High-Speed Rail in Asia: The Taiwan Experience

台灣高鐵 TAIWAN HIGH SPEED RAIL

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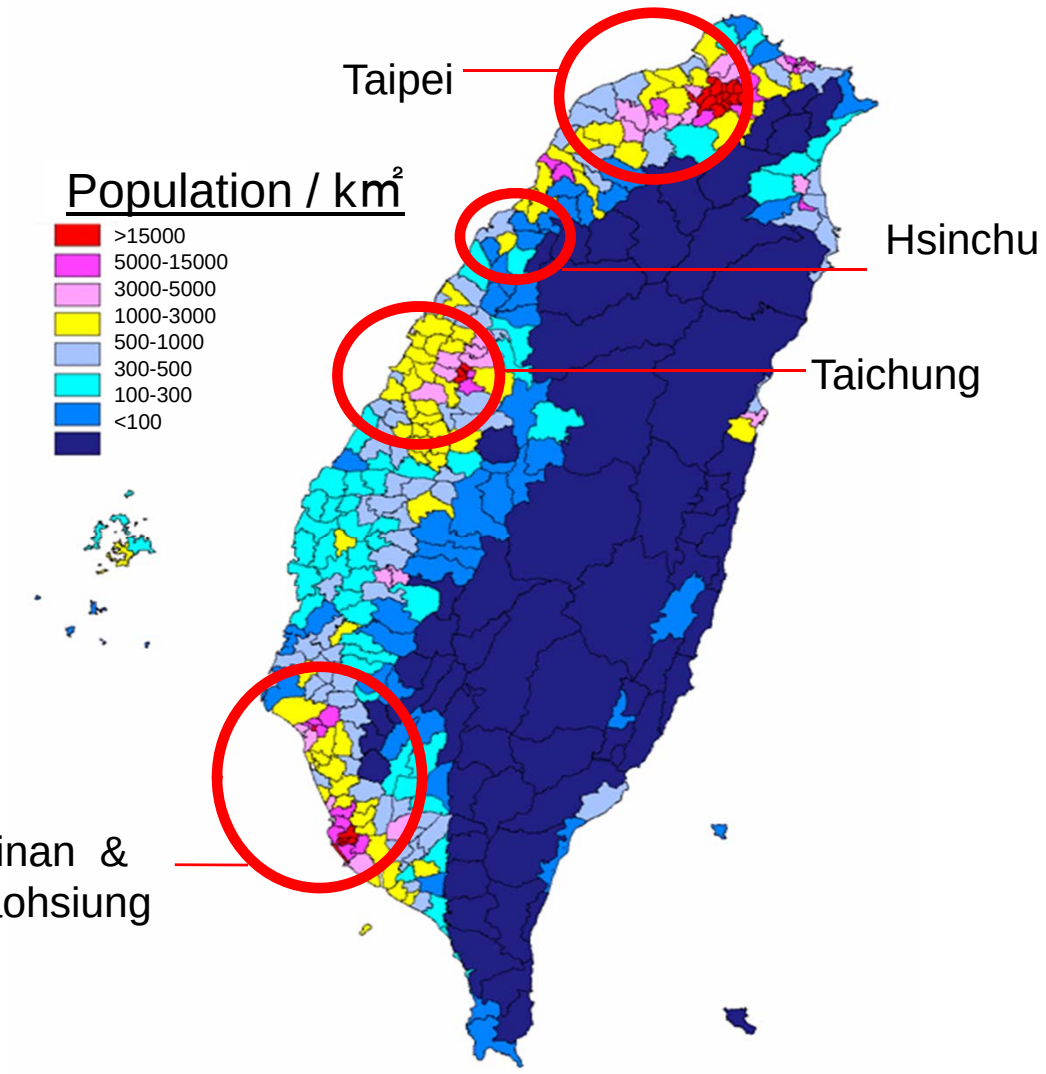
Agenda

1. Background Information
2. Operation of Taiwan High Speed Rail
3. Financial Sustainability
4. Governance Sustainability
5. Conclusion & Recommendation

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

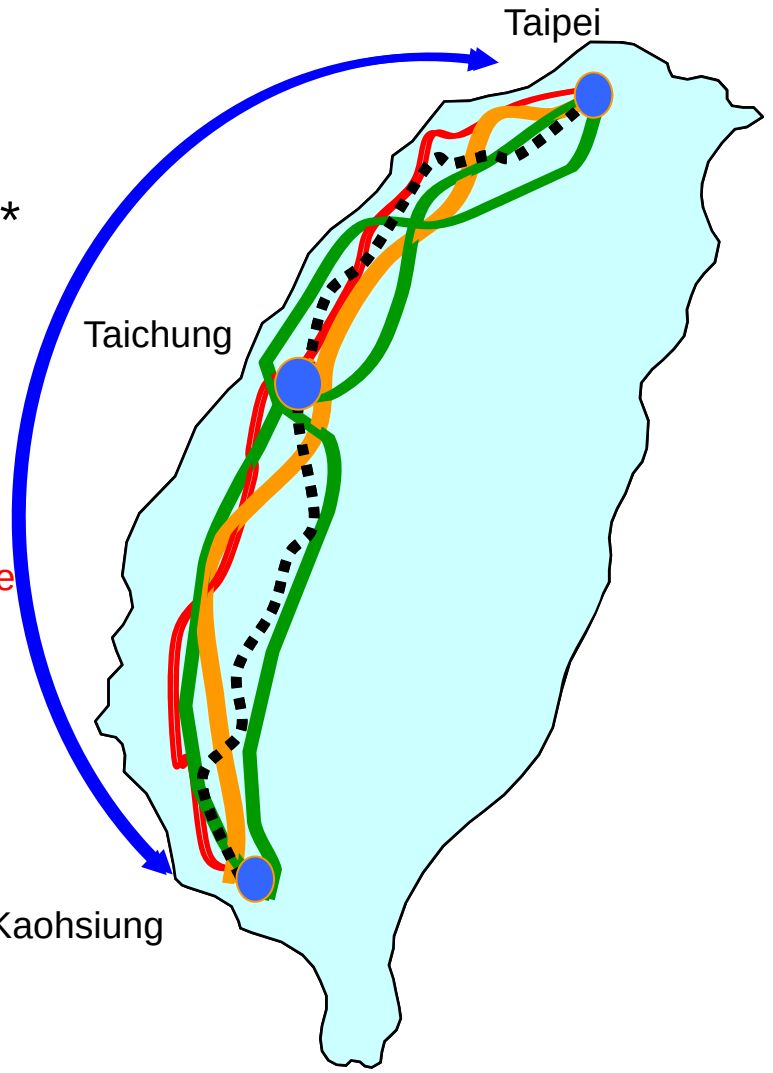
Urbanization phenomenon/issue ~ But, at least, we identified a corridor which can support the HSR.



