms of transport other than their personal vehicles. Article 15 of the Urban Traffic Readjustment Promotion Act indicates that when a city mayor deems it necessary to adopt the TDM approach within a specific area under his or her jurisdiction to facilitate traffic flow, improve air quality, or promote the efficient use of the transportation infrastructure, it may be undertaken after review by the Regional City Transportation Policy Deliberation Committee.

In accordance with the higher level nature of the Urban Traffic Readjustment Promotion Act, the City of Seoul has developed various TDM programs that reflect the urban characteristics of the city. These programs can be divided into 2 types: mandatory programs regulated by law; and voluntary programs that encourage residents and/or businesses to become involved. The first TDM program was the congestion impact fee in 1990. In the late 1990s, the scope was expanded to include the Namsan tunnel congestion charge, the parking threshold, and mandatory charging of parking lot fees. Into the 2000s, the city began to explore and adopt TDM programs that involve residents on a voluntary basis, such as the Weekly No-Driving Day Program and the car sharing service. Seoul's TDM programs can be seen below in Figure 1:

Figure 1 - Seoul's TDM Programs by Year



Summary & Status

The Congestion Impact Fee System

Background

In the 1980s and 1990s, income levels improved and the number of cars increased. As a result, transportation demand escalated but infrastructure was unable to keep up, deteriorating the traffic situation. Buildings such as wedding halls and department stores induced a sudden rise in traffic at specific hours and caused congestion, and the socioeconomic costs to address the issues were phenomenal. The congestion impact fee was first introduced in 1990 as part of Seoul's TDM policy, and was levied against such facilities, with fees used to build and improve the transportation infrastructure.

The congestion impact fee was designed to indirectly curtail urban concentration of the facilities that attract a large volume of traffic and to have the owners of these facilities assume the financial cost according to the “causer-pays” principle, which would then be used to improve urban transportation. This system was faced with a certain level of resistance from potential fee payers, but generally, social consensus was reached as the public understood the need to reduce congestion and the related costs and to offer quality transportation services to people from all classes.

Summary

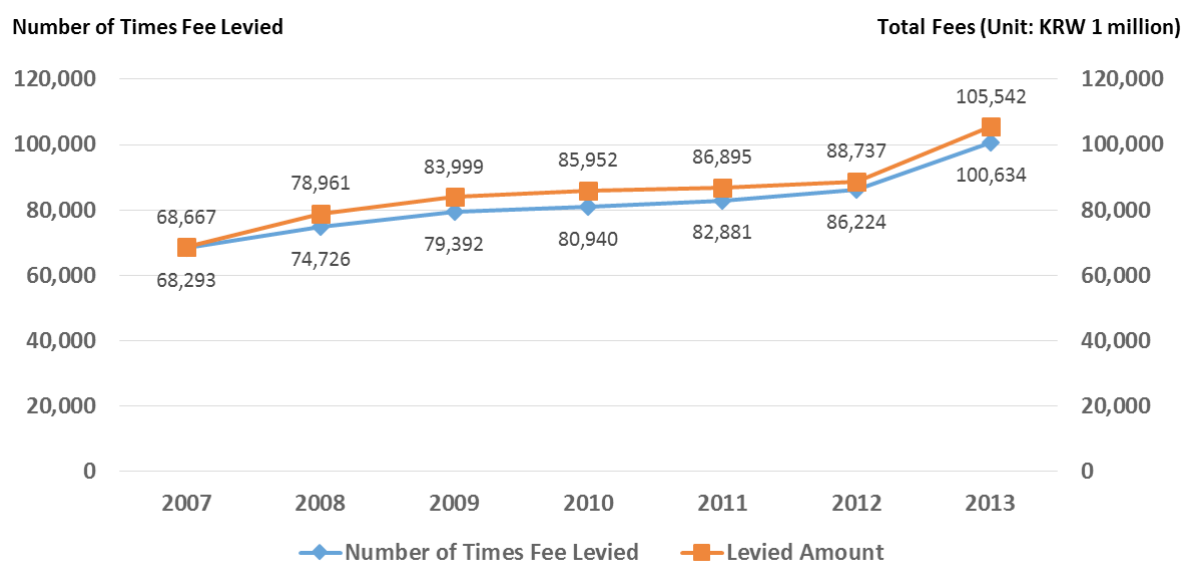
The legal basis for the congestion impact fee is in the Urban Traffic Readjustment Promotion Act revised on January 13, 1990. Pursuant to the Act, the target area is a city of 300,000 or more in population, or a city with 100,000 or more people that has obtained approval from the mayor or the provincial governor. The fees collected are to be deposited into a dedicated account for the local city transportation program and used to improve urban transportation facilities and infrastructure such as the center bus lane.

