

Drivers of Metro Development in China

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Outline

- I. Metro Development is Scaling Up in China**
- II. New Policy Environment, New Challenges**
- III. Innovations in Metro Financing**
- IV. Metro and Transit Oriented Development (TOD)**
- V. Conclusions**

Metro Development is Scaling Up in China

China metro in operations in figures (By the end of 2017)

34 Cities

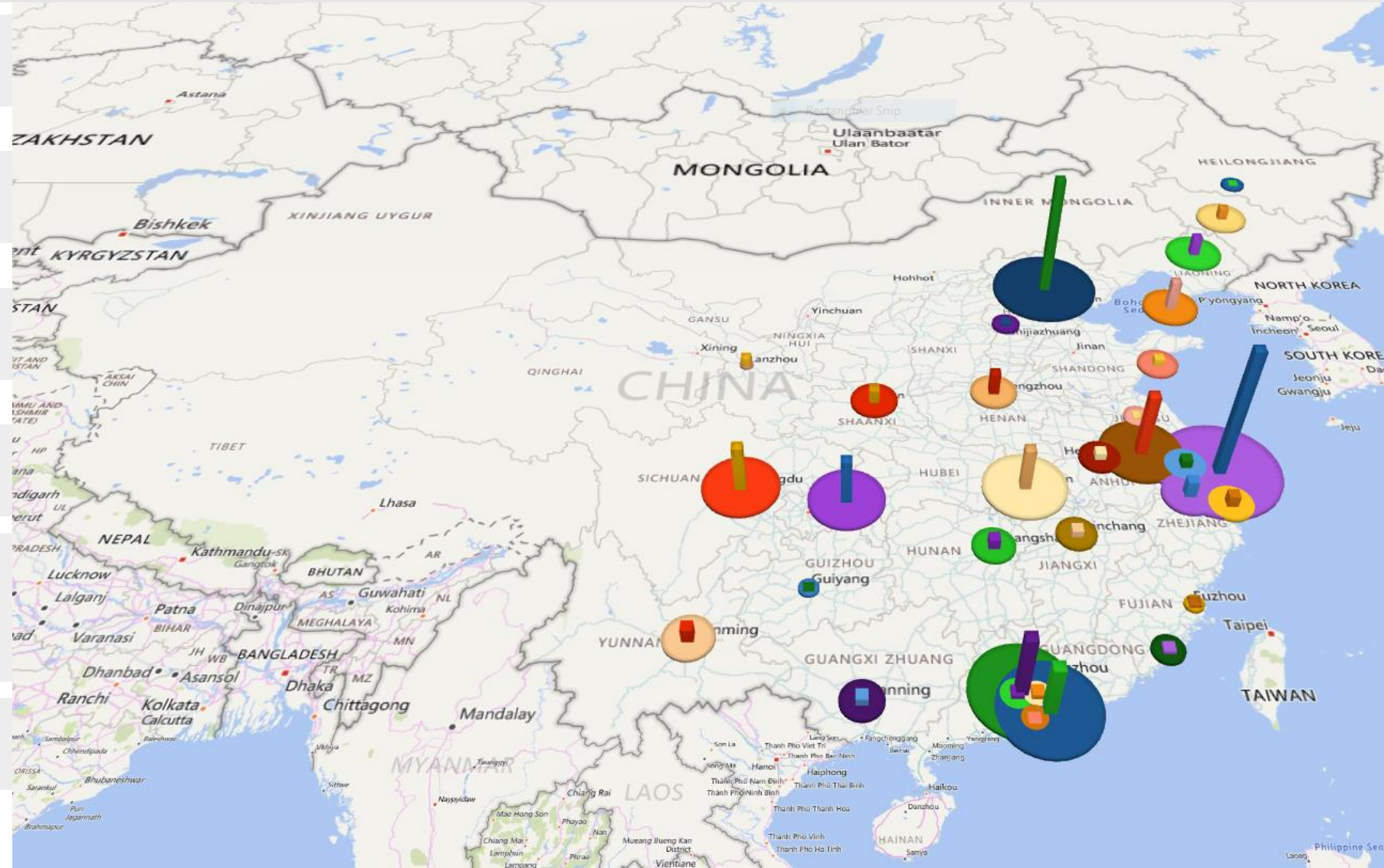
165 Lines

5,033 KM

3,234 Stations

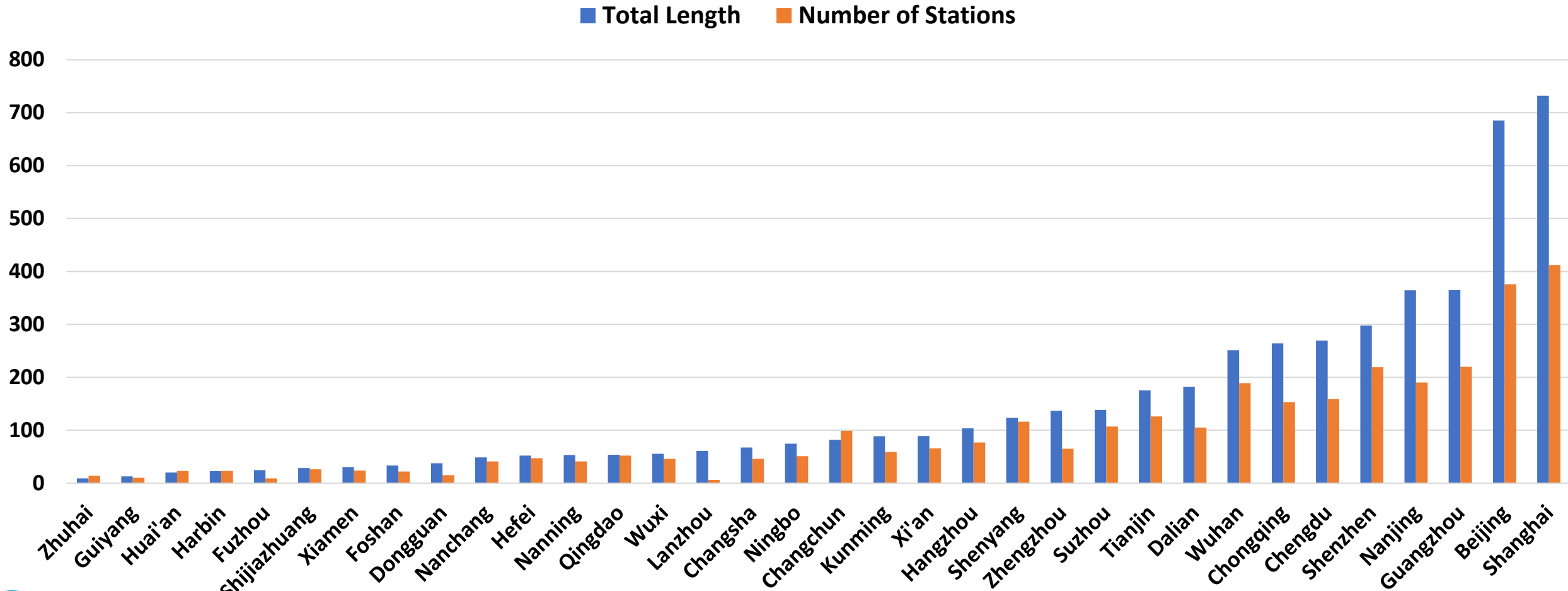
18.48 Billion
Passenger Trips