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
- High Speed Rail (90 min)

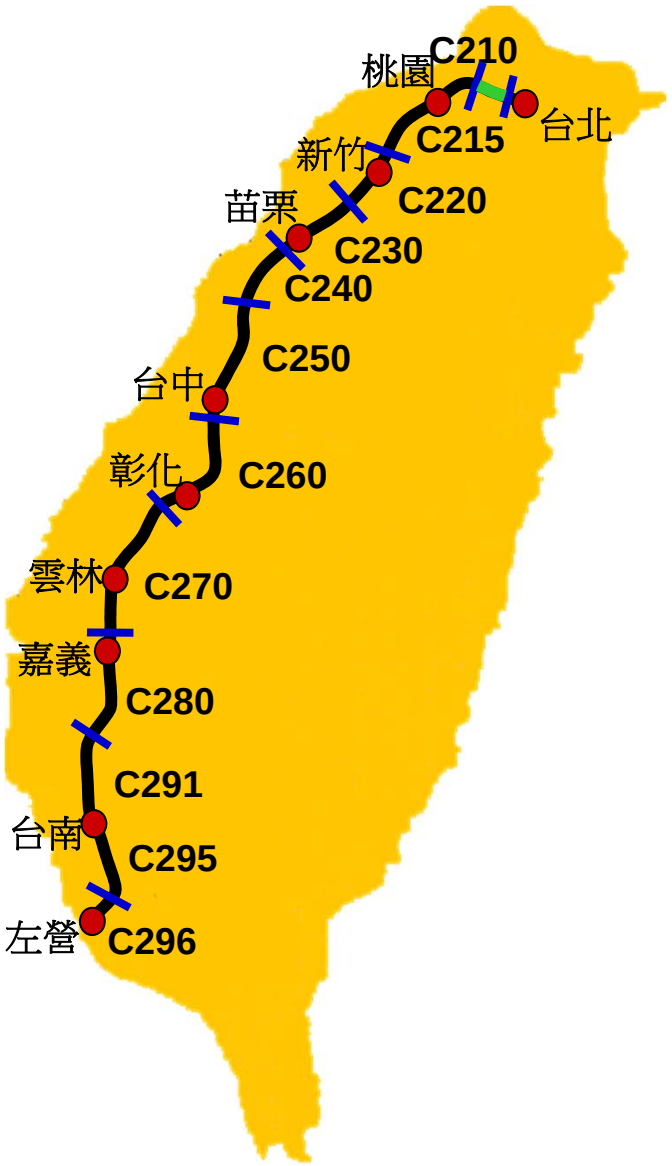


** Without Considering Traffic Congestion*

Taiwan High Speed Rail

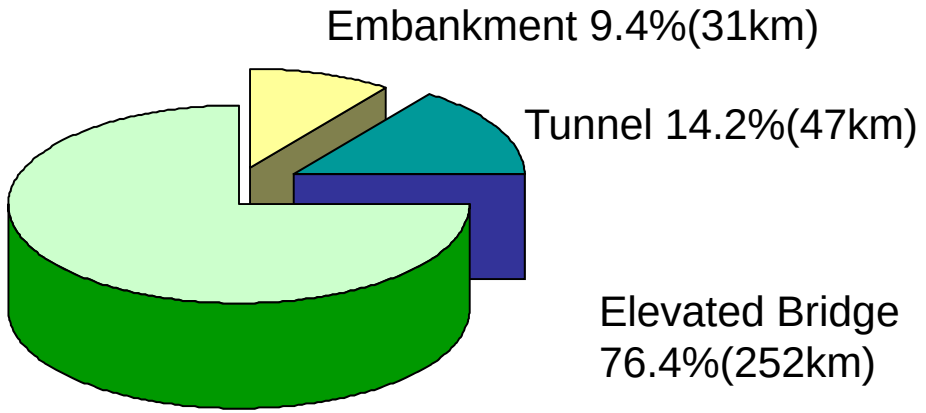
Total length: 345 km

Construction



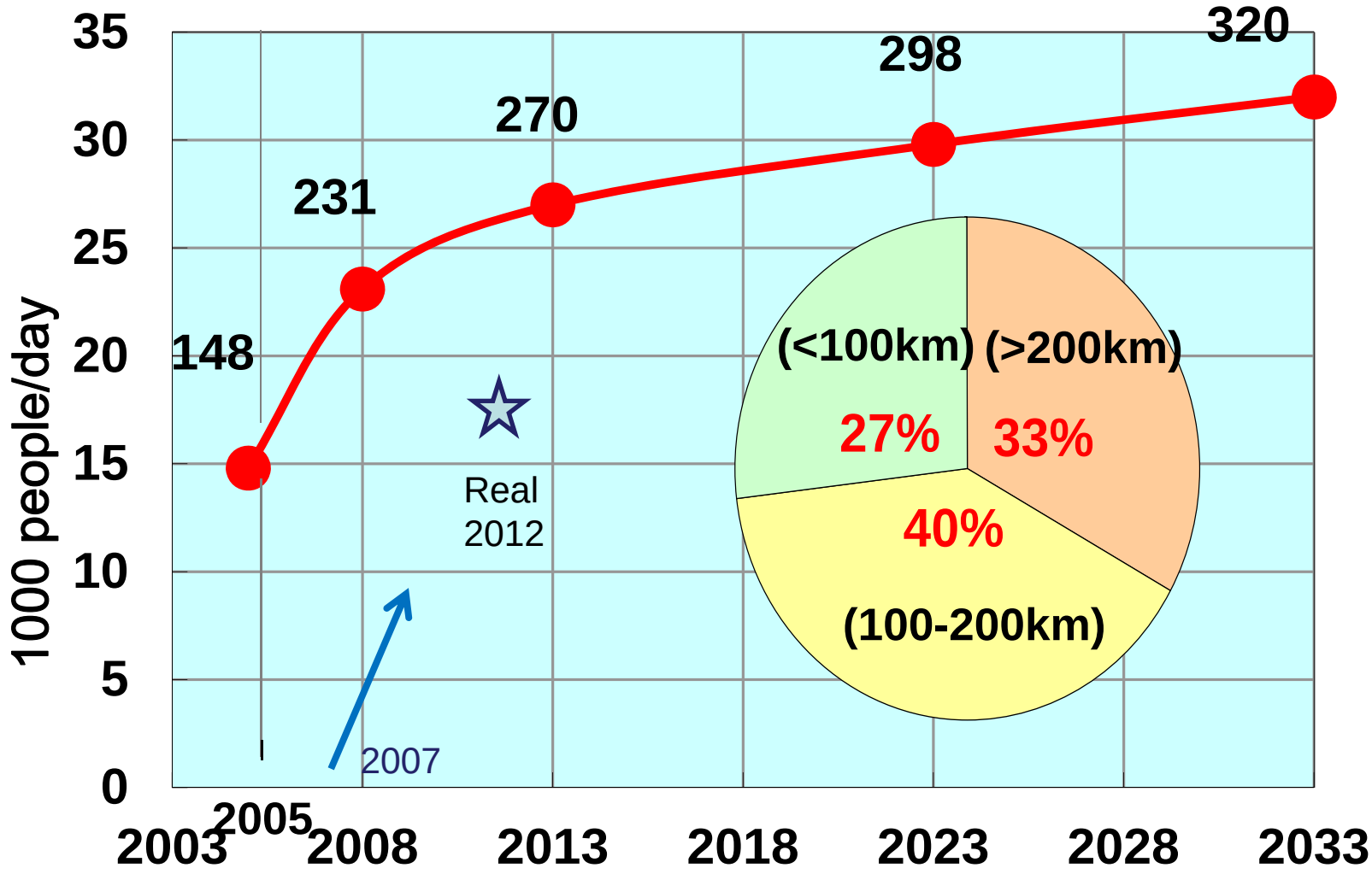
Magic #: 345 km !

