

**CHINA CITY DEVELOPMENT STRATEGIES
DRAFT FINAL REPORT:
CHANGSHA/ZHUZHOU/XIANGTAN**

For:
**Hunan Provincial Government
Municipalities of Changsha, Zhuzhou & Xiangtan, Hunan**

By:
**Chreod Ltd./The Urban Institute/
International Centre for Sustainable Cities**

November, 2001

EXECUTIVE SUMMARY

The Executive Summary is presented as a table and a series of attachments to give the reader an overview of the major findings, conclusions, and recommendations of the report. Under the headings used to organize the research - economic, social, urban structure and transport, environment and infrastructure, and financial – the table shows CDS goals and the major strengths and weaknesses identified. Finally, the recommended strategies are listed, and the recommendations and priority infrastructure projects for each strategy are provided in the attachments.

The strategies are designed to capitalize on strengths or lessen the impact of weaknesses, and the recommendations point to programs that would help Guiyang implement the strategies. Priority infrastructure investments are those that are directly related to pursuing a particular strategy, and they provide an idea of the amount of capital investment implied by the strategy. A full description of the strategies and related programs are contained in the main body of the report.

With this format, the reader can follow the logic of the report and view all the strategies and recommendations in one place. This Executive Summary can be a useful handout at discussion sessions, meetings with outside parties, and stakeholder workshops.

This study was conducted in 2001 and funded by the Cities Alliance, a globally supported program managed by the World Bank.

EXECUTIVE SUMMARY: CHANG-ZHU-TAN CITY DEVELOPMENT STRATEGY REPORT					
	ECONOMIC	SOCIAL	URBAN STRUCTURE & TRANSPORT	ENVIRONMENT & INFRASTRUCTURE	FINANCIAL
GOALS	Improve the competitiveness of the economies of the 3 cities	Assist poor people, people laid-off from SOEs, and rural migrants to the city to integrate into the society & benefit from economic growth		Significantly improve the urban environment	Manage revenues & expenditures in a sustainable manner
	Plan & implement integration of the 3 cities in a manner that contributes to the achievement of the other goals				
STRENGTHS & WEAKNESSES	Changsha competes economically with other major cities in south-central China	National leader in higher education	Master Plans see the 3 cities growing together	Environmental conditions are poor and will compromise economic development if not addressed	Infrastructure financing depends more and more on non-budgetary sources; domestic borrowing single largest source
	Changsha has a diverse economy with some profitable sectors, strong tertiary growth, and known brands	Unique culture with strong cultural production	Each city will be expanding on to the west bank of the river, requiring considerable new bridge infrastructure	Xiang River cleanup ideal case for 3 city cooperation; can likely reduce the number of planned wastewater plants	Importance of land leasing for revenue generation biases decisions toward roads and urban renewal
	Food & beverages, electrical equipment, pharmaceuticals, and printing are important emerging sectors in Changsha	SOE reform underway with significant layoffs	Development nodes largely greenfield sites, while development potential exists in central city	Abundant water resources	In some sectors and some cities, tariffs do not cover O&M costs
	Zhuzhou has a strong, but specialized manufacturing base	Support programs in place, but have inadequate coverage and are under funded	Planned transport capacity between the 3 cities probably exceeds demand	New water supply capacity needed in Changsha & Xiangtan	Existing wastewater plants do not operate at capacity due to under-funding of O&M
	Transport hub & transport equipment sector have potential for significant cluster	Urban poverty problems not as severe as in many Chinese cities, but stronger programs and more funding will be required to keep the problem from worsening	LRT between the 3 cities not justified by demand levels until after 2010, but may play role in pulling 3 cities together	Integration would make significant contributions to the delivery of certain services	Availability of State bond funds and foreign loans biases infrastructure decisions; former will be decreasing
	Xiangtan has a number of weak sectors, but metals and chemicals have potential and its tertiary sector is strong		Functions of scenic/economic belt need to be balanced, not dominated by highways	Clean water project costly, but indicates cost of not addressing quality problems in Xiang River	UDICs not generally structured to lead to greater efficiency; Xiangtan UDIC is the best model
	CZT industrial structure (3 cities combined) diversified & relatively healthy			Natural gas distribution and coal desulfurization projects would make major contribution to better air quality	
	Many barriers to inter-firm cooperation				
	R&D and the commercialization process need strengthening				
STRATEGIES	Create conditions for cluster development in:		Develop stronger links with external markets	Develop & implement the integration concept	Environmental improvement
	transport equipment and services	education and culture			
	food products & pharmaceuticals	IT equipment & services			
RECOMMENDATIONS & PRIORITY INFRASTRUCTURE	Attachments 1 & 2	Attachments 3 & 4	Attachment 5	Attachment 6	Attachment 7

Attachment 1

Strategy:

Create conditions for cluster development in transportation equipment and services.

Recommendations:

- CZT governments sponsor a forum with participation from enterprise managers, transportation facility managers, government departments, the research institute, and service providers. The forum would have regular sessions, and would work toward a common understanding of the potential of the cluster and how sharing of information and ideas, and joint initiatives, would assist in achieving that potential. The forum would be formalized over time by choosing a set of officers and putting in place a small secretariat. Costs would be shared by CZT governments and enterprises.
- The forum sponsor the formulation of a cluster development strategy, to be carried out by the Hunan Development Planning Commission, with the support of domestic and foreign experts. It would define clearly the cluster's strengths and weaknesses, missing elements, infrastructure and services to be provided by government, the role of research institutes, and many other aspects. The strategy would be a rigorous analysis of strengths and weaknesses, not a promotional brochure.
- Zhuzhou review the plans for the transport hub in the context provided by the cluster development strategy, focusing on scale, design, and supporting services.
- CZT use the cluster development strategy as an investment attraction tool to interest additional transport-related enterprises and services in investing in CZT.
- CZT explore options for providing better research support to the cluster. Options include strengthening of the existing rail transport institute, and widening its mandate to include all modes; improved university curricula in transportation-related fields and better links between the universities and elements of the cluster; and formation of new R&D institutes perhaps in partnerships with institutes from other cities.
- Hunan complete the NTH segments within the Province, and use lobbying and persuasion to assure the timely completion of segments in other provinces, to link CZT with other major urban areas by expressway standard highways.
- CZT assure completion of internal roads that facilitate goods transport between the hub and CZT enterprises.

Priority Infrastructure:

- Zhuzhou transport hub as the centerpiece of the transport cluster
- Completion of NTHs to increase cargo volumes through the region
- Zhuzhou ring road to rationalize the city's road network so that the transport hub can function efficiently
- Upgrading of Highway 320 (which is currently saturated) between Zhuzhou and Xiangtan to improve the latter's access to the hub

Attachment 2

Strategy:

Create conditions for cluster development in education and culture.

Recommendations:

- Planning and implementation of the University City project, incorporating:
 - distance learning as a major specialty;
 - exploration of other specialties where CZT has a competitive advantage;
 - expansion of the fiber optic network to include the TV and Broadcasting Center;
 - broader curricula on culture and the arts, including creation, production, packaging and distribution;
- Establishment of a formal link between the universities, the managers of the University City project, and the TV and Broadcasting Center to explore common interests and opportunities for joint initiatives;
- A major conference on education and culture, with the goal of inspiring greater cooperation between Hunan and other centers in cultural production and arts education
- Pursuance of joint commercial ventures between Hunan and Shanghai-Hong Kong-Taiwan
- Opening the cluster to new businesses by:
 - provision of technical assistance and seed money;
 - improved access to financing;
 - more use of the call-for-proposal method of finding suppliers in the field;
 - access to the facilities at the universities and the TV and Broadcasting Center.
- Roads and public transit that make the University City and the TV and Broadcasting Center easily accessible from all parts of the city.

Priority Infrastructure:

- University City project as an opportunity to expand links between education and cultural production
- Fiber optic cable extended to the TV and Broadcasting Center to facilitate joint initiatives between the university and the center
- Western (Changsha to Xiangtan) expressway to link the University City with universities in Xiangtan
- Measures to make the cities more attractive as places to live, thus attracting talented people from the educational and cultural fields (environmental improvements – Section 5.1.4; Xiang River Corridor project)

Attachment 3

Strategy:

Create the conditions for cluster development in food products and pharmaceuticals.

Recommendations:

- CZT governments sponsor a forum on food products and pharmaceuticals where the participants would be enterprise managers, producers of raw materials, government departments, researchers, relevant educational institutions, and service providers. The forum would have regular sessions, and would work toward a common understanding of the potential of the cluster for development of new products and penetration of new markets. Over time, the forum would generate initiatives involving a number of members in collaborative work. If successful, the forum would become a formal organization by choosing a set of officers and funding a small secretariat. Costs would be shared by government and enterprises.
- The forum sponsor the formulation of a cluster development strategy, bringing in domestic and foreign experts where necessary. The strategy would define clearly the cluster's strengths and weaknesses, missing elements, the supply chain (current and future), infrastructure and services to be provided by government, the role of research institutes, the potential for biotechnology as an instrument for innovation, and many other aspects. The strategy would be a rigorous analysis of the strengths and weaknesses, not a promotional brochure.
- A program to strengthen the supply chain be mounted. An initial study could describe the current status of the supply chain and point out major opportunities for strengthening it. A subsequent program would likely include improving road links to rural production areas, technical assistance, and the introduction of more support services.
- Develop a research and commercialization center, perhaps government sponsored, to stimulate innovation, diversification and commercialization. Though financial contributions from enterprises is desirable, this may have to come over time as most enterprises in the sector are small. This center would:
 - provide lab facilities and technical staff, with access on a fee for service basis;
 - maintain a database on current CZT food and pharmaceutical products;
 - track national and international research relevant to the cluster;
 - undertake and make available market studies in promising markets for CZT products;
 - provide start-up loans to new firms entering the market (or assist firms in obtaining financing from banks).
- Enrich university curricula in the health sciences and strengthening of links to enterprises and the proposed research and commercialization center;
- Encourage the entry of new firms by making available sites and space in pre-built structures and better access to capital;
- Consider using the nodes at Liuyang and Wanchang as the primary production bases for pharmaceuticals and food products. Road connections to these two nodes are

good. If this is not feasible or desirable, integrate these two nodes better into the regional economy through participation in the forum and the R&D center.

Priority Infrastructure:

- Research and commercialization center to build on existing knowledge base and stimulate innovation
- Servicing of appropriate areas where food products and pharmaceutical firms might locate (in Liuyang, Wanchang, and the urban areas of all three cities)
- Improved road links to rural areas where raw materials are or could be produced

Attachment 4

Strategy:

Create the conditions for cluster development in IT equipment and services.

Recommendations:

- CZT undertake a study of niches in the IT equipment and services field where it could be competitive, building on existing elements and expertise.
- CZT discuss with Hunan Computer Group the possibility of adapting its products to participate in high growth areas and spinning off opportunities for related development of software and services.
- CZT explore linkages with the education and culture cluster through involvement in the University City project, the TV and Broadcasting Center, and formulation of the proposed cluster development strategy.

Attachment 5

Strategy:

Develop stronger links with external markets.

Recommendations:

- CZT formulate a rigorous development strategy, building on work already completed and using this report as an input, to serve as the major tool in development attraction initiatives;
- CZT explore the potential in closer economic relationships with other Chinese cities, starting with Wuhan;
- CZT assure the timely completion of NTH links to other major urban centers;
- CZT mount a major investment attraction program targeting IFIs, selected foreign governments, and selected foreign companies in the manner set out in this section

Priority Infrastructure:

National Trunk Highway links to other major cities.

Attachment 6

Strategy:

Develop and implement the integration concept.

Recommendations:

- CZT take action to reduce the barriers to inter-firm cooperation and economic integration;
- CZT pursue selected regional projects that will help to tie the three cities together and promote integration;
- CZT pursue as priorities the establishment of a regional wastewater management authority and a regional economic development authority;
- Hunan EPB continue to provide a coordinative and oversight role in regard to regional environmental issues.

Priority Infrastructure:

Projects that support integration:

- Xiang River cleanup
- scenic/economic belt
- University City
- natural gas distribution
- regional power grid
- development of Yijiawang for an appropriate regional use

Attachment 7

Strategy:

Environmental improvement.

Recommendations:

- CZT set environmental targets above those currently in the 10th FYP in order to assure that the cities, especially Changsha, can play the economic roles envisaged.
- A regional wastewater management authority be established to prepare a river basin improvement strategy and to undertake the major wastewater investments required.
- Other environmental services continue to be delivered by the cities, with the provincial EPB exercising a coordinative and oversight role.
- Investments in wastewater treatment, air pollution abatement, and solid waste management be considered high priorities.
- CZT seek technical assistance to build up its core of expertise in wastewater and solid waste management.
- Municipal governments take the necessary steps to assure that O&M funds for environmental infrastructure are sufficient, and that existing facilities are operating at or near capacity.

Priority Infrastructure:

- A wastewater treatment program that significantly improves the quality of water in the Xiang River;
- The proposed coal desulphurization project;
- Natural gas distribution project;
- A program that provides 100% treatment for solid wastes within ten years, including probably the proposed Xiangtan/Zhuzhou facility

Table of Contents

Executive Summary

1	INTRODUCTION	1
2	METHODOLOGY	1
3	GOALS AND MEASUREMENT	2
4	SUMMARY OF MAJOR ISSUES	4
	4.1 Economic	4
	4.2 Social	4
	4.3 Urban Structure and Transport	5
	4.4 Environment and Infrastructure	5
	4.5 Financial	5
5	PROPOSED STRATEGIES AND PROGRAMS	6
	5.1 Creating Conditions for Cluster Development	6
	5.1.1 Transportation Equipment and Services	10
	5.1.2 Education and Culture	13
	5.1.3 Food Products and Pharmaceuticals	18
	5.1.4 IT Equipment and Services	21
	5.2 Develop Stronger Links with External Markets	23
	5.3 Environmental Improvement	26
	5.4 Develop and Implement the Integration Concept	28
	5.5 Financial	34
	5.5.1 Budget Preparation and Financial Disclosure	35
	5.5.2 Debt Management	38
	5.5.3 O&M and Capital Efficiency	40
	5.5.4 Service Pricing and Land Leasing	41
	5.5.5 UDICs	43
	5.5.6 Financial Policy to Support Integration	44
	5.6 Poverty Reduction	46
6	CURRENT AND PROPOSED STRATEGIES	49
7	IMPLICATIONS FOR NATIONAL POLICY	52

APPENDIX: REVISED INTERIM REPORT

ACRONYMS

CDS	City Development Strategy
CLC	county-level city
CZT	Changsha-Zhuzhou-Xiangtan
DFI	direct foreign investment
EPB	Environmental Protection Bureau
FYP	five year plan
GDP	gross domestic product
IFI	international financial institution
IT	information technology
LRT	light rail transit
NTH	national trunk highway
NTHS	national trunk highway system
O&M	operations and maintenance
OCRI	Ottawa Centre for Research and Innovation
R&D	research and development
SDPC	State Development Planning Commission
SOE	state-owned enterprise
TEDA	Tianjin Economic and Technological Development Area
UDIC	Urban Development Investment Corporation
WTO	World Trade Organization
Y	yuan

1. INTRODUCTION

1. The objective of this Study was to assist the Hunan Provincial Government and the cities of Changsha, Zhuzhou, and Xiangtan (referred to as ChangZhuTan or CZT) in strengthening development strategies and plans, and to test the applicability of the city development strategy (CDS) approach to urban China. Particular attention was to be devoted to two aspects of development planning: 1) strengthening the links between economic development policy and physical planning, and 2) evaluating the financial viability of investment plans. The proposed integration of the three cities added another dimension. In addition, a stakeholder participation process was to be designed and tested¹

2. An Interim Report was completed in July 2001 and discussed during a visit to CZT in September 2001. That report includes a situational analysis and an analysis of underlying issues, and concludes with the identification of alternative development strategies. The Interim Report of July 2001 was revised based on the comments from CZT and is contained in the Appendix. The development strategies in the Interim Report were general, and the primary objective of this Draft Final Report is to develop them in more detail. Programs and actions leading to implementation of the strategies are discussed. The presentation of the data and analyses contained in the Interim Report are not repeated in this report, so the reader will need to refer to the Appendix for more detail.

2. METHODOLOGY

3. A CDS should be developed, periodically revised, and implemented by the city, and this study was approached with that perspective. The consultants' role was to stimulate the start-up of a CDS process that, hopefully, will continue after their departure. Specifically, the consultants provided input on selected elements of the CDS; helped identify strengths, weaknesses and issues; and developed strategies to approach these issues. A number of opportunities for training were used, including on-the-job training for local colleagues, a study tour to Canada, and reference to international literature and cases. Finally, the consultants guided the city in the planning of a stakeholder participation process and the conduct of two stakeholder workshops.

4. This report represents the perspectives and opinions of the consultants. It is an outside view of CZT's challenges, and proposes a set of strategies and programs for future development for the consideration of city officials. Consultants spent many hours in three visits to CZT collecting information, obtaining local views, and discussing possible ways to address some of the city's problems. In many respects this report represents a consensus between the consultants and the city. However, it was written as an independent view, and there are areas where the consultants hold a different opinion from that of the city in regard to interpretation of data, priorities, and appropriate strategies.

¹ This study was conducted in 2001, and was funded by the Cities Alliance, a globally supported program managed by the World Bank.

5. In some cases, data obtained from different sources were not consistent. Wherever possible, published data (largely from statistical yearbooks) were used in this report, supplemented by additional information and interpretation from local officials.

6. The study was designed to focus on the urban areas of the three cities (see map 1 in Appendix), not the entire municipalities. Thus, though it puts forward some ideas about rural development, it has less to say about the problems of the counties that the city might wish. The study tried to be comprehensive in its scope, looking at conditions, trends, and major issues in economic development, social development, urban structure, transportation, environmental conditions, environmental infrastructure, and financial management.

7. The study process went through five stages: 1) situational analysis and identification of current development strategies; 2) analysis of strengths and weaknesses; 3) identification and analysis of major issues; 4) identification of strategic directions for CZT; and 5) formulation of programs and actions to pursue the strategies.

8. The following types of analyses were conducted:

- regional contextual analysis, comparing conditions and trends in CZT with regional and national conditions and trends;
- collection of data and analysis of industrial structure;
- socio-economic projections to 2010 and 2020, based on Chreod's China database;
- environmental conditions and trends with regard to air quality, water pollution, and urban environmental quality;
- current and planned urban structure – existing and proposed development nodes;
- transportation demand and supply, existing and planned, within the city and interurban;
- demand and supply for water, wastewater treatment, and solid waste treatment;
- current and projected financial situation, especially in regard to infrastructure financing.

9. Two stakeholder workshops were held in CZT and the results fed into the development of strategies and setting of priorities. These workshops are described in a separate report (Stakeholder Participation Report, October 11, 2001).

3. GOALS AND MEASUREMENT

10. CDS goals were set out in the Interim Report as follows:

- Improve the competitiveness of the economies of the three cities;
- Significantly improve the urban environment;

- Assist poor people, people laid-off from SOEs, and rural migrants to the city to integrate into the society and benefit from economic growth;
- Manage revenues and expenditures in a financially sustainable manner;
- Plan and implement integration of the three cities in a manner that contributes to achievement of the above goals.

11. In a sense, integration is a strategy, not a goal. Achieving integration without improving economic competitiveness or environmental quality would not be very useful. Thus, proposals for integration are assessed in terms of their potential contribution to achieving the other four goals.

12. Success of the CDS over time should be measured in terms of progress toward these goals, and to measure progress the goals need to be expressed as a series of criteria, quantifiable wherever possible. The criteria proposed for monitoring progress are shown in Table 1:

Table 1: Monitoring Criteria

Goal	Criteria
Increase the competitiveness of the economies of the three cities	<ol style="list-style-type: none"> 1. growth in GDP 2. increase in GDP/capita 3. growth of non-traditional enterprises and emerging sectors 4. growth and diversification of the tertiary sector
Assist poor people, people laid-off from SOEs, and rural migrants to the city to integrate into the society and benefit from economic growth	<ol style="list-style-type: none"> 1. % of laid-off people re-employed 2. maintenance of adequate funding for income assistance programs 3. % of rural migrants employed
Significantly improve the urban environment	<ol style="list-style-type: none"> 1. improved surface water quality 2. improved air quality 3. improved urban environment
Manage revenues and expenditures in a financially sustainable manner	<ol style="list-style-type: none"> 1. decrease in on-budget deficits 2. increased capacity to borrow from commercial sources 3. adequate funding for O&M
Plan and implement integration of the three cities in a manner that contributes to achievement of the above goals	<ol style="list-style-type: none"> 1. creation of appropriate regional institutions 2. delivery of certain services at regional level

Recommendation:

As CZT continues developing and implementing its CDS, it should establish a monitoring system and regularly measure progress toward CDS goals. The above criteria should be used as a base for the formulation of a more detailed set. The monitoring responsibility should lie with either the provincial government or a newly-created regional planning institution.

4. SUMMARY OF MAJOR ISSUES

4.1 Economic

13. Changsha has a diversified economy with three large-scale and profitable sectors – tobacco, machinery and electrical equipment – and three small but important emerging sectors – food & beverages, pharmaceuticals, and printing. Though still important in terms of providing employment, SOEs represent a declining proportion of Changsha's industrial output. Changsha's tertiary sector is large and growing, and has the capacity to provide higher order services to the three-city agglomeration.

14. Zhuzhou's economy is specialized but its pillar industries – metals and transport equipment - appear to be viable and competitive. Its tertiary sector is small but beginning to grow. With a number of transport equipment firms, the largest rail marshalling yards in southern China, plans for a multi-modal transport hub, and research support from a national-level institute, Zhuzhou has the elements to develop a significant cluster in transport equipment and services.

15. Xiangtan has a number of weak sectors and little diversification, though metals and chemicals have potential. Its tertiary sector, however, is large and strong, and its urban environment is probably the best of the three cities.

16. From a regional perspective, the CZT industrial structure presents a fairly diversified and reasonably healthy regional economy.

4.2 Social

17. Some 10% of the labor force in CZT is in laid-off status, largely from the textiles, chemicals, ceramics and machinery industries. Another 4% are unemployed. Though income maintenance programs are in place, it appears that their coverage is inadequate and that they are under funded. As layoffs continue, rural migrants continue to come into the cities looking for economic opportunity, and the poverty line is raised making more people eligible for assistance, it is vital that considerably more money be attributed to social assistance. Urban poverty problems in CZT are less severe than in many Chinese cities, but they will worsen if social programs are not adequately funded and do not provide the necessary coverage.

18. Hunan Province is a national leader in higher education, with strong universities and leading-edge distance education services. There are plans to capitalize on this strength through the University City Project, through which university enrollment will be doubled and research and commercialization spin-offs stimulated.

4.3 Urban Structure and Transport

19. The cities are planning to expand on to new development nodes, many currently under developed. Though expansion is necessary to accommodate the expected increase in urban population and economic growth, servicing these new nodes will be expensive and should be phased to correspond with market demand. Maintaining current density levels in the core areas (rather than decreasing them as presently planned), and servicing new nodes in a phased manner is the appropriate strategy.

20. Only three of the major roads in CZT are currently operating at or above capacity, and most show a volume to capacity ratio of between 0.15 and 0.47. In terms of connecting the three cities, the existing Highway 107 is badly congested by vehicles escaping the tolls on the new Jing-Zhu Expressway, which is well below capacity. The latter is expected to reach capacity between 2005 and 2010, necessitating a new link. The estimated shortfall is 45,000 vehicles by 2010, a requirement that can be met by one of the two proposed highways (East and West Expressways). Proposed roadways along the riverbank can thus be designed as scenic roads since they will not be required to carry large amounts of traffic. A proposed light rail transit link (LRT) is not justified by volumes over the next ten years, but would help tie the three cities together. Preparation of this project should continue, with implementation delayed until demand increases or integration plans require such a link.

4.4 Environment and Infrastructure

21. Environmental conditions are poor. Air quality varies from Class II to Class III, and the Xiang River is badly polluted from Zhuzhou to beyond Changsha. Cleanup of the River is an ideal case for three-city cooperation, since it can best be accomplished through regional planning and operation of wastewater treatment facilities. Replacement of current fuels with natural gas, and the planned coal desulphurization project, should effect major improvements in air quality.

22. CZT cities, particularly Changsha, cannot achieve their economic and social objectives without dramatic environmental improvements. Changsha holds promise to become a sophisticated services center, but the state of its environment is incompatible with this scenario.

4.5 Financial

23. Compared to the past, CZT municipalities are funding less of their infrastructure spending from fiscal funds and more from commercial lending and off-budget sources like land leasing. Commercial loans generally have short terms, and efforts need to be

made to find alternative sources that extend the repayment period. Land leasing has been a very good source of funds. Though this may continue, land markets are very volatile and it is impossible to predict the amount of money that can be raised in this way. There are thus some significant risks inherent in current financial strategies that should be addressed and mitigated as much as possible.

24. O&M for environmental infrastructure is under funded and results in the under-utilization of some existing facilities. Further, service pricing in the environmental sector does not cover all O&M expenses, much less allow for the recovery of capital costs. Unless addressed, these issues will hinder any move to project financing based on a facility's revenue stream.

25. The UDICs in the three cities have functioned as borrowing entities but have not acted to rationalize economic management of assets through mechanisms like innovative leases with asset operators.

5. PROPOSED STRATEGIES AND PROGRAMS

26. CZT needs to pursue four streams of activities to improve its competitive position and assure the sustainable development of the three cities:

1. Create the conditions for cluster development: Building on the significant concentrations of activity in several sectors, take measures to stimulate greater interaction among enterprises, and strengthen support services, with the goal of creating clusters that generate innovation, diversification, and higher productivity;
2. Develop stronger links with external markets, development partners, and potential investors with the goals of securing access to new markets, increasing exports, and achieving higher levels of domestic and foreign investment;
3. Make significant improvements to the environment in order to improve the lives of residents, improve the image of CZT cities as places to invest, and provide enterprises with adequate infrastructure;
4. Develop and implement the integration concept to support these three streams of activity.

27. These four streams of activities are detailed in Sections 5.1 to 5.4. Programs designed to assist CZT governments in managing revenues and expenditures in a financially sustainable manner are discussed in Section 5.5, and suggested measures to assist poor people and people who are laid-off and unemployed are put forward in Section 5.6.

5.1 Creating conditions for cluster development

28. An industrial cluster is characterized by the location in a single economic region of competing producers, suppliers, customers, other related companies, financial and other supporting services, industry related infrastructure, training and research institutes, universities, government labs and other government agencies. All cluster companies and

agencies are participating in the same or related industries or line of business. By competing with other companies in the same cluster, each firm becomes more efficient, innovative and competitive, thus increasing the competitiveness of the total economic region

29. Benefits to companies from locating in clusters are better access to skilled labor, technology, customers, suppliers, government services, and information. Government benefits from a more rapidly growing enterprise sector and higher government revenues. Further, a cluster approach helps set priorities and provides key themes for investment attraction and other economic development strategies.

30. Using clusters as the basis for policy formulation means a change from support for individual enterprises to a more systemic approach, and bringing into the analytical framework producers of end products, producers of intermediate products, business service providers, providers of raw materials, research and commercialization support, educational and training institutions, and customers.

31. There is a vast literature on clusters that cannot be adequately summarized in this report, but a few key concepts can be mentioned. First, an appropriate policy and legal framework is necessary, one that removes barriers to trade and other exchanges, facilitates the entry of new firms and exit of non-competitive firms, and fosters competition. The Chinese policy and legal framework is moving in directions that encourage cluster formation, and Hunan needs to assure that the elaboration of its framework is keeping pace.

32. Secondly, there are a number of firms participating in the same or related industries. A single large enterprise, or a limited number of small firms, does not generate sufficient interaction to develop an innovative cluster. CZT is fortunate in having a relatively large number of firms, of varying size and forms of ownership, in many sectors. An exception is IT equipment and services, as will be explained below.

33. Thirdly, in many cases a cluster is related to a strong knowledge base used by a number of firms operating in the same or similar sectors. Building CZT's knowledge bases in selected fields will be a key to successful cluster development, and this will involve improved cooperation among enterprises, universities, and research institutes, as well as better links to national and international innovation networks (through the internet, training opportunities, and attendance at conferences).

34. Fourthly, a successful cluster requires demanding customers. Unless an industry's customers demand high quality and innovative products, enterprises will not be stimulated to improve or to develop new products. This may be a problem in some CZT sectors where large enterprises have traditionally depended on a limited range of customers with unsophisticated demands, or where enterprises focus exclusively on local markets and have little understanding of the requirements of external markets. Demanding customers for CZT industries could come from exporting to advanced

provinces or foreign countries where quality standards are high, or from governments becoming more demanding in their procurement policies.

35. Finally, the cluster literature places strong emphasis on the role of small and medium size enterprises (SMEs). On the one hand, they often provide much of the dynamism to the cluster, introducing new ideas and products, and providing much needed competition for the large, established firms. On the other, they often require assistance in adopting sound business practices, obtaining financing, and penetrating new markets. Common government instruments to encourage SME participation are supporting collaborative networks between firms, and between firms and knowledge providers; sponsoring forums, seminars and training for potential participants in a cluster; participating in the establishment of a common R&D facility for the cluster; and setting up public or private agencies to function as brokers to initiate and guide collaborative efforts. Thus, infrastructure and direct investment in enterprises are seen as less important to cluster development than “softer” measures designed to encourage elements of the cluster to work together, share information, and develop new products and process innovations.

36. Government cannot direct the development of a cluster, but it can assist and encourage with the tools at its disposal. Table 2 shows frequently encountered constraints to cluster formation, the types of public policies often used to address such constraints, and examples of commonly used tools. Many of these constraints exist in CZT, and the policy responses and tools listed in the table are useful to the identification of appropriate cluster policies in CZT. Many of the tools in this table find their place in the recommendations of this report.

Table 2: Cluster Formation: Constraints, Policies and Tools

Constraints	Policy Actions	Tools
lack of cluster identity & awareness	identification and public marketing of clusters	<ul style="list-style-type: none"> • mapping exercises • external promotion of regional clusters • external/internal promotion of cluster members' competencies
government regulations hamper innovation or competitiveness	organize cluster forums to identify regulative bottlenecks and take actions to improve them	<ul style="list-style-type: none"> • cluster platforms and focus groups • tax reform • regulatory reform (e.g., environment, labor markets, financial markets)

firms do not take up opportunities for collaboration with other firms	<ul style="list-style-type: none"> • encourage and facilitate inter-firm networking • purchase innovative products through collaborative tender procedures 	<ul style="list-style-type: none"> • networking programs • brokerage training • public procurement for consortia
firms, particularly SMEs, cannot access strategic knowledge	<ul style="list-style-type: none"> • support cluster based retrieval and spread of information • organize dialogue on strategic cluster issues 	<ul style="list-style-type: none"> • set up cluster specific information and technology centers • platforms to explore market opportunities • foresight exercises
forms do not utilize the expertise of knowledge suppliers	<ul style="list-style-type: none"> • collaborative R&D actions • cluster specific R&D facilities 	<ul style="list-style-type: none"> • set up cluster specific technology and research centers/initiatives • subsidize collaborative R&D and technology transfer
lack of crucial elements in a cluster	<ul style="list-style-type: none"> • attract or promote growth of firms in cluster • attract major R&D facilities 	<ul style="list-style-type: none"> • targeted inward investment • support start-up firms in the cluster

Adapted from Boosting Innovation: The Cluster Approach, OECD Proceedings, OECD, 1999; chapter 16: “Public Policies to Facilitate Clusters: Background, Rationale, and Policy Practices in International Perspective”, by Patries Boekholt and Ben Thuriaux

37. The United Nations Industrial Development Organization (UNIDO) has experimented with cluster development projects in the developing world for a number of years, and on the basis of this experience describes five phases leading to cluster development. The process is normally started by a broker who works to bring the enterprises together and helps in the initial stages of discussion, planning and structuring. UNIDO’s five phases are¹:

1. Promotion and motivation: Identification of a critical mass of enterprises sharing similar growth constraints, sensitizing them to the benefits of networking, and the emergence of groups and leaders;
2. Strategic planning: Analysis of common problems and opportunities, establishment of a common work plan, and group organizational structure;
3. Pilot projects: Relatively small initial joint initiatives, often of a commercial or promotional kind, to engender optimism and trust;
4. Strategic projects: Initiation of more complex and risky joint projects involving specialization by firm in a multi-firm project, provision of common facilities, and the launch of new products;

¹ From Boosting Innovation: The Cluster Approach, OECD Proceedings, OECD, 1999, chapter 11: “Cluster and Network Development Projects in Developing Countries: Lessons Learned Through the UNIDO Experience” by Giovanna Ceglie, Michele Clara, and Marco Dini

5. Self management: Developing greater autonomy from the brokers who have been involved in the initial phases; adoption of formal structure with leadership from the enterprises.

As will be seen below, this concept of phases lends itself well to the situation in CZT and was used in framing the recommendations for each potential cluster.

38. There are concentrations of activity in four areas in CZT that hold promise for development of clusters: 1) transportation equipment and services; 2) education and culture; 3) food products and pharmaceuticals; and 4) IT equipment and services. There may well be others – for example, new materials, chemicals, metals – but these four seem to have the greatest potential.

5.1.1 Transportation Equipment and Services

39. CZT is well positioned to develop a cluster of activities in the transportation field. Major existing elements are the Zhuzhou rail marshalling yards, the largest in southern China; the intersection of the major north-south and east-west rail lines; a navigable river with capacity in water transport; a producer of locomotives for Chinese railways; enterprises producing auto parts, motorcycles, aircraft engine components, and other products; and a State-level research institute on rail transport.

40. There are 74 enterprises in the CZT transportation equipment sector that employ 71,000 people and produce a total output value of Y6.7 billion. Though transport equipment and services are centered in Zhuzhou, and the more successful enterprises are there, enterprises and cargo handling activities are present in all three cities. Thus this cluster would potentially be strengthened by integration and common economic development planning

In a study in Norway a transport cluster was identified, consisting of an inter-related network of transport functions and associated services, and contributing 9% to the national GDP. The boundaries of the cluster are drawn broadly, including shipyards, transport machinery, energy equipment, auto services, road/sea/air/railway transport, energy supply, related retail activities, environmental equipment, and others. (“Norwegian Input-Output Clusters and Innovation Patterns”, Johan Hauknes)
In the case of CZT, initially the prospective cluster would be defined more narrowly, but the Danish case illustrates the degree to which enterprises in seemingly distinct industries can become involved in a supply chain.

41. There are several significant constraints to the emergence of a true CZT cluster in transportation:

41. There are several significant constraints to the emergence of a true CZT cluster in transportation:
 - The lack of modern facilities for transfer of cargo among different transport modes, particularly between road and rail, impedes CZT’s competitiveness vis-a-vis other transport centers;
 - The fact that most of the National

Trunk Highway (NTH) links between CZT and other major urban centers have not yet been completed limits the volumes of cargo traffic flowing through the region;

- To a large degree the enterprises and other parties involved in transport-related activity in CZT do not cooperate or compete, because they belong to and report to different governments and companies, and because of trade barriers and long experience operating as independent entities;
- The transport-related services sector is weak and is unable to provide modern services in cargo handling, logistics, insurance and others to customers.

42. Some of these constraints are being addressed. Planned NTH links, at least those within Hunan Province, are either under construction or programmed for construction in the 10th FYP. Eventually CZT will be linked by expressway standard roads to Wuhan and northward to Beijing, to Shanghai, to Guangzhou, and west to Guiyang and Kunming. Even today 80% of freight shipped through the region is by road, and the NTHs are essential to assure that high volumes of cargo pass through the region.

43. A new transport hub facility in Zhuzhou is programmed that will allow transfer of goods and containers between truck and rail modes. The chosen site allows access to rail cars (directly from the marshalling yards) and trucks (via a short exit road from the NTH). There is also a small port in Zhuzhou, but it is not within the hub site and direct transfers between water and rail will not be possible. Containers being transferred between water and rail will have to be loaded on trucks. The planning and design of this facility should be re-visited to assure that it is large enough and provides the required range of services to play the role as the centerpiece of a future transport cluster.

44. There is a suggestion that, in the future, the east-west NTH will be relocated south of Zhuzhou to avoid the congestion expected to develop in the central portion of CZT. This would take the roadway farther from the hub, and is undesirable from the point of view of the development of a transport cluster.

45. The process of integrating the three cities should effectively eliminate any trade barriers between them, but other constraints to cooperation will remain and must be addressed. Some of the major elements of the cluster (e.g., the research institute, the locomotive plant) belong to State ministries and may not be able to cooperate fully. Other enterprises belong to domestic or foreign companies whose interest may lie more in keeping costs down than in innovation. This type of constraint will take time to overcome, since it involves a learning process and the breakdown of old habits and ways of doing business. Governments need to assist the formation of a network among the elements of the cluster for sharing ideas, proposals, and research results. The research institute has a role to play here, but it is limited by the fact that it focuses exclusively on rail transport.

46. The development of firms providing transport-related services needs to be encouraged. Emphasis should be on emergence of private and shareholding companies

that do not require capital investment by governments and that will likely be more flexible and innovative than government-owned enterprises. Related services could include cargo handling and inter-modal transfer, logistics, security, and insurance.

To assist the development of a cluster in transport equipment and services, it is recommended that:

- CZT governments sponsor a forum with participation from enterprise managers, transportation facility managers, government departments, the research institute, and service providers. The forum would have regular sessions, and would work toward a common understanding of the potential of the cluster and how sharing of information and ideas, and joint initiatives, would assist in achieving that potential. The forum would be formalized over time by choosing a set of officers and putting in place a small secretariat. Costs would be shared by CZT governments and enterprises.
- The forum sponsor the formulation of a cluster development strategy, to be carried out by the Hunan Development Planning Commission, with the support of domestic and foreign experts. It would define clearly the cluster's strengths and weaknesses, missing elements, infrastructure and services to be provided by government, the role of research institutes, and many other aspects. The strategy would be a rigorous analysis of strengths and weaknesses, not a promotional brochure.
- Zhuzhou review the plans for the transport hub in the context provided by the cluster development strategy, focusing on scale, design, and supporting services.
- CZT use the cluster development strategy as an investment attraction tool to interest additional transport-related enterprises and services in investing in CZT.
- CZT explore options for providing better research support to the cluster. Options include strengthening of the existing rail transport institute, and widening its mandate to include all modes; improved university curricula in transportation-related fields and better links between the universities and elements of the cluster; and formation of new R&D institutes perhaps in partnerships with institutes from other cities.
- Hunan complete the NTH segments within the Province, and use lobbying and persuasion to assure the timely completion of segments in other provinces, to link CZT with other major urban areas by expressway standard highways.
- CZT assure completion of internal roads that facilitate goods transport between the hub and CZT enterprises.

Priority Infrastructure Projects:

- Zhuzhou transport hub as the centerpiece of the transport cluster
- Completion of NTHs to increase cargo volumes through the region
- Zhuzhou ring road to rationalize the city's road network so that the transport hub can function efficiently
- Upgrading of Highway 320 (which is currently saturated) between Zhuzhou and Xiangtan to improve the latter's access to the hub

5.1.2 Education and Culture

47. Hunan culture is considered unique in China, and the province, especially Changsha, produces a large number of television programs, books and films. The importance of this sector has been given physical expression by the construction of a new TV and Broadcasting Center in Changsha. The center groups production facilities, performance venues, and office space.

48. In addition, Hunan Province has a long tradition of providing quality higher education, and today Changsha has reportedly the highest ratio of students and faculty to population in the country, with Xiangtan also being a university city. The growth and diversification of the education sector will be stimulated considerably by the University City project, which will double the size of the student population and integrate teaching, research, and housing. A new high-tech industrial zone will also be developed, linking the universities to economic development through R&D and commercialization initiatives. The University City will become a major distance learning center, a specialty in which Hunan University already has a strong record.

49. The three cities have considerable historical interest for Chinese and interested foreigners, having been the home of many famous people and the location of landmark events in Chinese history. This provides themes for cultural products and help in defining a brand name.

50. Finally, the printing industry in Changsha is large and profitable, and it is assumed that at least some of that is book publishing. Though comparable data on education and other cultural activities are not available, they are clearly significant components of the local economy.

51. Thus, the major existing elements of a potential education and culture cluster are:

- A known brand, consisting of a unique culture and history;
- Changsha's three major universities, including the historically significant Hunan University;
- Universities in Xiangtan and Zhuzhou;

- Emergence of a distance learning industry, with the accompanying technology and expertise;
- A large and profitable printing industry;
- High production of television programs, films, and books that are distributed and known nationally;
- Historical interest that can provide themes for both cultural production and education.

52. These two sectors, education and culture, have natural linkages. Universities are normally large consumers of cultural products, and the cultural industry draws some of its young recruits from the educational institutions. Both attract young, talented, entrepreneurial people, and this contributes to the diversification of Changsha. Such people demand different products and services, and in many cases local enterprises can meet this demand. Finally, the combination of strong educational and cultural establishments can only improve the image of Changsha and increase the number of people who know about the city and would like to visit. An educational-cultural cluster would encourage innovation and, after it reaches a certain size, would tend to generate its own further growth.

53. Analyses often divide the cultural field into content creation, production, packaging, and distribution. Hunan already has a large number of content creators, and its production capacities will be augmented by the new TV and Broadcasting Center. However, if this is to become a commercially important part of the CZT economy, more attention will have to be paid to packaging and distribution, and to sound business practices.

In a study of the Dutch art and cultural sector in 1998, the following activities were included: publishing, printing, binding, advertising, film and video related activities, radio and broadcasting services, press and news agencies, museums and libraries, and related business services. ("The Emerging Information and Communication Cluster in the Netherlands", Pim den Hertog & Sven Maltha) This is similar to the elements of the cluster in CZT, but the Dutch study went further. Arts and culture were linked to a cluster of activities in the communication field - manufacture of communications equipment, IT services, and post and telecommunication services.

54. It is beyond the scope of this report to describe the "convergence" now underway in the telecommunications field. Television, voice transmission, and data transmission are coming together in ways that are only dimly perceived at this time, driven by the rush of new technologies. Planning in the educational and culture field will have to be aware of these trends and try to identify opportunities for CZT in this rapidly changing sector. Cultural products can now be disseminated in a huge variety of ways other than the traditional ones of television, books, theaters, and museums.

