

LAD CASE STUDY

Luxury or Priority? Ethiopia Wants a Light Rail

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LAD

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Introduction

With a rapidly growing population, Ethiopia's capital Addis Ababa is in urgent need of a more efficient urban transport system. According to Mulugeta Gudeta of the Addis Ababa Chamber of Commerce, "The state of public transportation in Addis Ababa is perhaps the weakest link in the otherwise fast growing economy in the Ethiopian capital," one major problem being "an increasing discrepancy between supply and demand."¹ Currently, the city has two main forms of public transport: buses run by the state-owned company, Anbessa, and the 'blue donkeys,' or blue-and-white minibus taxis, a hybrid of bus and taxi that picks up passengers and drops them wherever they want to go.² Each has its shortcomings. Whereas the publicly run bus services are scarce, costly and inefficient, the minibus taxis have a limited capacity of 15 to 20 passengers each.³ Moreover, the proliferation of minibus taxis has caused traffic congestion due to "chaotic movement," and led to other problems such as "environmentally unacceptable emissions" and frequent traffic accidents "hazardous to life and property."⁴ Economic activities are seriously affected by traffic congestion. According to a 2012 World Bank study, for example, congestion in Egypt's capital Cairo costs the country \$8 billion a year due to lost productivity, additional fuel consumption and the impact of pollution.⁵ An Ethiopian business owner has complained that his employees often cite traffic jams as an excuse for late arrival.⁶

In response, in early 2007 the Ministry of Transport and Communications (MoTC) of the Federal Democratic Republic of Ethiopia set up a steering committee to find a solution to congestion. Among all the options, Light Rail Transit (LRT) was considered the best for multiple reasons, not least because it was viewed as a part of Ethiopia's national rail strategy.

However, according to official sources, the major challenge is "high investment costs."⁷ In April 2008, the first EPC turnkey tender was issued by Ethiopian Railways Corporation (ERC), a state-owned enterprise set up by the government to take charge of the country's railway construction, including the LRT project. Three tenders submitted proposals, but the pre-contract negotiation failed for financial reasons—"high cost" and "unconfirmed finance source."⁸ The Ethiopian government hoped that the builder could help find the required funding, but unfortunately none of the tenders could do so at that time.⁹

Lin Le conducted interviews and prepared this case under the supervision of Francis Fukuyama of Stanford University. This case was developed solely as a basis for class discussion. It is not intended to serve as a historical record, a source of primary data, or an illustration of effective or ineffective management.

Through high level contact with Chinese representatives, the then Ethiopian Prime Minister Meles Zenawi finally managed to secure support from the Chinese government for the LRT project, with the Chinese Embassy in Ethiopia playing a mediating role.¹⁰ This meant that funding the LRT project became a political task for the Export-Import (Exim) Bank of China.¹¹

The project resumed in July 2009. China Railway Engineering Corporation (CREC) presented a conceptual design and cost estimate to ERC, and the EPC turnkey contract was signed in September.¹² This time, financing did not seem to pose a problem. The Chinese Exim bank ultimately approved a loan to cover 85% of the construction cost, provided that the Ethiopian government be responsible for the remaining 15% with a matching fund. (Appendix A)

Now, it is mid-June 2011, and the Ethiopian government must decide whether Ethiopia should accept the loan and build the LRT. While financial support from the Chinese could initiate this much desired project immediately, it is a commercial loan that comes with a high interest rate and short repayment time. In other words, it is expensive. (Appendix A) A loan is by no means a free lunch: the Ethiopian government must repay it at some point in the future.

In short, the question is whether the high cost of an urbanization project, i.e. the LRT, should be assumed at this moment. Ethiopia is a developing country that greatly needs funds elsewhere for other kinds of infrastructure. Is the LRT is an immediate priority?

Ethiopia's Developmental State

Ethiopia, under the leadership of Prime Minister Meles Zenawi, has been following the path of a developmental state since the early 2000s. Inspired by successful East Asian economies that were characterized by government intervention in the process of industrialization, Meles called for a paradigm shift from the predatory state to pursuit of fast economic growth “as a way of ensuring Ethiopia’s survival.”¹³

Beginning in 2002-2003, Meles initiated a succession of large scale, state-led developmental plans, e.g. the Sustainable Development and Poverty Reduction Program (2002-2005), the Plan for Accelerated and Sustained Development to End Poverty (2005-2010), and the Growth and Transformation Plans I and II (GTPI 2010–2015, and GTPII 2015-2020). The Ethiopian economy experienced rapid growth after 2004. (Appendix B)

“Transformation” means industrialization. The GTP aimed at turning Ethiopia into a middle-income country by 2025, mainly through development of light manufacturing capabilities. Prioritized sectors include textiles and apparel, leather and leather products, agro-processing, and pharmaceuticals and chemicals. While Ethiopia has huge potential in developing labor intensive manufacturing industry, it suffers multiple constraints such as access to land, trade logistics,

customs regulations, and a skills gap. However, in the eyes of Ethiopian authorities, the country's fundamental problem is weak infrastructure. As a senior official at Development Bank of Ethiopia put it, "Without infrastructure you can do nothing."¹⁴ In fact, Ethiopian authorities attributed the economic success of China to prioritization of the infrastructure sector. And Ethiopia appears to have adopted China as its model of a developmental state.

Ethiopia's Infrastructure Demand and Burden

Over the next decade, Ethiopia must find \$5.2 billion to meet its infrastructure needs; capital expenditure accounts for 82 percent of the total amount, according to a World Bank report published in March 2011.¹⁵ (Appendix C)

Surveys of enterprises suggest that weak infrastructure is responsible for an estimated 50 percent of the productivity handicap faced by Ethiopian firms,¹⁶ and insufficient electricity supply has been their major infrastructure constraint. (Appendix D)

Ethiopia's power system is among the most underdeveloped in Sub-Saharan Africa. The installed generation capacity is less than 10 megawatts per million of population, less than half of the low-income country benchmark. Power consumption, at 33 kilowatt-hours per person per year, is about one-third of the low-income country benchmark. Ethiopia's access to electricity, at 12 percent, is among the lowest of all African countries. While urban access to electricity is as high as 86 percent, rural areas have almost no access to power. (Appendix E) The 2011 World Bank statistics show that about 82% of the total Ethiopian population (around 90 million) lives in rural areas.¹⁷

Its potential for exporting power, which could help bring Ethiopia much-needed foreign currency, is a strong incentive for prioritizing investment in the power sector. Proper use of Ethiopia's huge hydropower resources could potentially transform the country into one of the major power exporters on the continent. The long-term marginal cost of tapping into this power generating resource is around \$0.04 per kilowatt-hour, significantly lower than that of neighboring countries. Ethiopia may have the potential capacity to export more than 26 terawatt-hours of electricity per year (Appendix G) At a profit margin of \$0.01 per kilowatt-hour, power export could bring Ethiopia a handsome annual revenue of \$263 million (about two percent of the country's GDP).

However, power export would be an expensive ambition. To make the power trade possible, Ethiopia would have to first build up a cross border transmission capacity of 3000 megawatts, in addition to increasing overall generating capacity. In order to meet both Ethiopia's domestic demand and this export ambition in the next decade, some 8700 megawatts of generation capacity would have to be added to the currently installed 1200 megawatts. The cost would be

\$3.4 billion per year, with the export business costing almost one third of the total, more than \$1 billion per year.

Transport and water sanitary system investment needs are high in absolute terms, though small relative to the power needs. Each requires almost \$1 billion annually. (Appendix C).

According to the World Bank report, the gap between available and needed funds was \$3.5 billion per year, as of 2006. Over 77 percent (\$2.9 billion) of the infrastructure funding gap is in the power sector. (Appendix F)

In general, the financial burden on the Ethiopian government is massive. In terms of total infrastructure spending requirements, Ethiopia's is one of the highest in Sub-Saharan Africa at 42 percent of the country's GDP. (Appendix H) In terms of infrastructural spending as a share of GDP, Ethiopia remains one of the highest in Africa at around 10 percent of GDP. (Appendix I)

Is the LRT a Necessity at Present?