The City of Seoul fundamentally follows the enforcement rules concerning the impact fee as prescribed in the Urban Traffic Readjustment Promotion Act, but it also set up its own ways to levy the fees, which are calculated by multiplying total floor area of the facilities, the unit congestion impact fee, and the congestion coefficient. The unit congestion impact fee is 350 or 700 Korean won per m² of floor area; the congestion coefficient varies by location and use of the facilities – from 9.83 for a department store to 0.47 for a factory. The congestion impact fee is levied on owners of facilities with a total floor area of 1,000 m² or more. In the event a facility is owned by multiple entities, each pays in accordance with their share of ownership.

Implementation

In Seoul, the number of facilities paying the congestion impact fee and the amount collected grow every year, with data on collected fees kept since 2007. As can be seen in Figure 2 below, the number of times the fee was levied reached 100,634 times in 2013, and equaled approximately KRW 105.542 billion.

Figure 1 - Congestion Impact Fees Levied in Seoul



Source: The Korea Transport Institute (2014)

Transportation Demand Management Policy for Companies

Background

To further drive the congestion impact fee system and encourage companies to get on board, the City of Seoul introduced a TDM system for companies, designed to get them involved in reducing traffic volume on a voluntary basis. This allows companies to participate in traffic volume reduction programs, the outcome of which determines the discount on (or even exemption from) the congestion impact fee for which the business is responsible. In the early days of introducing the program in 1995, companies were required to impose parking fees on cars using their parking facilities, but this mandatory requirement was soon abolished in 1999. It became easier to participate in the program, and the participation rate rose. This TDM for companies is positive for individual residents, as it targets the facilities and companies that create large traffic volumes.

Summary

The TDM policy for companies stems from Regulation 15, adopted as part of Southern California's Clean Air Act. The major difference is that California imposes penalties on non-complying companies but Seoul offers discounts instead for those that participate.

This system was first proposed in the Study on Transportation Demand Management in Seoul conducted by the Seoul Development Institute (currently The Seoul Institute) in 1993. In 1994, feasibility was tested in preliminary research on 6 companies located in Jongno-gu, and the Ministry of Land, Infrastructure & Transport revised the Urban Traffic Readjustment Promotion Act and officially announced the TDM system for companies. In April of the following year, the Seoul Metropolitan Council enacted the Seoul Ordinances

on the Congestion Impact Fee Discount, Etc., and by August 1, 1995, the TDM policy for companies was launched. This policy targets buildings with a total area of 1,000 m² or more, providing varying discounts (2% - 30% by program) on the congestion impact fee based on participation and performance. If one company participates in multiple programs designed to reduce traffic volume, the discounts are added together. The traffic reduction programs that companies can choose include mandatory parking fees, voluntary road space rationing, and commuter buses.