55. There is clearly a link between an education and culture cluster and the distance learning technology being developed at Hunan University. Properly planned and managed, distance learning can place Hunan at the cutting edge in the use of modern technology to

disseminate educational and cultural products. There is potentially a very large market for distance learning in China. The installation of fiber optic cable will also support the wider dissemination of cultural products, and facilitate the development of joint initiatives with other centers. Finally, this cluster is related to the development of an IT equipment and services cluster (see Section 5.1.4), in ways that should be explored as development proceeds.

56. Constraints to emergence of a true cluster in education and culture include:

- Traditionally these sectors are heavily subsidized by governments at all levels. Educational and cultural products and services are seen as public goods rather than commodities. Though this is appropriate and is common throughout the world, it means that they are subject to frequent changes in policy and cutbacks in funding.
- Packaging cultural products for commercial purposes and developing a wider distribution network are weak links in the CZT cluster at this time.
- Links to other production centers in China, including in Hong Kong and Taiwan, appear to be weak. This means that Hunan cultural production is operating with inadequate exposure to potential markets and many of the new ideas circulating in the field. Production centers in Shanghai, Hong Kong and Taiwan have been successful in penetrating foreign markets, and have learned much about producing commercially successful products.
- Though there are some links between the universities and the cultural field, they need to be strengthened.

57. The University City project is an opportunity to strengthen the links between education and cultural production. Curricula in arts and culture could be dramatically expanded, including not just creation of art but also production techniques and the business of packaging and distribution. The system should produce not only artists but also arts administrators, entrepreneurs, and business people. In the same way that the high-technology park that is part of the University City concept will stimulate industrial spin-offs, the combination of relevant university curricula, a strong cultural community, and the presence of sophisticated production facilities in the TV and Broadcasting Center could result in the emergence of many small production companies and private schools focusing on culture and the arts.

58. Joint initiatives with centers in

A potential “multimedia and cultural content” cluster was explored in an Austrian study in 1998. The country is rich in content creators, but it was found that the labor market did not offer sufficient opportunities for arts professionals to pursue careers. The sector is highly subsidized, and there is insufficient competition in the telecommunications and TV markets to foster the emergence of new firms and new opportunities. Culture in Austria is sophisticated and of high quality, but is apparently not commercially viable. (Creating a Coherent Design for Cluster Analysis and Related Policies: The Austrian TIP Experience, Michael Peneder) This may well be an issue in CZT, and the adoption of a more business orientation to cultural production may be called for.

Shanghai, Hong Kong and Taiwan would help to enlarge Hunan's potential audiences, generate new ideas for the Hunan cultural community, and present the opportunity to commercialize some cultural activities. Likewise, distance learning and other new educational innovations will allow for greater revenue generation by the universities.

59. Commercialization of the educational/cultural area must be approached cautiously. These are rightly considered public goods, and something of which Hunan people can be proud. Public support, financial and otherwise, for education and the arts should certainly continue. However, there are opportunities for integrating a more commercial orientation into the mix. Commercializing certain aspects of the education and culture area will not just generate revenues that can be re-invested in universities and cultural facilities, but will expose local educators and artists to new ideas as they become exposed to a wider variety of audiences.

60. Entry of new firms into the market, largely private SMEs, should be facilitated through access to financing, assistance in operating a small business, and the opportunity to compete on an equal basis with government sponsored enterprises. Where possible, production should be on a proposal-call basis, with the best proposal at the lowest cost given the opportunity. Though SMEs should be privately owned and self supporting, a program offering small amounts of seed money to promising start-ups might be considered. These should be one-time loans, to be paid back within a reasonable period of time based on the revenues and profits of the enterprise.

The recommended program for development of an education and culture cluster is:

- Planning and implementation of the University City project, incorporating:
 - distance learning as a major specialty;
 - exploration of other specialties where CZT has a competitive advantage;
 - expansion of the fiber optic network to include the TV and Broadcasting Center;
 - broader curricula on culture and the arts, including creation, production, packaging and distribution;
- Establishment of a formal link between the universities, the managers of the University City project, and the TV and Broadcasting Center to explore common interests and opportunities for joint initiatives;
- A major conference on education and culture, with the goal of inspiring greater cooperation between Hunan and other centers in cultural production and arts education
- Pursuance of joint commercial ventures between Hunan and Shanghai-Hong Kong- Taiwan
- Opening the cluster to new businesses by:
 - provision of technical assistance and seed money;
 - improved access to financing;
 - more use of the call-for-proposal method of finding suppliers in the field;
 - access to the facilities at the universities and the TV and Broadcasting Center.
- Roads and public transit that make the University City and the TV and Broadcasting Center easily accessible from all parts of the city.

Priority Infrastructure Projects:

- University City project as an opportunity to expand links between education and cultural production
- Fiber optic cable extended to the TV and Broadcasting Center to facilitate joint initiatives between the university and the center
- Western (Changsha to Xiangtan) expressway to link the University City with universities in Xiangtan
- Measures to make the cities more attractive as places to live, thus attracting talented people from the educational and cultural fields (environmental improvements – Section 5.1.4; Xiang River Corridor project)

5.1.3 Food Products and Pharmaceuticals

61. CZT has 120 enterprises in food processing, food manufacturing, and beverages. Together they employ 20,000 people and produce an output value of Y3.1 billion (5% of the total). Pharmaceuticals is a small sector but highly profitable. There are 26 enterprises with 9,000 employees and Y900 million in output, and pre-tax profit rates reach 16%. Limited R&D is provided by the medical university.

62. There is a growing domestic market for specialty food products, driven by rising disposable incomes. Also, the international market for Chinese medicine and other natural remedies is expected to grow dramatically over the coming decades, and has already attracted the attention of major international companies.

63. Enterprises in these sectors tend to be related by providing intermediate products in a chain of enterprises. Agricultural producers provide raw material to food processing enterprises, which in turn provide processed materials to food manufacturing and beverage companies. The same agricultural base that provides the foundation for food products also furnishes much of the raw material for pharmaceuticals, which is focused on Chinese medicine.

64. This situation appears to be ideally suited for cluster development. Elements already present are:

- A good land base and cultivation of a wide range of crops;
- The presence of food products companies, some with widely recognized brands;
- The presence of some pharmaceuticals firms with profits to re-invest;
- Two nodes where these enterprises are concentrated – Liuyang for pharmaceuticals and Wanchang for food products;
- A nucleus of research support, which nevertheless needs considerable strengthening.

65. However, a true food products and pharmaceuticals cluster cannot develop until the following issues are addressed:

- The supply chain in foods and pharmaceuticals consists of farmers who grow the raw materials, firms that process the raw materials, and companies that fabricate

The success of the pharmaceutical sector in Denmark is attributed partially to a strong national science base. Danish universities have traditionally been highly regarded in the life sciences, and this leads to both successful local research programs and the capacity to utilize and commercialize research results from other places. (“Studies of Clusters as the Basis for Industrial and Technology in the Danish Economy”, Ina Drejer, Frank Skov Kristensen and Karl Laursen) Though basic research is increasingly accessible around the globe, the local community needs trained people to understand, interpret, and apply it. This is a key role for CZT universities, which already have significant competence in these fields.

the end product - a food product or medicine sold to the consumer. Other participants in the cluster include technical experts, laboratories and research institutes, business service providers, educational and training institutions, shippers, and wholesalers and retailers. The supply chain exists, but could be strengthened to involve more players, substitute local raw materials and intermediate products for imported ones, and develop new specialized and higher value food products. Currently some raw materials that could be grown locally are imported. With some exceptions, products are marketed only locally, and dependence on local markets means that there is little pressure on enterprises to develop new and better products.

- Though many current participants in the cluster have considerable knowledge of their field, the knowledge base is not organized or broad enough to allow diversification. There needs to be a central place where current knowledge is consolidated and organized, and used as a base for additional research and product development.
- Biotechnology is a growing and highly sophisticated (though somewhat controversial) field, applied to produce new and improved foods and medicines. It is perhaps the prime source of innovation in the food products and pharmaceutical industries today. It is not clear that CZT currently has the knowledge base to successfully enter the field on its own. One approach would be to explore the possibility of technical assistance from a developed country aid program, followed by attempts to form a partnership with an international company. The international company would be attracted by availability of a variety of high quality raw materials, the presence of local experts, lower costs, and the large and expanding Hunan and Chinese markets. The U.S., Canada, France, the U.K., and Germany all have strong and growing biotechnology sectors.

To help this cluster develop it is recommended that:

- CZT governments sponsor a forum on food products and pharmaceuticals where the participants would be enterprise managers, producers of raw materials, government departments, researchers, relevant educational institutions, and service providers. The forum would have regular sessions, and would work toward a common understanding of the potential of the cluster for development of new products and penetration of new markets. Over time, the forum would generate initiatives involving a number of members in collaborative work. If successful, the forum would become a formal organization by choosing a set of officers and funding a small secretariat. Costs would be shared by government and enterprises.
- The forum sponsor the formulation of a cluster development strategy, bringing in domestic and foreign experts where necessary. The strategy would define clearly the cluster's strengths and weaknesses, missing elements, the supply chain (current and future), infrastructure and services to be provided by government, the role of research institutes, the potential for biotechnology as an instrument for innovation, and many other aspects. The strategy would be a rigorous analysis of the strengths and weaknesses, not a promotional brochure.
- A program to strengthen the supply chain be mounted. An initial study could describe the current status of the supply chain and point out major opportunities for strengthening it. A subsequent program would likely include improving road links to rural production areas, technical assistance, and the introduction of more support services.
- Develop a research and commercialization center, government sponsored, to stimulate innovation, diversification and commercialization. Though financial contributions from enterprises is desirable, this may have to come over time as most enterprises in the sector are small. This center would:
 - provide lab facilities and technical staff, with access on a fee for service basis;
 - maintain a database on current CZT food and pharmaceutical products;
 - track national and international research relevant to the cluster;
 - undertake and make available market studies in promising markets for CZT products;
 - provide start-up loans to new firms entering the market (or assist firms in obtaining financing from banks).
- Enrich university curricula in the health sciences and strengthening of links to enterprises and the proposed research and commercialization center;
- Encourage the entry of new firms by making available sites and space in pre-built structures and better access to capital;
- Consider using the nodes at Liuyang and Wanchang as the primary production bases for pharmaceuticals and food products. Road connections to these two nodes are good. If this is not feasible or desirable, integrate these two nodes better into the regional economy through participation in the forum and the R&D center.

Priority Infrastructure Projects:

- Research and commercialization center to build on existing knowledge base and stimulate innovation
- Servicing of appropriate areas where food products and pharmaceutical firms might locate (in Liuyang, Wanchang, and the urban areas of all three cities)
- Improved road links to rural areas where raw materials are or could be produced.

The Ottawa high-tech cluster, visited on the study tour, includes 815 firms with 48,000 employees, revenues of \$8 billion and exports of \$5 billion. In 1998, 65% of these firms had fewer than 25 employees. Firms are involved in telecommunications, information technologies, software, health and medicine.

Ottawa's success is attributed, firstly, to the presence of the federal government and its increasing tendency, after the 2nd World War, to contract out much high-tech research and procurement. Initially many firms grew on the basis of government procurement. Secondly, government regulations concerning business start-ups were relatively simple.

The cluster's growth accelerated after the establishment of Nortel in Ottawa in the late 1950s. Nortel introduced a significant mass of output and employment into the cluster, in a field experiencing rapid growth, telecommunications. Over the last few decades, a large number of supporting institutions have developed and formed links with the high-tech cluster – brokers, laboratories, government research agencies, two universities, and financial institutions. (“The Ottawa Cluster: Policy or Luck?”, Roger Heath)

Though the Ottawa cluster is well advanced and the CZT cluster is just beginning, there are lessons here with regard to the importance of an initial stimulus, the large number of small firms, and the need for supporting institutions.

5.1.4 IT Equipment and Services

66. In the Interim Report, a possible cluster emerging from the electrical equipment sector was suggested, on the grounds that CZT has some large enterprises and national brands in this sector that provide a base for diversification. Mainframe computers, computer monitors, central air conditioning units, and electric motors are the major products. The sector has 78 enterprises, 41,000 employees, and Y4 billion in output. In discussions with local officials during the last mission, it was decided to transform this into a potential IT equipment and services cluster. This is more in line with CZT's aspirations for making technology a more important part of the economy.

67. The major products of the IT equipment sector in CZT are mainframe computers, produced by Hunan Computer Group, and computer monitors, produced by an LG joint venture. Both are known brands throughout China, and in particular the mainframe computers are the Chinese standard in their field. There are also some producers of software, at this stage largely making products for local applications.

68. Unlike cities in eastern China, the market for IT products and services in CZT is not yet saturated, and has considerable room to grow. It presents many opportunities for products and services designed for the local market, and CZT is well located to serve the southern and southwestern regions of China.

69. The Dutch have defined a cluster consisting of telecommunications, IT, and media, the elements of which are as follows:²

- Art and culture activities: publishers, printing, video retail, advertising, business services, film & video related activities, radio and broadcasting services, press and news agencies, journalists, museums and libraries;
- Manufacturing activities: manufacture of office machinery and computers, insulated wires and cables, electrical components, telecommunication and broadcasting transmission equipment, audio and video equipment, electrical measuring and controlling equipment;
- Service activities: post and telecommunication services, computer services and IT consultancy.

70. This list of elements raises interesting questions about future linkages between two proposed CZT clusters – IT equipment and services and education and culture.

71. Some elements of a future cluster in IT equipment and services exist in CZT:

- A large and successful company with a known brand name, Hunan Computer Group;
- Some small software firms;
- A local market for IT equipment and services that is young and has considerable room to grow.

72. The constraints are serious, however:

- Hunan Computer Group produces mainframe computers. This is not a high growth sector, and the company will need to adapt its products to changing conditions if it hopes to prosper;
- The software firms market locally, and have insufficient exposure to industry trends;
- Both Hunan Computer Group and the software firms do not have demanding customers by international standards. The former has established clients in large Chinese institutions and limited competition, and the software firms need only cater to relatively unsophisticated local buyers;
- The knowledge base is weak compared to more advanced Chinese cities and to international firms;

² Boosting Innovation: The Cluster Approach, OECD Proceedings, OECD, 1999; chapter 8, “The Emerging Information and Communication Cluster in the Netherlands”, Pim den Hertog and Sven Maltha.

- The entire sector is one of strong competition, and China's entry into the WTO will put enormous competitive pressure on the local companies.

73. CZT enterprises and products will likely not be competitive in the mainstream of the IT sector. It will need to find niches where it has or can develop a competitive advantage. Two options present themselves:

- Build a cluster of equipment manufacturers, software developers, and services around Hunan Computer Group. This company could adapt its mainframe computers to function as servers, for which the market is growing rapidly. Where only a few large institutions use mainframe computers, many large and small enterprises need servers. The servers could be designed for Chinese conditions and customers, thus perhaps offering an advantage over foreign producers. This would require new operating systems and a variety of other software, opening markets for CZT's software producers.
- Build the sector around the education and culture cluster, involving equipment, technologies and software for distance education, for example, and for the packaging and wide dissemination of Hunan cultural products. As discussed in Section 5.1.2, convergence of technologies in the telecommunications field is opening many opportunities for linkages.

It is recommended that:

- CZT undertake a study of niches in the IT equipment and services field where it could be competitive, building on existing elements and expertise.
- CZT discuss with Hunan Computer Group the possibility of adapting its products to participate in high growth areas and spinning off opportunities for related development of software and services.
- CZT explore linkages with the education and culture cluster through involvement in the University City project, the TV and Broadcasting Center, and formulation of the proposed cluster development strategy.

5.2 Develop stronger links with external markets

74. Levels of foreign investment in CZT and levels of exporting by CZT enterprises are low. Standards of living in the three cities will approach the current standards of middle-income European countries by 2020, and an urban region of this scale cannot develop its economy on the base of markets currently accessible in Hunan Province.

75. CZT enterprises need to find and exploit new markets, both in China and worldwide. They, as well as governments, research institutes, and universities, need to be better connected to networks providing information on trends in China and Asia, events

that will affect them, new technologies, and new management approaches. Improved investment attraction strategies need to be developed jointly by business and government.

76. Developing relationships with IFIs is important because of the high level of technical assistance they can provide and the potential for loans for projects that show high economic returns and have major social and environmental spinoffs.

77. Other Chinese cities can be development partners for CZT. Wuhan, the largest and most diverse metropolis of central China, is only 350 km to the north and connected by good roads. It is worth exploring how the economies of CZT and Wuhan can support each other through the exchange of products and services, business alliances, and joint technology development initiatives. Finally, a link to one or more of the developed coastal cities might be considered. The coastal city could be the source of new enterprises that can no longer pay the high costs of land and labor in their present location, but may be able to thrive in CZT. Such cities could be found in the Yangtze Delta, Pearl River Delta, and other regions.

78. NTH links to other major cities go well beyond the provincial boundaries and their completion depends on other provincial governments. Hunan will need to assure their timely completion through persuasion, with the cooperation of the national government.

79. A number of major enterprises in CZT belong to the national government. Though they are important components of the local economy, economic planning and investment decisions are to a large degree done by the enterprises or a ministry in Beijing with insufficient reference to the needs of the local economy. Further, CZT economic planners tend to ignore the potential of these enterprises to drive economic change because they are felt to be beyond the reach of local government. Negotiations with the national government and the relevant enterprises could help to strengthen the link between these enterprises and local economic planning.

80. With the constraints of distance from major markets and an economy that is less advanced than those of major eastern urban areas, it is not sufficient to simply go on trade missions. CZT must have a convincing message to investors in the form of a development strategy. Considerable work has been completed on such a strategy, and this report may constitute another input. A development strategy contains different messages than a promotional campaign. The latter focuses exclusively on the positive aspects of the region's situation, while the former discusses frankly the area's problems as well as its strengths, sets out a vision for the future, describes the actions governments will take to work toward that vision, and discusses how the region will apply its financial and institutional resources to that end. It is designed to convince others that the area has ambitious but feasible plans for overcoming its weaknesses and capitalizing on its strengths. Though there is a place for promotional literature, the major instrument to be used in investment attraction is the CDS. IFIs, foreign governments, and sophisticated international companies will expect the rigor characteristic of a development strategy.

81. It is recommended that CZT mount a major investment attraction program based on a sophisticated development strategy. The current work on CDS can form an important input to this strategy. The program should be developed jointly by government and enterprises, with inputs from universities and research institutes, and it should target the following:

- IFIs: Securing an IFI loan is a signal to the wider community that the city's planning process is solid, it has strong technical capacities, its finances are in order, and it has viable projects that could be of interest to outside investors. Preparation of a project for IFI financing is a major undertaking, but will serve as a mechanism for building capacity and developing cross-sectoral cooperation within the municipal government. In addition, the IFIs are sources of technical assistance.
- Foreign governments: CZT has already secured advantageous loans from the Japanese Government. Other countries should be targeted after careful consideration of the country's policies and priorities in regard to its external aid program. The integration concept will be seen as innovative and promising to many foreign aid donors, who could probably be convinced to assist in well defined technical assistance projects to advance the integration idea, or participate in loans for environmental infrastructure. The cluster approach, proposed in this report, may well attract foreign donors/lenders who would be interested in one of the first large-scale attempts to apply this theory in a developing country.
- Foreign companies: CZT has shown its capacity to attract prestigious foreign firms, but the amount of direct foreign investment is as yet not sufficient to have a major impact on the economy. The region might attract more foreign investment through progress in development of innovative clusters as suggested in this report. This would attract the attention of foreign investors who are at a stage in their China investments where they want to do more than just produce pre-designed products at a low cost. Such firms want to bring their research capacities with them and develop new and innovative products within China. This is a higher risk strategy than trying to attract branch plants of companies located in Shanghai or Shenzhen, but the potential payoffs are much greater. If such a strategy succeeds, CZT would vastly strengthen its R&D capacities.

82. It is suggested that CZT's investment attraction program proceed in the following stages:

1. Complete a city development strategy as described above;
2. To begin the process of getting the message out, form a high-powered delegation of government and business leaders to present the strategy to IFIs, the embassies of selected foreign governments, and business/industrial

- associations in major Chinese cities; repeat this annually in order to form a network of interested people and organizations;
3. Prepare strategies for cluster development in selected fields as proposed in this report;
 4. Prepare to high standards a number of projects where outside investment is desired and feasible;
 5. To take the process to the next level, use the development strategy, the cluster development strategies, and selected project packages in discussions with IFIs and foreign governments with a view to procuring investment agreements;
 6. Based on the results of stage 2 and the developing network of people and organizations, carefully select Chinese and foreign companies for investment attraction efforts;
 7. Feed selected project proposals through the network to see which ones attract attention;
 8. Where interest is expressed, begin discussions on the project in question; try to determine what aspects of the proposal make the investor uncomfortable and be prepared to modify the proposal; gradually move toward an investment agreement.

It is recommended that:

- CZT formulate a rigorous development strategy, building on work already completed and using this report as an input, to serve as the major tool in development attraction initiatives;
- CZT explore the potential in closer economic relationships with other Chinese cities, starting with Wuhan;
- CZT assure the timely completion of NTH links to other major urban centers;
- CZT mount a major investment attraction program targeting IFIs, selected foreign governments, and selected foreign companies in the manner set out in this section

5.3 Environmental Improvement

83. Environmental conditions are poor throughout CZT. Air quality does not meet national standards, and water quality in some sections of the Xiang River where raw water intakes are located is Class IV or worse. Progress in improving the situation is slow, and the targets in the 10th FYP are modest. CZT is considering a very expensive “clean water project” that brings water from a new source 86 km away from the city, partly on the grounds that the water in the Xiang River may not remain suitable for human consumption.

84. Changsha is rapidly changing into a sophisticated, relatively affluent city with an economy based on services and emerging industries that have locational choices. An enterprise decision to locate in a particular city is not determined by environmental

quality, but it plays a major role. To sustain this transformation, Changsha needs to attract sophisticated private firms and new, highly qualified people who demand good housing, a range of personal and government services, and clean air and water. Though housing and services are improving, the city's current environmental conditions do not meet the necessary standards.

85. Major investments will be required in air pollution abatement, wastewater treatment, and solid waste treatment, and this investment program will have to be kept within the financial capacity of the local governments. Whereas investments in transport infrastructure may be over-programmed relative to demand, investments in environmental infrastructure need to be accelerated. It is suggested that CZT authorities consider delaying some of the proposed transport investments in favor of environmental infrastructure.

86. Though it is expected that the EPBs of each of the three cities will continue to play their current roles, environmental planning and management need to be coordinated at the regional level. This is best accomplished by the Hunan EPB. As discussed elsewhere in this report, the cleanup program for the Xiang River should be managed directly by a regional institution, but in most other areas a regional coordinative role is adequate.

87. There is some recent local experience in the design, construction, and operation of wastewater and solid waste treatment facilities. Building on this core of knowledgeable people, technical assistance and training should be sought to build up a sufficiently large and competent group in the three cities to deal with the larger challenges ahead.

88. Adequate funding for O&M is essential. There is evidence that some existing facilities are operating below capacity because of insufficient operating funds. It will be very difficult to obtain IFI or private financing for new infrastructure if current facilities are not being used to their capacity, or are suffering from inadequate maintenance.

It is recommended that:

- CZT set environmental targets above those currently in the 10th FYP in order to assure that the cities, especially Changsha, can play the economic roles envisaged.
- A regional wastewater management authority be established to prepare a river basin improvement strategy and to undertake the major wastewater investments required.
- Other environmental services continue to be delivered by the cities, with the provincial EPB exercising a coordinative and oversight role.
- Investments in wastewater treatment, air pollution abatement, and solid waste management be considered high priorities.
- CZT seek technical assistance to build up its core of expertise in wastewater and solid waste management.
- Municipal governments take the necessary steps to assure that O&M funds for environmental infrastructure are sufficient, and that existing facilities are operating at or near capacity.

Priority infrastructure projects:

- A wastewater treatment program that significantly improves the quality of water in the Xiang River;
- The proposed coal desulphurization project;
- Natural gas distribution project;
- A program that provides 100% treatment for solid wastes within ten years, including probably the proposed Xiangtan/Zhuzhou facility.

5.4 Develop and implement the integration concept

89. The concept of the integration of Changsha, Zhuzhou, and Xiangtan is the driving force of provincial planning, and appears to have the full support of all three municipal governments. Though a number of studies and reports have been completed on integration, the concept is still not entirely clear. Primarily this is due to a reluctance on the part of the provincial government to identify what institutional reforms will accompany integration. Without regional institutions, the concept remains theoretical.

90. Potential benefits of integration are thought to be:

- Larger scale will give the region more influence and improve its competitiveness vis-à-vis other major Chinese urban agglomerations;
- Regional planning leading to coordinated urban growth management;
- More effective and efficient delivery of services in sectors like water supply, wastewater management, solid waste disposal, and public transit between the cities;
- Environmental management based on the Xiang River Basin;
- Sharing of educational and R&D capacities;
- Increased inter-firm cooperation and trading, leading to cluster development (though locally this term is not used).

91. Integration was a prime subject of discussion at the stakeholder workshop, and there was a clear consensus on several points:

- Integration would make the region stronger economically;
- Integration would strengthen the urban infrastructure through coordination and the avoidance of duplication;
- Integration planning should include environmental and heritage protection – especially of the river and the area at the conjunction of the three cities;
- The three cities should retain individual characters after integration.

92. Integration implies a much greater level of cooperation among both governments and enterprises than currently exists. Barriers to cooperation exist in transportation, communication, the varying ownership forms in CZT, and simply custom. CZT governments are making progress in reducing transport barriers and, by the end of the 10th FYP, circulation within the region should function efficiently. In communications, internet access (including fiber optic cable in the university), is developing rapidly. Information systems required to permit one-day cheque clearing and a common telephone area code are being implemented. Thus, the transport and communication infrastructure is either in place or will be in the near future.

93. A serious barrier, and one that is difficult to change, is the lack of relationships among enterprises due to the fact that some belong to a national government ministry, some to provincial or local governments, and still others to domestic and foreign companies. Generally they report upward to their ministry, local government, or the parent company in Shanghai or New York, and see little need to cooperate with other enterprises in the region. This will be increasingly resolved over the long term as ownership becomes more and more private, but in the meantime government can only attempt to create opportunities for dialogue, information sharing and eventual cooperation.

94. All opportunities for joint and coordinated planning, programming, service delivery and program delivery across the entire CZT economic region should be identified and pursued. Three areas for coordinated planning and delivery should be given priority at this time – regional service delivery, planning and implementation of projects that support integration, and economic development planning.

Regional Service Delivery

95. All opportunities for regional service delivery of infrastructure and other government services should be identified, assessed in detail through benefit/cost and other techniques, and promoted where regional service delivery would lead to lower costs, greater efficiency, more commercially oriented operations and better service to the customer.

96. The first candidate for regional service delivery would be wastewater treatment. The three municipalities' present independent plans call for the construction of numerous small wastewater plants serving local discharge. The optimal locations and size of treatment plants might well be different if the effect on river cleaning or water quality intake for municipal systems were looked at from a regional perspective. Institutionally, such an arrangement would require establishment of a regional wastewater authority. The authority would contract with each municipality for the treatment of a specified volume of effluent, and would guarantee as part of the contract that treatment for all contract effluent would reach a pre-specified quality standard. Contract payment might be supported in the first instance by a uniform regional wastewater treatment surcharge, backed by each municipality to promise to pay for any shortfall. Against this ensured revenue stream, the regional authority could issue revenue bonds or borrow from a bank to finance construction. For this model to work financially, user charges or municipal

payments would have to include a component to cover capital costs. Alternatively, the regional authority could be given existing and under-construction treatment plants free of charge, so that revenue generating by the sewage surcharge could cover O&M plus new construction rather than being used to repay debt on existing facilities.

97. Other candidates for regional service delivery would include (in the possible order of priority) public transit, solid waste management, water treatment, and urban roads and bridges.

Projects that support integration

98. A number of projects underway or in planning would both support the integration goal and generate significant spin-offs for all three cities. These projects help to tie the cities together and serve as symbols of their cooperative approach, and are probably best planned and implemented at the regional level. Key projects of this type are:

- cleanup of the Xiang River, as both an essential environmental project and as a test of the willingness of the municipalities to accord certain powers to a regional body;
- the scenic/economic belt along the Xiang River, linking the three cities with a landscaped recreational corridor that also has flood control, transportation, and economic functions;
- University City, with its stimulus to the important educational sector and the links it can create between Changsha universities and those in Xiangtan and Zhuzhou;
- natural gas distribution as an initiative that will improve air quality throughout CZT;
- regional power grid;
- development of Yijiawang as the central point of CZT, with an appropriate use and high quality design;
- though current volumes do not justify it, ultimately a light rail transit joining the three cities.

Regional Economic Development Planning

99. Economic planning should be coordinated and integrated across the three cities, and the delivery of economic development programs in the areas of trade promotion, investment promotion and approvals, tourism promotion, and R&D and innovation strategies should be the responsibility of a single CZT Region Economic Development Authority under the direction of the three city governments. The Authority should be run by a Board of Directors that would include senior leaders from the three city governments, a representative from the Hunan Provincial Government, and industry representatives and other stakeholders (e.g. universities, training and research institutes) from all three cities.

100. Chairmanship of the Authority could be rotated on an annual basis among the mayors of the three cities, and its operating budget would be drawn from contributions from each city based on its GDP, and hopefully from an annual contribution from the

Hunan Provincial Government. Sources of recurring revenues from outside government could be developed over time.

101. The Economic Development Authority would become the “one-stop” business service centre for the delivery of economic development programs and services to all enterprises, current and potential investors, and other stakeholders. In some cases, roles, responsibilities and powers would have to be delegated from the three cities to the Authority.

102. It is recognized that consistent with current Chinese law and practice, economic planning under the five-year plan and the urban master plan processes would continue to be the responsibility of the city planning commissions and other city bureaus reporting to the Peoples’ Congresses of each of the three cities. However, the five year and master plans of each city government would have to be prepared in close consultation with the other two cities, the Authority and the provincial government, in order to ensure that the economic plans of the three cities are as closely coordinated and integrated as possible. Consultation, coordination, and integration at the economic planning stage are essential to support coordinated delivery of economic development programs and services across all three cities by the Economic Development Authority.

103. The major features and benefits of the integrated delivery of economic development programs and services across the three cities through the CZT Economic Development Authority would include the following.

Common economic analyses, strategies and messages

- Integrated economic planning and program development would be based on and benefit from both the complementarities of the industrial structures of the three cities and internal competition in the same product line and markets (which is the basis for industrial clusters). Amalgamating the three economies provides a quite strong and diversified regional economy where the strengths of one city complements the strengths found in the other two cities.
- This will allow the development of common strategies and messages across the three cities that will greatly assist with investment attraction as well as with lobbying for provincial and state government funds in Changsha and Beijing, in attracting government funded science and research institutes, and in attracting IFI, bilateral donor and commercial financing.
- The CZT urban region and Hunan province will have a higher profile and greater prestige and credibility with outside audiences because of its proven success in regional cooperation that cuts across city boundaries. This kind of success is quite rare in China and other countries – including the OECD countries.

Regional assets

- Integrated economic planning, program development and service delivery will allow the region to fully capitalize on current and emerging regional assets starting with the economic/environmental corridor along the Xiang River and including University City in Changsha, Huanghua International Airport and other

regional transportation facilities, the regional power grid, the new provincial government campus at the southern edge of Changsha, and the region's many tourism assets that are of regional, provincial, national and international importance.

Attractiveness to Investors and Enterprises

- The local market, labour supply, production of intermediate inputs, and supporting manufacturing and service industries provided by a population of 12 million will be much more attractive to investors, domestic and foreign companies and other enterprises compared to the markets, labour supply and supporting industry provided by each city on its own.
- The larger geographic region and population would provide investors with a wider range of opportunities and industrial locations from which to choose the business opportunity and industrial site that best meet their needs in terms of price and access to suppliers, customers, labour supply, universities, research and training institutes, and key players in relevant industrial clusters.
- Economic integration would place the CZT urban region near the first rank of Chinese urban regions in terms of economic size and consumer purchasing power, behind only Shanghai, Beijing, Guangzhou, Hong Kong/ Shenzhen and Tianjin and about even with or a little ahead of Wuhan, Chongqing, Chengdu, Shenyang, Dalian, and the rapidly growing Yangtze Delta cities of Ningbo, Hangzhou, Suzhou, Wuxi and Nanjing (see Table __ in the Interim Report). On its own, Changsha City places well below these cities and about even with Kunming, Xian, Changchun, and Zhengzhou.
- Zhuzhou and Xiangtan are intermediate sized industrial cities that are comparable in scale and attractiveness to a large number of similar sized cities found throughout China. Their identification with Changsha and the CZT region greatly raises their profile compared to these other medium-sized cities but proximity to Changsha is not enough. Proximity must be augmented by coordinated and integrated economic and infrastructure planning, programming and service delivery.
- Investors as well will be impressed and attracted by the efforts of the three cities to work together for the common good and to provide high quality services to the enterprise sector. This will be an important selling point in attracting investors, businesses and research and training institutes to the CZT region and will mean that the region and Hunan will stand apart as a leader compared with other provinces and urban regions where cities within an urban region continue to compete for investment, enterprise development and tourists.

More efficient and effective program and service delivery

- Economic integration and regional service delivery would provide lower cost services, more efficient and effective delivery for infrastructure services, and other government services, including services to business. As stressed above, these improvements will in turn enhance the investment and business climate, including the CZT region's attractiveness to outside investors and businesses.

- All trade, investment, tourism and other promotion – including trade, tourism and investment missions to other cities and countries – would be conducted in a coordinated manner through the Development Authority, and cities would not carry out promotional activities on their own.
- Integrated trade, investment, tourism and other promotion representing the total CZT region will be less costly and more professional and effective than separate campaigns by the three cities, and will prevent the negative and costly competition and confusing messages that result when cities within the same urban region compete for the same investments, companies, and tourists. Important savings would be realized for example through the preparation and publication of one tourism or investment promotion brochure, rather than three, and through the development of a single website representing the interests of all three cities and the CZT region as a whole.
- Tourism promotion that covers tourism products in all three cities would generate more tourist visitations, longer stays by tourists, higher spending, and more return visits. This would benefit the economies of the three cities

Industrial clusters that are regional in scope and advantages

- Industrial clusters can and should be defined, developed and promoted to investors based on the products, companies, universities, training and research institutes, government services, and other entities available in all three cities.
- Regional economic integration and the development of industrial clusters are closely linked and will benefit as well from regional service delivery of infrastructure and other government services, and from regional environmental protection initiatives involving the Xiang River and air quality in all three cities.

Barriers to economic integration and cluster development

- The Development Authority would play the lead role in networking, information sharing, establishing cooperative arrangements across universities, training institutes, research institutes, companies, government bureaus and other groups located in different cities.
- Therefore, one of the first steps in making the Authority operational would be to identify and remove all formal and informal barriers and constraints to the free flow of information, investment, products, people, technologies and ideas between companies and other groups located in the three cities. For example, any formal or informal local preferences in city government procurement and other government programs should be identified and removed.
- The Development Authority cannot remove these barriers on its own. Removing these barriers to inter-firm and inter-institute cooperation will require action by the provincial and state government. However, the Authority can help to facilitate their removal through identification, analysis of their negative effects, and lobbying with the appropriate provincial and state government authorities in Changsha and Beijing.

104. All three cities will benefit from coordinated marketing, promotion and service delivery in the CZT economic region through the Economic Development Authority.

Changsha City would benefit from being identified with a much larger urban region of better than 12 million people. Zhuzhou and Xiangtan would benefit from the much stronger market identification and “brand name” enjoyed by the City of Changsha among international and domestic investors, tourists, customers, suppliers, financial institutions and markets.

105. The many smaller county level cities, market towns and rural counties within the urban region will also benefit from the more effective promotion, marketing and “branding” of the total CZT urban region. Many investors could ultimately be attracted to the lower wages and land prices, better access to raw material supply, and low to medium skilled labor provided by the smaller cities and rural counties. The Development Authority’s role will be to attract investors, businesses, and training, science and research institutes to the region and display to them the wide range of locational options available within this very diverse urban region. Investors and businesses would then select the location that best meets their needs based on their own commercial analysis.

It is recommended that:

- CZT take action to reduce the barriers to inter-firm cooperation and economic integration;
- CZT pursue selected regional projects that will help to tie the three cities together and promote integration;
- CZT pursue as priorities the establishment of a regional wastewater management authority and a regional economic development authority;
- Hunan EPB continue to provide a coordinative and oversight role in regard to regional environmental issues.

Priority infrastructure Projects:

Projects that support integration:

- Xiang River cleanup
- scenic/economic belt
- University City
- natural gas distribution
- regional power grid
- development of Yijiawang for an appropriate regional use

5.5 Financial

106. Sound financial and budgetary management is both an end in itself and a primary instrument for achieving other development objectives. The CDS recognizes this dual role by stating as one of the CZT development goals, to “manage revenues and expenditures in a financially sustainable manner.” Each of the other development goals

specifies a set of public infrastructure investments that are needed as strategic inputs to achieve the goal.

107. Public financing choices figure in other aspects of development strategy, as well. The pricing of public services is critical to resource management and to improvement of environmental conditions. More broadly, the kind of collaborative development planning between government and enterprises, and between city officials and international investors, contemplated in the CDS recommendations, will require fundamental reforms in the way budgetary information is organized and shared with those outside of government.

5.5.1 Budget Preparation and Financial Disclosure

108. CZT has stated that it wants to become a development leader in central China. To reach that goal it will need to secure additional public sector lending from international financing institutions (IFIs) as well as investment from firms in the coastal regions of China and from international corporations. The CDS recommends building a regional development strategy around a series of public-private initiatives in key sectoral clusters, stimulated by ongoing forums that identify investment and policy priorities for cluster development.

109. Achievement of these goals will be greatly aided by a new posture toward budget preparation and the sharing of budget and financial information. At present, CZT like other local governments in China, does not publicly disclose basic budget information in a form that helps outsiders grasp a municipality's financial condition. Normally IFIs require this type of budget presentation before making lending decisions. Private investors and potential partners in development planning likewise need budget information if they are to make informed investment decisions for themselves or contribute meaningfully to discussions about prioritizing public infrastructure investment choices.

110. The complexities of inter-governmental relations in China make it unrealistic to aim for full financial disclosure at the local level. However, CZT could go far toward distinguishing itself from other regions competing for international loans and international investment, while at the same time providing the informational underpinnings needed to make collaborative cluster development succeed, if it organized the basic content of local government budgets in a meaningful way and reported this budget information publicly and routinely. Table 3 summarizes the content that such a budget report might contain. In essence, each city would report on their budgets for a five-year period (actual data for three past years, estimated data for the current year, and budgeted data for the next year)—showing the annual operating balance in the municipal budget, annual investment levels and the financing sources used to pay for investments. Such data would be reported for the municipal budget, the city portion of the municipal budget, and the off-budget items formally recognized by the Ministry of Finance. In the consultants' discussions with the respective finance departments, information was obtained from the CZT cities in essentially this format (see Interim Report). However,

information organized in this fashion is not regularly available to the public or to the investment community, and even the tables compiled for the Interim Report contain some missing elements.

111. In addition to basic budget figures, the Municipal Financial Summary would provide other fundamental information such as the tax rate for each significant local tax and the pricing structure for each significant public service for which fees are levied. The major infrastructure and other capital investment projects included in the current Five Year Plan would be summarized, along with the capital cost of each project and progress toward completion. The whole report might consist of 8-12 pages illustrated with charts and graphs.

112. Clearly, this recommendation involves a substantial departure from present practice, where budgetary information tends to be closely held within governmental circles. Indeed, it is this backdrop of practice elsewhere that creates the opportunity for CZT to stand out prominently as an international example of information sharing, greatly magnifying the interest of international firms and international multi-laterals in supporting CZT's development. If officials judge that the full set of information covered in Table 3 cannot be disclosed publicly, even a shortened version regularly reported would allow CZT to distinguish itself for fiscal transparency. Information of this type will be demanded by commercial bank lenders in the future, by international lenders, by bond-rating agencies, and by large international investors. It is almost certain to become routine disclosure at some point in the relatively near future. CZT has the opportunity now to assume a high-profile leadership role in financial disclosure. Most of the budget sharing information also will be needed for the forums recommended in the CDS if these are to produce worthwhile results. Development partners cannot meaningfully discuss public infrastructure investment alternatives with public officials unless they have some conception of the costs of different projects, the size of the local capital budget, and the impact that different investment alternatives are likely to have on local tax rates or service fees.

Table 3
Municipal Financial Summary

Item	1998 Actual	1999 Actual	2000 Actual	2001 Estimated	2002 Budgeted
MUNICIPAL BUDGET					
Operating Revenues					
• By principal revenue source					
Operating Expenditures					
• By principal expenditure category					
Operating Surplus					
Capital Revenues					
• Earmarked Taxes					
• Earmarked Fees					
• Operating Surplus					
• Other					
Capital Expenditure					
Net Budget Surplus/Deficit					
Off-Budget Revenues					
Net Budget and Off-Budget Surplus/Deficit					
SOURCES OF CAPITAL FINANCING (Consolidated to include all local government entities)					
Capital Expenditure					
Sources of Capital Financing					
• Fiscal Funds (Muni. Budget)					
• State Bond Funds					
• Foreign Loans					
• Domestic Borrowing					
• Land-Leasing and Other Self-Raised Funds					

Information Item: Local Tax Rates and Fee Schedules for Capital-Related Items

- Urban Construction and Maintenance tax rate and base
- Construction Fund tax rate and base
- Water fee schedule per m³
- Sewerage fee schedule per m³
- Land leasing rates per Chinese mu
- Others

Table 3 (continued)

Information Item: Capital Projects in Approved Five-Year Plan

Project	Initial Estimated Capital Cost	Revised Cost Estimate	Expended to Date	Sources of Capital Financing	Planned Completion Date
Project A					
Project B					
Project C					
Project D					
Others					

113. Each municipality also should establish goals for budget management that ensure sustainable financing. At a minimum, these goals should include:

- Generation of an annual on-budget operating surplus, with operating surplus amounts used to help finance infrastructure investment.
- Stabilization of the magnitude of operating surpluses. In CZT in recent years, operating surpluses have tended to decline as a share of the operating budget, because of increasing requirements for enterprise subsidies and other operating expenses. This trend has limited the contribution that the municipal budget can make to capital financing, increasing the pressure on self-raised funds, like land leasing revenues. As noted later this shift in capital financing patterns makes local infrastructure investment highly vulnerable to swings in the volatile urban land market.
- Planned, gradual increases in service fees where these are needed for full financing of O&M costs and at least partial recovery of capital costs.

