



Korea's Think Tank For Transport and Logistics

# Financing Urban Railways in Korea

November 9, 2016

Jinsu Mun

# Contents

I

**Urban Railways in Korea**

II

**Government Funding**

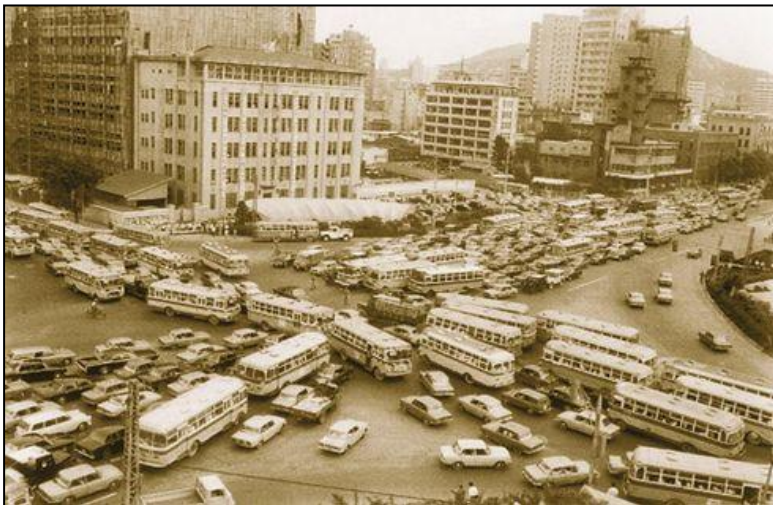
III

**Public Private Partnership**

# I. Urban Railways in Korea

## □ Seoul Subway Construction (Line 1&2)

- Request of Alternative Transport to Tackle Severe Traffic Congestion in Seoul
  - Rapid increase in population: 1.69M ('50) → 2.45M ('60) → 5.43M ('70) → 8.36M ('80)
  - Rapid increase in passenger car: 3,004 ('61) → 30,304 ('70) → 130,064 ('80) → 883,415 ('90)
- Construction of Seoul Subway
  - Line 1 ('71~'74): Tackling traffic congestion in old city area(Radial, 7.8km)
  - Line 2 ('78~'84): Connecting new city centers, De-centralization of population (Circular, 54.2km)



<Traffic Congestion of Seoul in 1960s>



<Opening of Seoul Subway Line 1>



# I. Urban Railways in Korea

## □ Expansion of Seoul Subway Lines

- Subway lines for tackling subway passenger increase & severe road congestion
  - Subway Lines 3 & 4 ('80~'85)
  - Subway Lines 5~8 ('89~'01)

## □ Subway Lines in Other Cities

- Need for subway lines in other cities
  - Road congestion due to population increase
  - Busan 4 lines, Daegu 3 lines, Incheon 2 lines, and Daejeon/Gwangju/Yongin/Eijungbu/Kimhae cities 1 line each in operation



<Seoul Subway Line 2>



<Opening of Busan Subway Line 1(1985)>

# I. Urban Railways in Korea

## □ Urban Railways by Local Gov.

- Total 23 lines (670.1km) of urban railways in 9 cities
  - 3 lines are constructed through PPP

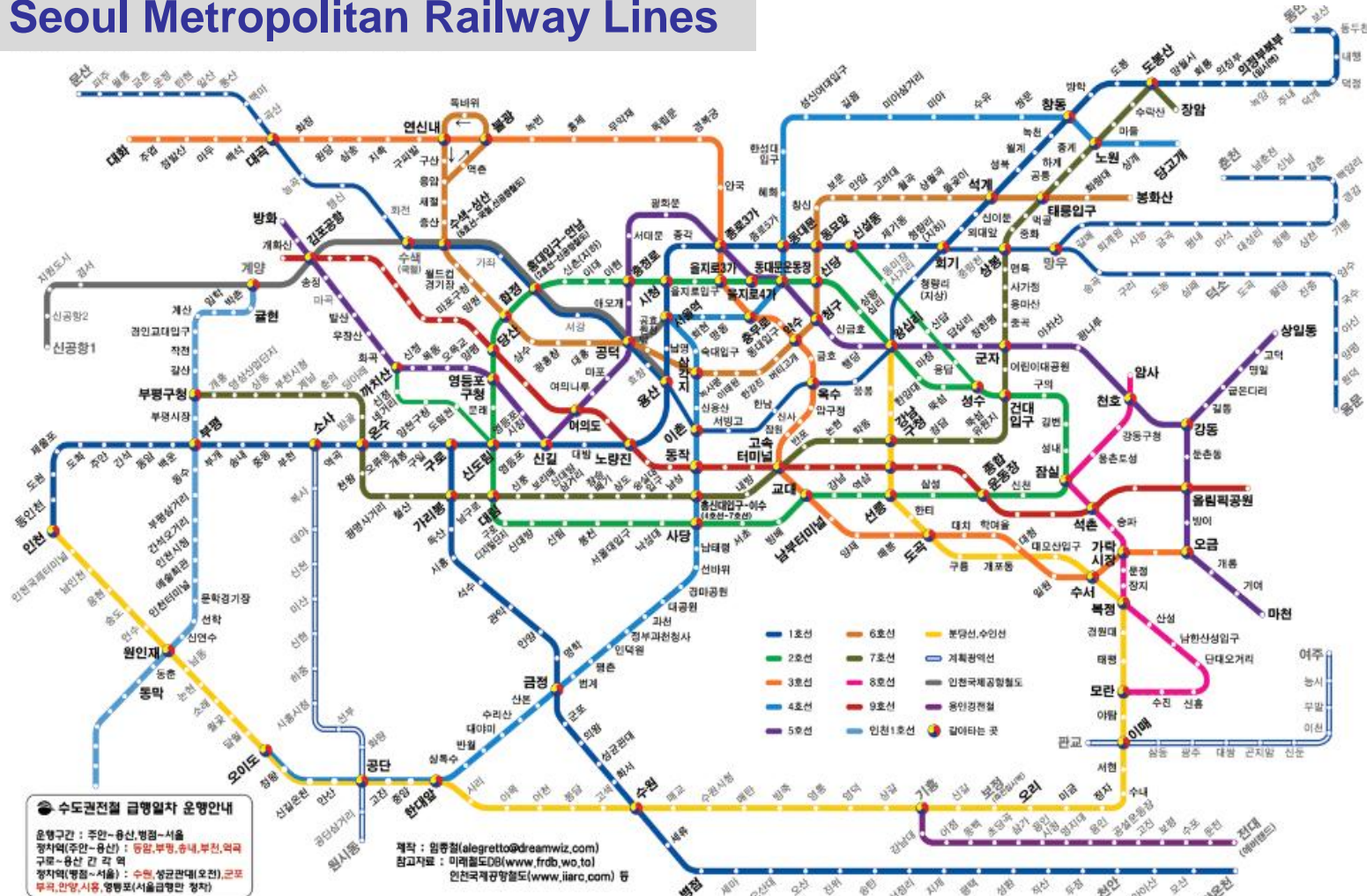
City	Seoul	Busan	Daegu	Incheon	Daejeon	Gwangju	Busan-Kimhae	Euijung-bu	Yong-in	Total	
No. of Lines	9	4	3	2	1	1	1	1	1	23	
Length(km)	327.1	107.8	80.4	52.0	20.5	20.5	23.2	20.5	18.1	670.1	
Rider-ship	Million persons/year	1,906	325	134	73	41	18	16	8	4	2,779
	Modal split(%)	34.7	12.6	3.2	9.9	4.2	n/a	n/a	n/a	n/a	n/a

