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ZAMBIA ECONOMIC BRIEF

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POWERING THE ZAMBIAN ECONOMY



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POWERING THE ZAMBIAN ECONOMY



December 2015

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IACRONYMS

BoZ	Bank of Zambia
BSA	Bulk Supply Agreements
CEC	Copperbelt Energy Corporation
CFL	Compact Fluorescent Lamps
CSO	Central Statistical Office
DAM	Day Ahead Market
DFID	Department for International Development
ERB	Energy Regulation Board
FDI	Foreign Direct Investment
GDP	Gross Domestic Product
GWh	Giga Watt Hours
IDC	International Development Corporation
IMF	International Monetary Fund
IPP	Independent Power Producers
KW	Kilo Watt
LCMS	Living Conditions Monitoring Survey
LCPDP	Least Cost Power Development Plan
LPG	Liquefied Petroleum Gas
MW	Mega Watts
PSA	Power Supply Agreements
SAPP	Southern African Power Pool
SSA	Sub-Saharan Africa
US\$	United States Dollar
USc	United States Cent
VAT	Value Added Tax
WBG	World Bank Group
ZRA	Zambezi River Authority
ZMW	Zambian Kwacha

FOREWORD

I am pleased to share the sixth Zambia Economic Brief with a focus section on the power sector. This Brief is part of a series of short economic updates produced twice a year by the World Bank. Each Brief includes two sections: the World Bank's assessment of recent economic developments and outlook in the short- to medium-term, and its analysis of a specific development topic or theme. Previous Briefs covered opportunities for mining, human development, jobs, trade, and financial inclusion.

Zambia faces its toughest economic challenges in at least a decade. The economy has come under strain in 2015 as external headwinds and domestic pressures have intensified. Insufficient fiscal buffers were built up in the times of higher copper prices, limiting the room to maneuver now that prices are low. Stark trade-offs exist between cushioning people from the impact of the power crisis by sourcing emergency electricity and reducing the fiscal deficit to restore confidence and fix the underlying problems in the economy.

In the power sector, global experience shows there is no substitute for effective planning. Zambia may

again face a similar crisis in the near future if structural weaknesses in the sector are not adequately addressed. There remains a need to shift from being reactive to anticipatory or preemptive in dealing with reduced generation capacity. Additionally, the need to increase access to electricity in the country should not be neglected.

We hope that the findings of this Brief will stimulate a healthy debate around these questions so that Zambia can weather the current economic difficulties and power crisis and shift to inclusive growth underpinned by a reliable power supply.



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The World Bank

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EXECUTIVE SUMMARY

Regional economic developments

As African economies face difficult global conditions combined with domestic challenges, Sub-Saharan Africa's (SSAs) economic growth will continue to slow in 2015 to 3.7% from 4.6% in 2014, according to World Bank projections. The end of the commodity price super cycle – with a substantial drop in the price of oil, copper and iron ore; a slowdown of the Chinese economy; and tightening global financial conditions underpin the deceleration in growth.

Worsening current account and fiscal imbalances have propagated a depreciation in most resource-dependent currencies. This depreciation has been compounded by a general increase in the demand for the United States dollar (US\$) in anticipation of an increase in the US Federal Reserve rate. Domestic factors have also weighed on some currency depreciation.

Another recent trend is increased access to international debt markets by low income and lower-middle income countries. But the cost of borrowing has increased sharply in 2015 for many sovereigns and the spreads on African countries' Eurobonds have widened over uncertainty about government policies and a slowdown in the economies. The spreads have increased the most where market confidence is weakest.

The state of the Zambian economy

Zambia faces its toughest economic challenges in at least a decade. The economy has come under strain in 2015 as external headwinds and domestic pressures have intensified. Growth of the economy is expected to drop beneath 4% in 2015 for the first time since 1998, resulting in only marginal growth of per capita incomes. The external headwinds include slower regional and global growth (crucially in China who purchase 40% of global copper production) and a US\$ that has strengthened considerably against the kwacha. Domestic pressures include a power crisis impacting on all sectors of the economy, repeat fiscal deficits that have reduced investor confidence, and low and poorly-timed rains that

have reduced the agricultural incomes of 62% of the population living in poverty.