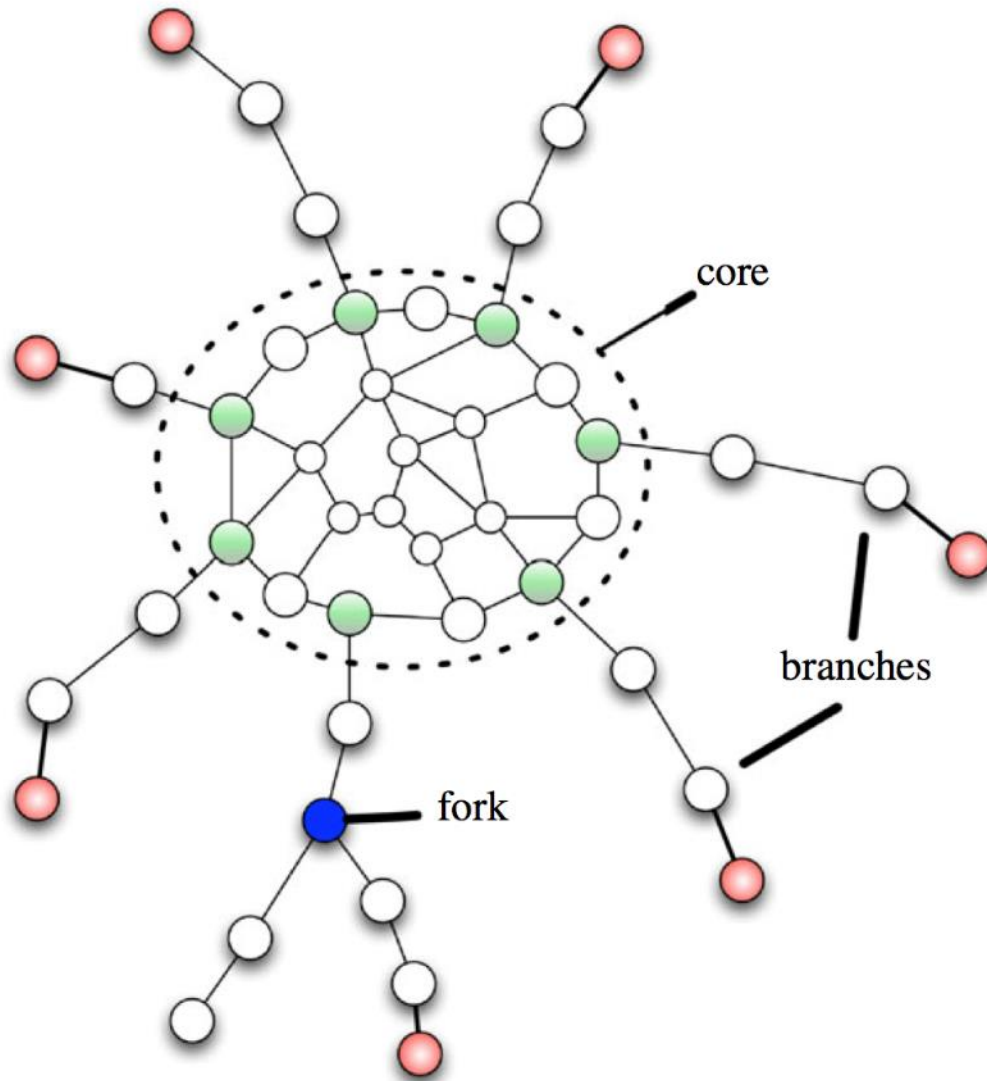
Service Intensity: 0.81



Metro Development is Scaling Up in China

Physical Scale

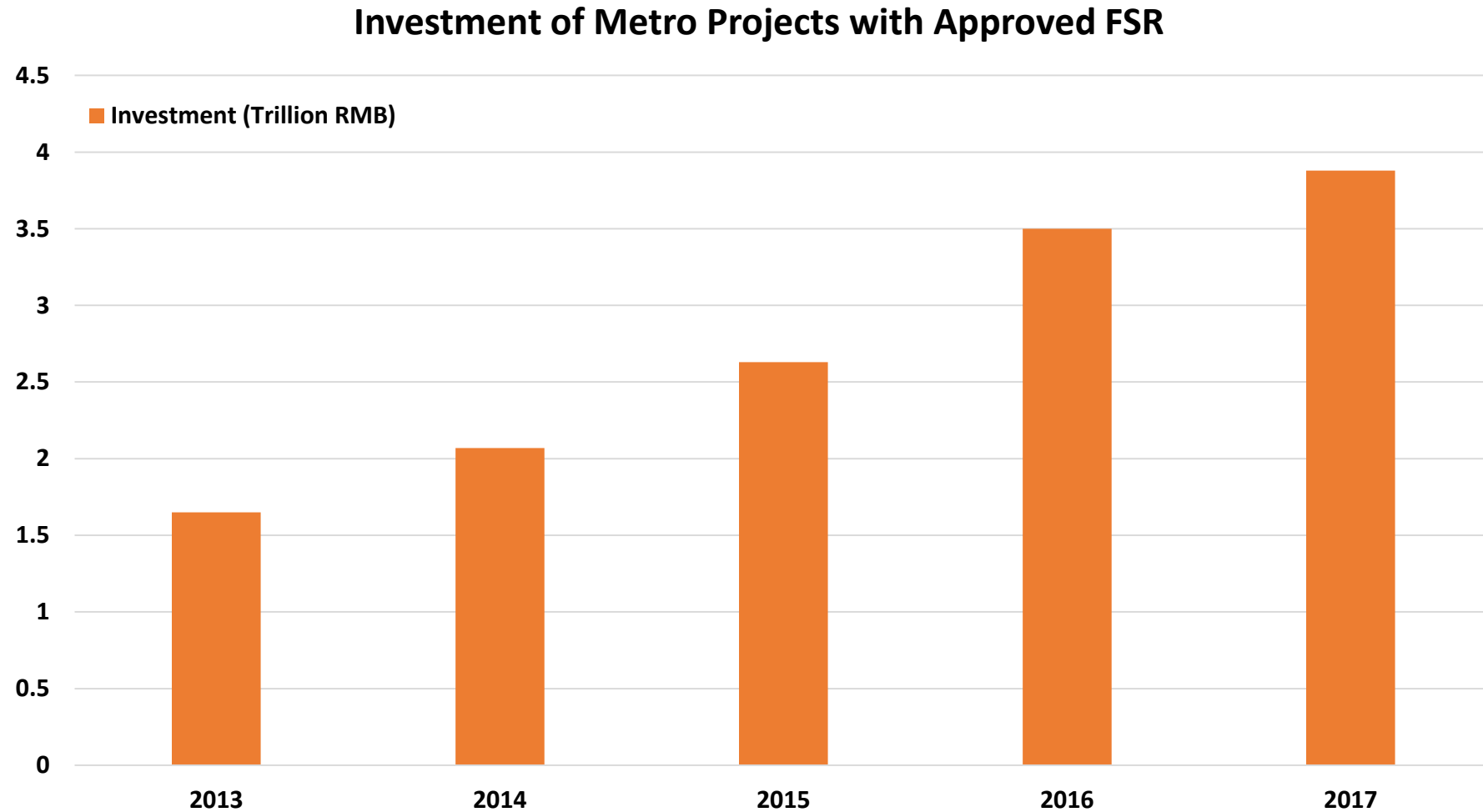




- Large-scale, networked structure, diversified systems, equipment based on own intellectual property and independent technology
- Hierarchized integrated network:
 - large-capacity subway in the central areas of megacities and super cities
 - medium-capacity monorail, magnetic suspension, inner-city rapid rail transit and modern trams between central urban area and satellite towns.