Given limited resources, is this the best time to build a modern urban transport system in a country with huge investment demand for other basic infrastructure? The MoTC must consider the importance and necessity for the proposed \$475 million LRT project relative to other infrastructure projects such as power generation.

In fact, stable electricity supply is so great a concern for the LRT that the light rail system is designed to be powered by its own dedicated grid, supported by an independent power station built specifically for the system.¹⁸ According to the Manager of the Light Rail Project, the LRT "will not have continuous interruptions or power shortage problems" because the system will not "share the power from the city of Addis."¹⁹

However, in economic terms, the \$3.4 billion Addis Ababa-Djibouti railway is arguably more important to Ethiopia than the LRT. (Box 1)

Box 1: Ethiopia's Railway Blueprint

Ethiopia has a grand strategy for the national railway: a 5,000km network crisscrossing and stretching into almost every area of the country. (Appendix K)²⁰ "The main purpose of the national network is to connect Ethiopia economically and increase access for imports and exports," explains Abebe Miheretu, head of information and public relations at the ERC.²¹ The network will link main productive centers and allow fast transport of commodities such as sugar, charcoal, potash, and coffee. The routes will extend to and connect Ethiopia with Djibouti, Sudan, South Sudan, and Kenya. (Appendix I) The "unintegrated nature of the country" and high transportation cost are two factors directly responsible for Ethiopia's poverty. "Bringing in the resources from the rural areas for processing is a problem," according to an Addis Ababa-based

consulting firm. "For a country that is looking to grow richer by light manufacturing, where margins are very low, you need to be doing volumes and railways become a very handy instrument."²²

A railway that links Addis Ababa to the port of Djibouti is obviously the most important part of the plan. As a landlocked country, Ethiopia must rely on the port of Djibouti as the only gateway for export of its internationally traded goods (90% to 95%). Trucks provide the current means of transport, making Ethiopia's trade logistics costly and uncompetitive.²³ A new 656-km rail track leading to the Djibouti border will be built to replace the old 781-km long narrow-gauge railway constructed by the French between 1897 and 1917.²⁴ Once completed, the new railway will reduce the transport time from Djibouti to the Ethiopian capital from 7 days to 10 hours.²⁵ The project will cost \$3.4 billion, and be built by two Chinese companies, the state-owned China Railway Group and the China Civil Engineering Construction Corporation.

Nevertheless, spending millions of dollars on a public transport that serves only the urban population seems extravagant for a country like Ethiopia where the problem of huge urban-rural inequality remains unresolved. More than 80 percent of the population (about 70 million people) currently lives in rural areas and relies on subsistence farming, according to the U.S. Agency for International Development.²⁶ Rural infrastructure is thus badly needed. Only 10 percent of Ethiopia's rural population lives within 2 kilometers of an all-weather road. This is only half of the benchmark level for low-income countries in Sub-Saharan Africa. This low level of rural road accessibility means a high degree of isolation.²⁷

However, some Ethiopian officials seem unconcerned about funding. When asked about priorities among all kinds of infrastructure projects, an official from the Ministry of Finance and Economic Cooperation commented that different types of infrastructure are "interrelated." For this reason, as this official put it, there is "a priority at each time." In this case, the LRT project now has priority over other infrastructure demands, which will have their turn to be prioritized for financing and investment in the future.²⁸ Currently, five light rail networks are under consideration, but there should be at least one in place to somehow solve the (traffic congestion) problem.²⁹

The Chinese Loan

China has been playing a crucial role in Ethiopia's infrastructure development. Between 2001 and 2007, Chinese infrastructure projects in Ethiopia accounted for 10 percent of all Chinese infrastructure projects in Africa. The three major sectors of Chinese activity are roads, energy, and communications.³⁰ Chinese companies have dominated Ethiopia's road and railway construction, carrying out about 70 percent of the road construction throughout the country with funding from Chinese banks. Construction of hydroelectric power plants is another field where Chinese companies are highly visible.³¹ (Appendix G)

At present, China's Exim Bank has agreed to finance 85% of the LRT project, at the 6-month LIBOR interest rate plus 2.6 percent, with a repayment period of 10 years,³² a grace period of three years, and 23 year maturity.³³ This rate is slightly higher than normal in comparison to Chinese loans for other infrastructure projects in Ethiopia—LIBOR plus 1.8 percent to 2.35 percent.³⁴ An Ethiopian official readily proclaimed that “the strong political will and commitment from the government” for the LRT project received “positive response from development partners regarding the financing.”³⁵

But according to Eskinder Mohammed, ERC Chief Officer of Contract Administration and Project Execution Department, given Ethiopia's current debt burdens and foreign currency shortage, this is quite an expensive loan. Negotiations with China's Exim Bank allowed for bargaining. “The loan should be concessional, because it is for infrastructure,” commented Eskinder Mohammed, “but the giver sets the rule.”³⁶

However, the Ethiopian government does not actually expect a full recovery of the cost directly from the LRT service. In the view of Talihun Tadesse, the Directorate of Ethiopia-China Development Cooperation Office at the Ethiopia Ministry of Finance and Economic Cooperation, infrastructure itself is not expected to generate enough profit for repayment of the loan. Instead, such funds are expected to come from the long-term economic development generated by improved infrastructure.³⁷

Transport Minister Workneh Gebeyu stresses that better infrastructure is the Ethiopian government's motive for subsidizing this transportation system, saying, “This is not for commercial purpose, it's for the public.”³⁸ Behailu Sintayehu, the Project Manager of Addis Ababa Light Rail Transit Project, ERC, points out that like “anywhere,” a light rail project is not profitable and must be subsidized.³⁹ Indeed, with a rate of maximum 27 cents per ride, the light rail will be much cheaper than taxi (\$2.5 across town) and bus (90 cents).⁴⁰ Other possible income sources include ticket sales, renting out spaces in stations, advertising and monetizing carbon credits.⁴¹

This loan will add to the already large borrowings from China, with the volume of debt rising from \$46 million in 2000-2001 to \$1.4 billion in 2009-2010, or 25 percent of Ethiopia's total debt. Some estimate that in 2011, China's share had risen to half of Ethiopia's total debt (\$3 to \$4 billion out of \$7 to \$8 billion).⁴²

But in May 2007, Beijing wrote off \$18.5 million in debts owed by Addis Ababa. This action seems to suggest that insolvency in the future need not be a major worry of the Ethiopian government, provided that close political ties with China remain stable and firm.

The Sino-Ethiopian Relationship

Sino-Ethiopian formal diplomatic relations began in 1970. But it was not until the 1990s, when the Ethiopian People's Revolutionary Democratic Front (EPRDF) led by Meles Zenawi took power, that the bilateral relations began to grow substantially. The rise of the EPRDF received US backing at first, so the regime initially gave priority to a market economy and favored a federal and democratic polity. In 1995, however, after a long debate, the EPRDF regime decided to move closer to China in a bid to balance against the influence of the West. At the first Forum on China-Africa Cooperation (FOCAC) meeting held in Beijing in 2000, Addis Ababa was chosen to host the second forum in 2003.

The 2005 election further strengthened the ties between Ethiopia and China. The opposition party won a third of the parliament seats, leading Meles to crack down on his political rivals through both political and violent means. Such incidents led to a deterioration in the relationship between Ethiopia and its traditional donors, the US and the EU, which began to attach conditions to aid.⁴³ Meles's authoritarian turn, however, was not incompatible with his adoption of a developmental state agenda.

