

Document of
The World Bank

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Report No: 61044-CN

PROJECT APPRAISAL DOCUMENT

ON A

PROPOSED LOAN

IN THE AMOUNT OF \$300 MILLION

TO THE

PEOPLE'S REPUBLIC OF CHINA

FOR A

KUNMING URBAN RAIL PROJECT

April 14, 2011

China and Mongolia Sustainable Development Unit
Sustainable Development Department
East Asia and Pacific Region

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CURRENCY EQUIVALENTS

(Exchange Rate Effective September 2010)

Currency Unit = RMB or Chinese Yuan
6.83 RMB = \$1

FISCAL YEAR

January 1 – December 31

ABBREVIATIONS AND ACRONYMS

| | |
|---|---|
| AFC – Automatic Fare Collection System | KMG – Kunming Municipal Government |
| ATO – Automatic Train Operation | KMFB – Kunming Municipal Finance Bureau |
| ATP – Automatic Train Protection | KTRI – Kunming Transport Research Institute |
| ATS – Automatic Train Supervision | KRTC – Kunming Rail Transit Company, Ltd. |
| BART – Bay Area Rapid Transit | MBD – Model Bidding Documents |
| BRT – Bus Rapid Transit | MEP – Ministry of Environmental Protection |
| CBD – Central Business District | MOF – Ministry of Finance |
| CFAA – Country Financial Accountability Assessment | NATM – New Austrian Tunneling Method |
| CNAO – China National Audit Office | NCB – National Competitive Bidding |
| CPS – Country Partnership Strategy | NDRC – National Development and Reform Commission |
| CQS – Consultants Qualifications | PLG – Project Leading Group |
| DA – Designated Account | PMO – Project Management Office |
| DRC – Development and Reform Commission | PIU – Project Implementing Unit |
| EIA – Environmental Impact Assessment | QBS – Quality Based Selection |
| EIRR – Economic Internal Rate of Return | QCBS – Quality and Cost Based Selection |
| EMP – Environmental Management Plan | RAP – Resettlement Action Plan |
| EPBS – Earth Pressure Balance System | SBD – Standard Bidding Documents |
| FIRR – Financial Internal Rate of Return | SCADA – Supervisory Control and Data Acquisition |
| FMS – Financial Management Specialist | SIL – Specific Investment Loan |
| GDP – Gross Domestic Product | TDM – Travel Demand Management |
| GEF – Global Environment Facility | TOD – Transit Oriented Development |
| GHG – Greenhouse Gas | WA – Withdrawal Application |
| Hong Kong, SAR, China – Hong Kong Special Administrative Region of the People’s Republic of China | YPAO – Yunnan Provincial Audit Office |
| IC – Individual Consultants | YPFB – Yunnan Provincial Finance Bureau |
| ICB – International Competitive Bidding | |

| | |
|-------------------|---|
| Vice President: | Mr. James W. Adams |
| Country Director: | Mr. Klaus Rohland |
| Sector Managers: | Mr. Ede Jorge Ijjasz-Vasquez and Mr. Vijay Jagannathan |
| Task Team Leader: | Mr. Shomik Mehndiratta |

CHINA
Kunming Urban Rail Project

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CHINA
KUNMING URBAN RAIL PROJECT
PROJECT APPRAISAL DOCUMENT
EAST ASIA AND PACIFIC
EASCS

| | |
|--|---|
| Date: April 14, 2011 | Team Leader: Shomik Raj Mehndiratta |
| Country Director: Klaus Rohland | Sectors: General Transport sector (100 percent) |
| Sector Managers: Ede Jorge Ijjasz-Vasquez (EASCS), Vijay Jagannathan (EASIN) | |
| Project ID: P117656 | Environmental category: Full Assessment |
| Lending Instrument: Specific Investment Loan | |

| Project Financing Data | | | |
|---|---------------|--------------|---------------|
| [X] Loan [] Credit [] Grant [] Guarantee [] Other: | | | |
| For Loans/Credits/Others: Total Bank financing (\$ m.): 300.00 Proposed terms: variable spread loan in US dollars payable in 30 years, including 5 years of grace. | | | |
| Financing Plan (\$m) | | | |
| Source | Local | Foreign | Total |
| Borrower | 1336.6 | 75.0 | 1411.6 |
| International Bank for Reconstruction and Development | 50.0 | 250.0 | 300.0 |
| Total: | 1386.6 | 325.0 | 1711.6 |
| Borrower: People's Republic of China, represented by the Ministry of Finance San Li He Street, Xicheng District Beijing China 100820 Tel: 8610-68551124 Fax: 8610-68551125 | | | |
| Responsible Agency: Yunnan Finance Bureau Kunming Rail Transit Co., Limited No. 82, Mingtong Rd., Kunming, China, Phone:/Fax: (86-871) 351-7507 | | | |

| Estimated disbursements (Bank FY/\$m) | | | | | | | | |
|---------------------------------------|----|----|-----|-----|-----|-----|--|--|
| FY | 12 | 13 | 14 | 15 | 16 | 17 | | |
| Annual | 10 | 30 | 60 | 60 | 60 | 80 | | |
| Cumulative | 10 | 40 | 100 | 160 | 220 | 300 | | |

Project implementation period: Start: May 2011 - End: March 2016
Expected effectiveness date: June 15, 2011
Expected closing date: November 30, 2016

| | |
|--|---|
| Does the project depart from the CPS in content or other significant respects? <i>Ref. PAD I.C.</i> | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No |
| Does the project require any exceptions from Bank policies? <i>Ref. PAD IV.G.</i> | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No |
| Have these been approved by Bank management? | <input type="checkbox"/> Yes <input type="checkbox"/> No |
| Is approval for any policy exception sought from the Board? | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No |
| Does the project include any critical risks rated “substantial” or “high”? <i>Ref. PAD III.E.</i> | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No |
| Does the project meet the Regional criteria for readiness for implementation? <i>Ref. PAD IV.G.</i> | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No |

| |
|---|
| Project development objective <i>Ref. PAD II.C., Technical Annex 3</i> |
| The objective of the Project, which consists of the construction of the 19.54 km long Line 3 of the Kunming urban rail system, is to support compact, transit-oriented urban development by providing high quality, integrated public transport on the East-West Line 3 corridor. |
| Project description <i>Ref. PAD II.D., Technical Annex 4</i> |
| The project consists of three components: <ul style="list-style-type: none"> • Component 1. Civil Works (\$209.4 m): Carrying out a program of civil works for selected stations, including inter alia, bus interchange and bike parking facilities, where appropriate, and associated facilities such as, but not limited to, depots and track, equipments installation, and other related installation at selected stations. • Component 2. Equipment (\$86.9 m): Provision of various equipment such as, but not limited to, power supply, escalators, fare collection, and communication systems, and technological equipment at depot and other related facilities. • Component 3. Technical Assistance and Capacity Building (\$3.0 m): Provision of: (a) studies to support bus-rail integration and the future development and construction of the public transport system; and (b) support for Project management capacity building and for operations management. |

Which safeguard policies are triggered, if any? **Ref. PAD IV.F., Technical Annex 10**

OP 4.01 (Environmental Assessment), OP 4.11 (Physical Cultural Resources), and OP 4.12 (Involuntary Resettlement)

Significant, non-standard conditions, **if any**, for:

Ref. PAD III.F.

Disbursement Conditions:

For civil works, goods, consultant services and training (category 1):

- that the Subsidiary Agreement has been executed on behalf of KMG and KRTC; and
- the Subsidiary Agreement has been duly authorized or ratified and is legally binding upon the KMG and KRTC in accordance with its terms; and
- KRTC has secured the land required for metro - public transport - bicycle integration according to the Integration Plan, in form and substance acceptable to the Bank.

Implementation Covenants:

The Project Implementing Entity will:

- (a) prepare, in accordance with terms of reference satisfactory to the Bank, and furnish to the Bank by February 15 in each calendar year, beginning on February 15, 2012, for review and approval, a proposed action plan for carrying out its Respective Parts of the Project during the same calendar year, said work plan to include, *inter alia*, the scope and schedule of activities under its Respective Parts of the Project, the financing plan and detailed budget arrangements (including required counterpart funds as validated by each Project City);
- (b) thereafter, carry out such Respective Parts of the Project in accordance with such action plan, as shall have been approved by the Bank; and
- (c) provide to the Bank for its prior concurrence any proposed modification or waiver of its respective annual action plan, or any provisions thereof, prior to putting into effect such modification or waiver.

I. STRATEGIC CONTEXT AND RATIONALE

A. Country and Sector Issues

Urban rail in China – a Potential Anchor for Compact Urban Growth

1. Until recently, urban rail has been a relatively minor element of the urban transport systems of China's cities. As of 2000, only four cities in mainland China had urban rail systems operating on a total track length of 101 kilometers. The immense financial cost of urban rail (usually between \$60 to \$100 million/km) was one obvious reason for this low level of urban rail investment. Another related reason was the strict control of urban rail activity by China's national government. Even as responsibility for most urban infrastructure, including financing and operations of metros, was almost completely decentralized to local governments, National Development Reform Commission (NDRC) retained control of metro investments through review and approval of urban rail plans, as well as feasibility studies and eligibility thresholds for metro development.

2. Nevertheless, as a result of urbanization and rising incomes, traffic congestion became a more serious problem in China's biggest and most prosperous cities, and the last decade has seen significant urban rail development. By January of 2010, 10 cities were operating metros on 870 kilometers of total track. That marks an increase of more than 750 percent in a decade, equivalent to adding almost two times the total track length of London's Underground, the world's largest subway system by track mileage. In the last eighteen months, even this dramatic increase has further accelerated as the national government has used infrastructure spending as a means of stimulating renewed economic growth. As a result of the stimulus package, cities have found it much easier to finance their systems. As of January 2010, 23 cities had approved metro plans with a total track length of an unprecedented 5,148 km.

3. These developments mark a new era of rapid development in urban rail fueled by a potent mix of demographic trends and policy imperatives, related primarily to the urgent need to facilitate compact urban growth. The number and population of mega-cities and large cities are continuing to increase, regional city clusters are emerging, and metropolitan areas are expanding amidst a process of accelerated urbanization.¹ This urban growth has been accompanied by personal income growth in cities, which has created aspirations for higher quality of urban travel in terms of speed, flexibility, comfort, cleanliness, and safety. These trends have the potential to fuel significant low-density urban sprawl: an outcome that would conflict directly with national policies on land conservation, environmental protection, energy efficiency improvements, and CO₂ emission reductions.

4. Fortunately, however, the development of large cities with higher income populations also has the potential to fuel demand for quality public transport service, notably urban rail. Indeed, transport corridors with sufficient density of demand for mass rapid transit have begun to emerge in a number of Chinese cities. Urban leaders in China are increasingly concluding that

¹ The urbanization rate currently stands at 1.4 percent, which means that about 20 million farmers become urban residents each year. On the assumption that the urbanization drive maintains a growth of 1 percent annually, Chinese cities and towns will absorb about 300 million people from rural areas in the next 20 years.

urban rail systems could help meet diverse long-term demographic and policy challenges, and potentially catalyze a pattern of urban growth that conserves energy, reduces carbon intensity, and preserves agricultural land. Chinese cities are at a crucial point in their development, where current decisions will ‘lock in’ energy consumption and CO₂ emission patterns for the long term.

5. Thus, in many ways, recent large-scale investments in urban rail represent a positive trend in Chinese urban development that focuses proactively on compact growth and complementary public transport, and moves away from a roads-only approach. In addition, a focus on urban rail has the potential to deliver significant social, economic and environmental benefits: lower levels of congestion, air pollution, and greenhouse gas (GHG) emissions; fewer traffic-related fatalities; increased mobility and accessibility for low income populations; and increased use of complementary means of non-motorized transport.

6. Nevertheless, recent Chinese experience reinforces international experience that suggests that investment in large-scale urban rail capital projects alone is not enough to ensure optimal outcomes. Careful integration of urban development and public transport planning is needed to realize urban rail’s potential to foster compact growth. Moreover, urban rail works best where it is designed and implemented as part of an integrated multi-modal system. Achieving this requires integration between different modes and operators at the operational, service planning, and fare policy levels. Finally, the implementation of a comprehensive city-wide transport policy that supports public transport, moves to restrict automobile travel where appropriate, and fosters the use of non-motorized means of transportation, is crucial in creating an environment where urban rail can be successful. This project seeks to bring international best practice on these issues to Chinese urban rail.

B. Rationale for Bank involvement

7. Previously, the Bank’s role in the urban rail sector has included a significant program in Brazil over the last two decades (multiple projects in Sao Paulo and Rio de Janeiro from 1992-2010, as well as projects in Belo Horizonte and Recife in 1995), and occasional loans in other countries including Pusan, South Korea (1995) and Budapest, Hungary (1995). In earlier analytical work the Bank has expressed concerns that the benefits of urban rail projects needed to be balanced by the significant financial burdens these projects imposed on Bank-client countries. This included the difficulties in realizing many of the projected benefits of rail systems (due to widespread problems of integration with the rest of the public transport system and the lack of an adequate supporting policy environment); and the large and often untapped possibilities from incremental improvements to bus systems (starting with on-street priority and including other forms of priority, such as bus rapid transit (BRT)).²

8. The World Bank has recently completed a study of urban rail systems in Chinese cities that addresses these issues, titled “Urban Rail Development in China: Prospects, Issues and Options”.³ The findings from this report indicate that Chinese cities implementing new urban

² See, for example, “Cities on the Move; a World Bank Urban Transport Strategy Review”, 2002, page xv or “Approaching Metros as Potential Development Projects”, 1997

³ “Urban Rail Development in China: Prospects, Issues and Options”, World Bank Working Paper, 2009. Available on request.

rail systems would benefit significantly from: the integration of new metro systems with existing and future bus service; the use of urban development tools to maximize the benefit of new infrastructure and achieve desired compact growth patterns; and the incorporation of traffic management and traffic demand management measures into the planning and implementation of the project. Taken together, the recommendations of the report point to the need for urban rail to be more than simply an infrastructure project: to succeed, such projects should be planned, designed and operated as part of a broad-based policy on urban development.

9. The study also suggested that: (a) there was significant value in World Bank involvement in this sector, focusing on supporting an interested city to develop a model demonstration system that was part of a coherent, sustainable urban development and transport strategy, and was well integrated with the existing public transport system; and (b) there is a need to be pragmatic in the selection of a demonstration project, given the particular circumstances of China's rapid urban rail development—balancing the benefits of the demonstration impact with the need to find the 'perfect' corridor.

The Kunming Context for Urban Rail and Compact Growth

10. Kunming is an ideal partner for the World Bank to work with to demonstrate the principles critical to the design and operation of a successful, sustainable urban rail system as a catalyst for compact growth. The municipality has an estimated population of 5.7 million (with about 3 million residing in the central city area), 1 million motor vehicles, 3,000 buses, and gross domestic product (GDP) of RMB120 billion. As the city's spatial expansion is constrained by lakes and mountains, the municipality has promulgated a master plan that promotes high density, compact land use development.

11. The city is notable for its sustained focus on public transport. It was one of the first cities in China to implement a network of bus priority corridors. Moreover, the city has an efficiently operated conventional bus transport system, with labor-bus ratio of only 3, and in early 2009, a 90 percent operating cost recovery at a uniform fare of RMB1.00 per ride. However, the city is facing a major challenge from rapidly growing motor vehicle traffic.

12. As elsewhere in China, Kunming has witnessed a significant increase in the use of motor vehicles in the decade from 1994 to 2005. With the rapid growth of the city's extent, population and motorization, Kunming is now confronting a rapid rise in traffic congestion. Travel demand continues to increase rapidly. In response, the city has planned, and gained approval for, a massive investment in urban rail. The proposed system would encompass six lines operating on a total length of 162.6 km. The two lines to be constructed first are in corridors with some of the city's highest bus ridership. The first line is currently under construction, and this project would provide World Bank financing for the second.⁴ The World Bank financed line runs 19.54 km on a major east-west axis through the heart of the Kunming Central Business District (CBD).

⁴ The first line to be constructed will be a combination of the southern end of what will be Line 1 in the final six line configuration, and the northern portion of what will be Line 2 – throughout this document, this line will be referred to as Line1/2. The line financed under this World Bank loan is therefore referred to as Line 3- although it will be one of two lines to be completed in the first phase.

13. Kunming's ambitious urban rail proposal represents a positive step for the city that will benefit significantly from Bank support to address the issues described above: transit-oriented urban development planning; integration with bus operations; and broader transport policy designed to support public transport.

14. The World Bank is ideally placed to support Kunming in implementing this urban rail program, while strengthening the city's capacity for urban transport planning and management. The World Bank has been China's urban development partner for thirty years and has provided over \$1.8 billion for 14 urban transportation projects. These projects have focused on topics crucial to the successful implementation of this proposal, including the coordination of urban development and public transport planning through transit oriented development (TOD), institutional development for integrated multi-modal public transport operations, financial planning for long-term operational stability, and the improvement of investment and management practices. In the midst of a massive nationwide program of urban rail construction, demonstrating the effective principles of coordinated, multi-modal public transport and TOD in Kunming has the potential to be a catalyst for high quality urban rail development across China.

C. Higher level objectives to which the project contributes

15. The project is consistent with the 2006-10 Country Partnership Strategy (CPS) (approved by the Board on May 23, 2006), which seeks, among other objectives, to improve the competitiveness of the various regions of China and the overall investment climate, and to address the needs of disadvantaged groups and underdeveloped areas through financing infrastructure. Specifically, the project supports the objectives of: (a) promoting balanced urbanization; (b) reducing poverty, inequality, and social exclusion; and (c) financing sustainable and efficient growth. The objectives of the project are also expected to be consistent with the new CPS for 2011-2015, which will be prepared in 2011 in alignment with China's 12th Five Year Plan. Additionally, as a major public transport infrastructure project, the project is consistent with the Bank's transport strategy of focusing on 'safe, clean, affordable' transport services to serve as anchors for development.⁵

16. The proposed project also supports urban infrastructure development, recently identified as a priority by the government of China. Finally, the project supports the implementation of State Council Directive 46 regarding "priority for public transport", the "People First" initiative, and the development of low-carbon compact cities.

II. PROJECT DESCRIPTION

A. Lending instrument

17. The World Bank will finance the project through a specific investment loan (SIL). The Borrower has selected a variable spread loan in US dollars payable in 30 years, including 5 years of grace.

⁵ *Safe, Clean, Affordable: Transport for Development*, World Bank Transport Strategy, 2007

B. Project development objective and key indicators

18. The objective of the Project, which consists of the construction of the 19.54 km long Line 3 of the Kunming urban rail system, is to support compact, transit-oriented urban development by providing high quality, integrated public transport on the East-West Line 3 corridor.

19. The PDO will be measured through four broad indicators, including: (a) the provision of high quality transit service (measured by improved travel time in the corridor on public transport modes and the use of the system by riders with access to an automobile); (b) the development of an integrated public transport system, where bus and rail operate as a single system (measured by the provision of space for bus interchange facilities at stations, the restructuring of bus routes to complement the metro system, and a single I/C card for fare payment on both networks); (c) project cost effectiveness (measured by daily ridership and the working ratio of line 3); and (d) the achievement of compact city development (as measured by the percentage of new development that occurs within walking distance of the new system).

C. Project components

20. The Kunming Urban Rail Project consists of the construction of the 19.54 km long Kunming Metro Line 3 and its 17 stations. The line runs east-west from the proposed Shizui depot in the southwest along Chunyu road onto Renmin Lu, Dong Feng Dong Lu, through to the proposed Fangmaqiao parking yard in the East. The project includes: construction of the line; maintenance and stabling facilities for the trains; traction, signaling, communication, fare collection, and train control systems; procurement of the train sets; and all other works related to implementation of the line.

21. The total project cost will be \$1.72 billion, composed of \$1.42 billion of local counterpart financing and a \$300 million World Bank loan.

22. Briefly, the Bank will finance (details in Annex 4):

- **Component 1. Civil Works (\$209.4 m):** Carrying out a program of civil works for selected stations, including inter alia, bus interchange and bike parking facilities, where appropriate, and associated facilities such as, but not limited to, depots and track, equipments installation, and other related installation at selected stations.
- **Component 2. Equipment (\$86.9 m):** Provision of various equipment such as, but not limited to, power supply, escalators, fare collection, and communication systems, and technological equipment at depot and other related facilities.
- **Component 3. Technical Assistance and Capacity Building (\$3.0 m):** Provision of: (a) studies to support bus-rail integration and the future development and construction of the public transport system; and (b) support for Project management capacity building and for operations management.

D. Lessons learned and reflected in the project design

23. The Project design reflects the key lessons from international experience with urban rail, including that of the Bank. Key relevant lessons include:

- ***Multi-modal integration is critical*** in order for an urban rail system to achieve its potential as a mass transit mode. This requires effective coordination, particularly with bus services, in terms of the provision of physical interchange facilities; route restructuring of bus services to feed, rather than compete, with rail services; and integrated fare structures, fare media, and operational scheduling. It requires a multitude of governmental and non-governmental stakeholders with disparate and sometimes conflicting interests to work together. These include different levels of government, including provincial level agencies with fare-setting authority, municipal level planning, land and transport management agencies, as well as enterprises such as bus companies. Achieving effective coordination in this respect primarily serves the best interests of the rail operator - and requires sustained effort on their part.
- ***Rail projects can achieve desired compact growth patterns only as a part of an integrated package of activities.*** In regions where urbanization and income levels are both increasing rapidly, public transport improvements in and of themselves may have only a limited impact on spatial development patterns. Effective public transport needs to be coordinated with complementary urban growth and transport strategies that actively manage, rather than simply accommodate, automobiles.
- ***Demand forecasts for urban rail are often optimistic*** because they assume multi-modal integration and an integrated public transport oriented urban management approach that is not fully realized in practice. There is a need to ensure that the financial and economic forecasts include sensitivity analyses that reflect this consistent *ex-post* finding.

24. The project has also been designed to reflect lessons learned from the Bank's portfolio of urban transport projects in China, including:

- ***Benefits of focusing investment – particularly in public transport.*** This project represents the first in a new wave of urban transport projects in China that focus exclusively on public transport. This is a shift from a previous generation of projects that have supported a variety of investments, including both bus-based public transport and significant road construction components.
- ***The success of institutional development depends on ensuring clear ownership.*** An important element of the project's TA activities will support the institutional development of a marketing group within the implementing agency (KRTC), with a clear revenue interest in achieving outcomes related to the actions of external agencies such as the bus company, the urban planning bureau, and fare-setting and transport management agencies.
- ***The benefits of participatory planning processes.*** Chinese and international experience has shown that inclusion of the views of the public in the selection, planning and design of investments improves the quality of the completed infrastructure. Building on successful pilots in recent World Bank projects in Liaoning and Taiyuan, a public

consultation process has been carried out in Kunming, and has provided significant guidance on the detailed planning for the project components.

25. More generally, the project design reflects recommendations emerging from the Independent Evaluation Group review of the transport sector (*A Decade of Action in Transport: An Evaluation of World Bank Assistance to the Transport Sector, 1995-2005*) in the focus of evaluation efforts and in its focus on urban transport and multi-modal transport.

E. Alternatives considered and reasons for rejection

26. **Loan Product.** The Bank has previously been involved in lending operations with the municipality of Kunming, but not in the urban transport sector or with Kunming Rail Transit Company. Given China's internal competitive process and procedures regulating the use of World Bank loans, it is difficult to forecast the possibility of future projects in this or associated sectors. As such, a SIL was adopted as the most appropriate loan product for this project.

27. **Investment alternatives.** Kunming has one of the most advanced bus priority systems in China, including system-wide median lane priority on all major arterials. In response to increasing demand, the city had been assessing the possibility of upgrading elements of this system to fully-fledged BRT (including off-board fare collection, revised service plans, and articulated buses) as a short-term precursor to the eventual construction of urban rail. The city decided to advance its urban rail plans in response to the ready availability of financing as part of the financial stimulus.

28. Although the decision to proceed with an urban rail project was largely settled before the Bank became involved, design decisions made since that time reflect the results of careful analysis of alternatives. First, three different vertical alignments for Line 3 were considered, with different lengths of underground and elevated sections and consequently different costs. The chosen alternative reflects the city's decision to minimize long-term aesthetic and physical disruption to the urban environment from the rail system, and to maximize its integration with surrounding land use to facilitate appropriate growth about the alignment. Similarly, Bank intervention resulted in a review of station locations and resulted in a final design that balances considerations of cost, access and operational implications. In addition, technical alternatives were considered for key project components, such as traction systems, track fastenings, fare collection and communication systems.

29. **Choice of Bank-financed investments.** Initially, Kunming Rail Transit Company preferred the Bank to focus its investment solely on procuring equipment and rolling stock for the new line. While justification for this investment could have been made, it was agreed that there was value in the World Bank directly financing elements of the system that reflect the priority of the Bank's appraisal on multi-modal integration. As such the decision was made to include the civil works as well as communications and fare collection equipment in the project

III. IMPLEMENTATION

A. Institutional and implementation arrangements

30. Yunnan Province will be the project's implementing agency but will delegate most responsibility for project implementation, management and monitoring to Kunming Rail Transit Company (KRTC), which will have responsibility for managing and coordinating the implementation of the project (details of the provincial role are summarized in Annex 6). KRTC is an entity of Kunming Municipal Government (KMG), responsible for raising, managing, and repaying funds for Kunming's urban rail construction program.

