An Infrastructure Action Plan for Burundi
Accelerating Regional Integration

Executive Summary
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Foreword

The 53 countries that make up the African region have a combined gross domestic product of $1.1 trillion - a not insignificant market. The striking characteristics of the region are the low-level of intra-Africa trade, despite the size of the continental economy, the array of impediments to market integration, and the poorly developed network of continental infrastructure, especially in the areas of electric power, transport and communications. There is a compelling case for much greater emphasis on measures that will accelerate economic integration within the continent. African countries are increasingly realizing the advantages of regional co-operation and integration as a strategy to achieve economic growth and collectively to play a more important role in the global economy. To this end, African countries and governments, through regional economic communities and the African Union, are pursuing an agenda of continental integration along a road map of establishing free trade areas, customs unions and common markets. The African Development Bank (AfDB) recognizes that policy actions and investment in infrastructure have important roles to play in the development of continental trade and in promoting economic linkages within Africa. In recognition of this fact, the development of Africa’s infrastructure and economic integration are key components of the strategic direction being pursued by the Bank.

The focus of this Report is on the services associated with electric power, transport and communications infrastructure in Burundi. The Report includes a detailed examination of the current status of the infrastructure and services in these three sectors in Burundi and the extent of links to the infrastructure networks of the other members of the East African Community (EAC). Even more than in other countries of Sub-Saharan Africa, access to these services is limited to a relatively small part of the population, the cost of the services is high and, in the particular case of electric power, the available services are unreliable. Successful implementation of the proposed program over the next two decades will close the substantial infrastructure gap between Burundi and other developing countries and lay the foundation for an extended period of strong economic growth within the country.

The Report is important for several reasons. First, it provides the Government, the donor community and the private sector with a detailed assessment of infrastructure investment opportunities in Burundi and the wider region. It proposes an Action Plan to develop these opportunities, and in so doing, helps fill the gap created by the absence of master plans for the development of the electric power, transport and communications sectors. It can therefore be used to inform and support the Government’s ongoing dialogue with donors and the business community about the further development of these sectors. Increased coordination within this partnership can improve the alignment of investments with the national objectives, as set out in Burundi’s Poverty Reduction Strategy Paper (PRSP) of 2006, and regional priorities for infrastructure development within the EAC. In this way, the Report can contribute to the overall efficiency of the development process in Burundi.

Second, the Report has wider application within Africa. It provides an integrated framework within which to assess the infrastructure requirements of a country, the investment and maintenance costs associated with these requirements, and the human and institutional capacity building required for successful design and implementation of such a program. The Report also examines the links between infrastructure and key production sectors of the economy that have high growth potential, including mining, commercial agriculture, and specific opportunities within the industrial sector. This type of analysis can be used in other countries to translate broad objectives for infrastructure development, as set out in PRSPs or national development programs, into tangible programs for action that can accelerate growth and economic integration. Governments are then better placed to mobilize financial and technical support within the donor community and among international investors.

The Report is the first of a series of country and regional studies that the African Development Bank (AfDB) will prepare to assist member governments in identifying measures that they can take, individually and collectively, to close the infrastructure gap and accelerate integration of
their economies. Wider application of the framework used in this Report will make an important contribution to this program. The initiative reflects the intention of the AfDB to strengthen its capacity for analyses of individual country conditions, as well as regions within Africa and the continent as a whole. In this way, the AfDB will enhance its role as a Knowledge Bank for Africa - a service of benefit to all members. To achieve this important objective, the Bank intends to build internal staff capacities and support efforts of member governments to build their own internal capacities for analysis that can underpin effective policy-making and translate national development strategies into tangible programs of action. As with the Burundi report, these action programs can then be used to formulate activities to be supported by the governments concerned, by donors, and by private investors.

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Vice President for Operations I, Country and Regional Programs and Policy  
African Development Bank Group
To Find the Full Report

For the full report, the maps and annexes, see the African Development Bank website:

## Abbreviations and Acronyms

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Full Form</th>
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<tbody>
<tr>
<td>AfDB</td>
<td>African Development Bank</td>
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<tr>
<td>BOOT</td>
<td>Build Own Operate and Transfer</td>
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<tr>
<td>BOT</td>
<td>Build Operate and Transfer</td>
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<tr>
<td>EAC</td>
<td>East African Community</td>
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<tr>
<td>EAPP</td>
<td>East Africa Power Pool</td>
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<tr>
<td>GDP</td>
<td>Gross Domestic Product</td>
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<tr>
<td>GWh</td>
<td>Gigawatt Hours</td>
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<tr>
<td>ICAO</td>
<td>International Civil Aviation Organization</td>
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<tr>
<td>IRR</td>
<td>Internal Rate of Return</td>
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<tr>
<td>km</td>
<td>Kilometer</td>
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<tr>
<td>kWh</td>
<td>Kilowatt Hours</td>
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<td>MT</td>
<td>Metric Tons</td>
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<tr>
<td>MW</td>
<td>Megawatts</td>
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<tr>
<td>PPP</td>
<td>Public-Private Partnership</td>
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<tr>
<td>PRSP</td>
<td>Poverty Reduction Strategy Paper</td>
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<tr>
<td>REGIDESO</td>
<td>Régie de Production et de Distribution d’Eau et d’Electricité</td>
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<td>RSA</td>
<td>Civil Aviation Authority</td>
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Executive Summary

The Key Findings

To address the problem of pervasive poverty in Burundi, the Government is committed to accelerating the economic growth of the country. This Report concludes that a major improvement in infrastructure is critical for a successful transition to sustained strong economic growth of 6-7 percent a year in real terms. A concerted program of action will be needed over the next two decades to overcome the current serious infrastructure deficiencies of the country in power, transport and communications. The proposed Infrastructure Action Program outlined in this Report is built around three key policy objectives:

- Step up spending on infrastructure to ensure improved access to services and reduce the cost and improve the reliability of these services, thereby removing some of the main obstacles to sustained strong economic growth. The core Infrastructure Action Program to be implemented over the next two decades would cost $4.6 billion at 2007 constant prices. In addition, $1.2 billion would be spent on maintenance of assets in these three sectors.
- The $5.8 billion program will create substantial opportunities for development of domestic business activities. To generate a strong domestic supply response to this ambitious program and ensure sustained economic growth of 6-7 percent a year, the Government will need to design and implement comprehensive programs for development of small and medium business and for skills development in the labor market. Both of these programs are essential complements to the Infrastructure Action Program.
- Implementation of the proposed Action Plan will require increased attention to coordination of the power, transport and communications programs within the Government. It will also require close cooperation between the Government and the donor community in the design and implementation of these programs. Emphasis on coordination on these two fronts can improve the alignment of investments with national and regional priorities and the overall efficiency of the development process in Burundi.