Table 1 - Congestion Impact Fee Discounts by Traffic Volume Reduction Activity

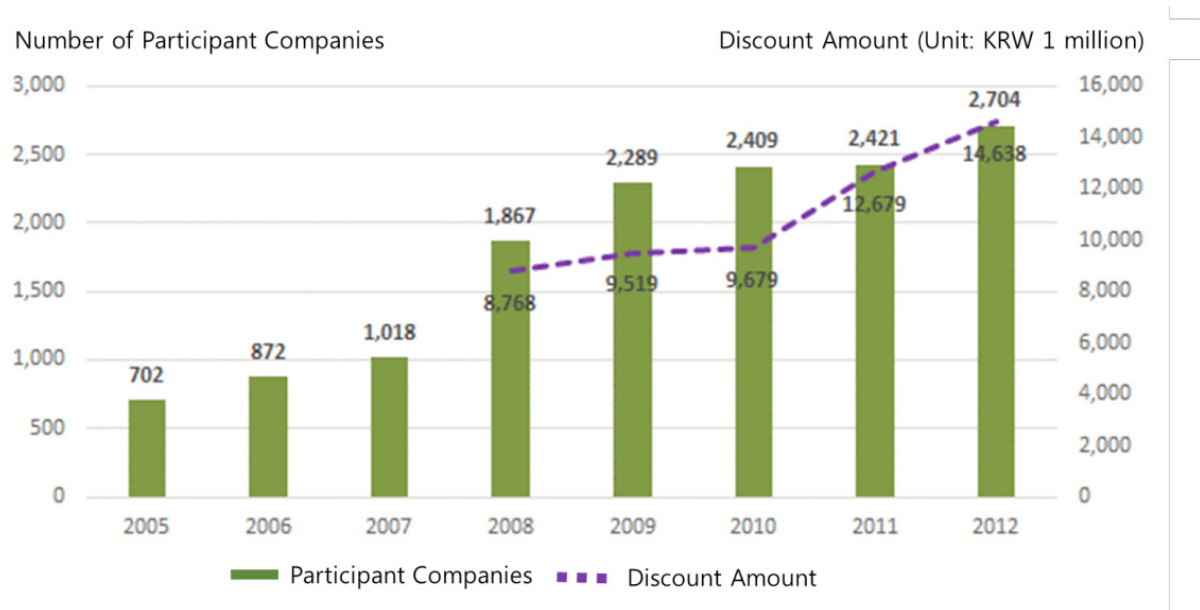
Activity	Target	Conditions	Discount(Unit: %)
Voluntary Road Space Rationing	Facility employees; users	1-10 system	10
		5-day system	20
		Odd-even system	30
		Weekly no-driving day system	20
Mandatory Parking Fees	Facility employees; users	Operating at least 9 hours on weekdays	10
Commuter Bus	Facility employees	At commuting hours; based on the number of seats provided	10
			15
			20
Subsidy	Facility employees	Transport cards/ticket worth KRW 30,000 per month	10
Phased Commuting Hours	Facility employees	Standard: 09:00 Phased by hour	5
Car Sharing	Facility employees	Always	5
			10
			15
Bicycles	Facility employees	Always	5
			10
Public Transit Days	Facility employees	1 – 2 times a month	2
		3 or more times a month	4

Source: Summary of the Seoul Ordinances on the Congestion Impact Fee Discount, Etc.

Implementation

First introduced in 1995, the TDM system for companies offered highly attractive incentives, and the number of participating companies and the total discount are growing steadily. As of 2013, some 22% of the facilities subject to the TDM program for companies are involved.