31. KRTC will be entrusted with overall project management and, through its units, with coordinating the implementation of procurement, contract management, resettlement, social and environmental safeguards, loan disbursement requests, fiduciary compliance, and evaluation, results monitoring, and reporting. KRTC will be the primary coordinating body responsible for communicating with the World Bank, ensuring that implementation is consistent with all relevant World Bank policies and procedures, and ensuring continuity and good coordination between the different implementing entities.

32. **Funds Flow.** The Ministry of Finance (MOF) will on-lend World Bank loan funds to Yunnan Provincial Government (through the Provincial Finance Department). The Provincial Finance Department will in turn on-lend funds to KMG (through the Municipal Finance Bureau), which will in turn on-lend funds to KRTC. This office will act as the representative of the municipal government to manage the loan and ensure future repayment.

B. Monitoring and evaluation of outcomes/results

33. Annex 3 lists the main outcome indicators for the project, as well as the principal results indicators for each component. KRTC will coordinate the relevant agencies in collecting data required for monitoring and evaluation of outcomes. KRTC will review the results on the basis of various progress reports, and take appropriate corrective actions as needed.

C. Sustainability

34. Past experience with infrastructure construction in China suggests that metro infrastructure is likely to be constructed to high quality standards, completed on schedule and operated professionally. However, the long-term financial sustainability of the rail system and its success as a catalyst for compact growth in Kunming will depend on the project's success in attracting riders, which in turn will depend on tackling issues related to modal integration, public-transport oriented urban planning and design, and enacting a broader transport strategy oriented toward public transport.

35. In general, the overall policy environment to achieve these outcomes is relatively favorable in China. This is because municipal boundaries cover both urban and suburban areas - limiting fragmentation of metropolitan governance - and because local governments also have a strong level of control over key factors such as bus service, urban land development and fares. Moreover, the national government is actively promoting compact growth and public transport

priority. Nevertheless, successfully implementing the project and ensuring sustainable outcomes poses significant challenges. Indeed, experience in China suggests that coordinating institutions, aligning disparate local incentives, and overcoming obstacles to implementation have been difficult in practice.

36. Identifying and addressing these challenges has been a critical element of project design and the Bank's preparation process, which has focused on ensuring that:

- demand for bus and bicycle interchange facilities at rail stations has been identified as part of the feasibility study process, and land for such facilities is being allocated;
- the rail fare-setting process fundamentally incorporates the need for coordination with bus fares in the development of a seamless customer-friendly integrated system;
- best practice urban design principles are reflected in any future redevelopment of the walking catchment area about stations;
- the city strengthens the management of urban growth in order to realize its plan for a compact rail oriented city; and
- the city continues to strengthen its public transport oriented urban transport policy.

37. The project's performance indicators and development objectives have also been designed to measure the project's success in addressing these key risks - the key focus of Bank implementation support once implementation begins.

38. Additionally, international experience suggests that ridership-related revenues are rarely able to generate financial returns at a level that could entirely service the capital costs of urban rail systems. This is also likely to be the case in Kunming. As Annex 9 describes, the costs of this investment will be supported by the municipal government using standard Chinese urban investment financing structures. This includes non-operating revenues from sources such as advertising, use of right-of-way for fiber optics, urban operations, renting of shopping facilities, and associated developments.

D. Critical risks and possible controversial aspects

39. The Bank's experience with infrastructure development in China has generally been very successful and suggests that broad systemic political and macro-economic policy risks are low. While fiduciary risks depend on a variety of local and institutional factors, the general track record of large cities with Bank experience has been good. Similarly, Chinese counterparts have a good record of adhering to the Bank's resettlement and environmental safeguard policies – in the case of resettlement policies the key has been to reach agreement during preparation of resettlement packages which is consistent both with Bank policy as well as local practice in use for other locally-financed projects. Key project-related risks and mitigation policies in this respect are described below:

| Description of Risks | | Mitigation Measures | Risk Rating with Mitigation |
|--|-------------------|---|-----------------------------|
| To Development Objectives: | | | |
| Continued urbanization and economic development of Kunming may falter. | M | Kunming is the leading city in China's southwest and has seen strong double-digit economic growth in the last decade. Plans call for it to grow to 7 million by 2020, consistent with broader trends in China. | M |
| <p>Compact growth (and forecast rail ridership) many not be realized due to:</p> <p>(i) dispersed urban growth outside of rail corridors.</p> <p>(ii) an auto-friendly transport environment that promotes sprawled spatial development.</p> | <p>S</p> <p>S</p> | <p>As confirmed by Bank team review, Kunming's master plan calls for compact future growth about rail stations. The key focus of this project will be support for the rail company in ensuring that it is able to deliver high quality TOD. The project will support KRTC to follow-up on these issues.</p> <p>Kunming has designed and has started implementing a progressive transport strategy for the Chinese context. Key will be to maintain consistent implementation of public transport priority. The project will support KRTC marketing department to follow-up on these issues.</p> | <p>S</p> <p>S</p> |
| Forecast rail ridership may not be realized due to poor integration: | | | |

| | | | |
|--|-----|---|-----|
| (i) with buses | S | <ul style="list-style-type: none"> - bus interchange facilities and land parcels for their placement identified by negotiations, and approved by planning commission before disbursement against works or goods. - agreement reached on principles underlying rail fare strategy to ensure coordination with bus fares. - city committed to implementing common rail-bus fare card. - Project will support KRTC marketing department to follow-up on these issues. | M/S |
| (ii) with cycles | S | Bicycle interchange facilities and land parcels for their placement identified by negotiations and approved by planning commission before disbursement against works or goods. | M |
| (iii) with the immediate pedestrian environment | S | Best practice urban design principles discussed with Planning Bureau. The project will support KRTC real estate development division to follow-up on these issues. | S |
| Financial sustainability and economic return: economic and financial analysis may be optimistic if rail ridership is not realized due to risks identified above. | H | Three pronged approach: (a) mitigation actions focusing on multi-modal integration, urban growth and management, as discussed above; (b) extensive sensitivity analysis of the demand analysis underlying the revenue estimates, as well as bottom-up checks based on bus system data - both these two actions focus on the economic return; and (c) financial analysis of the rail system and of the city's ability to support operations with direct subsidies, and fiscal impact analysis of the investment on the city's debt capacity. | S/H |
| The lack of timely counterpart financing could delay project implementation. | S | KRTC is financing counterpart funds with commercial bank loans that have already been committed. | L |
| Risk of delays in the procurement process. | M/S | The Bank team will engage the support of specialists with extensive experience in urban rail procurements in a World Bank setting to avoid problems experienced in similar bids. | M |

| | | | |
|--|----------|--|------------|
| Safety-issues related to complex underground construction, including risk of construction accidents. | L/M | The project is not complex or particularly large in the current Chinese context. Bidding documents will be monitored to ensure that contractors have adequate experience and take adequate safety precautions. To address construction safety concerns, strict compliance of construction safety norms will be enforced, and emergency plans for workers and people living around the construction area will be developed. | L |
| Lack of institutional capacity in the city to effectively implement World Bank fiduciary, environmental and resettlement safeguards. | L/M | The city has extensive experience of implementing prior Bank infrastructure projects. Assessments have been done on fiduciary and safeguards issues and all identified weaknesses have been addressed appropriately. | L |
| Overall | H | | S/H |

E. Loan/credit conditions and covenants

Disbursement Conditions:

For civil works, goods, consultant services and training (category 1):

- the Subsidiary Agreement has been executed on behalf of KMG and KRTC;
- the Subsidiary Agreement has been duly authorized or ratified and is legally binding upon the KMG and KRTC in accordance with its terms; and
- KRTC has secured the land required for metro - public transport - bicycle integration according to the Integration Plan, in form and substance acceptable to the Bank.

Implementation Covenants:

The Project Implementing Entity will:

- prepare, in accordance with terms of reference satisfactory to the Bank, and furnish to the Bank by February 15 in each calendar year, beginning on February 15, 2012, for review and approval, a proposed action plan for carrying out its Respective Parts of the Project during the same calendar year, said work plan to include, *inter alia*, the scope and schedule of activities under its Respective Parts of the Project, the financing plan and detailed budget arrangements (including required counterpart funds as validated by each Project City);
- thereafter, carry out such Respective Parts of the Project in accordance with such action plan, as shall have been approved by the Bank; and

- (c) provide to the Bank for its prior concurrence any proposed modification or waiver of its respective annual action plan, or any provisions thereof, prior to putting into effect such modification or waiver.

F. Reporting and Monitoring

40. The following reports will be furnished to the Bank:

- **Monitoring Reports.** KRTC will furnish half-yearly reports on implementation of the Environmental Management Plan (EMP) and Resettlement Action Plan (RAP).
- **Progress reporting and mid-project review.** KRTC will furnish a semi-annual progress report on project implementation, by February 15 and August 15 of each year, starting with August 2011 and until the project is completed. In addition, KRTC will submit a project mid-term review report by December 31, 2012.
- **Annual Review.** KRTC will conduct an annual review of implementation progress to address emerging problems and to agree on the annual work plan for the following year. The review will take place by December 15 of each year, starting 2011.
- **Annual work plans.** KRTC will furnish the consolidated annual work plan by February 15 each year, starting 2012, based on annual work plans.

IV. APPRAISAL SUMMARY

A. Economic and financial analyses

Economic (Cost Benefit) evaluation

Economic Internal Rate of Return (EIRR) = 8 percent

41. The benefits of the new Kunming metro line considered in this analysis fall into three main categories:

- The change in user benefits for passengers transferring to the metro; this is a combination of travel time savings, net of any change in fares, together with any changes in interchanges, headways and service frequencies.
- Changes in the operating costs of urban transport, i.e., the cost of the metro, net of the change in the cost of operating the urban bus network, as well as the operating costs of car users who also transfer to transit.
- Changes in the external costs of the urban transport system. These have been identified in five groups:
 - Accident benefits due to the reduced travel on the surface street network
 - Congestion benefits for other road users
 - Pollution benefits from the reduction in car and bus traffic
 - Noise benefits from the reduction in motorized traffic
 - Greenhouse gas benefits due to the reduction in petroleum-driven vehicles

42. The above are all quantifiable and were used in the economic analysis. There are, however, a number of non-quantifiable benefits which were not captured in the cost-benefit analysis, but are worth noting:

- *Accessibility*: The metro will promote interconnection between residential and employment areas and social facilities (hospitals, schools) by lowering the obstacles to travel within the city. Although the economic evaluation quantifies improvement in travel time savings, it does not directly quantify the benefits of this increased accessibility for residents of Kunming. The metro system will provide increased access to economic opportunity for all of Kunming's residents, including those of low income.⁶
- *Compact City Growth*: As described in Annex 1, one of the primary goals of Kunming's planned metro system is to focus urban growth on the upgraded public transport network. Experience elsewhere has demonstrated that this will require a package of measures designed to support the new urban rail network. Over the long term, compact urban growth can substantially reduce the energy intensity and greenhouse gas emissions of urban areas. This is particularly crucial since Kunming is at a relatively early stage of its development and decisions on urban development made now will be 'locked in' over the long term – for better or for worse. These long term secondary impacts are not quantifiable in a traditional cost-benefit analysis.

43. The project has an EIRR of 8 percent. The project is robust against a wide range of sensitivity tests, with most tests, such as reducing the value of time by 20 percent, reducing traffic growth rates by one-half, and increasing investment cost by 40 percent, still resulting in an EIRR of 5 percent or better.

Financial evaluation

Financial Internal Rate of Return (FIRR) = 0 percent

44. The fare policy for the metro is still under discussion, but it is expected to be integrated with that of the bus network, although the unit fares on the two modes may not be the same. The current fare on the existing bus network is a flat RMB1.00 with free transfers provided for I/C card users, equivalent to about RMB0.15 per passenger-km. As the bus passengers transferring tend to be those making longer journeys, the revenue loss to the buses is about RMB 0.10 per passenger-km lost. The demand model (and associated financial evaluation) assumes fares on the metro are set on a graduated basis ranging from RMB2.00 for short trips up to RMB5 for the longest trips, with an average yield of RMB0.21 per passenger-km, reflecting its superior level of service. This still represents a reduction in generalized cost for most passengers and it is expected that transfer rates of up to 50 percent can be achieved with this fare level. When the service is introduced, incomes will be about 40 percent greater than today and experience in China has shown that a majority of passengers are prepared to pay the higher price for improved service.

⁶ Tools have begun to be developed to directly measure the accessibility impacts (i.e., the increase in the number of jobs that can be reached within a given time frame by a given mode for different social groups) of major infrastructure projects. Due to a lack of data and the relative novelty of these techniques, this study did not seek to quantify these impacts in Kunming.

45. Based on these tariffs, the FIRR is 0 percent, i.e., the cumulative surplus of revenue over operating cost, taken over 30 years, just balances the capital cost of the project. However, it is expected that the project will be cash-positive from the start of operations.

46. The financial analysis also included an assessment of the financial structure supporting KRTC, as well as an assessment of the financial capacity of the municipality. The assessment (details in Annex 9) found that the project is affordable for Kunming based on its proposed funding sources.

B. Technical

47. As noted, Bank focus during preparation and project design was on four key issues:

- identifying and addressing barriers to transit-oriented spatial growth - ideally conceived as a major benefit of the urban rail system;
- identifying and addressing barriers to the development of an effective multi-modal public transport system with urban rail as the network backbone;
- technical and safety analysis of the urban rail project, ensuring that all appropriate technical, cost-effective, energy efficient alternatives were fully considered; and
- ensuring that the technical planning process was complemented by an inclusive public outreach and participation process.

48. **Compact growth.** In terms of catalyzing compact growth, three kinds of barriers were identified. First, while the municipal urban master plan supports and encourages compact rail-oriented future growth, planning management and plan implementation controls would benefit from strengthening. Ideally, strengthened controls would effectively discourage speculative development at ‘cheaper’ lower-priority sites not well connected to the public transport system. Second, many stations, particularly outside of the city center, are surrounded by urban villages that are expected to be redeveloped as part of the urban core. To ensure that this redevelopment process produces transit-oriented environments, careful and deliberate urban design is required. Finally, while Kunming has a tradition and a deliberate set of transport policies that prioritize public transport, such policies will need constant review and strengthening. Preparation has included a strong dialogue with the planning bureau on issues related to medium-term planning controls, urban design guidelines, parking charges and policy. The technical assistance component of the project includes support for KRTC to develop a marketing department that continues to follow and support such activities. Further, a complementary Global Environment Facility (GEF) project is being discussed to support the planning bureau on developing effective instruments in this respect.

49. **Multi-modal integration.** The most fundamental barrier to effective multi-modal integration is that the ‘red-line’ or the project boundary for an urban rail project in China does not include bus and cycle interchange facilities. While the need and value of such facilities is recognized, no institutional or implementation structure exists to ensure that demand for such interchange facilities is identified and such facilities are planned for and built. A significant breakthrough in Kunming, relative to standard Chinese practice, has been working to identify and allocate land for such key interchanges as part of the appraisal process. Additionally, studies

have commenced on bus system route restructuring to complement the proposed rail lines, and to design a fare structure that provides potential riders an integrated rail-plus-bus public transport system rather than competing rail and bus choices. The municipal government is committed to implementing a common fare card for rail and bus before the first rail line begins operation. Finally, in recognition of the fact that all of these issues will benefit from systematic review, the technical assistance component of the project includes support for KRTC to develop a marketing department that continues to follow up on and support such activities. A potential GEF project would also include support for the transport bureau, the bus company, and additional activities to promote the use of bicycles as an access mode for the rail system.

50. **Choice of technology.** The feasibility study has been prepared by the China Second Railway Design Institute, a reputable Chinese design institute with significant prior experience with Bank-financed projects. Project designs are technically sound and are based on sound engineering practice. Line 3 will use state-of-the-art technology with consideration for compatibility with Line 1/2, currently under construction. For underground construction, mostly shield (Earth Pressure Balance System-EPBS) tunneling method will be used along with mining and New Austrian Tunneling Method (NATM) at some locations where appropriate. Underground stations will be constructed by cut-and-cover method. Stations will be designed to provide easy interchange with the other lines of the Kunming rail system and other modes. Stations will not be air conditioned because of Kunming's relatively mild year round climate.

51. The system will use a 750 V DC traction power supply system with third rail bottom collection. The signaling system will use moving block automatic control system with automatic train protection (ATP), automatic train operation (ATO), and automatic train supervision (ATS) subsystems. The project will provide an efficient passenger information system. The fare collection system will be automatic fare collection system (AFC) with contact less tickets. A total of 144 train cars are required to run 15 services in either direction with 6 car trains. Each train will have a carrying capacity of 1,460 passengers, with 6 persons per square meter. These trains can run at a maximum permissible speed of 80 kmph. Trains will use a regenerative braking system, which will enable substantial saving in traction power.

52. **Public outreach.** A key feature of project design has been the use of an extensive public participation process to complement technical analysis. Technical preparation was complemented by an independently supervised three-stage effort consisting of focus groups, open meetings, and questionnaires, which sought to obtain public input into the project design and to target the needs of vulnerable groups, such as the elderly, migrant workers, the mobility impaired, and the poor. This process provided suggestions on station locations, suggestions relating to minimizing resettlement, and suggestions on how to minimize related disruption concerns related to construction-related traffic disruption as well as noise and dust impact of construction; concerns related to inclusive design to ensure full accessibility; and operational safety issues.

C. Fiduciary

53. **Financial Management.** The adequacy of the Project's financial management system has been assessed, applying the guidelines issued by the Financial Management Sector Board on

November 3, 2005. The project meets minimum Bank financial management requirements, as stipulated in OP/BP 10.02. The project will maintain adequate financial management arrangements acceptable to the Bank and, as part of the overall arrangements that the borrower has in place for implementing the operation, provide reasonable assurance that the proceeds of the loan will be used for the purposes for which the loan is granted. Financial management risk is defined as the risk that the World Bank loan will not be used for the purposes intended, and is a combination of country, sector and project-specific risk factors. Taking into account the risk mitigation measures proposed under the project, a “Low” FM risk rating has been assigned to the project.

54. **Procurement.** A procurement capacity assessment of the implementing agency, carried out prior to appraisal, concluded that the overall risk of the procurement process is moderate (for more details see Annex 8). Procurement will be conducted by KRTC. To ensure quality and consistency with Bank policy, KRTC has hired a procurement agent with prior experience of Bank-financed projects. On International Competitive Bidding (ICB) and National Competitive Bidding (NCB) procurement, the procurement agent will support KRTC in preparing the commercial portion of the bidding documents, publishing the Specific Procurement Notices, hosting the bid opening, evaluating bids, sending the bidding documents and the Bid Evaluation Reports to the Bank for review, and other related services.

D. Social

55. The project has significant social benefits as it supports the development of Line 3 as an integrated part of the public transportation system of the city. The project is expected to benefit the local communities by enhancing the options for affordable, safe and fast public transportation in the vicinity of the line.

56. The project has adverse impacts related to the need for land acquisition and involuntary resettlement. Table below summarizes the resettlement impacts of the project.

| Collective Land Acquisition | | House Demolition | | Affected Shops | | Enterprises/Institutes | |
|--|--------|------------------|-----------|----------------|-----|------------------------|-----|
| Area(Mu) | HH/PAP | Urban/PAP | Rural/PAP | Number | PAP | Number | PAP |
| 321 | 12/36 | 34/127 | 27/185 | 134 | 395 | 14 | 143 |
| Total Number of PAPs: 844 (42 people affected by both house demolition and shop demolition.) | | | | | | | |

E. Environment

57. The project will have significant positive environmental impacts by promoting mass public transportation, which will in turn help alleviate urban traffic congestion, reduce environmental pollution related to vehicle emissions, and improve overall quality of life in the Kunming metropolitan area.

58. Manageable negative impacts of the project are mainly the environmental issues related to urban construction activities, i.e., disruption of traffic; tunnel construction safety; potential impact on surrounding buildings and proper disposal of spoil material; and dust and noise

nuisance during construction. Other impacts during operation include noise and vibration, aesthetics integration, and waste management from rail operation facilities. These environmental and social impacts are thoroughly addressed by the Environmental Impact Assessment (EIA) report, and necessary mitigation measures have been developed in the EMP. Bank review has concluded that these adverse environmental and social impacts can be adequately avoided, minimized and mitigated with good management practice and mitigation measures, as developed in the EIA/EMP.

59. Two rounds of public consultations were conducted during EA preparation according to requirements of both Chinese legislations and the World Bank's OP 4.01. The EIA report has been disclosed on the websites of Yunnan Provincial Environmental Protection Bureau and Kunming Urban Rail Company, as well as on the World Bank's Infoshop.

F. Safeguard policies

| Safeguard Policies Triggered by the Project | Yes | No |
|--|-------------------------------------|-------------------------------------|
| Environmental Assessment (OP/BP 4.01) | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| Natural Habitats (OP/BP 4.04) | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| Pest Management (OP 4.09) | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| Physical Cultural Resources (OP/BP 4.11) | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| Involuntary Resettlement (OP/BP 4.12) | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| Indigenous Peoples (OP/BP 4.10) | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| Forests (OP/BP 4.36) | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| Safety of Dams (OP/BP 4.37) | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| Projects in Disputed Areas (OP/BP 7.60)* | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| Projects on International Waterways (OP/BP 7.50) | <input type="checkbox"/> | <input checked="" type="checkbox"/> |

G. Policy Exceptions and Readiness

60. No policy exceptions are requested. The project meets regional criteria for readiness.

* *By supporting the proposed project, the Bank does not intend to prejudice the final determination of the parties' claims on the disputed areas*

Annex 1: Country and Sector Background

CHINA: Kunming Urban Rail Project

Urban Rail in China

1. Urbanization is occurring on an unprecedented scale in China. As recently as 1985, China's urban population was less than 25 percent of the total. By 1995 it had reached 30 percent and by 2005, 43 percent. The Government expects 20 million people to migrate from the countryside to urban areas each year for the next 20 years.⁷ This urbanization process has been defined by the growth of a large number of major cities, and a restructuring of land-use patterns - both leading to more complex transport patterns that present a formidable development challenge.

2. In the last decade, this explosive growth in urbanization has helped spur an unprecedented boom in urban rail construction. As of 2000, 4 cities in mainland China had metro systems operating on a total track length of 101 kilometers. By January of 2010, 10 cities were operating metros on 870 kilometers of total track. That marks an increase of more than 750 percent in a decade, equivalent to adding almost two times the total track length of London's Underground, the world's largest subway system by track mileage. But even this dramatic increase is dwarfed by the fully built-out system plans that have already gained NDRC approval. As of January 2010, 23 cities had approved metro plans with a total track length of a remarkable 5,148 km. These are not simply numbers; gaining NDRC approval is perceived as virtually ensuring the construction of the proposed lines. Indeed, many of the proposed systems are already under construction. For reference, an informal tally of *all existing metro systems in Europe and North America combined*, including the vast systems in London, New York, Moscow and Paris constructed over more than a century, revealed that total currently operated mileage is approximately 4,750 km.

3. All cities proposing metro systems exhibit huge ambition - in their first project, in the basic metro network, and in the full future network. These networks are, for the city size and stage of development, massive by comparison with cities overseas. China's cities will rapidly become the leader in the world for scale of metro development. Shanghai and Guangzhou both have proposed networks that will dwarf the current world leaders. But even smaller cities are poised for unprecedented metro systems. Nanchang, for example, a city currently with 3.7 million inhabitants, has an approved plan for a network of 168 km, larger than all but a handful of the largest systems in the world.

4. This boom has been fueled by a potent mix of demographic trends and policy imperatives. The number and size of mega-cities in China is continuing to increase, more city clusters are emerging, and metropolitan areas are extending. These growing cities are also experiencing rapid income growth, creating demand for high-quality urban travel as measured by speed, flexibility, comfort, cleanliness, and safety. At the same time, national policies on land conservation, environmental protection, energy efficiency and CO₂ emission reduction are acting

⁷ The urbanization rate currently stands at 1.4 percent, which means that about 20 million farmers become urban residents each year. On the assumption that the urbanization drive maintains a growth of 1 percent annually, Chinese cities and towns will be absorbing about 300 million people from rural areas in the next 20 years.

to promote higher-density, compact land-use development patterns. Transport corridors with sufficient density of demand for mass rapid transit will therefore continue to emerge both organically and through prescriptive policies. This combination of rapid urbanization, growing travel demand, and increasing ability and willingness to pay for quality transport service mean that over the next 20-30 years China will probably generate more transport corridors with sufficient density of demand to justify new urban rail lines than any other country, or indeed continent.