It is important to emphasize that an expenditure of some $5.8 billion over the next two decades is, in fact, required to meet the current national objectives for infrastructure development. These programs will also lay the foundations for a major investment in nickel mining in the decade ahead that can bring substantial additional benefits to the country.

The Infrastructure Deficit is Substantial

On just about any measure of infrastructure coverage - road density, telephone density, power generation capacity, or service coverage - Burundi lags behind most other regional groupings in the world. Burundi also lags behind other EAC member countries in access to basic infrastructure services. About 90 percent of the population lives in rural areas. Despite the importance of agriculture, only a relatively small portion of the rural population has access to all-season roads. The road densities in areas of arable land are substantially lower in Burundi than elsewhere in Africa and in other low income countries. Only two percent of the population in Burundi has access to electricity, compared with 16 percent for Sub-Saharan Africa and 41 percent for other low income developing countries. Burundi is also lagging in mainline and mobile telephone densities, as well as internet access. Teledensity remains poor at three percent of the population, with more than 90 percent of subscribers concentrated in urban areas. Access to safe water and sanitation in Burundi is roughly comparable to other low income countries.

Not only is access to infrastructure services limited, but the poor state of infrastructure leads to substantially higher costs. Prices for services can be two to three times that of other countries, further undermining the competitiveness of Burundi business in regional and global markets. The cost and adequacy of these services affects commercial opportunities for small farmers, entrepreneurs, and businesses - small and large. Business surveys in Burundi consistently identify the cost of power and the poor reliability of the service as the single most important obstacle to increased business investment.
In the agriculture sector, transport costs represent, on average, 35 percent of import prices and 40 percent of export prices of agricultural products in Burundi. High infrastructure costs and lack of access are major obstacles to improved incomes and well-being for the very large part of the population that depends on agriculture for a livelihood.

Main Components of the Infrastructure Action Program

The focus of the proposed Infrastructure Action Program outlined in this Report is on power, transport and communications. Discussions with the Government of Burundi have confirmed the key objectives for the Program.

Programs for the Power Sector

The proposed program for the power sector has six key objectives:

• Through increased investments in domestic and regional generation capacity, ensure that the business community and households have access to reliable power supply 24 hours a day.

• Establish a national transmission and distribution grid by 2015, with all 15 of the provincial capitals linked to this grid which would supply electricity 24 hours a day at reasonable cost.

• With the grid in place, increase the electrification rate from the current two percent of households to 25 percent by 2020 and at least 40 percent by 2030. By 2020, 85 percent of urban households would have continuous access to the national distribution network, and by 2030, one-third of all rural households would be linked to the grid.

• Give priority to further development of domestic energy sources to avoid excessive dependence on imported supplies of electricity. At the present time, about 45 percent of total supply is imported. The design of the Action Program aims to keep this dependence at less than 50 percent and close to current levels until 2024, after which there would be a gradual increase in imported supplies of electricity.

• Improve demand management and reduce system losses.

• Ensure that the national electricity utility is built up into an effective and financially sound entity.

To meet the projected demand for power, the required generation capacity for Burundi would be about 600 MW by 2030, compared with less than 40 MW at present. The domestic and regional power plants identified and included in the proposed Action Program would be sufficient to meet the needs of the country until the mid-2020s. Provided that no further major mining or power intensive industrial projects are launched, the supply deficit would grow to about 1,240 GWh by 2030. The implication is that Burundi would need an additional 200 MW of capacity to meet domestic demand. The working assumption in the proposed program is that this shortfall is met by the import of additional electricity. The key policy question for the longer-term is whether to investigate other domestic hydro power sites within Burundi and develop these in order to keep dependence on imported power to prudent levels, or whether to allow increased dependence on imported power. If all the additional required capacity was domestic, the share of domestic power in total consumption would be 75 percent by 2030. A potential issue with these domestic sites is that the cost of the electricity produced may be significantly higher than that imported from Ethiopia via the EAPP grid. The trade-off between the degree of self-sufficiency in power supply and the cost of power and its effects on the competitiveness of Burundi business is discussed at some length in Chapter 5.

The ongoing operational and financial rehabilitation of the national power utility, REGIDESO, is central to its role as a major source of funding for the future power program. With continued prudent financial management the utility would develop into a major corporation by 2030, at which time it would have assets of about $1.6 billion and revenues of about $300 million a year (both at 2007 constant prices).
Hydro Power Stations and Transmission Grid for Burundi
The improved cash flow in the decade ahead would allow the utility to pass on benefits to consumers with an ongoing reduction in power tariffs from about 2016, which would lower the average tariff to less than nine U.S. cents a kWh. From about 2020 onwards, the utility would be able to fund the bulk of the power development of the country from its own resources and from prudent access to commercial sources of debt financing.

Action Plan for the Transport Sector

The key objectives of the proposed action plan for the transport sector are to lower the costs of transport for the entire economy and to improve access to local and international markets. The proposed program focuses on road transport and civil aviation, and also provides for further investigation of the possibility of a rail extension from Tanzania into Burundi.

The main component of the transport program is the upgrade and expansion of the road network of the country over the next decade. The proposed program would rehabilitate and pave the entire 1,950 km of national roads by 2020, and for those national routes where traffic densities are high it would upgrade roads to enhanced standards that can accommodate the increased traffic. By 2030, the urban road network would be expanded from the current estimated 650 km of roads to about 1,650 km so that all 2.6 million urban dwellers at that time are within 500 meters of a road that can carry vehicular traffic. The other key component is a program that will improve provincial, community and local feeder roads in key agricultural areas to facilitate access to product markets at home and abroad, and to key inputs, such as fertilizer, required for production activities. In conjunction with the rehabilitation of the road network, the program would increase substantially budget allocations for routine maintenance of these facilities.

