PUBLIC INFRASTRUCTURE INVESTMENT: 
A BRICS PERSPECTIVE FOR INCLUSIVE SUSTAINABLE DEVELOPMENT

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PUBLIC INFRASTRUCTURE INVESTMENT: A BRICS PERSPECTIVE FOR INCLUSIVE SUSTAINABLE DEVELOPMENT, JAYA JOSIE (PHD), HUMAN SCIENCES RESEARCH COUNCIL (HSRC).

Abstract: This paper focuses on the relationship between public infrastructure investment in the context of Rio+20 agenda and the post 2015 UN development agenda for integrating sustainable development goals (SDGs) and the millennium development goals (MDGs) from a BRICS perspective for global sustainable development. All eight MDGs emphasise human capital, infrastructure, and socio-economic and political human rights as integral to increasing an individual’s living standards and human capabilities. Of the three, public infrastructure provision is perhaps the key intermediate factor for ensuring that an individual’s living standard, capabilities and human, socio-economic and political rights are sustainable in the long-term. In this regard this paper presents a BRICS perspective on the extent to which public infrastructure investment may contribute towards the provision of basic public infrastructure as a solid foundation for sustainable long-term development integral to meeting public infrastructure objectives for MDG and SDG targets up to, and beyond 2015.

INTRODUCTION
The aim of this paper is to discuss public infrastructure investment in the context of the post-2015 UN development agenda for integrating SDGs and the MDGs from a BRICS perspective for attaining global sustainable development goals. In this regard is the provision of public infrastructure a key intermediate factor for ensuring that an individual’s living standard, capabilities and human, socio-economic and political rights are sustainable in the long-term? The MDGs emphasise human capital, infrastructure, and socio-economic and political human rights as integral to increasing an individual’s living standards and human capabilities. The paper focuses on the extent to which public infrastructure investment may contribute towards the provision of basic public infrastructure as a solid foundation for sustainable long-term development integral to meeting public infrastructure objectives for MDGs and SDGs up to,
and beyond 2015. The paper will discuss a possible relationship between development finance and BRICS public infrastructure investment policy to address inclusive sustainable development and public infrastructure backlogs that militate against meeting MDG and SDG targets.

A BRICS source of development finance would respond to the problem of insufficient long-term investment financing for developing countries to fund infrastructure investment for the provision of basic infrastructure services to disadvantaged communities. A BRICS source of development finance will supplement and complement existing national and international financing and create conditions for accelerating sustainable post-2015 economic growth and development. Section one of the paper briefly discusses the extent to which infrastructure investment may act as a catalyst for integrating post-2015 MDGs and SDGs. Section two provides a review of the current trends in infrastructure investment as they relate to gross fixed capital formation (GFCF) among BRICS countries. Section three outlines a possible theoretical framework for public investment to address basic public infrastructure service backlogs targeting MDGs and SDGs in BRICS countries. Section four discusses the possible role of a BRICS development finance institution in financing public infrastructure investment, and the paper concludes with some specific proposals. Accompanying the paper is a separate Annexure with data showing evidence of BRICS infrastructure programmes by sector and project.

1. INFRASTRUCTURE INVESTMENT A CATALYST FOR INTEGRATING MDGS & POST-2015 SUSTAINABLE DEVELOPMENT

Over the past two decades the development debate internationally has been dominated by two trends (Sachs, 2012; Loewe, 2012) that juxtaposed sustainable development goals (SDGs) with millennium development goals (MDGs). The MDG campaign has its roots in the 2000 Declaration of the Millennium Summit of the United Nations (UN) for attaining Millennium Development Goals (MDGs) by 2015 (Millennium Development Report, 2013).
This programme was adopted in 2001 by the UN General Assembly, and established as an integral part of the UN agenda. The MDGs seeks to ensure that an individual's living standard, capabilities and human, socio-economic and political rights are sustainable in the long-term. Eight MDGs were identified that included the eradication of extreme poverty and hunger; achieving universal primary education; promoting gender equality and empowering women; reducing child mortality rates; improving maternal health; combating HIV/AIDS, malaria, and other diseases; ensuring environmental sustainability; developing a global partnership for development. Presupposing the programme for the MDGs is a requirement for adequate human capital, infrastructure, and socio-economic and political human rights for improved living standards and enhancing human capabilities.

The campaign for SDGs on the other hand started with the Earth Summit in Rio de Janeiro in 1992 and continued at the Rio+20 summit in June 2012 (Loewe, 2012). The latter argued for integrating and extending MDGS as part of a post-2015 campaign for attaining global sustainable development goals (SDGs), and culminated in the release in May 2013 of a UN panel report on a Post-2015 Development Agenda focusing on a new global partnership for eradicating extreme poverty and transforming economies through sustainable development by 2030. This UN post-2015 Development Agenda underscores a convergence of the MDGs and SDGs. One argument (Sachs, 2012) suggests that the SDG’s could provide the necessary impetus for a sustainable global development trajectory. The other (Loewe, 2012) argues that indeed the SDG agenda is a pre-condition for attaining, and sustaining the MDG targets into a post-2015 development trajectory.

With respect to the post-2015 development trajectory, and relevant for this paper, the SDG agenda promotes among others, poverty reduction; food security, nutrition and sustainable agriculture; water and sanitation; energy; sustainable tourism, transport, cities and human settlements; health and population; full and productive employment, decent work for all and social protection; least
developed countries; landlocked developing countries; African regional efforts; education; gender equality and the empowerment of women (Loewe, 2012). When comparing the MDG and SDG targets it is clear that not only do they have much in common, but they also complement each other. However attaining the targets for the provision of sustainable basic infrastructure services explicit in some of the MDGs and SDGs requires a long-term commitment for infrastructure investment in physical and social infrastructure in particular. Such investment has to be differentiated, if it seeks to address inter and intra-regional spatial and socio-economic disparities that militate against attaining the MDGs and SDGs.

If the MDG and SDG policy targets set the public infrastructure standard that must be reached beyond 2015, then public infrastructure financing must seek to progressively close the gap between the existing norm and the desired standard within the post-2015 time frame for SDGs. Section two of this paper examines this proposition from a BRICS perspective by first reviewing the infrastructure investment trends and needs within BRICS member states. Section three then theoretically illustrates how a BRICS development finance institution, such as a new BRICS Development Bank (BDB), may be able to complement and supplement public infrastructure investment taking account of disparities in order to attain MDG and SDG targets in BRICS member states and associated developing and emerging economies.