Total Approved Network, route kms

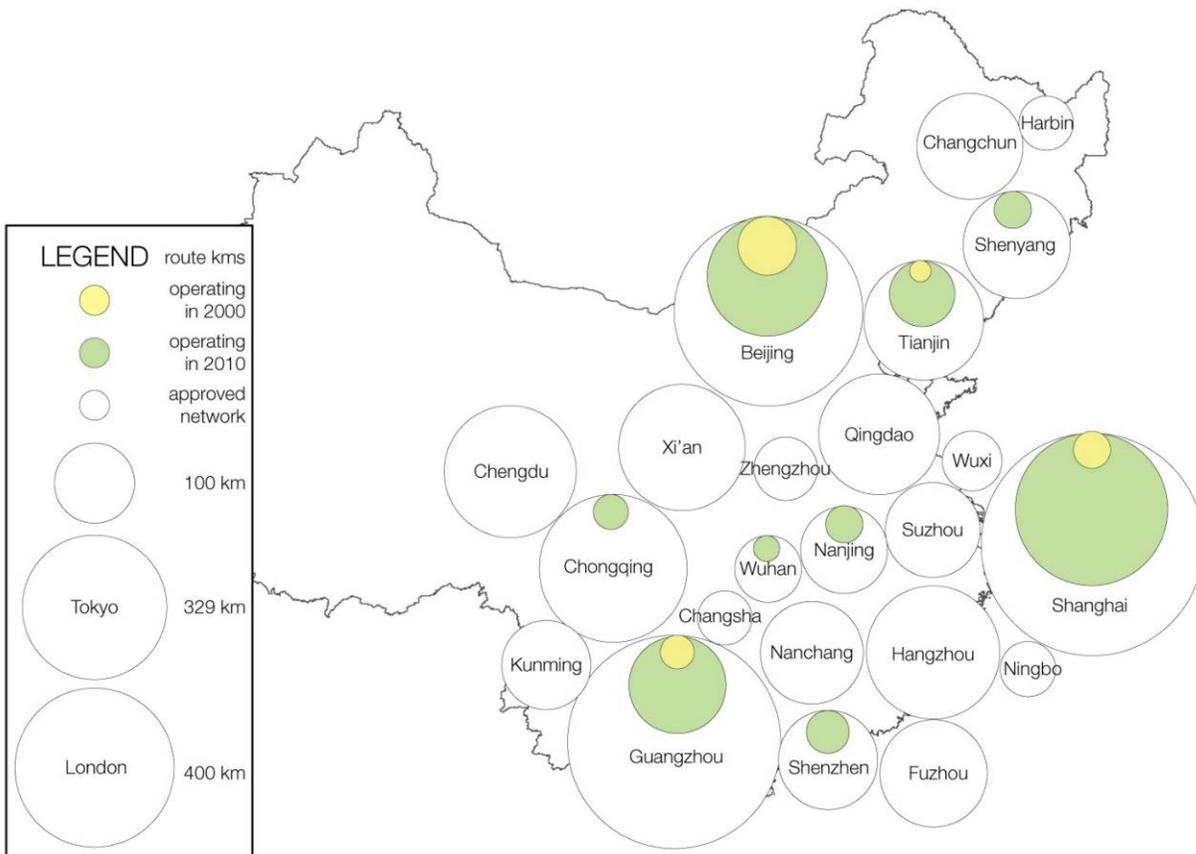


Figure 1 Metro Development in China. Source: World Bank (valid as of January 1, 2010)

5. In terms of ridership, the trunk metro lines of major Chinese cities (Beijing, Shanghai, Guangzhou) are currently experiencing very high levels of ridership – in many cases above 1 million riders a day. Some of the new lines into suburban areas (for example, recent lines in Shanghai and Tianjin) are finding that non-trivial ramp up times are needed to induce development and demand. However, the rapid spatial growth accompanying China’s urbanization has provided the base for real and relatively fast new development about rail stations. There is, as yet, less experience in second tier cities. Wuhan, as an example, had a line which for several years experienced very low ridership. It has, however, recently been extended to 30km and ridership has risen to 160,000/day and continues to rise. In general, experience

suggests that while all issues that need attention (modal integration, pro-rail development, supportive transport policy) continue to be as important as they are in the rest of the world – the trunk lines of major Chinese cities have had solid potential for urban rail.

6. The Chinese experience with respect to costs has been encouraging. There is a legal requirement for actual costs to not exceed feasibility study estimates significantly and generally actual costs have not been significantly greater than feasibility estimates.

The Kunming Context for Urban Rail

7. Kunming, the capital city of Yunnan Province in China’s southwest, is in many ways illustrative of this national trend. The municipality has an estimated population of 5.7 million (with 2.8 million residing in the central city area), 1 million motor vehicles, and GDP of RMB120 billion (approximately RMB21,000 per capita). According to the most recent urban plan, the Urban Planning Bureau is planning for the urban districts of central Kunming to grow from a current population of 2.8 million to about 4 million by 2020.

Table 1.1: Mode Split in Kunming, 1994 and 2005

| Means | Public Bus | Company Bus | Car | Taxi | Motorcycle | Bike | Walk | Other |
|-------|------------|-------------|-------|------|------------|-------|-------|-------|
| 1994 | 5.65 | 2.24 | 1.54 | 0.51 | 1.32 | 54.19 | 33.22 | 1.33 |
| 2005 | 14.63 | 2.52 | 10.77 | 2.10 | 4.90 | 31.02 | 33.83 | 0.23 |

8. As elsewhere in China, Kunming has witnessed a significant increase in the use of motor vehicles in the decade from 1994 to 2005. Kunming is now confronting a rapid rise in traffic congestion, a result of the city’s rapid growth in extent, population and motorization (see table 1.1). Travel demand continues to increase rapidly. In response, the city has planned, and gained approval for, a large scale investment in urban rail. The proposed system would encompass six lines operating on a total length of 162.6 km. The two lines to be constructed first are located in the corridors with the highest present day bus ridership. The first line is currently under construction, and this project would fund construction of the other.⁸

9. This line, still in the planning phase, consists of a total of 19.54 km running east-west from the proposed Shizui depot in the southwest along Chunyu road, through to the proposed Fangmaqiao maintenance yard in the east, including 17 stations. The total project cost is projected at US\$1.7116 billion.

10. The city is notable for its sustained focus on public transport. It was one of the first cities in China to implement a network of bus priority corridors. Moreover, the city has a substantial conventional bus transport system, with 200 routes covering more than 3,000 total route-kilometers, and more than 1.6 million daily public transport boardings. The system is efficiently

⁸ The first line to be constructed will be a combination of the southern end of what will be Line 1 in the final six line configuration, and the northern portion of what will be Line 2 – throughout this document, this line will be referred to as Line 1/2. The line financed under this World Bank loan is referred to as Line 3- although it will be one of two lines completed in the first phase.

operated, with a labor-bus ratio of only 3, and a 90 percent operating cost recovery at a uniform fare of RMB1.00. However, the city is facing a major challenge from rapidly growing motor vehicle traffic. In response, the city has planned an extensive urban rail network. It is expected that the urban rail lines will serve as the core for future high density urban land use development.

11. In Kunming, as elsewhere in China, the planned large-scale investment in urban rail represents a positive trend in urban transport infrastructure development away from a focus primarily on roads and toward public transport. A focus on urban rail has the potential to deliver significant social, economic and environmental benefits to rapidly growing Chinese cities: increased use of public transport, leading potentially to lower levels of congestion, air pollution, and GHG emissions; fewer traffic-related fatalities; an anchor for transit-oriented urbanization and spatial growth; increased mobility and accessibility for low income populations; and increased use of complementary means of non-motorized transport. Nevertheless, as experience elsewhere has shown, investment in urban rail alone is not sufficient to ensure optimal outcomes. To achieve their maximum benefit, metro projects need to be part of an integrated package that includes: (a) coordinated land use planning; (b) integration with bus services; and (c) a broader transport strategy that limits automobile use while favoring cycling and walking. Each of these issues is addressed below, along with the way in which the current project addresses these issues.

Issue 1: TRANSIT ORIENTED DEVELOPMENT

Urban Rail – A Potential Anchor for Compact City Growth?

12. It is now common knowledge that land use and transport are closely connected. Experience in developed countries has demonstrated that high-density development is necessary to support viable public transport operations and the greater energy efficiency and lower greenhouse gas emissions that such operations entail. In addition, experience has demonstrated the degree to which the initial design of an urban area exerts a ‘lock-in’ effect where low density, auto-dependent development is difficult or impossible to convert to support walking, cycling and public transport.

13. Recent metro projects have been advanced in many developed countries with the stated intent of creating a more compact and energy efficient urban form. Although the concept of integrating land use and transport has roots that stretch back before the turn of the 20th century, in its modern form the concept has become known as TOD, a term popularized by Peter Calthorpe in his 1993 work, *The Next American Metropolis: Ecology, Community, and the American Dream*.

14. Despite the growing popularity of this concept, examples of success are thus far limited. Some cities, notably Atlanta and Miami in the United States, have spent billions of dollars on implementing high-capacity rail systems but have not experienced the type of high-density residential development originally hoped for. The most systematic long-term study of the development impacts of a new heavy-rail transit system is Robert Cervero’s study of the Bay Area Rapid Transit (BART) system in the San Francisco Bay Area over 20 years of operation.⁹ Through careful investigation, the study concluded that the BART system had had only limited

⁹ *Twenty Years of the Bay Area Rapid Transit System: Land Use and Development Impacts*, Robert Cervero and John Landis, Transport Research A, 1997

development impact in outlying suburban areas, although it had helped to significantly strengthen the CBD as the focus of employment in the region.

15. The systematic study of BART, as well as summary evidence from American cities, suggests that the introduction of heavy rail is not on its own enough to foster compact city development. Indeed, the fractured of governance in American cities (consider, for example, Boston, where 101 separate cities and towns compose the metropolitan area) allows individual towns to exclude unwanted land use, including increased residential density, limiting the effectiveness of new rail systems in fostering high density development. In addition, many rail systems, notably Atlanta and Miami as mentioned, were inaugurated long after rapid urban growth supported by pervasive automobility had taken place, limiting the ability of urban rail to mould development.

16. Yet evidence of the power of transport and land development to work together abounds: 19th century examples such as New York City's high density core and inner ring suburbs are notable early examples, while the modern development of Hong Kong, SAR, China and Singapore provide more recent evidence. The crucial element of success in these cases was that urban development from the outset was deliberately tailored to foster the success of the rail system. In the case of Hong Kong, SAR, China and Singapore, land development responsibilities were deliberately handed over to the rail company both to provide financial support and to recognize the clear interest of the rail operating companies in the character of development in the area surrounding their systems. This deliberate combination of urban development and urban transport with a joint purpose has helped ensure that the two are mutually reinforcing, and has contributed to the long-term financial viability of these two systems.

17. This international experience provides valuable lessons for Chinese cities – such as Kunming – currently experiencing dramatic urban growth. However, any application of these lessons will need to consider the unique characteristics of Chinese urban development. In some sense, modern Chinese experience represents a mixture of the market-oriented and difficult to coordinate American context with the more carefully controlled structure of Hong Kong, SAR, China and Singapore.

18. The most important distinguishing characteristic of the Chinese context is rapid, robust, and continuing urban development. Chinese cities are in the midst of an urban development boom that has virtually no historical precedent; this continued urban growth ensures that development pressure will exist. The question is whether it can be tailored to support new public transport systems. In addition, Chinese cities contain a dense, historic core that provides an ideal anchor for a mass transit system, although the conditions that led to this density are rapidly transforming.

19. In addition, institutionally, China is well organized to respond when compared to many other countries. Chinese municipal governments usually manage a geographic catchment area much larger than the contiguously built-up city area. This is advantageous for long-term spatial development planning and for the management of the dynamics of land use and transport interactions. Most Chinese cities are therefore already in a position to plan their urban rail systems based on urban master plans that they develop from a wide range of policy objectives,

though they have not always proved ready to use these tools to support transit friendly urban development. Indeed, the road network - instead of the public transport network - was, until recently, most commonly used in Chinese urban master plans as an instrument to shape urban land use.

20. Chinese municipal governments also have nominal control over the entire collection of agencies required to successfully implement a compact city vision - the rail company, the planning bureau, the transport bureau, and the bus companies, to name only the most prominent. Having the municipal government as an umbrella organization with power over this collection of agencies has the potential to create a unified front advocating compact city development, although this is rarely achieved in practice.

21. Finally, the central government has acknowledged both a social and economic interest in urban public transport and a responsibility for financial oversight of investment in urban rail projects. It has established a formal screening mechanism for urban rail projects that sets out minimum requirements for cities that intend to develop urban rail projects, including benchmarks for city population, city GDP, city budget income, corridor passenger demand, and city equity investment (to guard against excessive borrowing). It also requires and reviews feasibility studies of specific investment project proposals.

22. Despite these advantages, a number of policies are currently inhibiting the development of efficient land use in Chinese cities, including the protection of farmland leading to fragmented development at the urban periphery; limits on building intensity in city cores; a surplus conversion of rural land to urban land; and lack of coordination between land use and infrastructure development. Taken together, the combination of the unique strengths and weaknesses of the Chinese context, and the mixed experience of cities around the world, demonstrate that using heavy rail systems to create a compact city form will require sustained effort over the long term. For this reason, Bank involvement has focused on this issue during preparation of the Kunming Urban Rail Project.

Compact City Growth in Kunming

23. In Kunming, the Municipal Urban Planning Bureau is in charge of promulgating the city's urban development vision and managing the mechanisms to implement it. The Urban Planning Bureau is planning for significant growth in central Kunming, with the population in urban districts projected to expand from the current 2.8 million residents to about 4 million by 2020. The city's vision includes the development of a compact urban form focused around new urban rail development. Constrained by lakes and mountains, the municipality's land use plan supports a high density, compact development pattern.

24. To help achieve this, Kunming has already modified its planning in advance of the construction of the new metro network to allow for higher building heights and higher Floor-Area ratios (FARs) in the downtown core and along proposed rail lines. Despite these initial steps, realization of transit-oriented development will require careful attention to detail throughout the implementation of this project and over the long-term.

25. Kunming has several mechanisms which may enable it to achieve this vision to a degree not seen elsewhere. First, the city of Kunming controls the release of land for development over

its entire territory through the Land Storage Center, an arm of the municipal government. This Center will be responsible for auctioning the land as per the directions of the Urban Planning Bureau. All government land development in Kunming has to proceed through the Land Storage Center, which reports directly to a municipal vice-mayor. This mechanism gives the municipal government more control over the supply of land available for development in Kunming than is the case in most Chinese cities - where districts are often able to dilute the vision of the municipal master-plan by implementing projects that serve district interests, even if they are not fully consistent with the priorities of the overall master plan.

26. The city is expected to use these tools to enable major redevelopment along the Line 3 corridor. Specifically, a combination of derelict industrial sites (such as power plants and cement factories) along the western end of the alignment, and greenfield areas along the east of the alignment, will be a focus of new development. In addition, several urban villages along the line are being redeveloped to support higher densities.

27. The Bank team has performed an extensive review of the recently updated master plan and complementary detailed control plan, which both focus on achieving transit-oriented development. However, despite the city's commitment, the considerable actions already taken and the favorable institutional climate relative to the broader Chinese context, achieving true TOD in Kunming will remain a challenge.

28. A key issue in this context is greater attention to the details of urban design. The success of both the Singapore and Hong Kong, SAR, China system reflect knowledge of and attention to the details of the urban environment (station design, entrance location, land use mix, road widths, setbacks, height, etc) and their influence on ridership and the ultimate success of urban rail systems. Chinese cities have in the past designed station areas without a similar attention to the factors that lead to rail system success.

29. The following project elements address this issue:

- Capacity building on best practice urban design and transit-oriented development has been planned. Significant dialogue has already taken place on this issue during project preparation. In addition, the marketing team to be developed as part of component 3 of the project will contain expertise on fostering transit friendly urban development.
- The Bank is funding station infrastructure with the intent of fostering the use of non-motorized modes to access stations. Well-designed stations will help create a more hospitable, pedestrian-friendly environment and ultimately help support the density of development envisioned by the urban planning bureau.
- An indicator has been designed specifically to monitor compact city growth. This monitoring will ensure that this issue will form an important component of project supervision.

Issue 2: BUS-RAIL INTEGRATION

30. A lack of bus-rail integration is one of the most frequently occurring issues in recently completed Chinese urban rail systems. As described in the World Bank "Urban Rail in China" report, these issues include:

- **Institutional.** Unfortunately, in most Chinese cities, urban rail and urban bus systems are managed by two separate agencies, with no formal mechanism for integration between them (despite both being under the nominal control of the municipal government). Exacerbating the situation, urban rail companies typically have a larger asset base, a clearer connection to the central government, and a higher status level than the urban bus companies, hampering cooperation.
- **Service Planning.** Bus and metro systems are often planned without careful cooperation between their respective services. Space for bus interchange facilities at stations is not often part of the design process, leading to problematic and inconvenient transfers. Clearly, this situation has the potential to produce sub-optimal results, including higher operating costs, duplication of service, and lower quality of service for transit riders.
- **Fares.** Development of fare policy and fare media technology that balances the affordability of the system to the municipal government and its users, provides an integrated experience for the customer, and considers the financial needs of both the bus and metro companies, is not a simple process. Unfortunately, in many Chinese cities, this issue has not received sufficient attention.

31. Although it may be easier than many other places in China, integration of bus and metro operations will be a crucial challenge in Kunming. If the introduction of the metro system is to attract more people to public transport, improve the quality and level of service for existing public transport riders and induce more sustainable land-use patterns, seamless integration with the existing bus network is an essential requirement. Seamless integration has multiple dimensions. It involves developing institutions capable of managing bus/metro integration; service planning to reorganize the bus system so that bus and metro networks complement, rather than compete with, each other; the development interchange facilities between bus and metro; and the integration of fare media and fare policy between modes.

32. **Institutions.** The bus system in Kunming is regulated by the public transport division of the Transport Bureau. The bus company signs a franchise agreement with the transport bureau that specifies service hours, scope of responsibilities, and the rights and interests of both parties. The Kunming Public Transport Group Company, a state-owned company, operates the bulk of the service with 2,100 of its own buses. It also has a 49 percent stake and operational control of a joint venture with the Hong Kong, SAR, China-based New World Company that operates 1,100 buses; and a controlling stake in the Urban Rural Bus Company that operates 200 buses and is a Joint Venture with the Zhongbei Company. Apart from these 3 companies, the Zhongbei Company operates 3 routes carrying about 10,000 passengers daily. In Kunming, as elsewhere in China, a new stand-alone state-owned company, KRTC, has been created to take charge of urban rail construction and eventual operation.

33. Ideally, the activities of all these operators would be coordinated by a single agency, and the public transport division of the transport bureau is well situated to become that agency in the future. However, in the interim, the Project Leading Group (PLG), tasked to implement the rail system and headed by a vice-mayor, fulfils that role. Both the rail company, as well as the transport bureau, report to this Leading Group, which has the power and an interest in ensuring effective integration. The Bank's intervention has further supported elements of this integration as described below.

34. **Service Planning.** Kunming has an extensive and productive bus system. Even under the most optimistic assumptions regarding the extent and geographic coverage of the metro system, a significant number (if not most) public transport users will continue to use only buses, and a significant number of metro riders will access and egress the metro system by bus.

35. Aligning bus service to take full advantage of the metro investment is essential to the long term success of both bus and metro operations. Changes to the bus network should be derived from an analysis that ensures that public transport travelers are better off in terms of total travel time, convenience and price with the metro in place than without it. Once an integrated service plan for the bus and metro systems has been developed, the design and placement of necessary physical facilities (e.g., bus interchanges at metro stations) can be determined.

36. **Bus interchange facilities.** After a careful study of bus route reorganization, the location and size of necessary physical interchange facilities can be laid out. However, the detailed specification of the bus route structure after the construction of the metro will not be completed before station designs are finalized. To address this, project preparation has focused on preparing preliminary estimates of land required at stations for bus interchange and bike parking facilities. The land requirement for these integration facilities was included as a supplement to the feasibility study, helping to ensure that future space will be available for these facilities.

37. **Fares and Ticketing.** Fare policy has important ramifications. At the most basic level, the fare level charged depends on the degree to which revenues cover the costs of operating the metro system, which itself is a tradeoff between the level of subsidy provided by the municipal government and the level of affordability of the system to its users. In addition, if metro fares are set much higher than bus fares with no fare integration discount, the metro will be more heavily utilized by middle- and upper-income classes, while bus travel will be more affordable for low-income populations. The balance between bus and metro fares will also have important ramifications for the financial sustainability of both the bus and metro operating companies.

38. The Kunming and Yunnan provincial DRCs have joint responsibility for setting fares for the bus system, and will also have responsibility for setting fares on the metro system. Project preparation has focused on ensuring that agreement is reached with the municipal government on a set of fare policy principles that will guide the future development of city-wide fare policy and reflect an integrated public transport approach to fare setting. A study is currently underway to propose designs for Kunming's future multi-modal fare policy, based on agreed-upon principles that include:

- Bus fares should be adequate for operational revenues to cover costs with clear government contributions for agreed public service obligations (such as reduced fare services for the elderly, veterans, students etc.);
- A way to protect the interests of vulnerable users (particularly the poor) as fares were increased to reflect higher costs;
- Avoiding high differentials between bus and rail fares;
- Considering graduated bus fares, including lower fares for metro feeder buses; and
- Making provisions for integrated fares, i.e., providing discounts for bus – rail transfers.

39. In terms of fare media (the method of fare payment), study tours by KMG have already exposed senior officials to the fact that many other cities in China are already using a single smart card to pay fares on rail, bus and other modes. Smart cards are the current state-of-the-art in transit systems, and have been widely adopted in leading systems around the world, including Hong Kong, SAR, China and London. Consensus exists in Kunming that such a card is desirable. The adoption of specifications for an I/C card that can be used on both the bus and rail systems has been a focus of project preparation.

40. A range of project elements that address bus/rail integration have been developed:

- A study has been commissioned to develop a fare policy (based on the principles enumerated above) that integrates bus and rail service into a unified system, maximizing rider benefit, while balancing the financial needs of both the bus and metro system.
- Significant effort during project preparation has focused on ensuring that station designs incorporate land for physical interchange according to projected modal access volume by station (bus, bike, walk, etc). Estimates of these land requirements have been appended to the project FSR, a significant advance in the Chinese context. In addition, Component 1 of the World Bank loan will fund station infrastructure at 5 stations to ensure the successful construction of bus interchange facilities. This component will help directly address the needed physical facilities to ensure seamless system operation at these stations.
- In terms of institutions, a marketing division to be developed within KRTC will focus on following up on the issue of bus/rail integration on behalf of the rail company.
- Finally, several metrics related to the progressive implementation of an integrated bus-rail system have been included as part of the project monitoring indicators and will form an important part of project implementation and supervision.

Issue 3: COMPREHENSIVE TRANSPORT POLICY

41. Experience elsewhere in the world has demonstrated that the construction of an urban rail system in the absence of a broader comprehensive transport policy that supports public transport is unlikely to achieve its policy aims. Therefore, if municipalities are unwilling to take reasonable actions to limit the use of cars in core urban areas - through the use of parking fees, higher vehicle registration charges, fuel taxes, or congestion charges - and foster the use of non-motorized modes, many of the benefits of urban rail construction are unlikely to be realized.

42. Indeed, many Chinese cities are still undergoing transition from ‘accommodating’ cars often at the expense of other road users to ‘managing cars’ by actively prioritizing and promoting the alternatives. A complementary policy would focus on improving facilities for pedestrians and cyclists and inculcating a culture of respect for pedestrians and cyclists, particularly at intersections and crossings, as well as through improved design of the station itself (for example, through the inclusion of bicycle parking). In addition, parking in areas well served by public transport, particularly the downtown core, will need to be limited. While this broad strategy is now generally accepted in China at the national level, more needs to be done at all levels of government to actively manage automobile use in urban areas in order to realize stated goals related to compact form, ‘people-centered’ development, ‘low-carbon growth’ and related air

quality, safety and congestion-relief benefits. In this context, Kunming is considerably progressive. Limits have been instituted on parking in the downtown area (significant and rare not just in China but globally) and instituting a system of traffic impact analysis for new developments.

43. Construction of the urban rail system will provide a high quality transport alternative capable of attracting ‘choice’ riders who have access to a car. As noted, availability of this alternative access mode will make further restrictions on automobile use in the central city more politically palatable.

44. For this reason, significant effort will be focused on ensuring that Kunming’s broader transport strategy supports the successful implementation of the urban rail system. Actions related to this issue include:

- During project preparation, the Bank team has reviewed the Kunming’s current policies on traffic impact analysis and parking restrictions in the central area. While these are innovative in the Chinese context, they could be strengthened with the development of the new urban rail system. Supporting the further development of these policies will be an important focus for the marketing department to be supported as part of the project TA.
- In addition, support for bringing best Chinese and international practice on parking and travel demand management to Kunming would be a crucial element of a potential GEF companion project.

