High Speed Rail in Taiwan

Dr. S.K. Jason Chang
Professor, Dept of Civil Engineering
Director, Advanced Public Transport Research Center
National Taiwan University
skchang@ntu.edu.tw

Roundtable on

The Economics of Investment in High Speed Rail

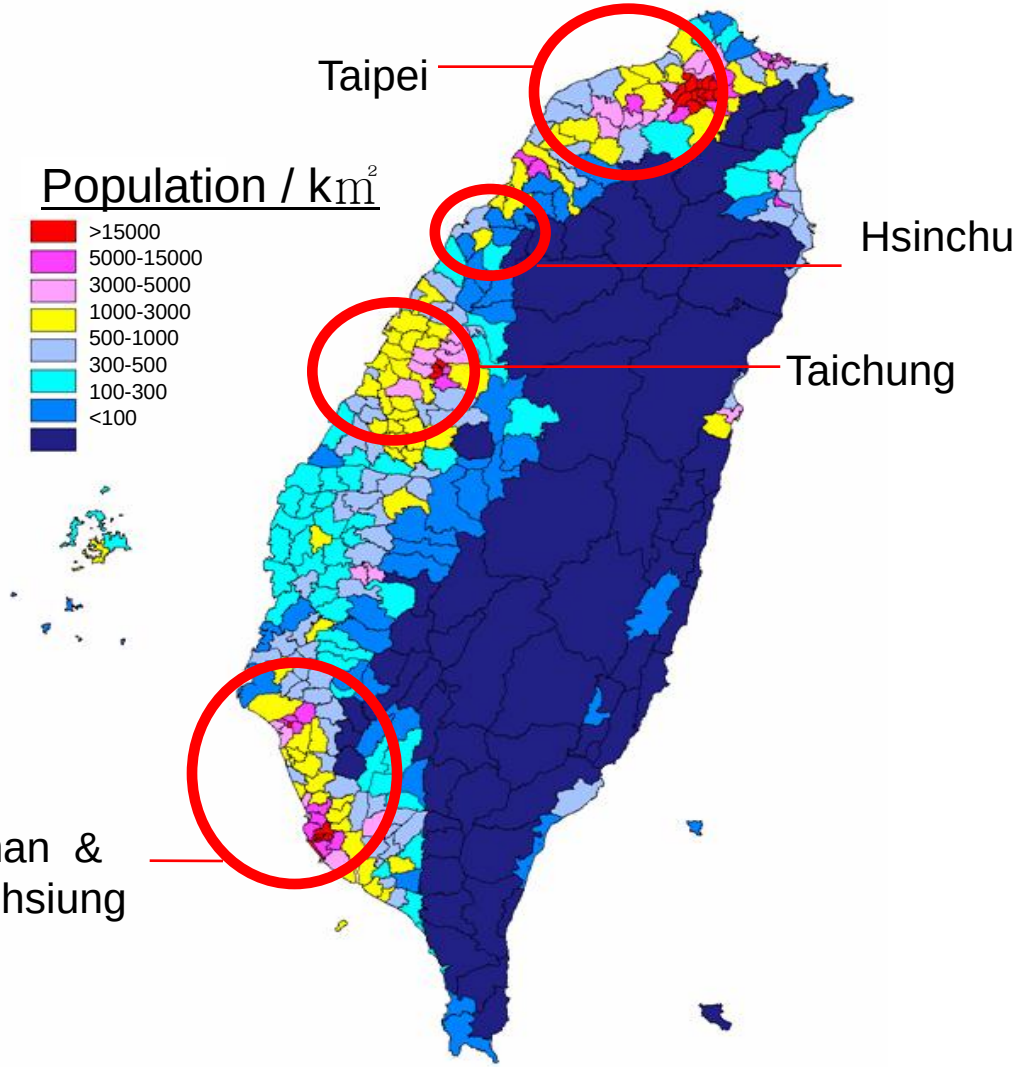
New Delhi, India, December 18~19, 2013

Agenda

1. Development of Taiwan High Speed Rail
2. Operation of Taiwan High Speed Rail
3. Financial Sustainability
4. Governance Sustainability
5. Concluding Remarks

94% of Taiwan's Population Live Along the West Corridor (20% of land)

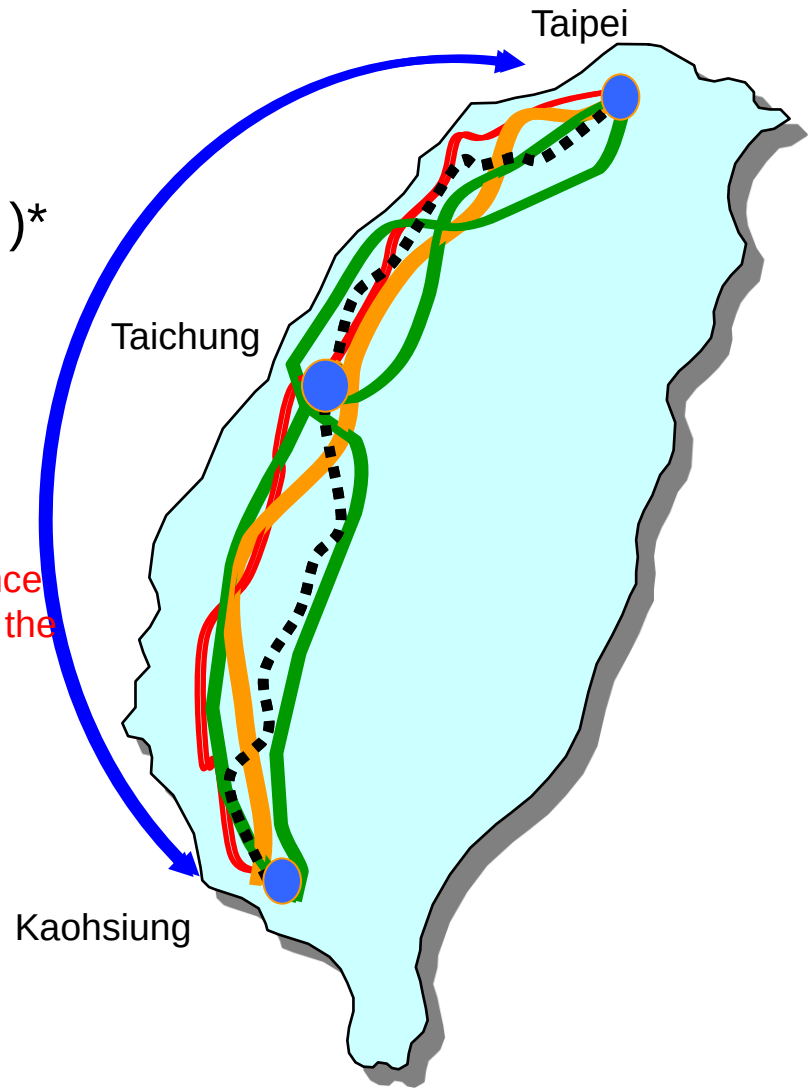
Urbanization phenomenon/issue ~ But, at least, we identified a corridor which can support the HSR.