2. UNDERSTANDING INFRASTRUCTURE INVESTMENT TRENDS: A LONG-TERM BRICS PERSPECTIVE

BRICS member states are currently considering a new complementary and supplementary development finance institution to support emerging economies and developing countries – especially in associated regional economies. The role of such an institution could be to mobilize resources for infrastructure and development projects not only for BRICS member states but also for other emerging and developing economies. Such an initiative will be a positive response to the problem of insufficient long-term financing and foreign direct
investment faced by developing countries in addressing challenges of infrastructure development.

To target infrastructure investment to address economic and social infrastructure backlogs resulting from socio-economic and spatial disparities policymakers require an indicator that captures both national and per capita infrastructure needs for inclusive and sustainable growth and development. The literature on public infrastructure investment in economic development suggests that its role is mediated through its contribution to capital stock in macroeconomic aggregates. By implication the role and measurement of capital stock in sustainable economic development suggests that capital stock and capital backlog estimates can be used in conjunction with capital cost disparity indicators to estimate the level of physical and social infrastructure investment required for financing public infrastructure in disadvantaged regional and sub-regional economies (Josie et al, 2008).

The relationship between infrastructure investment and GDP is expressed through the value of the infrastructure investment asset component in the total value of gross fixed capital formation (GFCF) of a country's national account calculation of the GDP\(^1\) (Natrass, 2000; Vane & Thompson, 1989). Although there are other determinants of general investment such as variations in business confidence and tax policies (Vane & Thompson, 1989) increases in public infrastructure investment will most likely have a significant impact on the levels of capital stock in general and economic development in particular. Timmer and van Ark (2002) demonstrated this relationship in constructing fixed non-residential capital stocks for South Korea and Taiwan. Aschauer (1989) tested this proposition in a seminal article in an econometric study that presented estimates to show dramatic returns to public capital investment in the USA. Naqvi, (2003) using the Aschauer model compared the productivity of public capital against private capital in Pakistan from 1965 to 2000 and demonstrated that externalities generated by public capital stock shows that public capital was more productive than private capital in growth. In a Europe-wide survey Romp

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\(^1\) Thus GDP is equal to the sum of consumption (C), GCF, government spending (G), exports (X), imports (Z) and can be written as GDP = C + GCF + G + X – Z.
and de Haan (2005) concluded that although not all empirical studies can show that public capital has positive impacts on economic growth there is currently greater unanimity that public capital investment increases economic growth. The arguments and conclusions advanced by Aschauer and others have been challenged (Hulten and Schwab, 1993) both methodologically and conceptually. Their critique suggests that the US data may indicate a correlation between infrastructure and output growth, but this association cannot be interpreted to mean that lower infrastructure was the cause of slower growth. The authors argue that any one of several other variables such as low productivity and higher costs may have had just as significant an impact on slowing growth for the period of Aschauer’s study. However, Hulten and Schwab (1993) do not question the need for public infrastructure investment they merely challenge the presumed causality between public infrastructure investment and economic growth. The authors propose that rather than arguing for more public infrastructure investment greater emphasis should be placed on developing and devising more effective ways of allocating and spending existing levels of public capital expenditure.

With respect to Africa Ndulu et al (2005) and Ndulu (2006) note that in sub-Saharan Africa inadequate public infrastructure is the greatest obstacle to faster economic growth. In this regard Sub-Saharan African economies were characterized by low capital accumulation, high prices of investment goods, low productivity of investment and a higher level of geographical disadvantages that compromised growth and regional integration. Given that the consensus in the literature seems to err on the side of increasing public infrastructure investment restating the role and contribution of infrastructure investment in capital stock will be important.

Infrastructure is a component of the capital stock of a country. The value of an infrastructure asset\(^2\) in GFCF is determined by the value the asset is expected to earn for the delivery, production or generation of specific capital services over

\(^2\) The SNA93 defines fixed assets as produced assets that are used repeatedly, or continuously in the production process for more than one year.
its lifetime (OECD Manual: 16). The standard formula (OECD Manual: 16) for calculating infrastructure asset values is written as:

\[ V_t = \sum_{t=1}^{T} \frac{f_{t+\tau-1}}{(1 + r)^t} \]

Where:

- \( V_t \) is the real value of an asset at the beginning of year \( t \),
- \( f \) is the real rental in each period,
- \( T \) is the service life of the asset in years,
- \( \tau \) takes values of 1, 2, 3..., \( T \), and
- \( r \) is the discount rate used to reduce the future flow of rentals to their present values.

Thus the role of infrastructure value in GFCF underscores the significance of capital stock in economic growth. This evident from the most recent GFCF trends in BRICS member states presented below.

According to historical data provided by the World Bank in 2013 China and India increased their GFCF investment over the last 9 and 10 years. Other countries saw a decrease in one or more years. On average China’s GFCF grew by 13.5%, and over the last 10 years South Africa’s was the lowest at 7.7%. South Africa is the only country where GFCF dropped in two consecutive years, i.e. 2009 and 2010. Brazil saw a decrease in both 2009 and 2012 and, Russia recorded a decrease in GFCF for 2009. (See Table 1 below.)

### Table 1: Gross Fixed Capital Formation at Constant 2005 Prices in US Dollars

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<tbody>
<tr>
<td>Brazil</td>
<td>124.35</td>
<td>135.69</td>
<td>140.61</td>
<td>154.35</td>
<td>175.73</td>
<td>199.58</td>
<td>186.16</td>
<td>225.87</td>
<td>236.52</td>
<td>227.04</td>
</tr>
<tr>
<td>Russia</td>
<td>108.93</td>
<td>122.65</td>
<td>135.65</td>
<td>160.07</td>
<td>193.68</td>
<td>214.21</td>
<td>183.37</td>
<td>194.13</td>
<td>213.96</td>
<td>226.80</td>
</tr>
<tr>
<td>India</td>
<td>175.65</td>
<td>217.77</td>
<td>253.04</td>
<td>288.00</td>
<td>334.67</td>
<td>346.40</td>
<td>372.96</td>
<td>425.15</td>
<td>443.79</td>
<td>451.44</td>
</tr>
<tr>
<td>China</td>
<td>721.63</td>
<td>809.57</td>
<td>905.91</td>
<td>1020.96</td>
<td>1158.79</td>
<td>1270.03</td>
<td>1560.87</td>
<td>1741.93</td>
<td>1907.41</td>
<td></td>
</tr>
<tr>
<td>South Africa</td>
<td>33.11</td>
<td>37.37</td>
<td>41.48</td>
<td>46.51</td>
<td>53.01</td>
<td>56.05</td>
<td>57.34</td>
<td>56.17</td>
<td>58.70</td>
<td>62.03</td>
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</table>