5.5.2 Debt Management

114. CZT has reached the stage where the bulk of its intermediate and near term investment will be financed by commercial or near-commercial borrowing. The region is unlikely to qualify for subsidized State Bond financing for new investment projects. National and provincial grants for capital projects will be very limited. According to estimates in the Interim Report, for the universe of projects for which CZT has identified financing sources, 45 percent of all capital financing will come from domestic commercial bank loans, and another 19 percent from international lending, most of it on near-commercial terms.

115. This reality makes it imperative that CZT organize its debt management procedures. As a first step, each municipality in the region should compile a

comprehensive listing of the outstanding debts carried by its UDIC and all other financing institutions associated with the municipality, as well as the debts of unaffiliated organizations for which the municipality has provided comfort letters or other types of quasi-guarantees.

116. Second, a full accounting should be compiled of each municipality's annual debt service obligations—for both principal and interest payments. This accounting would cover at least 10 years into the future and take the form shown in Table 4. It involves calculating the annual interest payments due under each outstanding loan, the annual principal payments due according to the terms of each loan, as well as the debt service likely to be owed by the municipality on any third-party borrowing for which the municipality or its associated organizations have issued comfort letters. The purpose of such a summary is to understand the exact schedule of debt service obligations, so that new investment financing can be negotiated to fit with existing debt service obligations. The debt service schedule is not intended for public release. It is an internal management tool.

Debt Management Strategy

117. A full compilation of a municipality's debt service schedule is likely to reveal a number of vulnerabilities. There may be a surge of debt service payments due in certain years that can be handled only by rolling over the debt. More generally, the financial burden of financing long-term infrastructure investment through short-term, three- to five-year commercial borrowing becomes apparent. Loan repayments become due before the economic benefits of the investment projects can be realized. This highlights the critical importance to the municipality of lengthening borrowing terms. Lengthening loan periods is all the more critical now, as national authorities emphasize cleaning up non-performing loans in the domestic banking system in preparation for competition with international commercial lenders. Municipal borrowers and bank lenders are unlikely to be able to continue to take for granted that short-term infrastructure financing loans can automatically be rolled over, in the face of municipalities' inability to repay principal amounts.

118. CZT can stretch out borrowing periods by shifting to greater use of IFI lending, by negotiating longer-term loans with domestic commercial banks, and, for some major projects like ring road construction, by balancing longer-term bond issues with bank borrowing.

119. The present course which CZT is on—namely, greater and greater reliance on short-term commercial lending to finance long-term infrastructure projects—appears unsustainable.

120. Table 4 also can be used to project a municipality's debt service ratio, that is, the ratio of its annual debt service payments to its total annual recurring revenues not used for new capital investment. The resulting ratio is a good indicator of the proportion of the operating budget that has to be devoted to paying debt service on existing debts. It would be desirable for municipal officials, in consultation with bank lenders, IFIs and the

province, to establish numerical goals for the debt service ratio. In Western Europe and North America, it is common for municipalities to set a target of 12 percent to 15 percent for the annual debt service ratio, and for banks and capital markets to decline to lend to municipalities that have debt service ratios in excess of some higher threshold, like 20 percent, except in exceptional circumstances. The numerical targets are likely to be different for CZT, which is in the midst of a high infrastructure investment period, and which has a higher rate of investment spending in relation to total budget expenditure than most Western municipalities. However, a rapidly and continuously climbing debt service ratio is always a sign of financial strain. It would be highly useful as a guide for budget preparation and future debt management to reach a consensus on what are prudent debt service ratios and trends given the special circumstances of CZT. This guideline would help the municipality in making decisions about new borrowing to finance new capital investments.

Table 4
Consolidated Debt Service Schedule
 Interest and Principal Payments Due by Year

Loan	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
A										
B										
C										
D										
Total										

Other Information:

- **Projected Revenues Not Used for New Capital Investment, by Year**
- **Projected Debt Service Ratio (%) from Existing Debt, by Year**

5.5.3 Operations and Maintenance (O&M) and Capital Efficiency.

121. In the press to finance new infrastructure projects, adequate financing of the operating and maintenance (O&M) costs of existing capital facilities often is lost sight of. As long as there is insufficient capital service provision, the end product of a capital investment plan is not infrastructure *capacity*, but infrastructure *capacity in use*. The Interim Report cites examples from CZT where costly new investment in wastewater treatment plants is underway with more investment planned for the future, at the same time that existing plants are operating at 50 percent of capacity, and have been operating at partial capacity for years, because of a lack of O&M financing. This situation is inefficient in the extreme. In effect, already existing, zero-cost capital is not being utilized, while comparable new facilities are being built at high cost.

122. Three important lessons follow from this experience. It is recommended that:

- Capital infrastructure financial planning identify not only the costs, and sources of funds, for capital investment, but the costs of ongoing annual O&M for the capital facilities, once built, and the sources of annual financing for O&M.
- Wherever possible, service prices should be set at levels that fully cover O&M. Moreover, the institutional pricing mechanism should assure that the revenues corresponding to O&M costs go directly to the service provider and are set aside for O&M. In CZT at present, the O&M portion of service revenues often goes to the municipal budget. A separate decision then is made as to how much funding should be transferred to the service provider for O&M.
- Capital facility operators should be required to report to the municipal government on the percentage utilization of capital facilities (i.e, the volume of sewage treated in relation to design capacity in the case of sewage treatment plants), and municipal authorities should give priority in budget preparation to financing repairs and O&M that can bring existing capital facilities into full use, whenever it is less costly to do so than to abandon facilities in favor of new construction.

5.5.4 Service Pricing and Land Leasing

123. One of the most important financial reforms for CZT to achieve is greater use of service pricing to recover not only the O&M costs of capital-intensive services but at least a substantial portion of capital costs. Greater reliance on service pricing will help stabilize longer-term capital financing budgets, without overloading reliance on land leasing (see below). Full-cost service prices also set the stage for using demand signals to help draw up capital budgets. If consumers must bear the true cost of service provision, market demand is likely to reveal that consumers, for example, are unwilling to pay for a parallel distribution system of potable drinking water, if, as presently projected, the full-cost tariff would have to be more than 200 times the cost of “ordinary” water that must be boiled before drinking. Full-cost service pricing restrains demand to economically realistic levels, thereby relieving some of the capital financing burden that might otherwise appear in project designs.

124. CZT actually lags most Chinese cities in the use of service pricing to finance environmental infrastructure. At the time of interviewing, the water consumption tariff did not fully cover the costs of O&M, much less contribute to capital cost recovery for water distribution systems. (A change in pricing policy was under discussion.) Only Changsha of the three cities imposes a sewage surcharge. The existing sewage fee level in Changsha, however, will generate enough revenue to pay for only a very small portion of planned capital investment. In fact, as sewage treatment becomes more prevalent, the sewage fee (charged to all water consumers, whether or not their wastewater is treated) will be insufficient to cover the O&M costs of wastewater treatment plants. The failure to use service fees more comprehensively in the environmental sector is somewhat puzzling, given the quite aggressive use of tolls to recover the capital costs of some roadway and bridge projects.

125. The failure to use service pricing to recover full capital costs in the environmental sector (water supply, wastewater treatment, natural gas conversion) and in major highway projects, like the ring roads, has had two harmful consequences for capital infrastructure financing:

126. First, it has forced CZT municipalities to rely heavily on land leasing revenues to finance their capital budgets. It is entirely appropriate in fast-growing economies like the CZT region, where public infrastructure investment greatly enhances urban land values, that a portion of public capital costs be recovered from land holders. Tying land leasing rates to land market values has been a step in the right direction, both as a revenue-generating strategy and as a strategy to increase the efficiency of land-use allocation by enhancing the role of market prices. In Changsha alone, land leasing prices per mu rose by 800 percent between 1992 and 2001 (see Interim Report).

127. Land markets, however, are notoriously volatile. Even mild economic slowdowns can have large impacts on urban land prices that are geared to expectations of higher growth. Such a land market slowdown appears to be underway at present. Ironically, all three CZT municipalities not only are planning to finance larger proportions of their capital budgets from land-leasing revenues in the future, but are planning to place ever-larger amounts of urban land on the market. Whether these massive amounts of land can in fact be absorbed by the market without depressing land leasing prices remains to be seen. For example, the Changsha Ring Road Corporation will have to lease all of the 33 square kilometers of land it has been granted (only a third of which now has infrastructure service access) at Y100,000 per mu in order to generate the Y4.9 billion that has been budgeted for land-leasing proceeds, the principal source of proposed ring road capital financing. The municipalities' capital budgets are likewise dependent upon their ability to lease downtown urban land at top-of-the-market rates. Almost all of the UDICs' commercial borrowing is backed by municipally-owned land as collateral.

128. These optimistic capital financing plans may come to fruition. However, they leave almost no margin for error or for even temporarily depressed urban land markets. A downturn in urban land markets would trigger a domino effect of shortfalls in municipalities' capital financing budgets, a decline in the value of collateral held by banks lending to municipalities for capital investment, which would lead both municipalities and banks to attempt to sell more urban land, further depressing the market.

129. To avoid this possibility, it is recommended that (a) municipalities increase the capital cost recovery element built into service pricing, to reduce the pressure on land leasing as a source of capital income, and (b) draw up alternative financing strategies, should the land leasing market fall short of current expectations.

130. Second, the Bank of China has advised domestic commercial banks that they should shift from general municipal lending backed by real assets (usually land) to project financing, backed by project revenue streams. In project financing, both the borrowing investor and the lending bank have a direct stake in the economic success of

an investment project. The project's probable revenue generation and costs are scrutinized by both parties to the loan financing, increasing the probability of a financially successful project and an efficient allocation of investment resources. Banks do not have the same motivation to investigate project feasibility when they make loans backed by land collateral or municipal comfort letters rather than project revenues.

131. In CZT, greater use of service pricing for capital cost recovery and capital financing in the environmental sector will require joint agreement between the municipalities and Hunan province. In recent years, municipal-level recommendations for water tariff increases have been rejected by the Provincial Price Bureau. The Province has taken the position as a matter of policy that tariff structures should not recover capital costs in the water and wastewater sector. (This policy was under review at the time of our interviewing.)

132. Many factors go into tariff determination. However, it is recommended that Hunan Province adopt the principle that service pricing should be used to recover a substantial part of the capital costs of municipal environmental infrastructure projects, whenever possible, and that provincial authorities provide guidelines for tariff setting that the municipalities can adhere to.

5.5.5 UDICs

133. UDICs are a new institutional creation which are in the process of being defined in each municipality. From the State's perspective UDICs appear to have two objectives: 1) to separate ownership of assets from management and service delivery, so that each function can be handled more efficiently (and so that owners have incentives to exert pressure on operators for more cost-efficient use of their assets), and 2) to ensure that municipal borrowing is backed by real property collateral rather than by mere promises to pay on the part of the municipal government.

134. In practice, UDICs have progressed further as borrowing entities than as institutional forces for cost-efficient asset management. As the Interim Report points out, each UDIC in CZT is maturing in its own way. None of the UDICs, however, has seized the opportunity to rationalize economic management of assets by working out innovative lease arrangements with asset operators like the water company or wastewater company. These leases would provide financial incentives for meeting volume and quality standards of importance to local environmental goals, while penalizing operators for underutilizing the public asset. It is recommended that:

- The UDICs in CZT be exposed to state-of-the-art asset management regimes, that separate asset ownership from service delivery operation, through study tours and exchanges with municipal asset ownership companies in New Zealand, Western Europe, or North America.
- Hunan Province promulgate guidelines emphasizing that UDICs should be used to increase economic efficiency in asset management, and recommending

measurement indices through which the efficiency of asset management can be monitored.

5.5.6 Financial Policy to Support Regional Integration

135. Regional integration will become a reality in CZT when officials move beyond the arbitrary limits of municipal boundaries in deciding where to site key public facilities like wastewater treatment plants and solid waste landfills. Elsewhere in this report it is recommended that wastewater treatment plants have the highest priority for regionalization. Wastewater treatment lends itself to a river basin management approach. Once freed from municipal boundary constraints, treatment plants can be located so as to have the maximum impact on river cleaning at points of high population density, while lowering costs of wastewater collection and delivery to the treatment plant.

136. A regional institution that operates a regional wastewater or other infrastructure facility should be supported by a regional financing policy. During the study tour, CZT officials visited the Washington Suburban Sanitary Commission (WSSC), which collects wastewater from many different municipalities in the State of Maryland around the Potomac River, and has an interstate cooperative agreement with the District of Columbia and Commonwealth of Virginia to operate a common tertiary wastewater treatment plant, downstream from Washington, D.C. This regional authority is supported financially by a common wastewater fee levied on all customers regardless of municipal jurisdiction. The WSSC service tariff is set so as to fully cover the capital costs of collection as well as Maryland's share of treatment capacity at the regional treatment facility. Using the revenue stream from tariff payments, the WSSC has financed entirely on its own through bond issues all of its capital projects for more than four decades. This capital investment includes the largest tertiary wastewater treatment plant in North America. All borrowing is project financing, supported by the stream of consumer tariffs.

137. It is recommended that CZT explore the legal, political, and economic feasibility of establishing a regional wastewater authority that will build and operate one or more wastewater treatment plants serving inhabitants and businesses in more than one municipality. The Regional Wastewater Authority would be empowered by Hunan Province to levy service fees adequate to cover the costs of capital investment and to borrow against this revenue stream to finance upfront investment. For the initial borrowing, the project revenue stream could be supplemented by comfort letters from Hunan Province and the CZT municipalities. Alternatively, the Regional Wastewater Authority could contract out construction and operation of the treatment plant, while retaining public oversight and fee-levying authority.

It is recommended that:

- CZT governments organize the basic content of local government budgets in a format similar to that shown in Table 1 and report this information publicly and routinely;
- CZT establish budget management goals including:
 - Generation of an annual on-budget operating surplus, with operating surplus amounts used to help finance infrastructure investment.
 - Stabilization of the magnitude of operating surpluses.
 - Planned, gradual increases in service fees where these are needed for full financing of O&M costs and at least partial recovery of capital costs
- CZT compile a list of the outstanding debts carried by its UDIC and all other financing institutions associated with the municipality, as well as the debts of unaffiliated organizations for which the municipality has provided comfort letters or other types of quasi-guarantees, and complete a full accounting of each municipality's debt service obligations.
- CZT develop a debt management strategy to shift away from short-term commercial borrowing to instruments and lenders that allow longer terms.
- CZT develop guidelines on prudent debt service ratios and trends for the three municipalities.
- Capital infrastructure financial planning identify not only the costs, and sources of funds, for capital investment, but the costs of ongoing annual O&M for the capital facilities and the sources of annual financing for O&M.
- Wherever possible, service prices be set at levels that fully cover O&M, and the revenues corresponding to O&M costs go directly to the service provider and be set aside for O&M.
- Capital facility operators be required to report to the municipal government on the percentage utilization of capital facilities and municipal authorities give priority in budget preparation to financing repairs and O&M that can bring existing capital facilities into full use, whenever it is less costly to do so than to abandon facilities in favor of new construction.
- Hunan Province adopt the principle that service pricing should be used to recover a substantial part of the capital costs of municipal environmental infrastructure projects, whenever possible, and that provincial authorities provide guidelines for tariff setting that the municipalities can adhere to.
- The UDICs in CZT be exposed to state-of-the-art asset management regimes, that separate asset ownership from service delivery operation, through study tours and exchanges with municipal asset ownership companies in New Zealand, Western Europe, or North America.
- Hunan Province promulgate guidelines emphasizing that UDICs should be used to increase economic efficiency in asset management, and recommending measurement indices through which the efficiency of asset management can be monitored.

- CZT explore the legal, political, and economic feasibility of establishing a regional wastewater authority that will build and operate one or more wastewater treatment plants serving inhabitants and businesses in more than one municipality. The Regional Wastewater Authority would be empowered by Hunan Province to levy service fees adequate to cover the costs of capital investment and to borrow against this revenue stream to finance upfront investment. For the initial borrowing, the project revenue stream could be supplemented by comfort letters from Hunan Province and the CZT municipalities. Alternatively, the Regional Wastewater Authority could contract out construction and operation of the treatment plant, while retaining public oversight and fee-levying authority.

5.6 Poverty Reduction

138. The goal of “assisting poor people, people laid-off from SOEs, and rural migrants to the city to integrate into the society and benefit from economic growth” should be considered in all four of the strategies discussed in this report. This section deals with measures specifically tailored to improve conditions for poor people and those in laid-off or unemployed status.

139. Hunan, Changsha and the CZT urban region rank in the middle of PRC provinces and cities in terms of various income, development and growth criteria. Consistent with this, the province and urban region compare favorably with many western provinces and cities in terms of most of the indicators used to assess rural and urban poverty. Only 10 of the 105 or so cities and counties in Hunan have poverty status under the national poverty reduction program and none of these ten are in the CZT urban region.

140. The most common indicator of rural poverty is the net income per capita of rural households. In this indicator, Hunan was only 4% below the national average in 1999, and all but one of the cities and counties in the CZT urban region were above the national standard. Averaged across all rural households in CZT, net farmer income per capita in the urban region in 1999 was about Y 2,700 compared to Y 2,130 in Hunan and Y 2,210 in the total country. In general therefore, the rural households in CZT are typically quite well off and perhaps rank among the more prosperous rural populations in the country outside of the highly industrialized and urbanized counties in the eastern provinces.

141. Rural poverty still exists in the CZT urban region but it would be found in pockets in specific townships and villages where poor land, weak transport systems and limited access to markets prevent farm households and villages from benefiting from the strong urban market provided by the three cities. This study focused on the urban area and therefore did not attempt to identify rural townships and villages where poverty is still a

major issue. However, evidence from other studies indicate that these pockets of rural poverty still exist and should be addressed in preparing and implementing the CDS.

142. In regard to urban poverty, the number of urban households living below the poverty threshold is probably on the rise in light of layoffs from SOEs, rural migration into the three CZT cities, and the under-funding of income assistance programs. Depending on the criteria, thresholds and indicators that are applied, the number of urban people in CZT who are living in poverty, or risk falling into poverty because of a small changes in their circumstances, probably number between 100,000 and 300,000, representing between three and nine percent of the registered non-agricultural population.

143. Because of these factors, it is proposed that efforts to reduce poverty among the rural and urban residents of the CZT urban region and to raise the living standards, cash incomes and quality of life of the poorer counties, townships, urban neighborhoods and households in the three cities should be an integral part of the CDS. The first step is to identify the urban districts, neighborhoods, rural townships and villages where the incidence of rural and urban poverty appears to be highest and to identify the constraints (e.g. poor road access, limited telephone and other telecommunications, limited water, wastewater and other infrastructure services, limited water resources for irrigated agriculture) that have held back development and prevented greater prosperity. Then, each initiative under the development strategy should be reviewed carefully and tailored to better involve urban and rural poverty households in strategy design and implementation, and to maximize the poverty reduction benefits from the CZT development strategy.

144. Some of the measures that could be explored to better involve and benefit rural and urban poverty households include the following.

- Priority should be given to the construction of secondary and farm to market roads in the rural areas to support rural tourism and industrial development and to better allow primary producers in the rural parts of the CZT region to supply to the existing industrial sectors and the targeted high-growth industries and industrial clusters under the strategy. Road construction should be supported by technical assistance to farmers and other rural households and by institutional and other improvements to better allow regional primary producers to meet the supply requirements of urban industry and thus benefit from the CDS. Building better linkages back to primary producers in the CZT region and the rest of the province will in turn raise rural incomes and generate greater rural demand for the manufactured goods produced by the three cities' urban industry.
- Secondary road construction and the tourism strategy should be particularly directed towards realizing tourism opportunities in the more rural areas of CZT.
- While higher and medium technology industry will be given priority in industrial restructuring and cluster development, appropriate attention should also be given to more labour intensive industry in developing the CZT

secondary and tertiary industries and in attracting outside investment to the urban region from foreign and domestic sources. More labour intensive industry will provide alternative employment to urban residents affected by SOE layoffs as well as permanent employment to the region's growing migrant population and to new entrants to the work force. Some of these more labour intensive manufacturers could and should be attracted to the more rural areas of CZT where wage rates are lower, land prices are cheaper, and farm products and other raw materials are readily available.

- Training programs to prepare workers for employment in tourism, secondary industry and other sectors should give particular attention to the training needs of poverty households and areas in both the urban and rural parts of CZT.
- In planning infrastructure investments, special efforts should be made to extend service to poorer townships, villages, neighborhoods and districts and to urban and rural poverty households.
- In providing modern infrastructure to its growing population, building the industrial clusters as proposed in this strategy, and making investments in the Xiang River Economic/Environmental Corridor, the three city governments will be conducting a very ambitious capital investment program over at least the next 20 years. Construction work will provide substantial employment opportunities to urban workers on layoff, urban migrant workers, and poorer households in both the urban and rural areas. However, training is needed to ensure that local workers benefit from these construction projects and have an opportunity to build careers in the construction sector.
- Training for construction work should be directed in particular to poorer urban and rural households and areas and should be designed to provide less prosperous workers with the opportunity to build a long-term career – with opportunities for skills improvement and advancement – in the construction industry.
- In addition, capital investment projects should be used to provide opportunities for smaller enterprises, in particular privately owned companies, to supply goods and services to prime contractors and to the operating entity after construction is completed. Training in operating a small business and meeting the needs of prime contractors and other major customers should be directed towards better involving poverty households and areas in the CZT urban region's rapidly expanding construction sector. In training both workers and suppliers, the proponents of capital investment projects should work closely with government to ensure that job, income and supplier benefits are generated for the urban region's rural and urban poor. Large capital investments should be viewed as an instrument to build a professional construction work force and modern supplier capability in the CZT urban region with substantial participation from and benefits to poverty households and areas.

145. The poverty reduction measures listed above and elsewhere in the text should as well be designed: to complement the rural, tourism, small enterprise development and related initiatives in the Tenth-Five-Year Plans of the three cities and Hunan province;

and, to complement the existing programs now in place to deal with low income, unemployed and laid-off people.

146. It appears that, like in many Chinese cities, income maintenance programs cover a relatively small proportion of the people who are poor and in need, and are under funded. Continuing lay-offs and inflows of rural migrants will only increase the need for much greater funding levels. Though income maintenance programs function under a national framework, a high proportion of the funds must come from local governments. This presents a dilemma for CZT municipalities that are pursuing a number of economic, environmental, and urban development objectives at the same time, all of which require substantial outlays of funds. However, urban poverty in CZT is less severe than in many Chinese urban areas at this time, and it is important that this positive situation be maintained and improved over time. If the situation is allowed to deteriorate, its repercussions on CZT's economic future will be large.

It is recommended that:

- CZT governments prepare to substantially increase funding for social and income maintenance programs over the coming years;
- CZT governments pursue a concerted program of poverty reduction measures as part of the CDS, with the elements discussed above.

6. CURRENT AND PROPOSED STRATEGIES

147. This report does not so much modify current CZT development strategies as provide different perspectives on them. There is little in this report that is not already being pursued, in one form or another, by CZT governments and enterprises. Implementing the integration concept and developing stronger links with external markets are already high priorities in CZT; what this report contributes is proposals on how best to prioritize and program a large number of actions leading to the desired outcomes. Environmental programs are already formulated, costed and programmed; this report suggests where the environmental priorities might lie and proposes a regional approach to the problem of wastewater collection and treatment. Transportation equipment and services, education and culture, food products and pharmaceuticals, and IT equipment and services are already considered very promising sectors; this report proposes a cluster approach to the development of these sectors. Cluster theory provides a different way of looking at the composition of the sectors; the links among enterprises; and the roles of governments, universities, and research institutes in promoting innovation and growth. If these sectors can be transformed into true clusters, the economic impacts will be far greater than if they remain collections of relatively independent enterprises. Table 5 illustrates the most important new perspectives that this report contributes to some of CZT's most significant issues. It shows current approaches, approaches proposed in this report, and priority infrastructure based on the proposed approach.

Table 5: Current and Proposed Approaches

CURRENT APPROACH	PROPOSED APPROACH	PRIORITY INFRASTRUCTURE
focus on sectors as groups of independent enterprises in the same field	cluster approach, where a cluster is the enterprises plus suppliers, customers, government support, R&D support, business services, etc.	
focus on investment in individual enterprises and in required infrastructure to support industrial growth	focus on measures designed to stimulate networking among members of a cluster, to increase R&D and commercialization support, to reduce barriers to trade and collaboration, and to open sectors to new businesses	
Zhuzhou transport hub as individual project	transport cluster with hub as a major element	Zhuzhou transport hub, perhaps modified to fit the context of the cluster development strategy; completion of NTH links passing through CZT; Zhuzhou ring road; upgrading of Highway 320 between Zhuzhou and Xiangtan
University City and TV and Broadcasting Center as separate institutions	University City and TV and Broadcasting Center as integral parts of an education and culture cluster	University City project, designed as part of an education & culture cluster; extension of fiber optic cable; western expressway between Changsha and Xiangtan; Xiang River corridor
education and culture as “public goods”	education and culture as “public goods”, but also with commercial potential	
food products and pharmaceuticals as independent sectors, both small and lacking R&D support	food products and pharmaceuticals as a potential cluster depending on a common supply chain, involving similar knowledge bases, and requiring better R&D support	research and commercialization center for the sector; servicing of land and structures to accommodate new enterprises; improved roads to areas of raw material production
goal to develop high-tech sectors and IT industry	definition of possible niches where CZT can be competitive in this field	
opening to the outside world as a goal, but focus on issues and initiatives within Hunan	major thrust to reach out to other markets, investors, and development partners;	completion of NTH links to other major cities

CURRENT APPROACH	PROPOSED APPROACH	PRIORITY INFRASTRUCTURE
	emphasis on completing transport links to other regions, links to other cultural production centers	
investment attraction program depends on publicity and occasional marketing trips	investment attraction depending on sophisticated CDS; better targeting of companies, IFIs and foreign countries; and better transport links to other urban centers	completion of NTH links to other major cities
environmental improvement targets relatively modest; major wastewater, air quality, and solid waste investments	gives environmental improvement higher priority in order not to compromise economic objectives; regional planning and delivery of certain infrastructure services	wastewater treatment program planned, implemented and operated at regional level; coal desulphurization project; natural gas distribution project; continuation of solid waste management program
economic integration of the three cities, with a variety of implementation mechanisms, guided by the province	integration with three initial priorities: regional wastewater management, implementation of major regional projects, and regional economic development planning	<p>projects that support integration:</p> <ul style="list-style-type: none"> • Xiang River cleanup • scenic/economic belt • University City • natural gas distribution • regional power grid • development of Yijiawang for an appropriate regional use
poverty reduction efforts based on income support programs, rural development initiatives, and tertiary sector	same, with additional measures; highlights need to increase funds for social programs to meet challenge of inadequate coverage and continuing lay-offs; integrates poverty reduction measures into economic development, tourism, and other programs	better road links to county towns; links and servicing for tourism areas in the counties; servicing of land for labor intensive industry in the rural areas
infrastructure financing strategy based on commercial borrowing, land leasing, fiscal funds, and foreign sources	continue to use these instruments, but move toward financing with longer terms and less risk than depending on revenues from land; establish debt service ratio guidelines	
O&M under funded and service pricing does not cover capital replacement	service pricing to cover O&M and capital replacement; adequate revenues set aside for operators to maintain the facilities	

CURRENT APPROACH	PROPOSED APPROACH	PRIORITY INFRASTRUCTURE
financing backed by real assets	project financing, backed by revenue streams	

7. IMPLICATIONS FOR NATIONAL POLICY

148. In the course of this study, a number of issues were addressed where national level policy plays a significant role. The purpose of this section is to highlight some of these issues, so that they can be discussed with the national government in the context of a continuing CDS program in China.

149. The concept of integrating the three cities is unique in China and its achievement will imply many changes to the practice of local planning and management. The national government will need to be open to these changes and assure that they are not blocked by national policies and regulations designed for a single municipality acting alone. Further, the integration might be an interesting pilot project to be considered for other urban regions in the future, and thus its progress should be followed closely by relevant national government ministries.

150. The development of industrial clusters, as discussed in this report, requires SOEs to participate fully in cluster activities and to collaborate with other companies in R&D and commercialization initiatives. On occasion, SOEs will be called upon to be part of consortia working to improve efficiency, penetrate new markets, or produce new products. This may mean a new perspective on SOEs on the part of the ministries to which they report. The SOEs would be seen more as part of an evolving local economy than as an asset of a State ministry.

151. The national policy on poverty reduction is largely oriented to rural poverty, and provides little guidance to problems of the poor, unemployed, and laid-off people in the urban areas. There are national guidelines for locally administered income maintenance and re-employment programs, which are being followed in CZT. Though a full assessment of such programs was beyond the scope of this study, it appears that they suffer from inadequate coverage and under funding. Currently the national government provides the framework and guidelines for social programs, but provides a relatively small proportion of the funding. Local governments need better guidance from the national level on urban poverty issues, and either more funding from senior governments or mechanisms for generating such funds themselves.

152. CZT's financing strategy depends to some degree on the issuance of State bonds. Funds from State bonds have been used heavily in the past three years, and there seems to be some uncertainty about whether the interest payments on the loan portion of these funds will be waived. Further, there are varying opinions about whether funds from State bond issues will be available to CZT in the future. Clarification from the national

government on these questions would help CZT governments improve their financial planning.

153. For CZT to find new markets and attract outside investment, further progress on the NTHS is essential. Though responsibility for completing NTH links has been delegated to the provinces, the framework is provided by the national government. More clarity from the national government on priorities in the NTHS and expected timing for completion of links would be helpful.

154. To finance its major infrastructure needs, particularly in water supply, wastewater treatment, and solid waste management, local governments in CZT will need to increase tariffs to the point where they not only cover O&M but also provide funds for extensions to existing systems and replacement of outmoded equipment. Though managed by the local Price Bureau, tariffs are affected by national policies.

APPENDIX
REVISED INTERIM REPORT

TABLE OF CONTENTS

1.	INTRODUCTION	1
2.	GOALS	2
3.	SITUATIONAL ANALYSIS	2
3.1	Regional Context	2
3.2	Industrial Structure	9
3.2.1	Introduction	9
3.2.2	Changsha	10
3.2.3	Zhuzhou	14
3.2.4	Xiangtan	16
3.2.5	Tourism	18
3.2.6	Comparison of Industrial Structures	26
3.3	Base Case Scenario	27
3.4	Social Development	30
3.5	Environmental Conditions	32
3.6	Urban Structure and Land Utilization	35
3.7	Transportation	38
3.8	Water Supply and Infrastructure	41
3.8.1	Water Resources and Supply	41
3.8.2	Wastewater	45
3.8.3	Solid Waste	48
3.9	Finance	48
3.9.1	Fiscal Context	48
3.9.2	Land Leasing	50
3.9.3	Service Pricing and User Fees	54
3.9.4	Operations and Maintenance	57
3.9.5	State Bond Funds	59
3.9.6	Foreign Loans	60
3.9.7	Domestic Borrowing	60
3.9.8	Regional Coordination	62
3.9.10	UDICs	62

3.10	Integration	66
3.11	Summary of Strengths and Weaknesses	69
4.	ALTERNATIVE STRATEGIES	70
4.1	Creating the conditions for cluster development	71
4.1.1	Transportation	72
4.1.2	Education and Culture	74
4.1.3	Food Products and Pharmaceuticals	75
4.1.4	Electrical Equipment	76
4.2	Developing stronger links with external markets, partners, and potential investors	77
4.3	Environmental Improvement	78
4.4	Integration	79
5.	NEXT STAGES	82

Annexes

A. Stakeholder Workshop Report

B. List of Major Infrastructure Projects

C. Maps

1. INTRODUCTION

1 In December 2000, The World Bank contracted Chreod Ltd. in association with the Urban Institute and the International Centre for Sustainable Cities to assist two urban areas in China in formulating City Development Strategies (CDS). The two urban areas are Guiyang (Guizhou Province) and the urban cluster of Changsha, Zhuzhou and Xiangtan (Hunan Province).

2 The objective of this Study is to assist Changsha-Zhuzhou-Xiangtan (referred to as Chang-Zhu-Tan or CZT) and Guiyang in strengthening development strategies and plans, and to test the applicability of the CDS approach to urban China. Particular attention is to be devoted to two aspects of development planning: 1) strengthening the links between economic development policy and physical planning, and 2) evaluating the financial viability of investment plans. In addition, a stakeholder participation process is to be designed and tested.

3 The Inception Mission was carried out in December 2000, and a second and larger mission in April-May 2001 to complete data collection, carry out interviews with local officials, and commence the analysis. All consultants were deployed as per the revised work plan of April 4, 2001. Stakeholder workshops were conducted in both cities.

4 In both cities, meetings were held with Municipal Development Planning Commissions, Planning Bureaus, Economic Commissions, Environmental Protection Bureaus, Finance Bureaus, Labour Bureaus, Social Security Bureaus, development zone managers, and managers of selected enterprises. The provincial government was closely involved through the Integration Administration Office, and meetings were held with the Hunan Provincial Development Planning Commission, Planning Bureau, Environmental Protection Bureau, and Finance Bureau.

5 In both cities, wrap-up sessions were held where the consultants shared their preliminary observations with local officials.

6 Section 2 sets out goals for the CDS process in CZT. Section 3 consists of a situational analysis including regional context, industrial structure, a base case scenario for CZT, social development, environmental conditions, land utilization, transportation, infrastructure, finance, and the integration project. Section 3 concludes with a summary of strengths and weaknesses. Alternative strategies are proposed in Section 4. These take the form of four streams of activities CZT governments and enterprises need to pursue over the next ten years to make progress toward the economic, social, and environmental goals. As explained in Section 5, Next Stages, these strategies will be discussed with CZT officials on the next visit and presented to a stakeholder workshop. In the Draft Final Report, the components of the strategies, now described in general terms, will be elaborated into a more detailed program of activities. A report on the stakeholder workshop and the list of major infrastructure projects are in Annex.

7 There is a separate Interim Report on Guiyang.

2. GOALS

8 It is important to have a meaningful and consistent set of goals for CDS so that alternative strategies can be compared in terms of their respective contribution to meeting these goals, and in order to be able to evaluate progress as CDS is implemented. The following set of goals was derived from review of the 10th Five-Year Plans (FYP) for Hunan Province, CZT, and the cities of Changsha, Zhuzhou, and Xiangtan; numerous interviews with government and enterprise officials; and the stakeholder workshop. The goals are economic, social, environmental, and financial in nature, with integration seen as a supporting goal.

- Improve the competitiveness of the economies of the three cities;
- Significantly improve the urban environment;
- Assist poor people, people laid-off from SOEs, and rural migrants to the city to integrate into the society and benefit from economic growth;
- Manage revenues and expenditures in a financially sustainable manner;
- Plan and implement integration of the three cities in a manner that contributes to achievement of the above goals.

3. SITUATIONAL ANALYSIS

3.1 Regional Context

Hunan Province is at the median of Chinese provinces on most economic criteria

9 Hunan province places in the middle of most of the key indicators of size, level of development and growth performance. Among the 31 provinces, autonomous regions and autonomous municipalities, Hunan in 1999 placed seventh in terms of population size (behind only Henan, Shandong, Sichuan, Guangdong, Jiangsu, and Hebei), and twelfth in terms of gross domestic product. Hunan ranked 17th in GDP/capita. Hunan places behind all of the coastal provinces from Liaoning down to Guangdong, but has a higher standard of living than all other interior provinces except for Hubei, Jilin, Heilongjiang, Inner Mongolia and Xinjiang. In 1999, GDP/capita in Hunan is estimated to be about 22% below the national average, the result in part of the province's relatively higher dependence on agriculture and other primary industries. The primary sector in 1999 contributed 21.3% to Hunan's GDP compared to 17% in the total country. During the 1990s, the Hunan rate of GDP growth was only marginally below the national growth rate. As a result, Hunan ranked 13th in economic growth performance from 1990 to 1999, which was below the coastal provinces but compares very well with the other interior provinces.

Hunan has competitive advantages in a limited number of products, most resource based

10 The Province is a significant agricultural base and is one of China's rice baskets. It possesses coal, iron, and timber resources, benefits from an abundant water supply, and is a major power producer. Cities in the eastern part of the province are showing strong industrial growth, but the western half is rural, mountainous and poor. It is a major tourism draw based on historic landmarks, scenery, and a unique culture.

11 Location quotients were calculated for the province based on data published in the China Statistical Yearbook. Location quotients are Hunan's percentage of national production of a given commodity divided by Hunan's percentage of China's GDP. A value greater than one thus indicates that the province is producing more than its share of the product relative to its economic size, and may indicate a competitive advantage in that product¹. Though the location quotients apply to the province as a whole, they still help to identify competitive advantages for CZT. CZT is the economic core of Hunan and will benefit from these comparative advantages. Finally, the analysis is limited to the published data, which does not include some products where Hunan is known to be a significant producer (e.g., food & beverages, wood products, pharmaceuticals). Location quotients of 1.0 or above are indicated in Table 1 with the provinces that are Hunan's main competitors based on location quotients and share of national production. :

Table 1: Hunan Location Quotients

Commodity	Location Quotient	Competing Provinces
Chemical Pesticides	2.4	Jiangsu, Zhejiang, Hubei, Tianjin, Hebei
Hydro-power	2.1	Hubei, Sichuan, Guizhou, Yunnan, Guangxi, Fujian, Gansu, Qinghai
Ferro-alloys (1995 data)	2.1	Shanghai, Sichuan, Guizhou, Yunnan, Shanxi, Inner Mongolia, Liaoning, Shaanxi, Guangxi, Jilin, Qinghai, Ningxia
Cigarettes	1.7	Anhui, Hubei, Sichuan, Yunnan, Guizhou, Henan, Shaanxi
Timber	1.6	Anhui, Jiangxi, Yunnan, Inner Mongolia, Guangxi, Fujian, Jilin, Heilongjiang
Sulphuric Acid	1.3	Jiangsu, Anhui, Jiangxi, Hubei, Sichuan, Chongqing, Yunnan, Shanxi, Shandong, Shaanxi, Guangxi, Gansu
Chemical Fertilizer	1.2	Anhui, Hubei, Sichuan, Chongqing, Guizhou, Yunnan, Hebei, Shanxi, Shandong, Henan, Shaanxi, Gansu, Qinghai, Ningxia, Xinjiang
Cement	1.0	Chongqing, Guizhou, Yunnan, Hebei, Shanxi, Shandong, Henan, Guangxi,
Plate Glass	1.0	Jiangsu, Beijing, Tianjin, Hebei, Inner Mongolia, Liaoning, Shandong, Henan, Gansu
Calcium Carbide (1996 data)	1.0	Jiangxi, Guizhou, Yunnan, Tianjin, Hebei, Shanxi, Inner Mongolia, Shaanxi, Fujian, Jilin, Gansu, Ningxia

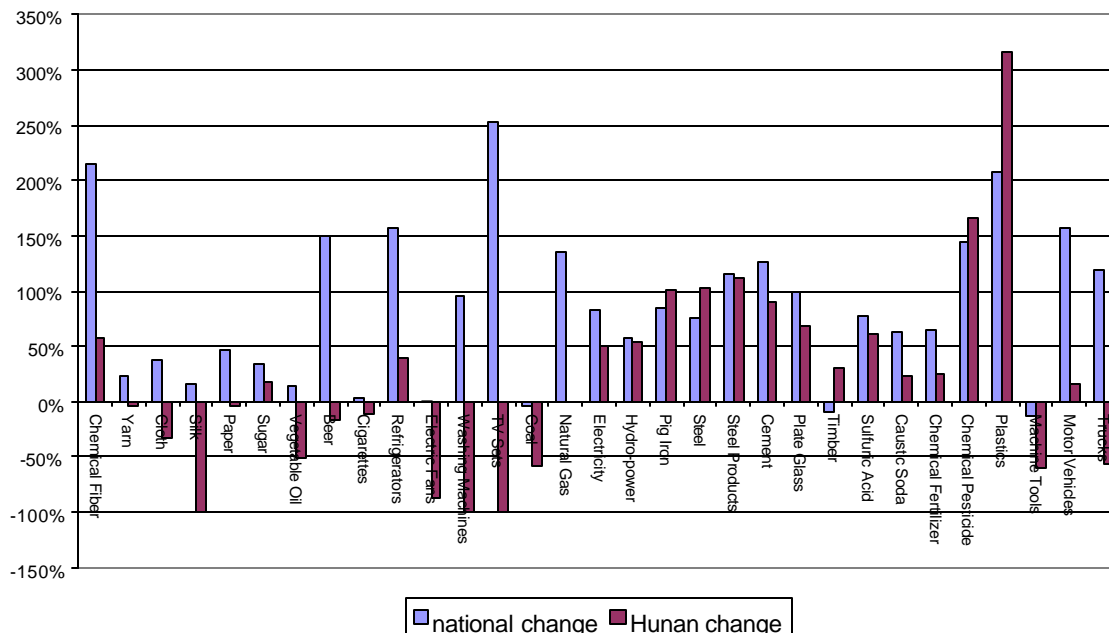
Source: China Statistical yearbook 1999

¹ It could also be the result of supply exceeding demand, due to over-producing by SOEs.

12 In most products, Hunan is competing against other interior provinces; the major exceptions are chemical pesticides and plate glass. This is a limited list of products, and most are resource-based. Comparing 1999 to 1991, the data indicate that the Hunan industrial sector has become more concentrated on and specialized in fewer industrial products, at least for the commodities covered in these data from the China Statistical Yearbook. As will be seen below, those that are important in CZT are cigarettes, chemical fertilizer and pesticides, and ferrous metals.