Annex 2: Major Related Projects Financed by the Bank and/or other Agencies

CHINA: Kunming Urban Rail Project

| Sector issue | Ongoing projects | Latest supervision (ISR) ratings | | | |
|---|---|----------------------------------|------------------------------|----------------------------|--|
| | | IEG rating | Implementation Progress (IP) | Development Objective (DO) | |
| Bank-financed | | | | | |
| Addressing urban transport needs in a comprehensive manner: | | | | | |
| <ul style="list-style-type: none"> • Selective road investments to enhance capacity and relieve bottlenecks. • Public transport investments and support to policy, operations, and planning. • Traffic management safety. • Development of a motor vehicle emission control strategy. • Road maintenance. • Training and capacity building. | Xi'an Urban Transport Project | N/A | S | S | |
| | Liaoning Medium Cities Infrastructure Project | N/A | S | S | |
| | Wuhan Urban Transport Project | N/A | S | S | |
| | Anhui Medium Cities Urban Transport Project | N/A | S | S | |
| | Taiyuan Urban Transport Project | N/A | S | S | |
| | | | | | |
| | | | | | |
| Supporting peri-urban expansion and coordination with transport and urban plans. | Fuzhou Nantai Island Peri-Urban Development Project | N/A | MS | MS | |

| | | | | |
|---|---|-----|-----|-----|
| Financing Urban Rail Projects in other regions: | Belo Horizonte Metropolitan Transport Decentralization | S | N/A | N/A |
| <ul style="list-style-type: none"> • Provision of trains, signaling and telecom systems. • Coordinating rail systems formerly managed by different levels of government under an integrated transport authority. • Improving the integration of different modes (bus/rail). • Modernization of major integration stations. • Using Travel Demand Management (TDM) to complement urban rail expansion. • Decentralization of rail services from federal to state government. • Construction of metro lines as PPP projects. | Rio de Janeiro Mass Transit Project | S | N/A | N/A |
| | Sao Paulo Integrated Urban Transport Project (the Barra Funda-Roosevelt link) | HS | N/A | N/A |
| | Sao Paulo Metro Line 4 Project | N/A | S | S |
| | Pusan Urban Transport Management Project | S | N/A | N/A |
| | Budapest Urban Transport Project | S | N/A | N/A |

Other development agencies

IADB

Financed improvements of stations of Sao Paulo C line, acquisition of rolling stock and construction of Metro's Fifth Line

ISR: Implementation Status Report

S: Satisfactory

MS: Moderately Satisfactory

Annex 3: Results Framework and Monitoring

China: Kunming Urban Rail Project

Results Framework

| PDO | Project Outcome Indicators | Use of Project Outcome Information |
|--|---|--|
| Support compact, transit-oriented urban development by providing high quality, integrated public transport on the East-West Line 3 corridor. | <p>Introduction of high quality service measured by reduction in peak period travel time along line 3 corridor and percentage of new riders who have access to private vehicles.</p> <p>Successful multi-modal integration with buses, and cycles (see below).</p> <p>Ridership and revenue attributable to line 3, and operating ratio.</p> <p>Percentage of total new development that occurs along rail lines.</p> | <p>Assess the enhanced level of service for public transport operations along corridor and its ability to attract and retain ‘choice’ customers.</p> <p>Assess degree to which public transport is being integrated across modes.</p> <p>Cost effectiveness of rail investment.</p> <p>Assess ability of rail investment to anchor compact growth.</p> |
| Intermediate Outcomes | Intermediate Outcome Indicators | Use of Intermediate Outcome Monitoring |
| Integrated bus/bike facilities. | Rail stations designed with integrated bus/bike facilities. | Assess the degree to which the rail system is integrated with bus and bike user and system needs. |
| Integrated bus routes. | Bus routes restructured to support integrated public transport as per the results of the integration study. | Assess degree to which bus and rail operations are integrated. |
| Single fare media. | Adoption of single card for bus and rail use. | Assess degree to which bus and rail fares are integrated. |

Arrangements for results monitoring

| Objective/Indicator | Intermediate Outcome Indicators | Baseline | Target (by project completion) | Data Collection Method | Frequency of Reporting | Responsibility |
|--|--|--|--|--|--|--|
| 1. High Quality Service | | | | | | |
| Reduction in peak period travel time between origin/destination pairs along Line 3. | | 2010 (by bus) From Shi Zui station site to Xiaoximen: 40 minutes in vehicle travel + 3 minutes expected wait + transfer. | 2.5 minute expected wait + 20 minutes travel time. | Operational reports from bus company and rail company. Should include a sufficient sample size to provide reasonable accuracy. | Data to be collected once per year after metro opening. | Project Management Office (PMO) in cooperation with bus company. |
| | | From East Long Distance Bus Terminal to NanPin Walking Street: 38 minutes travel + 3 minutes expected wait + transfer. | 2.5 minute expected wait + 15 minute travel time. | | Data to be collected once per year after metro opening. | |
| Percentage of public transport riders who have access to a private car for their commute | | To be provided based on market survey before opening of metro. | Share for metro commuters greater than pre-metro baseline. | Market Survey conducted by the Rail Company before and after metro opening. | Data to be collected once before metro opening, and at least once after. | PMO |
| 2. Development of an Integrated Public Transport System | | | | | | |
| Success on all 4 of the following intermediate outcome indicators. | | | | | | |
| | Land allocated for bus, cycle and car facilities at stations as identified in integration facilities report. | n/a | yes | Site plan reviews, supervision visits. | Once | PMO |
| | Identified bus/bike facilities constructed | n/a | yes | Site plan reviews, supervision visits. | Once | PMO |

| | | | | | | |
|--|--|---|--|--|---|---|
| | Bus routes restructured to support integrated public transport as per the results of the route restructuring report. | n/a | yes | At conclusion of the study, PMO should provide short report on how adopted fare policy responds to these principles. | Once | PMO in collaboration with KTRI and the Kunming Bus Company. |
| | Shared I/C card for both rail and bus use. | In planning | yes | | Once | PMO in collaboration with the Kunming Bus Company. |
| 3. Project Cost Effectiveness | | | | | | |
| Average Daily Weekday Ridership on Line 3 after 1 year of operation | | N/A | 200,000 passengers/weekday | | Annually after initial data collected | PMO |
| Working Ratio of the Kunming Rail Transit Company Line 3 ¹⁰ | | N/A | <1.0 | | Annually after initial data collected | PMO |
| 4. Compact City Development | | | | | | |
| Percentage of total new development that occurs along rail lines ¹¹ . | | 2010 baseline data to be compiled after negotiations. | Share of total new development in the municipality (measured in m2) that takes place along metro alignment to increase relative to baseline. | Planning permits. | At a minimum, for three periods: baseline, period before metro opening, period after metro opening to closing date. | PMO in collaboration with the Planning Bureau. |

¹⁰ This ratio is a measurement of operating revenue vs. operating costs before depreciation in the second full year of operations

¹¹ Each year, this data will be compiled by the PMO. If entrances to new development lie within 750 m of station entrances on either Line 1/2 or Line 3, such development will be considered to be within walking distance of the metro network. A more detailed description of how this metric will be collected is provided in an accompanying document.

Annex 4: Detailed Project Description
CHINA: Kunming Urban Rail Project

1. The planned Kunming urban rail network is a radial network with a planned final configuration of 6 lines. The first phase of the project will consist of a combination of the southern half of Line 2 and the northern half of Line 1 (referred to as Line 1/2) operating as a single line running north-south and the east-west Line 3. These two lines will intersect at Cultural Palace Station (文化宫站), where a major new development is planned. Line 1/2 is currently under construction and is planned to open for operation in 2013. The map in Annex 15 shows Line 1/2 (under construction), Line 3 (to be financed by the World Bank), the 17 stations of Line 3, and the station and depot infrastructure to be financed by the World Bank.

2. The Kunming Urban Rail Project consists of the construction of the 19.54 km long Kunming metro Line 3. The line runs east-west from the Shizui proposed depot in the southwest along Chunyu road onto Renmin Lu, Dong Feng Dong Lu, through to the Fangmaqiao proposed parking yard in the East. The project includes construction of the line; maintenance and stabling facilities for the trains; traction, signaling, communication, fare collection, and train control systems; procurement of the train sets; and all other works related to implementation of the line.

3. The feasibility study has been prepared by the China Second Railway Design Institute, a Chinese design institute with significant prior experience with Bank-financed projects. Project designs are technically sound and are based on sound engineering practice. Line 3 will use state-of-the-art technology with consideration for compatibility with Line 1/2, currently under construction.

4. The total project cost will be \$ 1.753 billion, composed of \$ 1.453 billion of local counterpart financing and a \$ 300 million World Bank loan. Briefly, the Bank will finance:

- **Component 1. Civil Works (\$209.4 m):** Carrying out a program of civil works for selected stations, including inter alia, bus interchange and bike parking facilities, where appropriate, and associated facilities such as, but not limited to, depots and track, equipments installation, and other related installation at selected stations.
- **Component 2. Equipment (\$86.9 m):** Provision of various equipment such as, but not limited to, power supply, escalators, fare collection, and communication systems, and technological equipment at depot and other related facilities.
- **Component 3. Technical Assistance and Capacity Building (\$3.0 m):** Provision of: (a) studies to support bus-rail integration and the future development and construction of the public transport system; and (b) support for Project management capacity building and for operations management.

Component 1. Civil Works (\$209.4m)

5. The project consists of a total of 17 stations (all underground). For underground construction, the shield tunneling method (EPBS) will primarily be used, along with mining and

NATM at some locations where appropriate. Underground stations will be constructed mainly by cut-and-cover method. Stations will be designed to provide easy interchange with the other lines of the Kunming rail system and other modes. Stations will not be air conditioned because of Kunming's relatively mild year-round climate.

6. Bank finance will support construction of five stations, a maintenance depot, a stabling yard, and track work. These stations will be the focus of the Bank's effort to ensure that station design supports transit-oriented urban design and integration with bus and cycle facilities. At the station design level, this means ensuring that access to the station is carefully thought out considering likely access points of metro riders to stations by foot, bike, bus, and car. Station designs are still being finalized with input from the World Bank. The five stations to be financed are described briefly below (a more detailed description is available in the project file).

7. **Liang Jia He.** The proposed location for this station is directly adjacent to an existing major municipal bus terminal. There is also a significant amount of redevelopment slated to occur in the surrounding area. For the metro system to succeed, it will be vital that station design at Liang Jia He incorporate both of these elements (large volumes of existing bus users, significant new development) into the design through carefully sited entrances, direct connections to adjacent buildings, bus transfer and waiting areas, and pedestrian and bike access to stations. The current station design proposes four exits (with the potential for two additional entrances at a later date), some new facilities for cycle parking, and the addition of two new bus bays.

8. **Da Shu Ying.** In the long term metro plan, this station will be the interchange between Line 3 and the planned Line 4. The current station design provides for this eventual connection, as well as for additional cycle parking and a new bus bay.

9. **Jin Ma Si.** The station is located in a densely built up area, and the adjacent buildings are mainly residential, with some office and educational functions. There will be extensive redevelopment in the area of the station. The station itself is designed with five entrances and areas of bike parking, as well as connections with two existing bus bays.

10. **Tai Ping Cun.** The station is located in an area that is largely undeveloped at this point. This provides an opportunity for the station to be an anchor for new development, if properly integrated with the surrounding area. The station, as designed, will have three areas for bike parking and be connected to two existing bus stations.

11. **Hong Qiao Cun.** The station is located in the east edge of the city and close to the city's east ring motorway. Adjacent to the station, the city is planning a major public transport terminus as well as a major park and ride facility.

12. The Bank will also provide financing for the **Shi Zui Depot** at the western end of the alignment and the **Fangmaqiao parking yard** at the eastern end.

Component 2. Equipment (\$87 million)

13. **Systems.** In selecting systems for line 3, a primary consideration has been compatibility with the systems of line 1/2. The power supply system proposed for the project is a 750 volt DC third rail bottom collection system and the same system is proposed to be used on line 1 and 2. Line 3 will have total 14 traction sub stations, including one each in the depot and parking area. A power supply workshop is planned in the train maintenance depot to manage and maintain the power supply equipment during operations. Supervisory Control and Data Acquisition (SCADA) systems will be used for monitoring and control. The signaling system proposed for the project uses moving block automatic control system with ATP, ATO, and ATS subsystems. The project will provide an efficient passenger information system. The fare collection system will be an AFC with contactless tickets. The system is planned to provide for the possibility of integrated ticketing with other modes and other lines of the Kunming urban rail system. Stations will be provided with elevators and escalators for passenger convenience. Platform safety doors will also be provided for passenger safety. The Bank loan will support the procurement of most of the systems which include track work, power supply system, passenger information system and fare collection system. The Bank finance will also support elevators, escalators and platform safety doors. Procurement of some important equipment for the rolling stock maintenance depot, like train washing plant and an under floor wheel lathe will also be supported by the Bank.

14. All Bank financed systems will be procured through International Competitive Bidding. These systems were chosen for Bank financing because they need to be procured internationally and KRTC felt it would benefit from Bank's supported international procurement. Systems like fare collection and passenger information systems play a critical role in facilitating (or, conversely, becoming a barrier to) the development of an integrated multimodal system and the Bank's experience in integrated transport planning will be leveraged to help overcome these problems. In all cases, the technical specifications of the system will be carefully designed to ensure compatibility with the other lines of the urban rail system, as well as the bus systems, and to create platforms for integrated public transport system operations. The elevators, escalators, safety doors and rolling stock maintenance depot equipment were also chosen for Bank finance because these are required to be procured internationally and KRTC will benefit from the Bank's experience with international procurement.

15. **Trains.** To cater to the expected traffic in year 2017, 15 trains per hour, composed of six cars will be run in both directions. For running these services, a total of 144 train cars [24 trains] will be procured. Six car trains will consist of four motor cars and two trailer cars, with a maximum permissible speed of 80 kmph. The carrying capacity of a six car train will be 1,460 passengers at a loading of 6 persons per square meter. To reduce the overall carbon footprint of the project, the train cars will use a regenerative braking system which will result in large savings in energy consumption.

Component 3. Technical Assistance and Capacity Building (\$3.0 m)

16. Four elements of technical assistance are to be financed by the Bank loan. A brief outline of these studies is provided below. The study specifications will be refined at the time of the issuance of the relevant TORs.

17. **Bus/Rail Integration.** The goal of the study will be to develop and implement a plan to create a seamless, multi-modal, customer oriented public transport system. Project elements will include a detailed modeling effort (based on Kunming Transport Research Institute's (KTRI) current model) to design and analyze different bus route modification schemes (a model for this work supported by the Bank will be provided as an example) and present detailed comparisons of various alternatives. This work should include the impact of implementing the different fare scenarios currently being studied. This study should lead to a route modification plan supported by the bus company, rail company and MTB, input into the design of identified bus interchange facilities at stations, and a program of public participation and consultation on the proposed changes.

18. **Transit Oriented Development.** The lead agency will be the Kunming Rail Transit Company Property Development Group. The study will focus on supporting high quality property development near rail lines – both on properties controlled by the rail company, and others. This should include, at a minimum, an analysis of existing conditions of detailed control planning near stations along line 3, building on the work already completed during project preparation. This work should identify obstacles to high quality TOD, including setback and land use requirements, sidewalk design regulations, parking codes, lack of pedestrian access through super blocks, etc. This study should also focus on the integration of new property development and the details of station entrances, vent structures, etc – again building on the work completed during project preparation.

19. **Support for a Marketing Division of the Kunming Rail Company.** The goal is to support the development of KRTC Marketing Department in articulating the interests of the rail company in a variety of crucial areas. Tentatively, funds will support the hiring of two specialized consultants. One should be mainly concerned with fare options, ticketing arrangements, ridership targets, bus feeders and facilities at rail stations, information, parking arrangements at stations and in the downtown core, and customer care to develop KRTC policies on these issues in the interest of maximizing rail ridership. The other should work directly with the property development department of KTRC to work closely with MPB to ensure that the necessary actions are taken for good station development on parcels under the control of KTRC.

20. **Project Management.** The goal is to support the development of best practice project management ability within the rail transit company. This should include training on construction, operation, and project management strategies as well as international and domestic research trips. It will also include hiring an independent consultant to ensure smooth operation in the company, as well as to make recommendations in the area of operations and maintenance.

Annex 5: Project Costs

CHINA: Kunming Urban Rail Project

| Project Cost by Component and/or Activity | Bank US\$ million | Local US\$ million | Total US\$ million |
|---|-------------------------|--------------------------|--------------------------|
| <u>Land Acquisition and Resettlement</u> | 0.0 | 165.7 | 165.7 |
| Resettlement | | 120.5 | 120.5 |
| Land Acquisition | | 45.2 | 45.2 |
| <u>Civil Works</u> | 209.4 | 434.1 | 643.5 |
| Stations | 110.4 | 199.4 | 309.7 |
| Tunnels + Viaducts | | 201.7 | 201.7 |
| Track | 39.5 | -2.2 | 37.3 |
| Depots | 59.5 | 35.3 | 94.8 |
| <u>Equipment</u> | 86.9 | 415.6 | 502.7 |
| Rolling Stock | | 137.0 | 137.0 |
| Power | 17.8 | 98.2 | 116.0 |
| Safety/Fire/Civil defense | 14.5 | 28.4 | 42.9 |
| Communication System | 5.1 | 34.8 | 39.8 |
| Signal System | | 37.3 | 37.3 |
| Lighting | | 31.1 | 31.1 |
| Station Auxiliary Equipment | 15.3 | 15.4 | 30.6 |
| AFC | 20.5 | 1.9 | 22.4 |
| Ventilation/AC | | 20.4 | 20.4 |
| Equipment for Depot | 13.8 | | 14.0 |
| Monitoring & Controlling | | 10.5 | 10.5 |
| Operations Management Center | | 0.7 | 0.7 |
| <u>Other</u> | 3.0 | 125.8 | 128.8 |
| Construction Management | | 45.8 | 45.8 |
| Survey and Design Fees | | 34.7 | 34.7 |
| Other Construction Costs | | 45.3 | 45.3 |
| Institutional Development and Capacity Building | 3.0 | | 3.0 |
| <u>Total Baseline Costs</u> | 299.3 | 1141.3 | 1440.7 |
| Contingency | | 130.4 | 130.4 |
| Interest During Construction | | 137.7 | 137.7 |
| Initial Working Capital | | 2.1 | 2.1 |
| Front End Fee (.25%) | 0.75 | | 0.75 |
| <u>Total</u> | 300.0 | 1411.6 | 1711.6 |

Note:

Calculation of Contingencies

- The design institute calculated contingencies (as per Ministry of Construction contingency regulations) as 10 percent of the base cost.
- An alternative approach more consistent with international practice (and consistent with most World Bank financed investments) would be separately estimating physical and price contingency. Physical contingency is generally calculated at 8 percent of the costs of civil works. Price contingency is calculated for each component based on estimates of future inflation (obtained from the World Bank's economic outlook for China) and the construction schedule. The total contingency using this alternative methodology was calculated.
- Both calculations yielded approximately equal levels of contingency. The estimate using Ministry of Construction regulations yielded a slightly, but not materially, higher estimate. This estimate was used in the final cost table.

Annex 6: Implementation Arrangements

CHINA: Kunming Urban Rail Project

1. The Yunnan Provincial Finance Bureau (YPFB) will sign the project agreement and will be the formal project implementing Entity. On behalf of the YPFB, the project will be implemented by KRTC, which will have responsibility for managing and coordinating the implementation of the project.
2. In order to provide overall leadership, policy guidance, and institutional coordination for project implementation at the Municipal level, a PLG was established by KMG in 2005. The Kunming PLG is headed by the responsible vice-mayor and is composed of leaders and directors of all key government line agencies. The PLG will be maintained throughout project implementation with functions and membership satisfactory to the Bank, and will meet on a regular basis (twice a year) and upon request of KRTC when important issues arise. KRTC would provide the PLG with relevant information and support for the PLG to carry out its functions on policy guidance and strategic coordination of the project.
3. The project will be implemented by KRTC, which will have responsibility for managing and coordinating the implementation of the project. KRTC is an entity of the KMG, established in 2005, responsible for raising funds, managing construction, and ultimately operating the proposed Kunming Urban Rail Company. This arrangement reflects the prevailing legal framework established in many municipalities that attempts to delineate the revenue-raising authority within the legal mandate and responsibility of the municipal governments in the implementation of investment projects.
4. KRTC will be entrusted with overall project management and, through its units, with coordinating the implementation of the procurement, contract management, resettlement, social and environmental safeguards, loan disbursement requests, fiduciary compliance and evaluation, results monitoring, and reporting. KRTC will be the primary coordinating body responsible for communicating with the World Bank, ensuring that implementation is consistent with all relevant World Bank policies and procedures.
5. **Institutional Arrangements for the Capacity Building and Institutional Strengthening Component.** KRTC will play a critical role in the execution of studies, training efforts and study tours. KRTC will serve as the executing agency, responsible for implementing all TA studies.
6. The definition and supervision of environmental and social safeguards will be carried out by specialized units within KRTC.
7. **Funds Flow.** The MOF will on-lend World Bank loan funds to the Yunnan Provincial Government (through the Provincial Finance Department). The Provincial Finance Department will in turn on-lend funds to KMG (through the Municipal Finance Bureau), which will in turn on-lend funds to KRTC. KRTC will act as the representative of the municipal government to manage the loan and ensure future repayment.

8. **Resettlement Compensation Funds Flow.** Individual bank accounts will be opened for each project affected person/household and compensation will be paid directly to the account. KRTC will review resettlement fund applications from project owners and arrange for an internal audit of the resettlement fund on a semi-annual basis.

Annex 7: Financial Management and Disbursement Arrangements

China: Kunming Urban Rail Project

Execution Summary

1. The Financial Management Specialist (FMS) has conducted an assessment of the adequacy of the project financial management system surrounding the Kunming Urban Rail Project. The assessment, based on guidelines issued by the Financial Management Sector Board on March 1, 2010, has concluded that the project meets the minimum Bank financial management requirements, as stipulated in BP/OP 10.02. In the FMS' opinion, the project will maintain adequate financial management arrangements acceptable to the Bank and, as part of the overall arrangements that the Borrower has in place for implementing the operation, provide reasonable assurance that the proceeds of the loan will be used for the purposes for which the loan is granted. Financial management risk is the risk that World Bank loan proceeds will not be used for the purposes intended and is a combination of country, sector and project specific risk factors. Taking into account the risk mitigation measures proposed under this project, a "Low" FM risk rating was assigned to the project at the appraisal stage.

2. Funding sources for the project include Bank loan and counterpart funds. Bank loan proceeds will flow directly into a project designated account (DA) to be set up at and managed by the YPFB. The Bank loan will be signed between the Bank and the People's Republic of China through its MOF, and on-lending arrangements for the Bank loan will be signed between MOF and the Yunnan Provincial Government through its YPFB and then between YPFB and KMG through Kunming Municipal Finance Bureau (KMFB). Finally, on-lending arrangements will be signed between KMFB and the project implementing unit (PIU), KRTC. Counterpart funds consist of local government appropriations and domestic financing.

3. No outstanding audits or audit issues exist with any of the implementing entities involved in the proposed project. However, the task team will continue to be attentive to financial management matters during project supervision.

Country Issues

4. To date, no Country Financial Accountability Assessment (CFAA) has been carried out by the Bank for China. Our knowledge of the system is, however, fairly comprehensive, as a result of several studies carried out by the Government and others.¹² Based on the studies and material produced by others, our observations of developments in the areas of public expenditures, accounting and auditing, and Bank experience with China projects for the past several years, we noted that substantial achievements have been made in the aforementioned areas and further improvement is expected in the next few years. This is a work in progress and as economic reform program further unfolds, the Government of China has come to realize the

¹²China Report on the Observance of Standards and Codes - Accounting & Auditing (World Bank 2009)
Financial Management and Governance Issues in China (ADB 2000)
Public Sector Management Issues in China (Christine Wong 2005)

importance of establishing and maintaining an efficient and effective market mechanism to ensure transparency and accountability, and minimize potential for fraud or corruption.

5. Due to a unique arrangement by the Government of China, funding (particularly Bank loan/grants) of Bank projects is controlled and monitored by MOF and its extension at sub-national level (i.e., finance bureaus at provincial, municipal/prefecture and county level). However, project activities are usually carried out by implementing entities of a specific industry or sector due to the level and complexity of expertise involved. While this segregation of duties provides added fiduciary assurance, the above arrangement then usually requires more coordination on the project, as the multi-level management of the funding and implementation mechanisms sometimes works to the detriment of smooth project implementation.

Summary Project Description

6. The project development objective is to support compact, transit-oriented development in Kunming by providing high quality, integrated public transport on the east-west Line 3 corridor. The total estimated project cost is \$1.7116 billion and the Bank loan will be \$ 300 million. For a detailed project description, please refer to Annex 4 – Detailed Project Description.

Audit Arrangements

7. The Bank requires that project financial statements be audited in accordance with standards acceptable to the Bank. In line with other Bank financed projects in China, the project will be audited in accordance with International Auditing Standards and the Government Auditing Standards of China. Yunnan Provincial Audit Office (YPAO) has been identified as auditor for the project. The annual audit report will be issued by YPAO. The Bank currently accepts audit reports issued by China National Audit Office (CNAO) or provincial/regional audit bureaus/offices for which CNAO is ultimately responsible.