Travel Time Comparison among Modes

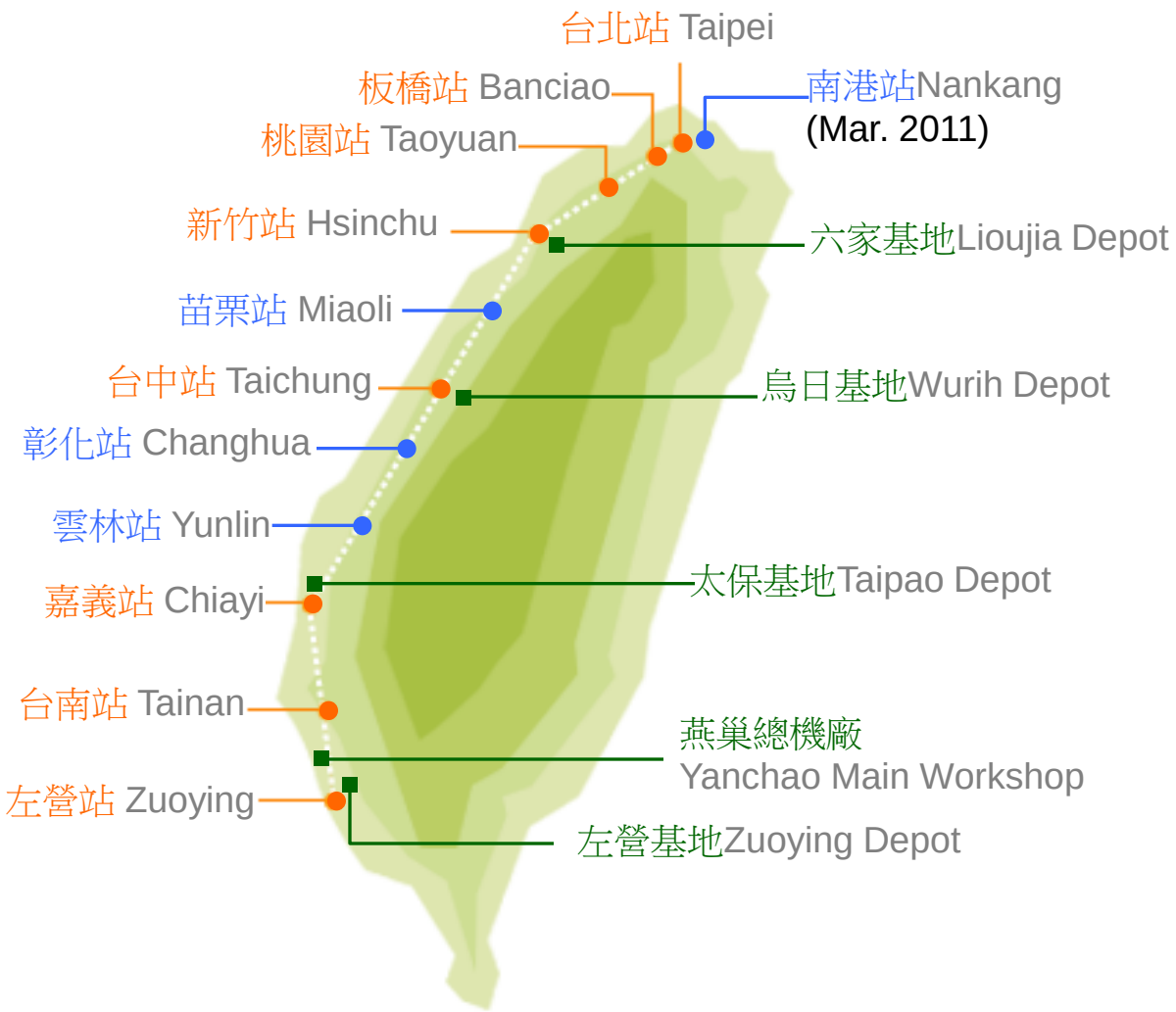
Taipei to Kaohsiung (345 km)

- Secondary Highway (8 –10 hours)*
- Freeway (5 – 6 hours)*
- Traditional Railway (5 – 8 hours)
- Air (50min)
  1. Check in 20 min in advance
  2. Only 2 flights/week (after the HSR)
- High Speed Rail (90 min)