13 Figure 1 shows change in output nationally and for Hunan Province from 1991 to 1999, from the same database. For many products, Hunan's output growth was lower than the national growth. Though the Province shows high growth in production of plastics, no evidence of this could be found in the data for CZT. Other areas where Hunan's growth exceeded national growth are iron, steel, timber, and chemical pesticides. Plans for the development of CZT must take account of the fact that, though the three cities show signs of economic strength, their regional context is characterized by a relatively weak provincial economy. Further, parts of surrounding provinces that border on Hunan are poor and under developed. The CZT hinterland is not strong and provides limited market potential for CZT's products and services.

Figure 1
Change in output by product 1991-99



Source: China Statistical Yearbook 1999

14 The industrial structures of CZT cities are similar to other central cities with regard to the dominant ownership forms – SOEs and collectives – and sectors – metals, machinery, chemicals. This likely results from assignment of certain types of enterprises to these cities in the past. They now face the challenge of breaking out of this pattern into

one of greater diversification. Historically Hunan has developed on the basis of its natural resources, adding some processing over time. Its development has been assisted by the State which has established a number of major enterprises in the Province. The potential of this development model is now coming to an end and Hunan will have to find new sources of economic growth and diversification. Provincial officials hope that CZT integration and economic development will prove to be one such source.

Changsha/Zhuzhou/Xiangtan plays a pivotal role in central China and in its province

15 The urban agglomeration of Changsha/Zhuzhou/Xiangtan is, in a sense, the gateway between eastern and western China, and thus can play a role in the transfer of eastern technology and ideas to the relatively undeveloped west. Integration will give the agglomeration the size and economic power to compete with other urban areas in this region – Wuhan, Chongqing, and in demographic terms even Guangzhou. Its location on major east-west and north-south highway and rail routes (some existing, some planned) will add to the agglomeration's strategic importance.

16 Table 2 compares the three-city agglomeration with other major Chinese urban centers using prefecture level data. Demographically CZT is considerably larger than all central Chinese prefectures and, at the national level, smaller only than Shanghai and Beijing. Its combined GDP places it at the same level as Wuhan but slightly below Chengdu and well below Guangzhou. In terms of GDP per capita, however, CZT ranks considerably lower, at about one-third to one-quarter the level of the major eastern metropolises. On this measure CZT is approximately equal to Chongqing, Xian, Nanning, and Nanchang, and at about 60% of Wuhan's GDP per capita.

Table 2
Comparing CZT With Other Major Urban Regions in China 1999 (1999 yuan)

Urban Region	Total Population (Million)	Gross Domestic Product (Y Billion)	GDP/Capita (Y)
<i>CZT Urban Region</i>			
Changsha	5.82	58.8	10,152
Zhuzhou	3.70	28.1	7,615
Xiangtan	2.79	21.3	7,677
Total CZT Region	12.31	108.2	8,790
Shanghai	14.74	403.4	30,805
Beijing	12.57	217.5	19,846
Guangzhou	4.05	145.1	36,062
Tianjin	9.59	145.0	15,976
Shenzhen*	4.00	143.6	35,896
Suzhou	5.76	135.8	23,592
Hangzhou	6.16	122.5	19,961
Chengdu	10.04	119.0	11,858
Wuxi	4.33	113.8	26,294
Wuhan	7.40	108.6	14,667
Ningbo	5.38	104.2	19,405
Shenyang	6.77	101.3	14,964
Dalian	5.45	100.3	18,395
Qingdao	7.03	99.3	13,394
Fuzhou	5.83	94.3	16,119
Shijiazhuang	8.75	90.8	10,425
Nanjing	5.37	89.9	16,816
Harbin	9.27	88.3	9,142
Jinan	5.58	88.1	15,863
Changchun	6.91	70.7	10,261
Chongqing	8.43	66.7	7,909
Zhengzhou	6.32	64.1	10,213
Xi'an	8.74	60.0	6,860
Kunming	4.73	59.2	12,588
Nanchang	4.23	40.0	9,505
Taiyuan	3.00	31.8	10,678
Hefei	4.30	29.5	6,880
Nanning	2.86	27.5	9,625
Lanzhou	2.91	27.5	9,632
Urumqi	1.59	24.9	14,135
Guiyang	3.31	23.8	7,232

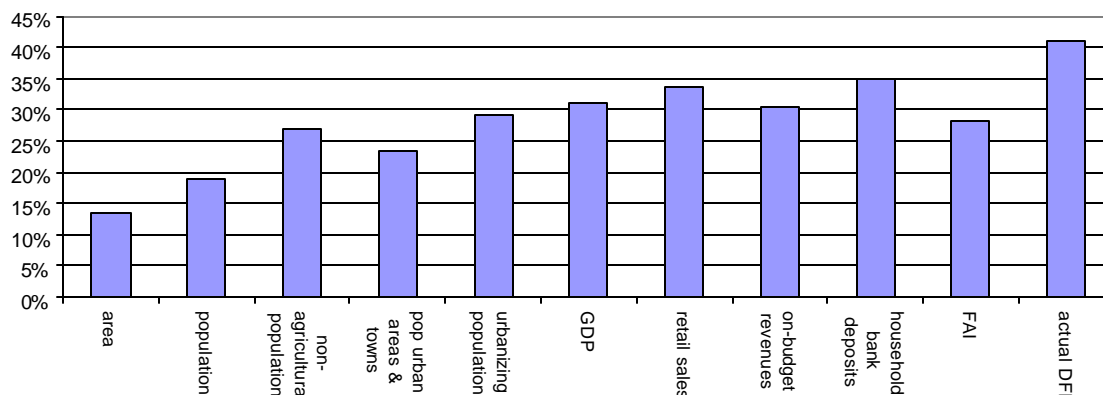
Source: Prefecture totals from the provincial statistical yearbooks are used for all urban regions except for Beijing and Tianjin where the figures for the total municipality from the China Statistical Yearbook are used. The ranking is based on 1999 GDP.

** The population for Shenzhen includes both the registered and temporary population. The registered population in 1999 in Shenzhen Prefecture was 1.2 million.*

Comparing Changsha city proper with other central China cities gives a somewhat different picture. At the scale of the city proper, Changsha is considerably smaller than Wuhan demographically, but surpasses Wuhan in GDP per capita, per capita bank deposits and DFI as a proportion of GDP.

17 In Hunan Province, the Changsha City-centered Region is the undisputed political, economic, cultural and transport center. Figure 2 shows the importance of the CZT Region within the Province on a number of dimensions. In 2000, CZT represents 19% of provincial population, but 31.5% of GDP, 35% of retail sales, 35% of household bank deposits, and 29% of fixed asset investment (FAI). It attracted 41% of direct foreign investment (DFI) in 1999 (figure not available for 2000).

Figure 2
Proportion of Provincial Totals Represented by CZT



Source: Hunan Provincial yearbook 2001

18 Table 3 compares all prefecture-level cities in Hunan. The importance of Changsha stands out in terms of registered population, non-agricultural population, and GDP (which is almost three times that of the next highest cities). Changsha's GDP per capita is the highest of all Hunan cities, followed by Zhuzhou, Xiangtan, and Yueyang. Other significant cities are Hengyang (south of CZT) with a large non-agricultural population, and Yueyang to the north which has a high GDP per capita. As will be shown below, most of these cities are within the area of influence of CZT.

Table 3: Hunan Prefecture-level Cities (2000, city proper)

	Registered population	Non agricultural population	% non agricultural	Population density person/km2	Gross Domestic Product current year Y	GDP per registered resident	Secondary as % of GDP	Secondary GDP current year Y	Tertiary as % of GDP	Tertiary GDP current year Y
Changsha City	1,762,200	1,434,800	81.42	3,169	41,524,710,000	23,564	38.65	16,048,620,000	59.27	24,609,800,000
Zhuzhou City	748,200	555,400	74.23	1,380	15,463,150,000	20,667	60.34	9,330,850,000	36.90	5,705,480,000
Xiangtan City	673,300	541,500	80.42	2,404	11,808,040,000	17,538	50.09	5,914,740,000	47.84	5,649,480,000
Hengyang City	800,400	584,400	73.01	1,833	8,280,400,000	10,345	33.56	2,778,700,000	61.54	5,095,610,000
Shaoyang City	606,100	311,300	51.36	1,411	3,756,630,000	6,198	41.27	1,550,200,000	51.46	1,933,170,000
Yueyang City	910,000	448,300	49.26	757	15,985,360,000	17,566	51.06	8,161,880,000	42.37	6,773,600,000
Changde City	1,339,300	384,400	28.70	484	12,477,420,000	9,316	51.94	6,480,280,000	31.24	3,898,480,000
Zhanjiajie City	460,500	115,900	25.17	165	1,679,440,000	3,647	15.63	262,580,000	51.46	864,260,000
Yiyang City	1,265,100	297,000	23.48	2,952	5,164,260,000	4,082	41.44	2,140,090,000	33.22	1,715,560,000
Chenzhou City	626,900	274,300	43.75	456	6,960,830,000	11,104	51.19	3,563,560,000	38.27	2,663,790,000
Yongzhou City	577,500	276,700	47.91	4,090	4,391,480,000	7,604	45.41	1,994,120,000	31.94	1,402,440,000
Huaihua City	313,900	-	-	4,991	1,208,870,000	3,851	32.41	391,800,000	48.87	590,830,000

Source: Hunan Provincial yearbook 2001

19 This table also shows that Hunan has a large number of significant cities, ten with registered populations over 500,000 and four with GDP per capita exceeding Y14,000. This is a solid base on which to build an increasingly urbanized economy.

Changsha has an extensive area of influence

20 Chreod recently completed a report on “Urbanizing Regions in China’s Yangtze Basin” in which different types of urban systems were identified. Changsha was classified as a City-centered Region, in which a single metropolis dominates both in share of population and economic activity. City-centered Regions exhibit the traditional central hierarchical relationship with surrounding smaller cities, connected through radial systems of roads.

21 Geographic areas of influence of urban systems were estimated based on the quality of transport links to other cities and the degree of urbanization occurring in counties outside the central cities (measured by the size and proportion of the population in non-farming occupations). By these measures Changsha has an extensive area of influence extending to Pingxiang (Jiangxi Province) in the east, Yueyang in the north, Changde in the west, and Yongzhou in the south. Thus its area of influence occupies virtually the entire eastern half of the province. The western half is mountainous and under-developed. In Changsha’s area of influence, estimated total population (including migrants) in 1998 was 18.5 million, projected to increase to 26.6 million by 2005. This growth results from population advances, modernization of the economy, and improvements in transportation. The non-farming population of the urban system in 1998 was about 11.5 million, estimated to rise to 17.2 million by 2005, giving an urbanization rate in 2005 of 63%.

22 However, in terms of area of influence, the Wuhan megalopolis dwarfs the other urban systems in central China. It extends to Jingzhou in the west, Jiujiang in the east, and Yueyang (Hunan Province) in the south. It has an estimated 26.5 million residents, of which some 15.6 million are non-farming, and its secondary and tertiary GDP equals Y132 billion.

Links to other centers are still weak but will be improving

23 The Changsha city-centered region is located on two major rail lines – Beijing to Guangzhou and Shanghai to Kunming. The express line from Beijing to Guangzhou, now under construction, will also traverse the region.

24 Planned NTH links between Shanghai and Ruili and between Beijing and Guangzhou pass through the Changsha city-centered region, and present an opportunity for the city to expand its area of influence. On the east-west corridor, it is the most important center between the Yangtze Delta and Kunming. On the north-south corridor, it cannot compete with Wuhan but is the only major center on the long stretch between Wuhan and Guangzhou. Potentially, development of the Changsha Region could help spur development of western Jiangxi, eastern Guizhou, northern Guangxi, and northern Guangdong.

25 The status of NTH links within Hunan Province is:

Beijing-Zhuhai NTH:

- north Hunan boundary to Changsha: under construction
- Changsha to Xiangtan: exists
- Xiangtan to Leiyang: completed
- Leiyang to south Hunan boundary: under construction

Shanghai-Ruili NTH:

- CZT to east Hunan boundary: exists but need to upgrade;
- CZT west to Shaoyang: under construction

3.2 Industrial Structure

3.2.1 Introduction

26 1999 and 2000 data on industrial structures were found for all three cities. It breaks down the enterprises by ownership and by industrial sector, and provides data on number of enterprises, output and sales, employment and payroll, value added, and pre-tax and after tax profits.

27 The following analysis is based on both the data set and interviews with many economic development officials, enterprise officers, and development zone managers. Thus there was an opportunity to confirm some of the findings from the data set with local experts, and to fill in gaps.

28 Three factors were considered to be of particular importance to the cities: 1) the presence of sectors with large-scale production capacities, generating revenues for both the enterprises and the municipality; 2) sectors that provide a large share of employment; and 3) sectors that may be small but generate significant profit levels.

29 The analysis of this data was conducted as follows:

- The size, strength, and profitability of each ownership category (SOE, collective, shareholding, foreign, etc.) was evaluated;
- The 37 industries in the data set were grouped into sectors², and industries with very few enterprises or very low output were deleted;
- The importance of each sector was assessed on three criteria:
 1. scale measured by output as a percentage of total industrial output for the city

² Definitions of the sectors are: a) Metals: black metal rolling & machining, non-ferrous metal rolling & machining, metal products; b) Machinery: special equipment, electrical machinery & equipment; c) Chemicals: chemicals and chemical products, chemical fabrics, rubber, plastics; d) Transportation equipment; e) Pharmaceutical; f) Wood, furniture, paper: timber processing, furniture manufacture, paper making & paper products; g) Food & beverage: food processing, food manufacture, beverages; h) Telecommunications: telecommunication equipment; i) Printing; j) Textiles: cloth & other fabrics, leather, fur, etc.

2. employment measured by employment as a percentage of total industrial employment for the city
3. profitability measured by pre-tax profits as a percentage of output

30 The one-year time series (1999-2000) was considered too short to analyze industry trends. Year 2000 data was used throughout, but where a 1999-2000 change appears to be particularly relevant it is noted in the text.

31 This allows the identification of sectors that are important to the city because they provide employment and/or generate significant revenues (but not necessarily profits), and other sectors that are currently small but show promise based on measures of profitability.

32 Value added as a proportion of output was also calculated as a general indication of the degree of processing involved in each industrial sector.

3.2.2 Changsha

Changsha's industrial structure is diversifying rapidly

33 Of a total of 657 enterprises in Changsha with output of more than Y5 million, 180 are SOEs (down from 205 in 1999), 193 are collectives (down from 230), 98 are private domestic (up from 79), 51 are limited companies (up from 34), and 66 are foreign (unchanged). In terms of scale, SOEs produce 32% of total output (down from 43% in 1999) but a number of other ownership forms each produce between 10% and 17% - collectives, limited corporations, limited shareholding, private and foreign. However, SOEs and collectives remain very important in terms of employment, providing 57% of the total (compared to 70% in 1999). Though profit margins of collectives are very low at 1%, limited corporations, limited shareholding, private and foreign companies all show respectable profits of between 15% and 17%. Limited corporations appear to be in a period of explosive growth, as their share of total output increased from 7% in 1999 to 17% in 2000, and profitability increased from 7% to 16%. The shares of foreign companies in output and employment changed very little, as did their profit margin Table 4).

Table 4: Changsha Industrial Structure by Ownership (2000)

Ownership Form	Output in current year Y, billions (% of total)	Employment (% of total)	Pre-tax profits
SOE	10.7 (32%)	84,558 (35%)	49%
collectives	3.4 (10%)	53,023 (22%)	1%
shareholding cooperative	0.9 (3%)	9,652 (4%)	10%
corp. limited	5.5 (17%)	38,779 (16%)	16%
shareholding ltd.	3.4 (10%)	15,711 (7%)	15%
private	4.8 (15%)	21,872 (9%)	16%
foreign	4.3 (13%)	17,092 (7%)	17%

Source: Changsha yearbook 2001

34 As shown in Table 5, tobacco is by far the most successful industrial sector, producing 20% of output and generating a profit margin of 72%. Value added/output for the industry is 78%. In terms of scale, machinery & equipment and electronic equipment are the largest, together producing 29% of total output, and both show profit margins of about 11%. Machinery & equipment provides about 20% of employment, but many other sectors are also important in this regard. Profitability of the metals and textiles sectors is low, but all others are in the medium to high range. Pharmaceuticals and food & beverages, though small industries, exhibit profit margins of 14% to 19%.

Table 5: Changsha Industrial Structure by Sector (2000)
(VH=very high; H=high; M=medium; L=low)

sector	Output in current year Y, billions (% of total)	Employment (% of total)	Pre-tax profits	value added/output
tobacco	VH (20.5%)	L (1.2%)	VH (71.9%)	77.7%
metals	L (4.5%)	L (2.8%)	L (2.3%)	10.9%
machinery & equipment	H (17%)	H (19.6%)	H (11.6%)	26.1%
chemicals	M (6.5%)	M (6.7%)	M (9.9%)	22.7%
wood, furniture, paper	L (2.2%)	L (2.6%)	M (7%)	20.3%
textiles	L (4.0%)	M (7.4%)	L (0.5%)	17.7%
food & beverages	M (5.9%)	L (4.7%)	H (14.3%)	24.3%
electronic equipment	H (12.3%)	L (4.4%)	H (11.7%)	21.5%
pharmaceuticals	L (2.3%)	L (2.7%)	H (19.4%)	28.7%
printing	L (2.2%)	L (2.2%)	VH (32%)	50.7%

Source: Changsha yearbook 2001

35 The cigarette industry dominates output and pre-tax profits, so more is learned about the remaining industrial structure if it is deleted (see Figures 3 and 4). It is a central government enterprise and revenues accrue to the central government and the province, but not to the municipality. Without cigarettes, only 15% of output is generated by SOEs, and SOE pre-tax profits fall dramatically to 7%. Since the cigarette enterprise has very low employment levels, SOEs still account for 34% of total employment. The various non-SOE, non-collective forms of domestic ownership, taken together, become the most important in terms of output and pre-tax profits (and even after-tax profits). Together they generate 70% of industrial output and 58% of pre-tax profits, and provide 21% of total employment. These ownership forms have an average after-tax profit rate of 12% compared to 7% for SOEs and 7% for collectives. Hongkong and foreign-invested enterprises account for 16% of output and 24.5% of pre-tax profits, but provide only 7% of employment.

Figure 3
Changsha industrial structure with cigarettes removed

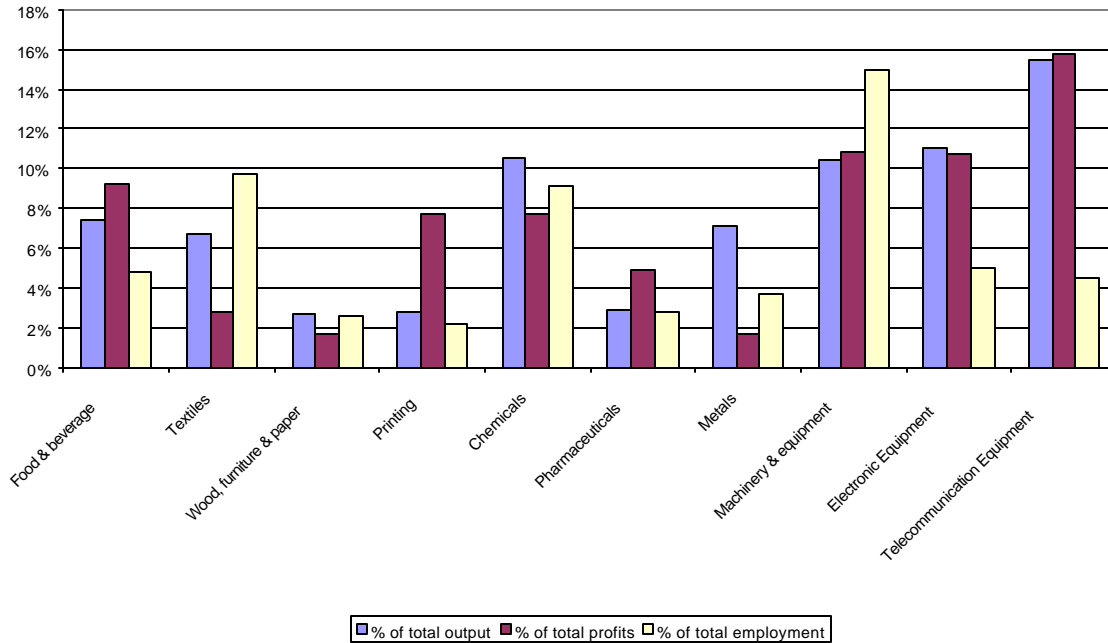
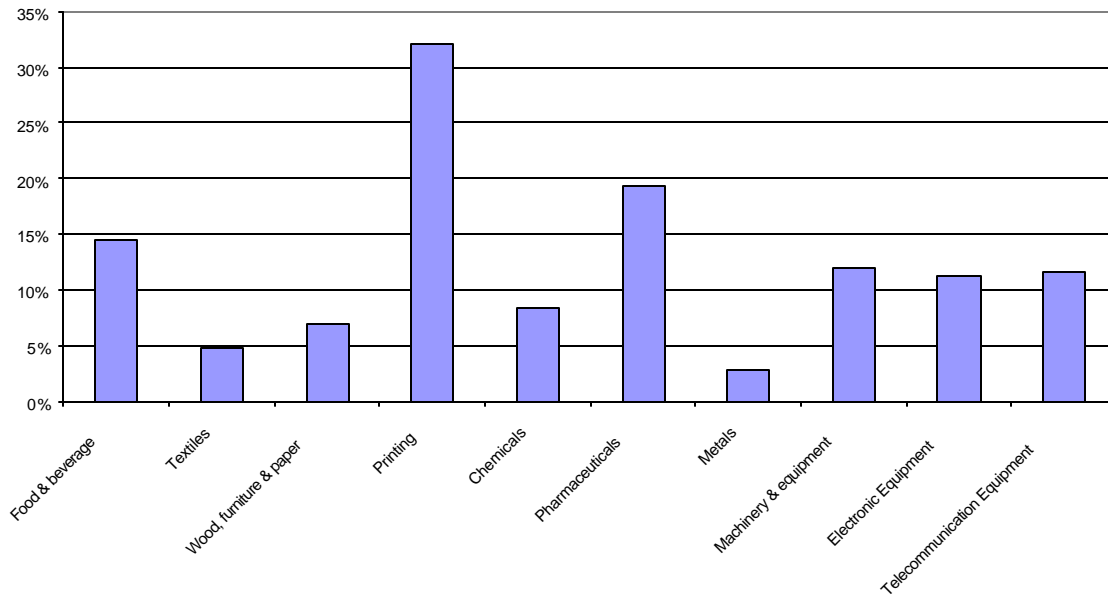


Figure 4
Changsha: profit margins



36 Machinery & equipment is Changsha's largest sector, includes some large and successful enterprises, and appears to be viable. It will remain important in terms of providing employment, and has the potential to grow at a moderate if not high rate. New

materials are another interesting area where new products are starting to be developed. These products include nickel for rechargeable batteries, industrial diamonds, wear-resistant coatings, and organic pesticides. Further, there are plans for remote sensing equipment with two factories under construction.

37 Four small sectors – food & beverages, electronic equipment, pharmaceuticals, and printing – together make up 22.7% of total output and 14.3% of pre-tax profits. However, they provide only 14% of total employment. Profit margins range from 11.6% in electronic equipment to 32% in printing. These emerging sectors have the potential to generate high rates of growth in the future and, along with the tertiary sector, may constitute the future “drivers” of the Changsha economy.

38 Changsha plans to introduce higher technology into its emerging sectors, transforming electronic equipment into IT equipment and services and pharmaceuticals into biotechnology. The five advanced sectors identified in the 10th FYP (electronic information, machinery, food, new materials, and bio-engineering) will, it is estimated, account for 80% of total industrial output by 2005. High-tech parks in Changsha, Zhuzhou, and Xiangtan will be linked to stimulate the growth of these advanced sectors.

The tertiary sector is strong with potential in tourism, communications & media and education

39 Changsha has a strong tertiary sector, representing 47.8% of GDP (see Table 6). Retail and wholesale is the most important tertiary sub-sector, producing Y10.25 billion in GDP, but tourism is growing rapidly and is seen locally as one of the most promising sectors. In 2000, the city received 19 million visitors, 221,000 from outside China. Further, communications and media, for which data are not available, is the subject of major investments, and education is very strong and will increase in importance with the doubling of the university enrollment and the University City project (see description of these initiatives in Section 4.1.2).

Table 6: Changsha Tertiary Sector (2000)

sector	GDP (billion yuan)	annual growth rate (%)
transport & post	5.09	16.5
retail & wholesale	10.02	12.2
finance & insurance	4.67	8.2
real estate	0.93	10.7
tourism	NA	NA
others	10.68	11.8

Source: Changsha yearbook 2001

Changsha has some national scale enterprises and brand names

40 Changsha is known for producing mainframe computers, computer monitors, central air conditioners, pesticides, and construction equipment.

41 Major Changsha enterprises include:

- Hunan Computer Group, China's prime producer of mainframe computers;
- an LG joint venture producing computer monitors;
- one of China's major producers of central air conditioning units;
- Haili Chemical, a shareholding company with over 10% of the China market in pesticides: It has sales of US\$70 million annually, including \$10 million in exports to Southeast Asia. Through its R&D unit, it has spun-off new products like solvents and pharmaceuticals, and is currently developing a non-toxic pesticide;
- Sany Heavy Equipment, a shareholding company producing construction and road-building equipment: Its sales in 2000 were Y800 million, and profit levels are reported to be growing at 60% annually. The firm has its own research department. It has an agreement with John Deere of the US whereby Sany will be the sales agent for John Deere in China and John Deere will represent Sany equipment in the US;

3.2.3 Zhuzhou

Zhuzhou has a strong heavy industry base, but with little diversification

42 The strong place played by SOEs in the Zhuzhou economy has not changed from 1999 to 2000; they still contribute 41% of total output, 38% of employment, and 51% of profits. Other domestic forms of ownership are well represented, however, producing 46% of total output. Of 442 enterprises, 133 are SOEs, 129 are collectives, and 180 are in other forms of domestic ownership. There are 30 foreign-invested firms, including major internationals like Yamaha, Siemens and Pratt & Whitney. The SOE profit margin is higher than that of Changsha with cigarettes removed, and shareholding and domestic private firms also show reasonable profits. Unlike cigarettes in Changsha, there is no single industry that biases these figures. Though experiencing recent growth (some of it since this database was produced), foreign presence is still relatively small. (Table 7)

Table 7: Zhuzhou Industrial Structure by Ownership(2000)

Ownership Form	Output in current year Y, billions (% of total)	Employment (% of total)	Pre-tax profits
SOE	8.2(41%)	76,079 (38%)	11%
collectives	1.9(9%)	33,237(17%)	8%
shareholding cooperative	0.9(5%)	12,568 (6%)	7%
joint cooperative	--	150 (--%)	---
corp. limited	4.4(22%)	44,599 (22%)	2%
shareholding ltd.	3.3(16%)	19,090 (10%)	15%
private	0.5(3%)	6,213 (3%)	11%
foreign	0.7(4%)	7,599 (4%)	6%

Source: Zhuzhou Yearbook 2001

43 As shown in Table 8, two industrial sectors dominate the economy, metals (mostly non-ferrous) and transportation equipment. Chemicals and non-metallic minerals play important, but less dominant roles. Among the pillar industries, profit margins are medium to high in metals, non-metallic minerals, and transport equipment, but low in chemicals, machinery & equipment, and food & beverages.

Table 8: Zhuzhou Industrial Structure by Sector

sector	Output in current year Y, billions (% of total)	Employment (% of total)	Pre-tax profits/output	value added/output
metals	VH (22.4%)	M (9.3%)	H (11.8%)	14.6%
machinery & equipment	L (4.6%)	M (8.7%)	L (-1.1%)	25.5%
chemicals	H (12.5%)	H (11.2%)	L (1.8%)	23%
non-metallic products	M (9.4%)	VH (21.2%)	H (10.5%)	31.8%
Food & beverages	L (6.7%)	L (2.1%)	L (2.0%)	18.5%
pharmaceuticals	L (1.4%)	L (0.9%)	VH (28%)	44.5%
electronic equipment	L (1.7%)	L (1.2%)	L (4.6%)	14.1%
transportation	VH(23.1%)	VH(23.7)	M (7.7%)	27%

Source: Zhuzhou Yearbook 2001

44 Though very small, pharmaceuticals are showing very strong profitability, but the data do not indicate the presence of any other small, emerging sectors. However, there are two national level industrial bases for new materials and remote sensing. The Zhuzhou high-tech zone focuses on attracting enterprises in bio-pharmaceuticals, optical and electronic equipment, and electronic information. Thus, Zhuzhou is taking action to stimulate the emergence of small, high-growth sectors to complement its strong heavy industry base.

45 Major enterprises include:

- Zhuzhou Smelter: An SOE producing zinc and lead with annual output of US\$350 million. A \$150 million expansion and upgrading is included in the 10th FYP to modernize equipment, in order to add 100,000 tons of capacity, and tool up for new products (galvanized plate, alloys);
- Hunan Tangrenshen Group: A food-processing firm that produces veterinary medicine, agricultural products, and meat. Sales are Y1.5 billion annually and it has 21 branches throughout China.
- Zhuzhou Electric Railway Car Plant, producing locomotives, coupled with China's primary rail research institute;
- an almost completed Pratt and Whitney plant that will make aircraft engine components;
- Zhuzhou Car Plant, a listed company;
- Zhuzhou Metallurgy Plant;

- Zhuzhou Hard Alloy Plant, producing tools and other products from lead and zinc;
- Zhuzhou Chemical Plant;
- various ceramic firms in Liling CLC.

Zhuzhou's status as a transport hub and its large transport equipment sector create the potential for cluster development

46 Transportation equipment and services is growing and has the potential to become a significant cluster. Major components are China's primary rail research and development institute, a major producer of locomotives, producers of auto components, a new joint venture company making aircraft engine components, and the presence of south China's most important rail marshalling yards. Zhuzhou has plans to develop a new, enlarged transport facility for the transfer of freight between rail and highway.

47 The transport equipment sub-sector contains 28 enterprises with 48,000 employees, and produces a total output of Y4.6 billion. Only 7 enterprises are in a loss position, which is much better than most other sectors. These figures do not include several significant factories that have begun operation since the data were published, including the Pratt & Whitney joint venture.

48 Zhuzhou's strengths in transportation are discussed further in Section 4.1.1, and are the subject of one of the suggested strategic directions.

The tertiary sector is weak

49 Zhuzhou's tertiary sector is quite small – representing 36% of total GDP. This is due to the fact that, until the 1980s, Zhuzhou consisted of several very large SOEs that met all their own needs in housing and services. Thus the commercial sector did not develop and, in fact, the city barely had a central business district until the 1990s. The city is making efforts to develop the service sector, including creation of a new central business district.

50 The concentration of transport-related activities can lead to the growth of transportation services, a tertiary sector that Zhuzhou has identified as one of its priorities. This could include cargo handling, logistics and e-commerce.

3.2.4 Xiangtan

Xiangtan's industrial structure is dominated by SOEs and the metals sector

51 The dominance of SOEs in the Xiangtan economy declined slightly from 1999 to 2000, but their share of total output remains 56% and their share of employment 69%. Limited corporations are growing, increasing their share of output from 15% to 20%. Pre-tax profits are moderate (10% to 11% in the SOE, limited shareholding, and foreign sectors) to low (Table 9).

Table 9: Xiangtan Industrial Structure by Ownership (2000)

Ownership Form	Output in current year Y, billions (% of total)	Employment (% of total)	Pre-tax profits
SOE	6.3B (56%)	92,342(69%)	10%
collectives	1.1B (10%)	14,890 (11%)	3%
shareholding cooperative	446M (4%)	7,827 (6%)	1%
joint cooperative	45M (0.4%)	232(0.2%)	-10%
corp. limited	2.2B (20%)	11,532 (9%)	9%
shareholding ltd.	149M (1%)	1,533 (1%)	10%
private	819M (7%)	4,639 (3%)	3%
foreign	132M (1%)	449(0.3%)	11%

Source: Xiangtan yearbook 2001

52 Metals (mostly ferrous) are by far the most important sector, producing 29% of output and providing 34% of employment. With pre-tax profits of 13%, it appears to be a viable sector. Chemicals and machinery & equipment each provide about 10% of total output. Chemicals appear to be profitable while machinery & equipment is not. (Table 10)

Table 10: Xiangtan Industrial Structure by Sector

sector	Output in current year Y, billions (% of total)	Employment (% of total)	Pre-tax profits	value added/output
metals	VH (28.9%)	VH (34.4%)	H (13%)	35%
machinery & equipment	H (11.2%)	H (10.6%)	L (1.9%)	34.2%
chemicals	H (10.4%)	M (9.4%)	H (10.3%)	28%
textiles	L (1.4%)	L (2.1%)	L (1.7%)	25.8%
food & beverages	L (3.9%)	L (3.2%)	M (5.5%)	28.9%
Electronic equipment	L (0.3%)	L(0.5%)	L (0%)	36%

Source: Xiangtan yearbook 2001

53 Major enterprises include:

- Jindi Chemical Fiber: An SOE producing materials for clothing and beverage containers, with annual output of Y800 million. It uses Swiss technology and German equipment, and its market area is south China;
- Xiangtan Electric Motor Group, producing electric motors for cars and trucks;
- Xiangtan Steel Company;
- Xiangtan Electric Chemical Group, producing MnO₂ for batteries; large scale, major exporter;

- Hunan Shaofeng Cement Group, with a capacity of two million tons annually.

The tertiary sector is large and diversified

54 Xiangtan's tertiary sector, on the other hand, is large for a medium-size industrial city, representing 42% of total GDP, and it is the home of several large universities and colleges. The local government has made efforts to create a quality urban environment, and the central city is pleasant and attractive. The city is a tourist destination, due primarily to the presence of Chairman Mao's hometown. In 2000, it attracted 2.4 million tourists, mostly domestic. It is reported, however, that most visitors stay in Changsha and make day visits to Xiangtan, which limits considerably the revenue generating potential of this sector for the city.

3.2.5 Tourism

55. The Chinese tourism sector has shown remarkable growth in the past decade. In 1999, the total number of international tourists who visited China came to 73.0 million, of which 61.7 million (84.7%) were from Hong Kong and Macao, 2.6 million (3.5%) were from Taiwan, 108, 000 (0.1%) were Overseas Chinese, and 8.4 million (11.6%) were defined as foreign country visitors. The 1999 figure of 73.0 million is 2.6 times above the 1990 figure of 27.5 million and 57% above the 1995 figure of 46.4 million.

56. Over the total 1990 to 1999 period, the total number of international tourists visiting China grew at an annual average exponential rate of 11.5% per year. Total earnings from international tourism in 1999 came to \$US 14.10 billion (or Y116 billion) compared to \$US 2.21 billion in 1990, \$US 7.32 billion in 1994 and \$US 8.73 billion in 1995. From 1995 to 1999, earnings from international tourism expanded at the annual average rate of nearly 13% per annum.

57. Turning to the domestic tourism market, the total number of domestic tourists traveling in China has increased steadily from 524 million in 1994 to 694 million in 1998 and 719 million in 1999. The annual average growth rate for domestic tourism over this period was 6.6% per year. Over the same period, the earnings from domestic tourism rose from Y102 billion in 1994 to Y239 billion in 1998 and Y283 billion in 1999. In 1999, the number of domestic tourists exceeded the number of international tourists (including visitors from Hong Kong, Macao, Taiwan and the Overseas Chinese community) by a factor of 9.8 times while earnings from domestic tourism exceeded earnings from international tourism by a factor of 2.4 times.

58. Most tourism data are collected and analyzed based on foreign country tourists and thus foreign visitors will be stressed in this analysis as well. The number of foreign tourists entering China expanded markedly from 1.7 million in 1990 to 5.9 million in 1995 and 7.4 million in 1997. Because of the East Asian financial crisis, the number of foreign visitors to China fell back moderately to 7.1 million in 1998 but then rebounded strongly in 1999 to reach 8.4 million. Over the full nine-year period, the number of foreign tourists entering China recorded an average exponential growth rate of 19% per

year. The increase in 1999 was consistent with the longer-term trend at 18.7%. Foreign tourists have accounted for between 11% and 13% of the total number of international tourists entering China since 1994, suggesting that significant growth in tourists has also taken place in tourist visitation from Hong Kong, Macao and Taiwan and among Overseas Chinese.

59. In 1999, the major countries of origin for foreign tourists entering China included Japan (1.85 million or 22.0% of the total), South Korea (992,000 or 11.8%), the United States (736,000 or 8.7%), Malaysia (373,000 or 4.4%), Singapore (352,000 or 4.2%), the Philippines (298,000 or 3.5%), the United Kingdom (259,000 or 3.1%), Germany (217,000 or 2.6%), Canada (214,000 or 2.5%), Thailand (206,000 or 2.5%), and Australia (204,000 or 2.4%).

60. Within China, the major provincial destinations for foreign tourists include Beijing (24.3% of total foreign tourists to the PRC visit Beijing), Guangdong (17.6%), Shanghai (15.3%), Jiangsu (9.5%), Yunnan (8.6%), Zhejiang (6.0%), Shaanxi (5.9%), Shandong (5.0%), Liaoning (4.6%), Guangxi (4.4%), Inner Mongolia (4.3%), and Fujian (4.2%).

61. The World Tourism Organization and other tourism experts expect that China will be one of the most rapidly expanding tourism destinations in the world through to 2020, and that from 1999 to 2020 China will move up from fifth to first place as the most popular international tourism destination in the world; moreover, Hong Kong in the same year will place fifth. In forecasts prepared in the late 1990s, the WTO projected that international tourist arrivals to all countries would expand by 4.3% per year from 1995 to 2020, and that the corresponding average annual growth rates for China, Hong Kong and the East Asia and Pacific Region in total would be 8%, 7.3% and 7% respectively.

62. Major international tourism trends that will benefit the PRC over the next 20 or so years include the comparatively faster growth in the Asian economy compared to other major international markets (North America, Europe etc.) leading to strong growth in intra-regional travel within Asia, the more rapid growth in long haul tourist travel, and the rapid growth in eco-tourism, cultural tourism, and visiting out-of-the way places.

63. Domestic tourism within China involving PRC residents travelling to other cities and provinces can be expected to expand even faster than international tourist arrivals, given the strong growth in GDP of 7% per year expected under the Tenth Five-Year Plan and through to 2010, the strong interest of PRC residents to visit other parts of the country, continuing improvements to the PRC domestic transportation system, and the anticipated removal of the remaining travel restrictions in China.

64. Events of September 2001 will slow down tourism growth throughout the international economy in the coming months and perhaps during the next few years. However, international tourism is expected to rebound in the medium term in line with the recovery in the global economy and in the travelers' confidence in international air

travel. Moreover, domestic tourism within China is expected to be affected less by international events than the number of international tourists entering China.

65. Strong growth in domestic and international tourism is driven by rising living standards, improvements in transportation and telecommunications systems, the removal of barriers to international travel, contracting workforces, and more people of retirement age in most industrialized countries and many emerging market economies (including the PRC), and strong interest among more prosperous travelers in all countries to visit places which offer different cultures, lifestyles, cityscapes and landscapes, and natural environments. China offers these attributes in abundance.

66. Hunan and the CZT urban region have a great deal to offer the domestic and international tourist but the province's and three cities' roles within China's tourism sector and market are relatively small. Most tourists to Hunan and the CZT are domestic – the number of domestic tourists to a destination are typically 10 times greater than the number of tourists from other countries (while in terms of spending domestic tourist expenditures are typically 2 to 4 times higher than international tourist spending). However, only limited data on domestic tourism were available to the team and therefore the following analysis will focus for the most part on international and foreign country tourism as a major indicator of the competitiveness of the Hunan CZT tourism product compared to other tourism destinations in China and Asia.

67. The number of international tourists visiting Hunan has grown very rapidly and quite steadily from 1990 to 1999. The number of international tourists from all markets, including Hong Kong, Macao and Taiwan, expanded from 85,200 in 1990 to 177,300 in 1995, 348,600 in 1998 and 385,800 in 1999. The average exponential growth rate over this nine-year period was 18% per year. Tourism from foreign countries increased even faster by an average of 26% per annum from 16,500 in 1990 to 71,800 in 1995, 122,000 in 1997 and 134,800 in 1999. Unlike the PRC in total, it appears that tourist visitation to Hunan was not greatly affected by the East Asian economic crisis in 1997 and 1998.

68. However, despite the province's strong gains during the 1990s, Hunan plays a small role within the total PRC tourism sector. Over the past few years, only 1.6% to 1.8% of the tourists from foreign countries that entered the PRC visited Hunan³ (compared with 0.9% in 1990), whereas in terms of overnight tourists from Hong Kong, Macao, Taiwan and the Overseas Chinese community, Hunan accounted for 251,000 or 1.9% of the visitations of this market segment to all PRC provinces. In contrast, Hunan contributes 3.8% to the PRC's total GDP and 5.2% to China's population.

69. In a meeting in Changsha, the Hunan and Changsha Tourism Bureaus provided more complete and up-to-date information on their tourism sectors. Based on recent surveys, the number of international tourists entering Hunan totaled 450,000 in 2000, and

³ It is recognized that foreign tourists – which excludes domestic tourists as well as tourists from Hong Kong, Macao and Taiwan – are a small part of the Chinese tourism market, but it also represents the most lucrative segment in terms of length of stay and spending per day.

these tourists spent \$US 220 million in that year. The total number of domestic tourists – including people taking trips of short duration of one day or less – was 46.5 million.

70. For Changsha, the number of international tourists in 2000 totaled 221,700 who spent \$US 119 million, whereas domestic visitors including people on short trips and in transit came to 19 million and earnings from domestic tourism were Y6.1 billion. Total earnings from Changsha tourism therefore were Y7.1 billion, and growth in tourism earnings during the Ninth Five-Year Plan averaged about 15% per year.