Metro Development is Scaling Up in China

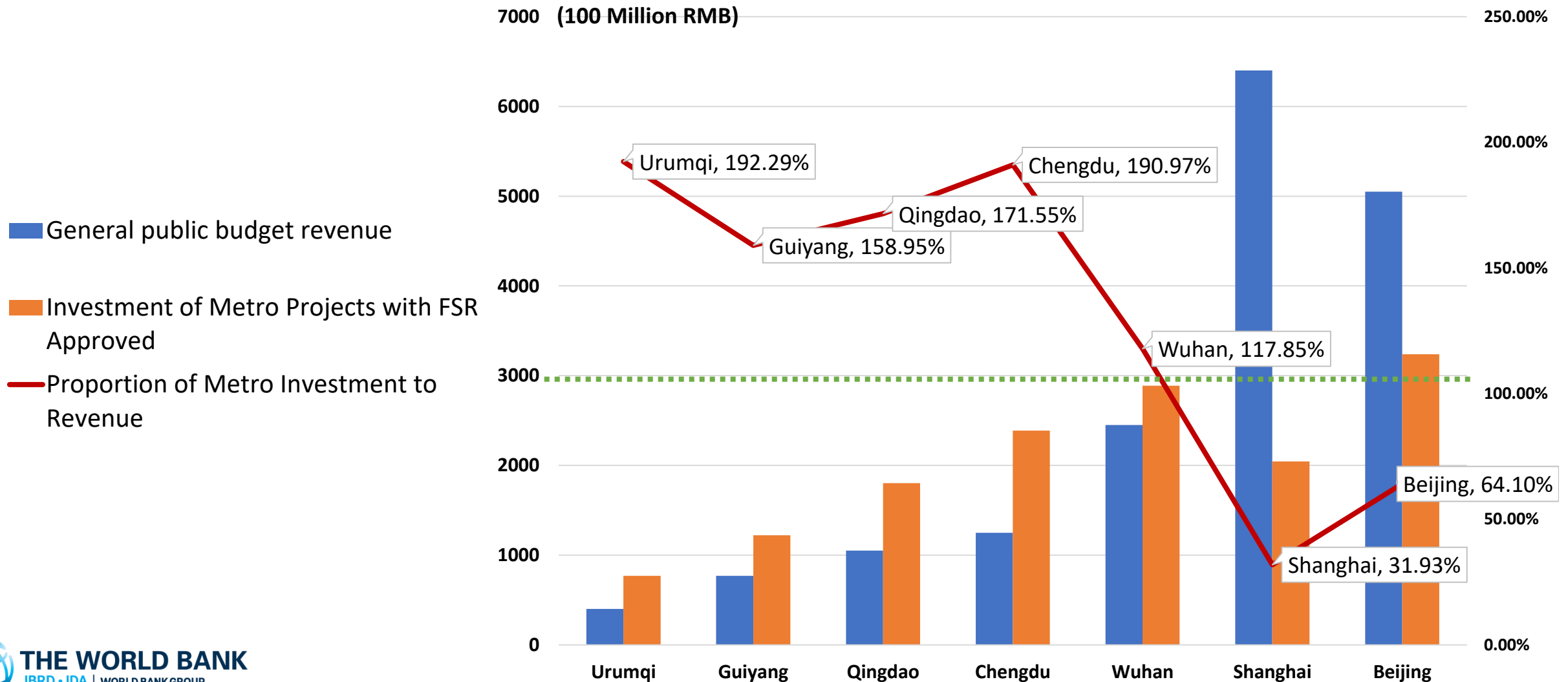
Investment Scale



About Rs. 40
lakh crores

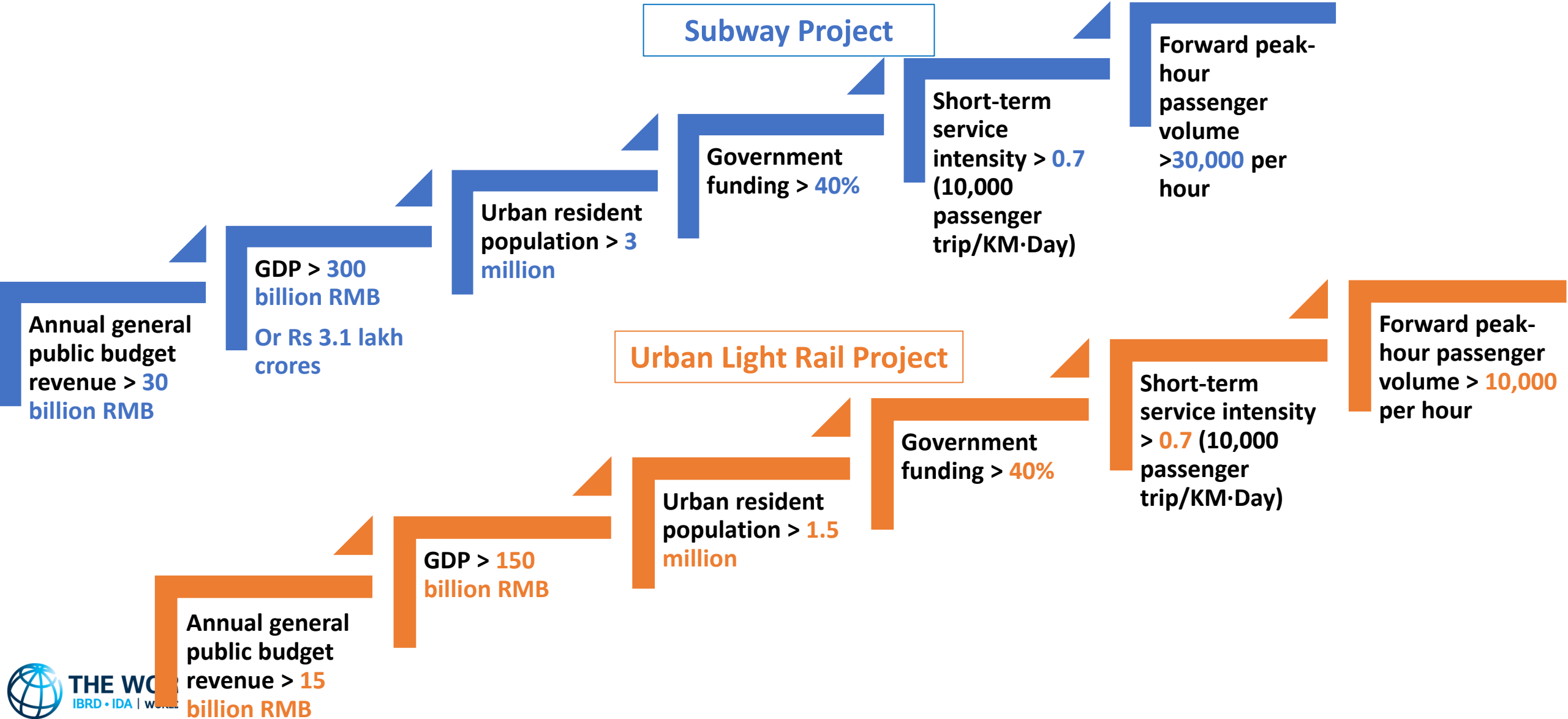
Metro Development is Scaling Up in China

Increased local financial burden due to metro project investments



New Policy Environment, New Challenges

New policies regulate metro development with raised requirements



New Policy Environment, New Challenges

New Rules Reinforce New Budget Law

MoF Directive No.50

- Prohibit local governments from providing guarantees for UDIC debt.

MoF Directive No.87

- Prohibition of government purchase service contracts to pay for civil works and financial services.