** Without Considering Traffic Congestion*

Taiwan High Speed Rail

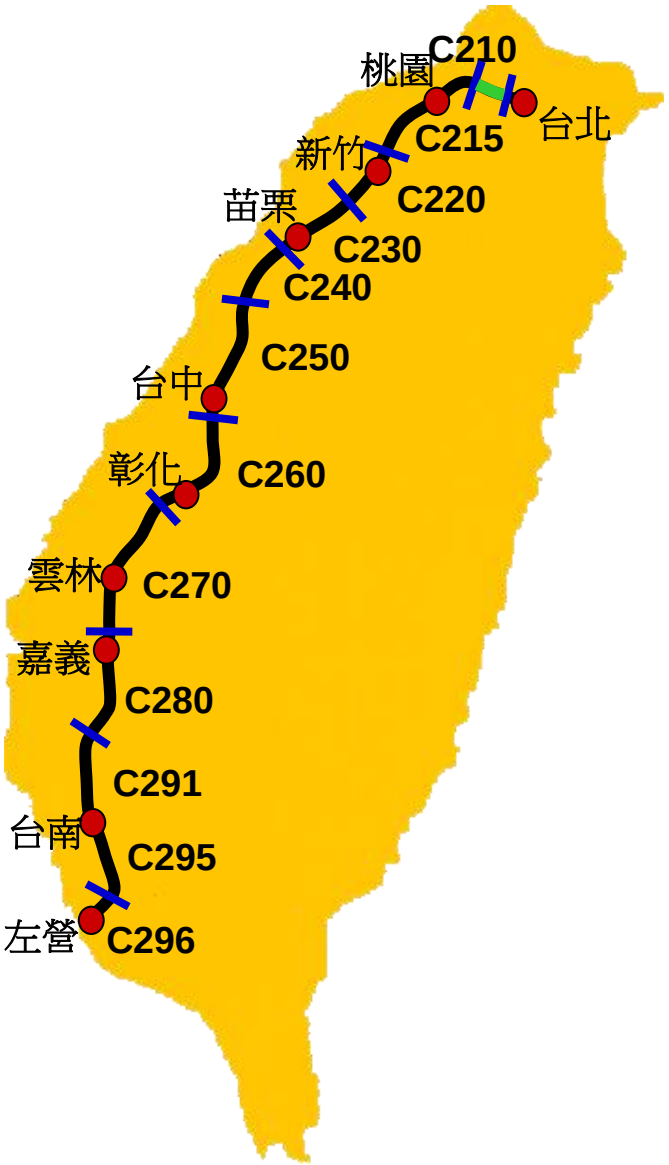


Total length: 345 km

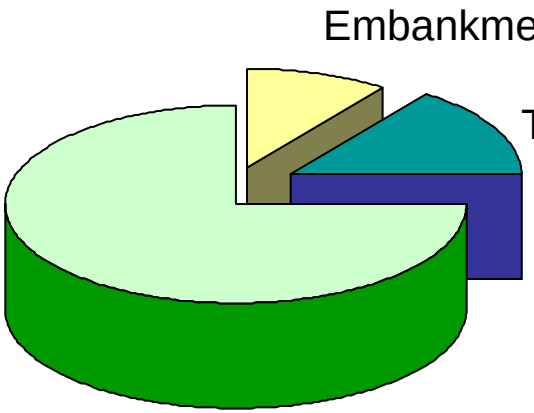
Taiwan High Speed Rail Development

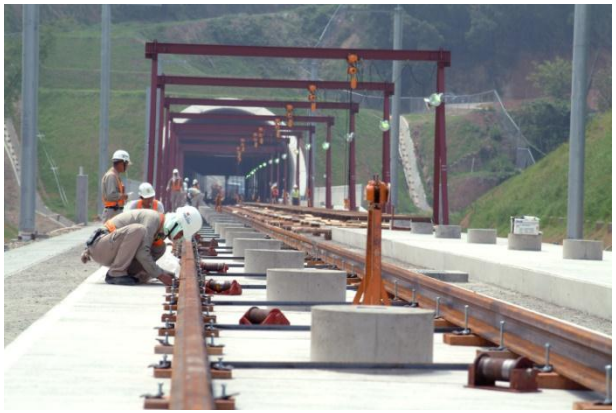
Year	Milestones
1974.4	The first high speed rail project conducted by Taiwan Railway Administration
1987.4.2	Feasibility study of HSR conducted by Ministry of Transportation and Communications, as part of integrated public transportation systems with metro in urban areas
1990.3.15	Confirmation of the feasible plans and a preliminary route is recommended based on alternatives analysis
1990.4.12	The preliminary plan is approved by the Central Government
1991.10.1	Revised plan was proposed and evaluated due to the National Plan on development of new towns and industrial parks
1992.6.25	Approval of the revised plan
1993.7	PPP Approach is requested by the Congress with a minimum 40% of investment from private sector
1996.10.29	Call for Proposal of the BOT Project announced by MOTC
1997.9.25	Taiwan High Speed Rail Consortium obtained the concession
1998.7.23	Signing ceremony of the BOT Project (MOTC and THSRC)

Construction



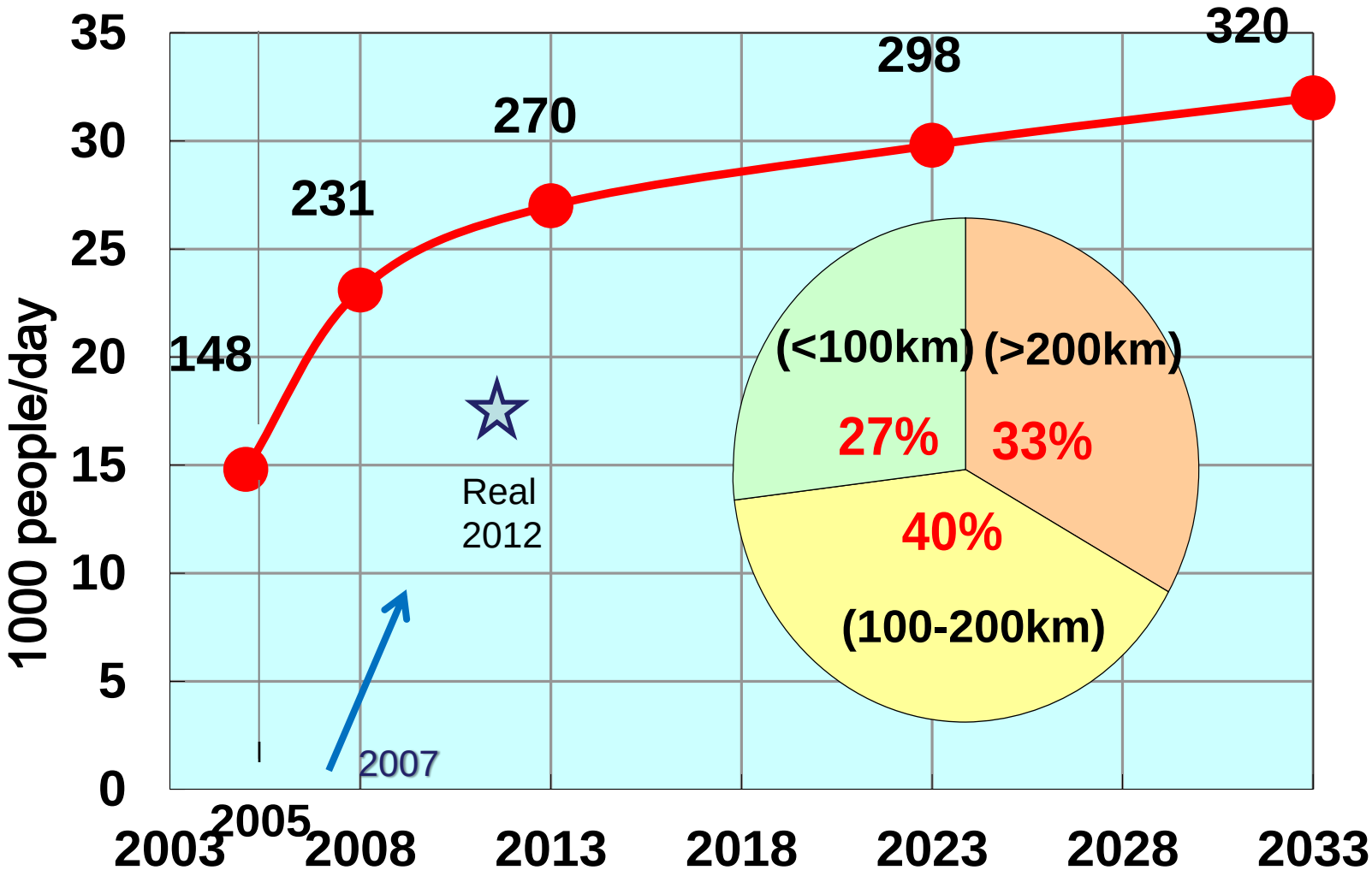
- Total 345KM
  - Tunnel provided by Government
- Total Budget: US$16B~17B





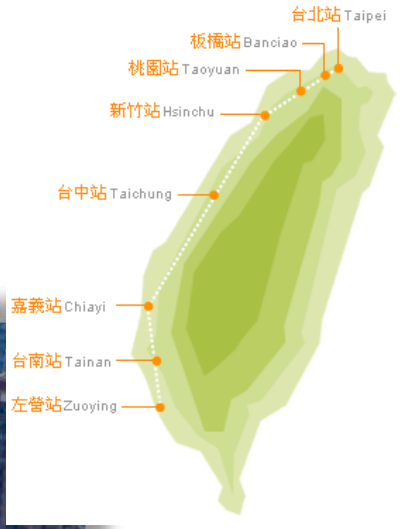

MOSTLY Elevated! ~

Demand Forecasting



Source: THSRC, 2002.05

Taipei Station



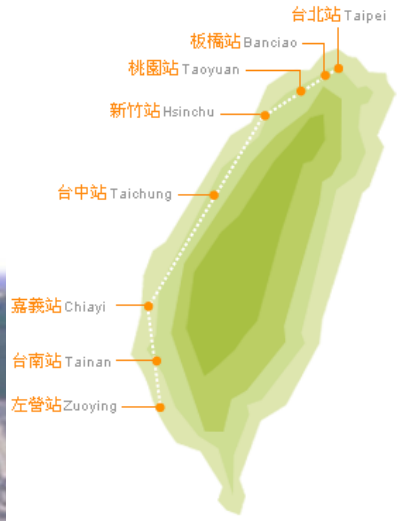
Banciao Station

HSR Taoyuan Station

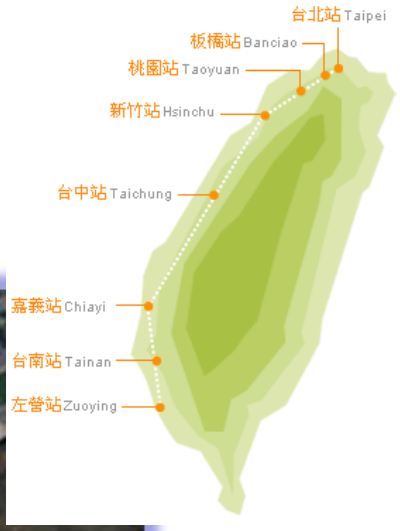
HSR Hsinchu Station

HSR Taichung Station

HSR Chiayi Station



HSR Tainan Station



Zuoying Station

Operation Speed 300 KPH

Taipei – Taichung	45 min
Taipei – Zuoying	90 min

Taiwan HSR Operation(1/3)