Medium-term outlook

The outlook for 2016 has become more sombre following announcements of expected mine closures, the severity of the power crisis and the rapid depreciation of the kwacha. Given the external and domestic challenges, we expect GDP growth to drop to 3 to 3.5% this year and next, before returning to potential (5 to 6%) by 2018 as copper prices stabilize and domestic pressures ease. Tough action is required in 2016 to curb runaway expenditures, double digit inflation and growing twin deficits. Fiscal policy should be put center stage and efforts made to shift the country back onto a sustainable fiscal path.

The outlook is subject to downside risks, both domestic and external. Externally, a further slowdown in China's economy would weigh on the demand for Zambia's exports by further reducing copper prices, and would severely affect Zambia's prospects. Furthermore, strengthening of the US\$ in the event of the Federal Reserve increasing interest rates would lead to added volatility of the kwacha.

The main domestic risks are threefold. Firstly, that the power crisis will worsen. This could occur via delays in new generation coming online or a further reduction of generation capacity at the main hydropower plants. Secondly, a deterioration of confidence in the economy, leading to further weakening of the currency and increased levels of inflation. This might result in the absence of measures to curtail runaway expenditure and failure to make any substantial dent in the fiscal deficit. In this event, external financing would also become more costly and put further pressure on the 2016 budget and for years to come via increased debt service obligations. Lastly, a bad harvest that serves to increase food prices and reduce rural and agricultural incomes, with the greatest impact falling on the poorest households.

Policy challenges

Commodity-exporting countries' policy makers face increasing challenges across the globe. Zambia is no exception and must grapple with multiple challenges as the economy slows down. Falling copper prices and a power crisis could be met with fiscal buffers, but in Zambia no savings were made, or stabilization measures carried out when the economy was prospering. Furthermore, debt levels have soared following repeat non-concessional borrowing making it more expensive to borrow from international debt markets.

This leaves the government with little room for maneuver, limited fiscal space to compensate for slower growth and recent job losses, and only hard choices. Trade-offs exist between cushioning people from the impact of the depreciation and power crisis by subsidizing the cost of fuel and electricity, and reducing the fiscal deficit to restore confidence to fix underlying problems in the economy. These trade-offs are particularly stark in 2016 given it is an election year.

Large fiscal deficits and inefficient government spending persist as sources of vulnerability for Zambia. Strengthening the fiscal position and restoring fiscal buffers are necessary to increase confidence in the economy, reduce the need for costly borrowing and build resilience against further exogenous shocks. Fiscal adjustment would also put less pressure on monetary policy and potentially make space for interest rates to be reduced, easing the pressure on individuals and firms. Keeping inflation expectations anchored in single digits remains critical to maintaining macroeconomic and wider development objectives.

With market access comes greater scrutiny and policy responses are judged by real action that affects the interest rate paid on new borrowing. Eurobond issuance has also increased international interest in the Zambian economy and events are being watched much more closely than prior to 2012. To help maintain confidence in the economy, and Zambia as an investment destination, better dialogue on the economy should be targeted and confusing messages avoided.

In addition, the commodity price shock highlights the need for Zambia to reduce its dependency on copper, a challenge it has been grappling with for over 50 years. Talk about diversification and growing manufacturing needs to be met with a clear and realistic strategy and structural reforms aimed at removing impediments to private sector activity and improving the business environment.

Powering the Zambian economy

Economic progress since 2000, driven by mining production and services, has substantially increased the demand for electricity in Zambia. A growing shortfall in supply has been exacerbated in 2015 by

a reduction in hydroelectric generation due to low water levels at the country's main reservoirs. This has increased power outages and impacted on all aspects of the economy, contributing to slower economic growth in 2015 and higher production costs. Since July 2015, ZESCO has increased the extent of rolling black-outs (load-shedding) to at least 8 hours per day on a rotational basis for the majority of its household, commercial and industrial consumers. And although they are not subject to rotational load-shedding, ZESCO has requested the mining industry to curtail its load by 30%. This is in order to manage a power deficit of around 591 MW each month (September to December 2015), representing approximately 34% of demand.