Subsequently the Sino-Ethiopian relationship entered a new phase. Ethiopia has lent diplomatic support to China on many occasions. For example, in 2007, together with other African countries, Ethiopia prevented a resolution in the UN Human Rights Commission that reprimanded China for its human rights practices. In 2008, Prime Minister Meles stated that Tibet is China's domestic affair and external powers should not interfere. Moreover, the EPRDF has established close ties with the Chinese Communist Party. Meetings between high-level party officials are frequent. The two parties have exchanged ideas on issues such as ruling party organization and succession strategies. China also provides strategic support, including technical assistance and jamming equipment that helps Ethiopia's Information Security Network block signals from anti-government radio stations, a variety of weapons, and routine exchange military visits.⁴⁴

Accompanying the political partnership is deepened economic interaction. Bilateral trade has been growing rapidly, jumping from just \$32 million in 1992 to \$100 million in 2002 and to \$1.46 billion in 2009. There were 580 registered Chinese companies in Ethiopia in 2010 with 1,065 investment projects, operating with estimated investment capital of \$2.2 billion.⁴⁵

For Addis Ababa, China is a partner offering not only diplomatic support, but also sharing economic experiences, extending technical assistance, and more importantly, serving as a crucial financial source. China's foreign direct investment (FDI) in Ethiopia increased from only 1.5

percent of total FDI in 2000 to 16 percent in 2007. Total Chinese FDI in 2009 was \$74 million and in 2010 \$58.5 million.⁴⁶

Prime Minister Meles Zenawi has commented that “China has been playing an irreplaceable role in our economy. It has unparalleled contribution towards funding infrastructure activities.” In 2006, the Ethiopian government signed a major framework agreement on financing with the China EXIM Bank, leading to a rapid rise in the number of Chinese infrastructure projects. (Appendix J)

China’s Motivation

Ethiopia is a resource-poor country. Unlike the two Sudans, Nigeria, or Angola, it lacks even direct access to the sea; it does have some oil and gas in the eastern desert, the Ogaden, but the area is a danger zone. In 2007, nine Chinese workers from the Zhongyuan Petroleum Exploration Bureau were killed and seven others kidnapped by the Ogaden National Liberation Front (ONLF).⁴⁷ Thus the Sino-Ethiopian economic relationship does not follow the “money-for-resource” logic of conventional wisdom that describes China’s economic engagement with other African countries. Rather, China’s motivation is mainly diplomatic, strategic, and ideological. Yet the Chinese involvement in Ethiopia’s infrastructure and industrial sector does conform to the economic and commercial interests of Chinese enterprises.

First, Ethiopia provides a large market for Chinese manufactured goods, and it has consistently experienced a trade deficit with China. In 2004, Ethiopia imported \$291 million in goods from China and exported only \$16 million in value to China. In 2006, China became Ethiopia’s largest trading partner, passing Saudi Arabia, and has maintained that rank ever since. In 2011, according to International Monetary Fund statistics, Ethiopia imported \$987 million in goods from China and exported \$265 million in value to China.⁴⁸

Likewise, Ethiopia represents a huge untapped market for infrastructure construction. After decades of intensive domestic infrastructure investment, China’s own infrastructure market is approaching saturation and excess productivity has been a problem looming large. For Chinese infrastructure construction companies, an infrastructure-weak country like Ethiopia provides abundant business opportunities.⁴⁹

As part of China’s global strategy launched in the 1990s, many large infrastructure projects receive loans from the so-called policy banks, most notably China Export-Import Bank and China Development Bank. Projects receiving Chinese concessional loans must be contracted to Chinese companies, which are often selected through a non-competitive negotiation process.⁵⁰

Moreover, successfully completed projects in Ethiopia serve as excellent examples of Chinese manufacturing and technology that enhance the image of Chinese companies on the world stage and increase business opportunities elsewhere.⁵¹

A welcoming Ethiopian market allows Chinese manufacturing enterprises to tap into Ethiopia's large pool of cheap labor. Both Chinese and Ethiopian officials view this industrial transfer as mutually beneficial. The two countries have signed a memorandum of understanding that encourages Chinese companies to relocate their production facilities to Ethiopia, in the hope that this will help Ethiopia realize its vision of becoming a light manufacturing hub in Africa.⁵² Another related benefit for Chinese companies is that moving manufacturing processes offshore helps to offset rising risk of protectionism against Made-in-China products.⁵³

While economic benefits are many, the cornerstone of Sino-Ethiopian relations is political.

First, Ethiopia provides a foothold in Africa for China to extend its influence over the continent. Addis Ababa is the seat of the headquarters of the African Union and other regional institutions. The "capital of Africa" is a perfect place for China to showcase its investment and aid to other African country leaders. A typical model project of this kind is the US\$200 million headquarter building of the African Union.⁵⁴ The deputy chairman of the A.U. commission was quick to describe it as "a very special gift to the whole continent of Africa."⁵⁵

Second, Ethiopian authorities' admiration of the so-called "China Model" contributes to strengthening China's international standing and consequently China's "soft power." Ethiopian Prime Minister Meles Zenawi played a crucial role; his attitude toward China was perhaps best expressed in his simple but powerful assertion that "China is not looting Africa." Chinese leaders thus hailed Meles as an effective expositor, and even defender, of China as a model and partner for Africa.⁵⁶ The presence of a China-friendly government in Addis Ababa, under the leadership of a media savvy prime minister, is one major factor responsible for China's elevated interest in Ethiopia.

In short, the Chinese financial support extended to Ethiopia's infrastructure development, including that for the LRT project, is largely driven by political considerations, of which China's general economic interest is an integral part. The Chinese loans provided by the Chinese state-owned banks are not merely an end in themselves for pursuing financial profit, but a means by which the Chinese state seeks to build a strong bilateral strategic relationship with the Ethiopian government. This point is obvious in the case of Addis Ababa LRT: the Chinese government pressured China Exim Bank into lending money to the LRT project, even though the bank did not deem it a good investment.⁵⁷

Thus it seems that the Ethiopian government need not worry about the debt burden or insolvency because, assuming that the Sino-Ethiopian political relationship remains sound, specific monetary problems, if any, should be easily remedied. Recall that recently, in 2007, China canceled a debt of \$18.5 million owed by the Ethiopian government.

Finally, thanks to the Chinese government's adherence to the so-called "five principles of peaceful coexistence" that emphasize non-interference in domestic affairs of other countries, the Chinese loans have no preconditions attached that predicate the provision of funds on fulfillment of non-project related requirements. Moreover, the Chinese would not suspend or withdraw the loans in case of political incidents related to human rights. In 2005, the World Bank and other donors suspended direct budget support to the Ethiopian government following a post-election crackdown on demonstrators.⁵⁸ This time, the Ethiopian authorities can be reassured that with the Chinese loans such action would not be taken. The then Deputy Prime Minister Hailemariam Desalegn has remarked that "We like the Chinese way of doing things, because they don't say 'do this, don't do that'—there are no preconditions."⁵⁹

If Money Is Not A Problem

The light rail is indeed worth having for multiple reasons, especially from the perspective of the Ethiopian government.

First, the LRT is not only of practical use in alleviating urban transport congestion, but it also conveys important political messages. Just like large-scale hydropower dams, a modern light rail system is a potent symbol of modernity. With the exception of South Africa's Gautrain, it will be the first light rail system to be built anywhere in sub-Saharan Africa,⁶⁰ and the country will join the likes of Morocco, Algeria, Egypt and Tunisia. Moreover, the light rail will further consolidate Ethiopia's already strong bilateral relationship with China, not least because it will be built by Chinese companies with Chinese technology and loans, a showcase of Chinese goodwill and economic power in Africa.

Moreover, a modern light rail running in the capital city will also serve to boost EPRDF's domestic legitimacy. The Ethiopian public was skeptical about the realization of the LRT when the plan was announced. Some pessimists considered the proposed LRT project as one of the "mega beasts the statist on the throne would use to divert public attention and amass as much populism as possible."⁶¹ The dominant feeling was suspicion. If the Ethiopian government can finally complete the project, it will send a strong political message to domestic constituents that the government is able to deliver what is needed.