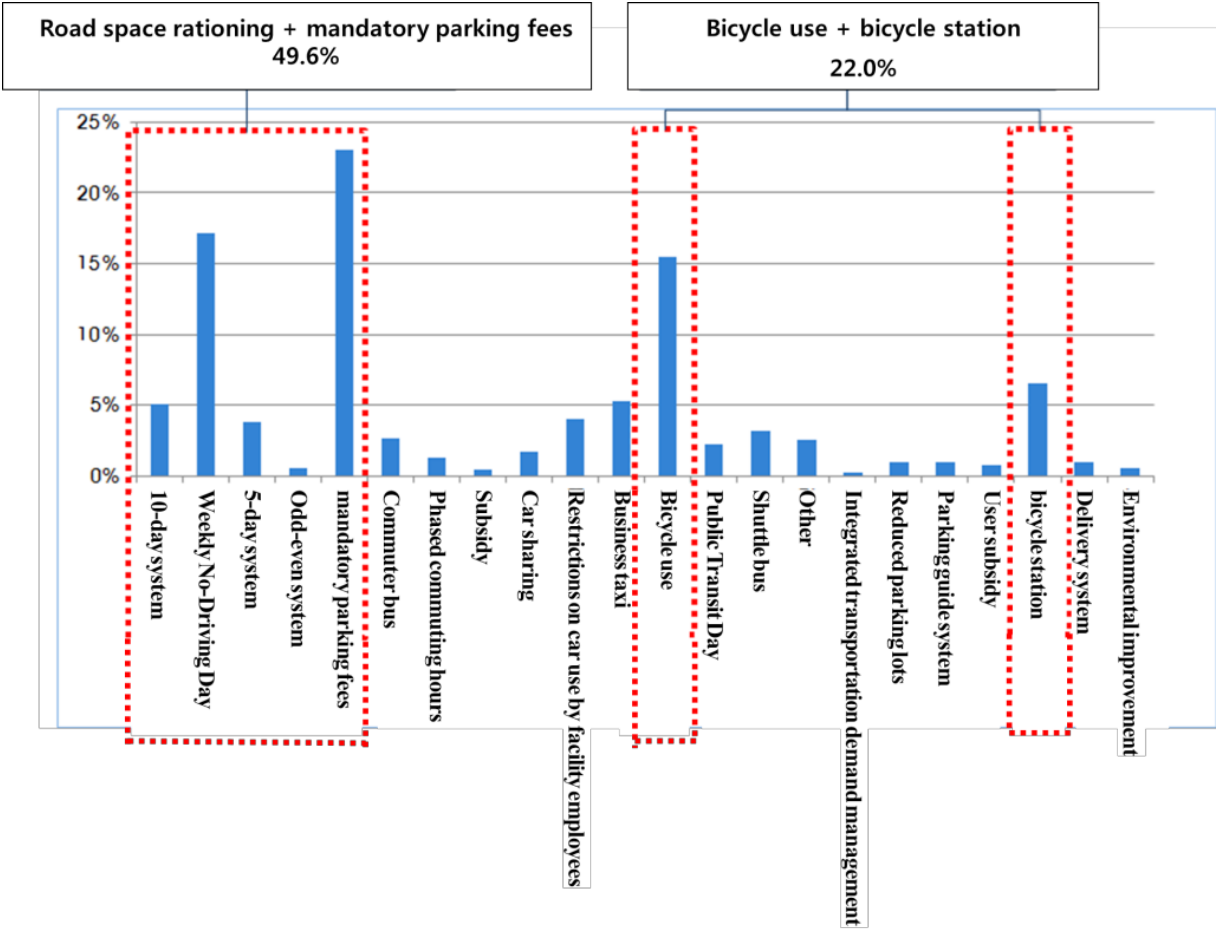
Figure 3 - Companies Participating in the TDM Program



Source: Internal data, Seoul Metropolitan Government.

The demand management programs for personal cars (e.g., such as the Weekly No-Driving Day Program, 1-10 Road Space Rationing, and mandatory parking fees) and programs to encourage the use of bicycle (such as installation of bicycle stations) account for 70% of all programs. These programs are easier than others for companies to participate in, so participation is high. On the other hand, phased commuting hours or restrictions on the use of cars by target facility employees may not be applicable due to specific business circumstances. Commuter/shuttle buses and parking guide system cost money to operate/install so participation is low.