Mitigating the power crisis

Power is essential for the Zambian economy to function. Despite new generation projects, the modelling of different hydrology conditions shows that even in a wet (above average rainfall) scenario, current power shortages will continue through to at least 2018. For 2016, the authorities have decided to increase the import of expensive emergency power options. This puts huge pressure on the budget at current tariff rates, in tough economic conditions, and unless tariffs are revised upwards, the government's subsidy of the sector will rise dramatically. At November 2015 tariff rates, the government will need to provide ZESCO with an additional US\$ 340 million in 2016 to meet the cost of emergency power. However, the financing requirement can be substantially reduced if the average tariff is increased.

Key to note is that an increase in tariffs to cost-reflective levels is necessary but not sufficient to increase private investment in electricity generation in Zambia. There are many other hurdles to overcome as well. Management and regulation of the sector have been improving, but there is still substantial work to do. Particular efforts are needed to improve sector planning and the procurement processes for large power projects.

Graduating to sustainable supply

The new generation capacity and emergency measures for 2016 will help in mitigating the impact of the power crisis in the coming year, but global experience shows there is no substitute for effective planning. Furthermore, Zambia may again face a similar crisis in the near future if structural weaknesses in the sector are not adequately addressed. There remains a need to shift from being reactive to anticipatory or preemptive in dealing with a reduced generation capacity. Additionally, the need to increase access to electricity in the country should not be neglected.

SECTION 1 RECENT ECONOMIC DEVELOPMENTS

A. REGIONAL ECONOMIC DEVELOPMENTS

As African economies face difficult global conditions combined with domestic challenges, Sub-Saharan Africa's economic growth will continue to slow in 2015 to 3.7% from 4.6% in 2014, according to World Bank projections. The end of the commodity price super cycle – with a substantial drop in the price of oil, copper and iron ore; a slowdown of the Chinese economy; and tightening global financial conditions underpin the deceleration in growth.

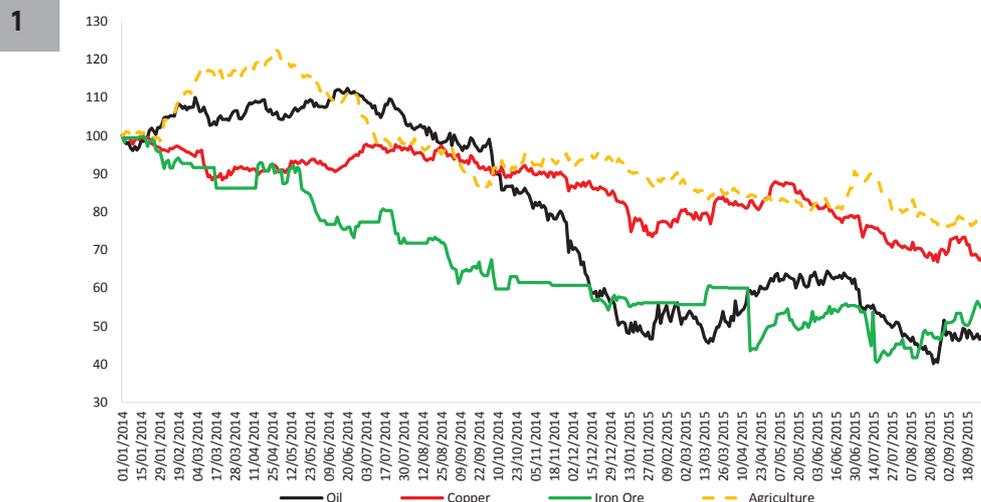
China's slowdown and economic transition has direct spillover effects.

The World Bank's *Africa Pulse* published in October 2015 highlights that continued dependency on oil and commodity exports has left the Sub-Saharan Africa (SSA) region vulnerable to periodic shocks from the prices of international commodities. The region remains a net exporter of oil, minerals, and agricultural commodities. Specifically, energy (oil and gas) and minerals comprise two-thirds of SSA's exports.¹ International commodity prices have steadily softened since early 2014, although they remain above the levels experienced during the 2008 financial crisis. In August 2015, oil prices reached their lowest level since the end of the financial crisis (figure 1). Similarly, copper prices fell to their lowest level since August 2009. The slowdown and economic transition in China has been a driver of weakening international commodity prices.

China is SSA's largest trading partner and its slowdown and economic transition has direct spillover effects, especially to the oil-exporting and mineral-rich SSA countries. Angola, Democratic Republic of the Congo, Mauritania, Republic of Congo, Sierra Leone,

Weakening oil and mineral prices have propagated a deterioration of the terms of trade of oil-exporting and mineral-rich economies.