71. The major markets for both Hunan and Changsha are Hong Kong, Taiwan, Macao and SE Asia for the international tourists, and Guangdong, Jiangxi and other Hunan residents themselves for domestic tourists. The duration of stay for the typical international tourist is 3.1 to 3.4 days, and the figure is similar for domestic tourists who stay overnight (not on one-day trips). When small trips within Hunan are excluded, domestic tourists to Changsha, Xiangtan, Zhuzhou and Yiyang totaled 4.3 million in 2000 whereas domestic tourists to other cities in Hunan came to 6.7 million, for a total of 11 million domestic tourists to all cities. Changsha and the Xiangjiang Corridor thus play a major role in Hunan tourism. The major domestic markets for the Changsha tourism sector include Beijing, Guangzhou (Changsha is on the Beijing to Guangzhou Railway and the Beijing to Guangzhou NTHS), plus the eastern provinces of Shanghai, Jiangsu, and Zhejiang.

72. Hunan, Changsha and the Xiangjiang Corridor have a rich history and culture and many scenic spots, offer a wide range of tourist attractions and are well located to expand their tourism sector. These areas offer history, culture, good natural scenery, strong urban amenities in Changsha and other cities, and easy access from major markets by air, passenger rail and highway. The major attractions in the CZT and the rest of Hunan include the following.

Within CZT

- The City of Changsha itself with its many museums, historical, cultural and scenic sites and parks including the Hunan Provincial Museum, sites linked to the life of Mao Zedong, the Lei Feng Memorial Museum, Yuelu Park, the Changsha National Forest Park, the Xiaoyuan Garden, the Changsha Zoo, the campus of Hunan University, the Loving Dusk Pavilion, the Long Island or Long Sandbank in the middle of the Xiangjiang River, the Tianxin Pavilion which is the only remaining part of the old city walls, the many scenic spots along the Xiangjiang River, and the many holiday resorts developed in recent years including the Huitang Hot Springs, the Shiyuan Lake resort, the Shanying Pond resort, and the Window of the World in Changsha.. Changsha is designated as one of the 24 historical cities in China.
- The Village of Shaoshan near Xiangtan and about 130 km south-west of Changsha, which is the birthplace of Mao Zedong; sites include Mao's childhood house and the Museum of Comrade Mao plus the Dripping Water Cave and Shaoshan Peak; 1.24 million people visited Mao's birthplace in 2000.

Rest of Hunan

- The Zhangjiajie Nature Reserve/Wulingyuan Scenic Area in the southern part of the province, which offers some of the most distinctive mountain scenery in China – the area includes Jiutiandong which is Asia’s largest cave covering an area of more than 20,000 sq. km. Zhangjiajie had 4 million visitors last year and this number is expected to increase to 6 million in 2001. .
- Yueyang in the northern part of Hunan, which is a major stop for Yangtze River cruises and borders Dongting Lake the second largest body of fresh water in China.
- The village of Wangcu, better known as Furongzhen or Hibiscus Town which was the site of a famous 1980s movie.

73. The CZT cities and the total province have a great deal to offer the eco-tourist, the cultural tourist and the tourist interested in China’s ancient and more recent history. The events and attractions in Changsha and the CZT are sufficient to support a three day stay at a minimum and the tourism destinations in the rest of the province should encourage tourists to extend their stay by another few days, leading to an average stay of a week compared to three days at the present time. For Changsha, the current length of stay is only 1.6 days for visitors on organized tours and 2.7 days for independent tourists traveling on their own.

74. However, Hunan, Changsha and the Xiang River Corridor have only begun to tap this enormous potential, including the province’s and cities’ many cultural, historic and scenic attractions, good transportation links and strategic location between the two most prosperous regions in China the Yangtze Delta and the Pearl River Delta. Of particular importance is the proximity of the CZT urban region and Hunan to Eastern China (especially Shanghai) as well as Guangdong and Hong Kong which offer both large domestic markets as well as a large number of visitors each year from other parts of China and from other countries. Their access to the Overseas Chinese community in other countries could be particularly important to Hunan and CZT tourism development.

75. Major constraints to stronger development of the Hunan and Changsha/CZT tourism sectors include:

- Less visibility in domestic and international tourism markets compared to the better known tourist destinations in China – Beijing, Shanghai, Guangzhou/Hong Kong, Yunnan/Kunming, and Xian.
- Need for further improvement to the accommodation and other tourist facilities and urban amenities and supporting facilities in the CZT cities and throughout Hunan.
- Need to develop new tourism products and attractions in the western and central parts of Hunan, in order to further diversify the Hunan tourism product and to increase the length of stay of domestic and international tourists.

76. Tourism is playing a prominent role in the Tenth Five-Year Plans of Hunan and the CZT urban region, as well as in the development of the Xiang River Economic/Environmental Corridor. Under the Hunan Tenth Five-Year Plan tourism is

expected to expand its role in the provincial economy. The number of international tourists is projected to more than double from 450,000 in 2000 to 950,000 in 2005 – providing an annual average exponential growth rate of 16% per year – while earnings from international tourism will nearly triple from \$US 220 million to \$US 630 million. For domestic tourism, growth is projected to average 7.2% per year over the five-year planning period, while earnings from domestic tourism is projected to grow by 21% per year to reach Y34.4 billion by 2005. Total earnings from Hunan tourism therefore would reach Y40 billion by 2005, which amounts to 7% of Hunan GDP compared to 4.1% in 2000.

77. Under the Changsha 10th FYP, the total number of tourists, including international and domestic visitors, is expected to grow from 19.94 million in 2001 to 22.85 million in 2005, with international tourists constituting 350,000 and domestic tourists 22.5 million. Total earnings from tourism would be Y15 billion in 2005 compared to Y8.7 billion in 2001.

78. The Hunan tourism plan for the next five years gives priority to sustainable development of Hunan tourism with a strong market orientation; to Changsha as the point of entry and major cultural, historical, business, conference and exhibition center; to Zhangjiajie as the major destination; and to accelerating the development of improved tourism products, attractions and infrastructure in other cities and regions to further diversify the Hunan tourism sector and more widely distribute the benefits from tourism.

79. The construction and operation of accommodation facilities, tourism attractions and other tourism products are now largely the responsibility of the non-government sector in the PRC, and the same trend is evident in the CZT urban region and Hunan. However, there is a great deal that the governments of CZT and of Hunan can do working in partnership with non-government investors and tourism operators, to grow the CZT and Hunan tourism sectors. It is proposed that the following initiatives would be part of a joint tourism strategy across the three cities that comprise the CZT urban region and between CZT and Hunan Province. Many of these are already included in the tourism plans for Hunan, Changsha and other parts of the CZT urban region.

Coordinated Marketing

- Marketing of CZT tourism should continue to be conducted jointly by the three cities, and CZT marketing should be closely coordinated with the tourism promotion conducted by the Hunan Tourism Bureau. Joint and coordinated tourism promotion by Changsha, Xiangtan and Zhuzhou is critical to increasing the length of stay of Hunan visitors, to fully capitalize on the very diverse range of tourism products and attractions offered by the three cities together, and to develop the full potential of the Xiang River Economic/Environmental Corridor.
- The CZT and Hunan Tourism Bureaus should explore the potential for joint marketing with the major tourism centres of Beijing, Guangdong/Guangzhou/Hong Kong, Shanghai as well as with Hubei/Wuhan in order to capitalize on Hunan's and CZT's strategic location between the Yangtze Delta and the Pearl River Delta and on

the Beijing to Guangzhou rail line and major highway. Particular emphasis in tourism promotion and joint marketing would be on expanding the number of tourists to Guangdong, who add Changsha, the CZT and Hunan to their travel itinerary. If one of twenty of these overnight tourists to Guangdong decided to visit Hunan as well, the number of international tourists to Hunan would be nearly double the 1999 level.

Marketing Priorities and Techniques

- A major goal of joint market and product development strategies of CZT and Hunan Tourism Bureaus would be to extend the length of stay of current tourists to the urban region and the province from 3 days at the present time to a week.
- Market promotion should give first priority to the domestic market with emphasis on the rapidly expanding number of middle class families in the eastern provinces – including the Pearl River Delta with emphasis on Guangzhou, Shenzhen and Hong Kong, Fujian province with its strong links to Taiwan, the Yangtze Delta centered on Shanghai, the Beijing-Tianjin urban corridor, and the emerging and very prosperous urban corridor in Shandong province. These domestic markets offer large and increasingly prosperous tourism markets and are also major destinations for international tourists to China – including visitors from Hong Kong, Macao and Taiwan as well as overseas Chinese.
- International market promotion should be conducted as part of joint marketing with neighboring provinces – as described above – and through ensuring favorable and extensive coverage of CZT and Hunan and its many tourism attractions in national tourism material for foreign distribution, in national tourism trade shows and missions, and in international sources such as the Lonely Planet (the current edition of the Lonely Planet contains a quite favorable write-up on Changsha, Shaoshan and Hunan more generally, but the number of tourist attractions noted there is quite limited for Hunan).
- International tourism marketing would stress East Asia and Southeast Asian countries that are already important sources of the foreign country tourists now visiting the CZT and Hunan. Marketing to potential visitors from Europe and North America should be through joint marketing with other better known provinces and with the national tourism authorities and through domestic marketing that emphasizes cities like Hong Kong, Guangzhou, Beijing and Shanghai where most international tourists are now entering and staying in China. As noted above, Hunan's and the CZT's urban region has excellent transportation, economic and cultural links with these main points of entry into China.
- Marketing in these geographic areas would focus on the diversity of CZT's and Hunan's tourist attractions, with special emphasis on the high expenditure education, culture and ecotourism travel markets that are now growing rapidly in China as well as in foreign countries.

- Tourism promotion and investment attraction into the tourism sector will require strengthening the capacity for nationwide and international promotion of the CZT urban region's and the Province's tourism assets and attractions. This can be done through for example establishing a Website (the current Hunan tourism web-site is only in Chinese – some English will need to be added to increase penetration of the international market) and then actively servicing the Site with responses to inquiries and fresh information; as well as through advertisements in newspapers in major Chinese cities, invitations to journalists and television crews to report on CZT and Hunan and its many tourist attractions; and through direct contacts with tourism industry intermediaries (travel agents, tour operators etc.) in China including Hong Kong and Taiwan.

Infrastructure Investments

- Tourism development should play a major role in planning highways, secondary roads and rural roads in the CZT urban region and throughout Hunan, as well as in identifying and planning other infrastructure investments.

Human Resource Development

- As the Hunan and CZT tourism sectors continue to expand, training needs to be provided in tourism services and in establishing and operating tourism businesses. Training programs would cover hotel, restaurant, and attractions staff, wilderness guides, and other tourism related occupations, and would place particular emphasis on the requirements of eco-tourists and cultural tourists.
- Training is also needed on tourism management to avoid conflicts with the environment and with current populations (including poverty households and ethnic minorities who live in the border regions of Hunan). Training strategies and programs should be designed to allow local residents to work in the tourist industry and to establish life-long careers in a high growth and high priority CZT and Hunan economic sector. Business development programs are also needed to assist local people in starting up and operating profitable and environmentally responsible tourism operations.

Tourism, Local Development and Poverty Reduction

- Tourism strategies in CZT and Hunan should give priority to local planning to open up and develop tourism in more dispersed smaller sites, focussing on local access roads, and where accommodation is anticipated, on electricity and water/sanitation systems. It is particularly important that the development of such sites fully involves and benefits the local community. In this manner, the social and poverty reduction benefits from tourism development will be maximized.

Investment Attraction

- Attracting high quality investment, better management, product development and marketing skills, are important to the full development of the urban region's and province's key tourism products and attractions. Tourism investment therefore

should play a major role in the broader investment promotion strategy of the CZT urban region under this City Development Strategy.

Overall Approach

- Tourism strategies and products should be carefully designed to both capitalize on and protect CZT urban region's and Hunan's natural scenery, environment, biodiversity, cultural assets, and cultural diversity, and should be designed to brand the urban region and province as an exciting place to visit offering a wide range of quality tourism experiences. The overall objective should be to promote tourism expansion that is sustainable commercially, environmentally, and socially, and distributes the benefits from tourism broadly across urban and rural areas of the CZT urban region and Hunan, and across different socioeconomic groups and income classes.

83 Tourism development in the CZT urban region will be supported by and integrated with other components of the City Development Strategy related to investment attraction, enterprise development, transportation, infrastructure investment, and environmental protection and improvement.

3.2.6 Comparison of industrial structures

84 Changsha is a diversified economy. Its SOEs produce 32% of total output including tobacco, and only 15% with tobacco removed. It has 66 foreign-invested firms and 98 private domestic companies. Profitability for all secondary industry is 23.9% including tobacco and 11.5% without.

85 Changsha has three sectors that are both large scale and profitable – tobacco, machinery & equipment, and electronic equipment, and three important emerging sectors that, though relatively small, show very high profits – food & beverages, pharmaceuticals, and printing. Its tertiary sector is large and growing.

86 Zhuzhou is a relatively specialized but competitive economy. The tertiary sector is small at 36% of GDP. Its SOEs account for 41% of output, a figure that does not appear to be changing very much. There are 30 foreign firms and 26 private domestic. Overall profitability in the secondary sector is 8.9%.

87 Zhuzhou has two sectors that are large and profitable – metals and transport equipment, and one small sector that is highly profitable – pharmaceuticals. Its tertiary sector is relatively weak but efforts are underway to stimulate the emergence of more service activities.

88 Overall profitability for Xiangtan is 7.9%, it has a number of weak sectors, and the rate of diversification of the economy appears to be slow. SOEs account for 56% of output and 69% of employment. An important strength is the large and growing tertiary sector.

89 Xiangtan has two sectors with the combination of large scale and high profits – metals and chemicals. Though the profit margins of food & beverages are weak, it may have potential as an emerging sector.

90 The above points of comparison are summarized in Table 11. Shaded cells indicate where a city exhibits a particular strength.

Table 11: Comparative Strengths of the Three Cities

	Changsha	Zhuzhou	Xiangtan
Secondary diversification			
Ownership diversification			
Emerging sectors			
Tertiary sector			
Tourism			
Tobacco			
Metals			
Machinery & equipment			
Chemicals			
Electronic equipment			
Transport hub			
Transport equipment			
Non-metallic minerals			
Food & beverages			
Pharmaceuticals			
Printing			

Source: Chreod Ltd.

3.3 Base Case Scenario

Growth projections for the three cities indicate significant increases in purchasing power and demand for urban services

91 The demand for infrastructure, other government services, and the goods and services produced by non-government sectors, will be driven by overall growth in the CZT population, urbanization, GDP and living standards. Population increases are mostly the result of in-migration from rural areas and smaller cities and towns. Table 12 presents a base case scenario for the CZT region through to the year 2020. The scenario has been constructed to be generally consistent with the Tenth Five-Year Plans for China, Hunan, and each of the three cities that comprise the Region. The projections were developed by Chreod, using its China database.

92 The Province of Hunan will register GDP growth similar to national rates. The real growth in GDP is projected to be 6.8% per annum from 1999 to 2010. From 2010 to 2020, the Hunan economy is projected to expand at the national growth rate as the

province starts to fully capitalize on its strategic location between the Yangtze River and the Pearl River Delta, made possible by investments in major highways and other infrastructure, and the CZT Integration during the first decade of the current century. As a consequence, in terms of 1999 prices, Hunan GDP under this scenario would expand from Y332.7 Billion in 1999 to Y686.0 Billion in 2010 and Y1,228.5 Billion in 2020. The growth rate for the total 21-year period would be 6.4% per annum.

93 Consistent with the 10th Five-Year Plans for Hunan and each city in the CZT Region, the region is expected to expand much faster than the total province and will make a major contribution to the province's overall economic performance and industrial restructuring. Table 12 presents one scenario for the CZT region and its three cities. Based on this scenario, growth in regional GDP will average 8.1% per year compared to 6.4% per annum for the total province. By 2020, the CZT Region will account for 22% of the province's total population and 45% of its GDP compared to 19% and 33% for population and GDP respectively in 1999.

94 GDP/capita in the total urban region will approach \$US 4,670 by 2020 (which is 25% higher than GDP/capita in Shanghai in 1999). Once purchasing power parity considerations are addressed, this implies a standard of living by 2020 that would be approaching the current figures in middle-income countries in the European Community such as Spain, Greece and Portugal. For the urban districts of Changsha, Zhuzhou and Xiangtan, standards of living will approach the levels now found in Canada. By 2010, over 70% of the residents of the CZT Region will be working in or dependent on secondary and tertiary sector activities and will be living in urban settlements of a significant size (typically 200,000 population or more). Accordingly, the urban districts of the three cities will comprise 37% of the regional population compared to 24% in 1999.

95 High urban purchasing power and standards of living and a greatly expanded and more concentrated urban population will result in new and more complex demands for urban infrastructure and other government services. However, greater urbanization and prosperity also imply that generally speaking the urban residents of the CZT region will have the ability to pay for these services through higher user fees and higher municipal taxes.

Table 12: Base Case Scenario

Year and Indicator	Changsha		Zhuzhou		Xiangtan		Total CZT
	Municipality	City Proper	Municipality	City Proper	Municipality	City Proper	
<i>1999</i>							
Population ('000)	5,825	1,715	3,701	737	2,785	662	12,311
Urban Population ('000)⁴	3,600 (62%)	1,650 (96%)	1,500 (41%)	704 (96%)	1,450 (52%)	633 (96%)	6,550 (53%)
GDP (Million 1999 Y)	58,844	37,777	28,099	13,849	21,338	10,776	108,281
GDP/Capita (1999 Y)	10,152	22,330	7,615	18,958	7,677	16,384	8,795
<i>2010</i>							
Population ('000)	6,430	2,600	4,040	900	3,010	768	13,480
Urban Population ('000)	4,310 (67%)	2,560 (98%)	2,400 (59%)	887 (98%)	1,960 (65%)	756 (98%)	8,670 (64%)
GDP (Million 1999 Y)	152,200	125,500	64,750	35,910	51,200	27,880	268,150
GDP/Capita (1999 Y)	23,670	48,280	16,030	39,900	17,009	36,300	19,890
<i>2020</i>							
Population ('000)	6,910	3,500	4,340	1,050	3,200	856	14,450
Urban Population ('000)	5,000 (72%)	3,460 (99%)	2,900 (67%)	1,040 (99%)	2,340 (73%)	847 (99%)	10,240 (71%)
GDP (Million 1999 Y)	321,700	290,700	130,600	78,640	105,100	59,990	557,400
GDP/Capita (1999 Y)	46,560	83,060	30,090	74,900	32,840	70,080	38,570
<i>Annual Average Growth Rates, 1999-2020 (%)</i>							
Population	0.8	3.5	0.8	1.7	0.7	1.2	0.8
Urban Population	1.6	3.6	3.2	1.9	2.3	1.4	2.2
GDP	8.4	10.2	7.6	8.6	7.9	8.5	8.1
GDP/Capita	7.5	6.5	6.8	6.8	7.2	7.2	7.3

Source: Chreod Ltd.

96 While the CZT Region will grow much faster than the rest of the province, there are many other cities in Hunan that will also record quite impressive gains in output and GDP/capita over the next two decades. These cities which are mainly located in the eastern part of the province would include Hengyang, Leiyang, Shaoyang, Wugang, Yueyang, Miluo, Linxiang, Changde, Zhangjiajie, Yiyang, Chenzhou, Zixing, Yongzhou, Loudi, Lengshuijiang, Lianyuan, Huaihua, Jishou, all of which are expected to record growth in GDP/capita of more than 4.0% per year over the next two decades. Most of these cities have urban populations of better than 250,000 people at the present time, and most have standards of living that approach or surpass the national average. Therefore, the CZT region will benefit from further strengthening of the Hunan network of regional

⁴ Based on economic function (non-farming), not administrative designation. Urban population as a % of total population is in brackets.

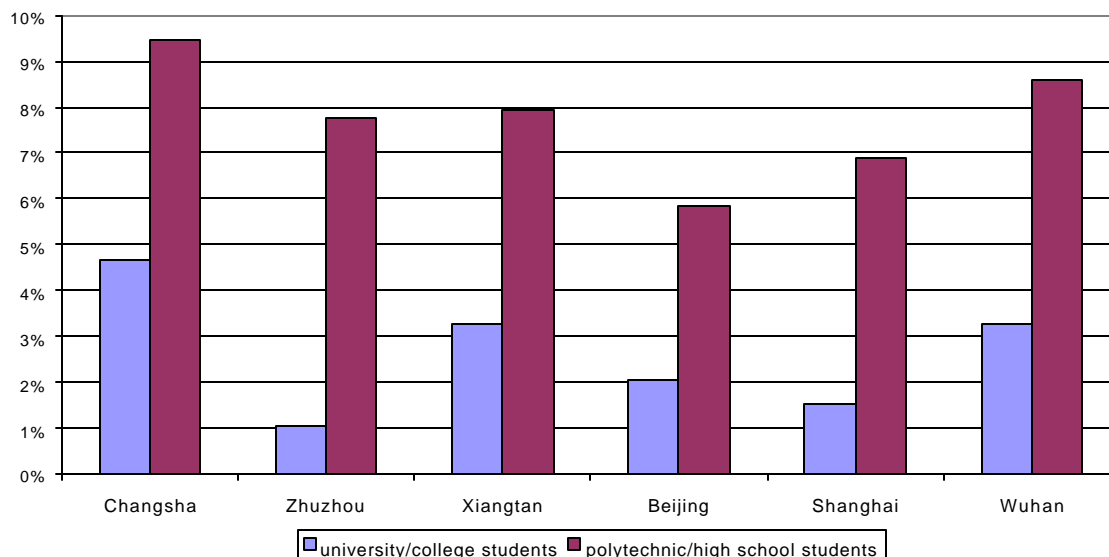
cities over the projection period. Many of the rural areas, particularly those with quite large populations working in or dependent on secondary and tertiary sector activities, will also experience quite significant advances in output and standards of living over the next two decades. For all areas outside the CZT Region in Hunan, GDP is projected to grow by an average of 5.4% per year through to 2020, while the growth rate for GDP/capita is projected to be 4.7% per year.

3.4 Social Development

Hunan is a national leader in higher education

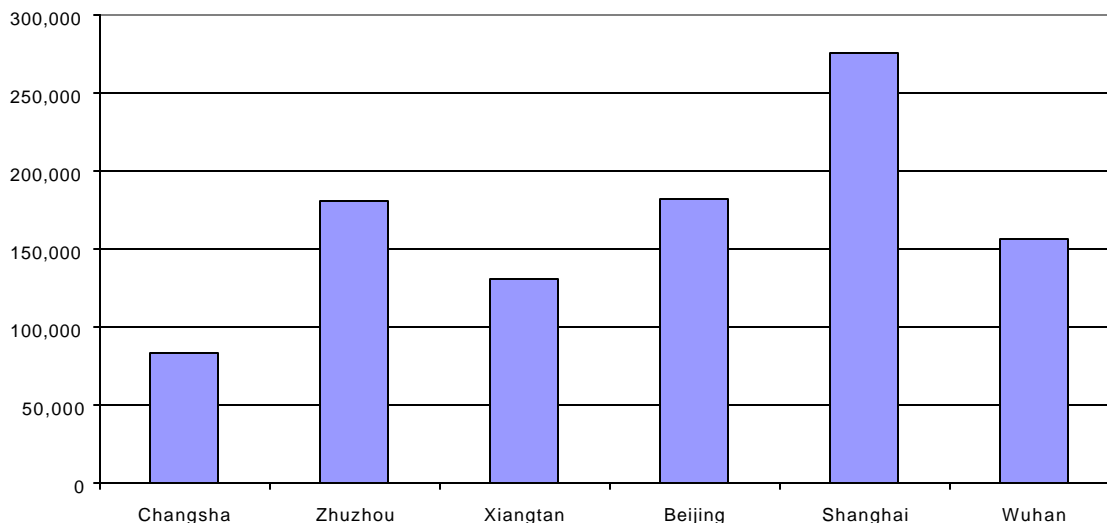
97 Changsha's education sector is very strong. Figures 5 and 6 show students relative to population and population per educational institution, for the three cities and for Beijing, Shanghai and Wuhan. Changsha's ratio of university and college students to population is almost double that of Beijing, Shanghai and Wuhan. Xiangtan also scores high on this measure, while Zhuzhou's ratio is relatively low. All three cities surpass Beijing and Shanghai in polytechnic/high school students as a proportion of the population.

Figure 5
Students as % of total population



98 Changsha has a university or college for every 80,000 people, compared to one for every 180,000 in Beijing, one to 270,000 in Shanghai, and one to 155,000 in Wuhan.

Figure 6
Population per university & college



SOE reform has moved ahead with significant layoffs

99 It is reported that 10% of the labor force in CZT is in laid-off status and another 4% are unemployed. Some 110 SOEs in CZT have been transformed into companies - State-owned companies, shareholding companies, and shareholding limited companies. In about 20%, the majority of shares are held by interests other than the State. Of these 110, 38 were part of a pilot project on SOE reform and, for the most part, their assets have been sold. Virtually all industrial sectors were affected, with the largest layoffs in textiles, machinery, chemicals, and ceramics. It is estimated that 50% of people registered as laid-off and unemployed find new jobs, largely in the tertiary sector.

Income assistance programs are in place but some appear to be under-funded

100 Laid-off and unemployed people receive a guaranteed minimum living cost (MLC) that varies by city - Y180 yuan per month in Changsha, Y170 in Zhuzhou, and Y165 in Xiangtan. About 170,000 people received the MLC in 2000, and a total of Y175 million was paid out (of which Y100 million came from the State).

101 There is also a retirement insurance plan to which virtually all enterprises contribute, even private and foreign joint ventures. This insurance fund is under financial pressure and it is reported that people are not receiving all they should.

102 Reform of a specific enterprise in CZT can be used as an example to illustrate the application of the income assistance programs. When the enterprise was reformed, 800 workers stayed and receive a salary of Y300-400 per month; 700 retired and receive unemployment insurance payments of Y200 per month; and 2,200 were laid-off and get MLC of Y165 per month.

3.5 Environmental Conditions

Air quality is generally poor

103 Air quality in Changsha City is Class III, due to high concentrations of SO₂ (concentrations of other pollutants are lower). It thus does not meet national standards, and has the worst air quality of the three cities. NO_x levels still meet national standards but are increasing. However, progress is being made in addressing a serious acid rain problem. In 1995, frequency was 97% at an average Ph of 4.2, but by 1999 the frequency had dropped to 48%.

104 The City is taking measures to improve environmental conditions, but goals are modest. The 10th FYP target for air quality is Class II to III depending on the zone. Measures included in the 10th FYP include:

- a coal desulphurization plant;
- drawing natural gas from the new western pipeline to replace domestic and commercial coal burning;
- relocation of certain industries from the central city;
- improved auto inspection program;
- converting small boilers to oil, gas or electricity, and fitting large boilers with desulphurization equipment;
- continuation of the acid rain research program.

105 Air quality in Zhuzhou is rated at Class II two-thirds of the time and Class III one-third. Pollutants are SO₂ and TSP. NO_x is increasing but still meets national standards. Acid rain frequency is 50%. In Xiangtan, ambient air quality is similar to Zhuzhou, and acid rain frequency is 62%

Natural gas and coal desulphurization projects are worth pursuing

106 Two major projects will, if implemented, have considerable positive impacts on air quality. Natural gas from Sichuan Province will be transported from Wuhan to CZT by a pipeline to be built by the East-West Natural Gas Pipeline Company. The task of distributing that gas throughout the three cities must then be financed and implemented locally. Total costs are estimated at Y2.2 billion, of which approximately Y1.6 billion is to be expended in the 10th FYP period. Construction start is expected in 2001, with 100,000 households to be served by 2003 and 400,000 by 2006. Users will pay market prices plus a connection fee. Once the system is in place, restrictions will be imposed on household coal burning.

107 Secondly, a coal desulphurization plant is in the 10th FYP. Present coal consumption in Hunan is 6 million tonnes and in 1996 annual emissions of SO₂ totaled 124,000 tons, implying an average coal sulphur content of approximately 1%. However,

poorer quality coal of higher than average sulphur content is frequently used in small boilers and for domestic purposes and emissions are therefore close to ground level.

108 The proposed project provides for the treatment of 2 million tonnes of coal by crushing and blending with chemicals, presumably based on limestone, to fix the SO₂ emitted during combustion by reaction to form a solid product. The crushed coal will then be reformed into briquettes. The process will reportedly reduce annual emissions of SO₂ to 53,000 tons, a reduction of about 57%. Assuming that there is no SO₂ emission from the combustion of the briquettes, this reduction in emissions will be achieved provided that the average sulphur content in the coal processed is not less than 1.8%. The sulphur content of the poorer quality coals that the process would treat reportedly may be as high as 3%.

109 In addition there will be benefits in terms of reduced coal consumption (up to 15%) by the users of the briquettes by virtue of the combustion efficiency improvements associated with the use of the briquettes. In terms of ground level air quality the relative improvement might be expected to be greater than that implied by the quoted level of emissions reduction. The reductions will be in emissions discharged to atmosphere at or close to ground level with the associated greater proportional impact on ambient air quality.

110 The cost of this proposal is estimated at Y154 million, which it is proposed would in part be funded by a loan from the World Bank of US\$ 10 million. The coal processing would add between Y10 and 20/t to the cost of coal, at least part of which would presumably be offset by the reported combustion efficiency improvements. It is proposed to introduce regulations requiring the use of the coal briquettes for small boilers and for domestic use in the three CZT cities.

Improvement of the Xiang River is an ideal case for three-city cooperation in river basin management

111 Water quality upstream of Zhuzhou is reasonably high, generally complying with the Class III standard of the national water quality classification, the minimum standard acceptable for municipal water supply. However, the lack of wastewater treatment in Zhuzhou causes a significant decline in water quality downstream of the city, and in the dry season the water quality falls to Class IV or worse. This adversely impacts the Xiangtan water supply. Considerable pollution loads are discharged to the Xiang River from Xiangtan, and downstream water quality is therefore degraded further.

112 Under low flow conditions the upstream pollution load results in poor water quality in Changsha, although there is an improvement to some degree as a consequence of the natural self purification occurring over the approximately 50 km of river between Xiangtan and Changsha. The river is further polluted by wastewater from Changsha, but the impact of this pollution is less noticeable because there are no major water users over the 150 km length of river downstream of the city.

113 The potential for pollution of the Xiang River and the associated degradation in water quality in the dry season may be appreciated from the significant proportions of the river flow abstracted at the three cities and therefore by implication discharged as wastewater. At the 95 percentile flow these are in the order of 3% at Zhuzhou, 7.5% at Xiangtan and 5% at Changsha (predicted to rise to closer to 10%). The river is therefore fairly heavily exploited, and a substantial degree of wastewater treatment is necessary if water quality objectives for the river are to be met.

114 State Council requirements for wastewater treatment demand that by 2005 cities with populations of 500,000 or more will have a wastewater treatment rate of 60% and provincial capitals a rate of 70% by 2010. In addition the Peoples Congress Report of March 2001 requires that by the end of 2005 all urban areas must achieve a treatment rate of at least 45%. While these requirements seek to achieve a nationwide improvement in river water quality, in cases where cities are close together along the same river and the wastewater from one city impacts upon a downstream city, the approach may not be completely effective.

115 In the case of the three CZT cities the requirements impose the greatest demand for wastewater treatment on Changsha, whereas the greatest benefit in terms of water quality would be realised by a greater level of investment in wastewater treatment in the upstream cities. In practice such a level of wastewater treatment in the upstream cities would not be perceived by the cities as necessary and may not be affordable.

116 In essence, in the case of the CZT cities, Zhuzhou has the best quality water supply and has no incentive to provide more than the minimum level of wastewater treatment demanded. Despite this, Zhuzhou invested Y355 million for pollution abatement in the 9th FYP and is building wastewater treatment plants. Xiangtan is impacted upon by the wastewater from Zhuzhou, and, provided that its wastewater discharges do not impact upon its own water intakes, again has no incentive to provide more than the minimum wastewater treatment demanded. Indeed it would be more beneficial in water quality terms for Xiangtan to invest in wastewater treatment in Zhuzhou. Likewise Changsha is impacted upon by the pollution from the upstream cities, but again, provided that it diverts wastewater downstream of its own water supply intakes, it receives no benefit from wastewater treatment. It also therefore has no incentive to provide more than the minimum level of treatment demanded and again would derive more benefit in water quality terms by investing in wastewater treatment in the upstream cities.

117 In summary the mandated wastewater treatment requirements for the three cities provide the maximum improvement in water quality downstream of Changsha, where there are few if any users of river water. By comparison there is much less water quality benefit in the reach of the river between Zhuzhou and Changsha where the river is extensively used for municipal water supply. These anomalies could be avoided and a more beneficial approach to wastewater and water quality management applied by considering the three CZT cities as a single entity and implementing the wastewater treatment plant investments that gave the greatest benefit in water quality improvements. This might be achieved by the formation of a strategic CZT Wastewater Authority that

would be funded by all three cities in agreed proportions, possibly initially in relation to the proportional State Council wastewater treatment requirements. In this way Changsha, the principal beneficiary of water quality improvements, would compensate the upstream cities for the enhanced levels of wastewater treatment that they would undertake.

118 In terms of wastewater treatment investments the Authority could take a micro-river basin approach to wastewater management using, for example, mathematical water quality models to identify optimal approaches. The Authority could have overall responsibility to the Hunan Provincial and individual Municipal EPBs in terms of ambient water quality, but within its area of responsibility could make investments in wastewater treatment based on optimising water quality benefits to the individual cities.

119 Such an approach would also be more appropriate in the context of a potential World Bank financed urban environment project in which the objective would normally be to derive the maximum environmental benefit for the investment proposed. In particular the objective would normally be for the project to represent the best first stage of a longer term program to solve the overall environmental problem. It would also have the additional benefit of not concentrating solely on one city but would assist in strengthening institutions throughout the CZT area. The overall approach outlined above is broadly in line with the environmental priorities indicated by Hunan EPB, namely control of upstream industry first, followed by upstream city wastewater and then Changsha wastewater.

The proposed Changsha Hydro Integration Project will impact on use of the river

120 This project involves construction of a rubber dam across the Xiang River between the east bank and an island close to the west bank to raise the normal water level to 31.5m. The objective is to improve the amenity value of the Xiang River in Changsha and to ensure that the city waster supply intakes are all effective during the dry season. Between the island and the west bank will be a hydropower station with a generating capacity of 63 MW. The annual power output is estimated at about 300 million kWh, which implies a load factor of about 55%.

121 The dam is downstream of many wastewater discharges some of which will reportedly have to be diverted downstream. The total cost of the scheme is estimated at Y1.88 billion of which Y400 million is accounted for by the dam. Revenue from electricity sales would be in the order of Y120 million/year, equivalent to about 7% of the construction cost. A number of environmental issues need to be addressed including the impact of the change in velocity regime in the river and of storage of possibly polluted river water and the effects of nutrients.

3.6 Urban Structure and Land Utilization

122 The maps referred to in this section are found in Annex C.

Year 2020 plans show the three cities growing together geographically

123 Maps 1 and 2 compare the extent of urban development in 2000 and projected to 2020. All three cities are spreading outwards into new or expanded development nodes. The maps suggest the degree to which the three cities will gradually become a single urban area. The southern-most node of Changsha and the northern-most node of Xiangtan are only five km apart, and Zhuzhou and Xiangtan effectively merge. Physically, integration is taking place.

The cities are expanding into new nodes, many on the under-developed west bank

124 Map 3 shows the development nodes proposed by each city to the year 2020, and the most important transport links. The arrows illustrate the major development directions.

125 Existing and planned nodes for Changsha are listed in Table 13.

Table 13: Current and projected populations of Changsha nodes

Node	Current population (,000)	Projected population (,000)	Current area (km ²)	Projected area (km ²)	Current density	Projected density
Central city	1050	1110	85	106	12,353	10,472
Hexi		530		64		8,281
Gaoxin		280		34		8,235
Laoxia		220		29		7,586
Xinma		730		88		8,295
Muyun	180	440	20	58	9,000	7,586
Hanpu		190		23		8,260
TOTALS		3500		402		8,706

Source: Changsha Planning Bureau

126 The Changsha plan makes room for an ultimate population of 3.5 million, but only 60,000 additional people will be accommodated in the central city. The central city will see its density decrease from 12,353 to 10,472 people per km². Most of the Changsha nodes are essentially greenfield sites with projected densities around 8,000 people per km². Overall density in 2020 would be 8,706 people per km². The west bank is currently underdeveloped, but will see its population increase by about one million people. Over the long-term, a total of 11 bridges across the Xiang River are indicated. There are currently 5 bridges and one under construction.

127. Changsha has an extensive program for the redevelopment of dilapidated inner city areas and their replacement by new housing in other parts of the central city or in one of the new development nodes.

128. Xiangtan will build a new city center within the already developed Hedong Cluster on the east bank of the river, absorbing some of the functions of the current city center in Hexi Cluster on the west bank. It will create or expand six nodes, four stretching north toward Changsha, one to the east near the boundary with Zhuzhou, and one to the south focusing on the existing Yishuhe Town. Four additional crossings of the Xiang River as seen as needed in the long term.

129. Zhuzhou will also create a new central district on the west bank in the partially developed Tianyuan Cluster, replacing some of the functions of the current center in the Hedong Cluster and increasing the population of the west bank to about 100,000. Further, it will develop Liling and Xiaoxian sub-centers. Two new bridges will be required for the ring road.

130. A high proportion of the built-up area in all three cities is currently located on the east bank of the river, and all three plan to use the west bank for major new development – residential, institutional, new city centers. This will involve significant infrastructure investment in roads, bridges, water supply and wastewater systems. However, at least in Changsha and Xiangtan, west bank development can be justified. The west bank is the current location of the universities in both cities, and Changsha proposes to develop the University City on the west bank at the foot of Yellow Mountain (see Section 4.1.2). Thus, the west bank between Changsha and Xiangtan could be seen as a corridor of less industrial, more institutional and residential uses. The question of transport links between them is treated in the next section.

131. However, the rationale for some of the nodes is not clear, nor is it clear why the built-up area needs to expand outward to the degree shown on Map 2. Over 15 new development nodes are proposed outside the built-up area of the three cities. Servicing these new nodes and connecting them to the center with roadways will be expensive. In Changsha, central core densities are projected to decrease by 15% while the developed land increases by 25%. If core densities were to remain the same over the larger land area, it could accommodate an additional 200,000 people, reducing or delaying the need to develop some of the outlying nodes.

132. In general, servicing new nodes should be phased to correspond with market demand. Though it is wise to offer businesses and households some locational choices, only a few strategic nodes should be brought on to the market in a given period. The priorities for the next 5-10 years might be:

- Changsha: 1) Hexi New Town, to support the University City and hi-tech parks on the west bank; 2) Muyun Cluster because it is well located along the expressway and helps bridge the gap of 50 kilometers between Changsha and Xiangtan; 3) HanPu Cluster on the west bank midway between Changsha and Xiangtan;

- Xiangtan: 1) ChiMa and JiuHua Clusters because they help define the development corridor along the economic/scenic belt; 2) Yijiawan, important as the central point of CZT;
- Zhuzhou: Tianyuan Cluster which should help development of the city's small tertiary sector

133 The Xiang River links all three cities and serves as a water source, a potential amenity, a transportation route, and, unfortunately, the point of discharge of virtually wastewater discharges. This corridor has important environmental values, including many hills, islands, and parks. A proposal for an economic-scenic belt has been put forward. This involves greening of both banks of the river, flood control embankments, improvement of scenic and recreational spots, roadways, and development of some low intensity residential and business areas. This proposal will be the subject of an international planning and design competition. It cannot be costed until the plans are completed and a final solution agreed upon by the municipal government.

3.7 Transportation

134 Map 4 illustrates the major transport and other infrastructure projects included in the 10th FYP. Many of the roadways referred to in the discussion below are indicated on this map.

Regionally, only two major roads are operating over capacity

135 Table 14 shows volumes and capacities for all major roads in CZT. Most are operating at between 15% and 47% of capacity, but there are three exceptions. Highway 107 between Changsha and Yisuhe is operating at 128% of estimated capacity, Highway 319 between Changde and Yongan at 109%, and Highway 320 between Xiangtan and Zhuzhou is operating near capacity. As discussed below, the saturation of Highway 107 will be remedied by the construction of one of the proposed new north-south links. The proposed NTH section between Xiangtan and Zhuzhou will help resolve traffic volume problems, but it does not link the two central cities. Additional roadway improvements between the two city centers may be required.

Table 14: Existing CZT highway capacity

NTH	Section	Direction	Est. volume AADT	Est. peak hour volume	Est. capacity	Estimated current v/c ratio	Est. reserve capacity	Est. ultimate capacity AADT	Ultimate capacity/ est. volume	Status
Jing-Zhu	Liangxiang-Changsha	N/S	21,000	2,520	6,600	0.38	4,080	55,000	38%	under const.
Jing-Zhu	Changsha-Xiangtan	N/S	26,000	3,120	6,600	0.47	3,480	55,000	47%	existing
Jing-Zhu	Xiangtan-Leiyang	N/S	15,000	1,800	6,600	0.27	4,800	55,000	27%	existing
Jing-Zhu	Leiyang-Yijiang	N/S	14,500	1,740	6,600	0.26	4,860	55,000	26%	under const.