Figure 4 - Companies Participating in the TDM Program (2013)



Source: Internal data, Seoul Metropolitan Government

Congestion Charge at Namsan Tunnel 1 & 3

Background

The first city to adopt the congestion charge was Singapore. Soon, others like London, Rome, and Stockholm followed suit. In Seoul, discussions began in the late 1980s, but it was not introduced for circumstantial reasons. With the explosive growth in automobile use in the 1990s came a great need to contain the use of personal cars, so the charge was introduced for Namsan Tunnel 1 and 3 in November 1996.

Summary

According to the Urban Traffic Readjustment Promotion Act, a congestion charge is to be levied on road segments according to travel speed and average delay. Targets are arterial roads or adjacent zones under the influence of such roads where the average travel speed is less than 21 km/h (for 4 lanes or more each way) or 15 km/h (for 3 lanes or fewer each way) on weekdays only (excluding weekends and holidays) during 3 or more time periods per day. The charge may also be imposed on intersections or adjacent zones under the influence of such intersections where the average control delay time is 100 seconds or more (at signaled intersections) or 50 seconds or more (at unsignaled intersections) for 3 or more times a day. By this standard, most major roads in Seoul at the time when the charge was being discussed were subject to the congestion charge. Knowing that the sudden introduction of the charge in most or all of Seoul would likely meet severe opposition, the city aimed to phase in the system.

At Namsan Tunnel 1 and 3, the city began with a levy of KRW 2,000 for both directions from 7:00 – 21:00 Monday to Friday and 7:00 – 15:00 on Saturday, excluding Sundays and public holidays, based on the City of Seoul Ordinance (no charge on Saturday currently). The charge is levied against vehicles with only 1 or 2 occupants, while vehicles used by people with disabilities or for public purposes (ambulances etc.) are exempt.

Implementation & Benefits

According to studies by The Seoul Institute (2012), traffic volume on roads linked to Namsan Tunnel 1 and 3 dropped by 24.2% a month after the charge was introduced. Beyond that, the rate of decrease slowed; a year later (in November 1997), the decrease rate was 13.6%. Until August 1998, the daily average traffic volume was 77,000 vehicles, and the decrease rate stood at 14% on average. In the meantime, the volume of private cars at peak hours fell by 30% a year after introduction, with cars occupied by 1 or 2 people dropping substantially by 40.2%. Four roads near Namsan Tunnel 1 and 3 can be used as detours, and there had been concerns that the congestion charge would simply cause congestion in other areas as cars moved to the detour roads. According to a year-long study after introduction, traffic volumes on the detour roads rose by only 5.7%. At the same time, average travel speed increased by 11.8%, from 24.5 km/h to 28.3 km/h.

One of the most important outcomes from the congestion charge was that cars with only 1 or 2 occupants stayed away from the tunnels, began carrying more people, or the occupants began using more public

transport such as buses or taxis. Studies by The Seoul Institute (2012) indicate that private vehicles passing through Namsan Tunnel 1 and 3 dropped by 25.8% while buses increased by 4.7% in 2010. At peak commuting hours, the share of buses and taxis soared from 3.3% and 7.8% to 8.0% and 26.4% respectively.

Figure 5 - Levying the Congestion Charge at Namsan Tunnel



Source: Street view, Naver.

Parking Lot Restrictions for Facilities in Certain Areas (Parking Threshold)

Background

Before 1990, Seoul's parking policy was keen on supplying more parking spaces to accommodate the increasing number of cars. However, such policies began to change with the growing importance of TDM in the 1990s. In line with the policy trend, South Korea adopted a system of restricting the creation of parking lots (also called the parking threshold) for facilities in congested areas to curb the parking demand. Seoul set up its own parking threshold system for implementation to incorporate the unique circumstances of the city in restricting parking lots pursuant to the Parking Lot Act. With Seoul's parking threshold regulations in place, parking lots for department stores and other commercial and business facilities in congested areas were limited to 50% of the parking lots located in non-congested areas.