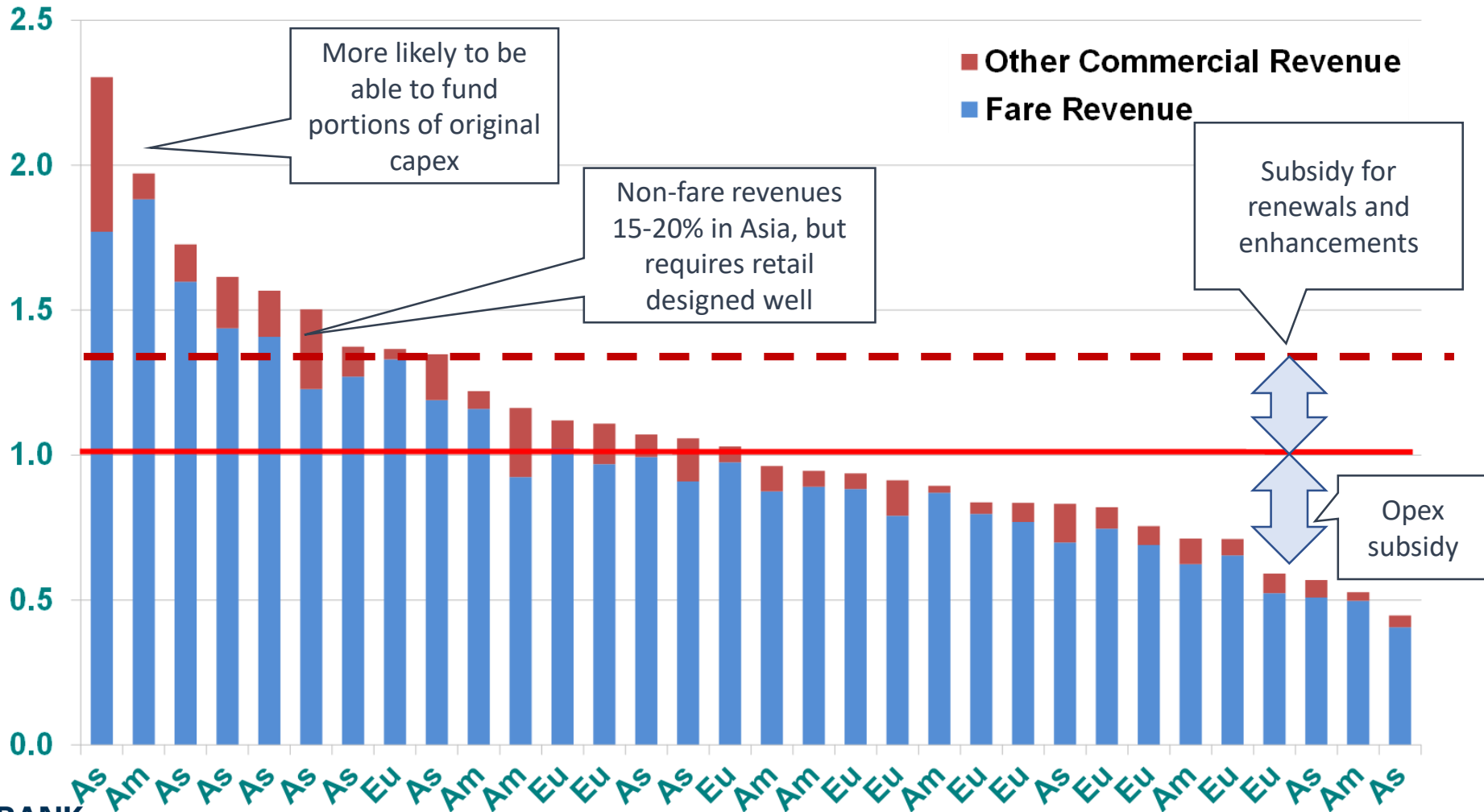
Prohibitions

- Prohibit government from injecting assets from government budgets into UDICs or pledging future land sale proceeds to bolster UDIC creditworthiness.

- Prohibit government from packaging railways, highways, airports, communications, water, power and gas supply, and the infrastructure construction projects into government purchased service contracts.