Figure 1 Commodity prices have continued to fall in 2015



Source: World Bank (2015)

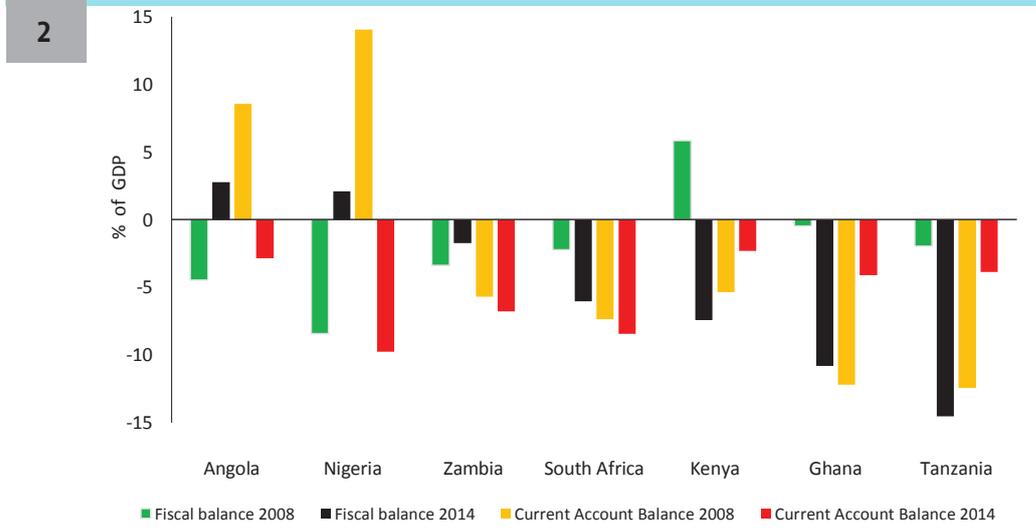
The Gambia, and Zambia have been the most affected given that 40% of their exports go to China. Central Africa Republic, Eritrea, Mali, South Africa, and Zimbabwe have also been affected as their exports to China are above 20% of total exports. Consequently, the growth of SSA is expected to slow to 3.7% in 2015 on the back of poor growth performance in the oil-exporting and mineral-rich economies. Domestic factors such as poor agricultural yields due to drought (e.g. Zambia), power supply bottlenecks (e.g. South Africa, Nigeria, Zambia), political instability (Burundi, Burkina Faso, South Sudan), and insurgency (e.g. Nigeria, Cameroon, Chad, Niger) are expected to further drag down growth.

Worsening current account and fiscal imbalances have propagated a depreciation in most resource-dependent currencies.

Nevertheless, in the majority of oil-importing countries, particularly those that are non-mineral rich, growth is expected to remain robust. Notable examples include Cote d'Ivoire, Ethiopia, Mozambique, Rwanda, and Tanzania, where growth will not only be driven by low oil costs, but also by government investment in infrastructure, and an expanding services sector. However, in some economies, there is a risk that low growth in the oil-exporting and mineral-rich countries will spill over to some of the non-resource rich economies through reductions in intra-regional trade and investment.

Weakening oil and mineral prices have propagated a deterioration of the terms of trade of oil-exporting and mineral-rich economies. This has led to weakened current account positions for most of these economies (figure 2). For example, in Nigeria, the current account deficit widened from 0.6% of GDP in Q4 2014 to 3.6% of GDP in Q1 2015. In Zambia, the current account deficit deteriorated to 3.4% of GDP in 2014 from 0.8% of GDP in 2013. Furthermore, in countries such as Angola, Nigeria, and Zambia, where oil and mineral exports contribute to part of the government revenue, the fiscal deficit has widened (figure 2). However, in other cases, fiscal imbalances have been worsened by recurring domestic factors, among others, which include rising wage bills, large expenditure on infrastructure, and high expenditure on subsidies. In countries such as Ghana and Zambia, these fiscal deficits have been financed by borrowing in the international debt markets, resulting in substantial increases in the debt to GDP ratios.

Figure 2 Current account and fiscal balances are growing



Source: World Bank (2015)

Depreciating currencies have exposed countries to inflation through imported inputs and consumables.