- Total 330Km + 15KM Tunnel provided by Government
- Total Budget: US$16~17B



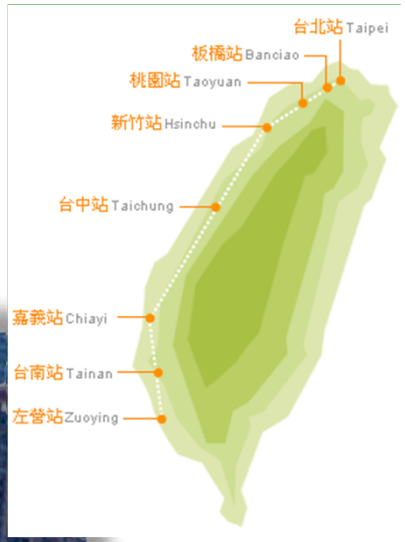

MOSTLY Elevated! ~

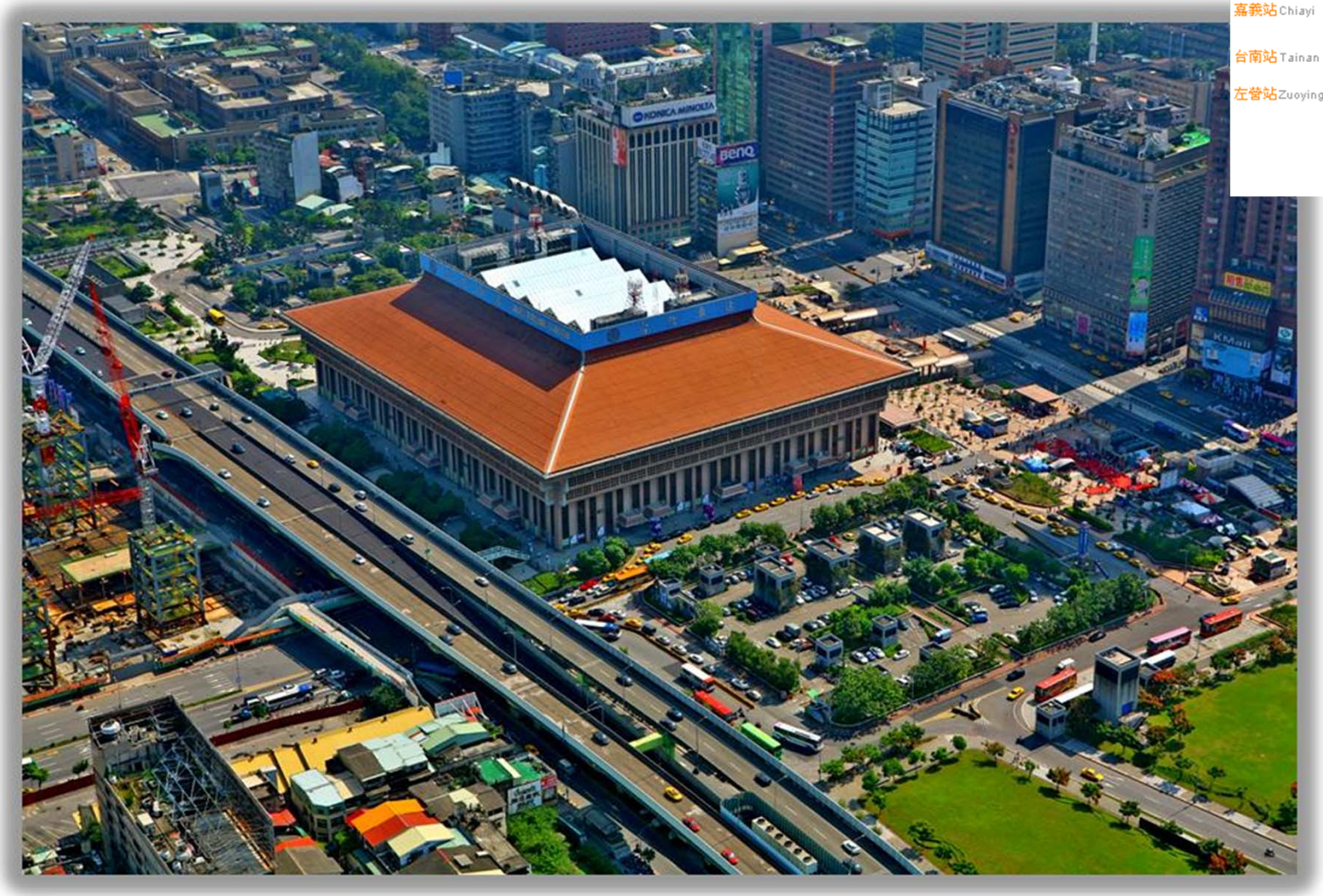
Demand Forecasting



Source: THSRC, 2002.05

Taipei Station





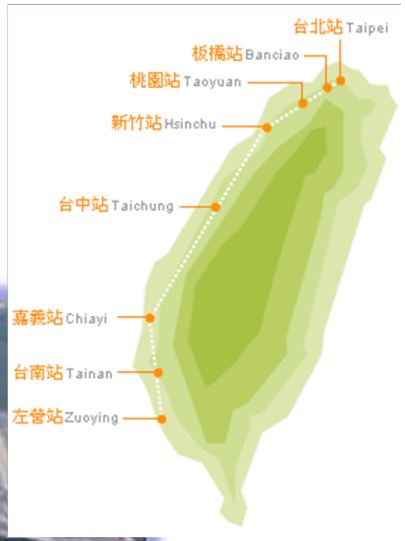
Banciao Station