Second, the LRT project is expected to facilitate technology transfer. Included in the agreement is a technology swap. Ten Ethiopians will travel to China for training, and a number of

trainmasters and project engineers will be trained for 10 to 15 months in China before returning to take charge under the supervision of Chinese engineers.⁶² As a part of China's railway diplomacy, the Chinese government plans to build a railway institution in Ethiopia that would be the first of its kind in Africa.⁶³ The Ethiopian government hopes that the first phase of construction of both the LRT and the national rail network, i.e. the Addis Ababa-Djibouti railway, can help build up domestic industrial capacity. An Institute of Technology has opened at Addis Ababa University, providing training in engineering. According to Abebe Miheretu, head of information and public relations at the ERC, the government hopes that the second phases of the LRT and rail network projects will be carried out entirely by Ethiopian enterprises.⁶⁴

Finally, once completed, the LRT will become an asset that can be used by the Ethiopian government as collateral to access bank loans for future extension of the light rail system. Getachew Betru, CEO of Ethiopian Railways Corporation, points out that "The Chinese city of Shenzhen was developed in the same manner."⁶⁵

Alternative Solutions?

Despite the numerous benefits mentioned above, there are two cheaper alternatives to a light rail, though they are by no means mutually exclusive. If without financial restrictions, they can be pursued simultaneously.

First, the severity of the congestion problem and the supply-demand imbalance of public transport can be reduced by simply improving road management and urban planning.

An Addis Ababa-based consulting firm specializing in transportation systems suggests that the congestion will be much mitigated "if the existing road network is properly used, if the country develops regulations to govern roadside parking, and if roadside businesses are not established so close to the road."⁶⁶

Referring to water, electricity, and road construction, Manaye Ewnetu, the managing director of a consulting firm, complained that construction decisions "are all made by separate bodies that do not work together to solve common problems."

Manaye Ewnetu further pointed to problematic urban planning as a major hindrance to the improvement of transport system, arguing that there must be "an integrated plan that takes into consideration the development of industries and existing villages." As he put it, "the planning should consider bringing schools, hospitals or other services close to the people so that they can access their needs from their localities."

In fact, the City Road and Transport Bureau of Addis Ababa has proposed a plan to improve transportation management in cooperation with the MoTC. Specific measures include prohibitions on driving large vehicles in certain time periods and areas, improving taxi terminals, and putting up more traffic signs. An additional 200 buses need to be deployed to meet rising demand. According to the Transport Bureau, the new plan is expected to reduce the time wasted queuing by 80 percent.⁶⁷

A second alternative to light rail is the bus rapid transit system (BRT). The BRT is an enhanced version of standard bus services that has higher levels of passenger capacity and faster speed. These benefits are achieved through the use of high capacity vehicles, increased service frequency, and high levels of priority and segregation over general traffic.

The BRT is much cheaper than the LRT, according to the estimates by Steer Davies Gleave, an independent consultancy specializing in transportation,⁶⁸ and by a researcher at the Institute of Urban and Region Development, University of California Berkeley. (Appendix M and Appendix N) The BRT is gaining popularity in developing countries. Three BRT systems have been built in South Africa so far, in Johannesburg, Cape Town and Nelson Mandela Bay; others are under construction in Durban and Pretoria. The BRT in Bogota, Colombia, boasts an ultra high capacity of 35,000 people per hour.⁶⁹

Conclusion

The cost of a light rail system is high. The Ethiopian government must decide whether the Ethiopian state has the financial capability to build it, and whether the LRT has sufficient priority over other basic infrastructure projects, such as power generation, a national railway network and rural infrastructure, to justify the spending of the nation's limited financial resources.

Cheaper alternatives include the BRT and increased efforts to improve city road management.

China has agreed to provide a commercial loan, albeit expensive, to cover 85% of the cost. Once completed, the LRT will boost the domestic legitimacy of the Ethiopian government. Moreover, the LRT may facilitate railway technology transfer and can be used as collateral for financing future extension projects.

Nevertheless, a loan is not a gift and must be repaid. But the Ethiopian government has reason to be unconcerned about future insolvency. The Ethiopian assumption is that China would write off the debt in case of crisis, just as it has done in the past. However, such leniency is predicated on a sound and lasting bilateral relationship.

Should the Ethiopian government go ahead and sign the loan agreement to get the LRT project underway?

Endnotes

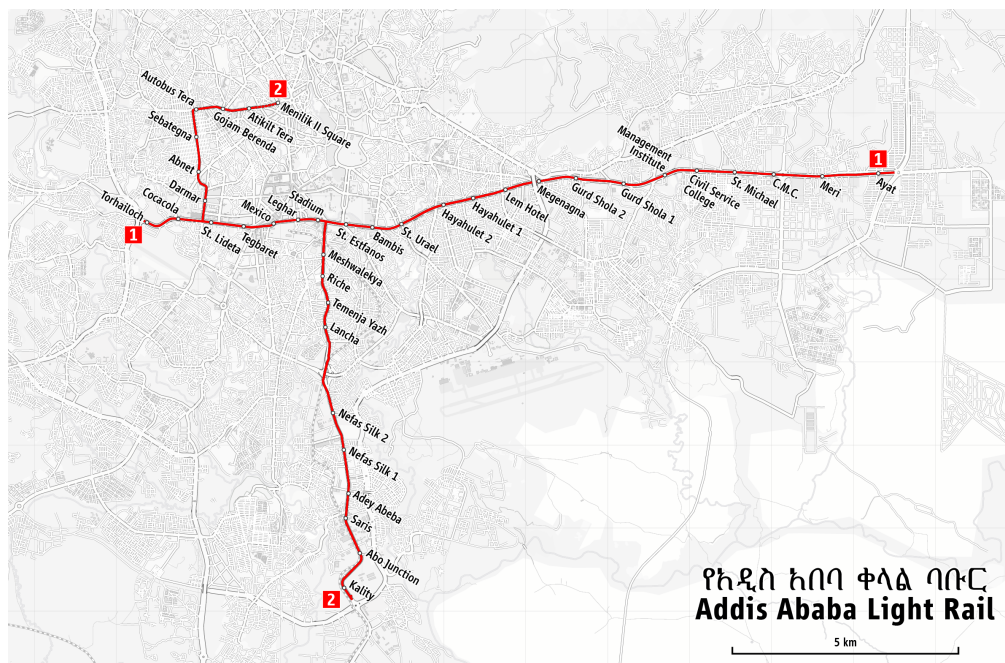
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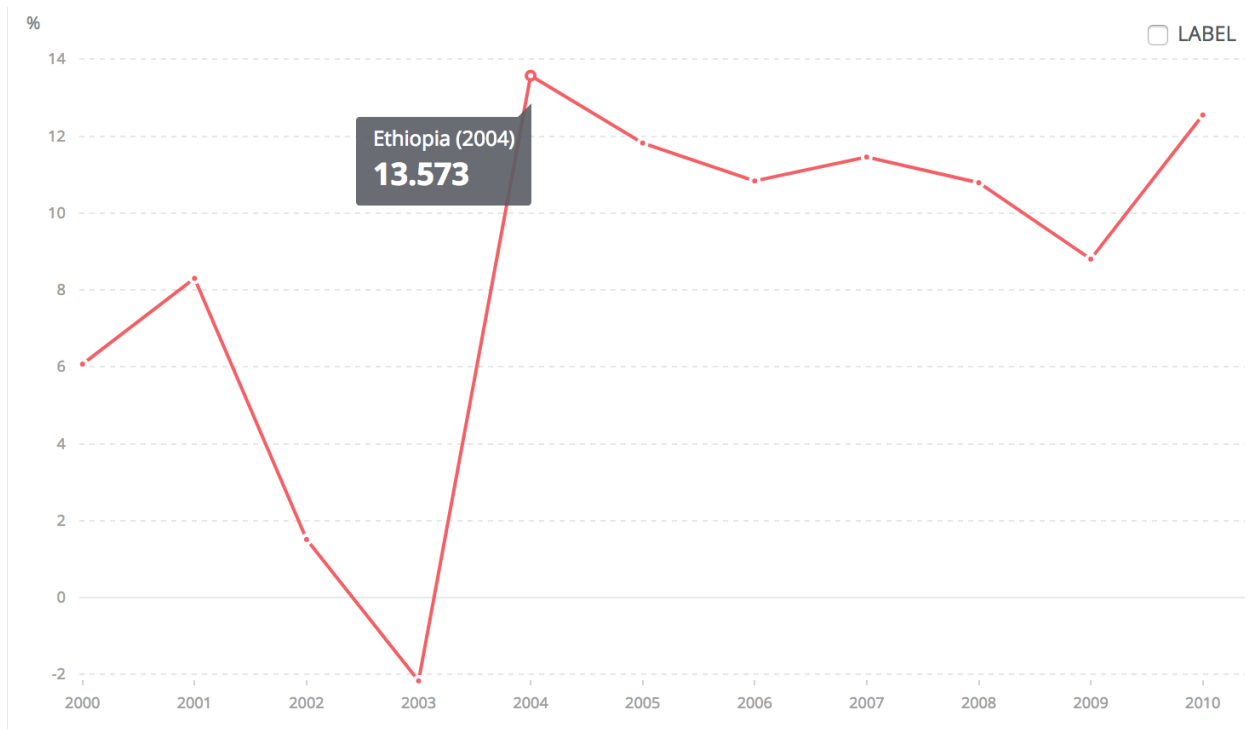
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Appendix A: The Addis Ababa Light Rail Transit Project