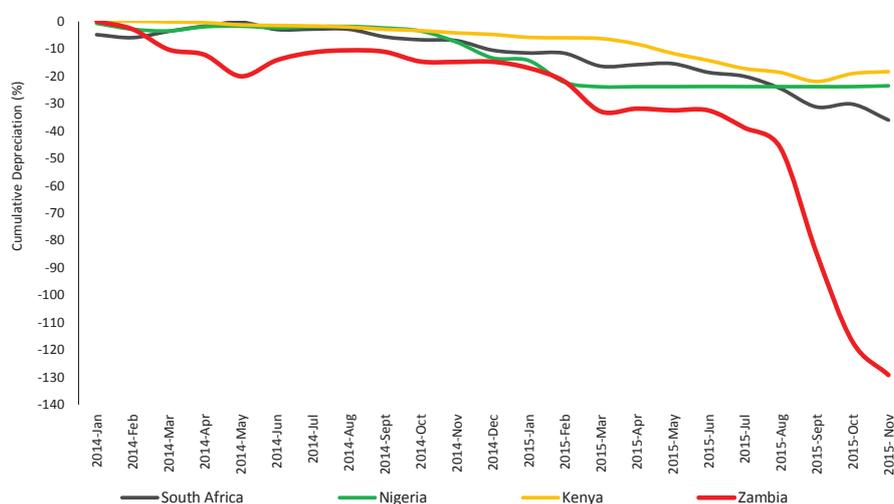
Worsening current account and fiscal imbalances have propagated a depreciation in most resource-dependent currencies (figure 3). This depreciation has been compounded by a general increase in the demand for the US dollar in anticipation of an increase in the US Federal Reserve rate. Domestic factors have also weighed on some currency depreciation. For example, in Zambia, investors' concerns about the government's commitment to reining in the fiscal deficit has caused volatility in the Zambian kwacha. Depreciating currencies have exposed oil-exporting and mineral-rich countries to inflation through imported inputs and consumables. Having remained stable over the past few years, and declined to 5.9% in 2014 from 6.1% in 2013, inflation rates in the SSA are expected to increase to 6.5% in 2015.

A recent trend is increased access to international debt markets by low income and lower middle income countries.

Domestic factors such as fiscal expansion in the lead-up to elections, and poor agricultural harvests and electricity bottlenecks, are also going to be drivers of inflation in some countries. At the sub-regional level, the Central African region is set to continue being the least inflationary. This is mainly because of the common monetary policy pursued by most countries in this region (being administered by the regional central bank — the Bank of Central African States, through pegging of their common currency, the CFA franc, to the Euro).

Figure 3 The US\$ has strengthened against frontier market currencies

3



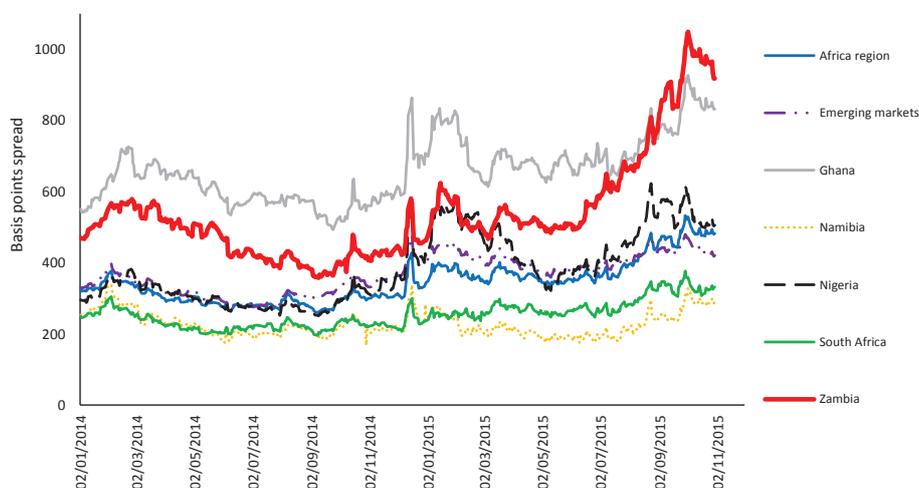
Source: World Bank (2015)

Spreads on African countries' Eurobonds have widened over uncertainty about government policies and a slowdown in the economies.