Operation Plan- Stopping Pattern

Stop Pattern	Taipei	Bain-Chiao	Tao-Yuan	Xin-Ju	Miao-Li	Tai-Jung	Zhang-Hwa	Yun-Ling	Chia-Yi	Tai-Nan	Zuo-Ying	Travel Time (min)
A	●										●	80
B	●	●				●					●	91
C	●	●				●	●	●	●	●	●	117
D	●	●	●	●	●	●	●	●	●	●	●	136
E	●	●	●	●	●	●						65

Tentative Daily Frequency　2007：60
2013：100
2033：120

Taiwan HSR Operation (2/3)

2007.01.05~2013.10.31

Total Train Service	300,487
No. of Passengers	241,190,908
Passenger-km	48.85 billion
Loading Factor	56.00 %

Taiwan HSR Operation(3/3)

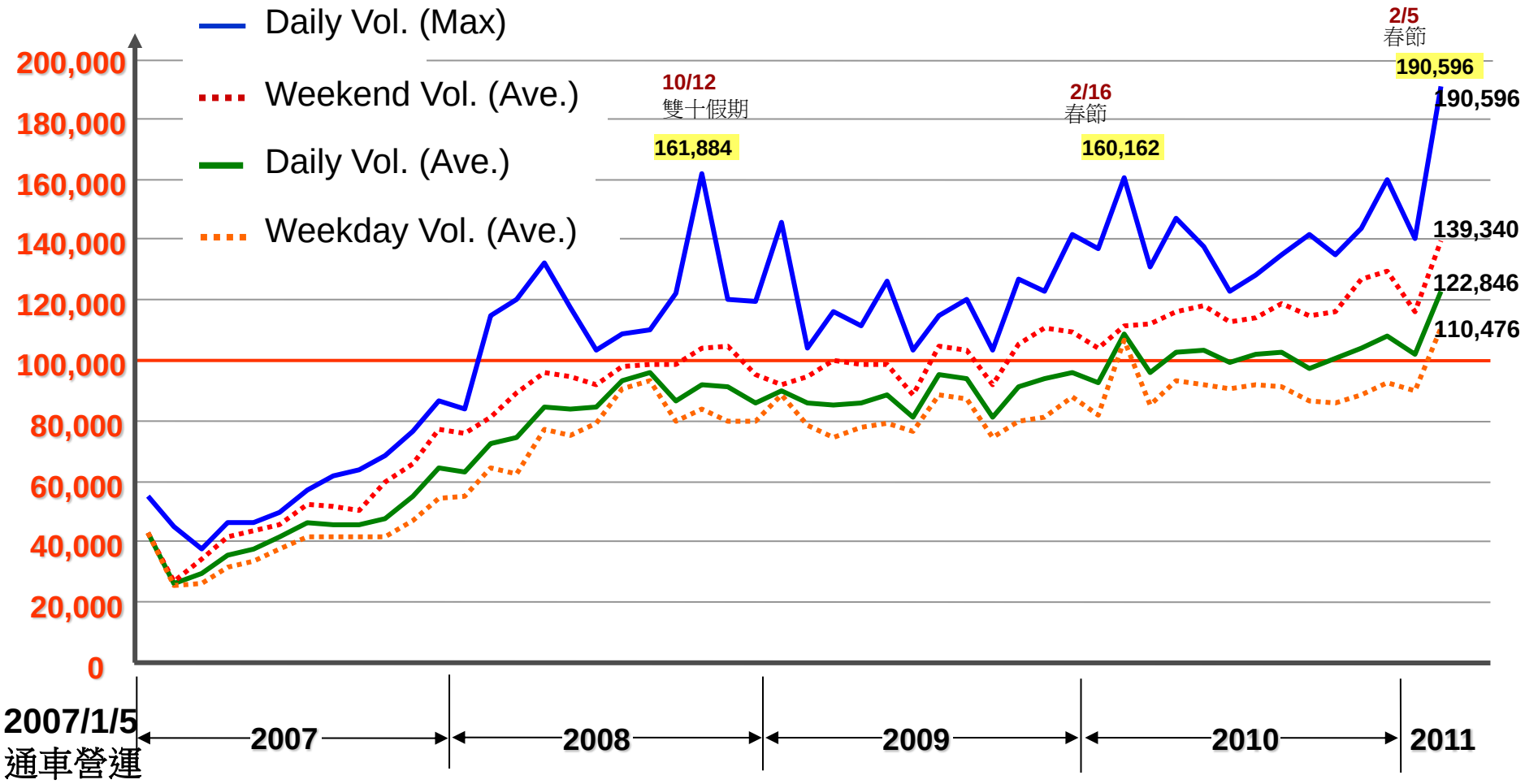
2007.01.05~2013.10.31

Service Reliability	99.94%
Service Punctuality	99.36% (delay< 5min)
Average Delay Time	0.25 min
No. of Operation Accident	0