HSR Taoyuan Station

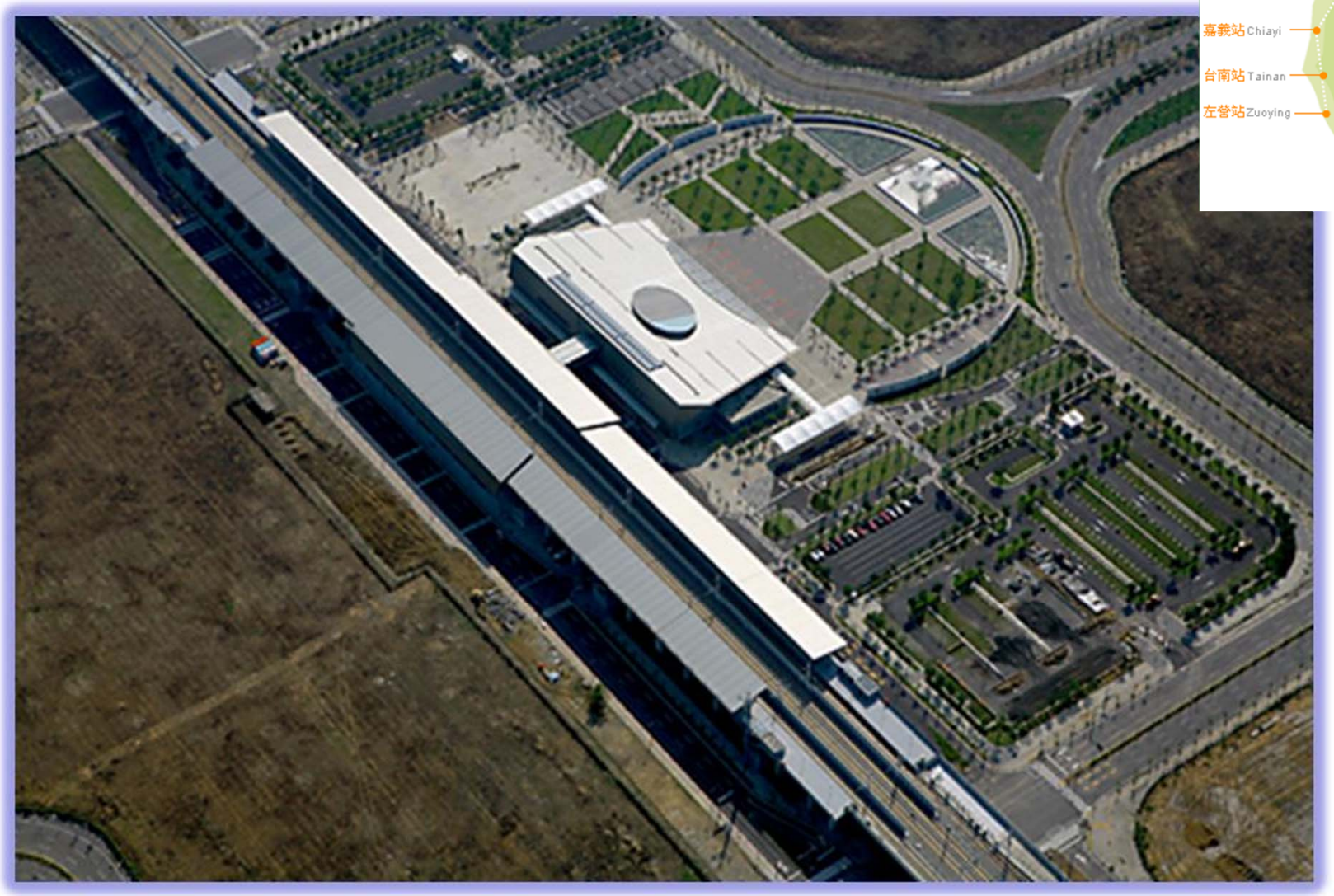
HSR Hsinchu Station

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)

2007.01.05~2011.12

Total Train Service	190,000 (approx.)
No. of Passengers	140,000,000 (approx.)
Passenger-km	28 billion (approx.)
Loading Factor	52 % (approx.)