A recent trend is increased access to international debt markets by low income and lower-middle income countries. Since 2007, 17 SSA countries, in addition to South Africa, have tapped over US\$24 billion, typically at fixed interest rates, with bullet repayment structures and in US dollars, thereby adding foreign currency risks that these countries need to manage. The cost of borrowing has increased sharply in 2015 for many sovereigns, with Ghana issuing US\$1 billion (15 year tenor) at 10.75% and Zambia US\$1.25 billion at 9.375% (11 year tenor on average); rates that are much higher than previous issues. Further, having narrowed in April and May 2015, the spreads on African countries' Eurobonds have widened over uncertainty about government policies and a slowdown in the economies. The spreads have increased the most where market confidence is weakest (figure 4).

Figure 4 Sovereign bond spreads have widened

4



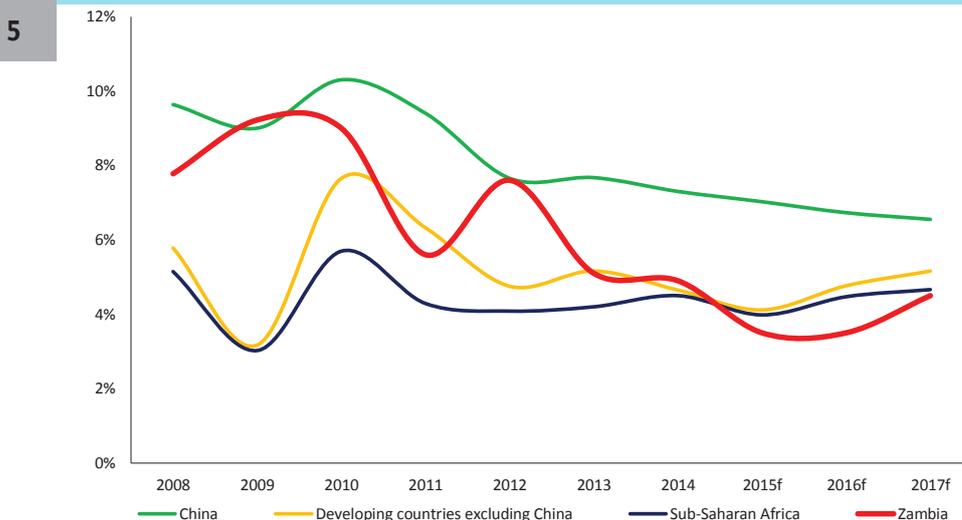
Source: Bloomberg

Power bottlenecks, fiscal consolidation and high costs of imported inputs will drag on growth recovery in SSA.

Outlook for Sub-Saharan Africa

In the medium term, the overall growth for the SSA region is expected to rebound to 4.4% in 2016 and improve to 4.8% in 2017, albeit with mixed recovery across countries due to domestic factors (figure 5). In some of Africa's frontier markets, medium-term growth recovery is expected to be much quicker on the back of rising oil production, easing external and fiscal imbalances, and continued large investment in infrastructure. However, factors such as power bottlenecks (in Nigeria, South Africa, and Zambia), fiscal consolidation and high costs of imported inputs imposed by weaker currencies (Nigeria, Zambia), political instability (Burundi and South Sudan), and policy uncertainties will also drag on growth recovery in the region.

Figure 5 Growth in SSA and developing countries has slowed



Source: World Bank (2015) and staff projections

Policy buffers are lower than before the global financial crisis, making it more difficult for countries to grow.

The medium-term growth outlook of the region is subject to several downside risks. The global risks include the slow growth and economic transition in China, which is expected to spill over to the SSA region through depressed prices and volumes of oil and mineral exports. Furthermore, an anticipated increase in the US Federal Reserve interest rate is expected to tighten global financing conditions and investment flows into the SSA region, and possibly cause further weakening of regional currencies. Countries with large external and fiscal imbalances are expected to be the most vulnerable to these factors. In this regard, fiscal consolidation and structural reforms can potentially help countries to contain the effects of these shocks. Domestically, the risks include political instability in Burundi and South Sudan, and security risks caused by insurgency in parts of Nigeria, Cameroon, Chad, Niger, and Kenya, while weather-related shocks are expected to negatively affect medium-term growth prospects.