8. The annual audit report of project financial statements will be due to the Bank within 6 months after the end of each calendar year. This requirement is stipulated in the loan agreement. The responsible agency and timing are summarized as follows:

| Audit Reports | Submitted by | Due date |
|------------------------------|---------------------|-------------------------------|
| Project financial statements | KRTC | June 30 of each calendar year |

Risk Assessment and Mitigation

9. The following risks with corresponding mitigating measures have been identified during the assessment.

| Risk | Risk Rating Before Mitigating Measures | Incorporated Risk Mitigating Measures | Risk Rating After Mitigating Measures | Conditions of Negotiations, Board or Effectiveness |
|---------------|--|---|---------------------------------------|--|
| Inherent Risk | | | | |
| Country level | Modest | Continuous dialogue with related government entities and technical assistance from the Bank will help the government to improve its public sector financial management. In the short-term, annual audit requirements will reduce the risk that project funds are not used for their intended purposes. For areas where the government system cannot be used, the Bank's specific requirements will be embedded in the project financial management system. | Modest | N |
| Entity Level | Modest | Only one PIU, KRTC, is involved in this project. KRTC is new to Bank financed operations, but is an existing company that is experienced in accounting and reporting. However, YPFB is experienced in Bank financed operations. Therefore, close monitoring and guidance from YPFB, as well as the Bank's regular supervision, can mitigate this risk to some extent. In addition, well-designed FM training sessions will be provided to all project financial staff before and during the project implementation. | Modest | N |

| | | | | |
|------------------|-------------|--|--------|---|
| Project Level | Modest | The project structure and activities are relatively straight forward and do not involve many project implementing units. The funds flow arrangement is also relatively simple. | Low | N |
| Control Risk | | | | |
| Budgeting | Substantial | The procedures regarding budget preparation and execution have been agreed between the Bank and government. The FM team will review their execution status during project implementation and help to improve any identified weak areas. | Modest | N |
| Accounting | Modest | Accounting policies and procedures are already in place. Circular #13 has been issued by MOF and adopted for all World Bank financed projects, and will be followed by KRTC. A well-designed training workshop will be provided to all financial staff before project start. | Low | N |
| Internal Control | Substantial | Detailed internal control procedures, including segregation of duties, review, approval and reporting procedures, and safeguard of assets, have been established in the project and documented in KRTC's financial management regulations. WB task team will review actual practice during project implementation. | Modest | N |

| | | | | |
|---------------------|---------------|--|------------|---|
| Funds Flow | Modest | The Bank loan proceeds will be managed and monitored through the finance bureau channels and all the disbursement requests will be subject to their substantive reviews. The funds flow arrangement is straight forward and approval processes have been streamlined. | Low | N |
| Financial Reporting | Modest | The format and content of financial statements have been stipulated by MOF. The preparation of the project financial statement will be done by KRTC with the assistance of YPFB. In addition, the loan agreement specifies the timing requirements for such financial reports. | Modest | N |
| Auditing | Modest | The external auditor, YPAO, has extensive experience with previous Bank projects. | Low | N |
| Overall | Modest | | Low | |

10. The overall FM risk-rating assigned to this project at the appraisal stage is low, provided the proposed mitigating measures are carried out. The FMS will monitor the effectiveness of the measures and the project FM risk during project implementation.

Fund Flow and Disbursement Arrangements

11. Four disbursement methods are available for the project: advance, reimbursement, direct payment and special commitments. Supporting documents required for Bank disbursements under different disbursement methods are documented in the Disbursement Letter issued by the Bank. Applications will be supported by:

- For reporting eligible expenditures paid from the DA or paid from the bank accounts of the owners for requesting reimbursement:
 - (a) List of payments against contracts, together with records evidencing eligible expenditures (e.g., copies of receipts, supplier invoices) for contracts subject to the Bank's prior review;

(b) Statement of Expenditure in the form detailed in the Disbursement Letter for all other expenditures / contracts not subject to the Bank's prior review.

- For requests for Direct Payment: records evidencing eligible expenditures, e.g., copies of receipts, supplier invoices.

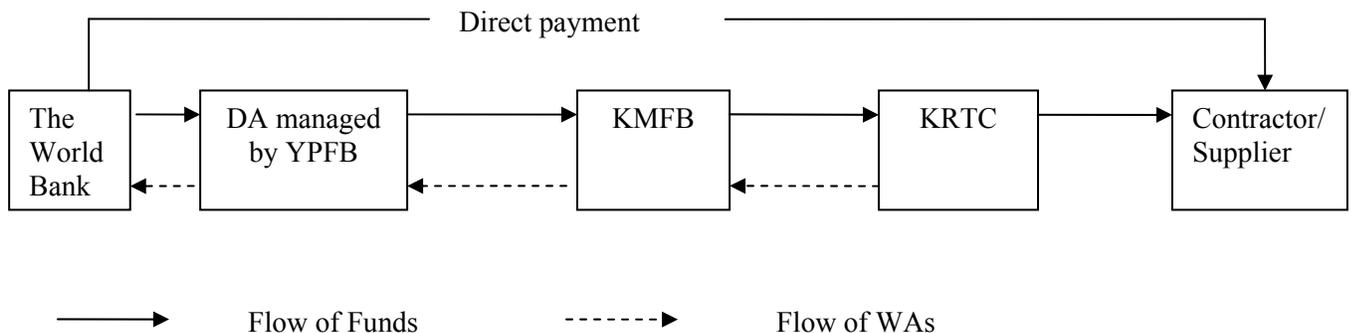
12. The Bank loan would be disbursed against eligible expenditures (taxes inclusive) as in the following table:

| Category | IBRD Loan | |
|---|-------------------------|---|
| | Allocated Amount (\$ m) | Percentage of Expenditures to be financed |
| Civil works, goods consultant services and training | 299.25 | 100 |
| Front end fee | 0.75 | |
| Premium for interest rate cap or interest rate collar | 0 | |
| Total | 300.00 | |

13. Retroactive financing will be applied for the project. The date of eligible expenditures, as noted in the legal agreements, is October 31, 2010 and the amount for retroactive financing was \$60 million (20 percent of the total loan amount).

14. One segregated DA in USD will be opened at a commercial bank acceptable to the Bank and will be managed by YPFB. The ceiling of the DA documented in the Disbursement Letter.

15. YPFB will be directly responsible for the management, maintenance and reconciliation of the DA activities of the project. Supporting documents required for Bank disbursements will be prepared and submitted by KRTC for approval and verification by YPFB before sending to WB for further disbursement processing. The proposed flow of funds and withdrawal applications (WAs) are as follows:



Financial Management and Reporting Arrangements

16. YPFB has accumulated extensive experience in the Bank’s project related financial management and disbursement, which will benefit the implementation of this project. In addition, KRTC is an existing company that has experience with the financial management of construction projects.

17. The following action plan for addressing potential weaknesses has been identified:

| Significant weakness | Actions | Responsible Person | Completion Date |
|---------------------------------------|---|-----------------------|---------------------------|
| KRTC is new to Bank-financed project. | Bank disbursement procedures and requirement- related training should be provided to all project financial staff. | YPFB and WB if needed | Planned at Project Launch |

Implementing Agencies

18. A description of the implementing agency and the activities they are implementing is provided in Annex 6.

19. **Budgeting.** The annual project implementation plan, including funding budget, will be prepared by the related operational units of KRTC and approved by their board of directors. The budget for counterpart funds committed by local governments will be reviewed and approved by the People’s Congress at each level and be included in their sectoral budget. Based on the approved budget and implementation progress, the related finance bureaus will provide government appropriations to the project. Budget variance analysis will be conducted regularly by KRTC and necessary actions will be taken to ensure that the project is implemented as planned. The Bank will work with the KRTC through supervising the project budgeting system to enhance their budget preparation and execution during project implementation.

20. **Accounting.** The administration, accounting and reporting of the project will be set up in accordance with the Circular #13: “Accounting Regulations for World Bank Financed Projects” issued in January 2000 by MOF. The circular provides in-depth instructions of accounting treatment of project activities and covers the following:

- Chart of account
- Detailed accounting instructions for each project account
- Standard set of project financial statements
- Instructions on the preparation of project financial statements

21. The standard set of project financial statements mentioned above has been agreed between the Bank and MOF and applies to all Bank projects appraised after July 1, 1998 and includes the following:

- Balance sheet of the project
- Statement of sources and uses of fund by project components
- Statement of implementation of loan agreement
- Statement of designated account
- Notes to the financial statements

22. KRTC will be managing, monitoring and maintaining the project accounting records. Original supporting documents for project activities will be retained by KRTC. KRTC will work with YPFB to prepare the project financial statements, which will then be submitted to the Bank for review and comment on a regular basis.

23. Adequate project accounting staff with educational background and work experience commensurate with the work they are expected to perform is one of the factors critical to successful project financial management. Based on discussions, observation and review of educational background and work experience of the staff identified for financial and accounting positions in KRTC, the task team noted that they are qualified and appropriate to the work they are expected to assume. Well-designed training sessions will be provided to all project financial staff before project implementation. In addition, during implementation, their capacities will be further strengthened through the Bank's review.

24. KRTC will utilize computerized financial management information software, Lang Chao, to record and maintain the project accounting books. The task team will monitor the accounting process, including the adequacy of this software, especially during the initial stage to ensure that complete and accurate financial information is provided in a timely manner.

25. **Internal Control and Internal Auditing.** The related accounting policy, procedures and regulations have been issued by MOF and will be followed by KRTC. There is no formal independent internal audit department for the project. However, this will not have an impact on the project's financial management, as management and monitoring from various levels of finance bureaus and KRTC (which will review withdrawal applications, and annual external audit) will serve as the mechanism to ensure that financial management controls are functioning appropriately.

26. **Financial Reporting.** The format and content of project financial reports have been agreed between the Bank, KRTC and YPFB. KRTC will prepare the project financial statements and submit to the Bank for review and comment on a regular basis. The interim unaudited project financial statements will be furnished to the Bank by KRTC no later than September 15 and March 15, in form and substance satisfactory to the Bank.

27. **Financial Covenants.** No specific financial covenants are applicable to the project except for standard financial covenants, e.g., project audit and interim financial reports.

28. **Supervision Plan.** The supervision strategy for this project is based on its FM risk rating, which will be evaluated on regular basis by the FMS, in consultation with relevant task team leader.

Annex 8: Procurement Arrangements
CHINA: KUNMING URBAN RAIL PROJECT

A. General

1. Procurement for the proposed project (Kunming Urban Rail Line 3) will be carried out in accordance with the World Bank's "Guidelines: Procurement under International Bank for Reconstruction and Development (IBRD) Loans and International Development Association (IDA) Credits" dated May 2004, revised May 2010; "Guidelines: Selection and Employment of Consultants by World Bank Borrowers" dated May 2004, revised May 2010; and the provisions stipulated in the loan agreement. The general description of various items under different expenditure categories is described below. For each contract to be financed by the loan, the different procurement methods or consultant selection methods, the need for prequalification, estimated costs, prior review requirements, and time frame have been agreed between the Borrower and the Bank project team in the Procurement Plan.

Procurement of Works

2. Works procured under this project will include civil works for stations, particularly bus-rail interchange facilities and terminal stations, rolling stock depot and parking yard, laying tracks etc., for an approximate amount of US\$209 million.

3. Procurement will be done using MOF's Model Bidding Documents (MBD), agreed with the Bank for all NCB through post-qualification (each contract below \$20 million), and the latest Bank Standard Bidding Documents (SBD) for ICB (each contract equivalent and above \$20 million). The current versions of SBD are from the "Standard Procurement Document, Prequalification Document for Procurement of Works and User's Guide" dated August 2006 and revised May 2007, and the "Standard Bidding Document, Procurement of Works, dated May 2006, revised August 2010." Contracts equivalent and above \$5 million are subject to the Bank's prior review.

Procurement of Goods

4. Goods procured under this project would include equipment and instruments including communications systems, power supply system, automatic ticketing equipment, elevators etc. for an approximate amount of US\$87 million.

5. Procurement will be done using MOF's MBDs agreed with the Bank for NCB (each contract below \$1,000,000, and equivalent to and above \$100,000), and the latest version of the Bank's SBDs for ICB (each contract equivalent to and above \$1,000,000), and Shopping (each contract below \$100,000). The current versions of SBDs are Procurement of Goods, May 2004, revised May 2010, and SBDs for Procurement of Plant Design, Supply and Installation & User's Guide, dated April 2008, revised August 2010. Contracts equivalent to and above \$500,000 are subject to the Bank's prior review.

Procedures for National Competitive Bidding

6. The procedures to be followed for NCB shall be those set forth in the Law on Tendering and Bidding of the People's Republic of China promulgated by Order No. 21 of the President of the People's Republic of China on August 30, 1999, with a number of clarifications (agreed between the Bank and the Government) required for compliance with the Guidelines.

Selection of Consultants

7. Consultants selection methods will be: Quality and Cost Based Selection (QCBS) or Quality Based Selection (QBS) conforming to Sections 2.8 and 3.2 of the Consultant Guidelines; selection based on Consultants Qualifications (CQS); and Individual Consultants (ICs), in conformity with Section V of the Consultant Guidelines. CQS may only be used for small assignment contracts (i.e., less than US\$ 200,000). Chinese universities and design and research institutes may be included in the shortlist in accordance with the provisions of paragraphs 1.11(c) and 2.8 of the Consultant Guidelines.

8. Short lists of consultants for services estimated to cost less than \$300,000 equivalent per contract may be composed entirely of national consultants in accordance with the provisions of paragraph 2.7 of the Consultant Guidelines. The Bank's latest Standard Request for Proposals shall be used. The current version is: Standard Request for Proposals, Selection of Consultants May 2004, revised May 2010. Contracts equivalent to and above \$200,000 for firms and equivalent to and above \$50,000 for ICs, are subject to Bank's prior review. In addition, all terms of reference for consultant contracts, regardless of contract value, will be subject to Bank prior review.

9. **Capacity building.** A budget of US\$3 million has been included in the loan for the following activities: (a) studies to support bus/rail integration; (b) support for the property development division in developing TOD plans; (c) support for a marketing department of KRTC; and (d) support for project management.

B. Assessment of the Agency's Capacity to Implement Procurement

10. The key procurement issues and risks during project implementation and the corresponding corrective measures are shown in Table 8.1.

Table A8.1: Procurement Assessment – Risks, Issues and Corrective Measures

| No | Risks and Issues | Corrective Measures |
|----|--|---|
| 1 | Limited knowledge of Bank procurement. | <p>Procurement training delivered in July 2010 to all procurement staff, other PMO staff and the procurement agent. One procurement officer participated in the May 2010 procurement workshop, jointly sponsored by the Bank and the MOF.</p> <p>The PMO will: hold more procurement training workshops; carry out study tours to other projects financed by the Bank; and send more staff to attend more Bank/MOF organized procurement learning events.</p> |
| 2 | Several parties, including the procurement agent, design institute, consulting firm and the PMO will be involved in the procurement process, which may cause delays. | The PMO will set up a mechanism to specify the role and responsibility of each party and the time required for each party's work. The World Bank Loan Project Coordination Office within the PMO will strengthen the coordination among all the parties involved. |
| 3 | Disclosure of procurement under the project. | The PMO will publish a General Procurement Notice in United Nations Development Business on-line and in www.dgMarket.com before any specific procurement notice is issued. |

11. The overall project risk for procurement is **moderate**.

C. Procurement Plan

12. The Bank has reviewed the revised procurement plan prepared by the PMO for implementation of the project, which provides the basis for procurement methods. The plan will be available at the PMO, located at *10th Floor, Zhongyin Building, No. 18, West Dongfeng Road, Kunming City, Yunnan Province, China*. It will also be available in the Project's database and in the Bank's external website. The Procurement Plan will be updated in agreement with the Bank Project Team annually (or as required) to reflect project implementation needs, and improvements in institutional capacity.

13. Goods, works, and non-consulting services requiring international competition.

Table below provides details of goods, works, and non-consulting services packages that will require international competitive bidding.

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|----------|--|-------------------------------|--------------------|---------------------------|------------------------------|-----------------------------|---------------------------|-------------------------------------|--------------------|
| Ref. No. | Contract Name | Estimated Cost (US\$ million) | Procurement Method | Prequalification (Yes/No) | Domestic Preference (Yes/No) | Review by Bank (Prior/Post) | Expected Bid-Opening Date | Construction Period/delivery period | Remark |
| SC1.7 | Civil works above ± 0.00 of Shizui rolling stock depot | 41.74 | ICB | Yes | No | Prior | July 2011 | 24M | |
| SC1.9 | Track laying works | 35.42 | ICB | Yes | No | Prior | Jan. 2013 | 12M | |
| E21.1 | PIS system | 5.06 | ICB | No | Yes | Prior | April 2012 | 31M | |
| E22.1 | Procurement and installation of conductor rail equipment | 17.81 | ICB | No | Yes | Prior | Feb. 2012 | 24M | |
| E23.1 | Procurement of automatic fare collection | 20.45 | ICB | No | Yes | Prior | April 2012 | 31M | |
| E24.1 | Procurement and installation of elevator | 15.25 | ICB | No | Yes | Prior | June 2012 | 26M | |
| E25.1 | Procurement and installation of safety door | 14.50 | ICB | No | Yes | Prior | June 2012 | 26M | |
| E26.1 | Procurement and installation of process equipment for Shizui Rolling Stock Depot and Fangmaqiao Parking Yard | 13.82 | ICB | No | Yes | Prior | Feb. 2012 | 24M | Multiple contracts |

ICB: International Competitive Bidding.

14. **Consulting Services**

List of Consulting Assignments with Short-list of International Firms and Individual Consultants

| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|----------|--|-------------------------------|------------------|-------------------------------|------------------------------------|---|
| Ref. No. | Description of Assignment | Estimated Cost (US\$ million) | Selection Method | Review by Bank (Prior / Post) | Expected Proposals Submission Date | Comments (Implementation period, month) |
| | Technical Assistance | | | | | |
| TA30.1 | Study and measures construction of public transit integration | 0.5 | QCBS | Prior | April 2011 | 60 |
| TA30.3 | Future spacial development and system construction of public transit | 0.7 | QCBS | Prior | April 2011 | 60 |
| TA30.6 | Consulting services for operation management | 0.05 | IC | Prior | April 2011 | 3 |

QCBS: Quality-and Cost-Based Selection; and
IC: Individual Consultant.

15. Prior review thresholds for the project will be:

Table A8.2: Prior Review Thresholds

| | Civil Works | Goods | Consultant services Firm | Consultant services Individual |
|------------------------------|-------------|---------|-----------------------------|-----------------------------------|
| Equivalent to and above US\$ | 5 million | 500,000 | 200,000 | 50,000 |

16. Procurement method thresholds for the project will be:

Table A8.3: Procurement Method Thresholds

| Procurement Method | Civil Works | Goods | Consultant Services |
|---|--------------------|--------------|---|
| ICB | ≥\$20 million | ≥\$1,000,000 | ≥\$300,000 (short list shall comprise six firms, with no more than 2 firms from any one country and at least one firm from a developing country); <\$300,000 (short list may comprise entirely national consultants) |
| NCB advertisement in a national newspaper | ≥\$2 million | ≥\$300,000 | |
| NCB advertisement in a provincial newspaper | <\$2 million | <\$300,000 | QCBS/QBS; CQS may be only used for small assignment contracts (i.e. <\$200,000); Individual consultant (IC) |
| Shopping | NA | <\$100,000 | |

17. **Advertisement.** All Procurement Notices for ICB, and consultant contracts equivalent to and above \$200,000 for firms, will be advertised in UNDB online, dgMarket, and in China Daily, a national newspaper with international circulation. Requests for expressions of interest from selected consulting firms for contracts below \$200,000 will be included in advertisements in a national newspaper.

18. Information on bid/proposal evaluation and contract award will be published in accordance with the Guidelines 2.60, 3.4 and 3.7 for works and goods, and 2.28, 3.8 and 3.13 for consultant services.

D. Frequency of Procurement Supervision

19. In addition to the prior review supervision to be carried out from Bank offices, Bank procurement supervision missions will visit the field to carry out post review of procurement actions every 12 months. The post review sampling ratio will be one out of five contracts.

Annex 9: Economic and Financial Analysis
CHINA: Kunming Metro Railway Project

A. Introduction

1. This annex presents the results of the economic evaluation of the construction of Line 3 of the Kunming metro. Over 30 years of operation, the project is expected to yield an economic rate of return of 8 percent.

2. Kunming currently operates one of the most successful bus systems in China, with steadily increasing ridership and a network of bus priority corridors. Without a major public transport upgrade, the growth in ridership projected over the medium term was expected to place a severe strain on the existing bus network within the Line 3 corridor. At the same time, rising motorization was widely anticipated to degrade the general level of service for buses citywide. The table below provides some representative volume/capacity ratios on roads in the line 3 corridor. Ratios greater than 0.7 generally indicate a level where significant congestion delays occur.

| Road | | Segment | V/C |
|------|--------------------|------------|------|
| 人民西路 | RenMingXiLu Road | 正义路~小西门段 | 1.15 |
| 北京路 | BeiJing Road | 人民东路~东风东路段 | 0.98 |
| 拓东路 | TuoDong Road | 春城路~北京路 | 1.04 |
| 环城东路 | HuanChengDong Road | 岔街~东站 | 1.24 |
| 东风东路 | DongFengDong Road | 环城东路~东二环 | 1.14 |
| 人民路 | RenMingXi Road | 西园路~环城西路 | 0.99 |
| 东风东路 | DongFengDong Road | 青年路~北京路 | 0.97 |

3. As a solution to these problems, the city has long envisioned a substantial urban rail network to upgrade both the capacity and quality of service of its public transport system. With the availability of financing provided by the recently enacted stimulus plan, the city was able to move up the start of planning for this network. The final network will be composed of six lines and stretch over 162.2 km. In the first phase of this project, the city is constructing two lines: Line 1/2, and Line 3.¹³ Line 1/2 is currently under construction, and the Bank loan will finance Line 3. The table below presents some basic demographic forecasts for the city overall and the line 3 corridor.

¹³ The first line to be constructed will be a combination of the southern end of what will be Line 1 in the final six line configuration, and the northern portion of what will be Line 2 – throughout this document, this line will be referred to as Line 1/2. The line financed under this World Bank loan is referred to as Line 3- although it will be one of two lines completed in the first phase.

| | Year | 2005 | 2015 | 2030 |
|------------------------------|------------|-----------|-----------|-----------|
| Region-Wide | Population | 2,503,000 | 3,954,000 | 4,952,000 |
| | Employment | 1,448,000 | 2,310,000 | 2,920,000 |
| Metro Line 3 Corridor | Population | 810,000 | 1,004,000 | 1,151,000 |
| | Employment | 655,000 | 807,000 | 905,000 |

4. The macro-level decision to proceed with an urban rail line along the Line 3 corridor was taken prior to Bank involvement. Since Bank involvement, alternative analysis has been used to focus on making cost-effective decisions on issues including different vertical alignment options, different options for station spacing, and different options for technical sub-systems, such as track fastenings, and traction systems. In addition, the Bank project preparation process has focused on other crucial elements that will ensure that maximum benefit is derived from the metro investment (described in Annex 1 and Annex 4). This includes bus/rail integration, transit-oriented development, and a broader transport policy that supports metro system success.

B. Traffic Forecasts

5. Traffic forecasts were prepared for the Chinese feasibility study using an EMME/2 traffic model prepared by KTRI. This model is an all-day model with 264 zones representing the Kunming urban area, together with some surrounding developed areas, and was developed using data from a 2005 Home Interview Survey (covering some 20,000-30,000 households and about 60,000-70,000 people), together with data from a 2008 bus survey. It includes highway and transit (including busway) networks. There are three trip purposes in the generation module (but no car ownership model), a distribution model and a mode-split model based on generalized time.

6. Although the KTRI model is reasonably detailed spatially, it has limited flexibility to examine such issues as different fares policies, and interchange arrangements etc, and it could only provide a subset of the detail required for the Bank evaluation. Independent forecasts have therefore been prepared by the Bank team using a spreadsheet model which concentrates on the Line 3 corridor. The model has greater sensitivity to policy issues such as fare structure and changes in the prices of competing modes, as well as in the impact of the introduction of the metro on the different modes.

7. The interzonal flows by mode for future years and networks were derived from the 2015 Line 1/2 modeled flows using a two-stage process:

- Changes in the attractiveness of different modes were taken into account by using the ‘pivot point’ technique in which the existing mode shares are adjusted to take into account changes in modal characteristics such as travel time and cost.¹⁴
- The ‘pivot point’ technique requires an existing share on which to pivot. Where this was zero in the case of the Line 1/2 model (e.g. in the Line 3 corridor away from Line 1/2),

¹⁴ This is a standard technique which uses existing mode shares as a base and thus does not require a mode share model to be calibrated.

the use of the metro Line 3 was estimated using a simple logit model to share the ‘transit’ demand. The impact of metro on the overall transit mode share, and on the generation of new trips, was taken into account by replacing the bus generalized time by ‘transit’ generalized time, calculated as a ‘composite’ of both bus and metro¹⁵.

8. The incremental metro patronage as a result of the construction of Line 3 was taken directly from the metro trip matrix; this includes both passengers on Line 3 itself, as well as the incremental patronage on Line 1/2 as a result of the ability to interchange to Line 3. The base ridership on line 3 is expected to be about 225,000 passengers a day. A number of sensitivity tests were undertaken to examine the impact of changes in the external assumptions and policy decisions concerning other modes and the parameters determining the transit mode split. These assumptions, and their impact on the modeled metro volumes for 2015, are summarized in Table A9.1.

Table A9.1 Forecasts of metro patronage – Kunming Line 3 for 2015

| Policy Scenario/Assumption | Actual Modeled Change | Incremental pax km on metro system (000) | Estimated Line 3 Ridership (000) |
|---|--|---|---|
| <i>Addition of Line 3 to Line 1/2 base network</i> | base | 2,563 | 227 |
| <i>Improved station area interchange facilities and schedule coordination</i> | interchange penalty 20% reduced | 2,764 | 230 |
| <i>Bus service reduced in project corridor</i> | Bus wait time along corridor increased 20% | 2,707 | 245 |
| <i>Bus service connecting to metro provided at half price</i> | feeder bus fare reduce by 50% | 3,042 | 236 |
| <i>Incomes Grow More Rapidly</i> | Value of time increased 50 percent | 2,766 | 274 |

C. Project Investment

9. The estimated cost of the project infrastructure is RMB9.8 billion (\$1.5 billion) at 2009 prices. For the purposes of economic analysis, all input costs are assumed to be adjusted to market prices and no shadow price factors have been used. The project is assumed to have a life of 60 years and a residual value of 50 percent of the investment has been assumed at the end of the evaluation period.