*Source: World Bank, 2013*
3. ILLUSTRATIVE FRAMEWORK: PUBLIC INFRASTRUCTURE INVESTMENT, BASIC PUBLIC SERVICES, MDGS AND SDGS

Theoretically, to determine the desired level of capital stock needed to achieve economic objectives a reasonable estimate of existing capital stock has to be calculated. The difference between the desired level and existing level of capital stock is the level of capital backlog that has to be eradicated. The cost of eradicating capital backlogs while taking account of regional and sub-regional capital cost disparities determines the level of fixed investment that will be required to achieve socio-economic goals. Thus capital stock data is a critical input for measuring and forecasting infrastructure investment and, for estimating infrastructure deficiencies or backlogs (Levtchenkova and Petchey, 2000). However, in developing and emerging economies such as South Africa the challenge for public infrastructure investment to address MDGs and SDGs is the absence of disaggregated capital stock and GFCF data at local level. The South African Reserve Bank (SARB) publishes the public sector economic infrastructure components of South Africa’s GFCF and the per capita fixed capital stock data aggregated at national level although it is collected locally. However, for targeted public infrastructure investment to attain MDGs and SDGs across sub-regions capital stock estimates for these areas will provide an important
indicator for determining the amount of financing required to enhance government’s contribution to the desired level of capital stock in the economy. Alternative approaches for estimating capital stock such as the perpetual inventory method (PIM) demand infrastructure expenditure time-series data spanning at least two to three decades to smooth out errors (Levtchenkova and Petchey, 2002). Nevertheless, assuming a supply of regional and sub-regional capital stock data the following discussion presents an illustrative framework for public infrastructure investment to meet basic MDG and SDG public infrastructure service targets.

In developing a policy model for reducing capital backlogs in transitional economies and using South Africa as a case study, Petchey and Levtchenkova (2002) concluded that compared to an international benchmark the overall amount of physical infrastructure and social infrastructure available for the provision of basic services was insufficient. The results from the study show a marked variation across provinces in South Africa indicating widely variable access to services across provinces. Figure 2 illustrates the theoretical possibility of how the development gap between a desired benchmark standard and current norm can be closed.

Figure 2: Closing the Capital Stock Gap between Policy Norm & Desired Standard

![Diagram Illustrating Actual Capital Stock Relative to the Policy Norm and Standard](image)

Source: Adapted from Petchey, Macdonald, Josie & Nthite; 2004
The diagramme schematically illustrates how public infrastructure investment could underpin sustainable development. In Figure 2 the actual per person capital stock of a representative poor region for a particular service is plotted (point \(b\)) against the standard capital stock for the service across all regions and in which the standard capital stock is growing over time. In the diagramme, the actual capital stock is depicted below the standard. The region has a capital backlog equal to the distance in \(ab\). In a current period, this would have grown to equal the distance \(cd\) because investment is insufficient to reduce the backlog of the preceding period. In addition because of low investment over time the backlog has increased further to equal the distance \(ef\). The key question is how to raise the level of net investment so that its actual capital stock for the service equals the desired standard at some future period? Line \(de\) represents the development trajectory for closing the investment gap, and is arbitrary in the illustration. Of course there can be several possibile trajectories depending on how quickly or gradually the investment gap can be closed, and therefore the pace and amount of investment will define the shape of line \(de\).

4. A BRICS DFI FOR PUBLIC INFRASTRUCTURE INVESTMENT
A leaders statement at the BRICS Summit in Durban 2013 acknowledged that developing countries face challenges of infrastructure development due to insufficient long-term financing and foreign direct investment, especially investment in capital stock. By implication, and following from the preceding discussion, such an inadequacy will place constraints on attaining MDG and SDG targets. The statement asserted that BRICS cooperation towards more productive use of global financial resources can make a positive contribution to addressing the problem. The statement further indicated that a BRICS Finance Ministers feasibility and viability study supported the establishment of a New Development Bank to mobilize resources for infrastructure and sustainable development projects in BRICS, emerging economies and developing countries to supplement the existing efforts of multilateral and regional financial institutions. Table 1 clearly demonstrates that among BRICS member states trends for capital GFCF vary widely. As a percentage of GDP total capital investment across BRICS
has also been variable (See Table 2). According to Business Monitor International (BMI) forecasts, Russia is expected to grow from 2012 to 2022 after experiencing a decrease from 2008 to 2011. Brazil also decreased its investment in 2009 and BMI expects the 2012 data to show another decrease. However, for other years, including the BMI forecasts, an increase in investment spending is expected. China witnessed an increase from 2008 to 2010 and a decrease in 2011, with the trend expected to continue through to 2022. South Africa is the only country that shows a persistent marginal decrease in its spending.

Table 2: Total Capital Investment as a Percentage of GDP

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</thead>
<tbody>
<tr>
<td>Brazil</td>
<td>19</td>
<td>16.9</td>
<td>18.4</td>
<td>19.3</td>
<td>18.9</td>
<td>19.6</td>
<td>20.2</td>
<td>20.8</td>
<td>21.2</td>
<td>21.5</td>
<td>21.7</td>
<td>21.9</td>
<td>22</td>
<td>22</td>
<td>22.1</td>
</tr>
<tr>
<td>Russia</td>
<td>23.8</td>
<td>22</td>
<td>21.9</td>
<td>20.9</td>
<td>21.8</td>
<td>22.3</td>
<td>23.4</td>
<td>24.3</td>
<td>25</td>
<td>25.2</td>
<td>25.6</td>
<td>25.9</td>
<td>26.2</td>
<td>26.5</td>
<td>26.8</td>
</tr>
<tr>
<td>India</td>
<td>33.9</td>
<td>33.5</td>
<td>32.6</td>
<td>32.9</td>
<td>31.3</td>
<td>31.5</td>
<td>32</td>
<td>32.5</td>
<td>33</td>
<td>33.1</td>
<td>33.2</td>
<td>33.4</td>
<td>33.4</td>
<td>33.3</td>
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<tr>
<td>China</td>
<td>40.7</td>
<td>45.3</td>
<td>47.9</td>
<td>46.2</td>
<td>44.8</td>
<td>43.5</td>
<td>42.8</td>
<td>42.2</td>
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<td>40</td>
<td>39.3</td>
<td>38.7</td>
<td>38</td>
<td>37.4</td>
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<tr>
<td>South Africa</td>
<td>23</td>
<td>21.8</td>
<td>19.6</td>
<td>18.9</td>
<td>19.6</td>
<td>19.4</td>
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<td>18.9</td>
<td>18.8</td>
<td>18.8</td>
<td>18.8</td>
<td>18.7</td>
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</table>

Source: Business Monitor International

With respect capital investment per capita Business Monitor International (BMI) expects all countries to increase their investment spending from 2014 (See Table 3). Past trends show that between 2008 through to 2011 China increased its

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investment, and is expected to grow further until 2022. Brazil, Russia, and South Africa all decreased their investment from 2008 to 2009; however, South Africa is also expected to decrease its spending further from 2011 to 2013 where after all three are expected to show growth in investment. Out of all member countries India has the lowest per capita investment.