## □ Urban Railways by Korail (Nat'l Train Operator)

- Mainly in Seoul Metropolitan Area (Total 13 lines, 601.1km)
- Some are using existing national railway network and others are newly constructed
  - Incheon International Airport Railway and Sinbundang lines are constructed through PPP

# I. Urban Railways in Korea

## Seoul Metropolitan Railway Lines



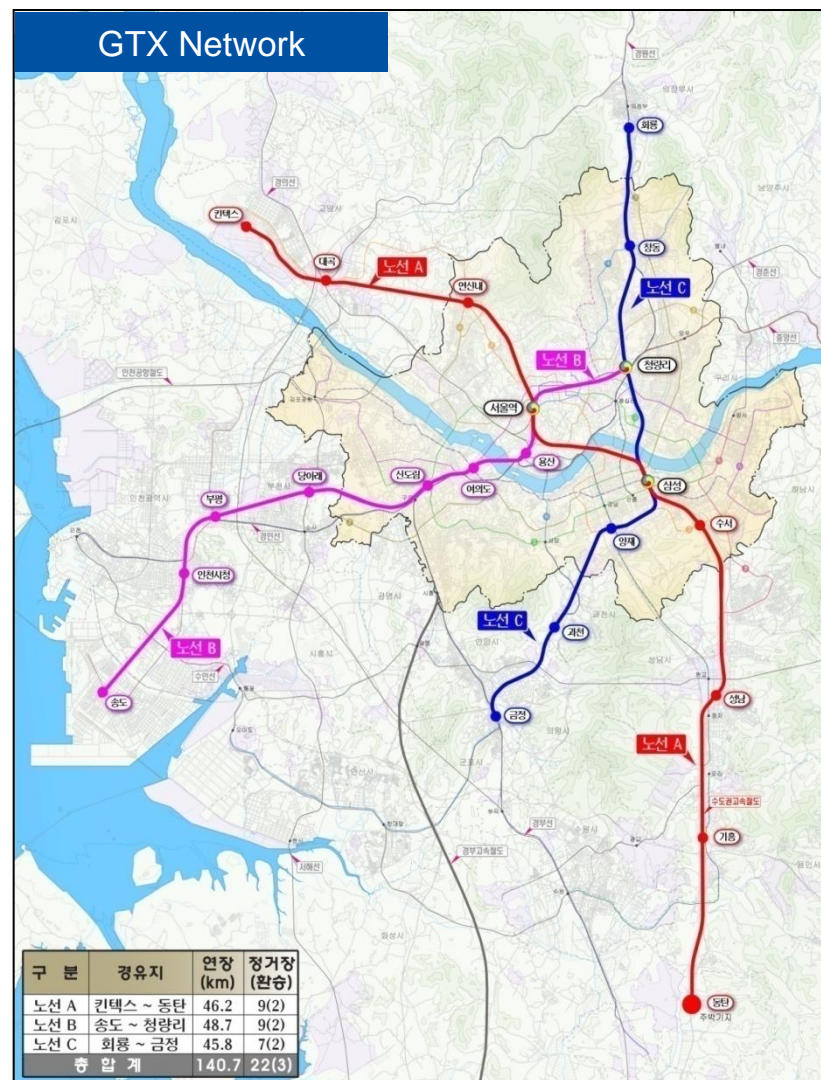


# I. Urban Railways in Korea

## □ Plan for High Speed Urban Railways

- Construction of faster urban railway lines

- Phenomenal increase of train speed in SMA: 30~35km/h ⇒ 100km/h
- Expected to be constructed through PPP