¹⁵ Technically, this composite cost is known as the ‘logsum’; the availability of the metro will increase the total demand for transit (and for transport as a whole) by varying amounts depending on how much of an improvement it is compared to the existing bus services.

D. Benefits

10. The benefits of the new construction of the Kunming metro line fall into three main categories:

- Change in user benefits for passengers transferring to the metro; this is a combination of travel time savings net of any change in fares, together with any changes in interchanges, headways and service frequencies.
- Changes in the operating costs of urban transport, i.e., the cost of the metro net of the change in the cost of operating the urban bus network, as well as the operating costs of car users who also transfer to transit.
- Changes in the external costs of the urban transport system. These have been identified in five groups:
 - Accident benefits due to the reduced travel on the surface street network
 - Congestion benefits for other road users
 - Pollution benefits from the reduction in car and bus traffic
 - Noise benefits from the reduction in motorized traffic
 - Greenhouse gas benefits due to the reduction in petroleum-driven vehicles

11. **Changes in passenger benefits.** The new line will save the typical metro passenger in the Line 3 corridor 5-10 minutes compared to the existing bus-only network. This has been valued using an average income per head of the expected metro passengers of RMB 2,500/month or RMB 15/hour (2015 prices), based on the average income in Kunming. Business and non-business travelers are valued at 100 percent and 35 percent of this average income (based on estimates derived for countries at a similar stage of development) and the business/non-business mix was taken at 20:80¹⁶. This gives an average value of time savings in 2015 of RMB 7.80 per hour (US\$1.15), increasing at 5 percent annually to 2030 and thereafter at 4 percent, in line with the expected growth in average income per head.

12. **Changes in vehicle operating costs.** Transferring passengers to the new metro line from the existing bus network and other modes will generate changes in vehicle operating costs. These have been derived using the rail operating costs developed in the feasibility study (in turn based on costs currently experienced in Metros in other cities) and average bus operating costs derived from the current bus operations. Allowance has also been made for savings in motor vehicle variable operating costs (taken as RMB0.44 per passenger-km) for those passengers transferring from car and motorcycle.

13. **Changes in external costs.** Changes in vehicle-km by the various modes will also cause changes in external costs. The evaluation considers changes in accidents, congestion, noise, pollution and greenhouse gases. These have been estimated by calculating physical changes in each of these impacts (e.g., time saved from congestion relief and changes in the physical volume of emissions, including an allowance for emissions associated with the electricity used to power the metro) and then combining these with unit costs. Unit costs have been derived from a study of external costs in China, undertaken in 2007 by consultants who adapted work from the

¹⁶ This treats self-employed passengers as traveling for work purposes.

INFRAS and HEATCO studies in Europe to Chinese conditions. The GHG reduction was valued using a value of \$29/tonne of carbon dioxide equivalent, in line with current Bank practice.

14. There are a number of non-quantifiable benefits, which were not captured in the cost-benefit analysis, but are worth noting:

- *Accessibility:* The metro will promote interconnection between residential and employment areas and social facilities (hospitals, schools) by lowering the obstacles to travel within the city. Although the economic evaluation quantifies improvement in travel time savings, it does not directly quantify the benefits of this increased accessibility for residents of Kunming. The metro system will provide increased access to economic opportunity for all of Kunming's residents, including those of low income.¹⁷ Over time, this accessibility benefit is likely to be capitalized into increased land values near metro stations.
- *Compact City Growth:* Over the long term, compact urban growth can substantially reduce the energy intensity and greenhouse gas emissions of urban areas. This is particularly crucial since Kunming is at a relatively early stage of its development and decisions on urban development made now will be 'locked in' over the long term - for better or for worse. These long term secondary impacts are not quantifiable in a traditional cost-benefit analysis.

E. Economic Rate of Return and Sensitivity Analyses

15. The benefits are calculated for the 30-year period following project completion, from 2015 to 2045 and the estimated EIRR derived is 8 percent. In China, the discount rate accepted by the Chinese government for public investments is normally 8 percent.¹⁸ The distribution of direct transport-related benefits is as shown in Table A9.2.

¹⁷ Tools have begun to be developed to directly measure the accessibility impacts (i.e., the increase in the number of jobs that can be reached within a given time frame by a given mode for different social groups) of major transport infrastructure projects. Due to a lack of data and the relative novelty of these techniques, this study did not seek to quantify these impacts in Kunming.

¹⁸ As per 2006 NDRC Circular 'Economic analysis methods and parameters of construction projects' (建设项目经济评价方法与参数). This relates to a range of 4- 6 percent test discount rate used by most major governments and agencies for the evaluation of similar large infrastructure projects. The real discount rates currently used by a range of OECD governments to assess returns on transport were recently described in a World Bank policy note. An updated review specific to urban rail projects in New York, London and Toronto revealed that these projects have used rates varying between 2.35 percent and 5 percent in analysis conducted since 2000.

Table A9.2: Analysis of Project Benefits

| | percent of total |
|----------------------|------------------|
| User benefits | 34 |
| Operator benefits | |
| Rail | 2 |
| Bus | 8 |
| Car | 8 |
| Subtotal | 18 |
| External benefits | |
| Accident reduction | 13 |
| Congestion reduction | 30 |
| Pollution reduction | 3 |
| Noise reduction | 1 |
| GHG reduction | 1 |
| Subtotal | 48 |
| Total benefits | 100 |

16. The results of these tests are given in Table A9.3.

Table A9.3: Sensitivity of project evaluation

| Test | | IRR (percent) |
|------|---------------------------------------|----------------|
| 1 | Base | 8 |
| 2 | Construction costs +50 percent | 6 |
| 3 | Traffic growth rates halved from 2015 | 7 |
| 4 | Excluding external benefits | 5 |

Financial Analysis of the Kunming Metro

17. This financial analysis focuses on the financial soundness of the project from the perspective of overall public transport operations - including both bus and metro.

Financing Structure

18. Financing for construction of Line 3 (as with Lines 1 and 2) is being arranged through purpose-specific long-term (25-30 year) loans from commercial banks and the IBRD, combined with equity contributions from the provincial and municipal governments, amounting to \$ 1.7116 billion.

19. In order to provide the capital funds for the first two lines to be constructed, the rail company has borrowed against various parcels of land that were transferred to it by the municipality. The company will get fees for developing primary infrastructure on this land—which will then be returned to city authorities for public auction. This is standard operating protocol for financing urban infrastructure in China.

Cash Inflows

20. The overwhelming share of cash inflows on the metro will be earned from passenger revenue, either directly or allocated to it through the revenue settlements. Unit revenues are planned to be RMB0.22 per passenger-km, compared to the current average level for the bus network of RMB0.15 per passenger-km. Revenue from other sources (station advertising, rentals etc) is estimated at 10 percent of traffic revenues (as projected by the domestic feasibility study report prepared for the project). A study of bus/rail fare policy is currently being undertaken.

Cash Outflows

21. The initial category of cash outflows is the project investment outlays at RMB10 billion, with a credit of RMB5 billion for the residual value of the investment at the end of the evaluation period. Operating costs have been based on unit costs adopted in the feasibility study, based on industry experience.

Financial Rate of Return

22. Net cash flows have been calculated for the bus and rail companies combined for the period between 2011-2045 and these show a financial IRR of approximately 0 percent. This reflects the very substantial initial costs, with revenues not being earned until after five years of construction, and the capital cost not being repaid until the very end of the evaluation period. However, the project is always cash-positive once operation begins, with the combined change in rail and bus working expenditure (i.e., operating expenditure less depreciation) typically being about half the incremental revenue.

23. The same series of sensitivity tests were carried out for the financial analysis as for the economic analysis. The results are presented in Table A9.4 and indicate that a substantial increase in construction costs does have the potential to seriously affect the financial performance of the system.

Table A9.4: Financial Analysis

| Scenario | FIRR |
|---------------------------------------|---------------|
| Base case | 0.31 percent |
| 50 percent construction cost increase | -1.15 percent |
| Demand growth rates halved from 2015 | 0.13 percent |

Municipal Financial analysis

24. The key fiscal statistics of Kunming Municipality for the last three years are shown in Table A9.5.

Table A9.5: Kunming Municipality Financial Statistics

| Key Fiscal Statistics | 2007 | 2008 | 2009 |
|--|-----------------|-----------------|-----------------|
| Total GDP (in billion RMB) | 139.3 | 160.7 | 180.0 |
| Locally Generated Fiscal Revenues (in billion RMB) | 13.3 | 17.5 | 20.2 |
| Total Municipal Revenues including Transfers (in billion RMB) | 19.0 | 25.1 | 29.1 |
| Share of Transfers over Total Municipal Revenues | 30.0 percent | 30.0 percent | 31.0 percent |
| Budgetary Expenditures for Infrastructure (in billion RMB) | 1.9 | 2.8 | 2.2 |
| Extra-Budgetary Expenditures for Infrastructure (in billion RMB) | NA | NA | NA |
| Outstanding Local Public Debt (in billion RMB) | 12.8 | 13.3 | 66.4 |
| Outstanding Local Public Debt as percent of GDP | 9.2 percent | 8.3 percent | 36.9 percent |
| Off-Budget Revenue from Land Concessions (in billion RMB) | 5.9 | 7.4 | 8.5 |

25. The data indicate that the overall municipal finance situation in Kunming is sound, with the following highlights:

- Kunming's economy performed reasonably well even during the global financial crisis. Its GDP has grown by over 12 percent a year over the last 3 years, despite the difficult economic situation domestically and internationally.
- Fiscal revenues from locally generated sources grew even faster than the municipal GDP, at 32 percent during 2007-08 and 15 percent during 2008-09.
- Kunming has received sizable inter-governmental transfers from the higher level government. Transfers received accounted for 30 percent of total municipal fiscal revenues.
- As with many cities in China, Kunming experienced a sharp increase in outstanding local public debt during 2008-09, but the debt ratio over GDP is at 36.9 percent in 2009, considerably lower than many other cities in China, some of which reached over 100 percent.
- Kunming was able to generate sizable off-budget revenues from land concessions, which are equivalent to about 30 percent of the total municipal budgetary revenues. However, similar to other cities, such revenues are not sustainable in the longer term.

26. The urban rail project has a total cost of RMB12 billion, potentially the largest infrastructure project for the city in the next few years. Assuming a 3-year implementation period, annual investment would be RMB4 billion, which is only 2.2 percent of the 2009 municipal GDP of RMB160 billion. This percentage would certainly continue to be lower as the annual municipal GDP will continue to increase in the next few years. In comparison to the experience of some East Asia cities that invested over 8 percent of their GDP for municipal

infrastructure during the period of rapid urban growth, it appears that Kunming's Urban Rail Line 3, at an investment level comparable to just 2 percent of GDP, would be affordable by Kunming, and would not excessively compete with public expenditures for other development priorities.

Annex 10: Safeguard Policy Issues
CHINA: Kunming Urban Rail Project

Environmental Safeguards

A. Background

1. The project is classified as a Category A due to the scale of tunnel construction, waste disposal and potential environmental and social impact from construction and operation in urban context. The TOR of the EIA was developed in December 2009, and reviewed/commented by the Bank task team. Draft EIA and EMP report have been prepared and reviewed by the Bank during project preparation period, and the final EA documents (in both English and Chinese) were submitted in October 2010, which include the following:

- *Environmental Impact Assessment Report*
- *Environmental Management Plan*
- *EA Executive Summary*

2. Preparation of EA documents followed relevant national laws, regulations, technical guidelines and standards applicable to the project, as well as the World Bank safeguards policies as appropriate. Based on screening, three World Bank safeguards policies are triggered: (1) OP4.01 Environmental Assessment; (2) OP4.11 Physical Cultural Resources, and (3) OP4.12 Involuntary Resettlement.

Compliance with World Bank Safeguards Policies

| Safeguard Policies | Actions |
|--|---|
| Environmental Assessment (OP/BP 4.01) | - Full EIA and EMP have been prepared as per requirements of OP4.01. |
| Physical Cultural Resources (OP/BP 4.11) | - Cultural buildings identified through survey and consultation with authorities. - Tunnel and stations avoid the protection zone of these buildings. - State-of-art engineering techniques used to minimize operation impact. - Chance procedures developed in EMP. |
| Involuntary Resettlement (OP/BP 4.12) | - RAP has been prepared |

3. The proposed rail line (No.3 line) is one of the overall urban rail network specified under the *Kunming Urban Rail Network Construction Plan (2008-2015)*. A Plan EIA has been approved by Ministry of Environmental Protection (MEP) in October 2008. The Plan EIA ensured the overall compatibility of rail network plan with urban master plan and other relevant plans, assessed the potential environmental and social impacts of the rail network plan at a strategic level, and provided guidance for the follow-up specific project EIA preparation. The EIA for the proposed No.3 line project drew on the findings and recommendations of the previous Plan EIA.

B. Baseline Environmental Setting

4. **Socio-economic situation.** The project is located in the urban area of Kunming city. Kunming, with a population of 6.26 million, is the capital city Yunnan Province. As a nationally famous tourism resort, the city has strong commitment and capacity on urban environmental management, and is now striving to become a National Model City for Environmental Protection.

5. **Landscape.** The proposed urban rail is within Kunming urban area where the landscape is a flat lacustrine plain in central urban area with mild rolling hills at both ends. The underground tunnel will be under existing major urban streets, and the short via-duct sections at both ends are over the median of urban roads where adequate space is available. Land to be occupied by stations and the parking/depot at both ends are mainly urban residential, commercial and green areas.

6. **Ecology.** The project will not affect any sizable surface vegetation or any natural habitats, except for some street trees and green area, with no protected or rare plant species.

7. **Cultural relics.** A cultural relics survey along the rail line, with consultation identified 8 buildings which are classified as protected buildings along the street, 14 – 60m from the underground metro tunnel. Though the tunnel and stations were designed to avoid the officially designated construction protection buffer zone of these buildings, there is a potential risk of impact from tunnel excavation during construction and vibration during operation.

8. **Sensitive sites.** In addition to the 8 cultural resource buildings, other sensitive sites have been identified along the line, i.e. residential areas, schools and hospitals, that subject to potential noise, air pollution and vibration impact during the construction and operation stages.

C. Main Environmental Impacts and Mitigation Measures

9. The project will have significant positive environmental and social impact by promoting mass public transportation which in turn will alleviate urban traffic, reduce environmental pollution related to vehicle emission and traffic congestion, and improve urban quality of life. Manageable negative environmental impacts of the project are related to urban construction activities, i.e., urban utility and traffic disruption; tunnel construction safety; potential impact on surrounding buildings; and proper disposal of spoil material, dust and noise nuisance during the construction stage. Impacts during operation include noise/vibration impact, aesthetics integration, and waste management from rail facilities. These impacts are thoroughly addressed by the EIA report, and necessary mitigation measures have been developed in EMP. These adverse impacts can be adequately avoided, minimized and mitigated with good management practice and mitigation measures as developed in the EIA/EMP.

Project Feasibility Study and Design

10. Various alternatives were carefully studied to minimize resettlement, avoid environmental and cultural sensitive sites, increase the convenience of public transport transfer,

and integrate with the overall public transport plan. Further optimization will be conducted during preliminary design and detailed design.

11. Adequate engineering measures have been designed to mitigate the expected impacts, including noise barriers, vibration reduction equipment, intensive greening plan, and landscape design for stations, via-duct and parking/depot site.

Construction

12. **Social Disturbance.** Urban rail construction will have impact on surface road traffic and disturb local people's daily life. There is also potential impact on utility facilities (water, gas, power, communication etc.). These impacts will be mitigated by effective implementation of city procedures for traffic diversion and utility relocation, coordination with police department, and prior notice through public media. The construction site will be properly fenced for safety. Temporary access roads, with adequate safety measures (temporary bridge, protection net, night light etc.) will be provided for nearby residents, businesses, schools, etc. A bulletin board will be established at the construction site with information on construction activity, timing, and the channel for complaints. Public consultation will be conducted throughout the construction period to address public concerns and improve construction activities. Pamphlets will be distributed in the local community, providing detailed information about traffic diversion plans, bus route changes, etc.

13. **Spoil waste.** The project will generate large amount of spoil wastes. A portion of the waste soil will be reused as backfill in stations and parking/depot sites. The rest will be transported to two dedicated construction waste landfills, as designated by Kunming Urban Management Comprehensive Enforcement Department. According to Kunming Urban Environmental Hygiene Regulation and Kunming Construction Waste Disposal Regulation, the contractors are required to register with city Comprehensive Enforcement Department for permit. Spoil material will be transported by professional construction waste transportation companies following routes assigned by the Department. Transportation is regulated by a four-copy manifest system, and supervised the Department on a daily basis.

14. **Noise and vibration.** Project construction will have temporary noise and vibration impact on local communities. These impacts will be managed in line with local Construction Site Management Code through: use of low noise equipment and construction technologies; limiting intensive construction activities during the 6:00-22:00; careful scheduling of construction activities near sensitive sites; installation of temporary noise reduction facility at sensitive sites; restricting night-time construction; and requiring prior public notice, as well as night-time construction permit from city EPB, for activities that need continuous construction during the night. Shield tunneling and cover-and-cut method will be used for the tunnel and most of the stations to minimize noise and vibration impact.

15. **Air pollution.** Construction activities will cause temporary impact of airborne dust. The mitigation measures to be adopted include: frequent water spraying on construction sites and access road to suppress dust; covering of trucks transporting bulk materials and timely site clean up after construction; hauling trucks will be wheel-washed before leaving the construction site;

material or waste hauling will avoid densely populated areas, and for densely populated areas, transportation will be arranged during the night; ban on burning of construction wastes; and not permitting on-site cement mixing.

16. **Ecological and aesthetic impact.** The project will affect about 9.11 ha urban green area. The surface of the construction site will be prone to soil erosion and also have temporary negative visual impact. Trees and green belts will be relocated with the approval of city authorities according to local regulations. An intensive greening plan has been developed to offset the loss of green area, e.g., greening for the parking and depot site and the areas under the via-duct section. Construction site will be properly fenced during construction. Special attention has been paid to aesthetic and landscape design for the stations, via-duct bridges, ventilation shafts, and greening of parking/depot sites to be compatible with the overall city taste plans.

17. **Cultural properties.** Construction of the tunnel using the shield method will avoid impact on the safety of the affected cultural buildings. Groundwater and land subsidence will be monitored during construction. Chance find procedures will follow the requirement of national regulations, i.e. excavation will be stopped immediately in case relics are found, and reported to the Kunming cultural property authority. Construction will only resume after the relevant authority authorizes the resumption.

18. **Wastewater.** Wastewater from the construction site will be properly treated (settling and oil separation) and discharged into the municipal sewerage network, as per the construction site management regulations in Kunming city. Random discharge of wastewater is strictly forbidden.

19. **Groundwater.** The underground tunnel will form a continuous barrier which may partially affect the groundwater hydrology. During construction, dewatering will be conducted at several stations, and temporary decrease of the groundwater table near these places will be induced; it will be restored upon construction completion. Special engineering measures (such as curtain grouting) will be adopted to minimize dewatering during construction, and groundwater monitoring will be conducted during excavation to guide proper construction.

20. **Cumulative impact.** Kunming will concurrently have three urban rail lines under construction, which will likely to generate substantial impact for Kunming city in terms of urban traffic disturbance, pedestrian safety, noise and dust, and disposal of significant amount of tunnel waste. The disruption of traffic can be mitigated by proper arrangement of traffic diversions with the involvement of the police departments. Nuisance from dust, noise and pedestrian safety will be managed through good construction management practice and adequate supervision. Kunming Urban Management Enforcement Unit has reviewed the tunnel spoil waste situation and has issued a special document “*Decision on Comprehensive Utilization of Spoil Materials from Light Rail Projects*”, which designates two construction waste landfills and one new industrial park as backfill for land development. These places have adequate capacity to absorb the waste from all three rail lines. Five more abandoned quarry pits which need immediate restoration have been selected for the disposal of excess material from the three lines and have been approved by relevant city agencies.

Operation

21. **Land Use Change.** The metro project will have significant land use impact - supporting higher density residential and commercial use the vicinity of new stations. Kunming city has developed an *Adjustment Plan for Land Use along Short-term Urban Rail Network*, a fine-tuning of “detailed control plan”. It adjusted land use within a 1 km corridor of the rail lines, integrating transport, urban function zoning and land use model. Kunming city has mature institutions and procedures to manage the land development to ensure that land development induced from the rail network is in line with urban master plan, and conducted in an orderly and legal process.

22. **Noise.** Noise impact modeling conducted for 25 sensitive sites identified along the rail line concluded that sensitive sites along the via-duct section are subject to noise impact above standard. To mitigate such impacts, a total of 44,380m² noise barrier has been designed for the via-duct sections. Ventilation shafts will be installed with low noise equipment and silencer, and will be located at least 15 m from nearby residential areas. Enclosure walls and green belt plantation will be adopted in the parking and depot sites to minimize noise impact.

23. **Vibration.** Vibration-reduction facilities will be installed for 26 sites with total length of 5.6 km, including state-of-art steel-spring floating slab track bed (1,750m X 2) for all cultural building sections, along with a flexible short sleeper track bed (2,550m x 2) and vibration-reduction fastener.

24. **Air quality.** Surface ventilation shafts are properly sited with adequate distance from nearby residential areas. Overall, the rail operation will substantially reduce the emissions in Kunming.

25. **Water Quality.** Wastewater and sewage from rail stations and parking/depot sites will be discharged into the municipal sewer system.

26. **Solid Waste.** Solid waste from trains and stations, as well as garbage and waste from rail parking and maintenance depot, will be properly treated, including recycling, landfill, and special for hazardous waste.

D. Alternative Analysis

27. **Kunming Urban Rail Network Plan.** Kunming city has developed a long-term urban rail network plan which identified a 6 rail line network. The plan has been approved by the State Council in 2009. The proposed No.3 line is among the first 3 lines to be constructed by 2016. The option of rail strategy and alignment corridors has been intensively studied in the overall network plan with due regard to economic, technical, and environmental and social development issues.

28. **Project feasibility stage.** Various alternatives were considered for specific sections and station locations, taking into account environmental, social, technical and financial factors. Some examples:

- Chunyulu viaduct section: Two alternatives were considered, i.e., viaduct in the median of Chunyulu road, or on roadside. The option (in-median) was selected due to lower land acquisition, lower noise impact on residential areas, and urban landscape considerations.
- Majie – Shawei section: Two alternative alignments were considered, i.e. original alignment in the network (along an existing rail line) and a new alignment west of Chunyulu road. The new alignment was finally selected due to the easy connection with public transport network (an existing bus transfer center) and potential for surrounding urban development though with increased engineering cost.
- Xichang – Wenhuaogong section: Two alternative locations were considered for Baihuodalou station, with the final selection based on better service to commercial areas and easy transfer to the future No.5 rail line.
- Dashuying – Taipingcun section: Two alternative alignments were considered, i.e. original alignment in the network, and a new alignment along East Dongfenglu road. The new alignment was selected to accommodate the crossing of the existing 2nd Ring Road, and avoid massive resettlement.
- East Passenger Terminal station: Two configurations for the East Passenger Terminal Station were considered to accommodate the connection of No.3 and future No.6 rail lines. A double-layer option was selected (vs. parallel) due to lower land acquisition, reduced civil works, and easy passenger transfer.

E. Environmental Management Plan

29. A stand-alone EMP has been developed which details the environmental management organization and responsibilities, mitigation measures, capacity training plan, monitoring plan, and budget estimates of EMP implementation. EMP measures will be incorporated into bidding documents and contracts in order to ensure effective implementation.

30. Environmental management responsibility will be built into the relevant divisions of the overall project management structure, with dedicated management staff. Dedicated environmental staff will also be assigned to Supervision Engineers and Contractors to ensure effective EMP implementation. A training plan will be implemented prior to/and during construction for project management staff, Supervision Engineers and Contractors.

31. A two tier monitoring program has been developed for this project: daily and regular monitoring to be carried out by contractors and construction supervision companies, and periodical compliance monitoring by professional monitoring stations.

F. Public Consultation and Information Disclosure

32. Two rounds of public consultation were conducted during EA preparation. The first round was conducted in January 2010 through meetings, field interviews and questionnaire surveys among project-affected people, local village committees, schools and hospitals, and through a telephone hotline. Project information and notice of commencement of EIA preparation were disclosed in local newspaper and on the website of Yunnan Environmental Protection Bureau. The main concerns raised by the public are resettlement compensation,

information disclosure, disturbance of traffic, night time construction noise etc. All these concerns were addressed in the RAP and EIA/EMPs.

33. The second round of public consultation was conducted in March 2010 after the draft EIA reports had been prepared through public meetings and 210 questionnaire surveys. During the consultation, the key findings of draft EIA report and proposed mitigation measures were explained, as well as the responses to the questions raised from the first round consultation.

34. **Disclosure.** As required by Chinese EIA regulations, the first round of information disclosure was carried out on January 1, 2010, when a brief project information and commencement of EIA was notified in Kunming Daily. The second round of disclosure was on February 12, 2010, when the draft EIA report was disclosed through the internet (Yunnan Environmental Protection Bureau) with announcement in Kunming Daily. The full final EIA report has been disclosed in the website of Kunming Urban Rail Company on June 15, 2010. The English EIA has been disclosed in Infoshop on September 17, 2010.