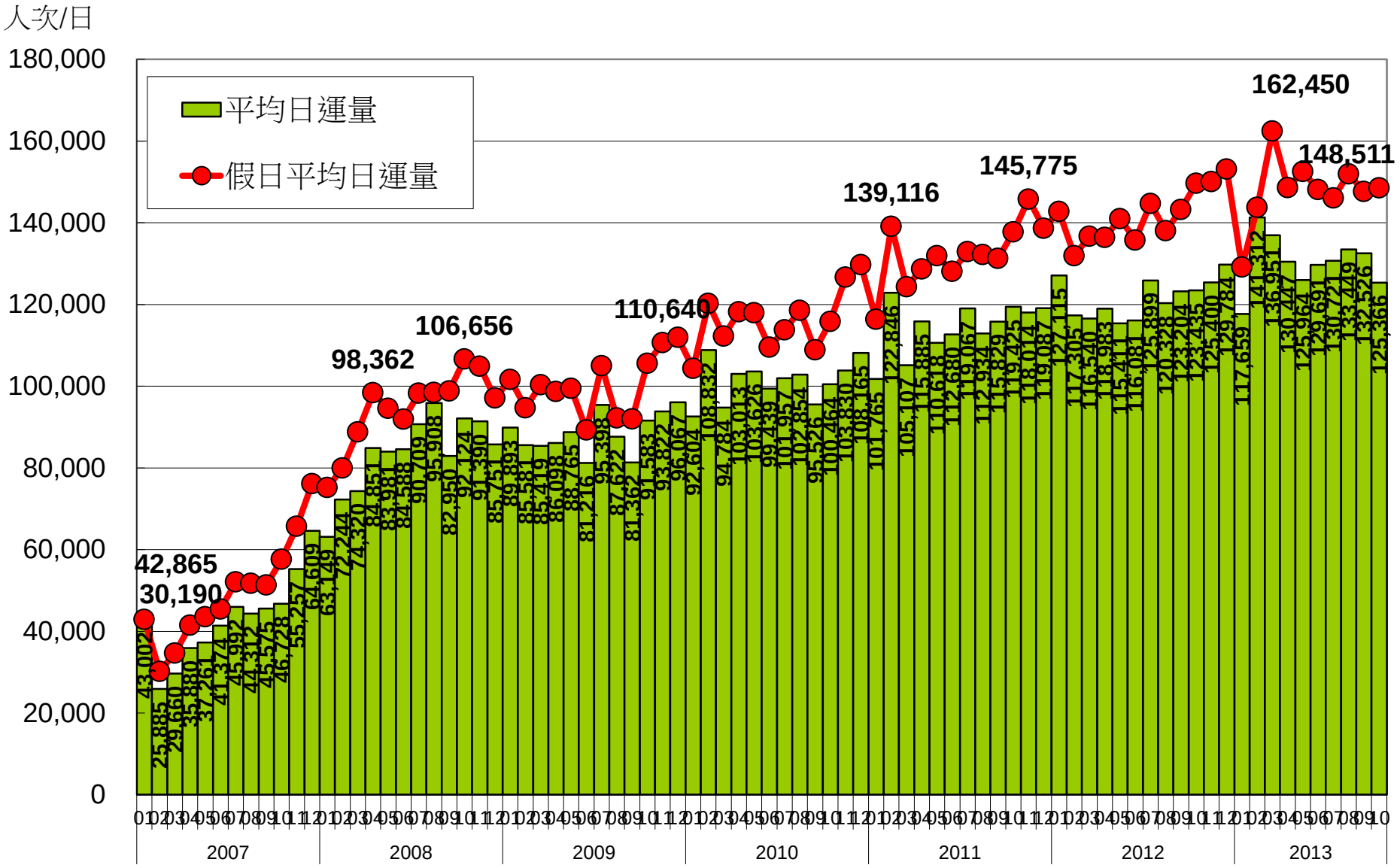
Growth of Passenger Volume

Daily Volume

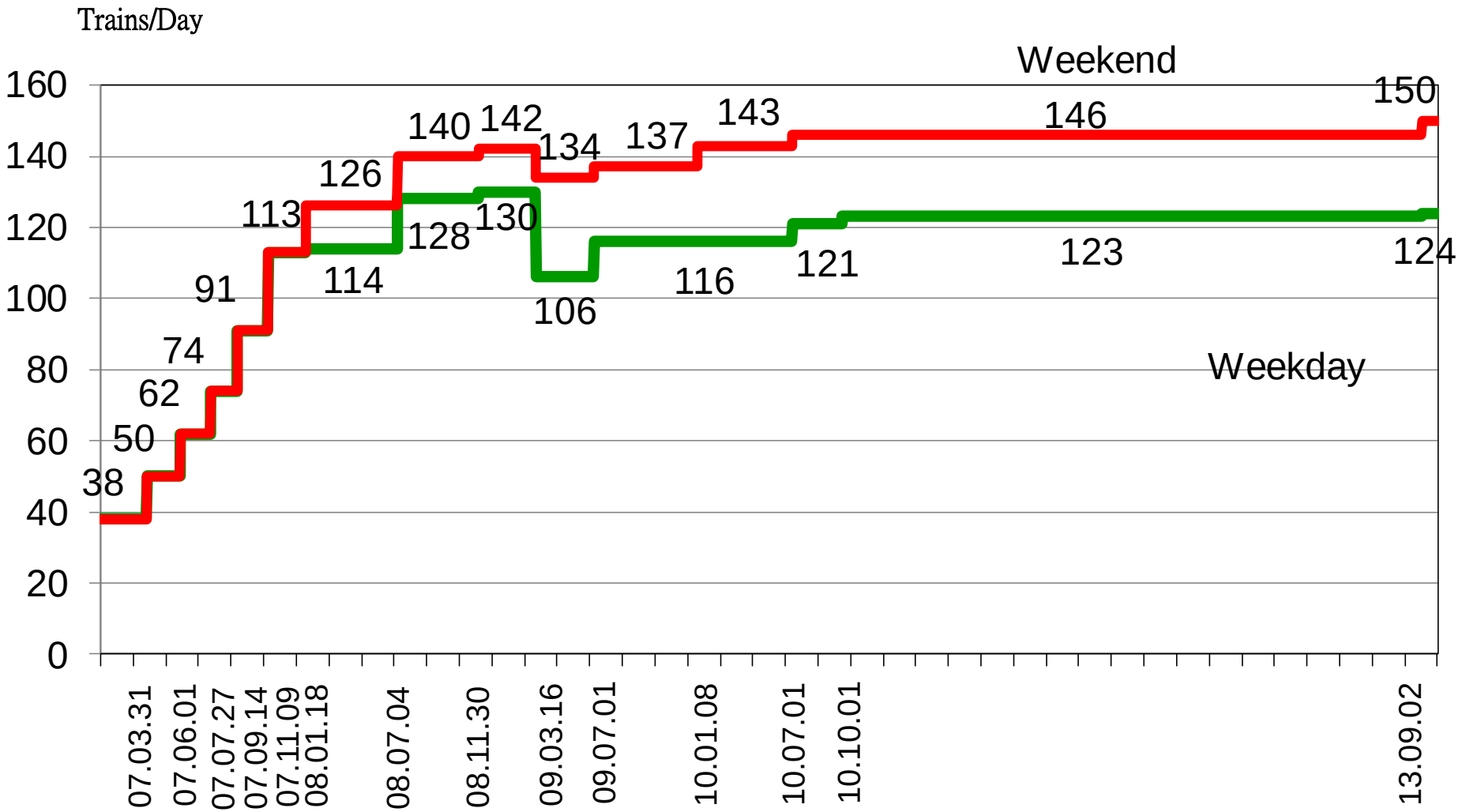


Growth of Passenger Volume

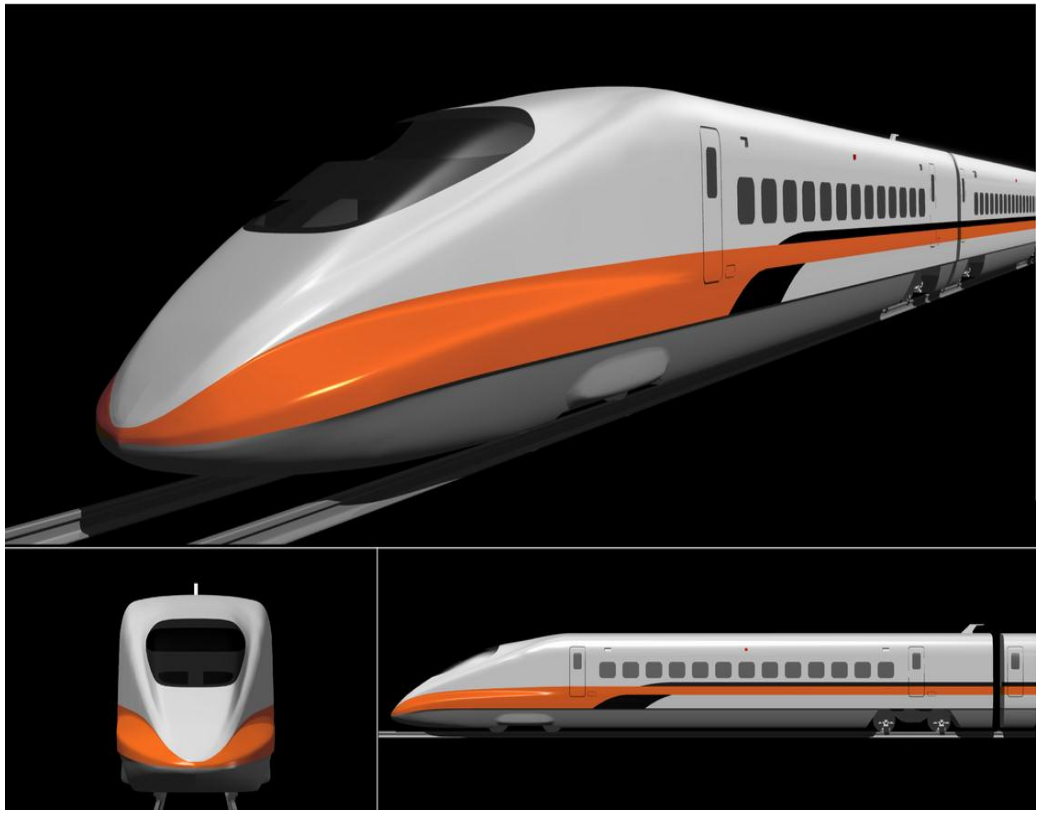