# I. Urban Railways in Korea

## □ Urban Railway Construction Plan by Seoul City

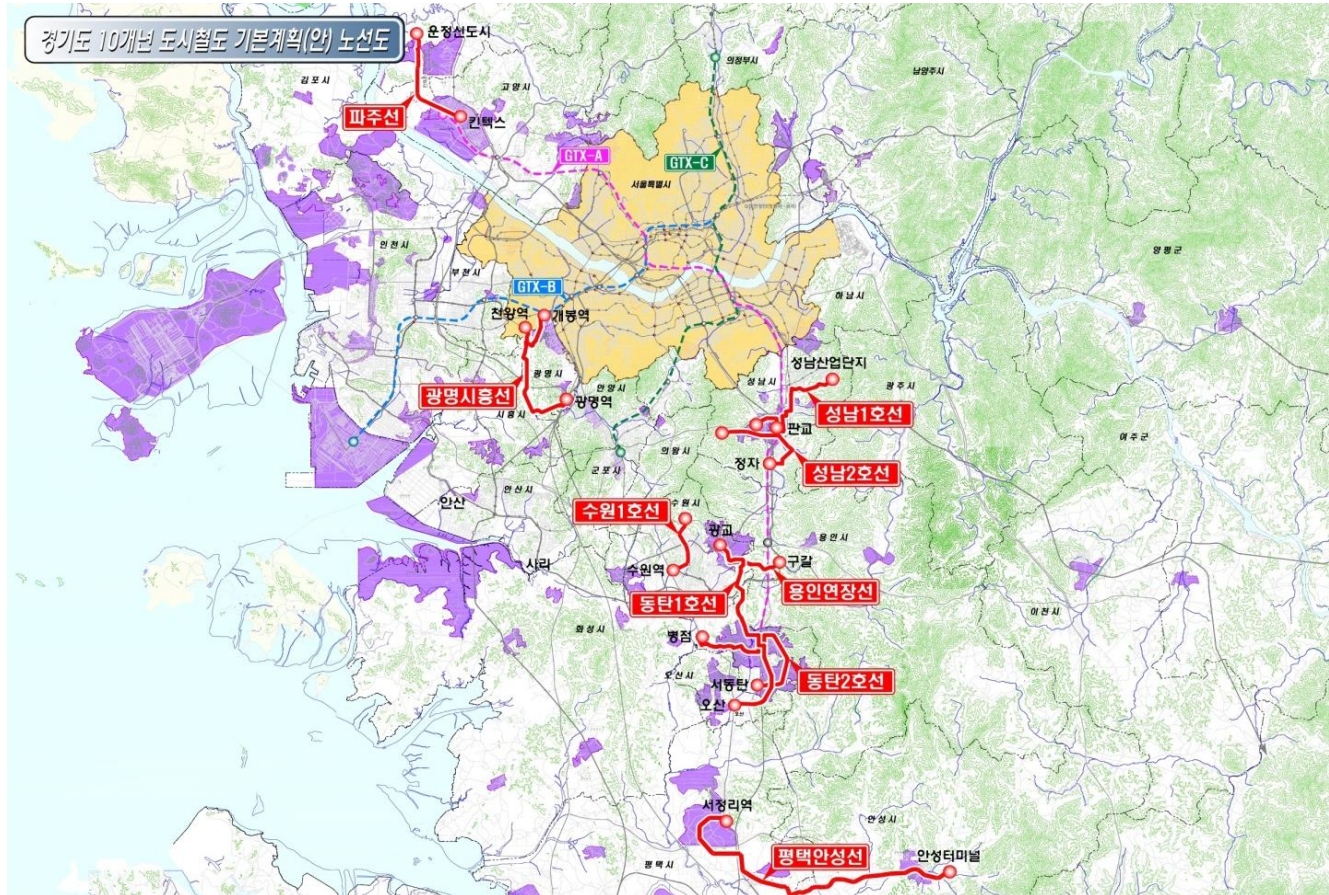
- Plans to construct urban railways through PPP