Involuntary Resettlement

35. The project will cause involuntary resettlement and resettlement impacts were determined during project preparation. In accordance with local laws and Bank requirements, a RAP was prepared in Chinese and English by Kunming PMO, with assistance from house demolition offices, local land bureaus, affected villages and communities, potentially displaced persons, and Resettlement Consultants. The initially contemplated resettlement impacts were reduced by optimizing project design and implementation arrangements (See details in Section 1.2.2.1 of the RAP). The RAP was prepared in compliance with OP 4.12 Involuntary Resettlement and describe in detail the impacts, affected populations, consultation process, rehabilitation measures, budget, and implementation and monitoring arrangements. The RAP was disclosed locally in Chinese on August 25, 2010 and sent to the Bank’s InfoShop on August 24, 2010.

36. **Scope of Impacts.** Major impacts relate to land acquisition and demolition of residential houses, enterprises/institutes and shops. The Table below summarized the resettlement impact of the project.

| Collective Land Acquisition | | House Demolition | | Affected Shops | | Enterprises/Institutes | |
|--|--------|-------------------------|-----------|-----------------------|-----|-------------------------------|-----|
| Area(Mu) | HH/PAP | Urban/PAP | Rural/PAP | Number | PAP | Number | PAP |
| 321 | 12/36 | 34/127 | 27/185 | 134 | 395 | 14 | 143 |
| Total Number of PAPs: 844 (42 people affected by both house demolition and shop demolition.) | | | | | | | |

37. **Policy objectives and legal framework.** Key principles, considerations and salient activities in project design and RAP preparation included:

- Acquisition of land and other assets, and relocation of people, will be minimized as much as possible.
- A socio-economic survey will be conducted to determine baseline conditions, especially of project affected persons.

- Compensation for houses or other properties will be determined at full replacement value.
- Compensation will be provided to all project affected persons, including shop operators and those who lack house registration or other documents, such as business documents and legal documents.
- Affected persons will be consulted during planning for acquisition of land and other assets, and provision of rehabilitation.
- Financial and physical resources for resettlement and rehabilitation will be made available when required.
- Institutional arrangements will be established to ensure effective and timely design, planning, consultation and implementation of the RAP.
- Effective and timely supervision, monitoring and evaluation of project implementation will be executed.

38. **Compensation Standards.** Land acquisition compensation will include land compensation, a resettlement subsidy, and compensation for standing crops. The land acquisition fund is calculated based on land output value according to local regulation. Compensation rates for structures are determined based on their replacement costs.

39. **Affected public infrastructure.** Compensation based on replacement value will be paid to relevant government agencies or local governments to restore affected infrastructure and services.

40. **Implementation arrangements.** A multi-level organization has been established to implement the RAP. An independent monitor will be selected to monitor resettlement implementation and livelihood restoration. Participatory Monitoring Mechanism has been designed. The PMO will be responsible for internal monitoring and will provide semi-annual internal monitoring reports to the Bank. Details of staffing and their responsibilities are provided in the RAP.

41. **Budget and funding arrangement.** The RAP contains a detailed resettlement cost estimation that covers all the basic costs for resettlement, management, contingencies, surveys, design and monitoring. The basic resettlement cost includes compensation for land, standing crops and trees and reconstruction of affected infrastructure. The Borrower will prepare a sufficient budget from counterpart funding for resettlement implementation.

42. **Public participation.** Project-affected persons and organizations were informed about the project and its impacts in meetings during the preparation of the RAP. Key comments and recommendations received from these meetings were incorporated in the RAPs and feasibility studies. Public participation will continue during RAP implementation. Project information will be provided to affected persons through television, newspapers, bulletins and posters. Participatory monitoring mechanism will be established to ensure public participation during project implementation.

43. **Grievance mechanism.** A grievance mechanism was established during the preparation of the RAP. All relevant telephone numbers were disclosed to PAPs. The PAPs can prosecute any resettlement aspect, if needed. All prosecuted cases will be recorded in paper.

Indigenous People

44. The Bank team visited the project area to conduct a screening to determine whether ethnic minority peoples are present in, or have collective attachment to, the project area. Besides the site visit, the team also consulted with the client and collected data from relevant census documents. Although 13.48% of the Kunming population is ethnic minority individuals, they are scattered across the city, and no ethnic minority community has been identified within the project area. The Bank team concludes that no ethnic minority communities are present in, or have collective attachment to, the project area. Therefore, the Bank's Policy on Indigenous Peoples OP 4.10 is not triggered.

Annex 11: Project Preparation and Supervision

CHINA: Kunming Urban Rail Project

| | Actual | Proposed |
|---------------------------------|--------------------|-------------------|
| PCN review | January 15, 2010 | |
| Initial PID to PIC | April 8, 2010 | |
| Initial ISDS to PIC | April 8, 2010 | |
| Appraisal | September 28, 2010 | |
| Negotiations | March 9-10, 2011 | |
| Board/RVP approval | | May 10, 2011 |
| Planned date of effectiveness | | June 15, 2011 |
| Planned date of mid-term review | | December 2013 |
| Planned closing date | | November 30, 2016 |

Key institutions responsible for preparation of the project:

1. Ministry of Finance (MOF)
2. National Development and Reform Commission (NDRC)
3. Yunnan Finance Bureau (YFB)
4. Kunming Rail Transit Company, LTD (KRTC)
5. Kunming Transport Research Institute (KTRI)
6. Kunming Planning Bureau (KPB)
7. China Second Railway Design Institute (CREEC)

Bank staff and consultants who worked on the project included:

| Name | Title | Unit |
|--------------------|--|-------|
| Shomik Mehndiratta | Task Team Leader, Lead Transport Specialist | LCSTR |
| Kishor Uprety | Senior Counsel | LEGES |
| Robert O' Leary | Senior Disbursement Officer | LOAG |
| Zhi Liu | Lead Infrastructure Specialist | EASIN |
| Rein Westra | Senior Transport Specialist (incoming TTL) | EASIN |
| Xuan Peng | Team Assistant | EACCF |
| Guoping Yu | Procurement | EAPPR |
| Fang Zhang | Financial Management | EAPFM |
| Wu Lei | Team Assistant | EACCF |
| Eric Ho | Urban Transport Economist, Consultant | EASCS |
| Peishen Wang | Environmental Specialist, Consultant | EASCS |
| Jun Zeng | Social Development Specialist | EASCS |
| Atul Agarwal | Transport Specialist | SASDT |
| Luquan Tian | Transport Specialist | EASCS |

| | | |
|------------------|---|-------|
| Holly Krambeck | Young Professional | ENVCF |
| Andrew Salzberg | Transport Specialist | EASIN |
| Imogene Jensen | Quality Assurance, Lead Transport Specialist | EASIN |
| Gordon Neilson | Urban Transport Specialist, consultant | EASCS |
| Alan MacDonald | Urban Planning and Design Specialist, consultant | EASCS |
| Dick Bullock | Transport Economist, consultant | EASCS |
| Samuel Zimmerman | Urban Transport consultant | ETWTR |
| Jorge Rebelo | Peer Reviewer, Lead Transport Specialist | LCSTR |
| O.P. Agarwal | Peer Reviewer, Senior Urban Transport Specialist | EASIN |
| Ajay Kumar | Peer Reviewer, Lead Transport Economist | AFTTR |

Annex 12: Documents in the Project File
CHINA: Kunming Urban Rail Project

| No | Name | Author | Date | Chinese /English | Hard/ Digital |
|-----------|--|---|--------------------|-------------------------|----------------------|
| 1 | Kunming Master Plan 2008-2020 | Kunming Planning Bureau | Updated July, 2010 | Chinese | Digital |
| 2 | Station Designs and Rail Alignment | China Second Railway Design Institute | January, 2010 | Chinese | Digital |
| 3 | Line 3 Preliminary Plan | Kunming Urban Planning and Design Institute | September, 2009 | English | Digital |
| 4 | Kunming Municipality Road and Rural Passenger Transport Integration and Transformation Plan | Kunming Municipal Government | September, 2009 | English | Digital |
| 5 | Notice on the Implementation Plan of Approval and Transmission of Kunming Urban and Rural Public Bus Integration | Kunming Municipal Government | September, 2009 | English | Digital |
| 6 | Building Regulations | Urban Planning Bureau | 2006 | Chinese | Digital |
| 7 | Sample Planning Approval Permit | Urban Planning Bureau | 2005 | Chinese | Digital |
| 8 | Detailed Control Plans along Line 3 | Urban Planning Bureau | 2009 | Chinese | Digital |
| 9 | Bus Route Maps | Kunming Bus Company | 2010 | Chinese | Digital |

Annex 13: Statement of Loans and Credits

CHINA: Kunming Urban Rail Project

| Project ID | FY | Purpose | Original Amount in US\$ Millions | | | | Cancel. | Undisb. | Difference between expected and actual disbursements | |
|------------|------|---|----------------------------------|------|------|------|---------|---------|--|------------|
| | | | IBRD | IDA | SF | GEF | | | Orig. | Frm. Rev'd |
| P098078 | 2011 | CN-Huai River Basin Flood Management and Drainage Improvement | 200.00 | 0.00 | 0.00 | 0.00 | 0.00 | 199.50 | 0.00 | 0.00 |
| P105872 | 2011 | CN-Integrated Forestry Development | 100.00 | 0.00 | 0.00 | 0.00 | 0.00 | 99.75 | 0.00 | 0.00 |
| P116656 | 2011 | CN-Zhejiang Qiantang River Basin Small Town Environment Project | 100.00 | 0.00 | 0.00 | 0.00 | 0.00 | 100.00 | 0.00 | 0.00 |
| P100455 | 2010 | CN-Henan Ecological Livestock Project | 80.00 | 0.00 | 0.00 | 0.00 | 0.00 | 79.80 | 0.00 | 0.00 |
| P099751 | 2010 | CN-Sustainable Dev. in Poor Rural Areas | 100.00 | 0.00 | 0.00 | 0.00 | 0.00 | 99.75 | 0.00 | 0.00 |
| P101716 | 2010 | CN-Jilin Food Safety | 100.00 | 0.00 | 0.00 | 0.00 | 0.00 | 91.75 | -7.33 | 0.00 |
| P081615 | 2010 | CN-Taiyuan Urban Transport Project | 150.00 | 0.00 | 0.00 | 0.00 | 0.00 | 149.63 | 0.00 | 0.00 |
| P096920 | 2010 | CN-Ningxia Highway | 250.00 | 0.00 | 0.00 | 0.00 | 0.00 | 224.38 | -25.00 | 0.00 |
| P117107 | 2010 | CN-Tech Vocational Ed | 40.00 | 0.00 | 0.00 | 0.00 | 0.00 | 36.90 | -3.00 | 0.00 |
| P106956 | 2010 | CN - Ningbo New Countryside Development | 50.00 | 0.00 | 0.00 | 0.00 | 0.00 | 48.38 | 0.67 | 0.00 |
| P108627 | 2010 | CN - Nanning Urban Environment | 100.00 | 0.00 | 0.00 | 0.00 | 0.00 | 99.75 | 0.00 | 0.00 |
| P111163 | 2010 | CN-Xinjiang Water Conservation Project | 100.00 | 0.00 | 0.00 | 0.00 | 0.00 | 99.75 | 0.00 | 0.00 |
| P111421 | 2010 | CN-Anhui Medium Cities Urban Transport | 100.00 | 0.00 | 0.00 | 0.00 | 0.00 | 99.75 | 0.00 | 0.00 |
| P112759 | 2010 | Shandong Ecological Afforestation | 60.00 | 0.00 | 0.00 | 0.00 | 0.00 | 53.85 | -6.00 | 0.00 |
| P112838 | 2010 | CN-Wuhan Second Urban Transport | 100.00 | 0.00 | 0.00 | 0.00 | 0.00 | 99.75 | 0.00 | 0.00 |
| P113766 | 2010 | CN-Energy Efficiency Financing II | 100.00 | 0.00 | 0.00 | 0.00 | 0.00 | 99.75 | 0.00 | 0.00 |
| P086446 | 2010 | CN-Chongqing Urban-Rural Integration Project | 84.00 | 0.00 | 0.00 | 0.00 | 0.00 | 75.79 | -4.67 | 0.00 |
| P096926 | 2009 | CN-Jiangsu Water and Wastewater Project | 130.00 | 0.00 | 0.00 | 0.00 | 0.00 | 92.40 | -6.61 | 0.00 |
| P096923 | 2009 | CN-Shanghai APL III | 200.00 | 0.00 | 0.00 | 0.00 | 0.00 | 199.50 | 15.77 | 0.00 |
| P096812 | 2009 | CN-Yunnan Urban Env | 150.00 | 0.00 | 0.00 | 0.00 | 0.00 | 128.04 | -2.08 | 0.00 |
| P096707 | 2009 | CN - GD Tech&Vocational ED and Training | 20.00 | 0.00 | 0.00 | 0.00 | 0.00 | 17.25 | 3.05 | 0.00 |
| P096556 | 2009 | CN-Eco-Farming | 120.00 | 0.00 | 0.00 | 0.00 | 0.00 | 92.43 | -2.27 | 0.00 |
| P091950 | 2009 | CN-Guizhou Cultural and Natural Heritage | 60.00 | 0.00 | 0.00 | 0.00 | 0.00 | 59.70 | 7.68 | 0.00 |
| P114107 | 2009 | CN-Wenchuan Earthquake Recovery Project | 710.00 | 0.00 | 0.00 | 0.00 | 0.00 | 613.33 | 272.50 | 0.00 |
| P112359 | 2009 | CN-NanGuang Railway | 300.00 | 0.00 | 0.00 | 0.00 | 0.00 | 299.25 | 0.04 | 0.00 |
| P107559 | 2009 | CN-Guizhou-Guangzhou Railway | 300.00 | 0.00 | 0.00 | 0.00 | 0.00 | 299.25 | 16.67 | 0.00 |
| P101988 | 2009 | CN-Jiangxi Shihutang Navi & Hydropower | 100.00 | 0.00 | 0.00 | 0.00 | 0.00 | 65.36 | 43.48 | 0.00 |
| P101829 | 2009 | CN Xining Flood and Watershed Mgmt | 100.00 | 0.00 | 0.00 | 0.00 | 0.00 | 74.30 | 0.22 | 0.00 |
| P101258 | 2009 | CN-Hubei Yiba Highway | 150.00 | 0.00 | 0.00 | 0.00 | 0.00 | 148.63 | 39.02 | 0.00 |
| P100968 | 2009 | CN-Shanxi Coal Bed Methane Development | 80.00 | 0.00 | 0.00 | 0.00 | 0.00 | 79.80 | 23.20 | 0.00 |
| P096925 | 2008 | CN- Bengbu Integrated Environment Improvement Project | 100.00 | 0.00 | 0.00 | 0.00 | 0.00 | 87.94 | 20.86 | 0.00 |
| P099224 | 2008 | CN-Liaoning Med. Cities (LMC) III | 191.00 | 0.00 | 0.00 | 0.00 | 0.00 | 154.92 | 62.96 | 0.00 |
| P099112 | 2008 | CN-Anhui Highway Rehab & Improvement | 200.00 | 0.00 | 0.00 | 0.00 | 0.00 | 42.96 | -70.04 | 0.00 |

| | | | | | | | | | | |
|---------|------|--|----------|------|------|------|-------|----------|----------|--------|
| P099062 | 2008 | CN-ShiZheng Railway | 300.00 | 0.00 | 0.00 | 0.00 | 0.00 | 227.91 | 5.33 | 0.00 |
| P093963 | 2008 | CN-Guiyang Transport | 100.00 | 0.00 | 0.00 | 0.00 | 0.00 | 32.77 | 13.50 | 0.00 |
| P093882 | 2008 | CN-Shandong Flue Gas Desulfurization | 50.00 | 0.00 | 0.00 | 0.00 | 0.00 | 33.95 | 29.14 | 0.00 |
| P092631 | 2008 | CN-Xi'an Sustainable Urban Transport | 150.00 | 0.00 | 0.00 | 0.00 | 0.00 | 130.24 | 12.98 | 15.23 |
| P091949 | 2008 | CN-Gansu Cultural & Natural Heritage | 38.40 | 0.00 | 0.00 | 0.00 | 0.00 | 20.68 | -2.42 | 0.00 |
| P084437 | 2008 | CN-Rural Health | 50.00 | 0.00 | 0.00 | 0.00 | 0.00 | 36.35 | -9.86 | 0.00 |
| P084874 | 2008 | CN- Energy Efficiency Financing | 200.00 | 0.00 | 0.00 | 0.00 | 0.00 | 123.35 | 54.41 | 0.00 |
| P085376 | 2008 | CN-Migrant Skills Dev. and Employment | 50.00 | 0.00 | 0.00 | 0.00 | 0.00 | 47.45 | 11.91 | 0.00 |
| P087224 | 2008 | CN-Han River Urban Environment | 84.00 | 0.00 | 0.00 | 0.00 | 0.00 | 70.14 | 40.75 | 0.00 |
| P077752 | 2007 | CN-SHANDONG ENVMT 2 | 147.00 | 0.00 | 0.00 | 0.00 | 0.00 | 60.11 | -14.39 | 0.00 |
| P081776 | 2007 | CN-GUANGDONG/PRD2 | 96.00 | 0.00 | 0.00 | 0.00 | 0.00 | 64.06 | 23.23 | 0.00 |
| P083322 | 2007 | CN-SICHUAN URBAN DEV | 180.00 | 0.00 | 0.00 | 0.00 | 0.00 | 79.86 | 74.69 | 0.00 |
| P086515 | 2007 | CN-3rd National Railway | 200.00 | 0.00 | 0.00 | 0.00 | 0.00 | 35.91 | -2.49 | 0.00 |
| P088964 | 2007 | CN-Guangxi Integrated Forestry Dev | 100.00 | 0.00 | 0.00 | 0.00 | 0.00 | 5.70 | -42.46 | 0.00 |
| P092618 | 2007 | CN-LIAONING MED CITIES INFRAS 2 | 173.00 | 0.00 | 0.00 | 0.00 | 0.00 | 133.92 | 46.71 | 0.00 |
| P095315 | 2007 | CN-W. Region Rural Water & Sanitation | 25.00 | 0.00 | 0.00 | 0.00 | 0.00 | 9.65 | 0.55 | 0.00 |
| P091020 | 2007 | CN-Fujian Highway Sector Investment | 320.00 | 0.00 | 0.00 | 0.00 | 0.00 | 16.62 | -50.25 | 0.00 |
| P096285 | 2007 | CN-MSE Finance | 100.00 | 0.00 | 0.00 | 0.00 | 0.00 | 5.00 | 5.00 | 0.00 |
| P081348 | 2006 | CN-HENAN TOWNS WATER | 150.00 | 0.00 | 0.00 | 0.00 | 0.00 | 100.30 | 65.30 | 0.00 |
| P081255 | 2006 | CN-Changjiang/Pearl River Watershed Rehabilitation Project | 100.00 | 0.00 | 0.00 | 0.00 | 0.00 | 49.44 | 31.11 | -0.04 |
| P070519 | 2006 | CN-Fuzhou Nantai Island Peri-Urban Dev | 100.00 | 0.00 | 0.00 | 0.00 | 0.00 | 24.69 | 14.27 | -8.81 |
| P075732 | 2006 | CN-SHANGHAI URBAN APL2 | 180.00 | 0.00 | 0.00 | 0.00 | 0.00 | 61.55 | 49.05 | 0.00 |
| P096158 | 2006 | CN-Renewable Energy II (CRESP II) | 86.33 | 0.00 | 0.00 | 0.00 | 1.65 | 8.86 | 10.51 | 0.00 |
| P099992 | 2006 | CN-Liaoning Medium Cities Infrastructure | 218.00 | 0.00 | 0.00 | 0.00 | 0.00 | 97.11 | 49.11 | 0.00 |
| P085124 | 2006 | CN-Ecnomic Reform Implementation | 20.00 | 0.00 | 0.00 | 0.00 | 0.00 | 12.85 | 21.51 | 0.00 |
| P086629 | 2006 | CN-Heilongjiang Dairy | 100.00 | 0.00 | 0.00 | 0.00 | 30.00 | 15.62 | 45.12 | 0.00 |
| P069862 | 2005 | CN - Agricultural Technology Transfer | 100.00 | 0.00 | 0.00 | 0.00 | 0.00 | 9.44 | 9.44 | 0.00 |
| P071094 | 2005 | CN - Poor Rural Communities Development | 100.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.22 | 1.22 | 0.00 |
| P075730 | 2005 | CN-HUNAN URBAN DEV | 172.00 | 0.00 | 0.00 | 0.00 | 0.00 | 87.44 | 87.10 | 14.44 |
| P081161 | 2005 | CN-CHONGQING SMALL CITIES | 180.00 | 0.00 | 0.00 | 0.00 | 0.00 | 31.60 | 21.07 | 0.00 |
| P081346 | 2005 | CN-LIUZHOU ENVIRONMENT MGMT | 100.00 | 0.00 | 0.00 | 0.00 | 0.00 | 12.55 | 10.38 | 0.00 |
| P075728 | 2004 | CN-GUANGDONG/PRD UR ENVMT | 128.00 | 0.00 | 0.00 | 0.00 | 0.92 | 49.44 | 50.37 | 47.12 |
| P077137 | 2004 | CN-4th Inland Waterways | 91.00 | 0.00 | 0.00 | 0.00 | 0.46 | 0.87 | 1.33 | 0.87 |
| P066955 | 2004 | CN-ZHEJIANG URBAN ENVMT | 133.00 | 0.00 | 0.00 | 0.00 | 0.00 | 14.09 | 14.09 | 4.77 |
| P040599 | 2003 | CN-TIANJIN URB DEV II | 150.00 | 0.00 | 0.00 | 0.00 | 0.00 | 51.11 | 51.11 | 39.02 |
| Total: | | | 9,196.73 | 0.00 | 0.00 | 0.00 | 33.03 | 5,975.14 | 1,107.54 | 112.60 |