2007.01.05~2013.10.31



Growth of Daily Frequency



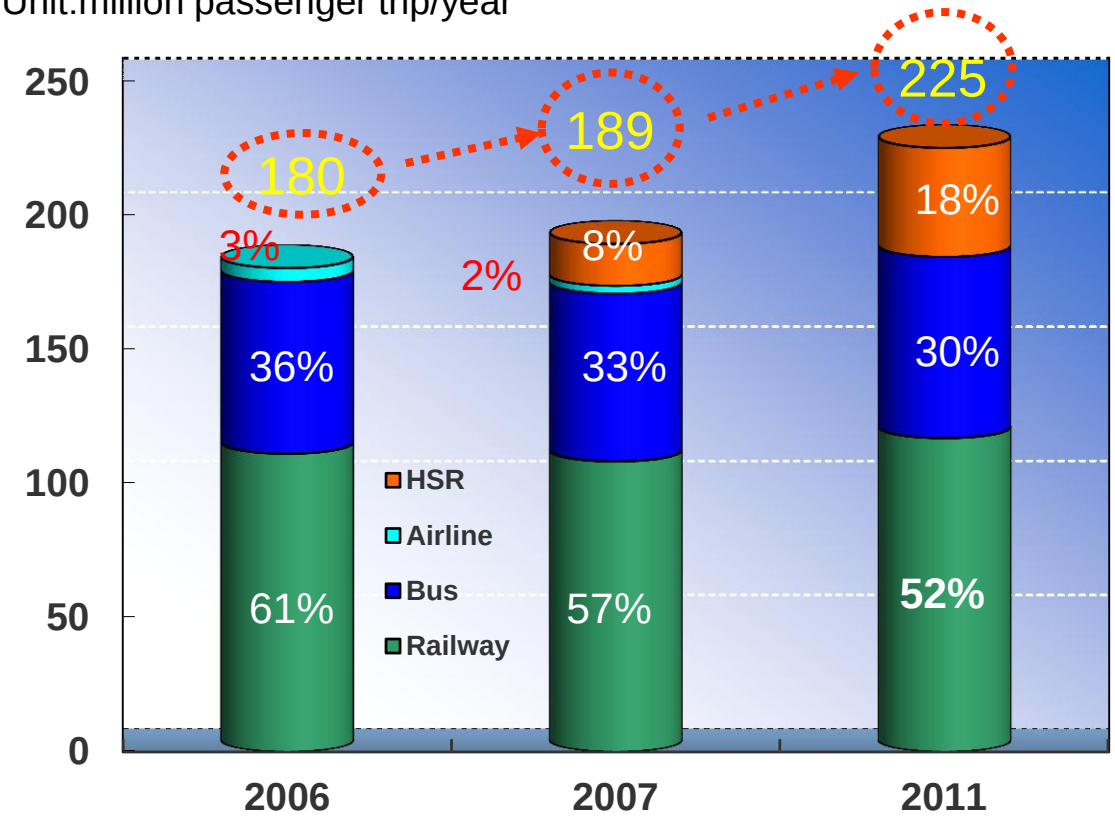
Vehicle: 700T



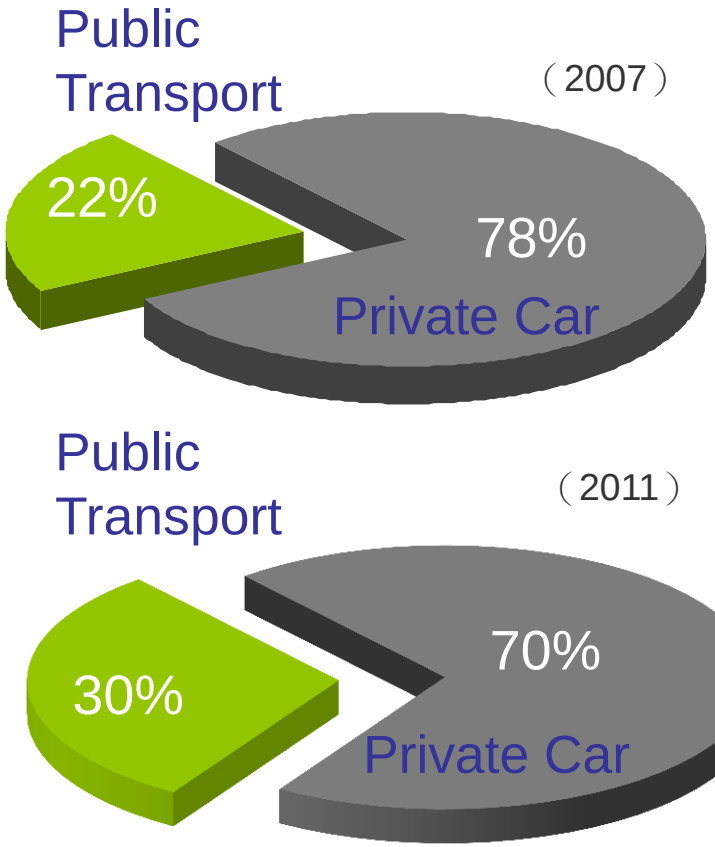
Intercity Travel Demand Along Taiwan's Western Corridor