Fares only partly support metro

FAREBOX RATIOS FOR METROS AROUND THE WORLD

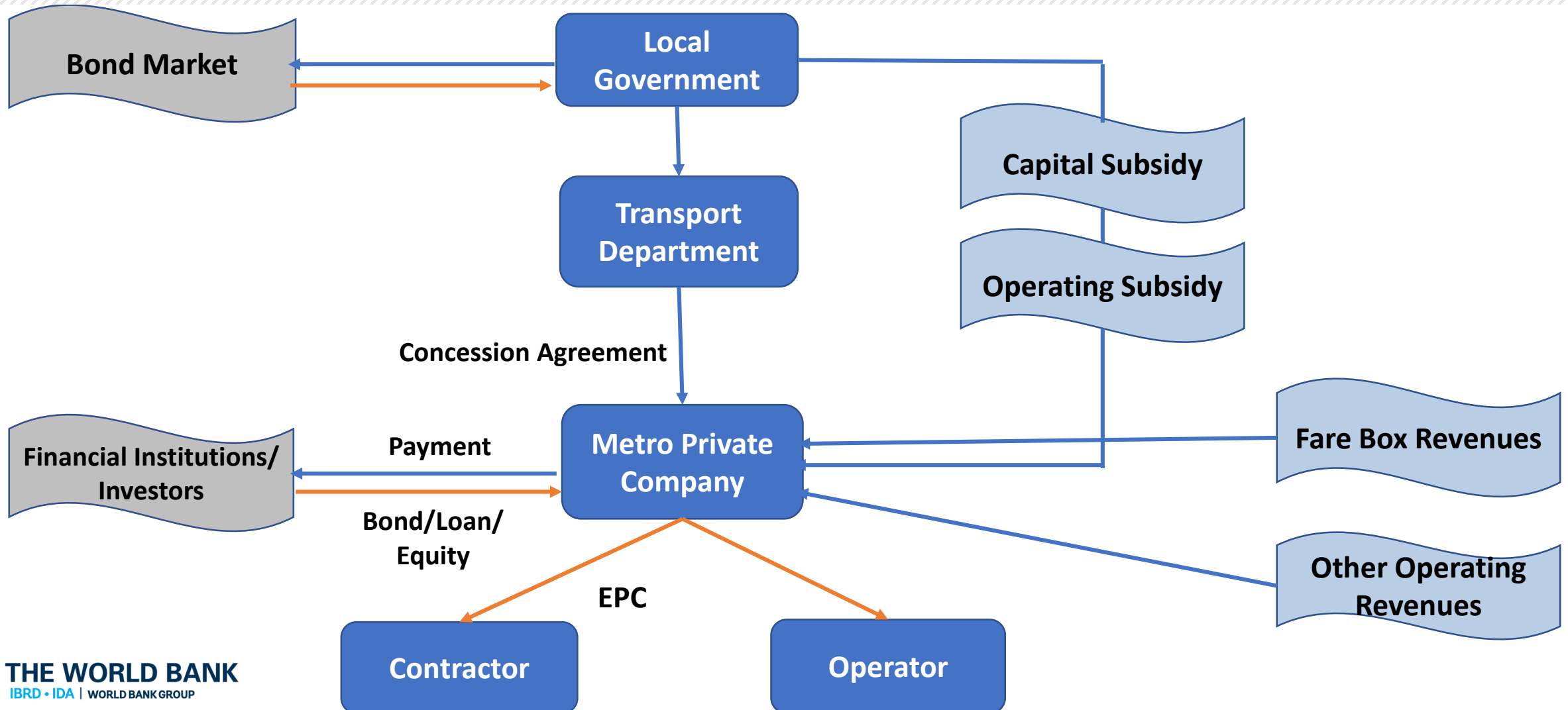


Source: Community of Metros / Imperial College London

Innovations in Metro Financing

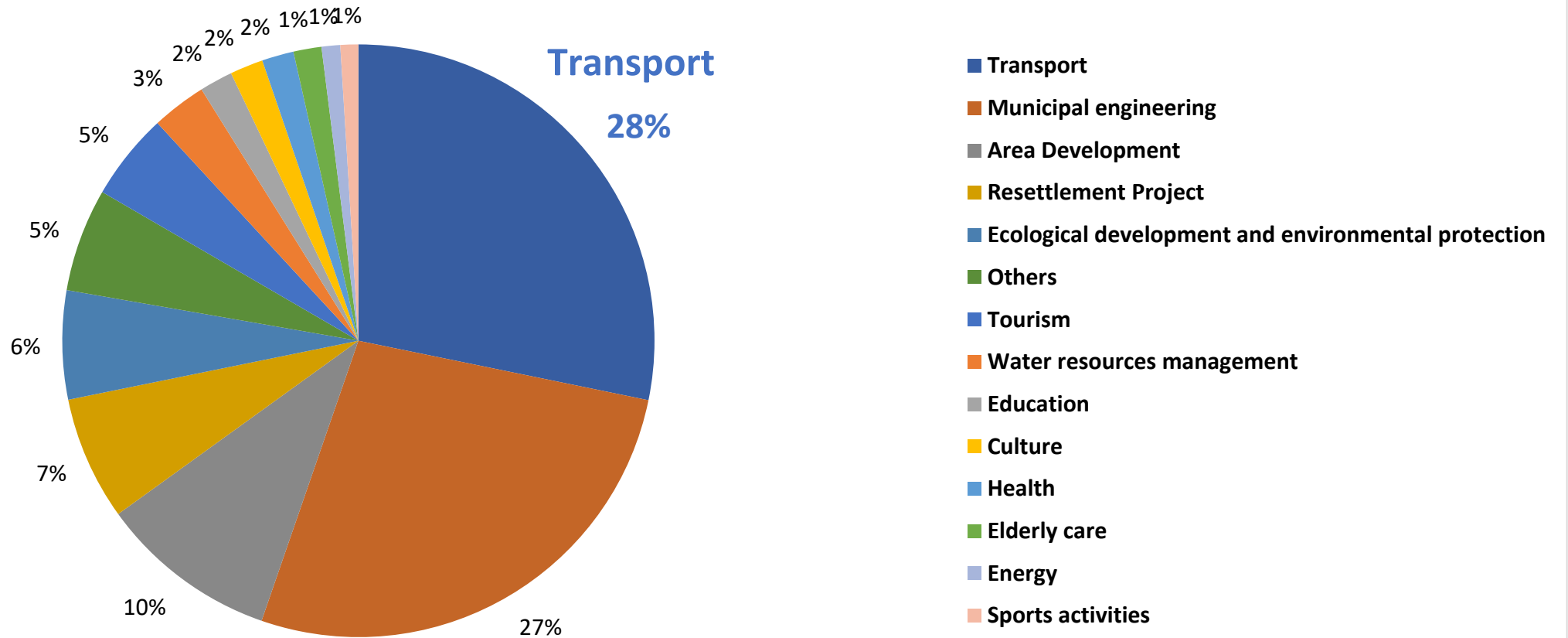
New Approach: From Urban Development Investment Company (UDIC) to PPP

Public Private Partnership (PPP) Structure



Transport PPP Projects Have the Highest Share of Project Value.

PROJECT VALUE BY SECTOR (MOF PPP PROJECT DATABASE)



Why PPP?



Infrastructure challenges



How PPPs may help

Meet public needs

- Coverage
- Quality
- Reliability
- Efficiency

Insufficient funds



Additional sources of funding and financing

Poor planning and project selection



Private sector analysis and innovation

Inefficient or ineffective delivery



Private sector incentives and life cycle management

Inadequate maintenance



Long-term investment perspective



Compete for market

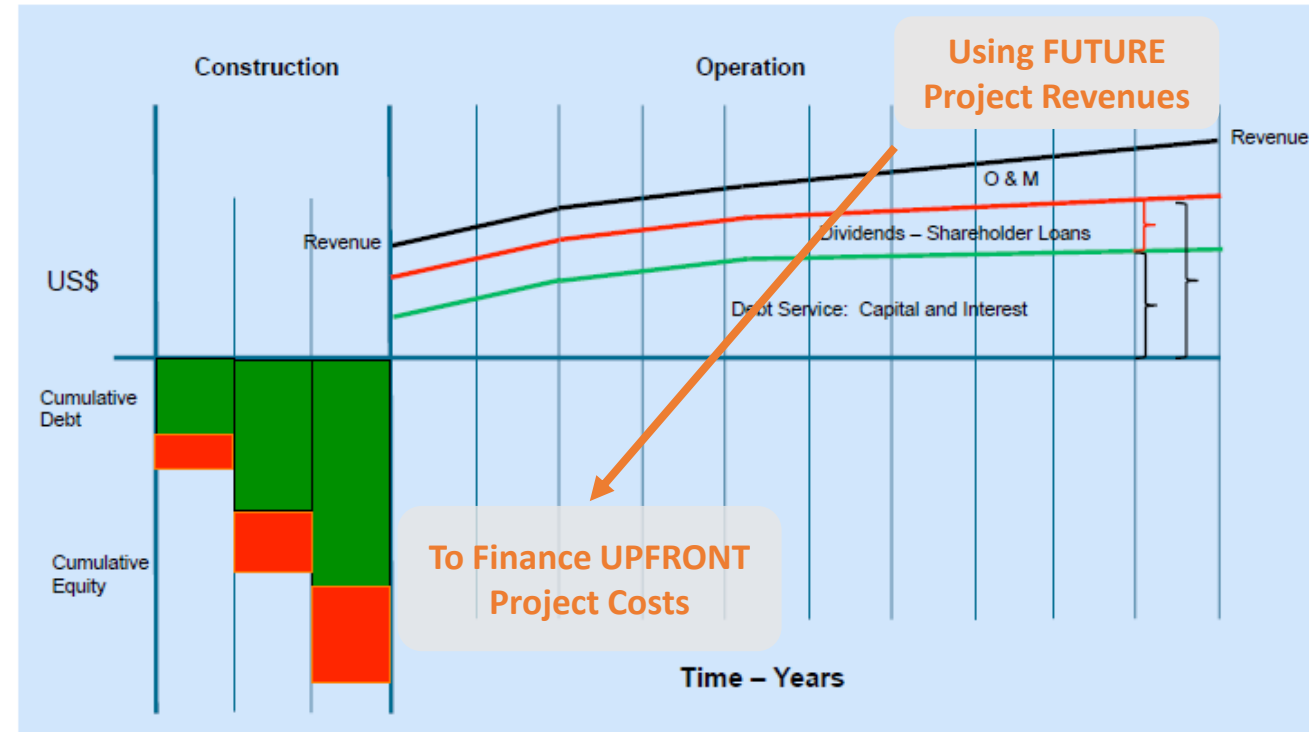
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Using Project Finance to Raise Funding for PPP Projects

What is Project Finance?

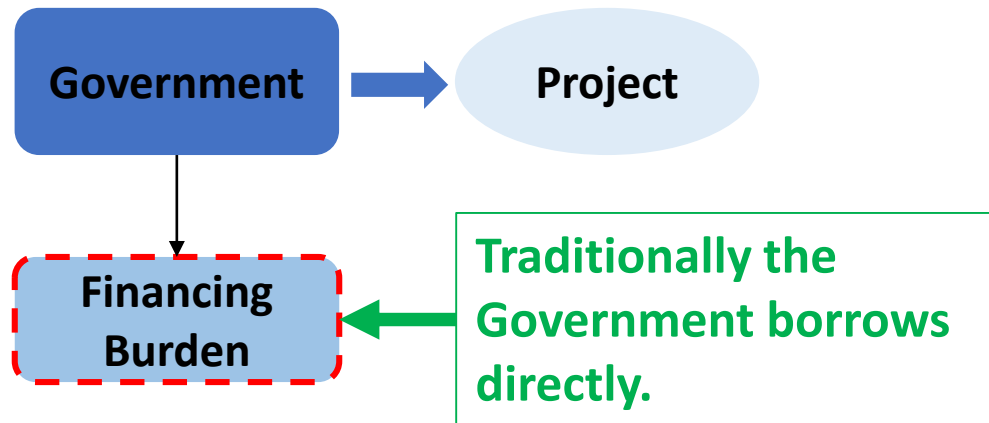
- ❖ Project Finance uses future project revenues to finance upfront project costs.
- ❖ PPP is project finance where risk is allocated between the government and private developer.