The international airport in Bujumbura would be expanded and modernized. The intent is to ensure, within the next five years, full compliance with the ICAO-mandated standards and procedures for international passenger travel and for freight. This would be done through a program of staff training and investment in infrastructure. As a result of this program, the international airport would obtain an ICAO “Certification of Aerodromes.” These improvements would allow Burundi to attract major international airlines and air freight companies, thus opening up opportunities for development of tourism and air freight of high value export products to European and Middle East markets.

The options for the extension of the Tanzanian rail network into Burundi have also been reviewed as part of this study. What emerges is that if the nickel deposits in the Musongati area of Burundi are developed for the export of nickel ore, and if the mine sites have access to the rail network, the four million tons of ore to be carried makes the investment in the rail extension quite attractive. The potential problem is that international investors interested in developing the site may prefer to refine the ore at the mine and ship the metal to export markets. In this case the volume of mine-related freight is substantially smaller - an estimated 50,000 MT of nickel metal a year and a small quantity of cobalt. Based on the assessments made for the future volumes of international freight in and...
out of Burundi each year that are unrelated to the mine activities, it would appear that the rail extension is not economically viable unless it carries a large volume of mine freight. If one of the two options were to go ahead in the absence of the mine, it is likely that the rail operator would require substantial public subsidies. The program proposes further evaluation of the costs and benefits of a possible extension of the Tanzanian rail network into Burundi.

The proposed program would lower the costs of transport for the entire economy and improve access to local and international markets. The benefits of lower transport costs under the program would be substantial; for example, at current costs for road freight of 13 U.S. cents per ton/km or more, it costs about $230 to move a ton of fertilizer from the ports in Kenya and Tanzania to Burundi. A reduction in transport costs to 8 U.S. cents a ton/km, the rate that prevails in these neighboring countries, would lower the freight cost of the fertilizer by almost $100 a ton. These types of cost reductions can have a significant impact on the profitability of farming and other business activities.

Development of the Communications Network

The proposed communications program aims to improve substantially access to international communications network and to lay the foundations for a national communications grid that will provide communities and business through Burundi with low cost voice and data communications.

East Africa is the only heavily populated region of the world that does not have access to the long-established international system of submarine cables that allow for low cost transmission of data and voice communications. The Eastern Africa international submarine cable network is currently being laid off the coast of East Africa with funding from the World Bank and a consortium of private investors. It is expected to become operational in 2010. Burundi would be linked to this low-cost international communications network via fiber optic cables that are currently being laid in Kenya and Rwanda. This cable extension to Bujumbura is expected to be completed by June 2010. With further developments already underway, Burundi would have four separate access routes to this regional communications network and the submarine cable.

Against this backdrop, the key elements of the communications program are as follows:

- A high priority is attached to the immediate development of a national communications grid of fiber optic cable and digital microwave that would be linked to the regional network. This program is already funded by the World Bank and will begin implementation shortly. On completion in 2012, it will have laid a fibre optic network of some 400 km throughout Burundi, along with a digital microwave network that will serve particular communities throughout the country.
- Launch an ambitious program to expand access to this low cost international communications network for schools, hospitals, universities, the business sector, and local communities throughout the country.
- Develop a range of applications, including e-government, e-commerce, e-schools, and e-health and complete the ongoing work on the legislative framework for the communications industry and corresponding regulatory framework related to e-security, fraud, privacy, data protection, and intellectual property rights.
- Promote the entry of additional private suppliers of communications services throughout the country to ensure competition and service quality.

Such a national grid would give communities, businesses, and a wide range of institutions throughout the country, access to low cost communications within the country and with the region and rest of the world. Rural as well as urban communities are expected to benefit from this program. According to the World Bank, for example, incomes of agricultural producers can rise by about nine percent through the use of mobile telephones.
Proposed Telecommunication Infrastructure for Eastern Africa
Building Human and Institutional Capacities

Given the size of the proposed program to be implemented over the next two decades, Burundi will have to make a large investment in building domestic capacities to manage the program and benefit fully from the services it will be able to provide. There are four specific components for the proposed capacity building program:

- Strengthen capacities of individual ministries for project design and implementation, including for example, arrangements for procurement and site supervision. These programs are of particular importance for the ministries responsible for power and transport.
- Strengthen and restructure arrangements for oversight and regulation of the power, transport and communications industries, given the substantial structural changes that would occur under the proposed Action Program. In the case of communications, for example, the proposal is to facilitate a transition to a neutral regime with respect to regulation of technology and service.
- Strengthen capacities for regular collection and analysis of survey data for these three industries. In the case of road transport, for example, surveys of transport service providers will provide basic information about the evolving amounts of passenger and freight traffic, the costs of service provision and prices of services offered to the public. Regular surveys of road traffic will be required for assessments of evolving road maintenance and upgrading requirements.
- Adopt appropriate standards for infrastructure construction and training of skilled workers for these industries. With specific standards for two lane paved national highways, for example, the donor community can then ensure that projects they fund do comply with these standards. Similarly, there is a need for clear standards for accredited institutions that train skilled trades people such as electricians. In developing these standards, close attention should be given to the evolving requirements of the EAC.

The proposed program would provide substantial support for the development of these capacities and for a wide range of technical studies that will be required for informed decision making in the early phases of the program. There is considerable urgency associated with the start of these capacity building programs.

The Required Investment for Infrastructure is Large

Development Expenditures

The core Infrastructure Action Program calls for development expenditures of $4.6 billion (at 2007 constant prices) over the next two decades. Successful implementation of this proposed program will essentially close the large infrastructure gap between Burundi and many other developing countries.

The power program would involve expenditures of about $2 billion, including about $465 million of private investment in new domestic generation facilities that would sell power to the national grid.
The roads program would require about $2.1 billion. The civil aviation program would involve a public-private partnership (PPP) arrangement under which the upgrade and operation of the airport and related services would be handled by one or more private contractors. The total amount of investment required for the aviation sector is estimated at $260 million over the next 20 years. The program includes about $120 million for the further development of the national communications grid and widespread community access to this grid.

The bulk of these expenditures would be capital outlays on infrastructure assets such as road networks, airport facilities, power stations and transmission and distribution lines, and communications networks. About three percent of the outlays ($170 million) would be used to meet the cost of the wide-ranging program of capacity building initiatives and various technical studies included in the Action Plan.