Modal Split

Unit:million passenger trip/year

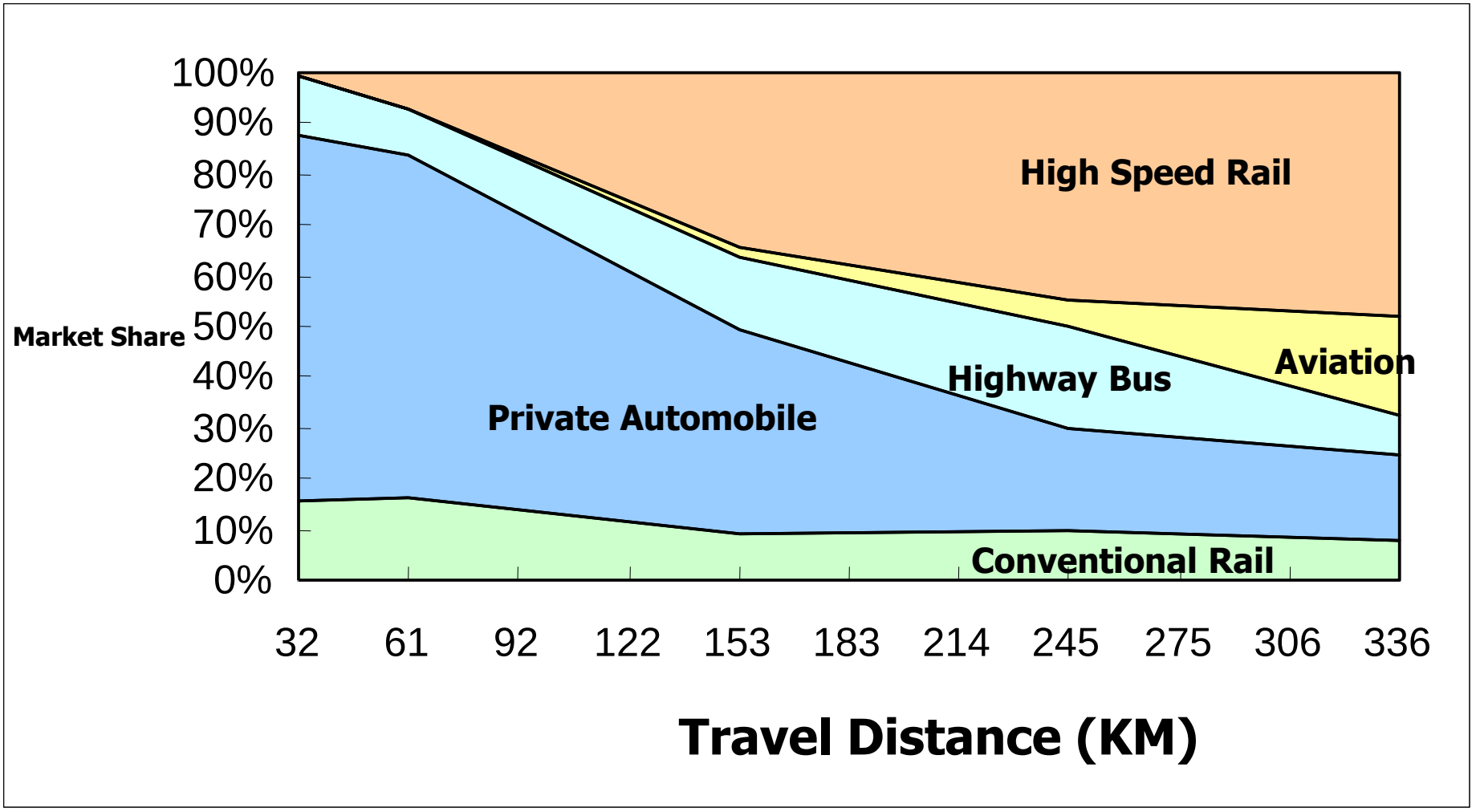


Intercity Travels



Source:"THI Consultants, Inc" ,2008 & THSRC

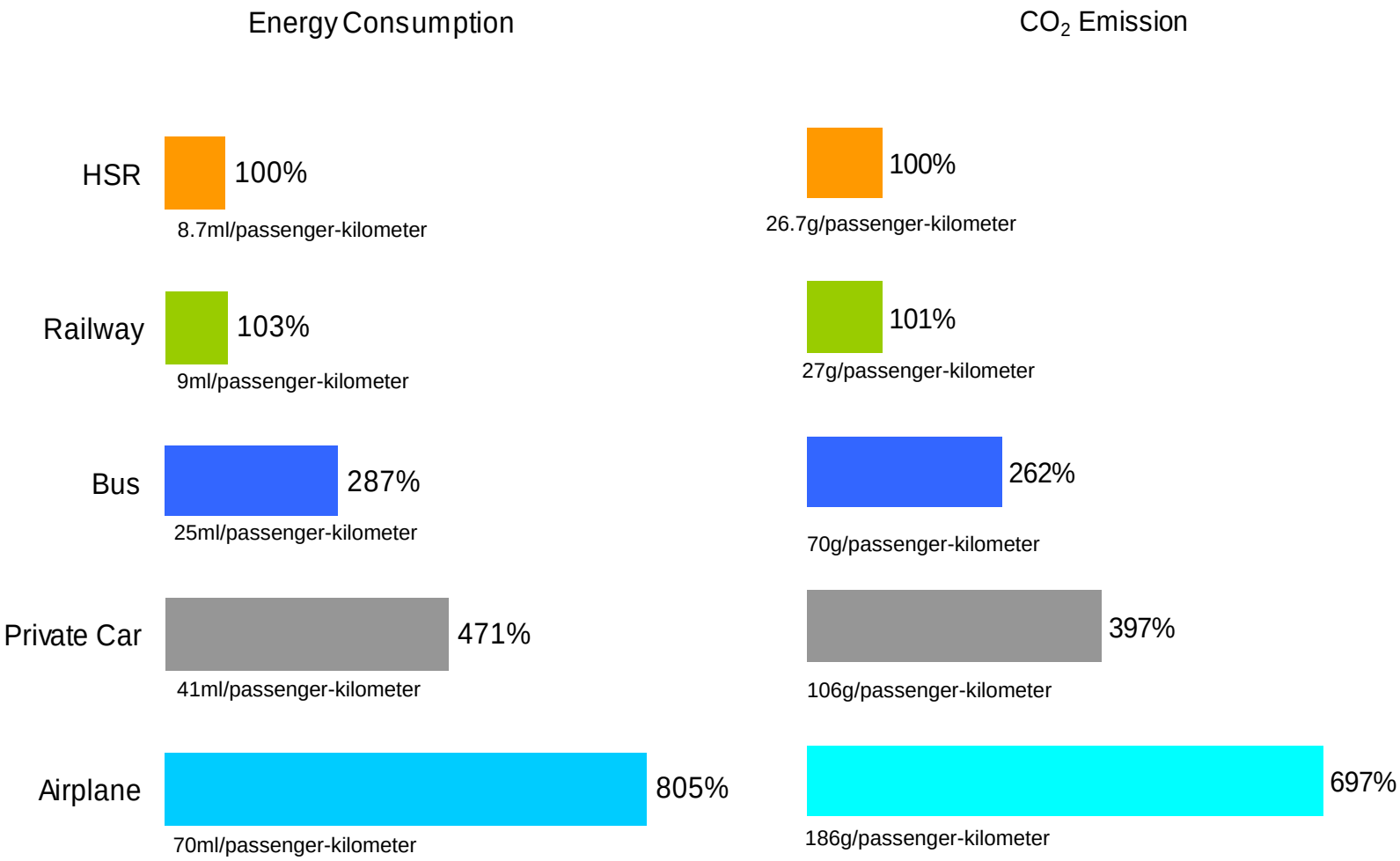
Market Share of Intercity Travel Demand



Based on Study on 2003.05

Note: Only for Trips from Taipei

Sustainable Mobility: Energy Consumption and CO2 Emission



Socio-Economic Impact of THSR (2007.01.05~2009.05.31)

Energy Saving

(Compare to Private Car)

420 Thousand Kilo-Liters oil equivalent or US$295 Million

Emission Reducing

(Compare to Private Car)

1.0 Million Tons CO2 or 70,000 hectares Forest Parks

Time Saving

90 Million Hours = US$480 Million

Economic Development and Competitiveness

Safety, Reliability & Comfort Services

Western Taiwan by Train

Get ready to infuse the long winter months with color, carnivals, and adventure. Chosen by our editors, this year's best winter trips span the globe and transcend the season. Find your favorite, then share your winter trip plans with fellow travelers.