The potential for further economic development within BRICS is obvious from the data. An accompanying Annexure with tables provides evidence of this potential for each country by sector and project.

Table 3: Capital Investment Per Capita in US Dollars

<table>
<thead>
<tr>
<th>Year</th>
<th>Brazil</th>
<th>Russia</th>
<th>India</th>
<th>China</th>
<th>South Africa</th>
</tr>
</thead>
<tbody>
<tr>
<td>2008</td>
<td>1,556.5</td>
<td>2,764.4</td>
<td>326.1</td>
<td>1,387.6</td>
<td>1,276.3</td>
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<tr>
<td>2009</td>
<td>1,395.0</td>
<td>1,876.7</td>
<td>357.9</td>
<td>1,718.1</td>
<td>1,245.8</td>
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<tr>
<td>2010</td>
<td>1,972.4</td>
<td>2,267.5</td>
<td>418.2</td>
<td>1,718.1</td>
<td>1,418.1</td>
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<tr>
<td>2011</td>
<td>2,424.5</td>
<td>2,713.7</td>
<td>494.5</td>
<td>2,470.3</td>
<td>1,527.7</td>
</tr>
<tr>
<td>2012*</td>
<td>2,122.8</td>
<td>2,764.8</td>
<td>526.6</td>
<td>2,693.9</td>
<td>1,494.5</td>
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<tr>
<td>2013*</td>
<td>2,187.3</td>
<td>3,049.7</td>
<td>477.3</td>
<td>2,843.6</td>
<td>1,458.4</td>
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<tr>
<td>2014*</td>
<td>2,267.1</td>
<td>3,484.2</td>
<td>555.9</td>
<td>2,990.1</td>
<td>1,571.8</td>
</tr>
<tr>
<td>2015*</td>
<td>2,363.5</td>
<td>4,084.2</td>
<td>607.3</td>
<td>3,176.3</td>
<td>1,690.2</td>
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<tr>
<td>2016*</td>
<td>2,638.0</td>
<td>4,749.0</td>
<td>671.0</td>
<td>3,381.4</td>
<td>1,817.4</td>
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<tr>
<td>2017*</td>
<td>3,084.3</td>
<td>5,380.5</td>
<td>734.8</td>
<td>3,601.0</td>
<td>1,954.2</td>
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<tr>
<td>2018*</td>
<td>3,516.5</td>
<td>6,058.5</td>
<td>805.0</td>
<td>3,836.2</td>
<td>2,101.3</td>
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<tr>
<td>2019*</td>
<td>4,015.5</td>
<td>6,795.4</td>
<td>882.1</td>
<td>4,088.0</td>
<td>2,259.5</td>
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<tr>
<td>2020*</td>
<td>4,593.4</td>
<td>7,629.5</td>
<td>962.2</td>
<td>4,357.7</td>
<td>2,429.4</td>
</tr>
<tr>
<td>2021*</td>
<td>5,268.5</td>
<td>8,554.3</td>
<td>1,045.0</td>
<td>4,646.6</td>
<td>2,612.0</td>
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<tr>
<td>2022*</td>
<td>5,891.2</td>
<td>9,609.8</td>
<td>1,129.8</td>
<td>4,956.2</td>
<td>2,808.2</td>
</tr>
</tbody>
</table>

Source: Business Monitor International

* NB:  e = expected and f = forecast. India is the only country that reports per financial year i.e. 2008/09 instead of 2008, and therefore for ease of reference annual data instead of the financial year data was used.
CONCLUSION AND RECOMMENDATIONS
In conclusion the questions to ask is can BRICS initiated infrastructure investment be equitable across member states and associated regional economies? Secondly, how can public infrastructure investment contribute towards this sustainable economic development among BRICS member states and associated regional economies experiencing public infrastructure backlogs? Of course these questions raise the fundamental issue of the role and impact of public infrastructure investment in sustainable and inclusive economic development.

The preceding sections of this paper briefly reviewed and discussed some of the key concepts and issues that may mediate the role and impact of public infrastructure investment for sustainable and inclusive economic growth that can contribute towards attaining the post-2015 MDG and SDG targets. If BRICS member states want to be part of the post-2015 MDG and SDG agenda member states should consider the following proposals: 1) A new BRICS development bank should include a programme for public infrastructure investment targeting the provision of basic services; 2) Give serious consideration to promoting and sharing research for disaggregating and recalibrating capital stock data to local levels to facilitate planning and targeting infrastructure investment; 3) Define an acceptable and consistent set of MDG and SDG indicators across BRICS that may be used to take account of socio-economic and spatial disparities that differentiate regions, sub-regions and communities from each other. The latter two will be important for making investment decisions in favour of meeting MDG and SDG targets.

REFERENCES

http://web.a.ebscohost.com/ehost/pdfviewer/pdfviewer?sid=ba394c2c-10c7-4bab-b0e9-7248371f1a43%40sessionmgr4003&vid=2&hid=4107 ; Industry Reports. (2013) India Infrastructure Report Q4 2013


Loewe, M.; 2012, Post 2015 – How to reconcile the Millennium Development Goals (MDGs) & the Sustainable Development Goals (SDGs)? German Development Institute (DIE), Briefing Paper 18/2012, Bonn, Germany.


MacDonald, G., Petchey, J. and Josie J., 2005, Allocating Spending on Public Infrastructure in Developing Economies with Regional Disparities, (Mimeograph), Occasional Paper, School of Economics, Curtin University of Technology, Perth, Australia


Timmer M. P. and van Ark B., 2002, Capital Formation and Productivity Growth in South Korea and Taiwan: Beating Diminishing Returns through Realising the Catch-up Potential, mimeograph, Groningen Growth and Development Centre, University of Groningen, Netherlands.