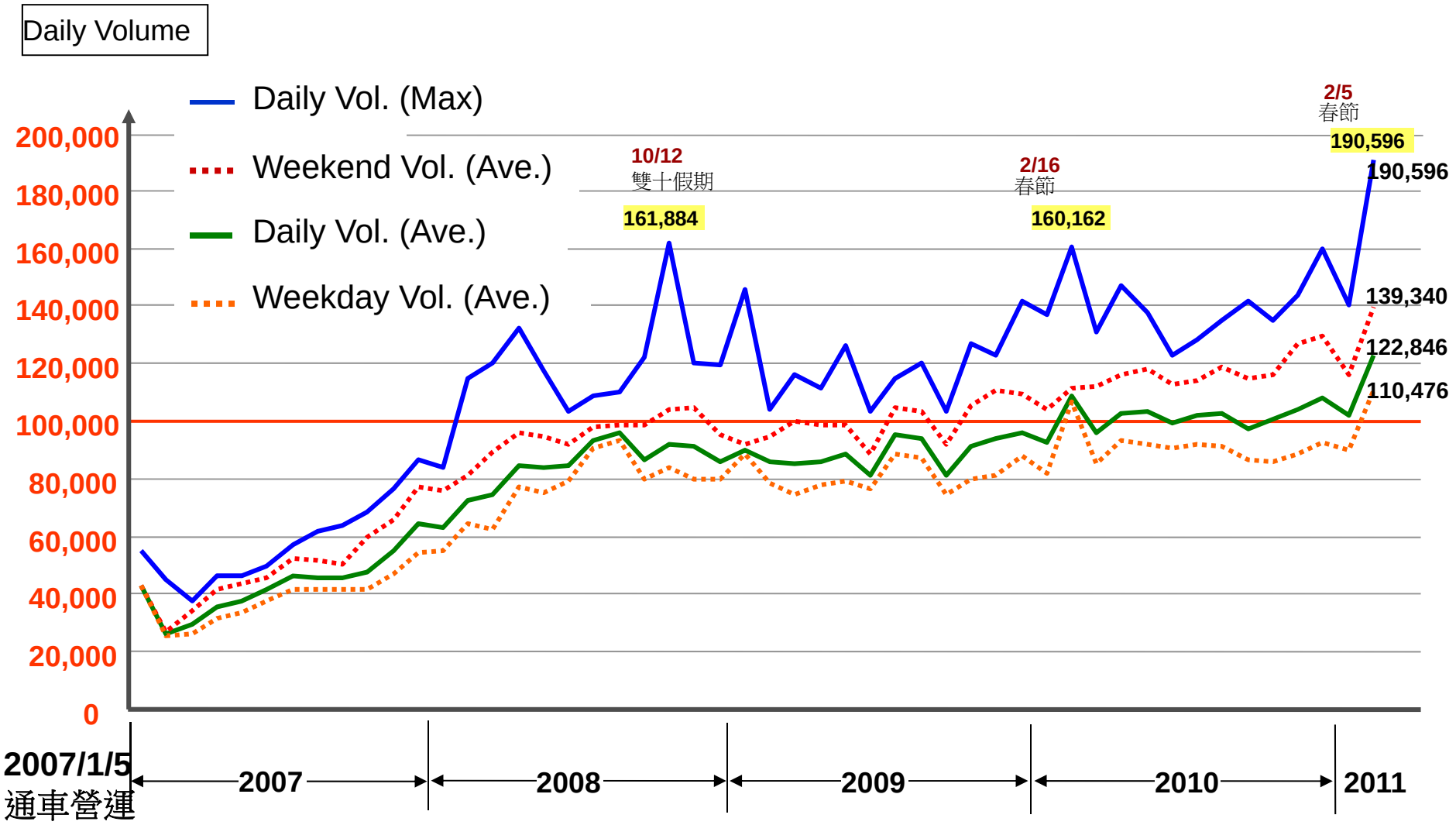


Taiwan HSR Operation(3/3)

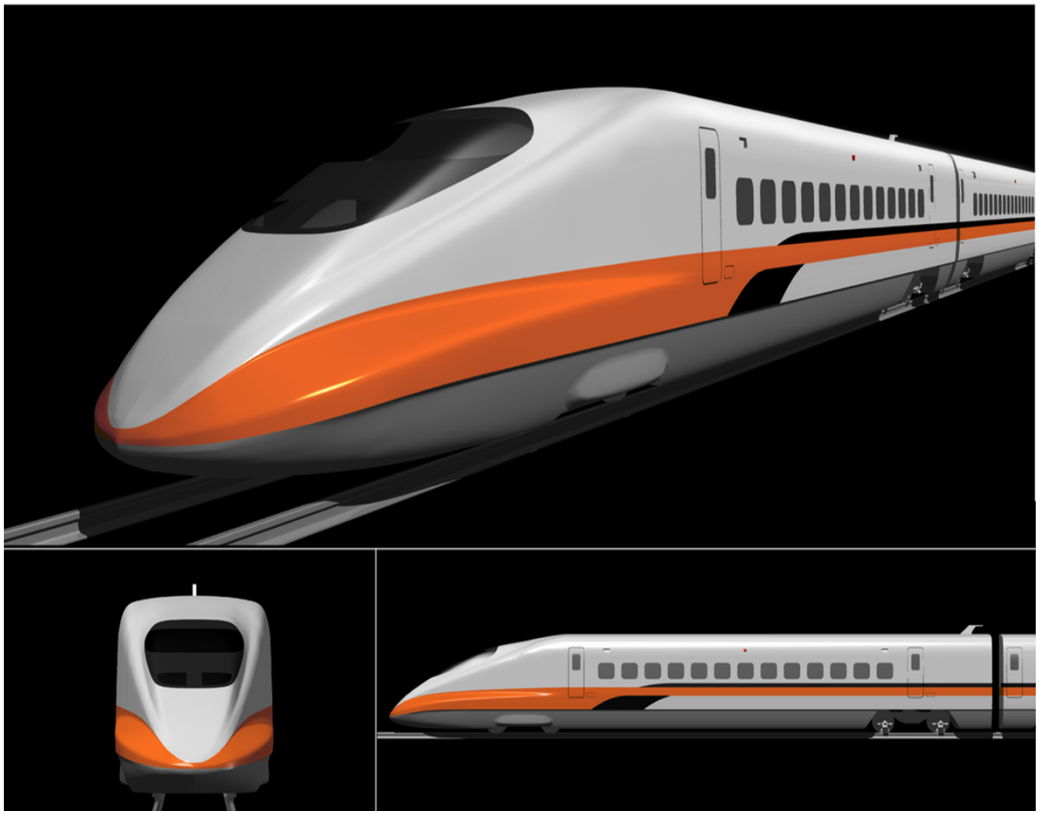
2007.01.05~2011.12

Service Reliability	99.51%
Service Punctuality	99.30% (<5min)
Average Delay Time	0.25 min
No.of Operation Accident	0