Shang-Rui	Shaoyang-Yijiawan	E/W	20,000	2,400	6,600	0.36	4,200	55,000	36%	existing
Shang-Rui	Yijiawan-Lianhuacheng	E/W	16,000	1,920	6,600	0.29	4,680	55,000	29%	planned
National Roads										
Chang-Yong	Changsha-Yongan	E/W	8,200	980	6,600	0.15	5,620	55,000	15%	existing
Chang-Chang	Changsha-Changde	E/W	8,300	996	6,600	0.15	5,604	55,000	15%	existing
107	Changsha-Yisuhe	N/S	19,200	2,300	1,800	1.28	-500	15,000	128%	existing
319	Changde-Yongan	E/W	16,400	1,968	1,800	1.09	-168	15,000	109%	existing
320	Xiangtan-Zhuzhou	E/W	7,000	840	1,800	0.88	120	8,000	88%	existing
Planned										
West X-way	Changsha-Xiangtan	N/S			6,600			55,000		planned
East X-way	Changsha-Zhuzhou	N/S			3,600			30,000		planned

AADT=average annual daily total in veh/hour
estimated peak hour volume taken as 12% of AADT
v/c=volume/capacity ratio

Planned transport capacity between Changsha and Xiangtan/Zhuzhou exceeds demand

136 Table 15 shows existing and planned north-south links, with current volumes and capacities. The two principal existing links are National Highway 107 and the Jing-Zhu Expressway. Highway 107 is saturated by traffic escaping the tolls on the Jing-Zhu Expressway, but the latter is operating at only 50% of its capacity. Local forecasts suggest that it will be at capacity between 2005 and 2010, assuming an annual increase in traffic volumes of 12% in the coming years (which appears reasonable, as numbers of vehicles are increasing at a rate of 15-20% annually). North-south volumes are expected to increase from the current 50,000 vehicles per day to 85-100,000 in 2005, 120-135,000 in 2010, and 195-215,000 in 2020.

Table 15: Existing and planned north-south links

Highway	Current volumes (AADT)	Peak hour volumes (veh/hour)	Capacity (veh/hour)	v/c ratio	reserve capacity (veh/hour)	ultimate capacity (AADT)
EXISTING						
1) Jing-Zhu	26,000	3,120	6,600	0.47	3,480	55,000
2) 107	19,200	2,300	1,800	1.28	-500	15,000
PLANNED						
3) West Expressway			6,600			55,000
4) East Expressway			3,600			30,000
5) Riverbelt west						
6) Riverbelt						

east					
Total 1+2			8,400		70,000
Total 1+2+3			15,000		125,000
Total 1+2+4			12,000		100,000

Notes: AADT = average annual daily total in veh/h
estimated peak hour volume taken as 12% of AADT
v/c = volume/capacity ratio

137 Five major new links are proposed:

- West expressway on the west bank from Changsha to Xiangtan;
- East expressway on the east bank from Changsha Airport to Zhuzhou;
- West riverbelt following the river on the west bank;
- East riverbelt following the river on the east bank;
- LRT system linking the three cities.

138 Once the reserve capacity of the Jing-Zhu Expressway is used, there remains a capacity shortfall of about 45,000 vehicles by the year 2010. This shortfall can be filled by either the West or East Expressways. Both are not required until after 2010. Given the presence of the Jing-Zhu Expressway on the east bank, and the fact that it is under-utilized, the western expressway should probably be accorded priority. The proposed eastern expressway primarily links Zhuzhou to the Changsha Airport, and it is not clear what volumes might be expected on such a route.

139 If this analysis is correct, the riverbelt roads are not required to carry large volumes of traffic and can be seen as scenic more than transportation elements. They could provide an alternative, lower speed route between the three cities, connecting scenic and recreational areas as well as economic nodes.

140 Typical LRT systems have a maximum capacity of 30,000 passengers per hour per direction. As shown in Table 16, forecasted 2020 passenger volumes are between 26,000 and 47,000 in one direction **per day**. The LRT proposal thus cannot be justified on the basis of demand until after 2020. Though improved public transit between the cities is necessary, for the foreseeable future the volumes can be accommodated by a bus system.

141 Though the LRT is not required at this stage to accommodate the projected volumes, planning should proceed and, once the alignment is fixed, the necessary land corridor reserved. Planning and approval of a passenger rail system is at least a ten year process, and the link will probably be required after 2010. Further, some cities implement passenger rail in advance of need to help channel development in the desired direction and structure the form of the future urban agglomeration.

Table 16: Forecast Passenger Volumes 2020

unit: passengers/day

	Changsha	Zhuzhou	Xiangtan	TOTAL
Changsha		47,738	29,733	77,471
Zhuzhou	47,382		26,669	74,051
Xiangtan	34,848	26,669		61,517
TOTAL	82,230	74,407	56,402	213,039

Source: No. 4 Railway Design Institute

3.8 Water Supply and Infrastructure

142 Map 4 illustrates the major infrastructure projects included in the 10th FYP. Many of the facilities referred to in the discussion below are indicated on this figure.

3.8.1 Water Resources and Supply

The area has abundant water resources

143 The CZT Region is relatively rich in water resources as a consequence of the Xiang River, which rises in Hunan and discharges into Dong Ting lake, about 150 km downstream of Changsha, and thence into the Yangtze. The average annual flow in the Xiang River at the Xiangtan gauging station is approximately 2,300 m³/s. The flow reportedly increases by only a few per cent over the approximately 50 river km reach between Xiangtan and Changsha. As a consequence of the seasonal rainfall pattern in the catchment, there is considerable annual variation in the flow in the Xiang River. The dry season flows are relatively low, the 90 percentile flow being reportedly approximately 230 m³/s and the 95 percentile flow approximately 200 m³/s or about 9% of the average flow.

144. The Xiang River is by far the principal water resource for the cities in the CZT region, with groundwater only accounting for a few per cent of water supply in Xiangtan. The flow in both the mainstream Xiang River and its tributaries is regulated through dams used for flood protection and hydropower.

145. There is no flood protection reservoir upstream of CZT on the Xiang River, and the risks of flooding have been a serious constraint to development. Hunan Province has set ambitious goals for flood protection. The main areas of Changsha are to maintain one in 200 years flood protection, and Zhuzhou and Xiangtan one in 100 years. Important towns and villages as well as major agricultural areas are also to receive increased protection. All three cities have and continue to undertake flood protection works. Flood protection strategies are comprehensive, including dams, dredging, control of erosion, embankments, and storage reservoirs. It is estimated that the total costs of meeting these standards will be Y3.7 billion for CZT – Y2.6 billion for Changsha, Y0.46 billion for Zhuzhou, and Y0.69 for Xiangtan.

146. Special attention will need to be paid to controlling development in the flood plain between the three cities, and to the potential impact of the many new bridges planned on water flow.

Water demand in Changsha will increase substantially due to growth in the water company's customer base

147. Water supply in Changsha City to both the domestic and industry sectors is entirely by the Changsha Municipal Water Supply Company (CMSWC) and entirely by abstractions from the Xiang River. The total quantity supplied in 2000 was 330 Mm³ and the net supply after deductions for distribution system losses and unbilled water use was 270 Mm³. This implies unaccounted for water of 18%, which is reasonable given that CMWSC supplies to only 36,000 bulk consumers, who then distribute the water to the total of 1.7 million consumers.

148. CMWSC has a total of 6 water supply intakes from the Xiang River, located between the South Bridge and the Wu Yi Da Dao Bridge. Of the total supply 65% is to domestic consumers and commerce, which on the basis of a total customer base of 1.7 million is equivalent to a *per capita* consumption of approximately 270 l/d on a comprehensive domestic demand basis. Water consumption by industry is reportedly 91 Mm³/a. On the basis of a secondary industry GDP of Y14.6 billion (1998), this is equivalent to a unit consumption of approximately 62.3 m³/10⁴ RMB. This is a low figure and reflects the relatively small proportional contribution of secondary industry to GDP (42.8%) and absence of heavy water consuming industry in Changsha.

149. Although the domestic consumption on a *per capita* basis is relatively low by comparison with many cities in China, CMWSC expect that the demand will decline and predict a *per capita* consumption of only 230 l/d by 2015. Notwithstanding this decrease in consumption, CMWSC expects a substantial increase in overall demand and is planning for increases of water treatment plant capacity by 800,000 m³/d (80%) by 2015. This increase is primarily a consequence of growth in its consumer base to 3 million, attributed principally to urban migration and transfer of the agricultural community to urban resident status. Total abstractions from the Xiang River by CMWSC would then be 1.8Mm³/d (approximately 21 m³/s), which is equivalent to 10% of the Xiang River 95 percentile flow.

Water tariffs in Changsha do not cover O&M costs

150. The water tariff in Changsha is Y0.89/m³ for domestic consumers and Y1.01/m³ for industry. There is a surcharge of Y0.2/m³ for industrial wastewater only and this is paid to the Finance Bureau. There is no subsidy from Changsha Municipal Government (CMG), but the tariff does not cover even operating and maintenance costs. The most recent tariff increase (Y0.1/m³) was in 1997 and an application for an increase of Y0.3/m³ has been submitted (approved by CMG but not yet by Hunan Provincial Government).

Zhuzhou has no requirement for additional water treatment capacity during the 10th FYP

151. Zhuzhou is the most upstream of the three CZT cities in the Xiang River basin and is about 60 river km upstream of Changsha. Zhuzhou Municipal Water Supply Company (ZMWSC) abstracts water from the Xiang River at four intakes, all of which were formerly upstream of the city, but increased city growth has resulted in development upstream of two of the intakes. ZMWSC has a total water treatment plant capacity of some 1.3 Mm³/d, but current abstractions are only about 670,000 m³/d, reportedly mainly as a result of a substantial decline in industrial consumption as a consequence of greater awareness of water saving and upgrading of processes and equipment. The only self supply of water by industry is for the nitrogenous fertiliser company, which abstracts about 100,000 m³/d, mostly for cooling water.

152. ZMWSC supplies water to only 6000 bulk consumers, and 65% of the consumption is by domestic consumers and 35% by industry. Industrial water consumption was reported to have declined from 50% of overall consumption, which is equivalent to a decline in industrial consumption of 50%. Total unaccounted for water is reportedly only 10%, which is probably reasonable given the very low number of bulk consumers and therefore limited scope of the distribution system operated by ZMWSC. The implied *per capita* domestic water consumption (comprehensive domestic), based on a total consumption of a population served of 700,000, is approximately 560 l/d, which is extremely high. This may be accounted for by high distribution system losses downstream of the bulk connections, over which ZMWSC has no control.

153. Industrial water consumption in the ZMWSC supply area is 211,000 m³/d or 71.4 Mm³/a on the basis of an average 340-day operating year. If account is taken of the self supply by the fertiliser plant, total consumption could be in the order of 90Mm³/a (this is in reasonable agreement with an estimate by Zhuzhou EPB of a total industrial wastewater discharge of 80Mm³/a). The Zhuzhou secondary industry GDP for 1998 was Y8 billion, which implies a unit water consumption of approximately 112 m³/10⁴ RMB. This is again a relatively low figure and surprisingly so in view of the relatively heavy industry base of Zhuzhou (including chemicals and fertiliser) and the importance of secondary industry in the overall GDP.

154. Although the population is expected to grow to about 1 million by 2010, industrial demand is expected to be stable. In view of the large existing spare water treatment plant capacity ZMWSC has no plans to augment treatment capacity in the near future. Reducing the high distribution system losses downstream of the bulk connections would further decrease future capital investment requirements. However, after 2010 considerable investment will be needed to augment Zhuzhou's water supply.

Zhuzhou water tariffs cover O&M and generate a profit

155. ZMWSC was reportedly incorporated in 1956 and currently has fixed assets of Y360 million and Y100 million of long term debt. The present water supply tariff averages Y0.83/m³ including a wastewater surcharge of Y0.05/m³. This tariff covers

operating and maintenance costs and yields a profit of Y8 million/a, equivalent to about 2.7% of fixed assets. The most recent tariff increase was in 1999 (Y0.2/m³) and the most recent investment was a water treatment plant of capacity 100,000 m³/d in 1997.

Xiangtan will require a new plant to meet projected water demand

156. The water supply situation in Xiangtan is substantially different from that in the other two CZT cities in that the Xiangtan Municipal Water Supply Company (XMWSC) supplies only a relatively small proportion of the overall water supply. XMWSC supplies a total of 325,000 m³/d using abstractions from the Xiang River, and there are further abstractions of 1Mm³/d from the Xiang River by industry, of which 80% is for process use and 20% for cooling water. In addition there are reportedly groundwater abstractions totalling about 300,000 m³/d and some supply of water to industry from the Shaoshan irrigation area. It is planned to reduce groundwater abstractions and replace them with water supplied by XMWSC. Total water supplies for the city, excluding cooling water for industry, are therefore by implication in the order of 1.5 million m³/d, equivalent to approximately 7.5% of the 95 percentile flow in the Xiang River.

157. XMWSC supplies water to 12,000 bulk consumers and reports distribution system losses of 12%, which appears reasonable given the nature of its limited distribution system. Of the resulting water consumption of 286,000 m³/d, 50% is used by industry, 40% by domestic/commercial consumers and 10% is unbilled (used for fire fighting etc). XMWSC reports that demand in its supply area currently exceeds supply capabilities, and a new water treatment plant of capacity 100,000 m³/d is planned for completion in 2002 (cost Y130 million).

158. The domestic consumption of 114,000 m³/d is equivalent, on the basis of the XMWSC supply area population of 350,000, to a *per capita* consumption of 326 l/d. This is relatively high and although lower than in Zhuzhou is still significantly higher than that for Changsha. The secondary industry GDP for Xiangtan in 1999 was approximately Y5.2 billion; on the basis of the implied total industrial water consumption of about 1.3 million m³/d, or 442 Mm³/a based on an average 340-day operating year, the unit water demand is 850 m³/10⁴ RMB.

159. Figures of this order are probably not uncommon for centers of heavy industry, but it appears an exceptionally high figure in relation to those for the other two cities, almost 8 times that in Zhuzhou, for which secondary industry is less important in terms of proportional contribution to overall GDP (52.6% compared with 61.8% for Zhuzhou). It may arise either from inaccurate reporting of consumption data (e.g. underestimation of quantities of cooling water), from highly inefficient use of water by industry or a combination of the two factors. Industrial water consumption appears to account for more than 90% of all water consumption in the city and is likely to be a consequence of the low cost of self supply. More efficient industrial use of water will reduce water demand and lower capital investment requirements in the future.

Xiangtan's tariffs for water cover O&M costs

160. XMWSC was reportedly incorporated in 1959 and its fixed assets total Y170 million. The current tariff is Y0.82/m³ for domestic consumers and Y0.95/m³ for industry; there is no surcharge for wastewater. This tariff reportedly covers operating and maintenance costs and a very small profit, equivalent to 0.5% of fixed assets. The most recent tariff increase (Y0.1/m³) was at the end of 1999.

The Comprehensive Clean Water Project is costly, and serves as an indication of the consequences of failure to protect the Xiang River as the major source

161. In view of the declining water quality in the Xiang River and the widespread use of bottled water for drinking there is a proposal for a duplicate water supply for Changsha, and possibly ultimately Zhuzhou and Xiangtan. The proposal would transport water from an existing reservoir that impounds the Liuyang River, a tributary of the Xiang River. Water quality is reportedly particularly high, avoiding the need for conventional water treatment. The scheme would involve an 89 km pipeline from the reservoir and a further 150 km of distribution mains within the city. The proposed scheme would yield 300,000 m³/d.

162. It is envisaged that consumers would have the option to provide at their cost their own connection to the duplicate distribution system and would take water from both systems, only water for high quality uses such as drinking and cooking being taken from the new system. Such use would only account for only about 10 l/d per person a very small part of the overall potential supply, even in the unlikely event of all consumers connecting to the supply. The estimated cost is in the order of Y2 billion and the unit cost of water would be extremely high under the proposed use scenario. Moreover, the small demand in relation to the system capacity would mean that water would remain in the distribution system for long periods, which could pose problems in terms of water quality.

163. A more realistic option, albeit still at high cost and subject to a sufficient available yield, might be to use the reservoir as a complete supply source to be used for the whole city and to abandon the Xiang River as a source of supply. Such an option would avoid the 150 km duplicate distribution system but would still require substantial costly modifications to the distribution system, not least of which would be the need to transfer water across the Xiang River from the east to the west areas of the city. The high cost of the scheme does, however, serve as an indication of the consequences of failure to protect the Xiang River as a sustainable source of supply.

3.8.2 Wastewater

Changsha is planning four wastewater treatment plants to treat 50% of estimated flow

164. Wastewater management in Changsha is the responsibility of the Changsha Municipal Drainage Company (CMDC), although the company currently has no income

and all costs are paid by CMG. It is proposed to phase out subsidies within two years. The present total wastewater flow from Changsha is estimated, on the basis of 90% of the corresponding quantity of water supplied, at approximately 700,000 m³/d. All wastewater is discharged to the Xiang River, some upstream of CMWSC water supply intakes.

165. Existing wastewater treatment plant capacity is 350,000 m³/d, equivalent to about 44% of the total wastewater flow. Three plants called for in the 10th FYP – No. 3 plant (100,000 m³/day), Jingui Plant (160,000 m³/day), and West Bank Plant (200,000 m³/day) – will raise total treatment capacity to 810,000 m³/day.

166. On the west bank of the Xiang River a wastewater treatment plant is proposed with a capacity of 130,000 m³/d. The present proposal is for discharge of the treated wastewater upstream of existing water supply intakes. This is understood to be on cost grounds and is not logical on grounds of risk. The aggregate wastewater treatment capacity provided by the four proposed plants is approximately 400,000 m³/d, slightly over 50% of estimated wastewater flows. Therefore even all four wastewater treatment plants will not be adequate to meet the State Council requirements and further investment would be necessary before 2005.

Three wastewater treatment plants are under construction or planned in Zhuzhou

167. Municipal wastewater management is the responsibility of the Zhuzhou Municipal Wastewater Company (ZMWC), which is in the process of being established and the appropriate assets transferred. Three major industries (Zhuzhou Chemicals, Zhuzhou Non-ferrous Metals Smelter and Xiang River Nitrogen Fertiliser), accounting for 70% of the industrial wastewater flow, either currently operate or will soon commission their own wastewater treatment plants and discharge treated wastewater direct to the Xiang River. The total quantity of wastewater handled by ZMWC on the basis of 90% of water supplied is therefore in the order of 400,000 m³/d.

168. There is only one wastewater treatment plant in Zhuzhou and its capacity is very small, approximately 8,600 m³/d or about 2% of total wastewater flows. There is, however, a plant under construction at Xia Wan with a capacity of 100,000 m³/d and a further plant is proposed at Long Quan some 12 km upstream of Xia Wan. The proposed capacity of this plant is 100,000 m³/d and the plant is currently at the design stage. Each of these plants is on the east bank of the Xiang River and the aggregate capacity of 200,000 m³/d is equivalent to 50% of the calculated 2000 wastewater flow and therefore these two plants would not be adequate to meet the 2005 requirement of a 60% treatment rate as specified in State Council Document No.36. A further plant is understood to be proposed for the west bank within the 10th FYP period; the capacity of this plant will be 200,000 m³/d. Major progress has been made in treatment of industrial wastewater.

Xiangtan has one wastewater treatment plant under construction and long-term plans for two others

169. Wastewater management in Xiangtan is undertaken by the Xiangtan Municipal Wastewater Company (XMWC). As would be expected in view of the small proportion of the water supply provided by XWSC, the relative proportion of wastewater handled by XMWC is also low, a total of 500,000 m³/d out of an estimated total wastewater flow of in the order of 1.3 Mm³/d. The flow handled by XWSC is still, however, greater than the quantity of water supplied by XMWSC, reflecting the discharge to the sewerage system of a proportion of the wastewater resulting from self supplied water. All wastewater is discharged to the Xiang River.

170. There are currently no wastewater treatment plants in Xiangtan but the Hexi plant is currently under construction with a capacity of 150,000 m³/d and an estimated cost of Y170 million. There are also longer term plans for two further wastewater treatment plants on the east bank of the Xiang River with an aggregate capacity of 250,000 m³/d. It is not clear at this stage whether adequate analysis of alternative options has been undertaken or whether a single larger plant might be more appropriate.

171. Of the overall industrial wastewater flow of about 800,000 m³/d approximately 67% is currently treated to comply with the appropriate national discharge standard. There are also reportedly five further industrial wastewater treatment plants under construction, which will bring the proportion of the flow in compliance with discharge standards to 78%. Of the remainder 10% can be accepted into the sewerage system and the enterprises generating the remaining 12% will be faced with closure if they cannot comply with discharge standards.

172. On the basis of these data less than 40% of municipal wastewater will be treated by 2005. However, in terms of the overall quantity of wastewater, including that from industry, the overall treatment rate is in the order of 70%, reflecting the high treatment rate of the dominant proportion of industrial wastewater.

A regional approach to wastewater treatment is the logical course of action

173. The wastewater treatment projects for the three cities are undoubtedly necessary in terms of the need to improve water quality in the Xiang River and to comply with the requirements of the State Council Document No. 36. In principle wastewater treatment projects for the three cities would probably be appropriate for inclusion in a project for World Bank support. However, it is not clear if there has been sufficient evaluation of alternative options, in particular the adoption of a more centralised approach to wastewater treatment with a smaller number of larger capacity plants.

174. The requirements of the State Council Document No. 36 would result in provision of wastewater treatment capacity that is not optimal in terms of environmental benefit. A more effective approach would be to consider the three CZT cities as a single entity, with the formation of a CZT Wastewater Authority that could take a micro-river basin

approach to wastewater investments based on meeting water quality objectives and optimising water quality benefits to the individual cities.

3.8.3 Solid Waste

One solid waste landfill is in operation and one is planned to receive wastes from both Zhuzhou and Xiangtan

175. Changsha is reportedly served by a major landfill site some 30 km NE of the city with a capacity of 30Mm³ and an operational lifetime of 35 years. A landfill is also reportedly under construction in Zhuzhou. A further wastes management project is planned for Xiangtan that would accept all of the solid waste from Xiangtan and some from Zhuzhou. The proposed capacity is 1200 t/d and the process stream proposed would include wastes sorting/classification to allow recovery of certain components of the waste stream for recycling; anaerobic digestion; compost production for use in local horticulture; and some form of compression and binding of construction waste to produce bricks. Residues from the recovery process, amounting to about one-third of the total waste stream, would be landfilled.

176. The cost of the proposed facility is estimated at Y169M, part of which would be financed by a proposed loan of US\$10 from the World Bank. The plant would involve a range of processes but the proportion of residue requiring landfill (one-third) is relatively high. It is not clear whether sufficient value would be added to justify the cost of the process relative to simple landfill, which in any event would still be required for one-third of the waste. In particular there is concern over the viability of the proposals for anaerobic digestion and recovery of construction waste.

3.9 Finance

3.9.1 Fiscal Context

177 Like other cities in China, Changsha, Zhuzhou, and Xiangtan (C-Z-T) are financing progressively less of their urban infrastructure spending through fiscal funds--the municipal budget and recognized off-budget items--while relying more on special sources of funds to finance infrastructure investment.

178 This trend can be illustrated by Changsha's municipal budget (Table 17). Despite the fact that total infrastructure investment within the municipality has climbed rapidly in recent years, the amount of fiscal spending on urban infrastructure was virtually the same in Changsha City in 2000 as it was in 1998, and only slightly larger in the municipality as a whole. Finance Bureau officials attribute the apparent stagnation to decreases in tax rates decreed by the State and to increases in the operating portion of the municipal budget (including subsidies for state-owned enterprises) that have squeezed the amount of on-budget funding available for capital investment.

Table 17: Fiscal funds and Urban Infrastructure Financing Changsha

Budget Item	Revenue & Expenditures in Y Millions			
	1998		2000	
	City	Municipality	City	Municipality
REVENUE				
Total On-Budget Retained by Municipality	1,720	3,440	2,120	4,200
Off-Budget Total	240	300	250	340
Total Revenue	1,960	3,740	2,370	4,540
Infrastructure Components of Revenue				
--Urban Construction & Maintenance Tax	(310)	(340)	(370)	(390)
--Construction Fund	(20)	(40)	(25)	(68)
--Fees and Charges	(140)	(180)	(160)	(200)
EXPENDITURE				
Current	890	2,240	1,250	2,890
Capital	720	1,050	720	1,130
Total Expenditure	1,610	3,290	1,970	4,020
Urban Infrastructure	(500)	(700)	(500)	(730)

Source: Changsha Municipal Finance Bureau

179 The underlying pressure on the municipal budget, which local officials expect to continue, has forced municipal officials to look to alternative means of financing infrastructure investment and has also forced them to investigate ways of bolstering recurring municipal income, even if it means diverting to the general budget some revenue sources, like land leasing revenues, that traditionally have been allocated to investment financing.

180 The reduced role of fiscal funds in infrastructure finance can be further seen from Table 18, which shows the breakdown of financing sources for those major capital projects carried out between 1998 and 2001, for which Changsha was able to provide information on the individual components of financing. The table undoubtedly understates the importance of fiscal funds to total infrastructure investment, but highlights the fact that for major projects municipal officials must now endeavor to put together financing packages that draw upon multiple outside sources of funds while reducing to the extent possible the burden on the municipal budget. This reality makes the availability and terms of alternative revenue sources an important driver of actual capital spending.

**Table 18: Financing Sources for Selected Major Capital Projects
Changsha 1998-2001**

<u>Item</u>	<u>Percentage of Financing</u>
Fiscal Funds	4%
State Bond Funds	17%
Foreign Loans	19%
Domestic Borrowing	45%
<u>Land Leasing & Other Self-Raised Funds</u>	<u>15%</u>
Total	100%

Note: Covers all major projects for which Changsha could provide a financing breakdown by revenue source, or RMB 2.02 billion in total.

Source: Changsha Municipal Finance Bureau

3.9.2 Land Leasing

181 All four of the municipalities participating in this study generate a large part of their revenue for capital financing from land leasing. The proceeds from land leasing may be invested directly in capital projects. Land authorized for leasing may be used as collateral for infrastructure-financing loans. Or the development rights to land may be auctioned off and the proceeds used to finance capital investment.

182 Table 19 illustrates several of the land-leasing variants used in the CZT region. In all three cities a municipal or parastatal agency—either the UDIC or a special ring-road corporation—has been given large amounts of land adjoining the ring-road route to be constructed, and has been assigned the task of converting this land into financing that can be used for construction purposes. In Changsha, the Ring Road Corporation was given 12 square kilometers of immediately developable land (1.8 million Chinese mu), having a minimum leasing price of 100,000 yuan per mu. Proceeds from land leasing are to be used to repay the principal on a planned Y3 billion in commercial loans which will finance a little more than 50 percent of the next stage of Ring Road construction. A loan for Y1.1 billion from the State Development Bank already has been committed for the project.⁵ The Zhuzhou UDIC has been given title to 10,000 mu adjoining that municipality's planned ring road, which it proposes to lease at Y60,000 per mu to generate Y600 million in Ring Road financing. The financing model follows closely that used in Changsha: the UDIC will obtain a Y600 million, 10-year loan from the State Development Bank (SDB), assign toll bridge revenue to pay interest on the loan, and repay the principal with the proceeds from land leasing. (Note, however, that the Zhuzhou structure allows far less room for error. All of the land given to it must be sold at the planned price to generate the principal needed to repay the loan. However, Zhuzhou reports that SDB has agreed to make a further loan of 200 million at the end of

⁵ Toll charge rights from existing bridges on the Ring Road will be used to pay the interest on this loan. Land leasing proceeds will repay the principal. The municipality also has provided a comfort letter.

the first loan's maturity—in ten years—if land leasing has not generated sufficient revenue to repay the borrowing in its entirety. The municipality may also provide more land for leasing.)

183 Both Xiangtan and Changsha now have annual, planned leasing of urban land as a general income source, not tied to a specific investment project. In 2001, the Changsha Land Bureau will lease enough urban land (roughly 300 Chinese mu) to generate Y130 million in net profit for the municipality. This revenue goes into the general budget. It is not restricted to capital expenditure purposes. In Xiangtan the UDIC is the owner of all urban land. For the last three years it has leased an annual average of 10,000 Chinese mu at a gross price between 20,000 and 25,000 yuan per mu, and a net profit of 10,000 yuan per mu, thus generating 100 million of net annual profit. These funds go into the UDIC's general budget and are used to finance a broad array of capital projects.

184 The May 1st Avenue (riverfront) project in Changsha offers another variant on land leasing. There, the UDIC is auctioning off commercial development rights to land adjoining the new riverfront avenue and greenbelt. Purchasers of the development rights must complete their construction within three years. If they do not, the development right reverts to the UDIC. This differentiates the program from pure land leasing, where the owner has the right to use the land in any way he sees fit for the duration of the lease.

185 As China has moved towards a market economy, and the pressure on municipal budgets has intensified, land leasing prices have escalated rapidly in value. Table 20 shows the minimum prices per sq. meter for urban land leased in Changsha. Land leases are auctioned off by the Land Bureau, but bidders must meet the minimum pricing threshold. Most general leases apparently take place at the prescribed minimum price, while leases in special locations like the May 1st Avenue are higher.

Table 19
Land Leasing Projects in CZT

Municipality	Project	Type of Transaction	Amount of Land	Land Price	% Net to Municipality Agency	Revenue Generated (RMB)
Changsha	Ring Road	Land used as collateral for loans and to repay principal	12km ²	100,000 yuan per mu	95%	3 billion
Changsha	May 1st Ave Expansion and Greenway	Sell Development Rights to land		To be auctioned	40%	600 million
Changsha	Land Bureau Annual Leasing, 2001	Lease	± 300 mu	1,500 yuan m ² or 1,000,000 per mu	40%	130 million
Xiangtan	UDIC Annual Leasing 1998-2000 average	Lease	10,000 mu per year	20,000-25,000 yuan per mu	40%	100 million
Xiangtan	Ring Road	Collateral for loan	All UDIC property offered as collateral	-----	-----	45 million
Zhuzhou	Ring Road	Proposed as collateral for loan and principal repayment	10,000 mu	60,000 yuan per mu	95%	600 million

Source: Municipal Finance Bureaus, Land Bureaus, and UDICs.

Table 20
Land Leasing Prices in Changsha

<u>Year</u>	<u>Price per m²</u>
1992	180 yuan
1995	390
1998	520
2001	1,500

Source: Changsha Land Bureau

186 Officials of the Land Bureau described the price increases as partly a result of the underlying increase in land values, but in greater part a consequence of the municipality moving to market value in its leasing policy.

Can Land Leasing Be a Recurring Source of Income?

187 One might think that land sales, like sales of a municipality's physical assets, must be a one-time or transitional phenomenon that cannot be repeated indefinitely as a strategy of infrastructure financing. In reality, the stock of municipally-owned land potential available for leasing usually is very large. Further, the authorization to convert nearby rural collective land to urban land owned by the municipality, as urbanization expands, can generate a significant flow of new land and potential new land revenue for the municipal government.

188 Changsha illustrates this process. The Land Bureau reports that it holds title for the municipality to some 20 million Chinese mu (some 1.33 million hectares) of urban land, worth, at the minimum leasing price, approximately Y105 billion. Of this total inventory, about Y85 billion corresponds to land not occupied by the municipality itself which could be leased. The Land Bureau estimates that on average, 60 percent of the gross price of leased land represents costs incurred in disposition—costs of re-settlement, taxes, upward sharing of revenue, etc. Still, with 40 percent of the gross value representing net profit to the municipality, the net value of Changsha's land inventory is some Y34 billion, or enough for more than 250 years of land leasing revenue at the 2001 rate of 130 million in net revenue.

189 In addition, Changsha adds to its land stock every year. As the urban area expands, more land becomes reclassified as "urban," and therefore available for urban construction. Collective rural land that is reclassified in this way becomes municipal land. Reclassification requires designation in the Master Plan for urban development and approval by the State. The State has discouraged broad land conversion as part of its policy to sustain rural agricultural production. However, the Master Plan calls for the Changsha urban area to expand by more than 10 percent, or 20-30 km², by 2010. At present, roughly 3,000 Chinese mu are converted annually from collective rural land to municipally-owned urban land. Half of this land is allocated for free public use. But the

other half, or 1,500 mu per year, is added to the stock of municipal land available for development and leasing. This additional urban land far exceeds the 300 mu that the city will lease out in 2001.

Policy Implications

190 The easiest municipal infrastructure financing to arrange in China is land revenue. Projects closely linked to land leasing therefore are the easiest to finance from own revenues. The feasibility of financing accounts for at least part of the popularity of ring road construction, other urban road projects, and urban renewal initiatives.

191 At the same time, budgetary dynamics drive municipalities to function as revenue-maximizing land entrepreneurs. Projects that can expand the urban area and convert rural collective land into municipally owned urban land are large profit makers for the municipality. Part of the incentive for building ring roads and new town centers is the financial benefit they bring to the municipality as landowner.

3.9.3 Service Pricing and User Fees

192 Service pricing and user fees present a paradox in the CZT region. On the one hand, tolls are used aggressively to finance road and bridge construction throughout the region. All of the ring roads have been financed in part by tolls. The Changsha airport road is a toll road. Xiangtan illustrates the willingness to impose tolls for bridge construction and even to generate a surplus from tolls that can be used to finance other construction. The municipality sold the right to levy tolls on the Xiang River bridge for 23 years to a Hong Kong investor group for Y250 million. As part of the agreement, the government will use the proceeds to build a second toll bridge over the river at a cost of Y185 million. The toll is set at 5 yuan for automobiles and 10 yuan for trucks. This toll structure now generates Y40 million per year, with a projected payback period for the whole project of 7-8 years.

193 Both Changsha and Zhuzhou also plan to charge stiff fees to finance natural gas delivery. Both municipalities plan to impose a connection fee of 1,500 to 2,000 yuan to finance part of the capital costs of the local distribution system; a 2,000 yuan fee to cover the cost of metering; and a consumption charge for households of roughly 2 yuan per m³ which includes a capital cost recovery element. At these rates, household consumers will cross-subsidize industrial users. Planners are projecting a high rate of voluntary connections even at these relatively high fee levels (partly because alternative supplies of coal gas and liquefied gas will be phased out). Banks and investor groups have expressed a keen interest in financing the upfront costs of installing gas lines because of the strong cost recovery characteristics and revenue flow.

194 In the water sectors, Changsha and Zhuzhou have plans to build duplicate pure drinking water distribution systems that would produce drinkable water at the tap. Consumption charges would be *more than 200 times* the present water consumption fee (Zhuzhou projects a fee of 160-200 yuan per m³ vs. a current charge of 0.83 per m³).

Planners believe that consumers will accept these charges, because they still are substantially less than the cost of bottled water.

195 Despite the general use of fees scaled to recover capital costs in selected sectors, and projections of consumer acceptance of high service fees to cover construction costs in other sectors, *actual service charges in the water, wastewater, and solid waste sectors generally do not cover the costs of operations and maintenance (O&M)*, much less contribute significantly to capital cost recovery.

196 Water consumption fees appear to be set fairly uniformly throughout the region at 0.85 to 0.89 yuan per m³. As a matter of policy, no attempt is made to recover any capital costs through the consumption charge. However, O&M costs alone now exceed 0.87 yuan per m³ in Changsha. The Changsha Price Bureau approved in 2000 a price increase for water supply based on O&M cost figures submitted to it by the water company and audited by the Price Bureau. The municipality and the provincial Price Bureau also approved the price increase. However, the provincial government rejected it for “political” reasons—arguing that citizens could not afford a tariff hike. A new request for a price increase, approved by the price bureaus, was submitted to the province in 2001. It was pending at the time of interviews.⁶

197 According to provincial and local official, Changsha is the only one of the three cities that imposes a charge of any kind for wastewater treatment, but all three cities are planning to begin soon. The Changsha surcharge of 0.20 yuan per m³ to the water bill applies to industry only; household customers do not pay it. Municipal respondents expected Hunan Province in 2001 to authorize a sewage treatment surcharge—perhaps in the range of 0.2 yuan to 0.5 yuan per m³ of water, at local option—in 2001. A People’s Provincial Congress to be held at the end of June 2001, was expected to consider and approve the wastewater surcharge. If applied universally to all water consumption, this surcharge would help generate funds for the construction of sewage plants in Xiangtan and Zhuzhou and generate the funds needed for O&M of existing wastewater plants in Changsha.

198 Table 21 provides additional information on selected infrastructure rates. Two patterns stand out. First, services having external environmental benefits (wastewater treatment, solid waste) typically are not charged or have fees that do not cover O&M. Second, many of the steepest general budget subsidies support services provided by local SOEs. These indirect subsidies impose costly burdens on local budgets.

⁶ The application for a tariff increase for water supply in Changsha illustrates some of the complications involved in price regulation. The Changsha water company some time ago agreed contractually to buy all of the output of a new investor-financed water treatment plant at a price of 0.83 per m³. However, the volume of purchased water output, when added to the water company’s own treatment capacity, considerably exceeds demand. As a result of underutilization of its facilities, the water company’s per unit costs of production have risen. Policy issue: Should this increase in per-unit costs be passed on to consumers as a higher tariff rate or should the water company be forced to absorb the extra costs as the result of its contract negotiation?

Table 21
Selected Service Pricing

Municipality	Project	Fee Scale	Cover O&M?	Cover Capital Costs?
Xiangtan	Bridges	5 yuan, auto; 10 yuan, truck	yes	100%
Zhuzhou	Sewer treatment plant under construction	no charge	None. Estimate 0.30 yuan surcharge per m ³ of water consumed will cover future sewage O&M	0
Changsha	Natural gas distribution (planned)	a) 1,500-2,000 yuan per connection; b) 2,000 yuan for meter; c) 1.9 yuan per m ³ for households	Yes. 100%. Household tariff would subsidize a lower, below-cost tariff for industry. Biggest industrial users are SOEs.	100%
Xiangtan	Natural gas distribution (planned)	Same	Same	100%
Zhuzhou	Natural gas distribution (planned)	Same, except 2.0 yuan per m ³ for households	Same, except a greater tariff subsidy would be provided to former coal-using industries (mostly SOEs)	100%
Zhuzhou	Coal gas distribution	Connection fee of 1,600 yuan being waived because of competition from de-regulated liquefied gas.	No. Large municipal budget transfer required for publicly owned coal gas company.	0
Changsha	Sewage treatment	0.2 yuan surcharge per m ³ of water charged to industry only	No. Fee does not go to sewage plant operator. Allocation from municipal budget covers 40-50% of O&M costs.	0
Xiangtan	Water supply	0.88 to 1.03 yuan per m ³	Yes. Plant O&M estimated at 0.50 per m ³ + 0.30 distribution cost	small fraction through depreciation charge.
Changsha	Water supply	0.87 per m ³	No. About 90% of O&M covered. Costs for own production: .56 supply .27 distribution .04 municipal charge. .87 Also buy treated water at .83 for distribution	0
Xiangtan	Solid waste	No household charge. 3 million per year raised from industry & construction fees	No. Fee covers less than 25% of O&M costs	0

Policy Implications

199 At a minimum, cities in the CZT region need to face fiscal reality and impose tariff schedules for water consumption that fully cover both water O&M and wastewater O&M, and fees for solid waste collection and landfill dumping that fully recover O&M costs. It is folly to undertake the massive new investments scheduled in the region for these sectors without a pricing system that generates enough revenue to assure full O&M coverage.

200 It would also be desirable to recover at least a portion of capital costs through water and solid waste or dumping fees. Indeed, the depreciation charge and depreciation fund required of water companies should serve this purpose. (Ironically, depreciation accounting is required only of water and sewer operations organized as separate companies. Systems that remain part of the municipal government—like the Changsha wastewater operation which is part of the Drainage Division—have public sector accounting rules which do not provide for depreciation nor do they require—or allow—establishment of a separate depreciation fund.)

3.9.4 Operations and Maintenance

201. As was found in Guiyang, CZT cities do not appear to have taken fully into account the future O&M costs that will be generated by the new investments that are scheduled. Environmental sector tariffs do not fully cover O&M costs at present. Future building on the scale projected will only widen the unfunded O&M gap. Nor has the system demonstrated the flexibility to raise tariff rates when necessary to ensure that O&M needs are met. Large-scale expansion of capital facilities is being planned, at great expense, at a time when existing capital is not being fully utilized because of O&M shortfalls.

202. The risks of the present system are best illustrated by Changsha's wastewater treatment facilities. Changsha has two wastewater plants—Plant #1 currently undergoing expansion and Plant #2 with a capacity of 140,000 tons per day. Two other new wastewater treatment plants are included in Changsha's capital projects schedule.

203. Yet for the past three years the two existing treatment plants have not been able to operate at capacity because of inadequate O&M funds. Funds for O&M are allocated directly from the municipality's budget. Table 22 compares Plant #2's O&M costs with its central O&M allocation.

**Table 22: Comparison of Sewage Treatment Plant #2, Changsha
O&M Costs vs. O&M Budget Allocation (2001)**

O&M Costs, Full Capacity Operation

Personnel (96 salaried staff)	1.5 million
Materials, direct operations (chemicals, fuel, contract personnel)	8.0 million
Equipment repairs, maintenance, replacement	3.5 million
TOTAL O&M	13.0 million

O&M Actual

Budget Allocation	6.43 million
Covers:	
Personnel: 1.5 million	
Direct operations: 3.93 million	
Equipment: 1.0 million	

Result: 60,000 tons of 140,000 ton capacity is actually operating.
Rest of flow is diverted directly into the river.

204. As a result of the partial funding of O&M, the Plant simply shuts off the intake valves and diverts 60 percent of its normal treatment capacity directly into the Xiang River. The situation at Plant #1 was reported to be similar before operations were shut down for expansion construction.

Policy Implications

205. Operations and Maintenance appears to be the weakest point of the CZT infrastructure system. Service pricing for environmental services (water, wastewater, and solid waste collection and disposal) should cover at least full O&M costs and depreciation, as specified in national policy guidelines. Revenue collected from O&M charges should go directly to the infrastructure facility budget, not to the municipality's general budget, with charges routinely adjusted to cover actual costs. Or, if the municipality suspects that operating costs are unnecessarily high, the municipality should exercise oversight to ensure that existing plant is being operated to designed capacity, and, if not, either raise O&M allocations or make staff reductions and other cuts to bring operations within budget.

206. Multi-lateral assistance for new environmental investments should be tied to the adoption of O&M and pricing reforms. External financing should require establishment

of an output monitoring system for water and wastewater systems that ensures that existing capacity is being fully utilized and that quality standards for water distribution and treated wastewater discharge are being met. At present, no performance monitoring of this kind takes place.

3.9.5 State Bond Funds

207. Between 1998 and 2001 CZT benefited greatly from State Bond financing for infrastructure. Table 23 shows the magnitude of State Bond receipts. In Hunan Province, only a portion (about two-thirds) of State Bond commitments are financed through the municipality finance bureau. The remainder is allocated by provincial sectoral ministries directly to their sectoral counterparts at the local level. The municipality as a whole has no obligation for repayment even of loan funds; in this case sectoral-agency loans are to be repaid by the sectoral agency directly.