Total Cost	US\$ 475 million
Finance	Loan from the Export-Import Bank of China at the 6-month LIBOR interest rate plus 2.6 percent, with a 10-year repayment period, a 23-year maturity and a grace period of three years
Loan Type	Commercial
Contractor/Builder	China Railway Engineering Corp
Length	First Phase: North-South 16.9 km Second Phase: East-West 17.35 km Total: 34.24 kilometers
Capacity	60,000 passengers per hour
Operation	The Ethiopian Railways Corp. service, which will be run and maintained by Shenzhen Metro Group and China Railway Engineering Corp. for five years
Ticket Price	6 Ethiopian birr (\$0.29) \$0.10 to \$0.30
Operation Cost	1.5 billion birr per year
Train Speed	Up to 70 km per hour
Third-party Supervision	Sweroad Swedish National Road Consulting Firm
Supervision Cost	14 million dollars



Appendix B: The GDP Growth Rate of Ethiopia 2000-2010



Source: World Bank Open Data

Appendix C: Indicative Infrastructure Spending Needs in Ethiopia

Table 8. Indicative infrastructure spending needs in Ethiopia

US\$ millions per year			
Sector	Capital expenditure	Operation and maintenance	Total spending
ICT	72	139	211
Power	3,105	276	3,380
Transport	248	149	398
WSS	846	355	1,201
Irrigation	6	—	6
Total	4,277	919	5,196

Source: Briceño-Garmendia and others 2008.

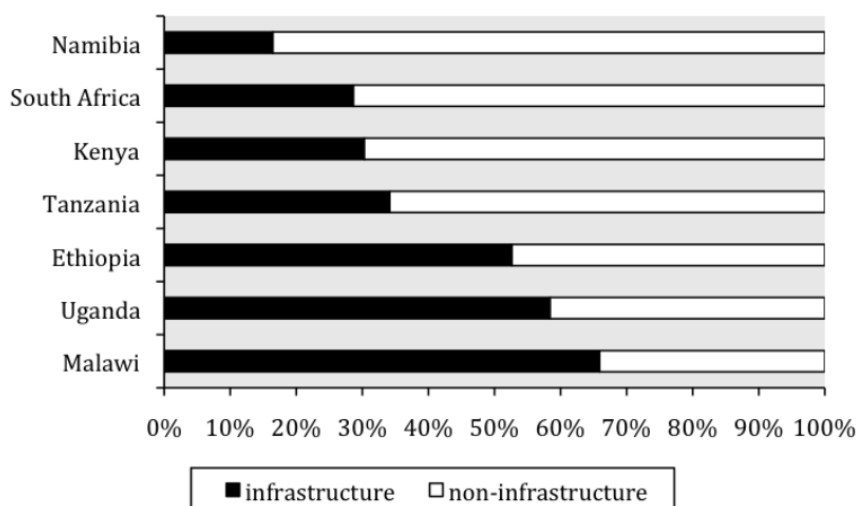
Note: Figures refer to investment except public sector, which also includes recurrent spending. Public sector covers general government and nonfinancial enterprises.

Source: Vivien Foster and Elvira Morella. “Ethiopia’s Infrastructure: A Continental Perspective” Policy Research Working Paper 5595. The World Bank Africa Region Sustainable Development Department. March 2011

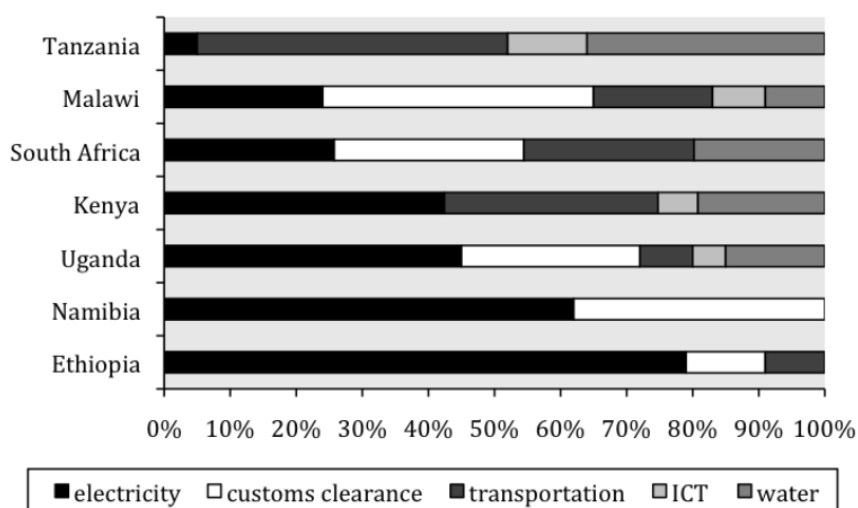
Appendix D: Infrastructure's Contribution to the Productivity Handicap of Firms

Figure 2. Infrastructure's contribution to the productivity handicap of firms

a. Overall contribution of infrastructure



b. Contribution of infrastructure by sector



Source: Escribano and others 2008.

Source: Vivien Foster and Elvira Morella. "Ethiopia's Infrastructure: A Continental Perspective" Policy Research Working Paper 5595. The World Bank Africa Region Sustainable Development Department. March 2011

Appendix E: Benchmarking Power Infrastructure

Table 5. Benchmarking power infrastructure and capacity, access, and utility performance