Traditional Finance VS. Project Finance

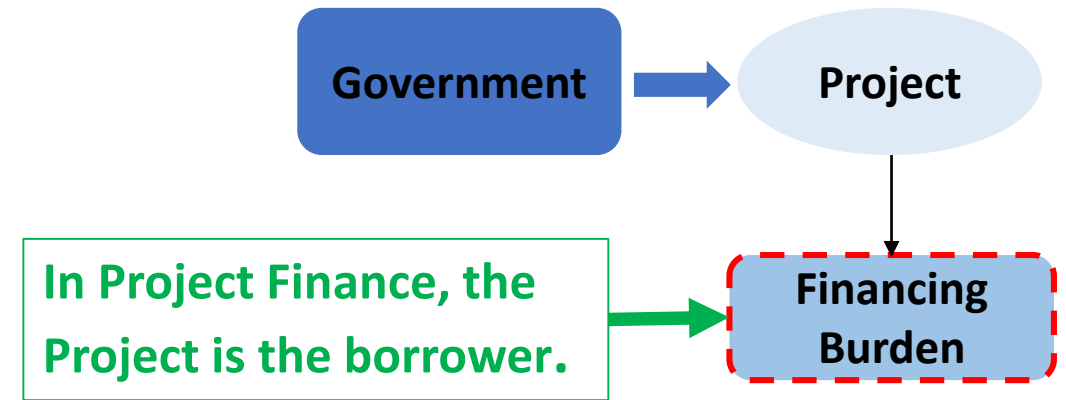
- ❑ The key difference between Traditional (Corporate) vs Project Finance is who acts as the borrower.

Traditional (Corporate) Finance



- **Advantages:**
 - Cost of financing (interest rate) is typically lower.
- **Disadvantages:**
 - Government has limited borrowing capacity, limiting infrastructure development.
 - Construction, operation & management risk is the governments. If the project fails, the government still must pay.

Project Finance



- **Advantages:**
 - Vehicle to mobilize private financing.
 - Motivates project developer (equity) and banks to ensure project implementation.
- **Disadvantages:**
 - More complex than traditional financing, needs a lot of analysis and takes longer.
 - More expensive than traditional financing.
 - Often has **contingent liabilities** and requires close monitoring.



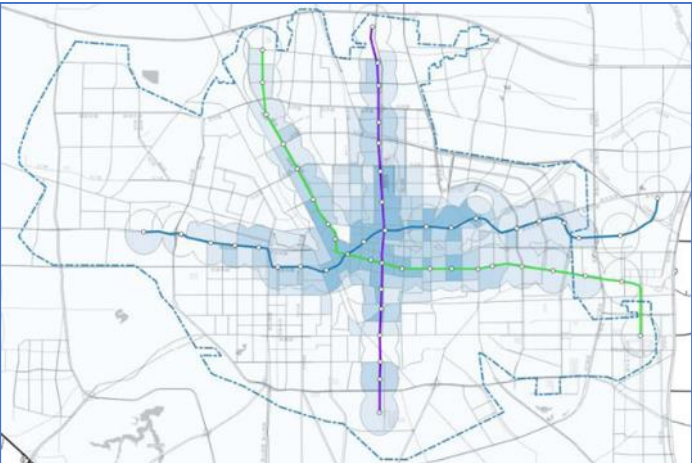
Symptoms

Integrated Mobility

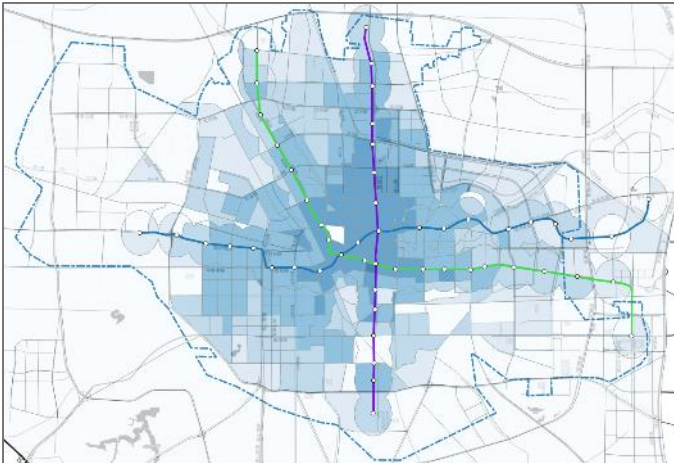
Integrated Land Use

Integrated Land Use and Transport Planning for JOB Accessibility

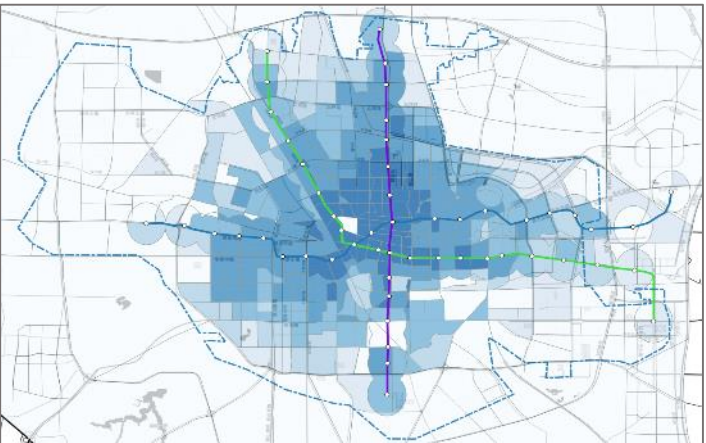
a. Line 1, 2, and 3 and walking: **12%**



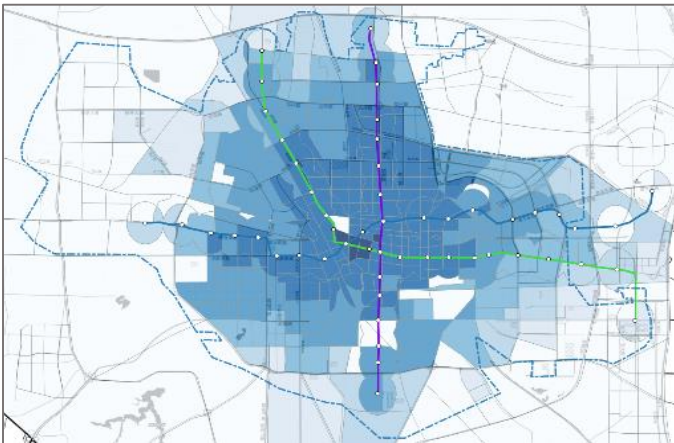
b. Scenario a plus bus: **28%**



c. Scenario b plus TOD: **39%**



d. Scenario c plus bicycle: **46%**



Zhengzhou

- Population: 6.4 million
- GDP per capita: US\$11k
- Peak hour accessibility

$$\frac{\sum_{location} \left(\frac{\text{number of jobs accessible from each location}}{\text{total jobs in the city}} * \text{population in each location} \right)}{\text{Total Population}} \times 100\%$$