Table 23: State Bond Fund Receipts, CZT, 1998-2001

<u>Municipality</u>	<u>State Bond Funds (Y millions)</u>	
	<u>Total</u>	<u>Municipal Responsibility</u>
Changsha	840	600
Zhuzhou	648	NA
Xiangtan	589	337

Source: Provincial Planning Commission and Municipal Finance Bureaus.

208. State bond funds in CZT as elsewhere are a blend of grants and favorably priced loans in roughly 50-50 proportions. However, provincial authorities believe that it is likely the State eventually will waive most or all of the interest payments due on the loan component, converting it into a reimbursable grant (i.e., the principal will be repayable but not interest). Already, a first installment of interest payments has been waived.

209. Hunan finance officials believe that future State bond funding for the CZT region will decline dramatically. The province is not part of the western areas development strategy which has been targeted for priority funding. Provincial officials believe that it is unlikely new projects from CZT will be approved for State bond financing, but expect further funding to be available for already approved projects. Municipal officials tend to be more optimistic about the future availability of State bond funds for local projects.

Policy Implications.

210. State bond funds have financed a very large part of the incremental growth in infrastructure financing in CZT over the period 1998-2001. The projected steep decline or elimination of funds from this source is bound to intensify the search for alternative financing sources, and to raise significantly the average cost of capital for municipal capital budgets. It further emphasizes the importance of domestic borrowing as a financing alternative.

3.9.6 Foreign Loans

211. The largest foreign lender in the CZT region, by a wide margin, is the Japanese government. It operates several different programs, all of which concentrate on financing for river cleaning, flood control, water and wastewater treatment, and related environmental projects. Japanese loans are available on very favorable terms: 40-year loans at 0.75% or 30-year loans at 1.3%, with 10-year grace periods on principal. The loans are especially attractive because they finance social environmental projects for which domestic commercial financing is difficult to obtain, given the service pricing policies reviewed earlier.

Policy Implications.

212. The availability of Japanese funds for certain projects appears to have a large impact on local priority setting in the capital budget. Changsha, for example, has been informed that its duplicate potable water distribution system, designed to produce drinkable tap water, qualifies for Japanese loan financing. It is difficult to believe that this very expensive project would be deemed feasible by local authorities in the absence of Japanese low-cost financing.

3.9.7 Domestic Borrowing

213. As illustrated by Table 18, domestic borrowing now is the largest single source of financing for urban infrastructure projects. Given the probable decline in State Bond funds for Hunan, and the continued tightening of municipal budgets, the proportion of local infrastructure investment financed by domestic commercial borrowing is likely to continue to increase.

214. The two largest bank lenders to municipalities are the State Development Bank (SDB) and the China Construction Bank (CCB). The SDB lends a nationwide annual total of Y150 to 170 billion, 80 percent of which is for infrastructure broadly defined. Bank representatives stated that urban infrastructure built by local governments is one of its four biggest lending sectors, and the fastest-growing sector. The Bank approved Y4.7 billion in loans in the CZT region in 2000; this total includes investments by SOEs as well as local governments. Within the CZT region the Development Bank is helping finance ring road construction for all three municipalities through loans of Y1.1 billion to the Ring Road Investment Corp for Changsha, Y600 million to the Zhuzhou UDIC, and 45 million to the Xiangtan Economic Development Investment Company.

215. The national leadership of the China Construction Bank (CCB) has identified urban infrastructure lending as a high growth sector and as the number three priority on its list of 12 different kinds of lending activities it will pursue over the next planning period. In the CZT region, CCB has financed or has committed to financing land acquisition and re-settlement for the city games sports stadium, the private-investor-owned Water Treatment Plant #8, a new water supply plant in Xiangtan, and extension to downtown Changsha of the main fibre optic cable network for the region.

216. The China Construction Bank at the national level has identified 60 cities where it will give priority lending support. The CZT region is one of the priority city areas, where lending will also be designed to support regional integration.

217. The China Construction Bank can make loans for periods of one to eight years. Loans typically are toward the short end of this distribution, but can be rolled over if a municipality desires and the project remains creditworthy. Loans are now being made at an annual interest rate of 6.31%. The interest rate is set by the People's Bank of China.

218. The State Development Bank can make loans for up to 20 years, although most of its loans do not exceed 10-15 years (normally, 10 years). It is guided in its financing decisions by the investment priorities identified by the SDPC and by provincial authorities.

219. Both banks emphasized that national guidelines have been promulgated to the effect that bank lending for local infrastructure projects should move toward a project finance model—i.e., a model in which loans are repaid by the revenue generated by the project being financed. The projected revenue stream also becomes the first security for the loan and is the object of special due diligence on the part of the banks. Real property is seen as backup collateral for the loan. The recent guidelines emphasize the importance of having such collateral. The banks indicated that they require comfort letters from the municipality only in cases where the projected revenue stream is not clearly identifiable or insufficient for debt service and where the backup real property collateral provided by the borrower is inadequate. Both banks acknowledged that the changeover to project financing was going slowly for public sector local infrastructure lending. They pointed to examples like the listed Ring Road Investment Corp as an example of a project with a clear revenue stream from tolls and land leasing, as well as broad back-up in terms of real property collateral. (Even in this case, however, Changsha was required to provide a comfort letter.)

220. Other national standards have recently been adopted that apply to urban infrastructure loans. The banks will lend for a maximum of 50 percent of project costs. Loan values cannot exceed 70 percent of the estimated market value of the collateral provided as loan support. Neither bank was willing to talk about specific default experience. They indicated that local infrastructure loans enjoyed one of the best repayment records, comparing favorably for example with SOE lending. Each bank acknowledged that it had had experience with delayed or skipped payments on municipal loans. The China Construction Bank said that rather than formally foreclosing on the loan collateral in these cases and taking possession of the pledged property, it preferred to seize movables like an agency's cars and trucks. This usually captured the borrower's attention and led to loan payment.

Policy Implications.

221. The projects being prepared by public officials in the CZT region do not always appear to give the same priority to project financing supported by clearly identifiable revenue streams that the banks report is now national policy. This is particularly true in

the wastewater and solid waste sectors, where domestic banks have been slow to enter as major lenders.

222. It would seem desirable for any IFI financing to strengthen the model of revenue-backed project borrowing which then could be applied to domestic commercial lending as well. The need for such models in financing local environmental projects seems particularly acute.

3.9.8 Regional Coordination

223. Given the importance of regional integration to C-Z-T's long-range goals, it is surprising how little inter-governmental cooperation appears in actual capital budgets. The three UDICs report that they prepare their investment plans independently of one another. Even a project as straightforward as the Zhuzhou-Huanghua Airport access road reveals a low degree of cooperation. Zhuzhou reported that the 14.3 kilometers of roadway to be built within the municipality's boundaries are a high priority for it. The project will be started in 2002 and finished in 2004. However, the remaining length of the highway is to be built on Changsha land by the Changsha municipality. Changsha did not mention the project as one of its priority investments.

224. A regional approach is perhaps most critical to future wastewater investments. As discussed elsewhere in this report, the three municipalities' present independent plans call for the construction of numerous small wastewater plants serving local discharge. The optimal locations and size of treatment plants might well be different if the effect on river cleaning or water quality intake for municipal systems were looked at from a regional perspective. Institutionally, such an arrangement would require establishment of a regional wastewater authority. The authority would contract with each municipality for the treatment of a specified volume of effluent, and would guarantee as part of the contract that treatment for all contract effluent would reach a pre-specified quality standard. Contract payment might be supported in the first instance by a uniform regional wastewater treatment surcharge, backed by each municipality to promise to pay for any shortfall. Against this ensured revenue stream, the regional authority could issue revenue bonds or borrow from a bank to finance construction. For this model to work financially, user charges or municipal payments would have to include a component to cover capital costs. Alternatively, the regional authority could be given existing and under-construction treatment plants free of charge, so that revenue generating by the sewage surcharge could cover O&M plus new construction rather than being used to repay debt on existing facilities.

3.9.9 UDICs

225. UDICs are a new institutional creation which are in the process of being defined in each municipality. From the State's perspective, UDICs appear to have two objectives: 1) to separate ownership of assets from management and service delivery, so that each function can be handled more efficiently (and so that owners have incentives to exert pressure on operators for more cost-efficient use of their assets), and 2) to ensure

that municipal borrowing is backed by real property collateral rather than by mere promises to pay on the part of the municipal government.

226. In practice, UDICs are developing in quite different styles in different municipalities. The Guiyang report noted that the New Century UDIC there continued to operate as a construction agent for the municipality. It derives the bulk of its income from construction fees paid by the municipality. Although it is the nominal borrower on a large volume of loans, the UDIC has assets that cover less than 10% of its debt liabilities. All debt service in fact is paid by the municipality out of the municipal budget.

227. The Xiangtan UDIC represents the opposite end of the institutional spectrum. It is the owner of all the municipality's land and all of the assets in water supply, gas, public sanitation, urban greenbelts, etc. Excluding land, which is not assigned an asset value until authorized for leasing, the UDIC at year-end 2000 had Y700 million of assets and liabilities of 45 million, consisting of one loan for ring road construction. The UDIC's asset/liability position is so strong that when the UDIC offers as collateral all of its property collectively, as in the ring road loan, banks do not require and do not receive a comfort letter from the municipality. This is the only borrowing institution in the four cities which reported that it borrowed without benefit of a comfort letter from the municipal government.

228. The Xiangtan UDIC reports that it generates Y250 to 350 million per year in revenue. The largest single source of revenue is annual leasing of urban land--see discussion under Land Leasing--which generates about Y100 million in revenue. In addition, the UDIC leases project-specific land in support of individual investment projects, such as the ring road construction. The UDIC also generates revenue from earnings on its fixed assets, from privatization and joint venture initiatives, from the auctioning of taxi licenses, from advertising sales (including road naming), as well as pass-through subsidies from the municipal budget targeted for various sectoral subsidiary companies (amounting to Y70-80 million annually.) With this revenue stream, the UDIC has been able to finance a steadily growing volume of investment: Y200 million in 1998, 256 million in 1999, 280 million in 2000 and an investment budget of 300 million in 2001. In sum, the Xiangtan UDIC owns the bulk of municipal assets, including land, and is responsible for attracting new investment finance based on these assets. The municipal Vice Mayor for Construction is chairman of the UDIC's board.

229. The most prominent privatization venture in Xiangtan was undertaken before formation of the UDIC. It involved sale of the toll rights to the existing national highway No. 1 and 2 bridges for 23 years. A group of Hong Kong investors paid Y250 million for the toll rights, and committed to build a third toll bridge at a cost of 185 million.

230. The UDICs in Changsha and Zhuzhou operate in an institutional form midway between that of Xiangtan and Guiyang. Both receive land leasing rights or land development rights when specific projects are to be financed. Proceeds from the leasing of land or sale of development rights for land adjacent to the infrastructure projects are

used to finance the project capital investment. For example, the Changsha UDIC has been given development rights alongside May 1st Avenue to auction off. Proceeds will help finance the avenue expansion and riverfront greenway.

231. Both UDICs have only modest general assets. The Changsha UDIC was formed with registered capital of Y210 million corresponding to the old city hall and environs which were to be vacated with the move of the city government. Changsha UDIC borrowed against this collateral. However, the lending bank evaluated the collateral at 150 million and made the maximum loan against collateral of such value, for Y100 million. (Per the People's Bank, loans cannot exceed 70% of the estimated market value of collateral). All borrowing by the Changsha and Zhuzhou UDICs require a comfort letter from the municipality, in view of the limited assets of the UDICs themselves.

232. The largest UDIC-like investor in the four cities is the Ring Road Investment Corporation, founded by Hunan Province but now listed on the stock exchange. Its mission is to invest in infrastructure and associated development opportunities. It is responsible for the Changsha Ring Road construction and financing--a vast project which in its next stage will cost Y5.7 billion and will cost an estimated Y8.7 billion to completion. The municipality has made a fiscal contribution of Y700 million to the next stage. The remaining 5 billion is being raised by the Ring Road Investment Corporation, taking advantage of land that has been transferred to it for leasing.

233. Thirty three square kilometers of adjoining land was given to the Ring Road Investment Corporation (RRIC) for leasing, of which 12 square kilometers is finished land now available and approved for development. (see discussion under Land Leasing). This land is being used by RRIC as collateral for an anticipated Y3 billion in bank loans, with Y1.1 billion already committed. Land leasing revenues will be used to repay the loan principal. Toll revenues from bridges on the ring road have been dedicated to cover interest costs. The municipality also has provided a back-up comfort letter. In effect, the bank loan gives RRIC time to lease its land in an orderly fashion, rather than flood the market with land in advance of road construction. In addition to building the Ring Road highway, RRIC has laid fibre optic cable along the roadway. It plans to sell the installed fibre optic line to one or more high tech firms locating in the approved economic development zone.

234. The Zhuzhou UDIC has Y400 million of assets, consisting principally of #1 Bridge over the Xiang river and #4 Water Supply plant. It will own the new sewage plant upon its completion as well as the assets of the Ring Road to be constructed. Against these assets, the UDIC has a Y600 million loan liability from the State Development Bank for ring road construction. (The loan has been signed. However, funds from the bank are to be received in installments, as needed for construction. A total of Y66 million was advanced in 2000. It is anticipated that the transfer to the UDIC of 10,000 mu associated with the ring road project will have been completed before further installments are drawn down.) Tolls from the #1 Bridge are pledged as security for interest payments on the ring road loan. Proceeds from land leasing are planned to repay the principal. The loan is backed by a municipal comfort letter.

235. The approach to collateral in Zhuzhou is this: If the UDIC negotiates a large loan, it will submit a report to the municipality to request that assets that can serve as collateral be transferred to it. The municipality will decide “yes” or “no.” In the event that the proceeds from the land leasing of 10,000 mu are insufficient to repay the Y600 million loan, for example, the UDIC would request additional land transfers from the municipality. In addition to its assets, the UDIC receives an on-budget allocation of Y60 million per year from the municipality as additional financial support for its role as municipal construction agent.

236. Proceeds from land leasing are not paid directly into the UDIC’s account. They are paid to the municipality which in turn makes an equivalent allocation to the UDIC. Other UDICs mentioned that they follow a similar procedure. The objective is to avoid the series of fees and taxes that the UDIC as an independent company would have to pay on land sales or leasing. (Zhuzhou reported that there were 19 separate fees or taxes to be paid on land transactions.) If the municipality is the formal seller, it is exempted from these taxes and fees.

Policy Implications.

237. UDICs clearly are not evolving as a single institutional form with a uniform set of responsibilities. In some cases it is difficult to see how the UDICs are furthering the goals assigned to them. Some UDICs merely hand over completed properties to the municipality or its operating subsidiaries. They do not maintain ownership and exert no influence of any kind on operations. In other cases, where the UDIC retains ownership of assets like water and wastewater plants, it is too early to determine whether the separate ownership/management structure is giving rise to greater efficiencies. The UDICs with this structure did mention that returns on existing assets is one of their revenue sources. Over time, they may evolve into owners that demand greater efficiencies from their operators.

238. The majority of our admittedly very small sample of UDICs have essentially no voice in setting investment priorities or arranging financing. They inherit projects that are assigned to them by the municipality and financing arrangements that have been worked out beforehand. The Xiangtan UDIC is an exception to this generalization, as it is the prime institution responsible for attracting and negotiating infrastructure financing in the municipality.

239. Any World Bank financing program should take into account the intended direction of change of UDICs and encourage movement in that direction through project design.

3.10 Integration

Integration is a prime goal but its form is still not clear

240. The concept of the integration of Changsha, Zhuzhou, and Xiangtan was introduced in the Plans and Strategies Report. It is the driving force of provincial planning, and appears to have the full support of all three municipal governments. Five plans concerning the integration are under implementation, and eight others are in preparation. A leading group responsible for the integration is chaired by the provincial governor and includes three vice-governors, three vice-mayors, and department heads.

241. Though a number of studies and reports have been completed on integration, the concept is still not entirely clear. Primarily this is due to a reluctance on the part of the provincial government to identify what institutional reforms will accompany integration. Without regional institutions, the concept remains theoretical. Amalgamation has been ruled out, but preferences among the other options have not been enunciated. Options generally considered in other urban regions have included 1) formation of a regional level of government, superior to but not replacing the three municipal governments; 2) creation of special purpose districts for certain services (water supply, wastewater management, etc.); and 3) establishment of a coordinative and planning body at the regional level, with no delivery responsibilities. Finally, the regional institutions could be special units within the provincial government or new agencies.

242. Potential benefits of integration are thought to be:

- Larger scale will give the region more influence and improve its competitiveness vis-à-vis Wuhan and other central China cities Regional planning leading to coordinated urban growth management;
- More effective and efficient delivery of services in sectors like water supply, wastewater management, solid waste disposal, and public transit between the cities;
- Environmental management based on a section of the Xiang River Basin;
- Sharing of educational and R&D capacities;
- Increased inter-firm cooperation and trading, leading to cluster development (though locally this term is not used).

243. Integration was a prime subject of discussion at the stakeholder workshop, and there was a clear consensus on several points:

- Integration would make the region stronger economically;
- Integration would strengthen urban infrastructure through coordination and the avoidance of duplication;
- Integration planning should include environmental and heritage protection – especially of the river and the area at the conjunction of the three cities;
- The three cities should retain individual characters after integration.

244. The group of stakeholders that reported the most complete vision of the future after integration described a region with three million residents where:

- Changsha will be a hi-tech, intensively developed city and the commercial center of Hunan;
- Zhuzhou will be a transportation center in south China and a regional industry center;
- Xiangtan will be a regional center for raw material production and a tourist center;
- In the center of the three cities, there will be an ecological protection zone

245. Group reports consistently called for strong leadership from the provincial government to implement integration. It was noted that the capacity of the three municipal governments to coordinate plans and activities is limited by forces such as provincialism and administrative inadequacies

The industrial structure of CZT as a whole presents a fairly diversified and reasonably healthy regional economy

246. CZT integration is referred to as an “economic integration”. This assumes that the the industrial structure of the three cities together would be more competitive than each taken separately. On the face of it, this is a reasonable hypothesis. A number of sectors are common to the three – metals, machinery, chemicals, pharmaceuticals. Changsha has sophisticated services and promising emerging industries, but lacks the large industrial base of Zhuzhou. Zhuzhou is too specialized and its service sector is weak, while Xiangtan has a strong tertiary sector but a manufacturing base whose competitiveness is not strong at this time.

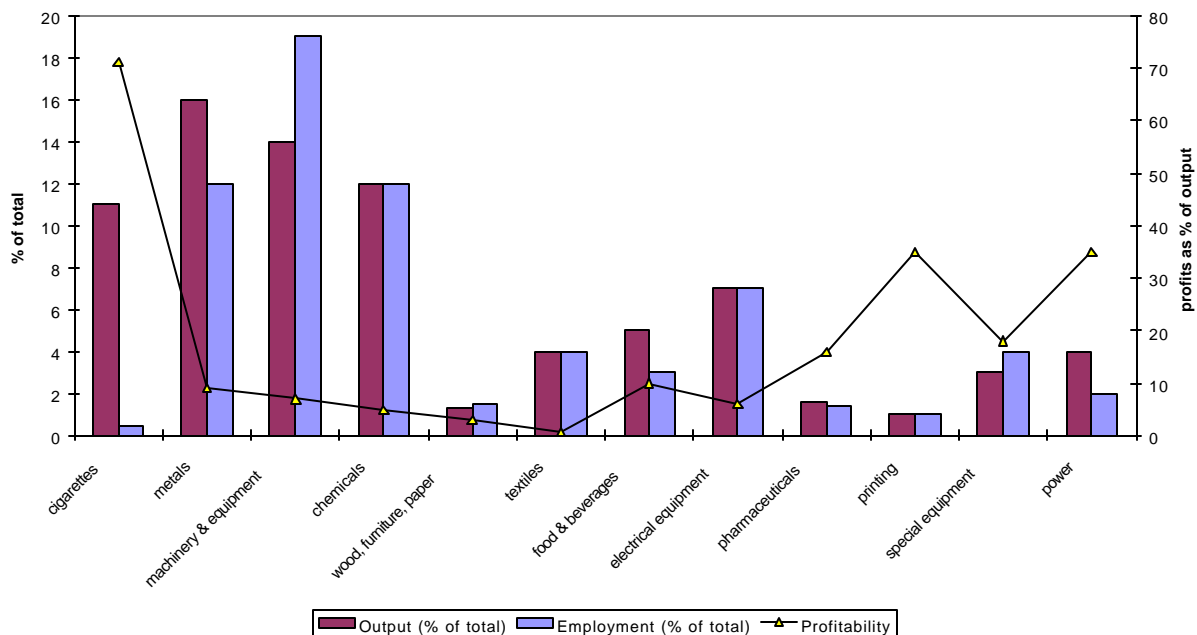
247. If the industrial tables for the three cities are summed, it gives the result shown in Table 24 and illustrated in Figure 7:

Table 24: CZT Industrial Structure

sector	scale (output)	employment	profitability
cigarettes	H – 11%	L – 0.5%	VH – 71%
metals	H – 16%	H – 12%	M – 9%
machinery & equipment	H - 14%	H - 19%	M - 7%
chemicals	H – 12%	H – 12%	L – 5%
wood, furniture, paper	L – 1.3%	L – 1.5%	L – 3%
textiles	L – 4%	L – 4%	L – 0.6%
food & beverages	M – 5%	L – 3%	M – 10%
electrical equipment	M – 7%	M – 7%	M – 6%
pharmaceuticals	L – 1.6%	L – 1.4%	H – 16%
printing	L – 1%	L – 1%	VH – 35%
special equipment	L – 3%	L – 4%	H – 18%
power	L – 4%	L – 2%	VH – 35%

Source: Changsha, Zhuzhou, and Xiangtan Yearbooks 2001

Figure 7
CZT Industrial Structure



248 This composite picture leads to the following observations:

- there are four pillar industries – metals, machinery and equipment, chemicals and cigarettes, providing 53% of output and 43.5% of employment;
- apart from cigarettes, these pillar industries show moderate levels of profitability;
- wood and textiles are small and not profitable;
- food & beverages, pharmaceuticals, and printing remain small but show promising levels of profitability;
- electrical equipment is a significant sector but with only moderate profit levels;
- a power sector that varies enormously by city, but on a regional level is very profitable.

Several initiatives under planning would both support the integration goal and generate significant spin-offs for the three cities

249 A number of project proposals are being developed locally to, among other goals, support integration. These include:

- Cleanup of the Xiang River that runs through all three cities: wastewater treatment, solid waste management, relocation of some water intakes (described in Section 3.5);
- A scenic/economic belt along both sides of the River from Changsha to Zhuzhou: greening of the river edge, enhancement of scenic spots, creation of small

- residential and commercial/industrial zones, construction of roadways along the river (described in Section 3.6);
- University City: major enlargement of Hunan University and other educational institutions located at Yellow Mountain on the west bank of the river in Changsha, development of associated research centers and high-tech industries (described in Section 3.6);
 - New provincial government campus at the southern edge of urban Changsha, closer to the other two cities (under development);
 - Light-rail transit linking the cities (described in Section 3.7);
 - Clean water project, bringing water from a reservoir at some distance from Changsha (described in Section 3.8.1);
 - Tapping the natural gas pipeline from Sichuan that will pass through the region (described in Section 3.5);
 - Coordinated tourism development;
 - Single telephone area code;
 - Common cheque clearing system;
 - Regional power grid;
 - Use of the point where the two national trunk highways intersect as the symbolic center of CZT, with appropriate uses (still being debated).

250 As discussed in other sections of this report, many of these projects have considerable potential, both in supporting integration and generating economic spin-offs for the three cities.

3.11 Summary of Strengths and Weaknesses

251. CZT holds a strong position in south central China due to its size and the performance of its economy. Rail and air links to outside markets are already good, and highway links will improve dramatically with completion of the NTHS.

252. An increasingly diversified economy is developing in Changsha, based on services and emerging sectors, while Zhuzhou retains its strong heavy industry base. Many, though not all, sectors in both cities appear to be generally viable, based on published statistics and interviews with local officials. Concentrations of activity in transportation, education and culture, food products and pharmaceuticals, and electrical equipment hold promise for the formation of clusters that would accelerate innovation and diversification.

253. Strong provincial leadership is helping the three cities come together in planning for integration that should result in stronger regional planning, more efficient provision of certain services, and environmental management based on the river basin.

254. Despite the strengths of CZT, its hinterland is economically weaker than the hinterlands of the more prosperous coastal provinces. The eastern part of Hunan Province is developing and contains a large number of significant urban areas that are expected to continue to make important economic advances in the years ahead. However,

the western half of Hunan and adjoining parts of neighboring provinces are rural and poor. Hunan Province has competitive advantages in a limited number of products, and most of those are resource based.

255. The economy of Xiangtan is based on older SOEs some of which are not competitive. Its strong tertiary sector and attractive urban environment will help, but will not be sufficient to allow its economy to grow and diversify.

256. There are barriers to inter-firm cooperation that need to be addressed. Enterprises are cut off from each other by ownership and reporting relationships, and there has consequently been little movement toward sharing information, innovative ideas, and new technologies. Further, CZT is only beginning to be integrated into national networks of information that will help its enterprises learn from events and trends in the rest of the country and thus become more competitive. There is some R&D being carried out in CZT but it needs strengthening, and the process of commercializing products developed through R&D is not well understood. In particular, the strong universities need to become more fully linked to the research and commercialization process.

257. Markets in Hunan and surrounding provinces will not be sufficient to further develop the CZT economy. Links to markets, enterprises, and investors in other regions need to be developed and cultivated. This in turn requires removal of inter-provincial trade barriers by State, provincial and municipal governments. CZT has experienced increasing levels of DFI, but it is still low compared to more developed parts of the country. The region needs to assure the completion of NTHs that link it to other major cities, and improve the facilities and operation of the transport hub in Zhuzhou. Installation of fiber optic cable networks is making progress.

258. CZT has been impacted by significant lay-offs from SOEs, and this will continue as additional enterprises are reformed. Programs are in place to assist these people as well as the unemployed and low-income population, but they will need increased funding in the next few years.

259. Environmental conditions are poor in CZT. Unless they are improved dramatically, economic and social progress will be compromised. Changsha cannot achieve its potential as a sophisticated central city with current air and water quality levels.

4. ALTERNATIVE STRATEGIES

260 CZT needs to pursue four streams of activities to improve its competitive position and assure the sustainable development of the three cities:

1. Create the conditions for cluster development: Building on the significant concentrations of activity in several sectors, take measures to stimulate greater interaction among enterprises, and strengthen support services, with the goal of

- creating clusters that generate innovation, diversification, and greater productivity;
2. Develop stronger links with external markets, development partners, and potential investors with the goals of securing access to new markets, increasing exports, and achieving higher levels of domestic and foreign investment;
 3. Make significant improvements to the environment in order to improve the lives of residents, improve the image of CZT cities as places to invest, and provide enterprises with adequate infrastructure;
 4. Develop and implement the integration concept to support these three streams of activity.

261 In the rest of this chapter, possible elements of each stream are discussed. In the Draft Final Report, the elements will be elaborated into programs or sets of projects, costed where possible.

4.1 Creating the conditions for cluster development

262. The economic development literature and recent development experience in industrialized as well as emerging market economies suggest that cities and urban regions in the PRC would benefit from the adoption and implementation of cluster-based policies and programs. In many national, provincial and urban economies, clusters of innovative firms are major drivers of growth, development, innovation, employment creation and economic restructuring.

263. Innovative clusters of economic activity attract new technology, skilled personnel, business investment and research and development activity, and can improve business performance and reduce costs through promoting partnerships between enterprises and between the enterprise sector and other groups. The basic concept is that economic development, diversification, innovation and economic restructuring take place not through the efforts of one company acting on its own, but rather through the clustering of a number of related enterprises, research centres, universities, and government agencies in a given location such as an urban region or province. Silicon Valley in the United States is probably the penultimate example of a successful economic cluster.

264. The cluster can be comprised of enterprises and other entities in the same sector or in different but related sectors; enterprises can even be competitors. Members of the cluster prosper by sharing information, stimulating innovation in each other and establishing mutually beneficial alliances with other enterprises and with non-enterprise members of the cluster, including universities, training institutions and research institutes. Successful economic clusters are most likely to emerge where there is a critical mass of enterprises allowing economies of scale and scope, a strong science and technology base, and a business culture that promotes innovation and entrepreneurship. Economic clustering cannot be dictated but rather arises through market mechanisms. However, government has an important role to play in terms of education, training, infrastructure, and through providing a supportive investment climate and policy framework.

265. There are concentrations of activity in four areas in CZT that hold promise for development of clusters: 1) transportation equipment and services; 2) education and culture; 3) food products and pharmaceuticals; and 4) IT equipment and services. There may well be others – for example, new materials, chemicals, software – but these four seem to have the greatest potential.

266. It is not implied that these sectors will constitute a large part of the CZT economy in the near future. They are relatively small and it will take some time for them to attain the size of major industry groups. Cigarettes, metals, machinery & equipment other than transport equipment, and chemicals will continue to be vitally important components of the economy, producing much of the output and providing much of the employment over at least the medium term. However, the four emerging sectors are likely to drive innovation and diversification, and over time to become major sources of output, profits, and employment.

4.1.1 Transportation

The combination of large, profitable transport equipment makers, R&D, and a major transport hub is a nucleus to build on

267. There are 74 enterprises in the transportation equipment sector that employ 69,000 people. They produce a total output value of Y6.2 billion or 11% of total regional output. Pre-tax profits represent about 10% of sales, with an after tax profit margin of 3%. These 1999 figures do not include several significant investments that are still under construction or started producing after 1999.

268. Major products of the sector include locomotives, aircraft engine components, motorcycles, and auto parts. Other major activities are rail, truck, and water shipping; rail car marshalling; rail system R&D, and cargo handling.

269. Zhuzhou is the home base of most of the large firms in this sector. It has 30 firms, or 40% of the total, but they provide 62% of the employment in the sector and produce 68% of the output. Profit margins of the Zhuzhou firms, at 12%, are higher than the average. Also located in Zhuzhou is China's prime R&D institute for rail transportation. It is a national level institute, and is closely linked to locomotive production.

270. Zhuzhou has what is reported to be the most modern rail hub in China. In the city the major north-south and east-west lines intersect, and the Jing-Guang express passenger service will pass through. CZT rail stations handle 22 million tons of freight annually, of which 10 million are handled in Zhuzhou. Most freight is minerals, construction materials, chemicals, industrial products, motorcycles, and pre-cast concrete. There are 14.6 million passenger trips, most passing through the Changsha main station.

271. The coming construction of two NTHs that will pass through Zhuzhou present the opportunity for a multi-modal hub. Even today 80% of freight shipped through the region is by road, and the NTHs are essential to assure the success of the hub. There is also a port

that handles a small number of containers, but current capacities for shipment by water are low. Though some enterprises would like to see a greater emphasis on water transport, others and some government agencies think that extra capacity is not necessary. Nevertheless, both Changsha and Zhuzhou are planning new ports.

272. Zhuzhou has recognized the potential and has chosen a site for the multi-modal hub. Planning is underway and financing is being sought. Designed for transfers between rail and road, it has a planned capacity of 60,000 standard containers and an estimated cost of Y276 million. Planners intend to integrate a logistics center into the complex, and hope to encourage the emergence of transport service firms. Currently there are only a few specialized cargo handling firms, and limited warehousing.

273. The mixed ownership and reporting relationships of firms in the sector prevent cooperation. Some, like the locomotive manufacturer and the rail research institute, are nationally owned and report to a ministry in Beijing. They have no incentive to search out local partners and, in fact, would probably be prevented from doing so. Others are local SOEs and there are some foreign joint ventures. The mandate of the rail research institute is not broad enough to serve as a forum for the interests of the diverse group of enterprises.

274. Elements of a program to stimulate the development of a transport cluster might include:

- detailed analysis of the current strengths and weaknesses of the transport cluster and of the key gaps to be filled through government and enterprise investments to make the cluster self-sustaining;
- extension of the existing R&D capacity in rail transport to other modes, possibly with links to research institutes in other provinces;
- breaking down the barriers to inter-firm cooperation;
- implementation of a new multi-modal hub facility in Zhuzhou, incorporating transfers of cargo between rail and road and, to the degree possible, water;
- completion of roads that facilitate goods transport between the hub and CZT enterprises;
- timely completion of the NTHs to increase volumes of highway traffic passing through the region and to improve the ability of CZT manufacturers to ship their product by road;
- sponsoring by local authorities (provincial and municipal) of regular meetings of key actors in the transport field to encourage the sector to develop a sense of its scale, and an understanding of what could be accomplished through inter-firm cooperation;
- assessing links to and possible benefits for other sectors including the more traditional industries;
- a targeted investment attraction program to support new enterprise development and fill key gaps in the transport cluster.

4.1.2 Education and Culture

The region's strong educational establishment and cultural industries can develop into a cluster that puts CZT on the map

275. Hunan Province has a long tradition of providing higher education, and today Changsha has reportedly the highest ratio of students and faculty to population in the country. Xiangtan is also a university city, with three institutions.

276. At the base of Yellow Mountain, on the west bank of the river, there are three major universities, two of them State level. This is a scenic and culturally significant spot, including original artifacts from the long history of Hunan University. It is proposed to develop the University City, doubling the size of the student population and integrating teaching, research, and housing. A new high-tech industrial zone will also be developed, linking the universities to economic development through R&D and commercialization initiatives. There will be an advanced laboratory, open to enterprises as well as academics, specializing in bio-technology, information technology, and optical equipment, and a common library for all the universities. The University City will become a major distance learning center, a specialty in which the area already has a strong record. Hunan University is part of a consortium (with Tsinghua, Beijing Aviation and Astronomy, and Southeast Universities) to develop distance learning and related technology.

277. Hunan University is connected to the main fiber optic line that follows the Beijing to Guangzhou rail line, and the University has its own fiber optic LAN to which 3,000 computer terminals are connected. Other universities will be connected to this network, and it may be extended to universities in Xiangtan and Zhuzhou.

278. Hunan culture is considered unique in China, and the province, especially Changsha, produces a large number of television programs, books and films. This sector has been given a stimulus by the recent development of the TV and Broadcasting Center that, like the University City, will integrate into a single complex many types of facilities and support services serving the cultural industry. The published output of the cultural industry is small, Y118 million, but this probably does not include all relevant activities. Products of the printing sector, with a larger output of Y614 million, are also partially cultural in nature.

279. These two sectors, education and culture, have natural linkages. Universities are normally large consumers of cultural products, and the cultural industry draws some of its young recruits from the educational institutions. Both attract young, talented, entrepreneurial people, and this contributes to the diversification of Changsha. Such people demand different products and services, and in many cases local enterprises can meet this demand. Finally, the combination of strong educational and cultural establishments can only improve the image of Changsha and increase the number of people who know about the city and would like to visit.

280. An educational-cultural cluster would encourage innovation and, after it reaches a certain size, would tend to generate its own further growth. Actions that would assist include:

281. Elaboration of the University City concept and its implementation over time;
- Extension of the fiber optic network to other CZT universities, research institutes, special development zones, and government;
 - Development of specialties where the educational sector has competitive advantages, like distance education;
 - Links and facilities that stimulate joint university/enterprise research and commercialization, like the common lab;
 - Roads and public transit that make the University City and the TV and Broadcasting Center easily accessible from all parts of the city, and from the airport and passenger rail station;
 - Sponsoring of forums that include people from both sectors and encourage cooperation and joint initiatives

4.1.3 Food Products and Pharmaceuticals

Hunan's strong agricultural base provides the foundation for a growing food products and pharmaceuticals cluster

282. CZT has 120 enterprises in food processing, food manufacture, and beverages. Together they employ 20,000 people and produce an output value of Y3.1 billion (5% of the total). Pre-tax profits average 10% across the sector, reaching 18% for food manufacturing enterprises. Value added as a proportion of output is 23%. There is reportedly some research support, and some enterprises are attempting to enter the organic food market. An important focus for this sector is Wanchang Town which has attracted a large number of Taiwanese invested food products enterprises.

283. Pharmaceuticals is a small sector but highly profitable. There are 26 enterprises with 9,000 employees and Y900 million in output. Pre-tax profit rates reach 16%, and even after taxes profits are 7%. Limited R&D is provided by the medical university. This industry is centered in Liuyang CLC which has a specialized park with 18 functioning factories, all owned by the private sector or shareholding companies. However, firms are located throughout Changsha which produces 78% of the sector's total output.

284. Enterprises in these sectors tend to be related by providing intermediate products in a chain of enterprises. Agricultural producers provide raw material to food processing enterprises, which in turn provide processed materials to food manufacturing and, to a lesser degree, beverage companies. The same agricultural base that provides the foundation for food products also furnishes much of the raw material for pharmaceuticals, which is focused on Chinese medicine.

285. This situation appears to be ideally suited for cluster development. What is required is building up the R&D support as well as management, marketing, and human

resource development assistance for the many small firms, and encouraging the inter-firm relations that already exist to intensify. CZT governments want to introduce higher technology into these activities and become a player in the biological engineering field.

286. Measures that would help this sector develop include:

- Improved transport links to Liuyang and Wanchang;
- Development of a research and commercialization center, perhaps government sponsored, to stimulate innovation and diversification;
- appropriate training in management, marketing, relevant technologies, and commercialization;
- Available sites and space in pre-built structures for the SMEs that will make up much of the sector;
- Better access to capital for SMEs.

4.1.4 Electrical Equipment

Some national brands and large enterprises in electrical equipment provide a base for diversification

287. The electrical equipment sector contains 78 enterprises with 41,000 employees and Y4 billion in output. Average pre-tax profits are only 6%, but are 11% in the more successful Changsha firms.

288. Brand names and enterprises include:

- Hunan Computer Group, China's prime producer of mainframe computers;
- an LG joint venture producing computer monitors;
- an SOE that is one of China's major producers of central air conditioning units;
- Xiangtan electric motors.

289. There are also a number of smaller firms, but these four are large and known throughout China. They provide a solid base for the development of additional products and the attraction of other companies from outside the region. This industry sector is strongly present in all three cities, though profitability is only modest in Zhuzhou and negative in Xiangtan.

290. Progress toward an electrical equipment cluster depends on the feasibility of spinning off smaller firms from these big four. The four will need to be convinced that enterprise creation and greater diversification of products will be beneficial to their businesses. Also, the government needs to facilitate access to the market for small firms by simplifying approval processes and assuring that credit is available on reasonable terms, and provide training support relevant to small start-up firms.

4.2 Developing stronger links with external markets, partners, and potential investors

CZT's level of interaction with the outside world is too limited to support growth and diversification goals

291. Levels of foreign investment in CZT and levels of exporting by CZT enterprises are low. As shown in Section 3.3, standards of living in the three cities will approach the current standards of middle-income European countries by 2020, and an urban region of this scale cannot develop its economy on the base of markets currently accessible in Hunan Province.

292. CZT enterprises need to find and exploit new markets, both in China and worldwide. They, as well as governments, research institutes, and universities, need to be better connected to networks providing information on trends in China and Asia, events that will affect them, new technologies, and new management approaches. Improved investment attraction strategies need to be developed jointly by business and government. On this matter, the integration concept could make investment attraction more effective if all three cities join efforts.

293. Developing relationships with IFIs is important because of the high level of technical assistance they can provide and the potential for loans for projects that show high economic returns and have major social and environmental spinoffs. Financial returns, however, must be sufficient to assure repayment of the loan. Further, securing an IFI loan is a signal to the wider community that the city's planning process is solid, it has strong technical capacities, its finances are in order, and it has viable projects that could be of interest to outside investors. Preparation of a project for IFI financing is a major undertaking, but will serve as a mechanism for building capacity and developing cross-sectoral cooperation within the municipal government. Finally, loans from the IFIs are normally at commercial rates, but other elements of the loan agreement are often advantageous.

294. The Japanese Government has been active in supporting environmental infrastructure in CZT, and this collaboration should be nurtured.

295. Other Chinese cities can be development partners for CZT. Wuhan, the largest and most diverse metropolis of central China, is only 350 km to the north and connected by good roads. It is worth exploring how the economies of CZT and Wuhan can support each other through the exchange of products and services, business alliances, and joint technology development initiatives. As discussed in Section 3.1, on some measures Changsha's economy is outperforming Wuhan's, so CZT certainly has something to offer such a partnership. Finally, a link to one or more of the developed coastal cities might be considered. The coastal city could be the source of new enterprises that can no longer pay the high costs of land and labor in their present location, but may be able to thrive in CZT. Such cities could be found in the Yangtze Delta or the Pearl River Delta.

Some of the actions that are important to the economic competitiveness goal are outside the control of governments in Hunan Province

296. NTH links to other major cities go well beyond the provincial boundaries and their completion depends on other provincial governments. Hunan will need to assure their timely completion through persuasion, with the cooperation of the national government.

297. A number of major enterprises in CZT belong to the national government. Though they are important components of the local economy, economic planning and investment decisions are to a large degree done by the enterprises or a ministry in Beijing with insufficient reference to the needs of the local economy. Further, CZT economic planners tend to ignore the potential of these enterprises to drive economic change because they are felt to be beyond the reach of local government. Negotiations with the national government and the relevant enterprises could help to strengthen the link between these enterprises and local economic planning.

298. A planned and coordinated campaign to approach these external parties should be mounted, carried out jointly by government, industry and the universities.

4.3 Environmental Improvement

299. Environmental conditions are poor throughout CZT. Air quality does not meet national standards, and water quality in some sections of the Xiang River where raw water intakes are located is Class IV or worse. Progress in improving the situation is slow, and the targets in the 10th FYP are modest.

Without major environmental improvement, economic and social progress will be compromised

300. Changsha is rapidly changing into a sophisticated, relatively affluent city with an economy based on services and emerging industries that have locational choices. An enterprise decision to locate in a particular city is not determined by environmental quality, but it plays a major role. To sustain this transformation, Changsha needs to attract sophisticated private firms and new, highly qualified people who demand good housing, a range of personal and government services, and clean air and water. Though housing and services are improving, the city's current environmental conditions do not meet the necessary standards.