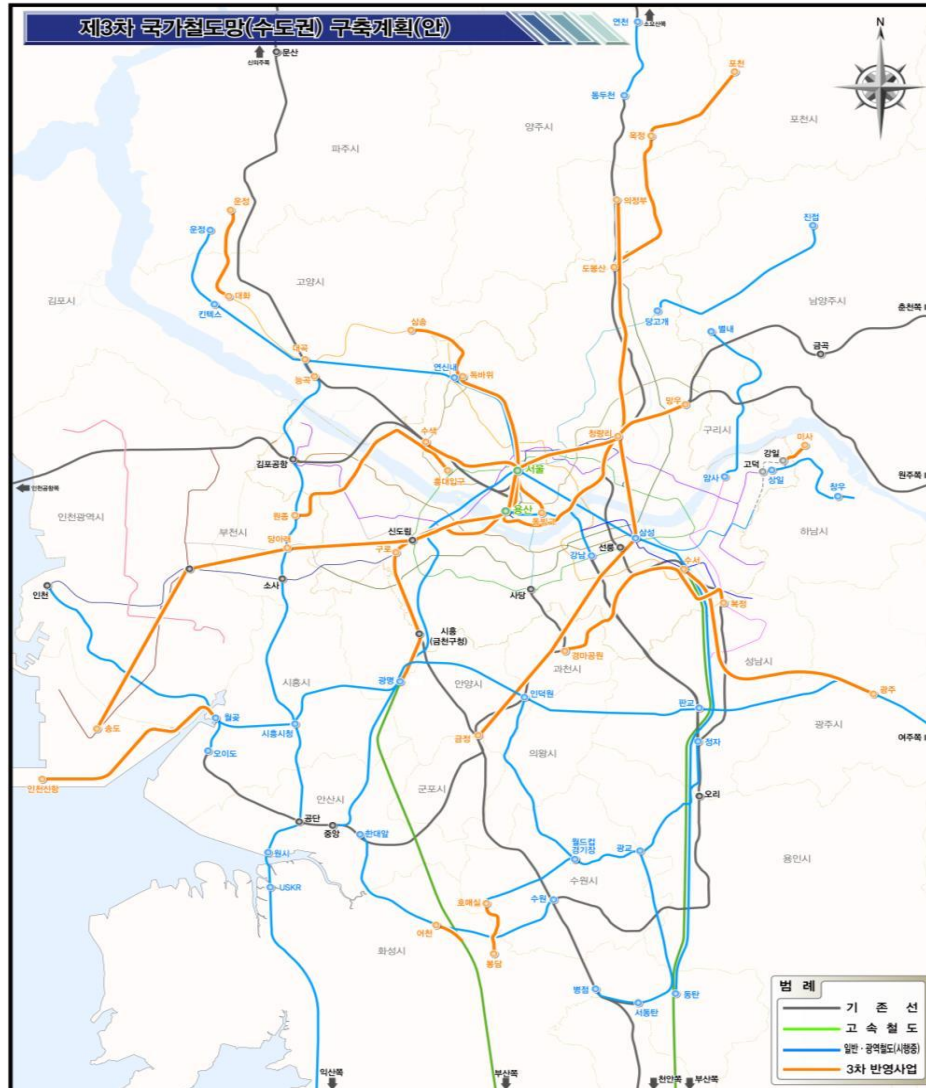
# I. Urban Railways in Korea

## □ Urban Railway Construction Plan by Gyeonggi Province



# I. Urban Railways in Korea

## □ Urban Railway Construction Plan by Central Gov.



## II. Government Funding

### Support from Central Government

- Metropolitan Rail
  - Central Gov. 70% (50%, Seoul) by Special Law on Metropolitan Transport Management ('97)
- Urban Rail
  - Central Gov. 40~60% (Seoul 40%, Others 60%)
  - \* Local gov.'s railway construction plan should get an approval from central gov.

<Changes in Urban Rail Funding Structure>

	Seoul		Other Cities	
	Central Gov.	Local Gov.	Central Gov.	Local Gov.
1980s	3%	97%	15%	75%
'91~'97	15~30%	70~85%	15~30%	70~85%
'98~'04	40%	60%	50%	50%
Since '05	40%	60%	60%	40%





## II. Government Funding

### Urban Railway Bonds & Foreign Loans

- Seoul city enacted the Ordinance on the first Seoul city subway bonds in 1973 to finance the construction of Seoul Metro Line 1
  - Bonds covered about 10% of total project cost
- Share of bonds in financing urban railways has since steadily increased
  - For some projects (Seoul Metro Line 2, Daegu Metro Line 1, Gwangju Metro Line 1), more than 30% of project cost was covered by urban railway bonds
- Urban Railways Law stipulates the compulsory purchase of the urban railway bonds
  - Registration of real estate or other assets with the central or local gov.
  - Subcontract agreement on construction with the central or local gov.
  - Subcontract agreement on construction, services, or procurement related with construction and operation of urban railways; and etc.
- Foreign loans were used for Seoul Metro Line 1 and others in 1970s and 1980s
  - Foreign loan was 48% of total project cost for Seoul Metro Line 1

A city skyline with several skyscrapers of varying heights and colors (blue, grey, brown) under a blue sky with white clouds. The buildings are reflected in a body of water in the foreground.