Growth of Passenger Volume



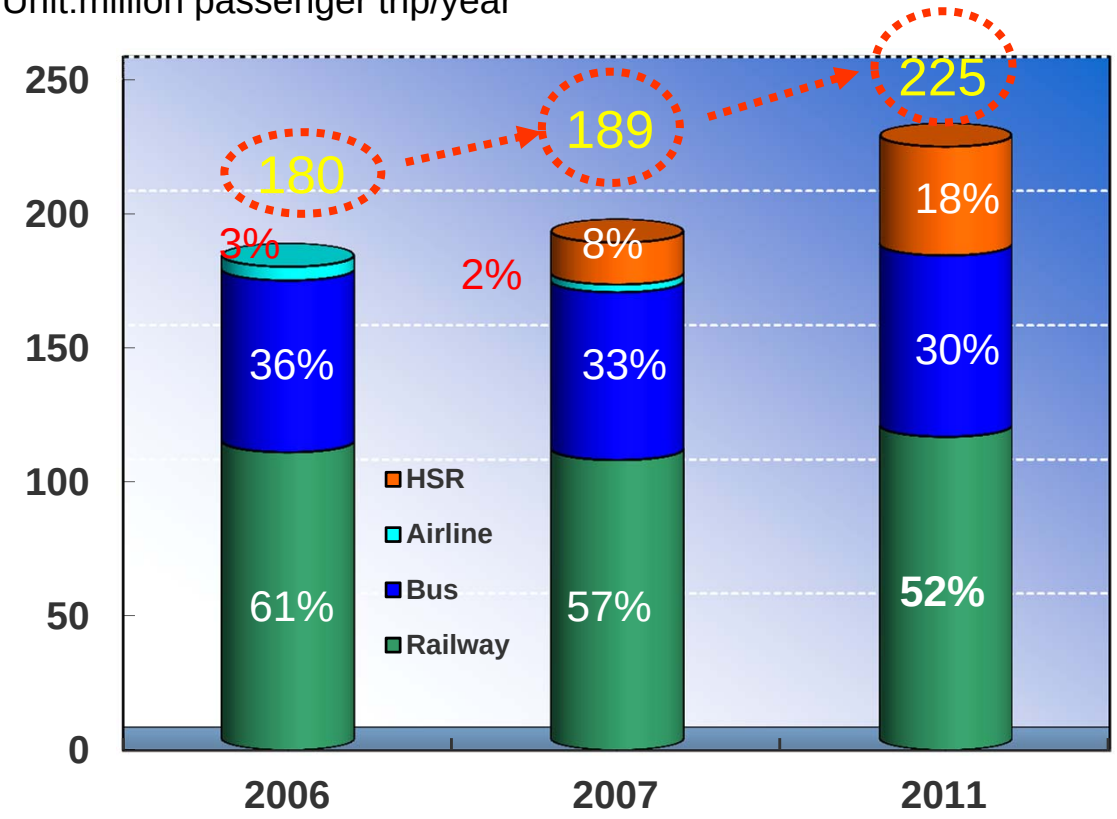
Vehicle: 700T



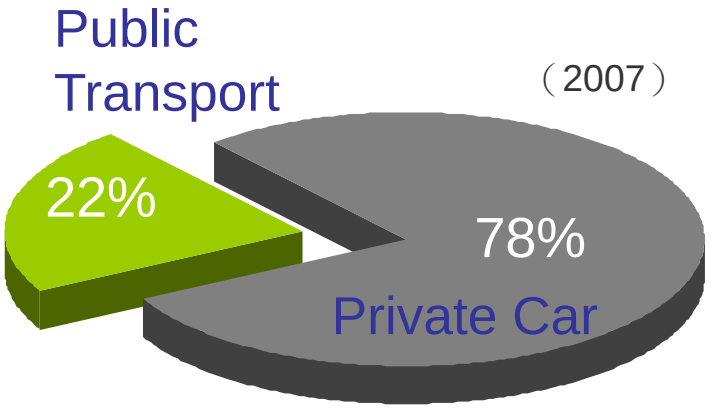
Intercity Travel Demand Along Taiwan's Western Corridor