Annexure

Public Infrastructure Investment: A BRICS Perspective for Inclusive Sustainable Development

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BRICS INFRASTRUCTURE INVESTMENT REQUIREMENTS, TRENDS AND PROGRAMMES BY SECTOR

Table A1. Infrastructure Investment Requirements

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<thead>
<tr>
<th>Sector</th>
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<th>China</th>
<th>South Africa</th>
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<td>Transport</td>
<td>PAC II</td>
<td>The Russian government will spend US$13.6bn from the National Welfare Fund on railroad and highway projects. They have also undertaken to allocate RUB13.5tn for transport infrastructure up to 2015.</td>
<td>BMI forecasts an annual average growth rate of 6.2% between 2013/14 and 2017/18.</td>
<td>The government intends to invest US$16bn in the development of the country’s transport infrastructure by 2016. Also, Transnet, announced a ZAR300bn capital expenditure plan up to 2042.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>PAC II constitutes planned transportation infrastructure investments of US$104.5bn by 2016.</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Energy &amp; Utilities</td>
<td>BMI expects an annual average real growth rate of 5.3% between 2013 and 2017.</td>
<td>Various projects are in the pipeline.</td>
<td>Under the 12th Five-Year plan, new capacity additions will be coal- and hyrapower-based.</td>
<td>BMI forecasts the sector will contribute nearly 73% of total infrastructure industry value by 2017.</td>
<td>Eskom, a parastatal, has to increase its electricity capacity by 2026 at an estimated cost of ZAR340bn.</td>
</tr>
<tr>
<td>Social &amp; Economic Infrastructure</td>
<td>FGTS pledged US$115bn for projects between 2013 and 2016. The federal unemployment</td>
<td>The Model School Scheme aims to build 6,000 schools.</td>
<td>The Ministries of Finance and of Housing and Urban-Rural Redevelopment has committed to invest</td>
<td>The government instituted a 10-year plan to address various inequalities.</td>
<td></td>
</tr>
</tbody>
</table>

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1 Gridlines, PwC, 2013.
2 Putin Promises $13.5Bln In Infrastructure Spending, The Moscow Times, 21 June 2013.
insurance fund has approved BRL47bn for housing projects.

US$5bn in subsidies to allow poor rural homeowners to renovate their housing.

Table A2. Transport Infrastructure Industry Value as a Percentage of Total Infrastructure Investment

<table>
<thead>
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</tr>
</thead>
<tbody>
<tr>
<td>Brazil</td>
<td>58.7</td>
<td>59.1</td>
<td>60.5</td>
<td>63</td>
<td>62.7</td>
<td>63</td>
<td>63</td>
<td>63</td>
<td>63</td>
<td>62.9</td>
<td>62.7</td>
<td>62.4</td>
<td>62.1</td>
<td>61.9</td>
<td>61.5</td>
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<tr>
<td>Russia</td>
<td>50.8</td>
<td>50.8</td>
<td>55</td>
<td>56.1</td>
<td>56.5</td>
<td>56.8</td>
<td>56.6</td>
<td>56.6</td>
<td>56.7</td>
<td>56.3</td>
<td>55.9</td>
<td>55.5</td>
<td>55.1</td>
<td>54.6</td>
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<tr>
<td>India</td>
<td>39.3</td>
<td>39.8</td>
<td>40.1</td>
<td>34.4</td>
<td>34</td>
<td>34.1</td>
<td>34.3</td>
<td>34.3</td>
<td>34.3</td>
<td>34.2</td>
<td>34.1</td>
<td>33.9</td>
<td>33.7</td>
<td>33.5</td>
<td></td>
</tr>
<tr>
<td>China</td>
<td>56.3</td>
<td>45</td>
<td>37.5</td>
<td>34.8</td>
<td>33.3</td>
<td>31.6</td>
<td>30.3</td>
<td>29.4</td>
<td>28.4</td>
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<td>25.9</td>
<td>25.1</td>
<td>24.4</td>
<td>23.7</td>
</tr>
<tr>
<td>South Africa</td>
<td>51</td>
<td>43</td>
<td>43.5</td>
<td>48</td>
<td>53</td>
<td>52</td>
<td>53.5</td>
<td>54.7</td>
<td>55.9</td>
<td>55</td>
<td>55.8</td>
<td>56.4</td>
<td>56.7</td>
<td>57.1</td>
<td>57.4</td>
</tr>
</tbody>
</table>

Source: Business Monitor International

* Please note that e = expected and f = forecast.

India is the only country that reports per financial year i.e. 2008/09 instead of 2008 and therefore for ease of reference I used the year instead of the financial year. The 2012/13 financial year has been reported on and therefore the data is not ‘expected’ as for 2012 for the other countries.

According to BMI, all BRICS countries apart from South Africa will decrease their spending on the Transport Infrastructure Industry as a Percentage of Total Infrastructure from 2017 to 2022. China decreased its spending dramatically

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between 2008 and 2011; BMI expects the decrease to persist but moderate somewhat for the forecasted period. All countries apart from China and India increased their spending between 2009 and 2011.

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<tbody>
<tr>
<td>Brazil</td>
<td>41.3</td>
<td>40.9</td>
<td>39.5</td>
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<td>37</td>
<td>37</td>
<td>36.9</td>
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<tr>
<td>Russia</td>
<td>49.18</td>
<td>55.45</td>
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<tr>
<td>India</td>
<td>59.3</td>
<td>60</td>
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<td>65.6</td>
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<td>65.9</td>
<td>65.7</td>
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<td>China</td>
<td>43.7</td>
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<td>62.5</td>
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<td>68.4</td>
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<td>74.2</td>
<td>74.9</td>
<td>75.6</td>
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<tr>
<td>South Africa</td>
<td>49</td>
<td>57</td>
<td>56.5</td>
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<td>46.5</td>
<td>45.3</td>
<td>44.1</td>
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<td>42</td>
<td>41.1</td>
<td>40.3</td>
<td>39.5</td>
<td>38.7</td>
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</tr>
</tbody>
</table>

Source: Business Monitor International

* Please note that e = expected and f = forecast.

India is the only country that reports per financial year i.e. 2008/09 instead of 2008 and therefore for ease of reference I used the year instead of the financial year. The 2012/13 financial year has been reported on and therefore the data is not ‘expected’ as for 2012 for the other countries.

China dramatically increased its spending on energy and utilities as a percentage of total infrastructure between 2008 and 2010 where after the increase in spending somewhat moderated. BMI expects this steady increase in spending to continue. This is in contrast with South Africa that showed a decrease in spending.