301. Major investments will be required in air pollution abatement, wastewater treatment, and solid waste treatment, and this investment program will have to be kept within the financial capacity of the local governments. Whereas investments in transport infrastructure may be over-programmed relative to demand, investments in environmental infrastructure need to be accelerated. It is suggested that CZT authorities consider delaying some of the proposed transport investments in favor of environmental infrastructure.

302. A number of neighborhoods in Changsha suffer from inadequate housing and services, and the City has an ambitious program to redevelop these areas. There are over 3 million m² of poor quality housing, much of it built before 1949. In the old city area average living space is 5 m² per person and 80% of units have no indoor plumbing. The drainage systems were constructed in the 1920s and 1930s. Redevelopment of these areas, which has already begun, will be completed by the end of 2003. Approximately 280,000 people will be relocated. Only about 10% of the area can be rehabilitated.

303. Total cost is estimated at US\$1.834 billion, \$880 million for relocation and \$954 million for construction of Anjou housing and rehabilitation of some existing structures. Compensation to relocated households is Y1,600 per m², and the sales price of Anjou housing will range from Y1,000 to 1,200 per m². The project is being managed and implemented jointly by Changsha Municipality and the affected districts, overseen by a Leading Group.

304. Priority environmental infrastructure projects include:

- A wastewater treatment program that significantly improves the quality of water in the Xiang River; as discussed in Section 3.8.2, this may involve fewer plants than currently proposed. Establishment of a regional water and wastewater authority is probably essential for the successful implementation of this program;
- The proposed coal desulphurization project;
- Natural gas distribution project;
- A program that provides 100% treatment for solid wastes within ten years, including probably the proposed Xiangtan/Zhuzhou facility.

4.4 Integration

Some of the projected benefits of the integration concept will happen with or without formal integration

305. The benefits, costs and impacts of integration cannot be analyzed without first specifying what is meant by the term. Political amalgamation has been ruled out, and the concept is referred to locally as economic integration. If that means greater inter-firm cooperation, it will happen with or without formal integration and with or without regional institutions. As the three cities grow and as their economies become increasingly occupied by firms that are private, shareholding, and limited corporations, firms will act in their own interests and will cooperate where it benefits them. Greater cooperation cannot be ordered or even planned by the government, and government's role in assisting cluster formation must be carefully planned. .

306. Whether or not integration in any formal sense takes place, the three cities will increasingly function as a single regional economy. Maps 1 and 2 show the degree to which they are becoming a single urban area. As they grow and diversify, each will more and more specialize in those areas where it has advantages and there will be increasing

trade and circulation of people and goods. Their proximity will force the three (gradually and perhaps reluctantly) to cooperate on matters of environmental improvement and investment attraction. As transport links improve and disposable incomes increase, people will increasingly live in one city and work in another.

Inter-firm cooperation depends more on the removal of barriers and the provision of certain types of support

307. Here the government can make a significant contribution. Barriers exist in transportation, communication, the varying ownership forms in CZT, and simply custom. CZT governments are making progress in reducing transport barriers and, by the end of the 10th FYP, circulation within the region should function efficiently. In communications, internet access (including fiber optic cable in the university), is developing rapidly. Information systems required to permit one-day cheque clearing and a common telephone area code are being implemented. Thus, the transport and communication infrastructure is either in place or will be in the near future.

308. A serious barrier, and one that is difficult to change, is the lack of relationships among enterprises due to the fact that some belong to a national government ministry, some to provincial or local governments, and still others to domestic and foreign companies. Generally they report upward to their ministry, local government, or the parent company in Shanghai or New York, and see little need to cooperate with other enterprises in the region. This will be increasingly resolved over the long term as ownership becomes more and more private, but in the meantime government can only attempt to create opportunities for dialogue, information sharing and eventual cooperation.

309. CZT has grown under a planned economy structure, and this has implanted customary ways of doing business that do not include much cooperation with other enterprises. This will change on its own, but it will take time.

310. The other area where government can stimulate inter-firm cooperation is in providing directly certain services that firms (particularly new, small ones) need to get established, find their markets, and grow. Possible government actions include:

- Developing R&D capacity, through direct investment or by linkages with relevant R&D centers in other cities; in selected sectors, a government sponsored research and commercialization center would be well worth the cost;
- Attracting business services to the area through marketing initiatives; new firms will need services in management consulting, accounting, and legal advice;
- Working with the banks to assure viable new firms have access to capital with reasonable conditions;
- Providing training in the many areas related to economic integration, cluster development, and the establishment and growth of small enterprises;

- Targeting investment attraction on forms of financing, companies, products and technologies that would support inter-firm cooperation and cluster development.

However, integration can have a major impact in certain spheres

311. Where the integration concept has real substance and can make a major difference in the development of CZT is in the development of regional institutions, mandates and capacities in:

- Regional land use and transport planning;
- Economic development initiatives, planned and implemented at the regional level;
- Regional environmental management;
- Regional delivery of certain services, where larger scale provides opportunities for cost-effectiveness;
- Planning and implementation of selected major projects that clearly have regional importance.

Scenario building helps understand the implications of integration for each city

312. Governments, universities, and research institutes can analyze conditions and trends and formulate scenarios structured around the roles that each of the three cities can play in the urban agglomeration. The fulfillment of these roles cannot be planned in detail, but certain actions can be taken to favor a particular scenario. Three such scenarios for CZT are sketched below. The scenarios are designed, each in different ways, to capitalize on strengths of individual cities and to overcome (at least partially) their weaknesses. Central to the analysis and the structure of the scenarios is the centrality and diversification of Changsha, Zhuzhou's strong manufacturing sector, and Xiangtan's weak and precarious economy.

1. Changsha becomes more service oriented; delivers CZT and provincial business, educational, and personal services; retains specialized and high-tech manufacturing; relocation of much heavy industry to counties or to Zhuzhou and Xiangtan; Zhuzhou and Xiangtan continue to develop their heavy industry

Implications:

- *tertiary sector in Changsha grows to international levels (65-70% of GDP)*
- *create larger CZT enterprises with headquarters in Changsha and manufacturing facilities in Zhuzhou and Xiangtan*
- *major efforts to improve environment in Changsha*
- *create conditions in Changsha to stimulate development of specialized and high-tech firms (mostly private SMEs)*
- *significant industrial relocation costs, but also freeing of valuable urban land*

- *increased commuting between Changsha and Zhuzhou/Xiangtan as people who work in Zhuzhou/Xiangtan opt to live in Changsha*
2. Same as #1, plus Zhuzhou and Xiangtan “merge” their economies; joint economic planning, common tax base, sharing R&D facilities, focus on developing clusters

Implications:

- *creation of joint Zhuzhou-Xiangtan planning and financial agencies*
 - *create conditions that facilitate linkages (or mergers) between enterprises and between enterprises and research centers*
 - *stimulate development of private SMEs*
 - *encourage networking with a view to creating clusters of interdependent firms and support services*
 - *new industrial R&D to be located in Zhuzhou-Xiangtan*
3. All of CZT becomes more balanced; tertiary activities develop in all three cities, and all three cities specialize in different industrial sectors

Implications:

- *initiatives in Zhuzhou-Xiangtan to grow tertiary activities – retail, finance and insurance, tourism in Xiangtan, transport related services in Zhuzhou*
- *possibly less demand on transport system as people find services in their own cities*
- *each city develops its own clusters where it has comparative advantages*
- *form regional advanced manufacturing and high-tech administration (possibly as share-holding company), which coordinates policy and investment attraction and creates specialized parks in appropriate places in all 3 cities (example Liuyang bio-tech park)*
- *R&D located near the clusters it services*

5. Next Stages

313. This Interim Report carries the analysis through to the identification of strategic alternatives that are admittedly broad. This report, and particularly the alternative strategies, will be the subject of discussion and debate during the team’s next visit to CZT, scheduled in the last half of September. The findings will also be presented to a second stakeholder workshop.

314. Following the next visit, appropriate revisions will be made, and each of the components of the strategies, which are now described in general terms, will be elaborated into more detailed programs. Cost estimates will be developed where possible. These programs will be included in the Draft Final Report which will be produced by the end of October in English, to be submitted to the city in Chinese in early December.

315. It is proposed that the final phase of the CDS Study, the National Seminar, be held in November in Changsha. Officials from the study cities and the two involved provinces, other Chinese cities (particularly those to be involved in the next CDS Study), and representatives of interested ministries from the national government will be invited. The consulting team, the city of Guiyang, and the cities of Changsha/Zhuzhou/Xiangtan will make presentations on this CDS experience – how the study was carried out, relevance of the thematic studies, techniques of stakeholder participation, successes and failures. Input from the national seminar will be included in the Final Report.

Annex A

Stakeholder Workshop Report

Stakeholder Workshop: Changsha/Zhuzhou/Xiangtan

1 Background

The Hunan Provincial Development Planning Commission has sought expert opinion in plan development and conducted a citizen survey regarding the Ninth Five-Year-Plan (FYP). However, the April 23, 2001 Citizen Participation Workshop was the first time that Hunan Province has sought citizen input in plan development.

The Provincial Development Planning Commission was asked to select a topic for the CDS citizen participation workshop. The only guidance was the suggestion that the topic should not only be relevant to the CDS but also meet the following three criteria.

- The topic should be important enough to motivate government action and engage the citizens.
- It should be an area where government finds it feasible and helpful to consider citizens' opinions when making decisions.
- The issues addressed should be immediate enough to have the possibility of showing results in the short term.

The Hunan Development Planning Commission decided that the workshop should focus on the planned Integration of Changsha,, Zhuzhou, and Xiangtan municipalities. This is a highly visible and important issue with implications for both physical planning and economic development in Hunan Province. Hunan officials reported that the largest number of questions at the press conference for the Tenth FYP were about the Integration Strategy. The proposed integration has relevance for both long and short term planning and is already shaping public investment decisions.

The Chang-Zhu-Tan Integration Office was assigned responsibility within the Commission for the workshop. In order to bring the broad concept of integration down to a level of detail amenable to citizen participation, the Integration Office decided that it would present an overview of the six plans that comprise the overall Integration Strategy, and then present more detailed information about the projects involved with implementation of the scenic economy belt along the river and the university city. The World Bank consultant would design a visioning exercise to follow those presentations.

Because the workshop was the first of its kind, the goals were modest. The substantive goal was to gather information that would guide CDS development and provide the Hunan Planning Commission with useful information and ideas for its integration planning. The process goals were to (1) provide an opportunity for all participants to be heard and (2) to provide all involved with a positive experience that would encourage further citizen participation activities. It should also be noted that the role of the citizen participation was to be purely advisory.

2 Participants and Agenda

The Integration Office compiled a list of local government, business, university, and community leaders from the three cities, following the citizen participation plan developed after the previous visit of CDS consultants. Although thirty had been discussed as the optimal number, the final invitation list reached 50 persons. Invitations were sent from the Hunan Planning Commission. A list of the 39 individuals who attended is in Annex A.

Before the workshop, CDS consultants met with an individual from each city, who was selected by the Integration Office, to explain the purpose of the workshop and outline the agenda. Those individuals along with two others would be asked to serve as leaders of the break-out groups during the visioning process. Actual attendance achieved a good mix of representatives from the three cities and particularly strong representation from the business community.

The workshop began at 9:00 and ended at 16:00. It comprised a morning session devoted to information provision, a lunch break, and an afternoon visioning exercise. A copy of the agenda is in Annex A.

The information provision consisted of the following:

- The purpose of the workshop
- Introduction of participants
- A PowerPoint presentation about the Integration Plans
- Responses to questions about the Integration Plans

The visioning exercise comprised:

- An explanation of the visioning task
- Break-out groups working on the task
- Reporting back to the workshop
- A Wrap-up Statement

3 Citizen Participation Techniques

The process goals guided the choice of citizen participation techniques. The workshop began participation by going around the room and asking each person to introduce themselves to the group. Written questions and small-group work enhanced the opportunity for each participant to be heard.

The question and answer period following the presentation of information about the Integration Plans used written questions. Each participant was given several sheets of 2.5 by 4 inch "Post-Its" and asked to write their questions – one to a sheet on these notes and then stick them on a blackboard in the front of the room. The break for participants allowed staff time to organize the questions by category and combine duplicates. Follow-up spoken questions were allowed if the presenter did not answer a question to the full satisfaction of the participants. The questions are listed in Annex A.

The visioning task was conducted in small groups with people from all three cities in each group. The group leaders were assigned the responsibility for (1) ensuring that all members of the group had an opportunity to contribute ideas, and then helping the group decide which ideas should be included in its vision, (2) assigning one person to keep a written record of the group discussions, and (3) presenting the group's vision to the full workshop. This description of the leader's responsibilities was part of the directions for the vision task.

The description of the vision task was very specific and bolstered with examples to increase participants' comfort with visioning, which was an unfamiliar concept to most. The vision task instructions were given in a very brief (four-slide) presentation, and then each participant was given a copy of the presentation. This handout is in Annex A. The vision task concluded with the presentations from each group. There was no attempt to reach a consensus vision for the workshop.

4 Results

Most small group reports made recommendations about implementation of integration plans and echoed comments submitted as written questions. However, all but one also described at least some components of their vision for CZT in 2010. The reports expressed support for integration and produced several consistent themes that will be useful guidance for the CDS. There was a clear consensus on several points:

- Integration would make the region stronger economically.
- Integration would strengthen the urban infrastructure through coordination and the avoidance of duplication.
- Integration planning should include environmental and heritage protection – especially of the river and the area at the conjunction of the three cities.
- The three cities should retain individual characters after integration.

The group that reported the most complete vision of the future after integration described a region with three million residents that would be consistent with the other groups' recommendations:

- *Changsha will be a hi-tech, intensively developed city and the commercial center of Hunan*
- *Zhuzhou will be a transportation center in south China and a regional industry center*
- *Xiangtan will be a tourist resort*
- *In the center of the three cities, there will be an ecological protection zone*

Group reports consistently called for strong leadership from the provincial government to implement integration. There was clear consensus that strong support from the provincial level was the most crucial issue for implementing integration. It was noted that the capacity of the three municipal governments to coordinate plans and activities is limited by forces such as provincialism and administrative inadequacies.

The Integration Office of the Hunan Planning Commission stated that they were satisfied with the workshop. The information provided some confirmation of their ideas plus some new ideas. It also produced public expression of some hard truths, which the Integration Office knew but was reluctant to state themselves. These are, in fact, the same functions that citizen participation plays for US local governments.

The citizen participation workshop was a success in terms of its process goals. The participants engaged in active discussions and exhibited both engagement and good humor. At the conclusion of the workshop, several participants expressed the opinion that there should be further citizen participation workshops – both within and outside the context of the CDS. The government officials saw the operation and value of new techniques for citizen participation, which they expect to use in the future. They would like to receive additional information about citizen participation techniques.

There was only one area of criticism. Several participants stated that the time allowed for the visioning task, 1.25 hours, was not sufficient. For future citizen participation workshops that time should be expanded perhaps to 1.5 hours and/or the vision task should be more tightly defined.

Agenda

- 9:00 Welcome
Peng Shun Xi, Hunan Provincial Development and Planning Commission
- The World Bank CDS Program and Workshop Purpose
Reg McLemore, Chreod Ltd.
- Introduction of Participants
- 9:30 Chan-Zhu-Tan Integration Plans Presentation
Peng Shun Xi, Hunan Provincial Development and Planning Commission
- 10:30 BREAK (Participants place questions on board in the front of the room)
- 10:50 Response to questions; discussion
Peng Shun Xi, Hunan Provincial Development and Planning Commission
- 11:45 Morning Session Ends
- 12:10 Lunch
- 13:30 Introduction to the Vision Task
Pat Dusenbury, The Urban Institute
- 13:45 Group Work (room assignments will be provided)
- 15:00 Presentation of Group Visions
- 15:50 Workshop Wrap-up
Peng Shun Xi, Hunan Provincial Development and Planning Commission
- 16:00 Adjourn

Written Questions and Comments

Questions and Comments about Implementation and Institutional Support:

How to finance and invest in these projects?

Hunan province should begin now to take care of some important projects that are financed by city but will exert strong influence to the integration program.

How will you break through current "city-based" institution to form real region-based one?

How to position the relationship of "integration" and "individual city"?

Is there any policy prepared which would really push the progress of integration? How will it avoid the disorder in the development of the three cities?

How powerful should the plans (master plan and sector development plan) be? How to guarantee their implementation?

If there were no integrated administration institution, no integrated master plan, then economy integration would be only a short-lived concept.

If Integration Office is only a coordination agency, it is less useful for the real integration action.

Need to strengthen the leadership of integration program - identify a vice-governor of province who will be in charge of the integration program.

The theoretic support and objectives for current integration are still not clear enough.

How to position the integrated region of Chang-Zhu-Tan? What is its role in south of China?

What is the difference among the cities of Wuhan, Guangzhou and CZT?

Though the consideration of government-function integration is not underway at this stage, necessary adjustment of administrative function for the cross-areas among the three cities should be taken into account to reduce the duplication of government function there.

Government integration for Xiangtan and Zhuzhou would be easier and the integration of the two cities would be beneficial for the current integration program.

Make good plan to avoid duplication of construction and to save resources.

The CDS project should take international experience as its reference.

Questions and Comments about Land Use and Urban Design

Is a big city which includes the three cities to be formed in the future? If it is, where will the central area of it be? Muyun in Changsha and Yijiawan in Xiangtan are the geographic center, and so land control there should be considered from now on.

How to enforce the administration at the junction area among the three cities? Real estate developers only pay attention to build houses for profit, but who will be in charge of the administration of newly built communities?

Why don't you move the provincial administration buildings to the center of the three cities?

Control land use in the central area of the three cities.

Is there any special consideration for the development of towns in this area from the terms of integration?

How to move big and good enterprises to the center of the three cities?

What are their functions for the three cities? And how will these functions be reflected by the integration program?

How to coordinate the plan, which is to be made based on integration concept but has not done yet, and the current city master plans, which have been approved? If there is any contradiction, what is to be done?

There should be phased development plans and the goals for each phase should be clear.

Prepare process list and time schedule for the integration. If there is any contradiction with current Tenth Five-year plan, what measure will be taken?

If there is contradiction between the project of industries and planned land use, what will happen?

Questions and Comments about Transportation and Other Infrastructure

Is there any duplication between the light railway project and the project of roads along the Xiangjiang?

Have the city development tendency and environment issues been taken into account when considering the project of light railway.

How about a trolley bus system instead of a light railway?

There should be a study about the light railway project.

It is not urgent to build the high way from Zhuzhou to Huanghua International Airport, at least at this moment. Its benefit is a question.

With integration, it is reasonable to take the phone-line among the three cities as the same local calling area?

Questions and Comments about the Environment

How to coordinate the different issues related to development of economy and ecologic environment protection?

How to handle environment problem in this area, especially for Xiangjiang River? Zhuzhou and Xiangtan are located upstream of Changsha, their outlets of drainage are up the inlet of drinking water of Changsha. Integration should be reflected by the project of the treatment of Xiangjiang River.

Development of chemical enterprises along with Xiangjiang River should be controlled. Several chemical enterprises are moved from Zhaoshan to Zhubugang where it is even named as Chemical Industry Area, but the fact is Zhubugang is just besides Xiangjiang River.

Questions and Comments about Education and Culture

The foundation of culture in the three cities is quite strong, how to support the economic integration by using these resources?

Strong foundation of culture in the three cities asks for preparation of a plan based on the idea of culture integration.

It was said that some big cultural projects (theaters and ---) were under plan by each city. Is it necessary?

The integration for transportation, finance, power, information, environment has been planned. Is it the time to make integration plan for education now?

Questions and Comments about Industrial Development

What kind consideration has been made regarding to the industry development in the three cities? Industry development strategy is still not clear, current plan is not operational to some extent.

How to realize agriculture modernization? How to help and enlarge agriculture-related enterprises?

What is the future of Zhuzhou which is a typical industrial city?

Zhuzhou is an industrial city and transportation center. It should become a hi-tech industry city.

The term of economy integration means to identify economic position for each city. Please tell us what it is.

Sector development plan should be much detailed; for example, motor-cycle market is considered or not. If it is, where it will be located? And how government will support these markets?

What kind of measures will be taken by government to guarantee good investment environment for enterprises? Government is planning to support traditional industries or not?

Make sector development plan, do not count on each city to have full variety of sectors.

Economic integration should contain the integration of tourism, culture, education and so on.

Questions and Comments about Specific Project

For the project of river belt, different sections in different cities should have their own characters.

When will the project of river belt really start?

The Belt of Xiangjiang River should extend to the location of Zhuzhou navigation and hydraulic hub. The scenery of reservoir there is beautiful and two bands of the river have been done, in addition to the fact that 130,000 people lived in three towns on the way of the extension can be benefited.

The project of Yuelu mountain University City should include Science and Technology Park of Xiangtan University. 20 minutes of driving by Tan-Wang highway are not a long distance.

Vision Task Presentation

WORKSHOP GOAL

Get information and ideas to help
Guide integration planning

WORKSHOP PROCESS

1. Provide information about Integration Plans
2. Ask participants to envision the future resulting from successful integration

VISION TASK

The April 23, 2010 Hong Kong newspaper has a front-page article about the economic, physical and social progress that has occurred in ChangZhuTan as a result of integration. The vision task is to imagine what that article would say.

What might it say about:

- how integration has helped economic development in C-Z-T
- the role C-Z-T now plays in the national economy
- how the economic base of the C-Z-T region has changed in the last nine years
- how the quality of life has improved for C-Z-T residents
- any unintended consequences of integration
- how the cities of Changsha, Zhuzhou and Xiangtan are alike and how they are different

Small Group Report Summary

The following summarizes the key points from each groups report back to the citizen participation workshop.

GROUP 1

The CZT region will be very important – the leading economic force - in south China and 11th economically in China.

C-Z-T is an economic fulcrum connecting east and west China.

The scenic economy belt gives prominence to cultural characteristics and polluting enterprises are prohibited along the river.

Integration highlights the role of the central city and enlarges its impact. Stronger community management extends to areas on the urban fringes and they are no longer neglected.

Integration should:

- build on each city's advantages so they complement each other
- avoid duplication in construction projects
- pay attention to environmental protection

GROUP 2

People support integration.

Some think CZT will be a large metropolis while others think it should focus on being an economically strong city.

The conjunction of the three cities is properly planned and designed.

Integrations should:

1. highlight focal points
2. prioritize projects benefiting all three cities; such as, integrated power system, telecommunication network, integrated financial system, integrated public transportation system
3. learn from lessons of other cities
4. be guaranteed of implementation

GROUP 3

The people support integration but it is not moving ahead enough due to barriers as the local government level. These include:

- inadequate collaboration among the three cities,
- relatively poor local government capacity – personnel and financial management systems, and
- local protectionism.

The provincial government should pay more attention to integration and strengthen the effort.

There is concern that some projects – for example, the Provincial Television and Broadcasting Center - are being built in the area where the three cities come together.

GROUP 4

People support CZT integration.

Integration highlights the role of the central city and enlarges its impact to the surrounding areas.

CZT is the leading force in Hunan and the economic center of south China.

Integration extends to the urban management system in CZT.

There is legislative support for urban planning and sustainable development.

Integration includes ecological protection in the CZT region and protection of historic relics.

Integration should:

- adjust measures to local conditions
- build upon the advantages of each city

GROUP 5

The CZT region will have a population of three million in the three cities and will have large impact on surrounding areas.

Integration will bring greatly improved living standards for people and a better life for the lower-income residents.

Changsha will be a hi-tech, intensively developed city and the commercial center of Hunan.

Zhuzhou will be a transportation center in south China and a regional industry center.

Xiangtan will be a tourist resort.

In the center of the three cities, there will be an ecological protection zone.

Integration should:

- be based on government organizing, expert consultation, and market operation.
- include legislation to support coordinated urban planning
- address issues of lagging infrastructure, duplicated construction, and deteriorating environment.

Annex B

List of Major Infrastructure Projects

CZT

prepared by Hunan Provincial Planning Commission, May 16, 2001

	Project Name	Project Description	Total Cost	invested up to date	investment in TFY
CZT_1	CZT Xiang River Parkway Rural	Phase 1: West Bank Parkway, 44.7 km, Y 3.9 billion phase 2: East Bank Parkway + part of west bank, 152 km,	3,900,000,000		3,900,000,000
CZT_2	Hongqi Freight Hub	handling 4 million t/y, + 60,000 containers (ETU)	276,000,000		276,000,000
CZT_3	Changsha Hydro Dam	hydro electricity plant:63 MW; flood control dam; barge dock	1,880,000,000		
CZT_4	CZT Light Rail Transit	total length 57.8 km Changsha - Zhuzhou: 32.2 km, Huangjingwan - Xiangtan 25.6 km	1,862,000,000		1,862,000,000
CZT_5	CZT Environment Improvement Package	domestic sewage secondary treatment: + 35,000 t/d solid waste treatment:+ 900 t/d	1,538,690,000		1,498,690,000
CS_1	Changsha No. 3 Waste Water Treatment Plant Phase 1	150,000 t/d	125,000,000		125,000,000
CS_2	New Century Waste Water Treatment Plant	35,000 t/d	69,500,000		69,500,000
CS_3	Jingkui Waste Water Treatment Plant	60,000 t/d	80,200,000		80,200,000
ZZ_7	Longquan Sewage Treatment Plant	secondary treatment: 100,000 t/d (20% industrial, 80% domestic); phase 1: 60,000 t/d, phase 2: 40,000 t/d	249,860,000		249,860,000
ZZ_8	Hexi Sewage Treatment Plant	domestic WW secondary treatment: 200,000 t/d	320,000,000		320,000,000
XT_1	Xiangtan Hexi Sewage Treatment Plant	phase 1: 150,000 t/d, (phase 2: + 50,000 t/d)	173,500,000	40,000,000	133,500,000
XT_2	Xiangtan Hedong (Wulidui) Sewage Treatment Plant	150,000 t/d	170,000,000		170,000,000
ZZ_9	Nanjiao Solid Waste Treatment Site	domestic SW treatment: 600 t/d phase 1: dump 300 t/d, Y 37 million phase 2: incineration 300 t/d, Y 26.13 million	63,130,000		63,130,000
XT_7	Xiangtan Solid Waste Treatment Plant	domestic solid waste treatment 600 t/d, dupm site 4.67ha, SW treatment site: 5.37 ha	60,000,000		60,000,000
ZZ_10	Zhuozhou Coal Washing Center	coal washing: 2.5 mn t/y; liquidized coal: 500,000 t/y; packed coal: 150,000 t/y	227,500,000		227,500,000
CZT_6	Yuelushan University City		160,000,000		160,000,000
	Yuelushan University City LAN and Remote Class		160,000,000		160,000,000
CZT_7	CZT NG Package	2003: 538 million m3/y 2006: 839 million m3/y	2,231,480,000		1,588,960,000
CS_7	Changsha Natural Gas Supply	2003: 86 million m3/y 2006: 360 million m3/y	1,590,000,000		1,200,000,000
ZZ_11	Zhuzhou Natural Gas Project	2003-2006: 254 million m3/y; Y 144.24 million 2006-2010: 281 million m3/y; Y 201.02 million	345,260,000		144,240,000
XT_3	Xiangtan Natural Gas Supply Project	198 million m3/y	296,220,000		244,720,000
Total			11,848,170,000		9,285,650,000

CZT

prepared by Hunan Provincial Planning Commission.

	Project Name	Current Status of the Projects
CZT_1	CZT Xiang River Parkway Rural	
CZT_2	Hongqi Freight Hub	project proposal approved
CZT_3	Changsha Hydro Dam	
CZT_4	CZT Light Rail Transit	project proposal approved, feasibility study submitted
CZT_5	CZT Environment Improvement Package	project proposal approved
CS_1	Changsha No. 3 Waste Water Treatment Plant Phase 1	project proposal approved
CS_2	New Century Waste Water Treatment Plant	project proposal approved
CS_3	Jingkui Waste Water Treatment Plant	project proposal approved
ZZ_7	Longquan Sewage Treatment Plant	Engineering Deisgn of phase 1 submitted,
ZZ_8	Hexi Sewage Treatment Plant	project proposal not submitted yet
XT_1	Xiangtan Hexi Sewage Treatment Plant	phase 1 under construction,
XT_2	Xiangtan Hedong (Wulidui) Sewage Treatment Plant	haven't submit project proposal
ZZ_9	Nanjiao Solid Waste Treatment Site	phase 1 under construction
XT_7	Xiangtan Solid Waste Treatment Plant	project poposal approved
ZZ_10	Zhuozhou Coal Washing Center	project proposal approved
CZT_6	Yuelushan University City	
	Yuelushan University City LAN and Remote Class	under construction
CZT_7	CZT NG Package	
CS_7	Changsha Natural Gas Supply	project proposal approved
ZZ_11	Zhuzhou Natural Gas Project	project proposal approved
XT_3	Xiangtan Natural Gas Supply Project	project poposal approved, feasibility study completed

Changsha

prepared by Changsha Municipal Planning Commission,
May 16, 2001

	Project Name	Project Description	Implementation	Total Cost	invested up to date	investment in TFY
CS_1	Changsha No. 3 Waste Water Treatment Plant Phase 1	150,000 t/d	2001-2005	125,000,000		125,000,000
CS_2	New Century Waste Water Treatment Plant	35,000 t/d	2001-2004	69,500,000		69,500,000
CS_3	Jingkui Waste Water Treatment Plant	60,000 t/d	2002-2005	80,200,000		80,200,000
CS_4	Upgrading of Xiangjiang Wastewater Pumping Stations	4 drainage pumping stations	2000-2003	110,000,000		110,000,000
CS_5	Changsha Section of Clean Water Project	water diversion: 86 km; water distribution mains: 150 km; drinking water treatment plant: 600,000 t/d	2002-2006	243,700,000		1,400,000,000
CS_6	Central Changsha Urban Rehabilitation	heritage conservation / rehabilitation of Xiaoximen historic community	2002-2005	246,000,000		246,000,000
CS_7	Changsha Natural Gas Supply	2003: 86 million m3/y 2006: 360 million m3/y	2003-2006	1,590,000,000		1,200,000,000
CS_8	Changsha Xiang River Parkway	East City Parkway: 10.36 km; Y 2 billion West City Parkway: 8.4 km; Y 700 million	2001-2020	16,500,000,000		2,700,000,000
CS_9	Upgrading of Provincial Highway 1810 (Ningxiang-Hengqing)	38 km, upgrading from grade 4 to grade 2	2010-2003	68,000,000		68,000,000
CS_10	Changsha Urban Main Roads Projects (3+3)	28 km; two parkways, Furong Rd (N), Zhanlan Rd, Renmin Rd., Laodong Rd (W) and bridge	99-2005	2,758,000,000	90,000,000	2,668,000,000
CS_11	Huanghua Airport Freeway	19.4 km, 26 m wide	2001-2003	250,000,000		250,000,000
CS_12	CZT Light Rail Transit	57.8 km	2002-2006	2,600,000,000		2,300,000,000
CS_13	Western Changsha to Xiangtan Expressway	27 km	2002-2006	809,000,000		540,000,000
CS_14	Liuyang to Daweishan Freeway	55 km				
CS_15	Changsha Xianing Port Phase 1	1,000 tonnage port: 4 150 tonnage port:3	2000-2002	480,000,000		480,000,000
CS_16	Changsha Old City Roads Improvement	upgrading 13 urban roads, 1 interchange in the old Changsha urban area, 44 km in total	1999-	2,969,000,000	220,000,000	2,749,000,000
CS_17	Wangcheng County Roads Projects	two roads in Wangcheng County capital town, 12.6 km in total, including Zhanqian Rd, Xikuan Rd	1999-2005	284,600,000	33,000,000	251,600,000
Total				29,183,000,000	343,000,000	15,237,300,000

Changsha

prepared by Changsha Municipal Planning Commission,
May 16, 2001

	Project Name	financing				
		local gov fiscal fund	state bond fund	foreign loan/investn	domestic loan	self-raised fund
CS_1	Changsha No. 3 Waste Water Treatment Plant Phase 1	proposed WB loan, gov fiscal fund subject to external financing received			37,500,000	25,000,000
CS_2	New Century Waste Water Treatment Plant				UDIC as part of 3 WWTP and Clean Water Loan	
CS_3	Jingkui Waste Water Treatment Plant					
CS_4	Upgrading of Xiangjiang Wastewater Pumping Stations					
CS_5	Changsha Section of Clean Water Project			800,000,000	300,000,000	300,000,000
CS_6	Central Changsha Urban Rehabilitation					
CS_7	Changsha Natural Gas Supply					
CS_8	Changsha Xiang River Parkway					
CS_9	Upgrading of Provincial Highway 1810 (Ningxiang-Hengqing)					
CS_10	Changsha Urban Main Roads Projects (3+3)					
CS_11	Huanghua Airport Freeway					
CS_12	CZT Light Rail Transit					
CS_13	Western Changsha to Xiangtan Expressway					
CS_14	Liuyang to Daweishan Freeway					
CS_15	Changsha Xianing Port Phase 1					
CS_16	Changsha Old City Roads Improvement					
CS_17	Wangcheng County Roads Projects					

Changsha

prepared by Changsha Municipal Planning Commission,
May 16, 2001

	Project Name	Current Status of the Projects
CS_1	Changsha No. 3 Waste Water Treatment Plant Phase 1	project proposal approved
CS_2	New Century Waste Water Treatment Plant	project proposal approved
CS_3	Jingkui Waste Water Treatment Plant	project proposal approved
CS_4	Upgrading of Xiangjiang Wastewater Pumping Stations	project proposal approved
CS_5	Changsha Section of Clean Water Project	project proposal submitted to SDPC
CS_6	Central Changsha Urban Rehabilitation	project proposal not submitted yet
CS_7	Changsha Natural Gas Supply	project proposal approved
CS_8	Changsha Xiang River Parkway	phase 1 of 1.9 km under construction
CS_9	Upgrading of Provincial Highway 1810 (Ningxiang-Hengqing)	
CS_10	Changsha Urban Main Roads Projects (3+3)	under construction
CS_11	Huanghua Airport Freeway	project proposal submitted
CS_12	CZT Light Rail Transit	project proposal approved, feasibility study submitted
CS_13	Western Changsha to Xiangtan Expressway	preparing feasibility study
CS_14	Liuyang to Daweishan Freeway	
CS_15	Changsha Xianing Port Phase 1	project proposal approved, preliminary FS approved
CS_16	Changsha Old City Roads Improvement	under construction
CS_17	Wangcheng County Roads Projects	under construction

Zhuzhou

prepared by Zhuzhou Municipal Planning Commission,
May 23, 2001

	Project Name	Project Description	Implementation	Total Cost	invested up to date	investment in TFY
ZZ_1	Zhuzhou Urban Express Ring Road	total length: 32.8km, six sections, two bridges, three interchange	1999-2004	1,836,000,000	294,000,000	1,542,000,000
ZZ_2	National Hiway 106 Upgrading	total length: 280.39 km, four segments, upgrading road from grade 4 to grade 2, toll road after upgraded	2001-2003	750,340,000	100,000,000	650,340,000
ZZ_3	Liling - Yanling Expressway	total length:180 km	2003-2008	7,360,000,000		2,000,000,000
ZZ_4	Zhuzhou - Huanghua Airport Expressway	total length: 35km, km within Zhuzhou municipality boundary 14.7	2002-2004	450,000,000		450,000,000
ZZ_5	Zhuzhou Section of ShangRui NTHS Expressway	72 km within Zhuzhou municipality boundary	2002-2005	2,200,000,000		2,200,000,000
ZZ_6	Hongqi Freight Hub	handling 4 million t/y, + 60,000 containers (ETU)	2001-2005	276,000,000		276,000,000
ZZ_7	Longquan Sewage Treatment Plant	secondary treatment: 100,000 t/d (20% industrial, 80% domestic); phase 1: 60,000 t/d, phase 2: 40,000 t/d	2001-2005	249,860,000		249,860,000
ZZ_8	Hexi Sewage Treatment Plant	domestic WW secondary treatment: 200,000 t/d	2003-2005	320,000,000		320,000,000
ZZ_9	Nanjiao Solid Waste Treatment Site	domestic SW treatment: 600 t/d phase 1: dump 300 t/d, Y 37 million phase 2: incineration 300 t/d, Y 26.13 million	2001-2003	63,130,000		63,130,000
ZZ_10	Zhuozhou Coal Washing Center	coal washing: 2.5 mn t/y; liquidized coal: 500,000 t/y; packed coal: 150,000 t/y	2001-2003	227,500,000		227,500,000
ZZ_11	Zhuzhou Natural Gas Project	2003-2006: 254 million m3/y; Y 144.24 million 2006-2010: 281 million m3/y; Y 201.02 million	2002-2010	345,260,000		144,240,000
ZZ_12	Zhuzhou Clean Drinking Water Supply Project	clean drinking water 10,000 t/d	2002-2015	870,000,000		300,000,000
ZZ_13	Zhuzhou Urban Flood Control Project	Xiang River bank enhancement, drainage pumping	1994-2005	320,000,000	150,000,000	170,000,000
ZZ_14	Zhuzhou Bus Maitenance/Parking Stations	6 bus manitenance/parking stations	2002-2004	80,000,000		80,000,000
Total				15,348,090,000	544,000,000	8,673,070,000

Zhuzhou

prepared by Zhuzhou Municipal Planning Commission,
May 23, 2001

	Project Name	financing					Current Status of the Projects
		local gov fiscal fund	state bond fund	foreign loan/investn	domestic loan	self-raised fund	
ZZ_1	Zhuzhou Urban Express Ring Road	1,140,000,000	100,000,000		600,000,000		under construction,
ZZ_2	National Hiway 106 Upgrading	no muni. fiscal input	Y 153.4 million Subsidies from Prov Transportation Commission; Y 162.6 million of domestic bank loans; Y 120 million of County Governments' input, balance of Y 214.34 million not identified, proposed for WB loan				project proposal proposed by Prov Planning Commission
ZZ_3	Liling - Yanling Expressway	no muni. fiscal input	financing sources not identified yet				project proposal not submitted yet
ZZ_4	Zhuzhou - Huanghua Airport Expressway	no muni. fiscal input	financing sources not identified yet				project proposal approved
ZZ_5	Zhuzhou Section of ShangRui NTHS Expressway	no muni. fiscal input	financing sources not identified yet				project proposal approved
ZZ_6	Hongqi Freight Hub	no muni. fiscal input	financing sources not identified yet				project proposal approved
ZZ_7	Longquan Sewage Treatment Plant	16,000,000		60,000,000	173,860,000		Engineering Deisgn of phase 1 submitted,
ZZ_8	Hexi Sewage Treatment Plant	financing sources ont identified yet					project proposal not submitted yet
ZZ_9	Nanjiao Solid Waste Treatment Site	14,800,000		26,130,000	22,200,000	-	phase 1 under construction
ZZ_10	Zhuozhou Coal Washing Center	no muni. fiscal input	-	financing sources of Y 157.5 million not identified yet		70,000,000	project proposal approved
ZZ_11	Zhuzhou Natural Gas Project	funding sources for balance of Y 88.24 million not identified yet				56,000,000	project proposal approved
ZZ_12	Zhuzhou Clean Drinking Water Supply Project	funding sources not identified yet					project proposal not submitted yet
ZZ_13	Zhuzhou Urban Flood Control Project	85,000,000	Y 85 million to be identified			-	phase 1 completed
ZZ_14	Zhuzhou Bus Maitenance/Parking Stations	no muni. fiscal input	-	Y 60 million to be identified		20,000,000	project proposal not submitted yet

Xiangtan

prepared by Xiangtan Municipal Planning
Commission, May 21, 2001

	Project Name	Project Description	Implement	Total Cost	invested up to date	investment in TFY	financing					Current Status of the Projects
							local gov fiscal fund	state bond fund	foreign loan/investn	domestic loan	self-raised fund	
XT_1	Xiangtan Hexi Sewage Treatment Plant	phase 1: 150,000 t/d, (phase 2: + 50,000 t/d)	2000-2003	173,500,000	40,000,000	133,500,000	45,500,000	45,000,000	83,000,000	-	-	phase 1 under construction,
XT_2	Xiangtan Hedong (Wulidui) Sewage Treatment Plant	150,000 t/d	2003-2005	170,000,000		170,000,000	financing sources to be identified					haven't submit project proposal
XT_3	Xiangtan Natural Gas Supply Project	198 million m ³ /y	2002-2010	296,220,000		244,720,000	-		143,500,000	20,000,000	81,220,000	project poposal approved, feasibility study completed
XT_4	Xiangtan Urban Ringroad, North 2 section	12.84 km	2000-2003	347,000,000		347,000,000	-		232,000,000	65,000,000	50,000,000	construction started in April 2001
XT_5	Xiangtan Urban Clean Drinking Waster Supply Project	200,000 m ³ /d (phase 2: + 200,000 m ³ /d); upgrading water distribution network	2000-2010	1,800,000,000	86,000,000	350,000,000	22,000,000	28,000,000	164,000,000	100,000,000	36,000,000	one of the four componets (XT WTP No1) is under construction
XT_6	Yisuhe Water Treatment Plant, Xiangtan County	expending 30,000 t/d (phase 1 of 30,000 t/d completed in 1999, operating)	2002-2005	63,260,000	32,000,000	31,260,000	-		Y 18 million to be identified		13,260,000	phase 1 completed in 1999, now operationing
XT_7	Xiangtan Solid Waste Treatment Plant	domestic solid waste treatment 600 t/d, dump site 4.67ha, SW treatment site: 5.37 ha	2001-2003	60,000,000		60,000,000	20,000,000		Y 10,000,000 to be identified		30,000,000	project poposal approved
XT_8	Xiangtan Xiang River Parkway Project	total length 42 km, phase 1: 2.7 km of section in urban area	2002-2004	200,000,000		200,000,000	100,000,000		Y 100 million to be identified		-	project poposal not submitted, subject to further coordination of CZT Xiang River Parkway
Total				3,109,980,000	158,000,000	1,536,480,000						

Annex C

Maps