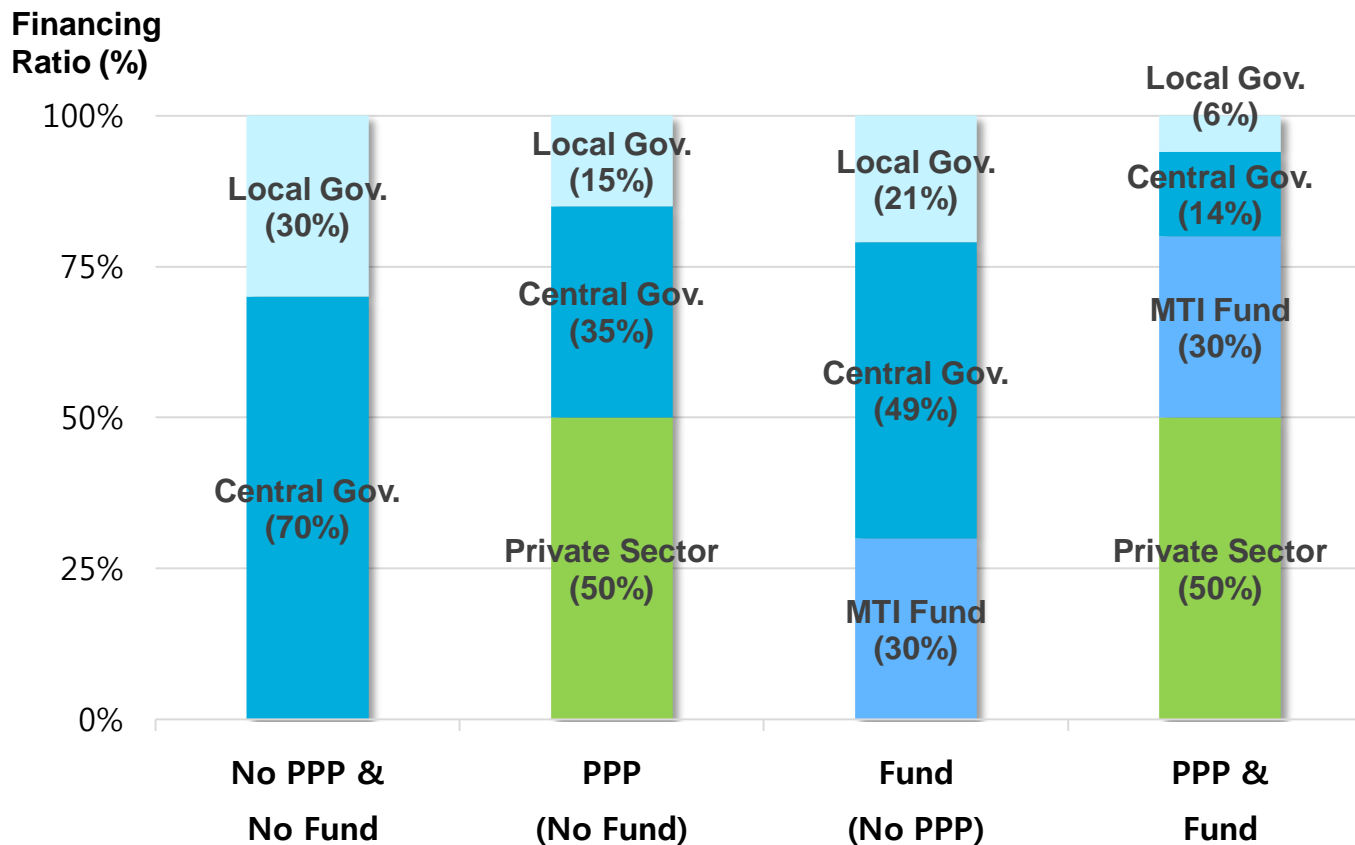
## II. Government Funding

### □ Metropolitan Transport Infrastructure Fund (MTI Fund)

- MTI Fund is available for the construction of metropolitan railway lines
  - Project implementation agency for new town projects in metropolitan area is stipulated to compulsorily pay MTI Fund (Special Act on Metropolitan transport management)
  - In the case of Byulnae Metropolitan Railway Line, 142 Million USD of MTI Fund was used for the construction of the line (12.8% of total project cost)

## II. Government Funding

### Financing for Metropolitan Railways (Non-Seoul City Case)





## II. Government Funding

### Special Account for Transport Infrastructure

#### Introduction of the account for provision of transport infrastructure in 1994

- Source : Transport, Energy & Environment Tax, General Account, Facility Usage Fee
- Taxes of 0.48 USD and 0.34 USD are levied for 1 liter of gasoline and diesel respectively

#### The special account is main source for national transport infra. investment

- The special account accounted for 80% of national transport infrastructure Investment in 2015
- The tax accounted for 51% of national transport infrastructure investment in 2015 (tax accounts for 63.8% of the account)

Unit: Million USD

		2012	2013	2014	2015
General Account		1,505 (10.3%)	2,777 (16.3%)	2,253 (13.7%)	3,749 (20.0%)
Special Account	Sum	13,052 (89.7%)	14,300 (83.7%)	14,177 (86.3%)	14,960 (80.0%)
	Transport Tax	11,103 (76.3%)	8,472 (49.6%)	9,469 (57.6%)	9,539 (51.0%)
	Etc.	1,949 (13.4%)	5,828 (34.1%)	4,708 (28.7%)	5,421 (29.0%)
Total		14,557	17,077	16,430	18,709

## II. Government Funding

### □ Increase of transport infrastructure investment since the Account introduction

- Transport Investment Increase: 11.7 Bn. USD ('87~'91) → 29.2 Bn. USD ('94~'98) → 61.7 Bn. USD ('04~'08)

(Bn. KRW)

Road      Rail  
Seaport      Airport

<Transport SOC Investment>

### <Special Account for Transport Infrastructure>

	2011 Budget (Bn. USD)	Ratio
<b>Road</b>	<b>6.1</b>	<b>51%</b>
<b>Rail</b>	<b>3.2</b>	<b>26%</b>
<b>Transport System Mana.</b>	<b>0.9</b>	<b>8%</b>
<b>Airport</b>	<b>0.7</b>	<b>6%</b>
<b>Seaport</b>	<b>1.1</b>	<b>9%</b>
<b>Total</b>	<b>12.0 (6.9)</b>	<b>100% (57%)</b>

\* ( ) indicates Transport, Energy& Environment Tax

# III. Public Private Partnership

## Legal Framework of PPP

### PPP system was first introduced in 1994 with succeeding several revisions

- Unsolicited proposals and MRG in 1999
- BTL in 2005: to promote construction of educational facilities, military residences, etc.
- Dispute resolution committee in 2011

**Enactment  
(1994)**

『The Private Capital Inducement Promotion Act』  
· 35 Facility Types

**Revision  
(1999)**

『The Act on Private Participation in Infrastructure 』  
· Unsolicited proposals, Minimum Revenue Guarantee

**Amendment  
(2005)**

『The Act on Private Participation in Infrastructure 』  
· Diversified Facility Types (35 -> 44)  
· Introduction of BTL Scheme (5 railway BTL projects)