When the global financial crisis hit the region, some countries were able to use government investment in infrastructure and other built-in buffers to finance policy responses to enable growth. Overall, the analysis shows that before the current bout of global difficulties, these policy buffers were already showing signs of vulnerability from overvalued currencies and growing fiscal deficits. Today, these policy buffers are lower than before the global financial crisis, according to the report, and will make it more difficult for countries to grow in the current situation.

B. THE STATE OF THE ZAMBIAN ECONOMY

Zambia faces its toughest economic challenges in at least a decade. The economy has come under strain in 2015 as external headwinds and domestic pressures have intensified. Growth of the economy is expected to drop beneath 4% in 2015 for the first time since 1998, resulting in only marginal growth of per capita incomes. The external headwinds include slower regional and global growth (crucially in China who purchase 40% of global copper production) and a US dollar that has strengthened considerably against the kwacha. Domestic pressures include a power crisis impacting on all sectors of the economy, repeat fiscal deficits that have reduced investor confidence, and low and poorly-timed rains that have reduced the agricultural incomes of 62% of the population living in poverty.

The slowdown in China and fall in international commodity prices is having a ripple effect globally and particularly so in Zambia.

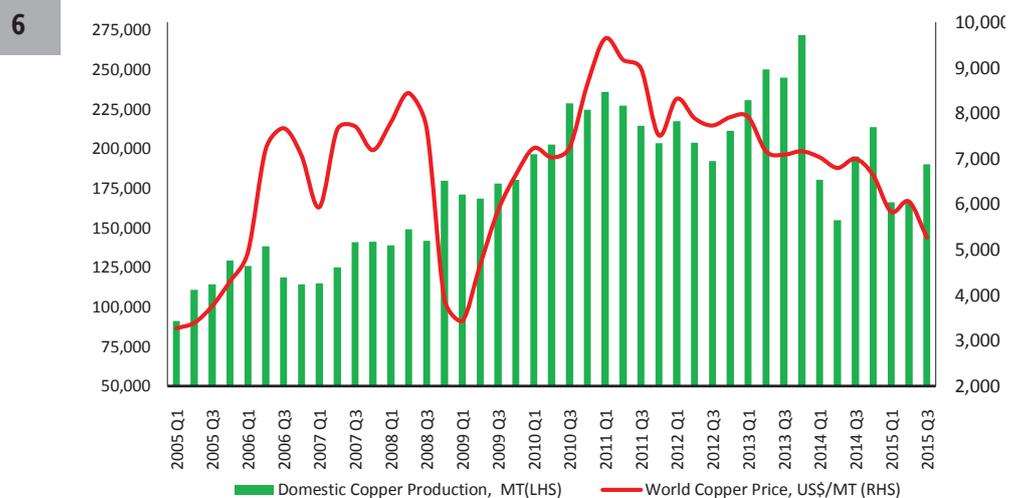
The Zambian economy grew at an average annual rate of 6.4% between 2010 and 2014, above the overall growth rate of SSA and on the back of high copper prices, foreign direct investment (FDI) in the manufacturing and mining sectors, government investment in infrastructure, and expanding private sector investment in construction and services. Until recently, inflation remained stable due to prudent monetary policy, the currency remaining relatively stable, and good agricultural harvests recorded. Mining and fiscal pressures have been building since 2012-13, but in 2015 the economy has slowed considerably as global headwinds and domestic pressures have intensified.

The slowdown in China and fall in international commodity prices is having a ripple effect globally and particularly so in Zambia. Some relief has been provided in the form of lower global oil prices, but the dominant effect is negative and comes via low copper prices, which have been falling since 2011. The Zambian economy remains dependent on copper mining, including for 77% of its exports, and the decline in global copper prices, falling 20% in 2015 and ever since its 2011 peak, has put additional pressure on the sector (figure 6).

Mining companies are looking globally to scale back operations in high-cost environments and low copper prices have meant that in Zambia, copper mines are being closed, new investment is being delayed and substantial job losses have started in the sector (7,700 between January and end-November 2015). In addition to lower prices, the mining sector is being impacted on by the current power crisis and uncertainty from frequent changes to the mining tax and royalty regime and the back-log of VAT refund payments.²

Growth in 2015 is expected to fall to a range of 3 to 3.5% highlighting the impact of the lower copper prices and domestic pressures.