CHINA
STATEMENT OF IFC's
Held and Disbursed Portfolio
In Millions of US Dollars

| FY Approval | Company | Committed | | | | Disbursed | | | |
|-------------|------------------|-----------|--------|-------|---------|-----------|--------|-------|---------|
| | | IFC | | | | IFC | | | |
| | | Loan | Equity | Quasi | Partic. | Loan | Equity | Quasi | Partic. |
| 2002 | ASIMCO | 0.00 | 10.00 | 0.00 | 0.00 | 0.00 | 10.00 | 0.00 | 0.00 |
| 2006 | ASIMCO | 0.00 | 0.00 | 4.12 | 0.00 | 0.00 | 0.00 | 3.61 | 0.00 |
| 2005 | BCCB | 0.00 | 59.21 | 0.00 | 0.00 | 0.00 | 59.03 | 0.00 | 0.00 |
| 2003 | BCIB | 0.00 | 0.00 | 12.04 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 2006 | BUFH | 8.14 | 0.00 | 0.00 | 0.00 | 8.14 | 0.00 | 0.00 | 0.00 |
| 2005 | Babei | 0.00 | 5.00 | 0.00 | 0.00 | 0.00 | 5.00 | 0.00 | 0.00 |
| | Babei Necktie | 11.00 | 0.00 | 0.00 | 6.00 | 8.94 | 0.00 | 0.00 | 4.88 |
| 1999 | Bank of Shanghai | 0.00 | 21.76 | 0.00 | 0.00 | 0.00 | 21.76 | 0.00 | 0.00 |
| 2000 | Bank of Shanghai | 0.00 | 3.84 | 0.00 | 0.00 | 0.00 | 3.84 | 0.00 | 0.00 |
| 2002 | Bank of Shanghai | 0.00 | 24.67 | 0.00 | 0.00 | 0.00 | 24.67 | 0.00 | 0.00 |
| 2005 | BioChina | 0.00 | 3.70 | 0.00 | 0.00 | 0.00 | 3.13 | 0.00 | 0.00 |
| 2002 | CDH China Fund | 0.00 | 2.02 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 2005 | CDH China II | 0.00 | 17.99 | 0.00 | 0.00 | 0.00 | 11.38 | 0.00 | 0.00 |
| 2006 | CDH Venture | 0.00 | 20.00 | 0.00 | 0.00 | 0.00 | 0.51 | 0.00 | 0.00 |
| 2005 | CT Holdings | 0.00 | 0.00 | 40.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 2004 | CUNA Mutual | 0.00 | 10.53 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 2006 | Capital Today | 0.00 | 25.00 | 0.00 | 0.00 | 0.00 | 0.32 | 0.00 | 0.00 |
| 2005 | Changyu Group | 0.00 | 18.07 | 0.00 | 0.00 | 0.00 | 18.07 | 0.00 | 0.00 |
| 1998 | Chengdu Huarong | 3.36 | 3.20 | 0.00 | 3.13 | 3.36 | 3.20 | 0.00 | 3.13 |
| 2004 | China Green Ener | 20.00 | 0.00 | 0.00 | 0.00 | 15.00 | 0.00 | 0.00 | 0.00 |
| 2004 | China Re Life | 0.00 | 0.27 | 0.00 | 0.00 | 0.00 | 0.27 | 0.00 | 0.00 |
| 1994 | China Walden Mgt | 0.00 | 0.01 | 0.00 | 0.00 | 0.00 | 0.01 | 0.00 | 0.00 |
| 2006 | Chinasoft | 0.00 | 0.00 | 15.00 | 0.00 | 0.00 | 0.00 | 10.00 | 0.00 |
| 2004 | Colony China | 0.00 | 15.31 | 0.00 | 0.00 | 0.00 | 9.29 | 0.00 | 0.00 |
| 2004 | Colony China GP | 0.00 | 0.84 | 0.00 | 0.00 | 0.00 | 0.49 | 0.00 | 0.00 |
| 2006 | Conch | 81.50 | 40.93 | 0.00 | 0.00 | 81.50 | 0.00 | 0.00 | 0.00 |
| 2006 | Dagang NewSpring | 25.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 2002 | Darong | 10.00 | 0.24 | 0.00 | 8.00 | 6.67 | 0.24 | 0.00 | 5.33 |
| 2006 | Deqingyuan | 0.00 | 2.85 | 0.00 | 0.00 | 0.00 | 2.85 | 0.00 | 0.00 |
| 1994 | Dynamic Fund | 0.00 | 2.21 | 0.00 | 0.00 | 0.00 | 2.01 | 0.00 | 0.00 |
| 2007 | Epure | 0.00 | 10.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 2004 | Fenglin | 17.64 | 0.00 | 6.00 | 13.47 | 13.64 | 0.00 | 6.00 | 12.53 |
| 2006 | Fenglin HJ MDF | 0.23 | 0.00 | 0.00 | 3.27 | 0.00 | 0.00 | 0.00 | 0.00 |
| 2005 | Five Star | 0.00 | 0.00 | 7.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 2006 | GDIH | 50.85 | 0.00 | 0.00 | 0.00 | 50.85 | 0.00 | 0.00 | 0.00 |
| 2003 | Great Infotech | 0.00 | 1.73 | 0.00 | 0.00 | 0.00 | 1.03 | 0.00 | 0.00 |
| 2006 | Hangzhou RCB | 0.00 | 10.85 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 2005 | HiSoft Tech | 0.00 | 4.00 | 0.00 | 0.00 | 0.00 | 3.00 | 0.00 | 0.00 |
| 2006 | HiSoft Tech | 0.00 | 4.34 | 0.00 | 0.00 | 0.00 | 1.74 | 0.00 | 0.00 |

| | | | | | | | | | |
|------------------|------------------|--------|--------|--------|--------|--------|--------|-------|--------|
| 2004 | IB | 0.00 | 52.18 | 0.00 | 0.00 | 0.00 | 52.18 | 0.00 | 0.00 |
| 2004 | Jiangxi Chenming | 40.00 | 12.90 | 0.00 | 18.76 | 40.00 | 12.90 | 0.00 | 18.76 |
| 2006 | Launch Tech | 0.00 | 8.35 | 0.00 | 0.00 | 0.00 | 8.33 | 0.00 | 0.00 |
| 2001 | Maanshan Carbon | 5.25 | 2.00 | 0.00 | 0.00 | 5.25 | 2.00 | 0.00 | 0.00 |
| 2005 | Maanshan Carbon | 11.00 | 1.00 | 0.00 | 0.00 | 5.00 | 1.00 | 0.00 | 0.00 |
| 2005 | Minsheng | 15.75 | 0.00 | 0.00 | 0.00 | 7.00 | 0.00 | 0.00 | 0.00 |
| 2006 | Minsheng & IB | 25.09 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 2001 | Minsheng Bank | 0.00 | 23.50 | 0.00 | 0.00 | 0.00 | 23.50 | 0.00 | 0.00 |
| 2005 | Minsheng Bank | 0.00 | 2.80 | 0.00 | 0.00 | 0.00 | 2.79 | 0.00 | 0.00 |
| 2001 | NCCB | 0.00 | 8.94 | 0.00 | 0.00 | 0.00 | 8.82 | 0.00 | 0.00 |
| 1996 | Nanjing Kumho | 0.00 | 3.81 | 0.00 | 0.00 | 0.00 | 3.81 | 0.00 | 0.00 |
| 2004 | Nanjing Kumho | 31.38 | 2.23 | 0.00 | 0.00 | 31.38 | 2.23 | 0.00 | 0.00 |
| 2006 | Neophotonics | 0.00 | 0.00 | 10.00 | 0.00 | 0.00 | 0.00 | 10.00 | 0.00 |
| 2001 | New China Life | 0.00 | 5.83 | 0.00 | 0.00 | 0.00 | 5.83 | 0.00 | 0.00 |
| 2005 | New Hope | 0.00 | 0.00 | 45.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1995 | Newbridge Inv. | 0.00 | 0.22 | 0.00 | 0.00 | 0.00 | 0.22 | 0.00 | 0.00 |
| 2005 | North Andre | 8.00 | 6.74 | 0.00 | 0.00 | 0.00 | 4.25 | 0.00 | 0.00 |
| 2003 | PSAM | 0.00 | 2.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | RAK China | 13.00 | 0.00 | 0.00 | 0.00 | 13.00 | 0.00 | 0.00 | 0.00 |
| 2006 | Renaissance Sec | 0.00 | 0.00 | 20.04 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 2006 | Rongde | 0.00 | 35.00 | 0.00 | 0.00 | 0.00 | 31.38 | 0.00 | 0.00 |
| | SAC HK Holding | 0.00 | 1.60 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 |
| 2003 | SAIC | 12.00 | 0.00 | 0.00 | 0.00 | 12.00 | 0.00 | 0.00 | 0.00 |
| 2006 | SBCVC | 0.00 | 20.00 | 0.00 | 0.00 | 0.00 | 2.00 | 0.00 | 0.00 |
| 2000 | SEAF SSIF | 0.00 | 3.74 | 0.00 | 0.00 | 0.00 | 3.37 | 0.00 | 0.00 |
| | SH Keji IT | 3.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 2004 | SHCT | 38.18 | 0.00 | 0.00 | 28.64 | 29.04 | 0.00 | 0.00 | 21.78 |
| 2004 | SIBFI | 0.14 | 0.07 | 0.00 | 0.00 | 0.00 | 0.07 | 0.00 | 0.00 |
| 1998 | Shanghai Krupp | 19.25 | 0.00 | 0.00 | 36.75 | 19.25 | 0.00 | 0.00 | 36.75 |
| 2006 | Shanshui Group | 50.00 | 5.50 | 2.20 | 0.00 | 50.00 | 5.50 | 0.00 | 0.00 |
| 1999 | Shanxi | 12.61 | 0.00 | 0.00 | 0.00 | 12.61 | 0.00 | 0.00 | 0.00 |
| | SinoSpring | 0.00 | 0.00 | 20.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | Stora Enso | 20.83 | 0.00 | 0.00 | 4.17 | 11.00 | 0.00 | 0.00 | 0.00 |
| 2005 | Stora Enso | 29.17 | 0.00 | 0.00 | 20.83 | 0.00 | 0.00 | 0.00 | 0.00 |
| 2006 | Stora Enso | 50.00 | 0.00 | 0.00 | 175.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 2006 | TBK | 4.00 | 0.00 | 0.00 | 0.00 | 2.00 | 0.00 | 0.00 | 0.00 |
| 2006 | VeriSilicon | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 |
| | Wanjie High-Tech | 9.89 | 0.00 | 0.00 | 0.00 | 9.89 | 0.00 | 0.00 | 0.00 |
| 2004 | Wumart | 0.00 | 1.62 | 0.00 | 0.00 | 0.00 | 1.62 | 0.00 | 0.00 |
| 2003 | XACB | 0.00 | 17.95 | 0.00 | 0.00 | 0.00 | 0.64 | 0.00 | 0.00 |
| 2004 | Xinao Gas | 25.00 | 10.00 | 0.00 | 0.00 | 25.00 | 10.00 | 0.00 | 0.00 |
| 2006 | Zhejiang Glass | 50.00 | 24.96 | 0.00 | 18.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 2003 | Zhengye-ADC | 10.43 | 0.00 | 0.00 | 4.87 | 10.43 | 0.00 | 0.00 | 4.87 |
| 2002 | Zhong Chen | 0.00 | 4.78 | 0.00 | 0.00 | 0.00 | 4.78 | 0.00 | 0.00 |
| 2006 | Zhongda_Yanjin | 21.89 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Total portfolio: | | 733.58 | 577.30 | 181.40 | 340.89 | 470.95 | 371.06 | 29.61 | 108.03 |

| FY Approval | Company | Approvals Pending Commitment | | | |
|---------------------------|----------------|------------------------------|--------|-------|---------|
| | | Loan | Equity | Quasi | Partic. |
| 2002 | SML | 0.00 | 0.00 | 0.00 | 0.00 |
| 2004 | NCFL | 0.00 | 0.00 | 0.02 | 0.00 |
| 2007 | Xinao CTC | 0.04 | 0.01 | 0.00 | 0.14 |
| 2004 | China Green | 0.00 | 0.00 | 0.01 | 0.00 |
| 2006 | Launch Tech | 0.01 | 0.00 | 0.00 | 0.00 |
| 2005 | MS Shipping | 0.00 | 0.01 | 0.00 | 0.00 |
| 2003 | Peak Pacific 2 | 0.00 | 0.01 | 0.00 | 0.00 |
| Total pending commitment: | | 0.05 | 0.03 | 0.03 | 0.14 |

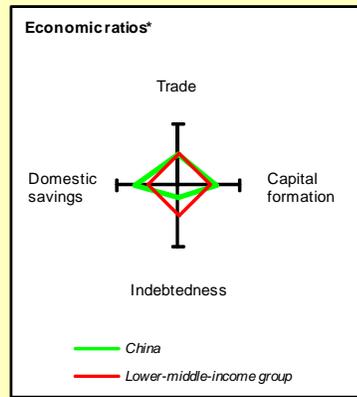
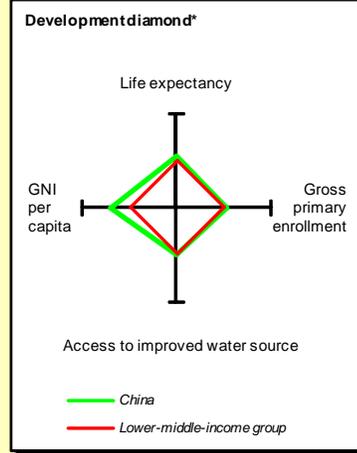
Annex 14: Country at a Glance

CHINA: Kunming Urban Rail Project

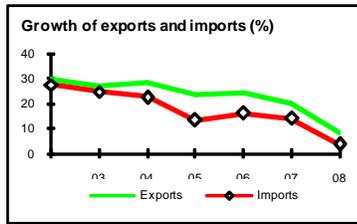
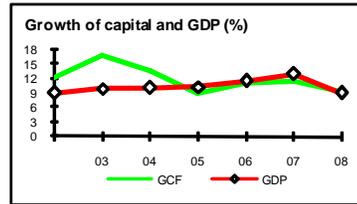
China at a glance

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| POVERTY and SOCIAL | China | East Asia & Pacific | Lower-middle-income | | |
|--|----------------|---------------------|---------------------|-------------|----------------|
| 2008 | | | | | |
| Population, mid-year (millions) | 1,324.8 | 1,931 | 3,702 | | |
| GNI per capita (Atlas method, US\$) | 2,930 | 2,631 | 2,078 | | |
| GNI (Atlas method, US\$ billions) | 3,888.1 | 5,081 | 7,692 | | |
| Average annual growth, 2002-08 | | | | | |
| Population (%) | 0.6 | 0.8 | 1.2 | | |
| Labor force (%) | 0.9 | 1.2 | 1.6 | | |
| Most recent estimate (latest year available, 2002-08) | | | | | |
| Poverty (% of population below national poverty line) | 3 | .. | .. | | |
| Urban population (% of total population) | 40 | 44 | 41 | | |
| Life expectancy at birth (years) | 73 | 72 | 68 | | |
| Infant mortality (per 1,000 live births) | 18 | 22 | 46 | | |
| Child malnutrition (% of children under 5) | 7 | 13 | 26 | | |
| Access to an improved water source (% of population) | 88 | 87 | 86 | | |
| Literacy (% of population age 15+) | 93 | 93 | 83 | | |
| Gross primary enrollment (% of school-age population) | 112 | 111 | 109 | | |
| Male | 110 | 112 | 112 | | |
| Female | 114 | 110 | 106 | | |
| KEY ECONOMIC RATIOS and LONG-TERM TRENDS | | | | | |
| | 1988 | 1998 | 2007 | 2008 | |
| GDP (US\$ billions) | 309.5 | 1,019.5 | 3,382.3 | 4,327.0 | |
| Gross capital formation/GDP | 37.9 | 37.1 | 43.1 | 44.4 | |
| Exports of goods and services/GDP | 14.8 | 20.3 | 39.7 | 36.6 | |
| Gross domestic savings/GDP | 36.6 | 41.4 | 52.2 | 52.5 | |
| Gross national savings/GDP | 36.7 | 40.2 | 54.1 | 53.6 | |
| Current account balance/GDP | -12 | 3.1 | 11.0 | 9.8 | |
| Interest payments/GDP | 0.7 | 0.7 | 0.3 | 0.2 | |
| Total debt/GDP | 13.7 | 14.1 | 11.1 | 8.7 | |
| Total debt service/exports | 8.4 | 8.5 | 2.3 | 2.1 | |
| Present value of debt/GDP | .. | .. | 10.8 | 8.2 | |
| Present value of debt/exports | .. | .. | 25.5 | 21.3 | |
| | 1988-98 | 1998-08 | 2007 | 2008 | 2008-12 |
| <i>(average annual growth)</i> | | | | | |
| GDP | 10.5 | 9.9 | 13.0 | 9.0 | 8.4 |
| GDP per capita | 9.2 | 9.2 | 12.4 | 8.4 | 7.7 |
| Exports of goods and services | 13.4 | 23.0 | 19.8 | 8.4 | 1.7 |



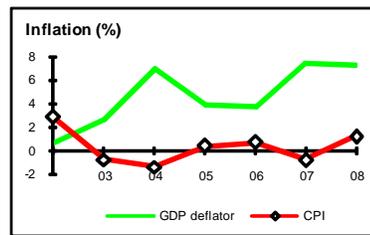
| STRUCTURE of the ECONOMY | 1988 | 1998 | 2007 | 2008 |
|---|----------------|----------------|-------------|-------------|
| <i>(% of GDP)</i> | | | | |
| Agriculture | 25.7 | 17.6 | 11.1 | 11.3 |
| Industry | 43.8 | 46.2 | 48.5 | 48.6 |
| Manufacturing | 34.6 | 31.8 | 34.0 | 34.4 |
| Services | 30.5 | 36.2 | 40.4 | 40.1 |
| Household final consumption expenditure | 50.3 | 44.0 | 34.1 | 34.0 |
| General gov't final consumption expenditure | 13.1 | 14.6 | 13.7 | 13.5 |
| Imports of goods and services | 16.1 | 16.0 | 30.6 | 28.5 |
| | 1988-98 | 1998-08 | 2007 | 2008 |
| <i>(average annual growth)</i> | | | | |
| Agriculture | 4.4 | 3.9 | 3.7 | 5.5 |
| Industry | 14.1 | 11.1 | 14.7 | 9.3 |
| Manufacturing | 13.1 | 11.2 | 16.6 | 10.5 |
| Services | 10.6 | 10.5 | 13.4 | 9.5 |
| Household final consumption expenditure | 10.4 | 4.3 | 7.1 | 3.9 |
| General gov't final consumption expenditure | 10.2 | 8.8 | 10.5 | 8.1 |
| Gross capital formation | 11.2 | 11.3 | 11.4 | 9.5 |
| Imports of goods and services | 14.6 | 18.8 | 13.9 | 3.8 |



Note: 2008 data are preliminary estimates.
 This table was produced from the Development Economics LDB database.
 * The diamonds show four key indicators in the country (in bold) compared with its income-group average. If data are missing, the diamond will be incomplete.

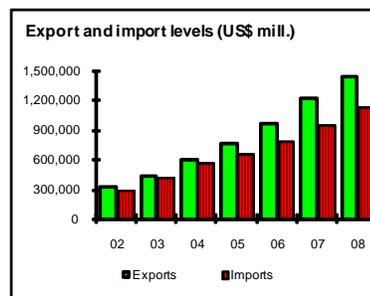
PRICES and GOVERNMENT FINANCE

| | 1988 | 1998 | 2007 | 2008 |
|--|-------|------|------|------|
| Domestic prices | | | | |
| <i>(% change)</i> | | | | |
| Consumer prices | 4.5 | 14.7 | -0.8 | 12 |
| Implicit GDP deflator | 12.1 | -0.9 | 7.4 | 7.2 |
| Government finance | | | | |
| <i>(% of GDP, includes current grants)</i> | | | | |
| Current revenue | 0.0 | 12.1 | 19.9 | 20.4 |
| Current budget balance | -15.2 | 0.4 | 3.7 | 3.2 |
| Overall surplus/deficit | -19.5 | -2.8 | 0.6 | -0.4 |



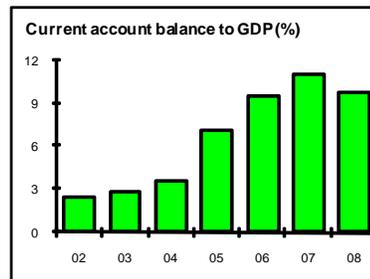
TRADE

| | 1988 | 1998 | 2007 | 2008 |
|--|--------|---------|-----------|-----------|
| <i>(US\$ millions)</i> | | | | |
| Total exports (fob) | 47,516 | 183,809 | 1,218,015 | 1,428,546 |
| Food | 5,890 | 10,613 | 30,751 | 32,764 |
| Mineral fuels, lubricants, and related materials | 3,950 | 5,175 | 19,944 | 31,634 |
| Manufactures | 33,110 | 163,220 | 1,166,468 | 1,350,698 |
| Total imports (cif) | 55,275 | 140,237 | 955,819 | 1,133,086 |
| Food | 3,476 | 3,788 | 11,497 | 14,050 |
| Fuel and energy | 787 | 6,776 | 104,826 | 169,109 |
| Capital goods | 16,697 | 56,768 | 412,508 | 441,917 |
| Export price index (2000=100) | 76 | 112 | 113 | 119 |
| Import price index (2000=100) | 89 | 100 | 127 | 148 |
| Terms of trade (2000=100) | 85 | 112 | 89 | 81 |



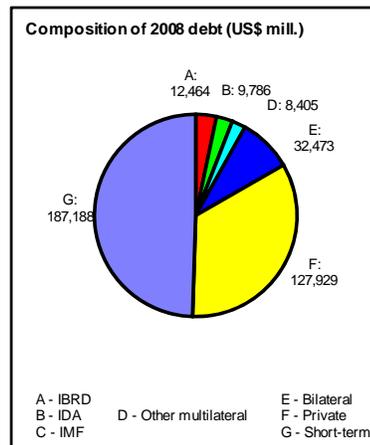
BALANCE of PAYMENTS

| | 1988 | 1998 | 2007 | 2008 |
|---|--------|---------|-----------|-----------|
| <i>(US\$ millions)</i> | | | | |
| Exports of goods and services | 45,912 | 207,425 | 1,342,206 | 1,581,713 |
| Imports of goods and services | 49,973 | 163,589 | 1,034,729 | 1,232,843 |
| Resource balance | -4,061 | 43,836 | 307,477 | 348,870 |
| Net income | -161 | -16,644 | 25,688 | 31,438 |
| Net current transfers | 419 | 4,278 | 38,668 | 45,799 |
| Current account balance | -3,803 | 31,471 | 371,833 | 426,107 |
| Financing items (net) | 4,258 | -25,045 | 89,911 | -7,129 |
| Changes in net reserves | -455 | -6,426 | -461,744 | -418,978 |
| Memo: | | | | |
| Reserves including gold (US\$ millions) | 23,739 | 152,831 | 1,546,365 | 2,047,629 |
| Conversion rate (DEC, local/US\$) | 4.9 | 8.3 | 7.6 | 6.9 |



EXTERNAL DEBT and RESOURCE FLOWS

| | 1988 | 1998 | 2007 | 2008 |
|--|--------|---------|---------|---------|
| <i>(US\$ millions)</i> | | | | |
| Total debt outstanding and disbursed | 42,439 | 143,982 | 373,773 | 378,245 |
| IBRD | 1,831 | 9,644 | 11,762 | 12,464 |
| IDA | 1,819 | 8,693 | 10,151 | 9,786 |
| Total debt service | 4,565 | 18,435 | 32,175 | 34,389 |
| IBRD | 165 | 941 | 1,561 | 1,524 |
| IDA | 15 | 97 | 349 | 388 |
| Composition of net resource flows | | | | |
| Official grants | 304 | 340 | 566 | 631 |
| Official creditors | 1,355 | 2,288 | -10 | 903 |
| Private creditors | 5,425 | -2,349 | 15,570 | 12,142 |
| Foreign direct investment (net inflows) | 3,194 | 43,751 | 138,413 | 147,791 |
| Portfolio equity (net inflows) | 0 | 765 | 18,510 | 8,721 |
| World Bank program | | | | |
| Commitments | 1,463 | 2,636 | 1,361 | 1,713 |
| Disbursements | 1,110 | 2,066 | 1,208 | 1,614 |
| Principal repayments | 39 | 434 | 1,184 | 1,281 |
| Net flows | 1,071 | 1,632 | 24 | 333 |
| Interest payments | 141 | 604 | 727 | 632 |
| Net transfers | 930 | 1,028 | -703 | -299 |

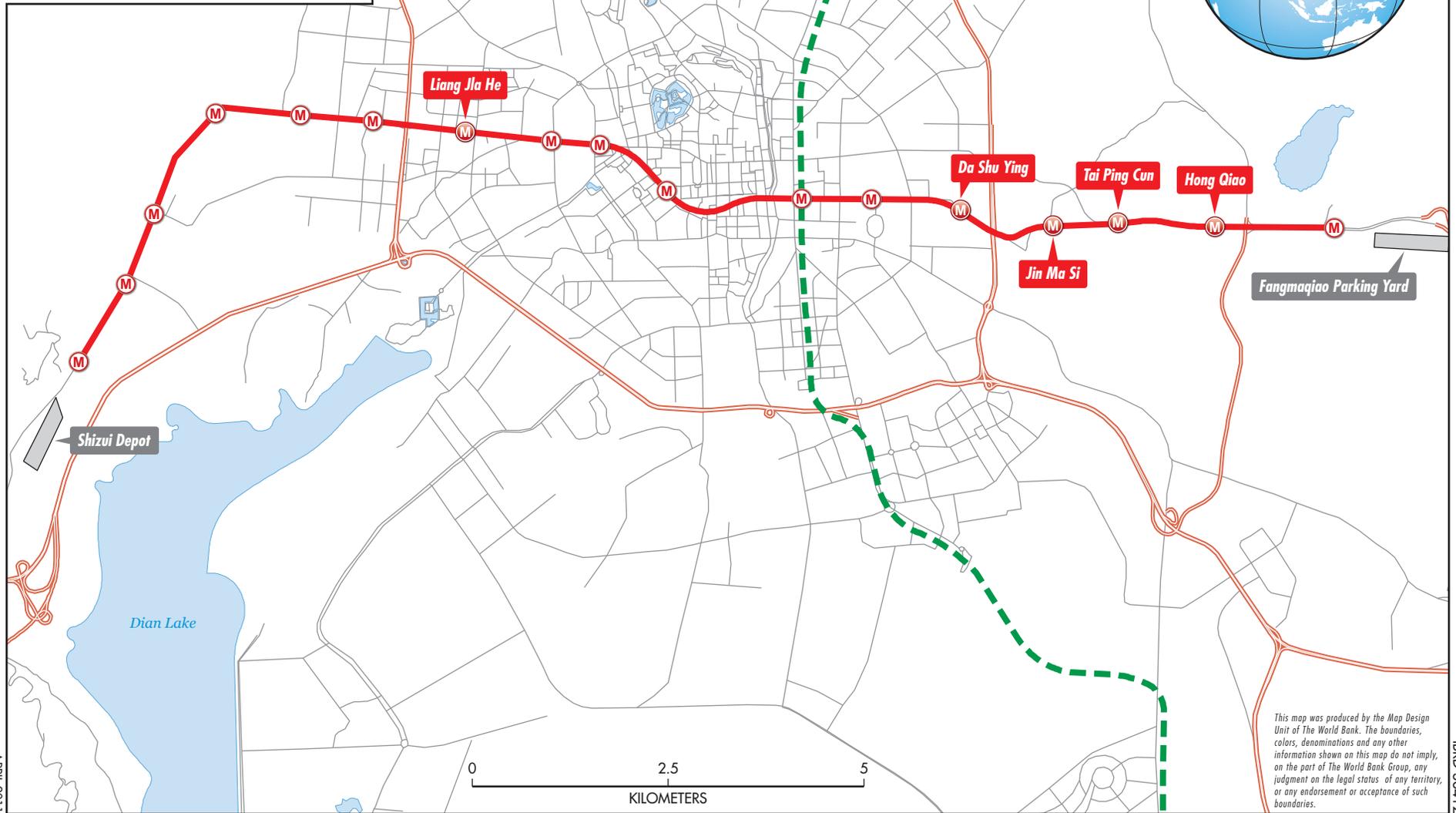


Note: This table was produced from the Development Economics LDB database.

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CHINA KUNMING URBAN RAIL PROJECT - METRO LINE 3

-  LINE 3 STATIONS
-  WORLD BANK FINANCED STATIONS
-  OTHER MAJOR BANK FINANCED INFRASTRUCTURE
-  LINE 1/2 UNDER CONSTRUCTION
-  LINE 3



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