# III. Public Private Partnership

## Minimum Revenue Guarantee

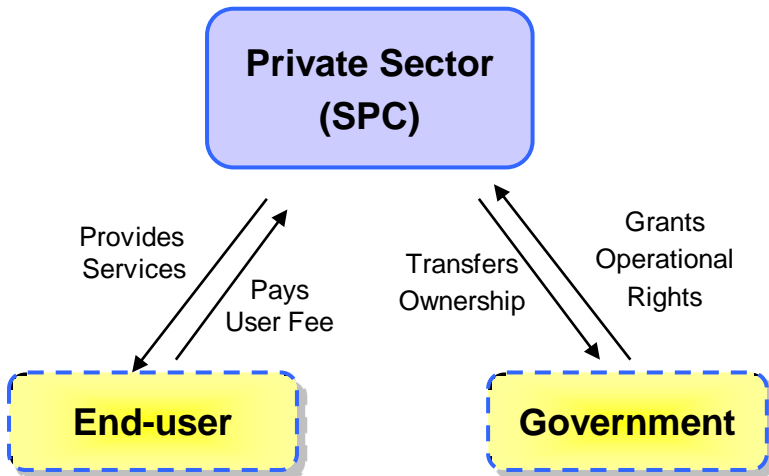
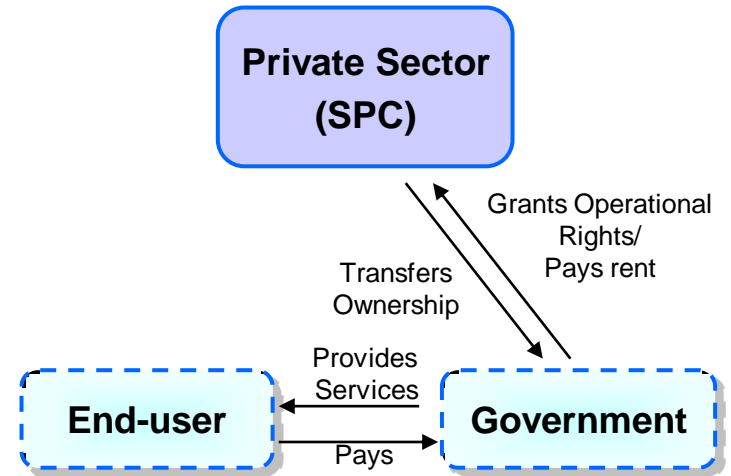
**MRG: A certain portion of projected annual revenues may be guaranteed when actual operation revenue falls short of projected revenue prescribed in the contract**

- 36 out of 145 signed contracts include MRG by the end of 2008

	1999		2003	2006		2009
	Solicited	Unsolicited		Solicited	Unsolicited	
MRG Period	Whole operating period		15 Years	10 Years		
Guarantee Level (Max)	90% of expected income	80%	First 5 Years 90% Next 5 Years 80% Last 5 Years 70%	First 5 Years 75% Next 5 Years 65%	Abolished	Abolished
Condition	None		No MRG applied if Actual Revenue < 50% of Forecasted Revenue	No MRG applied if Actual Revenue < 50% of Forecasted Revenue		

# III. Public Private Partnership

## ■ BTO & BTL Schemes

BTO (Build-Transfer-Operate)	BTL (Build-Transfer-Lease)
<ul style="list-style-type: none"> <li>- SPC is bestowed with operation rights and recovers investment costs through revenue (Demand risk on concessionaire)</li> <li>- Both solicited and unsolicited projects are eligible</li> <li>- Roads, railways, ports, etc.</li> <li>• By 2012, 200 projects (31.6%), 56bn. USD (69.1%)</li> <li>• Solicited and unsolicited projects are 55%, 45% respectively (investment size)</li> </ul>	<ul style="list-style-type: none"> <li>- SPC is guaranteed with an agreed profit rate with government irrespective of operation revenue (Little demand risk on concessionaire)</li> <li>- Only solicited projects are eligible</li> <li>- School, dormitory, military housing, etc.</li> <li>• By 2012, 423 projects (66.8%), with 23.3 bn. USD (28.8%)</li> </ul>
 <p>The diagram for BTO shows three entities: Private Sector (SPC) in a solid blue box at the top, End-user in a dashed yellow box at the bottom left, and Government in a dashed yellow box at the bottom right. Arrows indicate the following interactions:         <ul style="list-style-type: none"> <li>SPC provides services to the End-user.</li> <li>The End-user pays a user fee to the SPC.</li> <li>The Government grants operational rights to the SPC.</li> <li>The SPC transfers ownership to the Government.</li> </ul> </p>	 <p>The diagram for BTL shows three entities: Private Sector (SPC) in a solid blue box at the top, End-user in a dashed light blue box at the bottom left, and Government in a dashed light blue box at the bottom right. Arrows indicate the following interactions:         <ul style="list-style-type: none"> <li>The Government grants operational rights and pays rent to the SPC.</li> <li>The SPC provides services to the End-user.</li> <li>The End-user pays a user fee to the SPC.</li> <li>The SPC transfers ownership to the Government.</li> </ul> </p>

### III. Public Private Partnership

#### Urban Railway BTO Projects under MOLIT

Projects	Project Type	Cost (Mn. USD)	Opening (Operation)	MRG Condition	Issues
Incheon Int'l Airport Railway Line	Solicited (61km)	2,865 (Private 67%)	2007/ 2010 (30yrs)	- Less than 90% of expected revenue  * 90 mil. USD in '08	- Over-estimation of revenue and MRG (7% of contracted travel demand at early stage) - High earning rate (14.07%)  * Financing restructuring in 2015 (reduction of earning rate to 3.17%, cost compensation scheme, MRG abolishment)
Shinbundang Railway Line (Gangnam-Jungja)	Unsolicited (18.5km)	1,016 (Private 54%)	2011 (30yrs)	- 80% for first 5 yrs - 70% for 6-10 yrs  * No MRG when revenue is less than 50% of contracted one	- No MRG due to operation revenue is less than 50% of contracted revenue - Difficulty in financial condition due to accumulated deficit (lawsuit against government)  * Delay in construction of connecting railway lines attributable to government
Sinbundang Railway Line (Jungja-Gwanggyo)	Unsolicited (12.8km)	891	2016 (30yrs)		
Sinbundang Railway Line (Yongsan-Gangnam)	Unsolicited (7.7km)	758	(30yrs)		