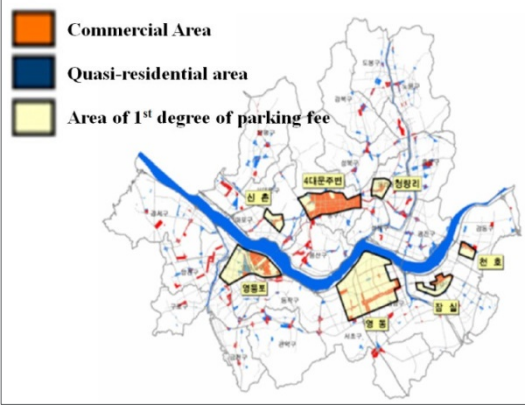

Summary

Through the Parking Lot Act, the City of Seoul came up with parking threshold regulations via the City of Seoul Ordinance on the Installation & Management of Parking Lots. In Seoul, "areas that are congested with automobile traffic," as stipulated in the Parking Lot Act, are categorized as "Class 1 areas as defined in the public parking fee table." The City of Seoul Ordinance also sets different standards for the installation of parking lots based on the type of facility.

Seoul's parking threshold program was first launched on January 15, 1997, was extensively revised on March 18, 2009 and is in effect to this day. In the beginning, there were seven Class 1 target areas (commercial only) as defined in the public parking fee table, but this number grew to 10 (and included quasi-residential areas) in

the course of revising the Ordinance in 2009. With the parking threshold program in effect, the City of Seoul achieved some success with its TDM in suppressing transportation demand.

Figure 6 - Parking Threshold Zones in Seoul

Beginning (1997 – 2008)	Now (2009 –)
<ul style="list-style-type: none"> Seven Class 1 commercial areas as defined in the public parking fee table 	<ul style="list-style-type: none"> Ten Class 1 commercial and quasi-residential areas as defined in the public parking fee table Special congestion management zone where public transport is easily accessible
 <p>13.8 km²</p> <ul style="list-style-type: none"> 2.3% of the total area of Seoul 60% of the total commercial area in Seoul 	 <p>16.2 km²</p> <ul style="list-style-type: none"> 2.7% of the total area of Seoul 58.7% of the total commercial area in Seoul

Source: The Seoul Institute (2014).

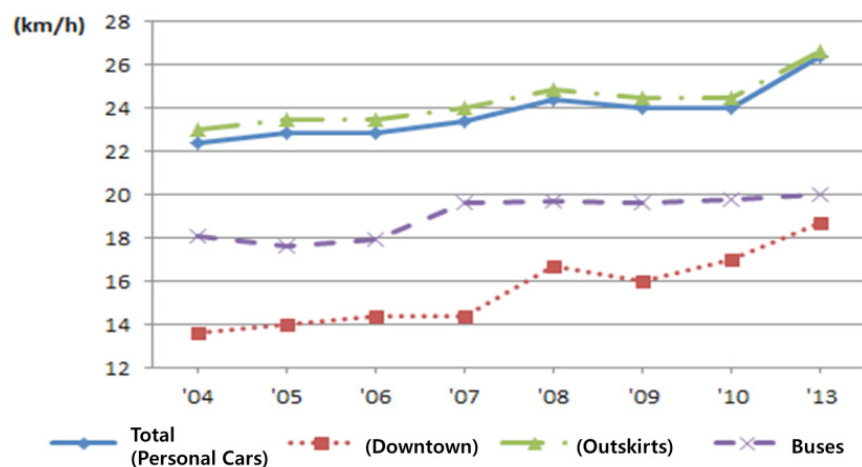
Achievements of Seoul's TDM Policy

Improved Transportation Environment due to Reduced Transport Share of Personal Cars & Increased Share of Public Transport