In the event that the railway extension was to proceed, the estimated cost is about $600 million (at 2007 constant prices), not including the cost of rail extensions to mine sites in the Musongati area. It is assumed that these latter costs would be met by the mine operator, in the event that the rail transport option was to be used. The proposal is to use a PPP-type arrangement to fund and operate the rail service if the project was to proceed. A small amount of public investment would be required for various studies and for capacity building within the government for oversight and regulation of the rail services.

**Expenditures on Routine Maintenance**

The combination of prolonged civil war and limited public financial resources led to deterioration in the basic infrastructure of the county. The ongoing program of infrastructure rehabilitation and the proposals to complete this rehabilitation in the decade ahead will restore and upgrade these facilities. The challenge then will be to step up allocations for routine maintenance of this infrastructure, and thereby contain the need for further large outlays for rehabilitation.

The proposed Action plan for Infrastructure calls for $1.2 billion outlays on routine maintenance over the next two decades. The bulk of these expenditures are for the maintenance of the power and roads infrastructure. As the accompanying table indicates, these estimates for maintenance spending include expenditures by the public sector, as well as private sector outlays on power and civil aviation infrastructure that would be operated under some form of public-private partnership (PPP) arrangement.

The proposed program represents a major step-up in funding for routine maintenance. In the case of the government component, outlays for maintenance average $25 million a year in the decade ahead. This compares with maintenance outlays for transport, power and communications infrastructure in the range of $8 million a year at the present time. In the 2020s, maintenance outlays by the public sector would step up to an average of about $85 million a year. These maintenance programs will provide important business opportunities for local companies and will

### Routine Maintenance Expenditures on the Core Program (US$ millions at 2007 constant prices)

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<th>2010-19</th>
<th>2020-30</th>
<th>Total</th>
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<tr>
<td><strong>Public sector outlays</strong></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Power sector</td>
<td>132</td>
<td>409</td>
<td>540</td>
</tr>
<tr>
<td>Transport sector</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Roads</td>
<td>105</td>
<td>160</td>
<td>265</td>
</tr>
<tr>
<td>Ports</td>
<td>4</td>
<td>6</td>
<td>10</td>
</tr>
<tr>
<td>Civil aviation</td>
<td>3</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Sub-total</td>
<td>112</td>
<td>166</td>
<td>277</td>
</tr>
<tr>
<td>Communications</td>
<td>9</td>
<td>19</td>
<td>29</td>
</tr>
<tr>
<td><strong>Total</strong></td>
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<td>594</td>
<td>847</td>
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<tr>
<td><strong>Associated private sector</strong></td>
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<td>Power sector</td>
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<td>153</td>
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</tr>
<tr>
<td>Communications</td>
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<tr>
<td><strong>Total</strong></td>
<td>115</td>
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<tr>
<td><strong>Total</strong></td>
<td>368</td>
<td>844</td>
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Source: Annex Table VI.8.
create substantial additional employment opportunities. As the subsequent discussion indicates, early action will be needed to develop the requisite skills in the labor force (electricians, for example) for these programs.

**Proposed Funding Arrangements for the Program**

The three main sources of funding for the program are the Government of Burundi, including the electricity utility and the airport authority, the donor community, and the private sector. The Government and donor community each fund major portions of the power program, but the strategy is to look to the private sector to own and operate the new domestic hydro stations that are proposed. In the case of the roads program, the donor community would fund about 80 percent of the program. The civil aviation program would be financed by the private sector, except for a small amount of donor and government funding for the human and institutional capacity building that will be required. For the program as a whole, the Government would fund about 27 percent, the donor community about 56 percent, and the private sector about 17 percent.

There are important differences in the timing of the required support from each of the three groups. Because of the current limited financial resources of the Government, its contribution in the first ten years of the program accounts for only 21 percent of total public expenditures on the program. In the second ten-year period, the Government contributes about $835 million, equivalent to 46 percent of the total public expenditure program. The improvement in these public funding capacities comes from three sources. As noted earlier, the financial position of the power utility, REGIDESO, is projected to improve substantially in the coming years as its customer base is built up. The expectation is that under the Base Case Scenario discussed below the utility will be able to finance about two-thirds of the new capital outlays for the power sector during 2020-2030. Second, the funding capacities of the airport authority would also be built up through a combination of increased air services and increases in the landing, freight and passenger fees. The third point is that the proposed Infrastructure Action Program is based on the expectation that the mining of ore deposits in the Musongati area would begin in 2017. Revenues from the mining operation in the form of income taxes and royalties are projected to be about $1.9 billion during 2020-2030. With a much stronger financial base, the Government may also be able to draw on long-term loan funding from international development agencies for particular components of the proposed program.

The proposed donor funding amounts to $1.4 billion during 2010-2019 and $1.2 billion in the following decade. The requirement for the coming decade is equivalent to an average of about $160 million a year of donor support. According to the African Development Bank (2009), Burundi has been receiving about $450 million a year in aid from all sources. The proposed infrastructure

![Funding Arrangements for Core Infrastructure Program](image-url)
program would therefore account for about one-third of current aid allocations. Such an allocation for infrastructure in Burundi is not exceptional and would likely find substantial support from within the donor community, given the importance that donors attach to overcoming the very large infrastructure deficit of the country. In the second decade of the program, the required donor funding averages $100 million a year - equivalent to about 20 percent of the current aid program.

The Government will need to take early steps to present to the donor community the case for enhanced support aimed at closing the infrastructure gap in Burundi. As the subsequent discussion of the growth and employment impact of this program makes clear, a step-up in infrastructure investment, in combination with development of the substantial mineral resources of the country in the decade ahead, lays the foundations for sustained economic growth in the range of 7 percent a year over the next two decades - a growth performance that has a significant impact on the incidence of poverty in the country.

Development of Burundi’s Substantial Mineral Resources

Burundi has significant exploitable mineral resources, but for years the civil war held up their development. Uncertainties about the prospects for developing these resources have been compounded by the lack of adequate power and transport infrastructure. A key element of the strategy for accelerating development in Burundi that is outlined in this Report is the development of the country’s extensive deposits of nickel. National nickel reserves are estimated at about 285 million tons. The most important nickel reserves are at Musongati, which has estimated reserves of 180 million tons of laterite deposits, putting it among the ten largest known deposits worldwide that have not yet been developed. The Musongati field is part of the “nickel belt” that extends from south-central Burundi to north-west Tanzania.