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*Same as footnote 5*
between 2009 and 2012; BMI expects the country to increase its spending somewhat in 2013 and thereafter curb its spending again for the forecasted period. Russia decreased its spending significantly between 2009 and 2010 where after the decrease in spending was at a slower rate. BMI forecasts that the decreasing trend in Russia's spending will continue in 2012 and 2013 where after it will mostly increase until 2022. India is the only country, apart from China, that increased its spending between 2008 and 2011 apart from showing no y-o-y growth in spending in 2010. BMI expects all countries apart from South Africa to increase their spending after 2016.

Table A4; The Federal Republic of Brazil

The 2014 FIFA Soccer World Cup and 2016 Olympic games are currently major drivers of Brazil’s infrastructure investment. Another driver is commodity exports; capacity expansion and efficiency improvements of ports and freight railways are the main targets.

<table>
<thead>
<tr>
<th>Brazil</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Transport</strong></td>
</tr>
<tr>
<td>• BMI expects annual average growth in the transport industry to be 4.3% between 2015 and 2017.</td>
</tr>
<tr>
<td>• The Brazilian government’s second Growth Acceleration Program of Investment (PAC II) constitutes planned transportation infrastructure investments of US$104.5bn by 2016(^\text{6}).</td>
</tr>
<tr>
<td><strong>Roads</strong></td>
</tr>
<tr>
<td>• Road infrastructure historically received the bulk of investment but new projects are focusing on other modes of transport. Investment value will remain the biggest source of value, but there will be greater growth in the rest of the transport sector.</td>
</tr>
<tr>
<td><strong>Airports</strong></td>
</tr>
<tr>
<td>• Brazil needs US$14 – 19bn for airport infrastructure as air passenger traffic is set to increase by 201mn between 2009 and 2030.</td>
</tr>
<tr>
<td>• The government administration announced in December 2012 a US$3.5bn regional airport infrastructure program. It includes US$1bn committed to 64 regional airports in Brazil’s remote northeast and nearly a billion US dollars</td>
</tr>
</tbody>
</table>

\(^5\) BMI Infrastructure report Brazil Q4 2013 unless stated otherwise.  
\(^6\) Gridlines, PwC, 2013.
to 67 airports in the north. The goal is to have 96% of the population living within 100 kilometres of an airport.\(^7\)

**Ports**

- Government announced plans in December 2012 for a US$26bn injection in the ports sub-sector. Investment is expected to take place between 2014 and 2017.

**Rail**

- The freight rail and water freight sub-sectors have become the focus of Brazil’s transport long-term investment programs. New and on-going projects in rail (excluding high-speed rail) accounts for nearly half, just in excess of US$39bn, of projects currently in progress\(^8\).

**Energy & Utilities**

- BMI expects an annual average real growth rate of 5.3% between 2013 and 2017.

**Water utilities**

- Water infrastructure is also experiencing investment including sanitation, drinking water, and pipelines.
- An estimated US$42bn will be invested in water infrastructure between 2011 and 2015. BMI have included US$13bn worth of projects in their key projects database that are currently in progress or in the pipeline.

**Power plants & transmission grids**

- The BMI expects the power plants and transmission grids sub-sector to increase with an annual average of 6.8% between 2013 and 2017.
- Furthermore, BMI expects electricity consumption to increase with an annual average growth of 4.4% between 2013 and 2021 due to a strong future demand for electricity due to blackouts.

**Oil & gas pipelines**

- Due to Brazil’s growing oil industry, oil and gas pipelines have seen considerable growth in industry value. However, investment is now focussed on subsalt projects, which has decreased the necessity of new oil pipelines.
- According to PwC, PAC II has planned infrastructure investment of US$885.9bn (by 2016 and thereafter) nearly half is accounted for in oil, gas, and biofuels\(^9\).

**Social & Economic Infrastructure**

- Brazil’s severance pay fund (FGTS) has pledged financing of US$115bn for social and economic infrastructure projects between 2013 and 2016. In addition, the federal unemployment insurance fund has approved BRL47bn for housing projects under the Minha Casa, Minha Vida programme.

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\(^7\) The same as footnote 8.

\(^8\) The same as footnote 8.

\(^9\) The same as footnote 8.
Table A5. Russian Federation

The 2014 winter Olympics and the 2018 FIFA Soccer World Cup are currently stimulating infrastructure project spending.

The Russian government has prioritised export of commodities infrastructure (pipelines, ports and transport infrastructure – to support oil and gas output east and west of the Urals).

According to the minister of transport, Maxim Solokov, Russia needs to spend an additional US$45bn to maintain the large infrastructure projects that are planned or currently in the pipeline.

BMI forecasts that total infrastructure industry value will grow by an average of nearly 5% per annum between 2013 and 2022.

<table>
<thead>
<tr>
<th>Russian</th>
<th></th>
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</thead>
</table>
| **Transport** | • BMI forecasts a real growth annual average of 5.2% between 2013 & 2017 for transport infrastructure. They further expect transport infrastructure to account for 56.8% of the total infrastructure industry value in 2013.  
• Renaissance Capital expects Russia to need an estimated US$875bn in new transport infrastructure investment, of which the government will probably obtain private sector involvement for 80% of the infrastructure projects.  
• In June 2013, the Russian government said that they would spend US$13.6 billion from the National Welfare Fund on three major railroad and highway projects. Furthermore, they have undertaken to allocate RUB13.5trn for transport infrastructure up to 2015. |
| **Roads** | • The world’s largest PPP toll-road construction project is underway. The US$6.5bn toll-road’s first phase will be funded by a consortium of five banks, who will supply US$1.8bn, and the balance of US$1.2bn will be supplied by the Russian government and state sponsors. |
| **Airports** | • BMI forecasts 4.5% real growth in 2013. |
| **Ports** | • BMI forecasts that ports infrastructure will have an average annual real growth of 5.2% for the period 2013-2017. BMI forecasts that the transportation sector will account for 55.7% of the total infrastructure industry in 2017 and 62.3% in 2022. |
The growth rate of 6.0% between 2013 and 2017.

**Rail**
- Many rail-projects are in the pipeline in order to meet the demand for transportation by tourists for the FIFA Soccer World Cup in 2018.

**Energy & Utilities**

**Electricity**
- The transmission and distribution sub-sector needs major investment if it is to support increasing power generation according to an industry survey done by KPMG. According to the Russian government estimates in the 2015 – 2020 state investment programme, US$13bn is needed for the distribution sector in order to replace old technology.