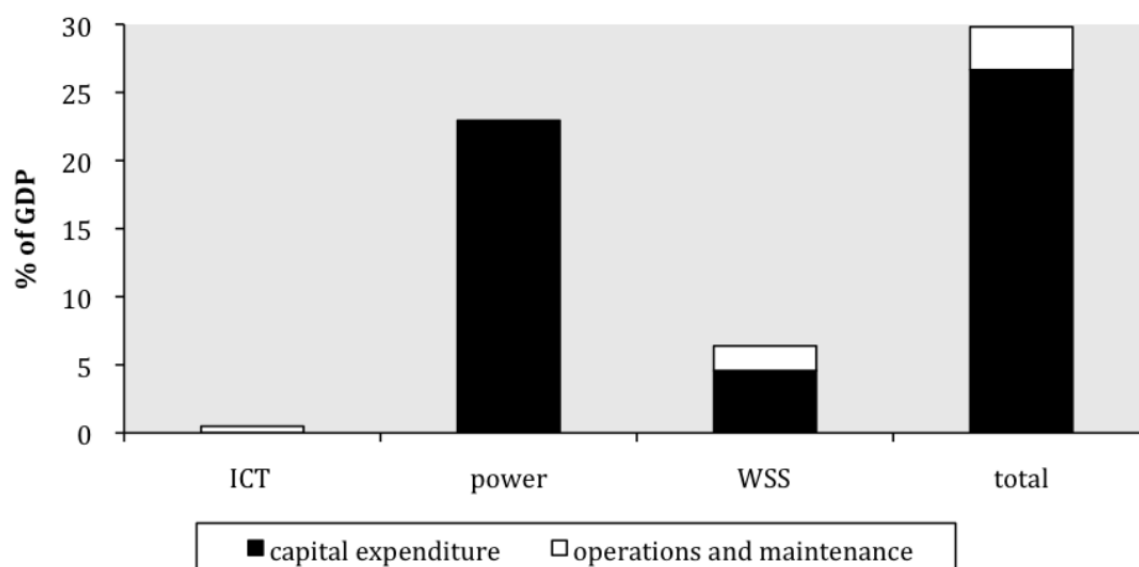
	Unit	Ethiopia	Low-income countries
Installed power generation capacity	MW/mil. people	9.8	24.4
Power consumption	kWh/capita	33.6	99.5
Power outages	day/year	44.2	40.6
Firms' reliance on own generator	% consumption	6.9	17.7
Firms' value lost due to power outages	% sales	0.9	6.1
Access to electricity	% population	12.0	15.4
Urban access to electricity	% population	86.0	71.0
Rural access to electricity	% population	2.0	12.0
Growth access to electricity	% population/year	0.4	1.4
Revenue collection	% billings	96.5	88.2
Distribution losses	% production	22.0	22.1
Cost recovery	% total cost	46.0	90.0
Total hidden costs as % of revenue	%	132.7	121.2
Tariff (US cents per kWh)	Ethiopia	Predominantly hydro generation	Other developing regions
Power tariff (residential at 75 kWh)	4.07	10.27	5.0 – 10.0
Power tariff (commercial at 900 kWh)	8.26	11.73	
Power tariff (industrial at 50,000 kWh)	4.76	11.39	

Source: Eberhard and others 2008.

Source: Vivien Foster and Elvira Morella. “Ethiopia’s Infrastructure: A Continental Perspective” Policy Research Working Paper 5595. The World Bank Africa Region Sustainable Development Department. March 2011

Appendix F: Magnitude and Composition of Ethiopia's Funding Gap

Figure 19. Magnitude and composition of Ethiopia's funding gap



Source: Briceño-Garmendia and others 2008.

Source: Vivien Foster and Elvira Morella. "Ethiopia's Infrastructure: A Continental Perspective" Policy Research Working Paper 5595. The World Bank Africa Region Sustainable Development Department. March 2011

Appendix G: Ethiopia's Potential to Export Power

Table 4. Ethiopia has the potential to export significant amounts of power

	Exports (TWh pa)	Net Revenue		Required Investments	
		(\$m pa)	(% GDP)	(\$m pa)	(% GDP)
DRC	51.9	519	6.1	749	8.8
Ethiopia	26.3	263	2.0	1,003	7.5
Guinea	17.4	174	5.2	786	23.7
Sudan	13.1	131	0.3	1,032	2.7
Cameroon	6.8	68	0.4	267	1.5
Mozambique	5.9	59	0.8	216	2.8

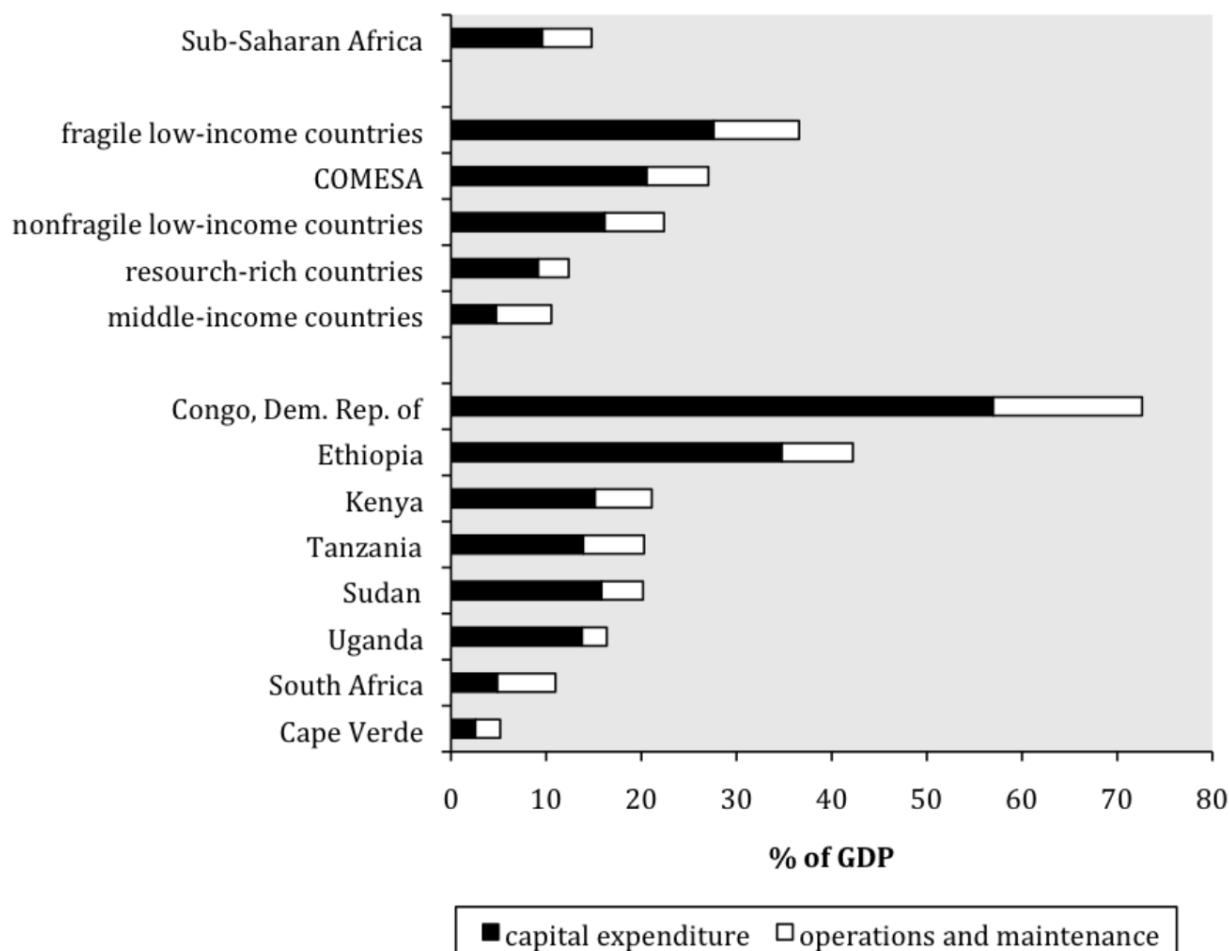
Source: Rosnes and Vennemo 2008.

Note: net revenue based on illustrative profit margin of \$0.01 per kWh.