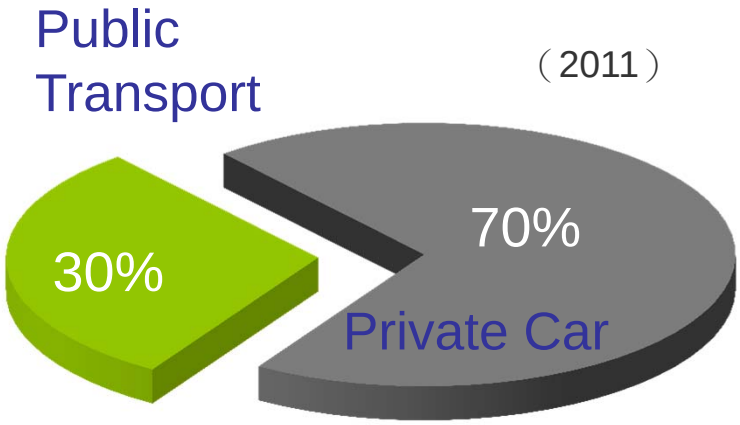
Modal Split

Unit:million passenger trip/year



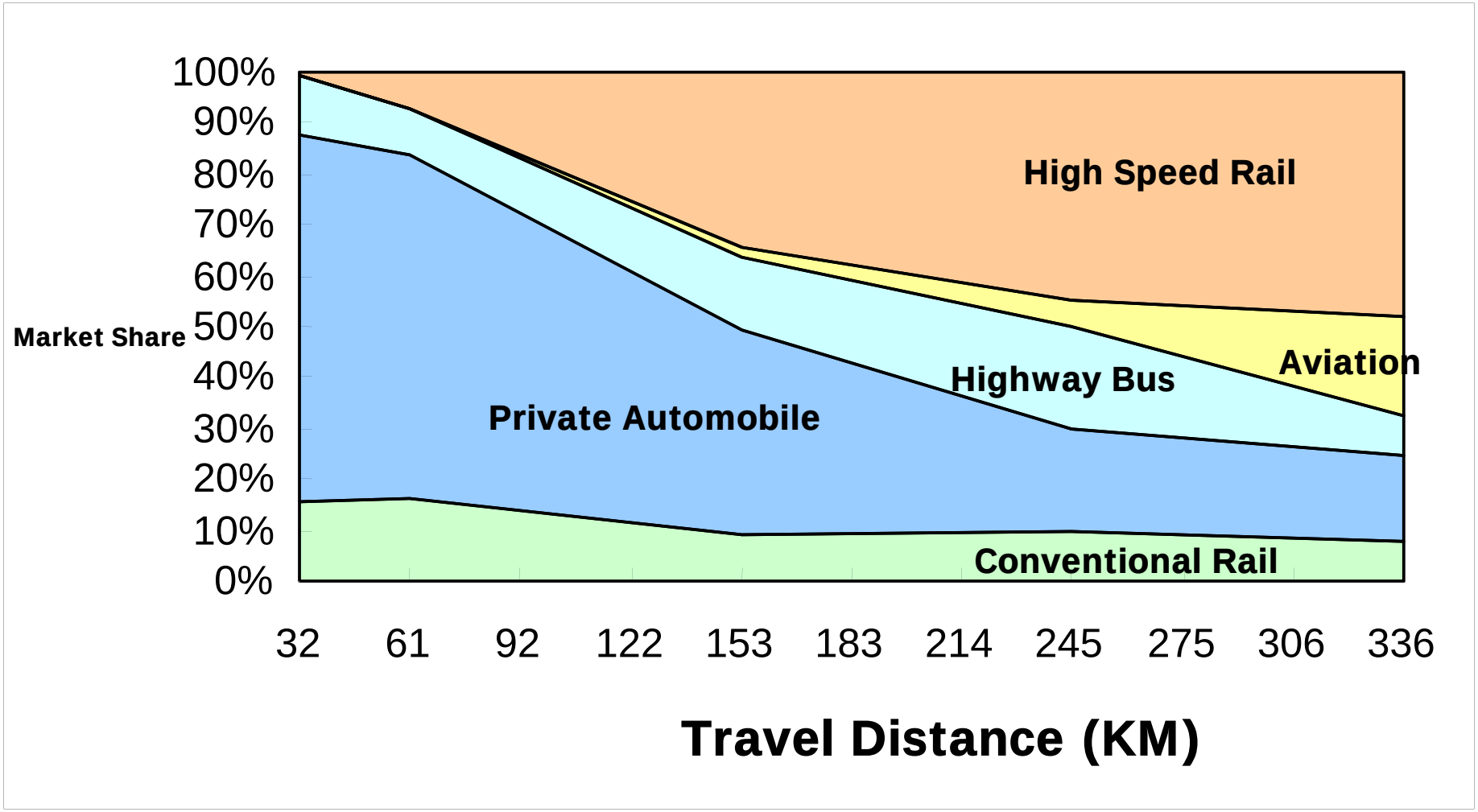
Intercity Travels





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

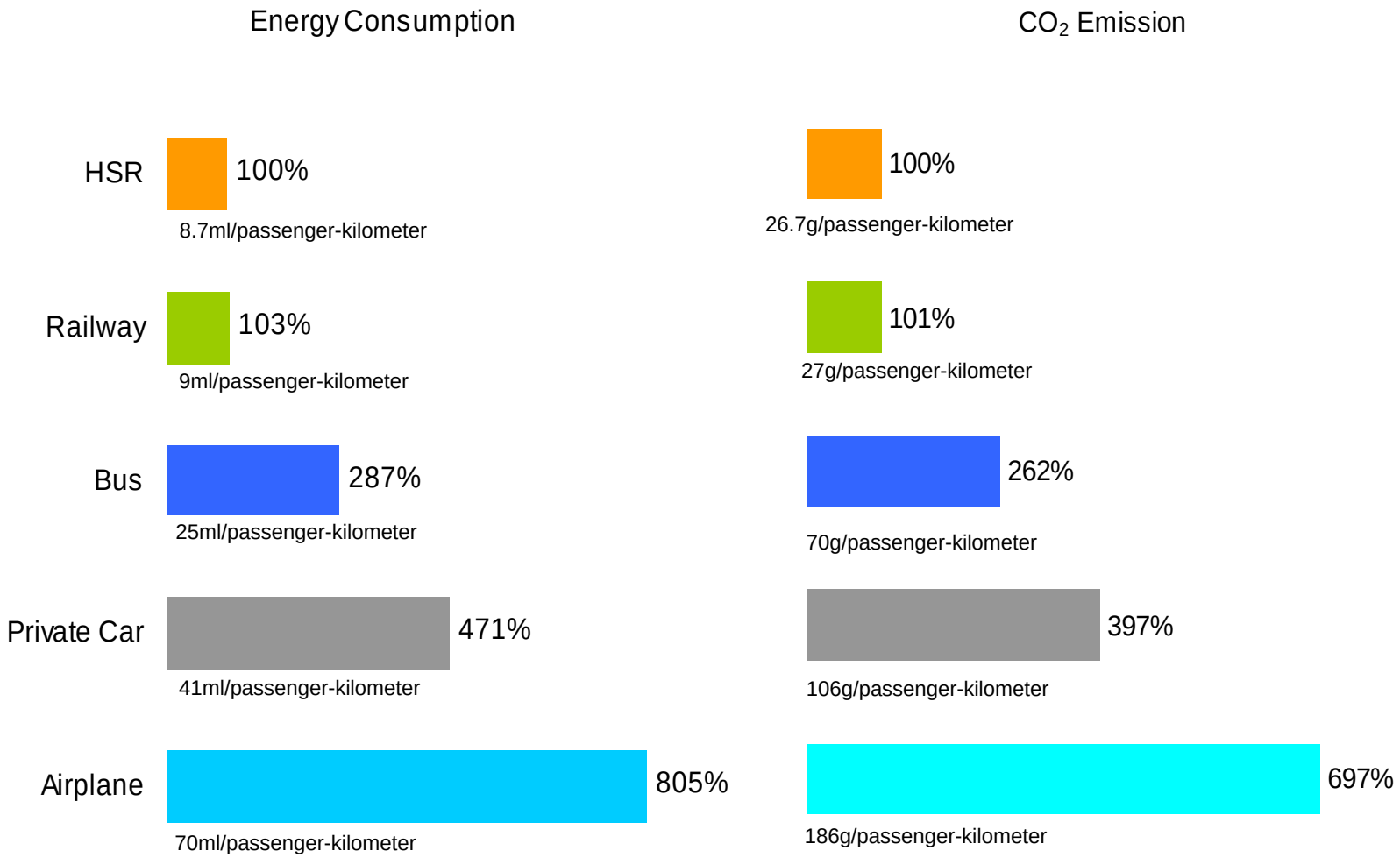
Market Share of Intercity Travel Demand



Based on Study on 2003.05

Note: Only for Trips from Taipei

Sustainable Mobility:
Energy Consumption and CO2 Emission



Socio-Economic Impact of THSR (2007.01.05~2007.12.31)