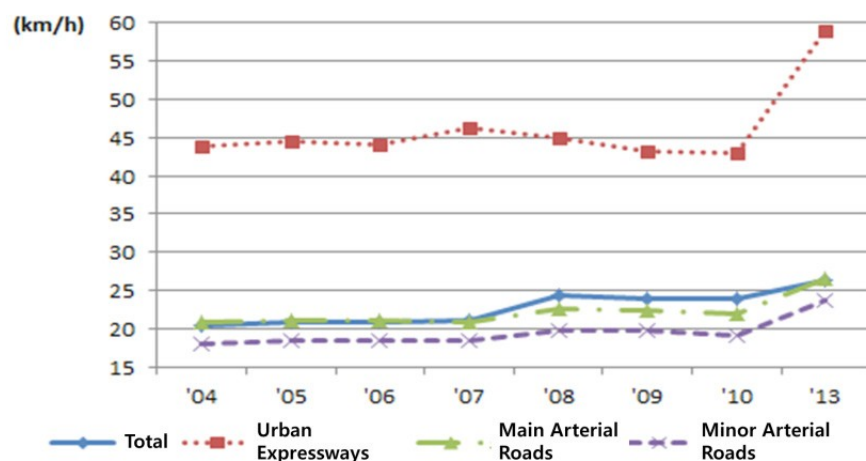
Implemented in various ways since the 1990s, the TDM policy contributed to lowering the transport share of personal cars in Seoul. Meanwhile, the share of public transport has steadily risen from 61% in 2004 to 66% in 2012. Naturally, the average travel speed on major and downtown roads is also increasing. In the early 2000s, the average downtown travel speed in Seoul was 22.4 km/h, rising 4km/h to 26.4 km/h in 2013. A similar phenomenon has been observed in the outskirts of Seoul and on major arterials roads.

Figure 8 - Changes in Average Travel Speed in Seoul

(a) > Changes in
Average Travel
Speed in Seoul



(b) > Changes in
Average Travel
Speed in Seoul
(by Road Type)

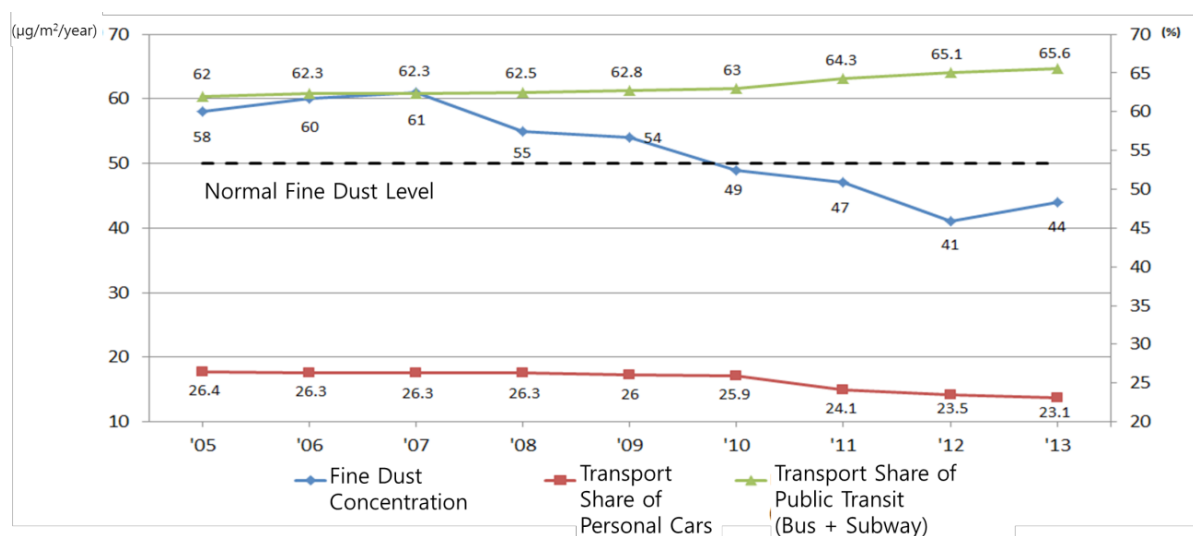


Source: Seoul Statistics

Contribution to Improved Air Quality

Seoul's air quality has also improved thanks to the increased average travel speed, decreased transport share of personal cars, and increased share of public transport. The concentration of fine dust – a cause of respiratory diseases and a hotly debated social issue – was $60 \mu\text{g}/\text{m}^3$ in 2004, $50 \mu\text{g}/\text{m}^3$ higher than Seoul's normal level. However, the decrease in passenger cars and other elements helped reduce the concentration each year, and by 2013 it had fallen to $44 \mu\text{g}/\text{m}^3$.