Development of these nickel deposits is an important objective of the Government. A number of international companies have expressed interest in commercial exploration of these resources. The Government has recently undertaken to reform the legal framework for the sector to make these investment opportunities more attractive to major producers. Two possible options have been proposed at one time or another for the actual mining operation: one is the export of nickel ore; the other is the export of metal from a refinery at the mine site. The first option would involve the transport of some four million tons of ore a year from the mine site to the Port of Dar es Salaam for shipment overseas to a refinery. These large volumes would require access to the rail transport network of Tanzania. This scenario therefore depends on completion of one of the current options for the proposed public rail extension from Tanzania into Burundi, and construction of rail spurs to the mine sites. The other option is to refine the ore at the mine site and transport refined metal to the coast for shipment abroad. If the ore is refined at the mine site, the quantities of metal to be shipped are estimated at about 50,000 tons a year. In this scenario, transport of the metal by road to the railhead at Kigoma is seen by industry analysts as the preferred option. The working assumptions used in the Base Case Scenario for the Action Plan is that the Musongati ore field is developed and brought into production by 2017, nickel and cobalt will be refined at the mine site, and that the mining company ships the refined metal by road to the railhead at Kigoma. The capital cost of mine development, not including power and transport requirements, is estimated at about $1.44 billion.

The infrastructure requirements of the mining operation are substantial. The proposed Action Plan for Infrastructure would address the two key infrastructure concerns associated with the further development of the mining industry - access to reliable supplies of low cost power, and suitable arrangements for the transport of mining supplies into the country and export of mineral products to international markets. The mine would require access to about 75 MW of installed generation capacity, which would be supplied from the national grid. The additional domestic hydro sites to be developed in the decade ahead would add sufficient
capacity to meet the needs of the mine at start-up in 2017. The transport and related infrastructure required to support the mining operation includes the complete rehabilitation of the rail line from Dar es Salaam to Kigoma, and purchase of additional locomotives and wagons to handle the increased freight generated by the mining operations. It would also require some upgrade of facilities at the Port of Dar es Salaam to handle the large volume of imported materials, and the exports of metal. The total cost of these improvements is put at about $640 million.

The benefits that flow from the project would be substantial. Gross revenues of the mining company would be about $975 million a year, with a net operating surplus of about $600 million a year. Taxes and royalty payments to the Government would be the subject of negotiation with the mining company concerned. For the purposes of this Report, these are assumed to be a little under $200 million a year. On this basis, the mining operation would have a net income of about $430 million a year. The IRR for the project is estimated at 23 percent - the implied return on equity invested in the operation is likely to be viewed as attractive by potential investors.

There are, of course, a number of uncertainties and potential risks associated with the proposed project. The project will require close cooperation and coordination between Burundi and Tanzania regarding plans for upgrading the existing rail lines and the large increase in the volume of freight to be transported to and from the Port. These discussions would need to be coordinated with parallel discussions with international mining companies that have expressed interest in developing the deposits. A second concern is that the rate of return on the project is particularly sensitive to changes in the price of nickel. The current outlook for the nickel market, therefore, may not favor quick development of these deposits. With the recent downturn in the global economy, the recent price collapse has had a major impact on nickel supply and a number of projects around the world have been put on hold or cancelled. Annual output from the Musongati mine of some 50,000 tons would require gaining about three percent of the global market at the current level of world production of 1.46 million tons.

A Program for Business Development is Essential

The new business opportunities that will be created by the proposed Infrastructure Action Program and associated nickel mining project are substantial. The Box below summarizes the opportunities for a wide range of business responses, not the least of which will be in the agricultural sector to meet increased demand for food-related products that will flow from the injection into the economy of an additional $100 million a year in wages and salaries associated with the Action Program.

Experience in the last few years points to the importance of this business development initiative. Since 2004, there has been a sharp step-up in spending by donors on the rehabilitation of infrastructure and related services under the various ongoing programs. At the same time, there has been a large increase in imports of consumer goods, very likely because of existing limited supply capacities in the local market. To ensure that the proposed project does not simply lead to a large increase in imports or press in an inflationary way on internal supply bottlenecks, especially in the labor market, the Government and donor community have important roles to play in taking complementary actions that will facilitate strong responses in the economy.

The Report outlines a range of programs that can be initiated by the Government to strengthen the supply response capacities of local business, including for example:

- Careful attention to the design of contracts for civil works, maintenance and the supply of other goods and materials that can be tendered in the local market, consistent with the local supply capacities. Over time, the size of local contracts for construction and for maintenance can be increased to help promote the growth of business activities and contracting capacities.
• Improve access of local business to construction equipment through the creation of equipment pools and or leasing companies.
• Establish business centers throughout the country that can provide information and training for local business in such things as submission of bid documents for government tenders, applications to the banking system for working capital loans, as well as training in basic business skills such as bookkeeping.
• Development of training programs for the skills that will be required for construction activities and maintenance. A comprehensive approach will be needed for skilled trades such as electricians. The power program will create several thousand jobs for electricians. The challenge will be to develop the capacity of local institutions to provide the required training, to ensure that the training meets an acceptable set of standards for the trade, to develop accreditation systems for these training institutions and introduce appropriate licensing for graduates of these programs.

New Business Opportunities

The Infrastructure Action Program calls for development and maintenance expenditures of some $5.8 billion over the next two decades. About 80 percent of these are development outlays for technical services, civil works, and equipment. The balance is for the ramp-up in maintenance spending. The Program will bring major new business opportunities to Burundi. About $2.3 billion will be spent on labor services, skilled, semi-skilled and unskilled. That is an average of $100 million a year of wages and salaries paid by contractors and the Government. The challenge is to ensure that a large share of this income is spent on goods and services available within Burundi. A weak supply response from domestic business will result in a large share being spent on imports where the main beneficiaries are import agents and the freight industry. Another major opportunity flows from the $2.3 billion that would be spent on goods of various kinds. The $1.8 billion of development expenditures on goods will be primarily for construction supplies such as cement, rebars, raw materials such as aggregate for construction of road beds, ceramics for buildings, and so on. There will be good opportunities for local supply of some of these materials, as well as building a substantial domestic fabrication industry based on imported materials. Maintenance outlays for materials will include asphalt for road works, a wide range of parts for maintenance of the electrical grid, house connections, and so on. Will there be opportunities for a cement industry, a ceramics industry, or an asphalt plant, for example? The $1.2 billion of outlays on equipment will have to be imported, probably with little opportunity for domestic value added.