Source: Vivien Foster and Elvira Morella. "Ethiopia's Infrastructure: A Continental Perspective" Policy Research Working Paper 5595. The World Bank Africa Region Sustainable Development Department. March 2011

Appendix H: Ethiopia's Spending Requirement

Figure 11. Ethiopia's spending requirements are very high relative to GDP

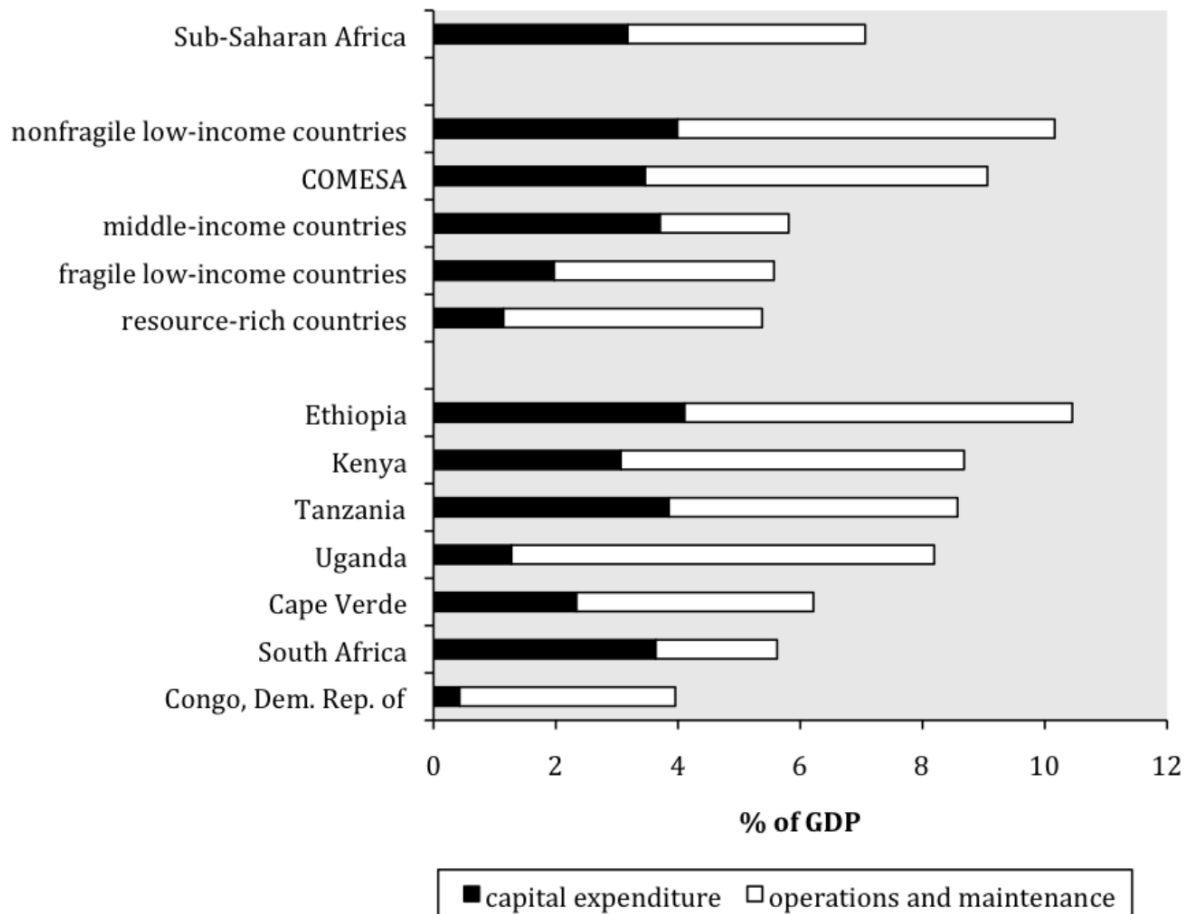


Source: Briceño-Garmendia and others 2008.

Source: Vivien Foster and Elvira Morella. "Ethiopia's Infrastructure: A Continental Perspective" Policy Research Working Paper 5595. The World Bank Africa Region Sustainable Development Department. March 2011

Appendix I: Ethiopia's Infrastructure Spending

Figure 12. Ethiopia's infrastructure spending is high compared to other countries in Africa



Source: Briceño-Garmendia and others 2008.

Source: Vivien Foster and Elvira Morella. "Ethiopia's Infrastructure: A Continental Perspective" Policy Research Working Paper 5595. The World Bank Africa Region Sustainable Development Department. March 2011

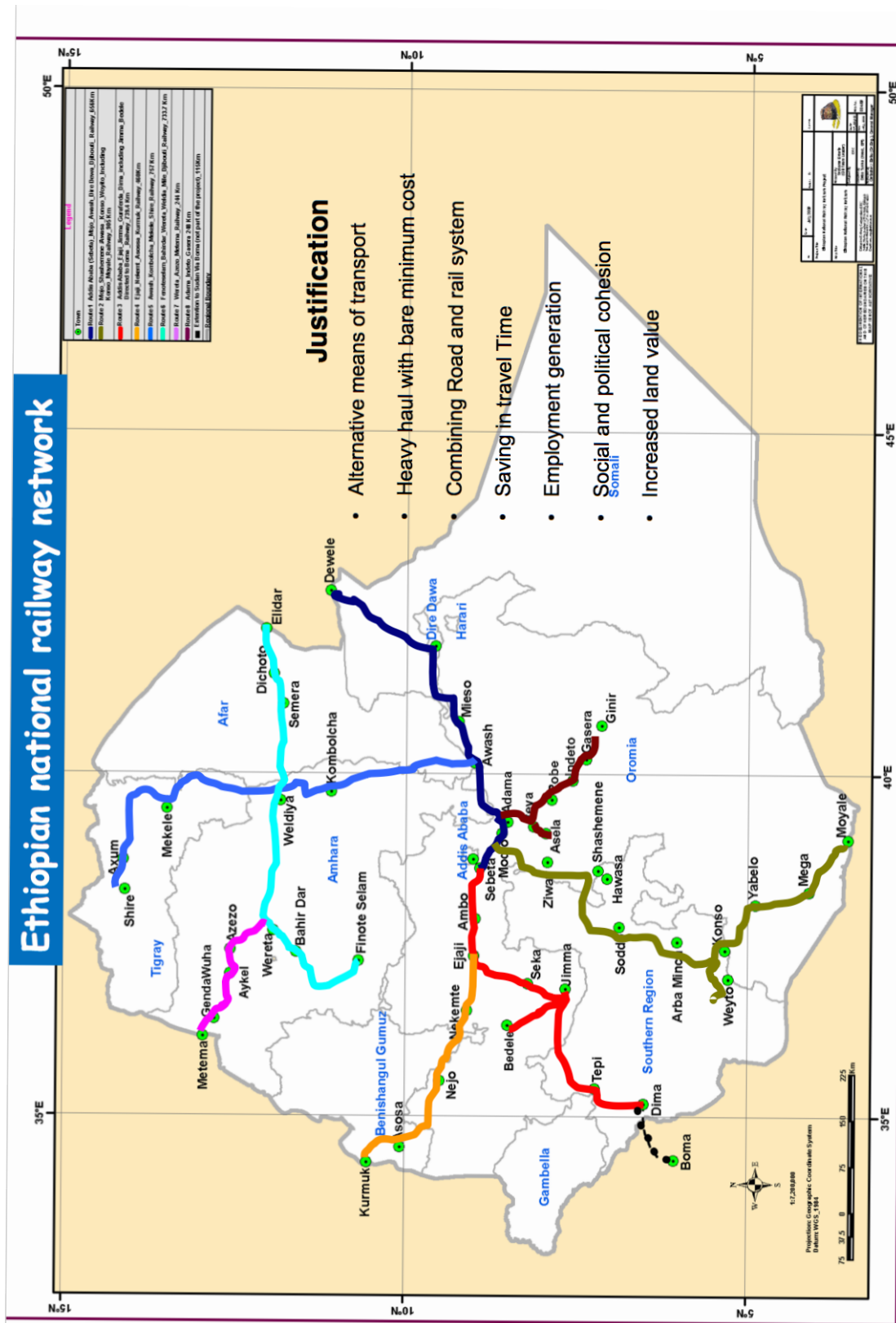
Appendix J: A Selection of Chinese Funded and Contracted Infrastructure Projects