Percent of jobs accessible within 45 minutes by public transit



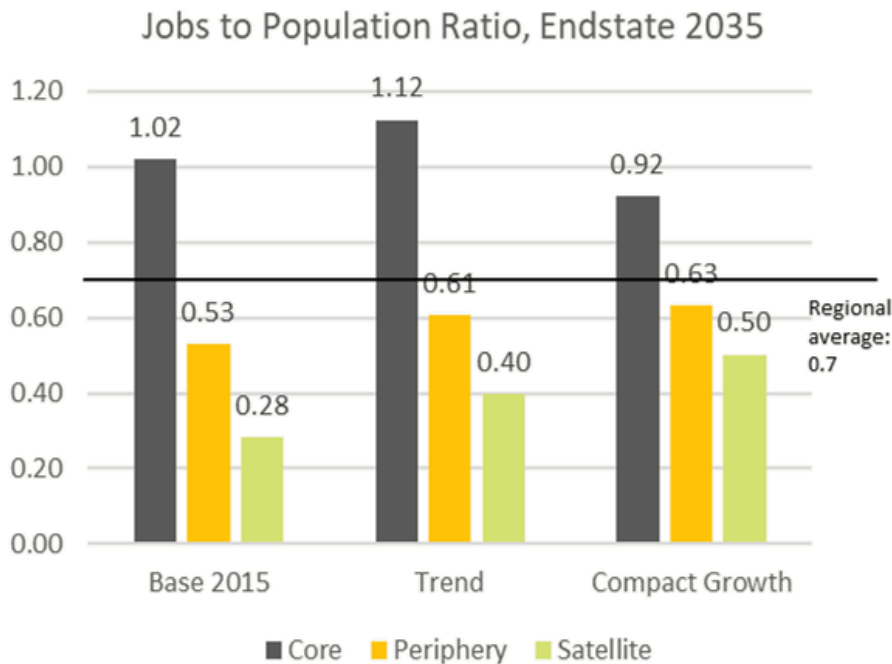
Source: The 3V Framework (World Bank)

Integrated Land Use Planning Impact: Chongqing 2035 Scenarios



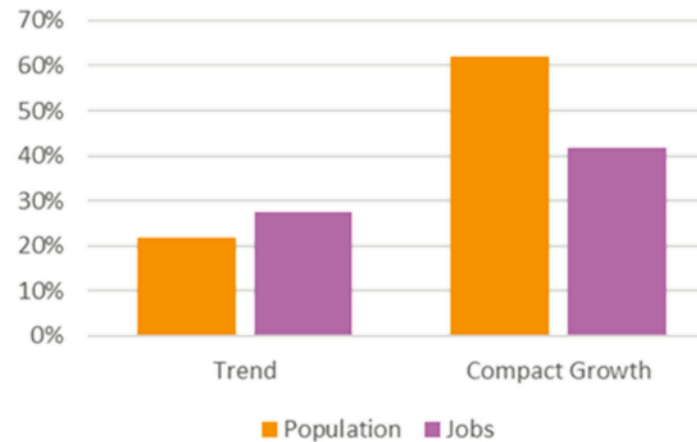
- High population growth (+5.8 m urban population and +4.6 m jobs)
- Scenario analysis on compact/TOD growth versus large block growth

Prioritizing better jobs/housing balance

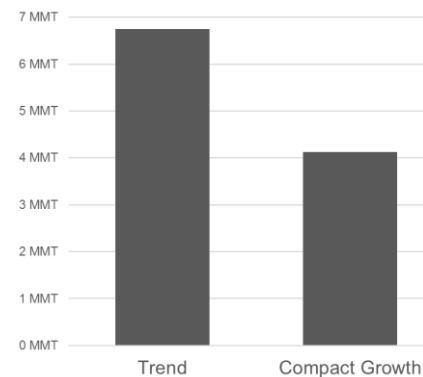


Supporting compact, walkable mixed-use development

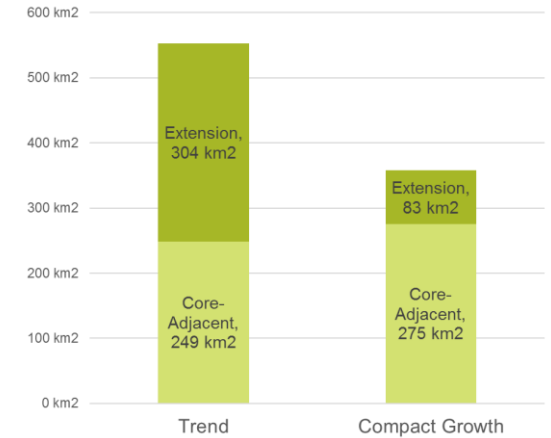
Proportion of Population and Jobs in Walkable, Mixed-Use Areas, Endstate 2035



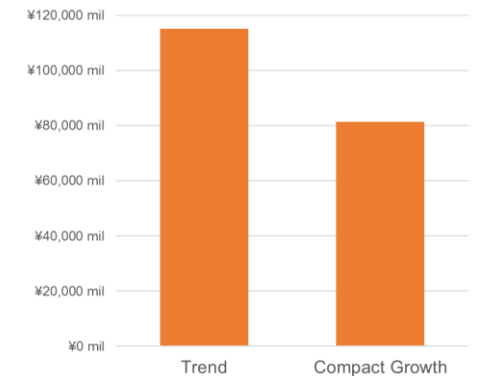
Reduced CO2 by 2.6 MT



Reduction in Green field land consumed by 195 km2



Reduced Infra cost by 5.4 BUS\$



Metro and Transit Oriented Development (TOD)

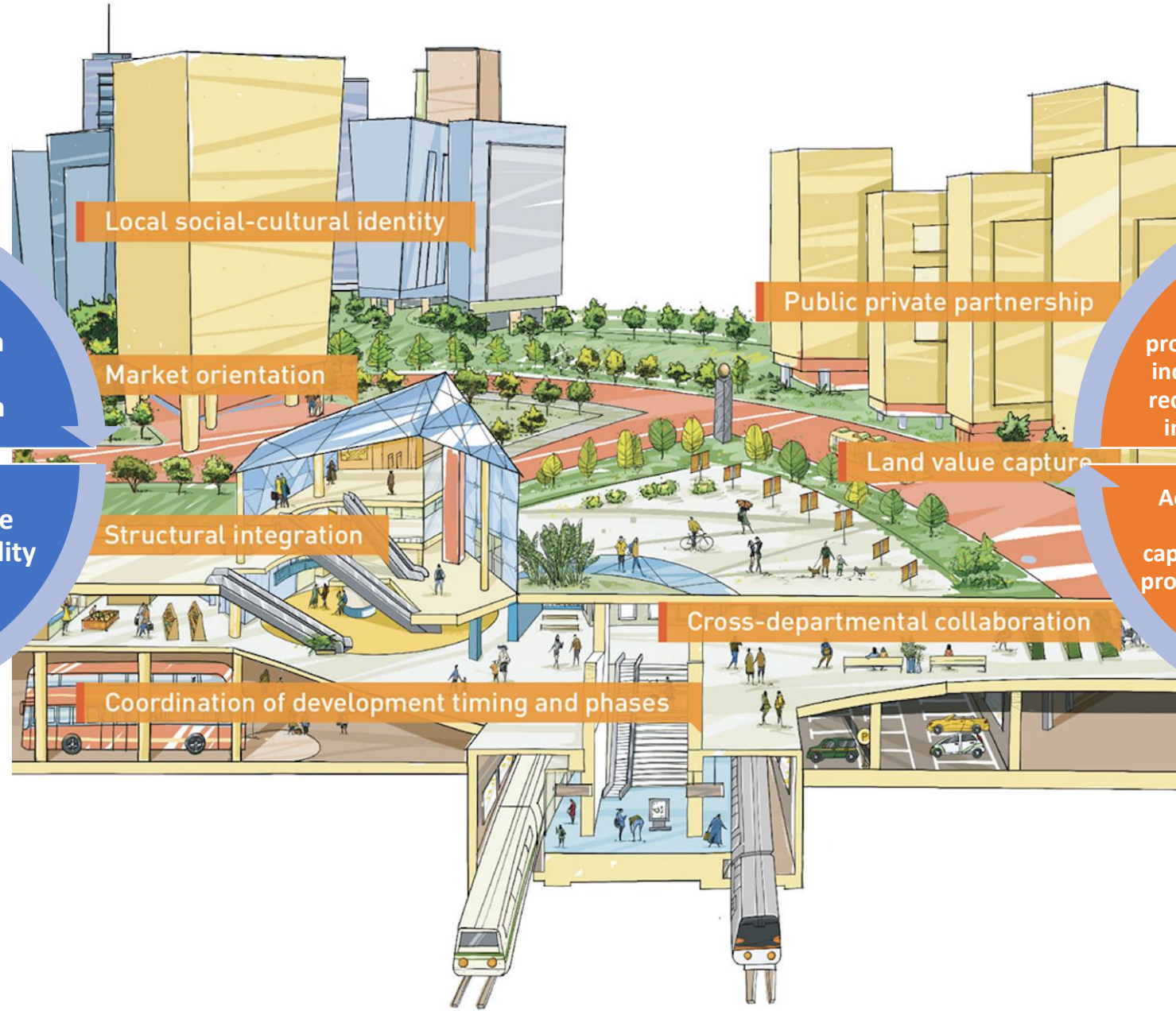
Virtuous Cycle of Transit-Oriented Development