Total Expenditures Under the Infrastructure Action Program (In US$ millions)

<table>
<thead>
<tr>
<th>Type of service</th>
<th>Development expenditures</th>
<th>Maintenance</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Skilled and unskilled labor services</td>
<td>1 549</td>
<td>756</td>
<td>2 304</td>
</tr>
<tr>
<td>Equipment</td>
<td>1 233</td>
<td></td>
<td>1 233</td>
</tr>
<tr>
<td>Goods</td>
<td>1 811</td>
<td>456</td>
<td>2 267</td>
</tr>
<tr>
<td>Total</td>
<td>4 592</td>
<td>1 212</td>
<td>5 804</td>
</tr>
</tbody>
</table>

Source: Table 3.11.
and that there is social and political stability; that the Government continues to adhere to sound macroeconomic policies; and that Burundi, with the help of the international donor community, continues to make steady progress in reducing its vulnerability to debt distress. It is also assumed that action is taken to improve the business and investment climate and that there is a strong domestic supply response to the proposed Infrastructure Action Program.

Economic Impact in the Near-term

For the short- and medium-term, the position taken in this Report is that the recent encouraging recovery in economic growth can be maintained. The improved economic performance has stemmed, in part, from the large increase in donor support for rehabilitation of infrastructure and related services in the economy. Since export earnings account for only about eight percent of total demand in the Burundi economy, the domestic impact of the current decline in global economic activity is likely to be limited. It is the level of domestic demand and associated supply responses that will largely determine the growth performance over the next few years. Even if no further domestic policy initiatives are taken, there will be further sharp increases in public investment expenditures until about 2011 because of the ongoing major donor-funded program of infrastructure rehabilitation. However, these projects come to a close by about 2014, and as a result, spending under these programs declines sharply from 2012 onwards. Analysis of the impact of the ongoing infrastructure rehabilitation program suggests that GDP growth may be in the range of four percent in real terms in 2009 and that it would increase to about five percent a year in 2010 and 2011. As the ongoing infrastructure program phases down after 2011, economic growth could decline to about four percent a year in 2013-2014. Serious delays in implementing the ongoing donor-funded program would result in slower economic growth in the immediate future.

The key point that emerges from this assessment of the economic outlook for the near-term is that a strong push to improve the basic infrastructure services in Burundi can sustain economic growth in the near-term and lay the foundations for a period of strong economic growth over the next two decades.
Impact of the Base Case in the Longer-term

The Base Case Scenario includes the Core Infrastructure Program and the nickel mining project. The economic benefits that accrue to Burundi under this scenario are substantial. They include:

- Sustained growth of the domestic economy that creates new business opportunities and increases incomes. GDP grows in real terms by about 7.2 percent a year over the next two decades in this Scenario. The economy expands from the current $1 billion to $4.6 billion (at 2007 constant prices) by 2030, roughly comparable to the current economies of Benin and Madagascar. The size of the domestic market for a wide range of goods and services is sufficient to open up a large range of business opportunities for domestic and offshore investors. GDP per capita increases by 4.5 percent a year to about $325 by 2030 (at 2007 constant prices). Sustained growth of incomes in this range begins to have a significant impact on the incidence of poverty in the country, with a substantial number of people at or just below the poverty line moving out of “official” poverty, although many of these people would still be vulnerable to downturns in the economy due to droughts or other disruptions.

- Increased opportunities for productive employment. Employment in the non-farm sector grows at six percent a year. Over the next two decades, about 1.3 million jobs are created in the non-farm sector, mainly in urban areas - equivalent to almost half of the 2.7 million new entrants into the labor force in this period. The share of employment in agriculture declines steadily to about 70 percent of the workforce by 2030. By 2030, the industrial sector, including mining, is projected to account for almost 10 percent of employment, while the services sector is projected to account for about 20 percent.

- Improved access to infrastructure services and lower costs for these services. The sustained strong growth in the economy and employment stems from the major investment in basic infrastructure proposed under the Action Plan. More reliable power supplies, improved transport and communications services, and lower costs for these services, improve the business environment and investment opportunities for the private sector and improve Burundi’s international competitiveness.

- Increased tax revenues and expanded public services. The combination of strong economic growth and the start-up of the mining operation have significant implications for the revenue position of the Government.
time, public revenues are about US$200 million a year (at current prices), equivalent to about 19 percent of GDP. The long-term projections of the IMF (which do not include a nickel mining project) imply revenues of about 21 percent of GDP in the 2020s. Should the nickel mine go ahead in 2017 as proposed, the Government's revenue would be in the range of $1 billion a year by 2030 (at 2007 constant prices). The prospect of additional revenues of some $180 million a year (at 2007 constant prices) from 2017 onwards may allow Burundi to overcome its current vulnerability to debt distress and improve its access to international capital markets for various PPP-type arrangements that require private funding.

The Alternative Scenarios

The Table above summarizes the outcomes for each of the five alternative scenarios considered in this Report and compares them to the Base Case. Several key points emerge from this analysis:

- In the event that the nickel mining project does not proceed, but the Core Infrastructure Program is implemented in full (Scenario B), GDP grows at about 6.4 percent a year over the next two decades - sufficient to create a substantial amount of additional productive employment and improve incomes and productivity in urban and rural areas and contribute to a significant reduction in the incidence of poverty in the country. The main economic impact is a substantial drop in export income and government revenues.

- If private investment is not available for the power and aviation sectors (Scenario C), there is a further modest decline in growth performance, with GDP increasing by an average of 6.2 percent a year over the next two decades. The decline in the growth rate is limited because it is assumed that all the additional power that is needed to meet demand is imported from the EAPP grid. The implication is that by 2030, imported power accounts for 90 percent of total supply in Burundi.