Table 4: A selection of Chinese-funded and contracted infrastructure projects

	Chinese contractor	Chinese lender	Loan amount (US\$ million)	Total cost (US\$ million)
Addis Ababa Light Railway	China Railway Engineering Corporation (CREC)	Exim Bank of China	403	475
Addis – Djibouti Railway line	China Railway Group, China Civil Engineering Construction Corporation (CCECC)	Exim Bank of China, China Development Bank, Industrial and Commercial Bank of China	2,400	3,400
Addis Ababa – Adama Expressway	China Communications Construction Company (CCCC)	Exim Bank of China	800	1,400
Bole International airport expansion	CCCC	Exim Bank of China	225	340
Tekeze Dam	China Gezhouba Group Corporation (CGGC), Sinohydro Company Ltd	Exim Bank of China	50 (initially)	365
Finchaa-Amerti-Neshe (FAN) hydro-electric power dam	CGGC	Exim Bank of China	119	140
Geba hydroelectric power project	CGGC, Sinohydro Company Ltd	Exim Bank of China	466	583
Genale Dewa III hydroelectric power project	CGGC	Exim Bank of China	326	408
Gibe III Hydropower project	Dongfang Electric Corp (as sub-contractor for electro-mechanical work) in collaboration with Italian Salini Impregilo)	ICBC	470	1,580

Source: Fancoise Nicolas “Chinese Investors in Ethiopia: The Perfect Match?” Notes de l’Ifri, French Institute of International Relations (Ifri), March 2017

Appendix K: Ethiopian National Railway Network



Ethiopian national railway network and African Connection

The map displays the Ethiopian national railway network, color-coded by region: Tigray (blue), Amhara (green), Oromia (yellow), Southern Region (red), Gambella (pink), and Benishangul Gumuz (purple). Major towns are marked with green dots. The network includes several key lines: the Addis Ababa-Djibouti line (blue), the Addis Ababa-Konso line (green), the Addis Ababa-Bahir Dar line (red), the Addis Ababa-Mekki line (yellow), and the Addis Ababa-Mogadishu line (purple). The map also shows the national boundary with Somalia to the north and east, and the international boundaries with Senegal to the west and Gabon to the south. The map is titled 'Ethiopian National Railway Network Project' and includes a legend, a scale bar, and a north arrow.

Dakar, Senegal Connection

Libreville, Gabon Connection

Djibouti Connection

Legend

- Town
- Route 1 Addis Ababa (Sebeta)_Mojo_Awash_Dire Dawa_Djibouti_Railway_656Km
- Route 2 Mojo_Shashemene_Iawasa_Konso_Woyto_Including Konso_Moyale_Railway_905 Km
- Route 3 Addis Ababa_Ejiji_Jimma_Guralferda_Dima_Directed to Boma_Railway_637 Km
- Route 4 Ejiji_Nekemt_Asoossa_Kurmuk_Railway_460Km
- Route 5 Awash_Kombolcha_Mekele_Shire_Railway_757 Km
- Route 6 Finoteleslam_Bahirdar_Wereta_Weldia_Mile_Djibouti_Railway_798Km
- Route 7 Wereta_Azazo_Metema_Railway_244 Km
- Route 8 Adama_Indeto_Gasera 248 Km
- Extension to Sudan Via Boma (not part of the project)_115Km
- Regional Boundary

Project Title Ethiopian National Railway Network Project

Map Title Ethiopian National Railway Network

Support By Technical Experts (O&E Expert)

Designed By BRC

Scale 1:2,290,000

Map No. 00409

Created By DMS Tunka (H&E, EPI)

Approved By Gashaw Betra (Dr. Eng.), General Manager

Date July, 2008

Number N/

Approval

THE ORIGINATOR OF INTERNATIONAL AND OTHER BOUNDARIES ON THIS MAP IS NOT AUTHORIZED TO BE

Projection Geographic Coordinate System

Datum WGS84

Scale 1:2,290,000

Map No. 00409

Created By DMS Tunka (H&E, EPI)

Approved By Gashaw Betra (Dr. Eng.), General Manager

Appendix M: LRT vs BRT

Investment Costs	BRT (US\$ m)	LRT (US\$ m)
Planning, building preparation and land acquisition	36	59
Route works	178	224
Stations	35	35
Vehicles	22	108
Maintenance and storage facility	14	34
Total costs	285	460
Total cost per route-km	14	23

The costs below are based on the following assumptions:

- 145 seat vehicles
- Two lines with total length of 20km
- Five-minute service frequency
- 20km/h trip speed
- 3000 route circulations per year with 32 vehicles
- System running on right-of-way track

Operating costs cover the cost of running the vehicles. The costs below are based on the following assumptions:

- Annual mileage of 60,000 km
- 3500 hrs of annual operation
- \$37.8/hr driver cost
- Interest rate of 3%
- 145 passenger capacity

Appendix M (Continued)

BRT	Strengths	Weaknesses
	<ul style="list-style-type: none"> • Fast and reliable journey times • Close peak headway possible • Higher total capacity than conventional bus services on street • Distinctive route/brand identity and at-station amenities including real-time information raise the profile of the system • Total capacity can be varied with rigid or articulated vehicles in conjunction with peak headway 	<ul style="list-style-type: none"> • Vehicles may not be able to overtake each other easily (depending on infrastructure) • Total capacity limited by articulated vehicle and frequency • Curb-guided systems may be subject to operational difficulties during periods of ice / snow • Segregated / guided route may be vulnerable to disruption during incidents • Segregation can be intrusive to urban landscape

LRT	Strengths	Weaknesses
	<ul style="list-style-type: none"> • Flexible alignment criteria allow LRT to be fully integrated with urban realm • Higher capacity than bus or BRT • Low Noise • Zero emissions at the point of use • Segregation and priority provide reliable journey times • Provision of fixed infrastructure, demonstrates a commitment to the provision of high quality public transport services • May act as a catalyst for wider urban development 	<ul style="list-style-type: none"> • Relatively high capital cost (including need for extensive utilities diversions in many cases) • Significant disruption during construction • Total capacity limited by vehicle and frequency • Speed and travel time benefits require priority over other traffic • On street rail-based route vulnerable to disruption during incidents

Source: Edmund Cassidy. “LRT versus BRT: which is the better option?” 28 July 2015. <http://www.steerdaviesgleave.com/news-and-insights/LRT-versus-BRT>

Appendix N: LRT vs BRT and Metro

	BRT	Urban Rail Transit	
		Light Rail	Metrorail
Rights-of-Way	Mixed: shared (at-grade); dedicated and exclusive lanes	Exclusive (elevated or barriers) or shared (at-grade)	Exclusive, grade-separated
Running Ways	Pavement; roadways	Steel Track	Steel Track
Vehicle Propulsion	Internal Combustion Engine	Electric (overhead wires)	Electric (high-voltage third rail)
Vehicle Control	Operator/Visual	Automated/Sign Control	Automated/Sign Control
Construction Time	1-2 Years	2-3 Years	4-10 Years
Maximum Capacity (passengers/vehicle unit)	160-270	170-280	240-320
Maximum Capacity (passengers/coupled unit)	160-270	500-900	1000-2400
Minimum headway (seconds)	12-30	75-150	120-150
Line Capacity (passengers/direction/hour)	5000 - 45000	12000 – 27000	40000 - 72000
Maximum Speed (kph)	60-70	60-80	70-100
Average Capital Costs¹ (2000 US\$/km)	8.4	21.5	104.5
Average Operating Cost¹ (2000 US\$ per vehicle revenue km)	2.94	7.58	5.30
Notes 1. Costs figures are for US case studies. Costs adjusted to \$2000, calculated using Consumer Price Index average. Sources: Levinson et al., (2003); Vuchic (2005); Hensher and Golob (2008); Zhang (2009); Deng and Nelson (2011)			

Source: Robert Cervero. Bus Rapid Transit (BRT): An Efficient and Competitive Mode of Public Transport, Institute of Urban and Region Development, University of California Berkeley, Report prepared for European Automobile Manufacturers Association 2013