Increase metro patronage

Build a metro system

Foster densified developments around stations

Improve accessibility



Local social-cultural identity

Market orientation

Structural integration

Coordination of development timing and phases

Public private partnership

Land value capture

Cross-departmental collaboration

Virtuous Cycle of Land Value Capture

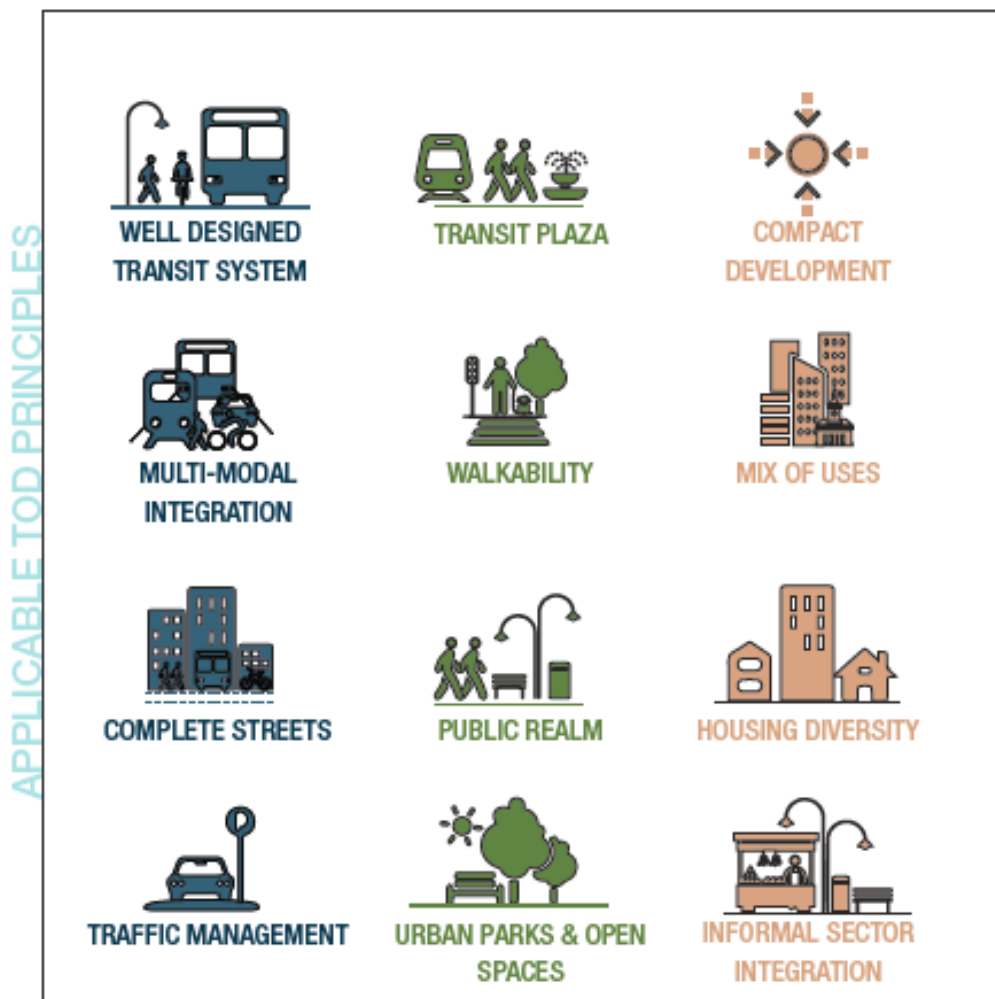
Capture property value increases and recover metro investment

Build a metro system

Accessibility benefits capitalized into property values

Deploy Rail+Property joint development

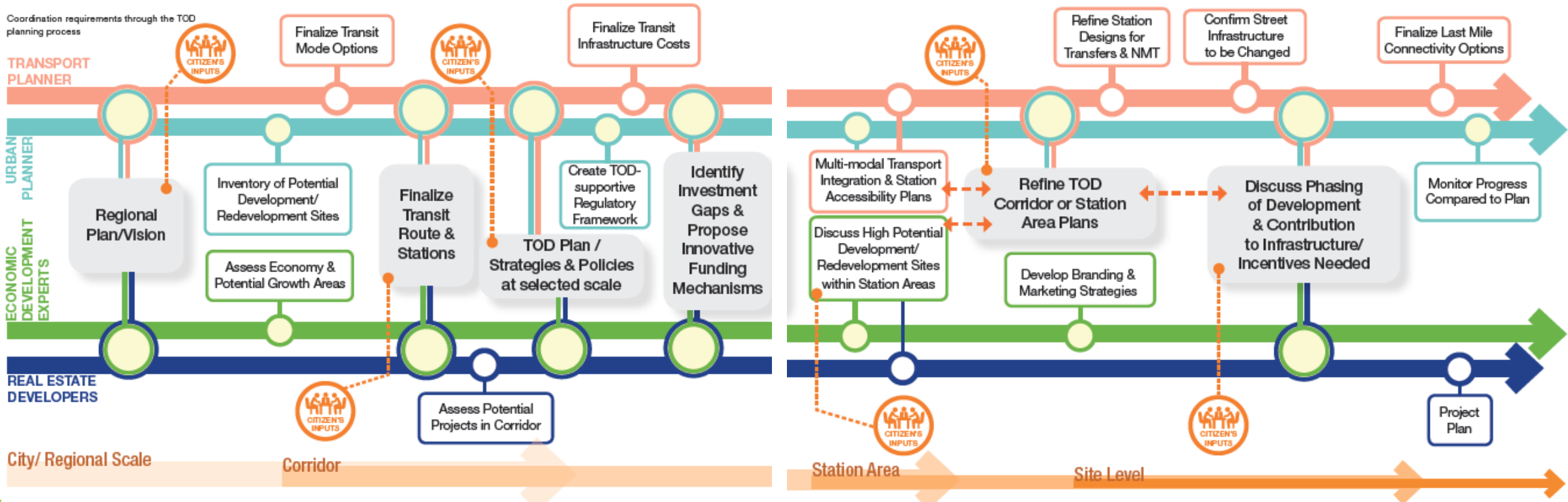
Station-Level planning for Communities



- Best addressed through city level guidelines tailored to the context.
- Also consider:
 - *Resilience*
 - *Smart city components*
 - *Balanced use of energy uses*
 - *Role of bikes, new electric mobility and new transport solutions*
 - *Underground and elevated space management*



Overall TOD Planning Process



Conclusions

- ❖ **Sustainable metro development needs new forms of financing.**
- ❖ **PPP and Project Finance present a promising approach.**
- ❖ **Integrate TOD and LVC into metro development.**
- ❖ **World Bank Group is working with central and sub-national governments**
 - Partnering with NDRC to identify possible PPP projects for WBG support
 - Shanghai – Infrastructure Financing Facility
 - Urumqi – borrowing based on revenues
 - Zhengzhou metro – PPP option being considered