Figure 9 - Changes in Fine Dust Concentration & Share of Transport



Source: Seoul Statistics

Priority on Pedestrians in Urban Transportation Policy

As the TDM policy encouraged drivers to switch to public transport or walk, the city also began to shift its focus from cars to pedestrians. In line with this trend, Seoul created a "Walk-Friendly Seoul" by reducing the 4-lane Gwangjingyo Road to 2 lanes in 2007 and expanding the pedestrian walkway. In January 2014, the city created its first transit mall on Yonsei-ro. Many zones busy with pedestrians on weekends (e.g., Cheonggye Stream, Hongik University) were turned into pedestrian-only areas. The TDM policy has significantly helped Seoul become a more walking-friendly city.

Limitations & Needs for Improvement

Differentiation of the Congestion Coefficient

The congestion impact fee system has attempted on many occasions to differentiate the congestion coefficient by city size and facility. However, regional characteristics or facility locations were not reflected, and the impact fee was unnecessarily imposed on areas where congestion is minimal or not an issue. On the contrary, the fee is too low in significant traffic-generating areas or where congestion is severe, making the system virtually impractical according to critics. It is therefore critical to differentiate the congestion coefficient in light of the level of congestion and regional characteristics. Now, the coefficient can be upwardly adjusted by autonomous districts within the 100% range prescribed in the Urban Traffic Promotion Act, but the terms of the Urban Traffic Readjustment Promotion Act should be revised to allow coefficients to exceed 100% for those facilities located in heavily congested areas. As for those areas without sufficient public transit, the coefficient should be lowered, even if the facilities generate large traffic volumes.

Usefulness of Congestion Impact Fee System

Launched in the 1990s, the congestion impact fee has become one of Seoul's major transportation policies over the past 20 years, but there are still doubts as to its usefulness. The unit fee has been fixed for 22 years despite rising prices, and the total levied impact fees account for only 1% of all costs arising from congestion in Seoul. The City of Seoul is seeking to revise the relevant Ordinances and raise the unit congestion impact fee to a more suitable level, thereby putting pressure on companies not yet participating in TDM programs to do so, while providing more and better incentives to participants.

Improvement of the Parking Threshold System

Currently, Seoul's parking threshold is the same regardless of the intended use of the land, buildings, and surrounding areas. This runs counter to the fundamental purpose of the system and is inefficient and illogical to some extent. Many large buildings allow parking outside or find parking spaces that get around the parking threshold. Opinions on the parking threshold vary greatly by facility type. For improved operational efficiency, the system needs more specifics in its design.

Improvement of the Congestion Charge Rate & Method at Namsan Tunnel 1 & 3

As part of the TDM policy designed to decrease the number of vehicles entering the city center and therefore

mitigate congestion, the City of Seoul began to levy the congestion charge on 10-person vehicles and smaller if they are carrying only 1 or 2 people (including the driver) at Namsan Tunnel 1 and 3 from November 1996. However, the effect of the congestion charge in reducing traffic has gradually slowed, probably because the congestion charge is the same during peak and off-peak hours and has never been adjusted upward. Meanwhile, discount benefits were increased for compact cars in 2003 and for Weekly No-Driving Day Program participants in 2004. Considering how overall prices and other transport costs have risen, the congestion charge should also be adjusted to a more suitable level and be differentiated by time of day to have the desired effect on traffic volume.

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