**Power plants & transmission grids**
- BMI forecasts that the power plants and transmission grids infrastructure industry will show an average annual real growth rate of 5.2% between 2013 and 2017.

**Oil & gas pipelines**
- Oil and gas pipelines will show an annual average growth rate of 6.3% between 2013 and 2017 according to BMI forecasts.

<table>
<thead>
<tr>
<th>Table A6. India(^{12})</th>
</tr>
</thead>
<tbody>
<tr>
<td>Under India's 12(^{th}) Five-Year plan (2012 – 2017) US$1trn will be spend on infrastructure, with a targeted 50% to come from the private sector.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>India</th>
</tr>
</thead>
</table>
| **Transport**
| - BMI forecasts an annual average growth rate of 6.2% between 2013/14 and 2017/18 in the transport sector. |
| **Roads & Bridges**
| - The roads and bridges sub-sector accounts for the largest proportion of the transport infrastructure industry and receive the most attention in investment plans by the Indian government. BMI forecasts an average annual real growth of 7.0% between 2013/14 and 2017/18.
| - India's Planning Commission forecasts total investment in roads and bridges during the 12th Five-Year plan (2012 – 2017) to be US$170bn, with 32% of investment being contributed by the private sector.
| - According to Ernst & Young and the Urban Land Institute, India is constructing 20,000 kilometres of new and upgraded roads as well as 120 bridges over the next five years\(^{13}\). |

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\(^{12}\) BMI Infrastructure report India Q4 2013 unless stated otherwise.

\(^{13}\) Urban Land Institute and Ernst & Young. Infrastructure 2013: Global Priorities, Global Insights. Washington,
### Airports
- BMI forecasts an annual average growth rate of 5.0% between 2013/14 and 2017/18 in the airports sub-sector.
- India's airports are expected to need investment of approximately US$13.86bn under the 12th Five-Year plan, most of which is likely to be from the private sector. This is part of the government's plan to invest US$30bn between 2004 and 2020 in airports.
- In addition, under the 12th Five-Year plan, the government proposed in August 2013, to construct 17 new airports in 11 states across the country.
- India further plans to have 500 operational airports by 2020. 10 – 15 Greenfield airports will be constructed and 50 non-metro airports upgraded.

### Ports
- The shipping ministry announced in June 2013 that it would award INR246bn worth of port projects in April – March in the FY2013/14. The investment will be spread across 30 projects and is intended to increasing the capacity of India's major ports by 288mn tonnes per annum.

### Rail
- Railways are the second fastest growing transport sub-sector. BMI forecasts an annual average real growth rate of 6.5% between 2012/13 and 2016/17. This is mainly driven by growth in urban railway projects and two freight corridors, which are estimated to be worth US$17.4bn.

### Energy & Utilities
- According to BMI estimates energy and utilities infrastructure accounted for 66% of total infrastructure industry value in FY2012/13.
- Under the 12th Five-Year plan, new capacity additions will be coal- and hydropower-based.

### Electricity
- BMI forecasts an annual average growth rate of 6.0% per annum between FY2012/13 and FY2016/17.
- The Indian government has set targets for an increase in electricity capacity of which 470 gigawatts (GW) will be from nuclear power by 2050, 20GW from solar power by 2022, and 20GW from wind capacity by 2020.

### Power plants & transmission grids
- Under the 12th Five-Year plan India's central government-owned transmission utility, Power Grid Corporation of India (PGCIL) aims to spend US$3.6bn per fiscal year.
- According to Ernst & Young and the Urban Land Institute, investments worth US$250bn are being made.

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### Thermal sources
- According to BMI estimates thermal sources accounted for 68% of total electricity generation capacity in 2012, with coal contributing the most. The focus on coal is illustrated by the government’s attention on developing ultra-mega power plants, which have a coal-based generation capacity of 4000MW each and several other large-scale coal-fired power plants.

### Nuclear
- Although nuclear power is estimated to account for less than 3% of India’s electricity capacity in 2012 the country hopes to grow the supply of nuclear sources to 25% by 2050. Furthermore, under the 12th Five-Year plan, the government anticipates to increase nuclear capacity from 4,800MW to 20,000MW by 2020 and 63,000MW by 2023.

### Renewable energy
- India hopes to reduce emissions intensity (carbon emissions per unit of GDP) by 20 – 25% of 2005 levels by 2020. In order to reach these targets India is increasingly looking towards renewable energy as an alternative source of electricity. India’s Ministry of New and Renewable Energy announced in January 2011, that it increased the country’s renewable energy targets fourfold to 72,400MW by 2022.
- The government plans to have in excess of 20,000MW in both wind and solar generating capacity by 2022.

### Hydropower
- BMI estimates that hydropower accounted for about 19.6% of India’s total installed electricity generating capacity in 2012.
- According to the Indian government, there are many hydroelectric capacity projects in the construction and planning phases.

### Social & Economic Infrastructure
- The Model School Scheme aims to build 6,000 benchmark schools, of which 2,500 will be offered as concessions under the PPP model. The PPP plan’s objective is to provide 4mn children with education of whom 2.5mn will be from socially disadvantaged backgrounds. The Indian government expected the building of the 2,500 schools would cost US$1.67bn in 2008.
BMI uses fixed asset investments (FAI) figures published by the national statistics as a proxy for China’s infrastructure and construction data.

Under China’s Five-Year plan (2011 – 2015), US$1trn will be invested in infrastructure. This will include a 19,000-mile high-speed rail system, which will be the largest transport infrastructure project in the country’s history.

<table>
<thead>
<tr>
<th>China</th>
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<tbody>
<tr>
<td><strong>Transport</strong></td>
</tr>
<tr>
<td>Roads &amp; Bridges</td>
</tr>
</tbody>
</table>
| Airports | • BMI forecasts that the average real growth in the airports infrastructure industry value will be 10.2% per annum between 2013 and 2015.  
• The Chinese government will build 82 airports and revamp another 101 by 2015. |
| Ports | • In March 2009, China’s Ministry of Transport said that it anticipates the country’s yearly throughput at ports to increase to 6.5bn tonnes by 2020 from 4.4bn tonnes in 2008. |
| Rail | • BMI forecasts the average annual real growth for the railway sub-sector to be 0.8% between 2013 and 2022.  
• In the last six months of this year, the National Development and Reform Council (NDRC) approved the building or expansion of metro lines in 23 cities. In November of last year, the NDRC approved infrastructure projects worth US$12bn. Furthermore, in September 2012 NDRC announced that it would invest US$127bn in the development of 25 new urban railway projects. These will be developed over a three- to eight-year period. |
| Energy & Utilities | • BMI forecasts the energy and utilities infrastructure sector will contribute nearly 73% of total infrastructure industry value by 2017. |
| Electricity | • BMI predicts that coal will dominate in electricity generation for the near future. Natural gas usage for electricity usage is forecast to contribute 4.5% |

15 BMI Infrastructure report China Q4 2013 unless stated otherwise. 
of total electricity generation by the end of 2022. However, BMI expects coal's importance will decrease from an estimated 75.5% in 2012 to 68.2% in 2022.