- In Scenarios D and E, the level of public investment in the proposed infrastructure program declines from $3.8 billion over the next two decades to less than $1 billion. The growth performance of the economy declines sharply. In Scenario E, the GDP growth rate is more than two full percentage points below the Base Case. The economy has difficulty in absorbing new entrants in the labor force into productive employment opportunities. As a result, there is the risk of rising unemployment in urban areas, especially among younger people. In addition, much larger numbers of people remain in low productivity agricultural pursuits. While there may be some reduction in the incidence of poverty in the country in this Scenario, the total number of people in absolute poverty would increase substantially over the next two decades.

- Scenario F assumes that one of the rail extensions into Burundi goes ahead, but that the nickel mining operation is based on refining ore at the mine site. In the absence of the four million tons of ore exports each year, the economic impact of the rail extension is modest and GDP growth is not much higher than in the Base Case. Moreover, in this scenario, there is a risk that large public subsidies would be needed for the operation of the rail network in Burundi.

Key Policy Issues for the Government

The Report has identified a number of important policy issues for consideration by the Government and donor community. These include the following:

- The importance of early action by the Government and donor community to expand support for the proposed Infrastructure Action Program.

- The role of private funding for infrastructure development under PPP or other types of arrangements and its implications for Burundi.

- The need to move forward expeditiously on the proposed nickel mining operation.

- Questions about the economic viability of the rail extension in the absence of mine-related freight.
Early Action on the Core Infrastructure Program

It is important for Burundi to maintain the current growth momentum generated by the ongoing strong donor support for infrastructure rehabilitation. An early launch of the proposed Infrastructure Action Program requires a series of decisions by the Government and donor community regarding the design of particular programs and projects and funding arrangements for these activities. There is a degree of urgency associated with some of these decisions because implementation of a number of key components of the program needs to begin in 2010 if the above-mentioned targets for the power and transport sectors are to be realized and if the current growth momentum in the economy is to be sustained. Mobilization of a total of about $620 million in new funding will be required for activities scheduled for implementation during the first five years (2010-2014) of the proposed program.

In the case of the power program for 2010-2014, the design of some $28 million of new capacity building initiatives and technical studies needs to be firmed up so that funding arrangements can be completed. Discussions with donors and private investors regarding the funding of almost $200 million needed for the construction of new generation capacity in the next five years is under way. However, discussions about the implementation and funding arrangements for the transmission and distribution network and associated customer connections for the next five years are less well advanced. The total amount of funding required is estimated at $107 million. In the case of road transport and infrastructure, new funding in the amount of about $265 million is required for the period 2010-2014. This includes $30 million for new capacity building initiatives and technical studies, and $235 million for capital works - mainly for the national road network and the start of the expansion of the urban road network. The civil aviation program will require mobilization of $8 million for capacity building, technical studies, including detailed design work on an upgraded international airport and the groundwork needed for mobilization of private funding for the airport project. Modest amounts of funding are also required for equipment replacement in the Port of Bujumbura and for further investigation of options for the possible rail extension into Burundi. New funding requirements for the communications sector are also modest, with some $3 million required for additional capacity building from 2012 onwards when the ongoing World Bank project comes to a close.

Mobilizing Private Funding for Infrastructure

The proposed Action Plan calls for increased use of PPP-type arrangements to mobilize private sector funding for the program. In general, accessing private funding under these types of arrangements allow governments to avoid or defer public spending on infrastructure without foregoing its benefits. To manage the risks associated with the proposed PPPs and ensure that they provide high quality infrastructure services in an efficient manner, the Government will need to give careful attention to the following three broad sets of concerns: (i) the legal framework governing the PPPs; (ii) the processes for selecting and implementing PPPs, including the roles played by relevant government agencies; and (iii) the contractual obligations on which PPPs are based that directly determine the fiscal risk incurred by the government.

The contributions from private investors for the power program, civil aviation and, if it proceeds, the rail extension in Burundi, are predicated on the assumption that it will be possible to form public-private partnerships for each of these operations using BOT, BOOT or some comparable privatization techniques. A total of $1.4 billion of private funding would be needed for PPPs in these three sectors. This excludes the approximate $670 million that might be required for a rail link to the mines; it is assumed that the mining company would fund and construct these spurs, if they were to go ahead. The bulk of the private funding for these programs is required in the first decade.
These PPP-type arrangements typically involve substantial amounts of debt financing by the private contractors. The issue that will arise in these circumstances is the manner in which lenders for these types of projects will be protected from sovereign risk, which includes risk of default, breach of covenants, availability of foreign exchange or convertibility, expropriation, and other concerns. The issue of sovereign risk is particularly important for Burundi, in view of its vulnerability to debt distress. If the required private debt financing is to be mobilized, consideration may need to be given by donors to some form of guarantee arrangements. The design of these proposed PPP arrangements will require substantial work over the next five years. Burundi will need early access to experienced legal and technical services for the work involved.

Moving Forward With the Nickel Mining Project

If private investor interest in the nickel mining project is to move forward, the Government will need to engage in negotiations with one or more potential investors on the terms and conditions for the investment. The capital cost of developing the mine site is estimated at about $1.4 billion, with an additional $600-700 million in public funding for improvements in the rail capacity of the TCR in Tanzania and in improvements at the port of Dar es Salaam. The Government will need to assemble an experienced legal and technical team for these negotiations and may need advice and assistance from a donor in this regard. In the event that the mine operation is able to proceed and the private funding can be mobilized, the $200 million a year in tax and royalty payments would, in turn, contribute significantly to improving the financial position of the Government and would help reduce Burundi’s vulnerability to debt distress.

Assessing the Viability of a Rail Extension into Burundi

An important point that emerges from this study is a series of questions about the extension of the Tanzanian rail network into Burundi. If the rail is unable to carry freight generated by the nickel mining operation in Burundi, then the volumes of freight available from regular commerce appear to be too small to justify the investment at any time within the next two decades. If refining metal at the mine site is the most attractive option available to potential investors, there may be little appetite for the alternative, perhaps higher cost, option of using a rail system in Burundi for the freight services for the mine. More analysis is needed on these options before final decisions can be taken by the Government. In any event, there will be need for close cooperation and coordination with Tanzanian authorities if the mine is to go ahead, because the rail system would be used to transport metal from Kigoma to the port at Dar es Salaam. The rail network would also have to carry 600,000 tons of chemicals a year for the refinery operation.