# III. Public Private Partnership

## Urban Railway BTO Projects under Local Gov.

Projects	Project Type	Cost (Mn. USD)	Operation	MRG Condition	Issues
Seoul Metro Line 9	Solicited (38km)	3,200 (Private 19%)	2009 (30yrs)	- 90 ~70% for 15 years only when actual revenue is over 50% of contracted revenue * 65mn. USD for '09- '11	- Dispute over fare increase with Seoul Metropolitan Gov. (revenue is 62.1% while demand is 106% of expected ones) - High earning rate (13.0%) * Financing restructuring in 2013 (reduction of earning rate to 4.86%, cost compensation scheme, MRG abolishment)
Yongin Light Railway	Solicited (18km)	632 (Private 59%)	(30yrs)	- When actual revenue is less than 80% of contracted one (30 yrs.)	- Delay of operation due to excessive MRG concerns (only 20% of passengers is expected, yearly MRG of 74 million USD) - Nullification of contract (Yongin city filed a lawsuit to International Chamber of Arbitration) → lost the lawsuit and worsening financial condition due to compensation and MRG * Financing restructuring in 2013 (Cost compensation scheme, MRG abolishment)



### III. Public Private Partnership

#### Urban Railway BTO Projects under Local Gov.

Projects	Project Type	Cost (Mn. USD)	Operation	MRG Condition	Issues
Busan-Kimhae Light Railway	Solicited (24km)	673 (Private 62%)	2011 (30yrs)	- 90% for 20yrs	<ul style="list-style-type: none"> <li>- MRG increase due to over-estimation of travel demand (35mn. USD of MRG in 2014; actual passenger is 22% of estimated one)</li> <li>* Considering restructuring of financing structure</li> </ul>
Euijungbu Light Railway	Solicited (10.3km)	413 (Private 52%)	2012 (30yrs)	- 50 – 80%	<ul style="list-style-type: none"> <li>- No MRG due to actual revenue is around 30%</li> <li>- Private investor is considering cancellation of PPP project due to high deficit (yearly deficit of 26mn. USD)</li> </ul>

# III. Public Private Partnership

## BTL Projects

### Daegok~Sosa Railway Line

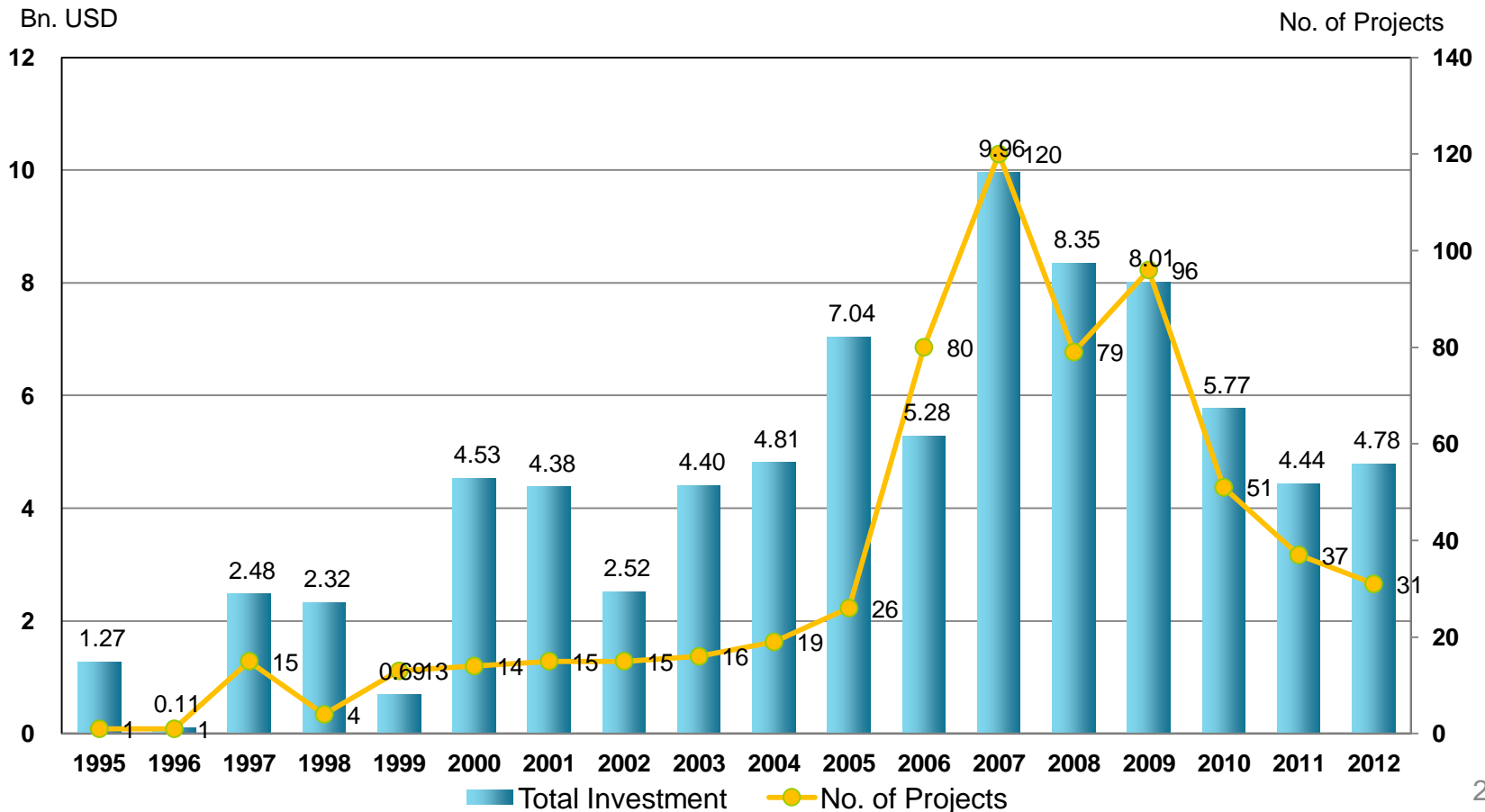
- Total Project Cost: 1.28 billion USD
- Capital Structure:  
Equity/Debt/Subsidies = 9%/81%/10%
- Work Scope: Construction of 18.4km of railway line
- Competent Authority: Ministry of Transport
- Construction Period: 2016-2020
- Operation Period: 20 years