<table>
<thead>
<tr>
<th>Water</th>
<th>• BMI predicts that water infrastructure will increase its energy-generating share each year to 2017 to reach just over 10% of the total value of energy and utilities.</th>
</tr>
</thead>
</table>

| Power plants & transmission grids | • This sub-sector is forecast to contribute the largest share of energy and utilities industry value at approximately 82% in 2017.  
• The US Energy Information Administration forecasts that China needs to allocate US1.5trn on transmission and distribution infrastructure by 2030.  
• According to the China Daily, as part of China’s 12th Five-Year plan, the largest of the two state-owned power grid companies, State Power Grid Co., said that it intends to spend US$76bn on China’s grid infrastructure. |
|------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

| Oil & gas pipelines | • China National Petroleum Corporation (CNPC), the Chinese state-owned oil and gas producer, announced expansion plans for its oil and natural gas pipeline, with plans to extend its network by 80%, or 40,000km, by 2015.  
• PetroChina plans to invest US$12.4bn in expanding its domestic network of oil and gas pipelines. |
|------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

<table>
<thead>
<tr>
<th>Thermal power</th>
<th>• China Knowledge reports that the country plans to build 260 – 270GW of new thermal power capacity under the Five-Year plan, mostly in the western regions where there is an abundance of coal.</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Nuclear</th>
<th>• China had 13 nuclear power plants with a combined capacity of 11GW at the end of 2010 and aims to increase its capacity to 86GW by 2020.</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Renewable energy</th>
<th>• The government predicts that the country's wind energy production capacity will grow to in excess of 100,000MW by 2015 and more than 200,000MW by 2020.</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Hydropower</th>
<th>• The Chinese government plans to build a US$4bn dam in the Sichuan province, which had been delayed due to environmental approvals. Construction is expected to take 10 years.</th>
</tr>
</thead>
</table>

| Natural gas | • The Chinese government has announced that it wants to increase the country's annual supply of natural gas to 269.5 billion cubic metres (bcm) by 2015. This is in line with government policies intending to reduce pollution and mitigate climate change.  
• The Sinopec Group will invest US$11.3bn in building the largest coal-to-gas |
|------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
project in China. Construction of the plant is expected to take 10 years.

| Social & Economic Infrastructure | • The Ministry of Finance and Ministry of Housing and Urban-Rural Redevelopment has committed, in a joint initiative, to invest US$5bn in subsidies to allow poor rural homeowners to renovate their housing.  
• Research done by CLSA indicates that 20% of total infrastructure investment of the past few years has been into the health and education sectors. |

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**Table A8. Republic of South Africa**

BMI forecasts an annual average real growth rate in infrastructure investment of 3.8% between 2013 and 2022.

<table>
<thead>
<tr>
<th>South Africa</th>
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</thead>
<tbody>
<tr>
<td><strong>Transport</strong></td>
</tr>
</tbody>
</table>
| • BMI forecasts the transport sector to grow by an annual average growth rate of 4.9% between 2014 and 2022.  
• The South African government announced in March 2011 that it intends to invest US$16bn in the development of the country’s transport infrastructure by 2016. The investment will primarily be in new rail lines, rail vehicles, and port capacity. In addition to this, the parastatal, Transnet, announced a ZAR300bn capital expenditure plan up to 2042. During this investment period, the bulk of the money will go to the rail sub-sector followed by the port sub-sector.  
• In March 2013, the Chinese Development Bank promised to provide approximately US$5bn in open-ended financial assistance to Transnet in order to help them implement its infrastructure upgrade plan and help develop South Africa’s cross border connections with its commodity-exporting neighbours. |

| Ports |
| • The port of Durban is a key target in Transnet’s investment plan over the medium and long-term. The Durban port will receive ZAR118bn of the ZAR186bn earmarked for investment in ports up to 2042. |

| Rail and ports |
| • South Africa’s railway lines account for 80% of the total rail network in Africa.  
• There are currently many rail projects in the pipeline, both to build and upgrade existing railway lines. E.g., in June of this year, a US$231mn |

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17 BMI Infrastructure report South Africa Q3 2013 unless stated otherwise.
A project was approved to upgrade an existing railway line between the Northern Cape and Eastern Cape and in January 2012, Transnet and Swazi Rail signed an agreement to build a US$2bn railway between South Africa’s Mpumalanga province and western Swaziland.

### Energy & Utilities
- Eskom, a parastatal, has to increase its electricity capacity by 2026 at an estimated cost of ZAR340bn.

### Electricity
- The South African government approved the Integrated Resource Plan for Electricity (IRP) 2010 – 2030 in March 2011. The plan includes a variety of sources for electricity generation, including thermal, nuclear and renewables in an attempt to diversify the dependence on coal.

### Thermal power
- Eskom is building two major coal-fired power stations at a cost of ZAR91.2bn and ZAR118.5bn respectively. Other thermal production projects include the development of a new gas-fired peaker power plant, which is worth US$1.02bn.

### Nuclear
- The IRP includes an increase in nuclear capacity of 9.3 gigawatts (GW) by 2030.

### Renewable energy
- Eskom finalised Power Purchas Agreements (PPA) for 19 renewable energy projects worth about US$3.1bn. Wind power continues to have a key place in the country but quotas and project approval suggests that the government is also trying to increase solar power considerably.

### Social & Economic Infrastructure
- The South African government has instituted a 10-year plan to address the backlog of water supply to an estimated 1.4mn households and the backlog for basic sanitation of approximately 2.1mn households. The plan will include delivery of a sustainable supply of water to meet social needs and support economic growth. Projects will provide new infrastructure, rehabilitation, and improvement of existing infrastructure, as well as improvement of the management of water infrastructure.
- In addition, the plan will build and refurbish hospitals, other public health facilities and revamp 122 nursing colleges.

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