Photograph by Nicky Loh, Reuters

Hop a high-speed (186 miles an hour) bullet train in Taipei to zip across western Taiwan's valleys, plains, and Central Mountain Range foothills. The Taiwan High Speed Rail western route winds through 48 tunnels and over 152 miles of elevated rail from Taipei south to Kaohsiung. The southernmost rail stop serves as the gateway to tropical Dapeng Bay National Scenic Area, Kenting National Park, and Maolin National Scenic Area, home to four indigenous groups—the Rukai, Paiwan, Bunun, and Tsou. A roundtrip western bullet train loop from Taipei and back is an easy day trip, getting travelers back in time to sample crispy salt and [illegible] city's famous night markets. Fo[illegible] station stops like Banciao, Taoyuan, Hsinchu, Taichung, Chiayi, and Tainan. From February 23 to March 10, [illegible] neighborhood [illegible] the Hsinchu High Speed Rail Station hosts the [illegible] During each night of the festival, thousands of soaring and animated lanterns illuminate the night skies of northern Taiwan's oldest city.

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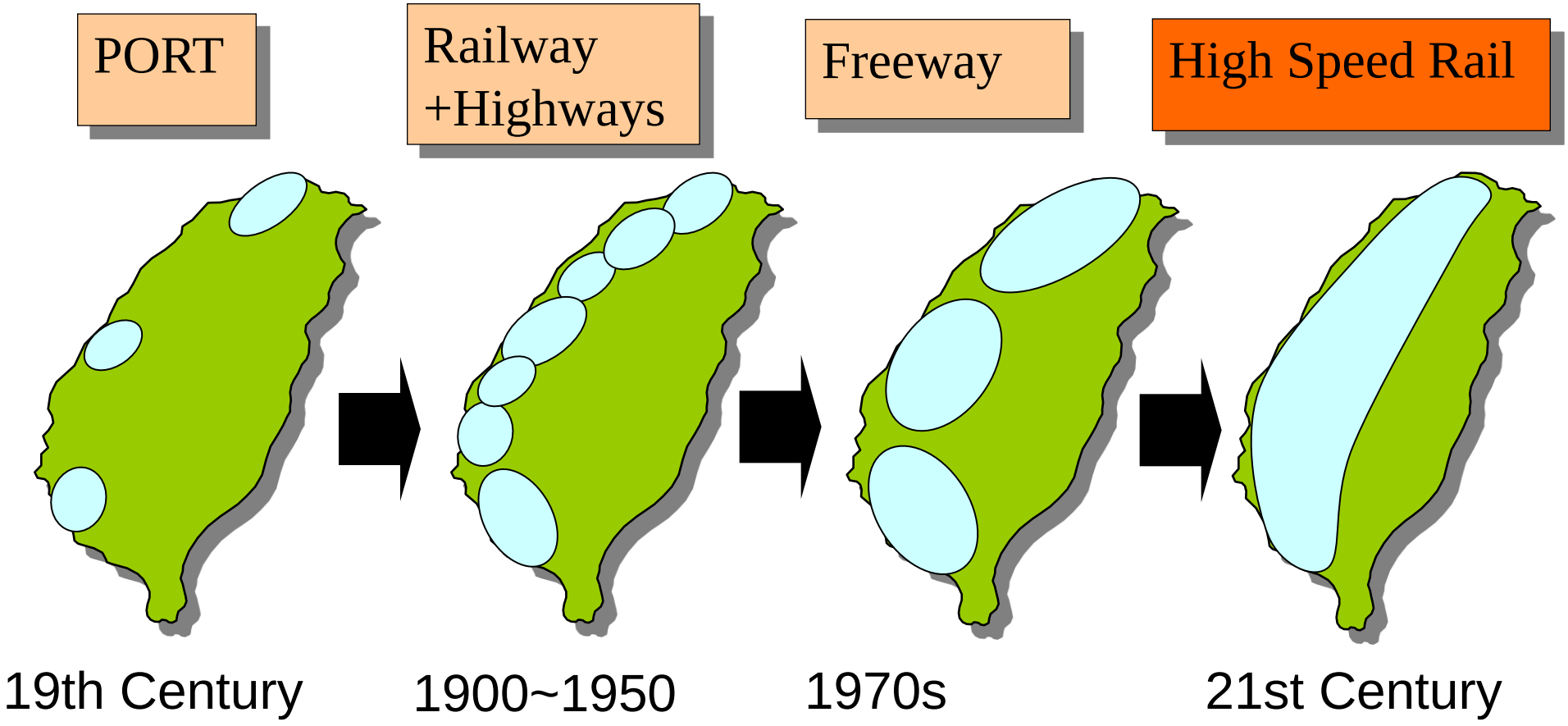
Taiwan Western Corridor – One-Day Living Circle



Transfer Service Strategic Planning of Taiwan High Speed Rail

Planning Strategy and Guidelines

1. Internalization of Transfer and Feeder Facilities
2. Intermodal Station: Multiple Alternatives
3. Priority of Public Transport Modes

PPP Model – The BOT

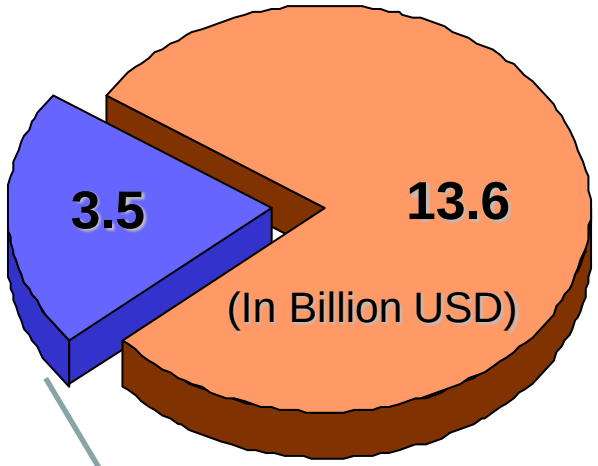
Financial Sustainability

- **Investment (including: facilities constructed before the concession; Direct $ (gov. funds) → shareholder)**
- **Loan from State Banks (due to global economy downturn, no foreign bank involved)**
- **Re-negotiation of the Interest Rate (due to low-ridership at beginning phase of HSR operation)**
- **Re-calculation of Depreciation (linear → performance-based)**

Government vs. Private Investment

- **Total Cost: 17 B (USD)**

Taiwan Government's Involvement (including: pre-HSR construction, direct funding as stakeholder)



Taiwan HSR Corporation Investment

"Zero Investment" Promised by THSRC at the bidding phase

At the end, THSRC DOES plan to buy out the gov. share after making profit.

Financial Independence

Governance Sustainability

- **Create an Institutional Framework to make HSR happen**

  ✓ **The HSR Bureau oversees the THSRC to ensure the quality (e.g., Reliability, Loading factor)**

  ✓ **Law/Regulation enacted to encourage private sector's investment**

- **Urban Planning and Land Development with help from Local Government**

  ✓ **HSR Stations at remote area → for purpose of developing new town**

  ✓ **Taipei and Kaohsiung Stations → Joint Development with TOD concept**

Concluding Remarks

1. Governance and Financial Sustainability is crucial for Mega Infrastructure Project
2. Taiwan's PPP Business Model → bring private sector's investment, efficiency on construction, innovative operation and marketing, total budget is not booming, etc.
3. Profitability is expected; however, to clearly identify the external benefits of HSR is crucial for development.
4. Government Step-in → in some way, it solved some problems, however..
   - ✓ Bureaucracy got introduced
   - ✓ Still "institutional barriers" between local and central government

   → so, the new towns are not fully developed.

   → so, station development & TOD are not as expected.

Thank you ~
Q & A