# III. Public Private Partnership

## Investment Trend of PPP

- PPP projects have increased with introduction of MRG and unsolicited proposal (1999), and BTL scheme (2005). However, PPP projects are decreasing recently.



# III. Public Private Partnership

## □ Government Investment vs. Private Investment

- In 2008, private sector investment amounted to 3.3 bn. USD, around 18% of total government investment in the sector (Transport and regional development sector)

Unit: Bn. USD, %

	'99	'00	'01	'02	'03	'04	'05	'06	'07	'08	'09	'10	'11
Private Investment (A)	0.44	0.87	0.52	1.04	0.87	1.48	2.52	2.52	2.70	3.30	3.39	2.35	1.91
Gov't Investment (B)	11.04	13.22	13.91	13.91	16.0	15.13	15.91	16.0	16.0	17.83	22.09	21.30	21.22
Ratio (A/B, %)	3.9	6.6	3.4	7.5	5.6	9.8	16.1	15.9	17.0	18.4	15.4	11.0	9.0

\* Statistics on Transport and regional development sector

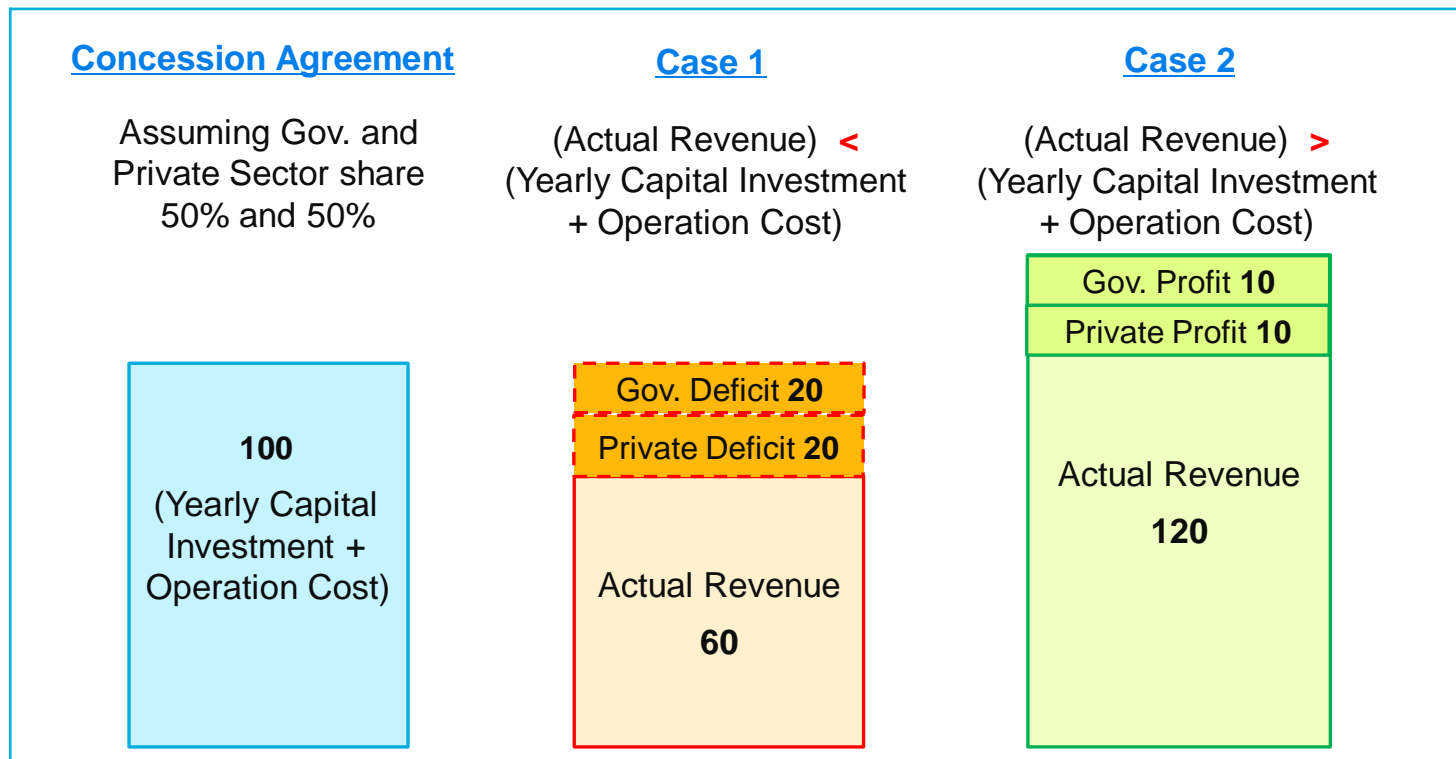


# III. Public Private Partnership

## ❑ Risk Sharing BTO

### ❑ BTO Risk Sharing

- Government and private sector share not only capital and operation costs, but also operational profits and losses (applied only to solicited projects)



# Thank you!

Jinsu Mun  
js\_mun@koti.re.kr