The other point that emerges is the timing of initiatives to proceed with the rail extension. Various feasibility studies suggest that it should proceed in the decade ahead. The analysis undertaken for this Report indicates that implementation of the Infrastructure Action Program and the mine development in the decade ahead will push public and private investment to levels that are manageable, but high in relation to GDP, at least for Burundi. If the rail extension were to be undertaken at the same time, investment levels
would rise to more than 80 percent of GDP for several years in the decade ahead. Given the limited absorptive capacities of the Burundian economy, this level of investment may pose serious stability questions for the management of the economy. Careful attention to the phasing of these various programs would be required to avoid inflationary pressures.

The Degree of Dependence on Imported Power

The analysis in this Report points to the emergence of a power supply deficit by about 2024. At that time, Burundi would need access to another 200 MW of capacity to meet projected needs in the latter part of the 2020s. If this is to be met from domestic hydro sources, it would involve a capital outlay of some $400 million (at 2007 constant prices). Further investigation is needed to determine whether there are additional large hydro sites available within Burundi to meet this continuing growth in demand. The key policy question for the longer-term is whether to develop other potential domestic sites in order to keep dependence on imported power at prudent levels, or whether to allow increased dependence on imported supplies from the EAPP network. A related question is the likely cost of new sources of domestic supply compared with imports from a low cost producer such as Ethiopia.

Managing Risks and Uncertainties in the Program

A twenty-year program of this magnitude inevitably faces risks and uncertainties, large and small, foreseen and unforeseen. Many possibilities can be considered, including for example, major political risks such as deterioration in internal security, or civil disturbances in neighboring countries that affect the overall performance of the Burundi economy and its attractiveness as a destination for private investment. There are also risks that stem from the international environment, including sharply higher petroleum or raw material prices that may adversely affect the attractiveness of investments in Burundi. For the purposes of this Report, the risks and uncertainties of most interest at this stage relate to the design, funding and implementation of the proposed program. The issues of particular concern include: (i) the availability of the various types of project funding that are required; (ii) the capacity of Burundi Government agencies to manage the formulation, design and implementation of the proposed program, including the ability of Burundi and other EAC members to reach timely agreement on key aspects of cooperation in the further development of the regional infrastructure networks and services; (iii) adoption of policies and programs that can maintain macroeconomic stability in the face of the proposed large ramp-up in investment spending within Burundi; and (iv) the design and early implementation of programs that will support strong domestic supply responses in input and product markets. To manage these risks, the Government and donor community will need to strengthen coordination mechanisms for the infrastructure sectors, starting with early completion and adoption of the proposed master plans for the infrastructure sectors. Regular meetings with donors may then be required to monitor progress in implementation of the program.

Availability of Funding

Shortfalls in funding may result in postponement or cancellation of particular projects or project components. An immediate concern, for example, is early agreement with donors or potential private investors on the funding arrangements for the new generation projects to be constructed within Burundi and the three regional generation projects in which Burundi would share power with neighboring states. Delays in reaching agreement on funding may lead to delays in commission dates for the plants. As the foregoing discussion indicates, shortfalls in public investment have a significant adverse impact on the overall growth performance of the economy over the next two decades. An inability to mobilize private funding on the scale required for the Core Infrastructure Program has the same effect, unless
of course the shortfalls can be made up by increased allocations from the donor community.

**Delays in Implementation**

Problems with capacities of line agencies to oversee the design and implementation of the program may result in cost overruns in the program, delays in start-up and completion of particular project components, or use of sub-standard materials or civil works activities that are not in accordance with the required technical specifications of a project component. In this case, there may be waste of public funds, or premature deterioration of an asset such as a section of a road, or a power line, that leads to sharply higher levels of maintenance spending. Another area of concern relates to careful assessment of the environmental impact of the proposed program, including the development of the nickel mine and disposal of waste materials from the refinery operation. The proposed program includes about $170 million of technical support for various aspects of program design and implementation. Early agreement with the donor community on these particular program components will make an important contribution to an effective launch of the Infrastructure Action Program.

Difficulties in reaching agreement on the terms and conditions for projects and programs that require regional cooperation may lead to delays in award of contracts for particular projects. The proposed rail extension from Tanzania to Burundi, if it is to proceed, will require substantial negotiation on how the costs and benefits of the project will be shared. A significant part of the capital cost stems from the need to improve the rail system on the Tanzanian side and provide port facilities for loading of ore or metal and unloading of mine supplies.

**Macroeconomic Policy Issues**

The proposed levels of investment may impose macroeconomic strains on the economy, including for example, shortages of skilled and semi-skilled labor that translate into inflationary wage pressures, and crowding out of private investment in areas unrelated to the Action Plan. Total non-mining investment is about 35 percent of GDP at the peak of the program in 2014-2016. Including the investment for the mine at this same period, the investment level is in the range of 65 percent of GDP at this time. An essential part of the next phase of the Action Plan would be detailed design work that includes programs and policies required to manage these potential pressures. It will require close attention to three aspects of the program: (i) early mobilization of the required public and private investment funds; (ii) building capacities for effective implementation of the program; and (iii) effective management of the macroeconomic impact of the program, including, for example, early action to develop the required skills in the labor force.

**Inadequate Domestic Supply Response**

In the event that the capacities of domestic business cannot be built up rapidly, the risk is that large amounts of income will move out of the economy in the form of payments for imports and remittances. A particular aspect of the competition from imports relates to Burundi’s recent entry into the East African Community. Membership carries with it a commitment to lower and eliminate intra-EAC tariffs on a wide range of products by 2010. Burundi producers will almost certainly face stiff competition from exporters in the large neighboring member countries. At the same time, membership requires increased attention to harmonization with policies, regulations and standards that are being adopted by the Community. A number of these standards have important implications for the further development of infrastructure facilities and services within Burundi. An early dialogue between the Government and donors interested in building these domestic supply capacities will be important. Regular monitoring of business activities and expenditures on imports will help identify obstacles to realizing a strong supply response. There will be a need for effective coordination between the Government and donors with programs that support business development activities and skills training.