Energy Saving
(Compare to Private Car)
110 Thousand Kilo-Liters oil equivalent or US$80 Million

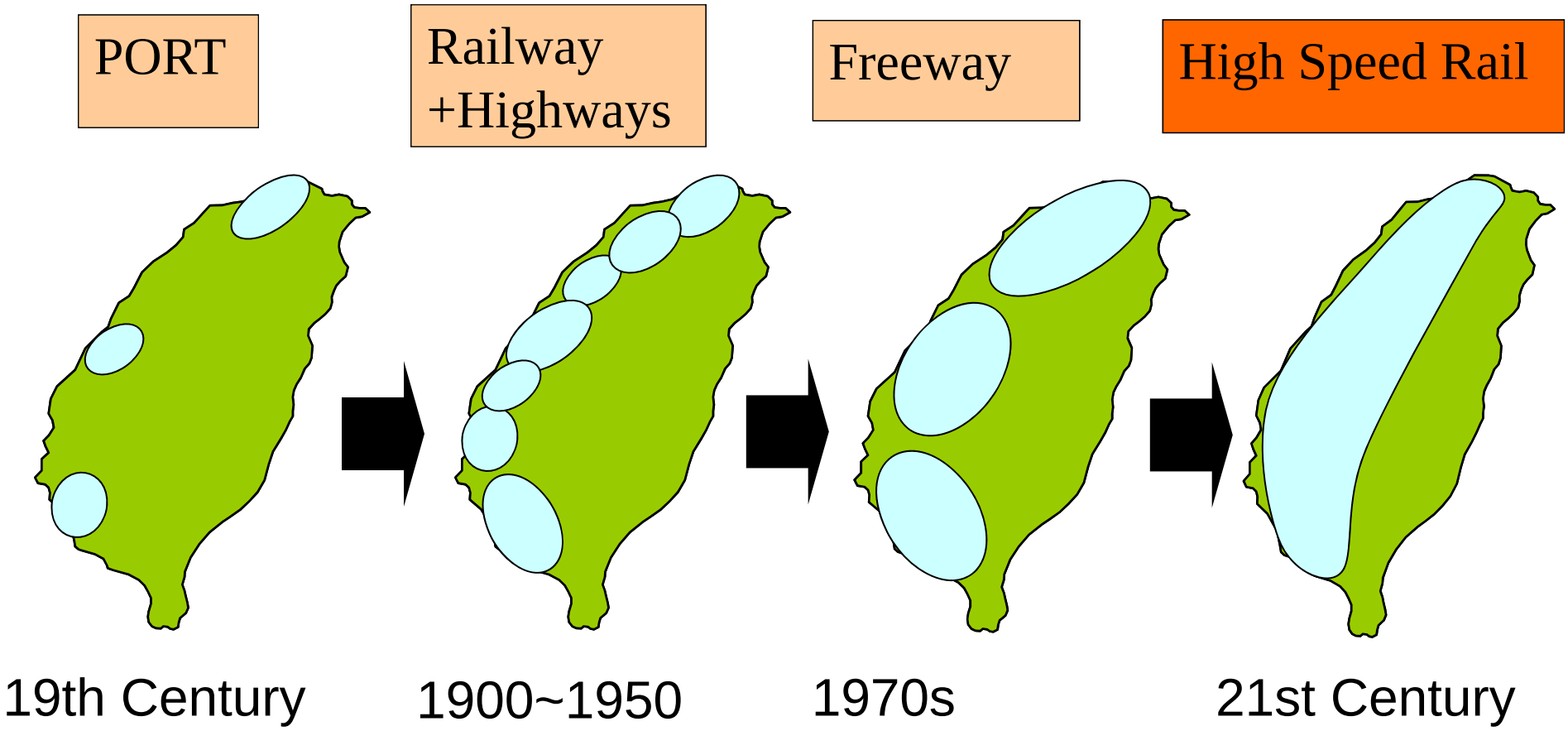
CO2 Emission Reducing
(Compare to Private Car)
280,000 Tons CO2 or 18000 hectares Forest Parks

Time Saving
26 Million Hours = US$30 Million

Economic Development Improvement → Hard to quantify

Safety, Reliability & Comfort → Hard to quantify

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

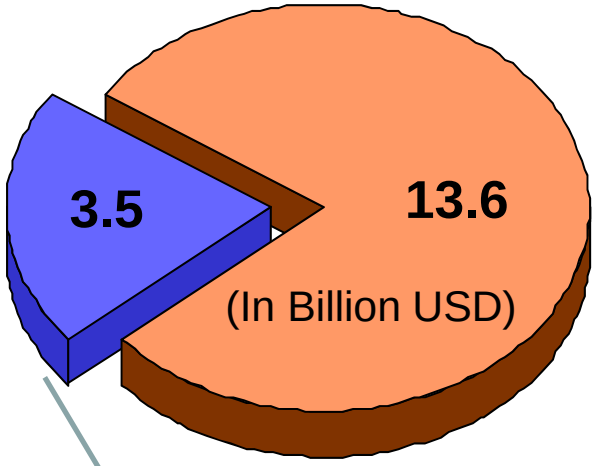
Financial Sustainability

- **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., loading factor < 75%)**

  - ✓ **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 → Development w. TOD concept**

Conclusion

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. Government Step-in → in some way, it solved some problem, however..
   - ✓ Bureaucracy got introduced (P > p)
   - ✓ Still "institutional barriers" between local and central government → so, the new towns are not fully developed.

Recommendation

1. CA (or else where) should clearly identify the benefit (can and can not be quantified) of HSR; to determine the “Go or No-Go” of HSR project.
2. Considering Taiwan (or else where) as example to CA (or else where), a cautious comparison between 2 places is needed.
   - For example, the development of Chinese HSR Network was due to the air control (only 20% sky are open for business aircraft); also due to a “supply-oriented

   →

   - *Do we have $ to make $?*
   - *Do we (CA) have such environment to “grow” the usage of CA HSR? (can the behavior be changed?)*
   - *Do we have a strong government? Or, do we need?*

Thank you ~
Q & A