Figure 6 Global copper prices have been falling since 2011



Source: Bank of Zambia, Ministry of Finance and World Bank staff calculations

Despite decreasing copper prices and declining mining output, growth in 2014 was supported by a good harvest (maize production increased 32% relative to the previous year), expanding services and construction sectors (both growing just above 7%), government investment in infrastructure, and rapid growth in the transport (12.5%) and financial and insurance sectors (up 13.2%). Contrastingly, growth in 2015 is expected

to fall to a range of 3 to 3.5%, highlighting the impact of the lower copper prices and domestic pressures such as a poor maize harvest and the current power crisis.

Food prices have been increasing steadily and high prices for mealie-meal and meat have repeatedly hit the headlines.

Low rainfall has reduced agricultural production, harming rural households' incomes. The 2014 -15 agricultural (October-March) season was characterized by extensive rainfall deficits resulting in markedly below average end of season vegetation (World Food Program³). This has reduced agricultural production for 2015 and increased the prices of food items. Recent drier weather patterns have been strongly influenced by the El Niño, an event active since March 2015 and expected to last into Q1 2016. Furthermore, climate change has increased the frequency of floods and droughts over the past three decades and will continue to have an impact on climate-sensitive sectors such as rain-fed agriculture, fishing, and forestry.

The contribution of the agriculture sector to economic growth is expected to be negative in 2015 (preliminary estimates are for a 7.5% decline in output from agriculture, forestry and fishing this year). Food prices have been increasing steadily and high prices for mealie-meal (the main staple in Zambia) and meat have repeatedly hit the headlines. The November 2015 bulletin from the Central Statistical Office (CSO) shows maize grain prices have increased by 32% (year-on-year). While a small proportion of farmers have benefited from the higher prices and sold their maize abroad (especially to the US dollar denominated Zimbabwean economy), the vast majority of rural households' incomes have been hit hard by lower production in 2015. Slower growth and reduced agricultural incomes are likely to halt poverty reduction, given the sector is the primary source of income for close to three-fifths of poor households.

Global headwinds have combined with domestic pressures and ebbing confidence in the economy resulting in huge shifts and market turbulence.

The current power crisis, discussed in **Section 2**, is impacting on all sectors of the economy. Like mining, the manufacturing and services sectors have been hit hard as costs have increased and margins squeezed, leading to 7,700 job losses in 2015 and lower output.

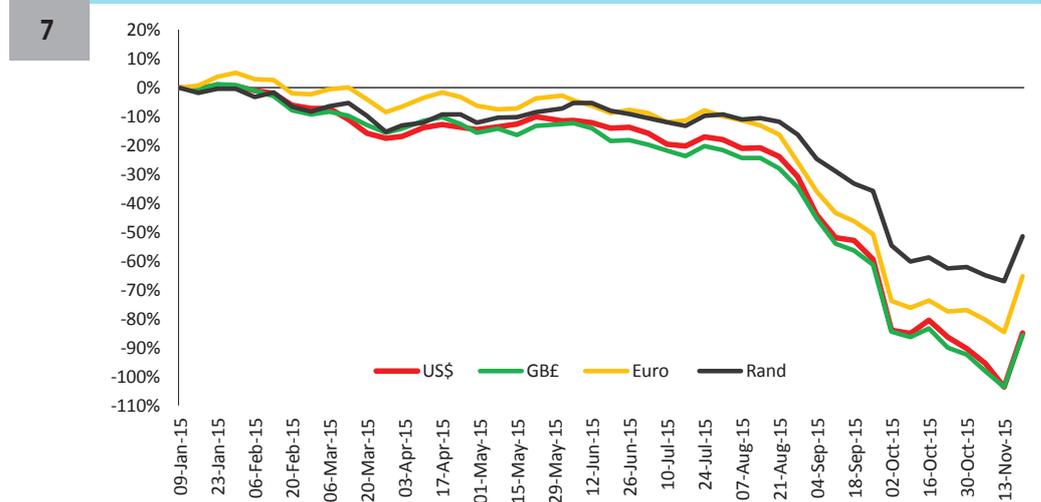
Sharp kwacha depreciation followed by an inflationary spike

As is typical in this part of Zambia's copper price cycle, the kwacha has depreciated considerably (the kwacha tends to depreciate as the copper price falls and appreciate as it rises). However, on this occasion, global headwinds have combined with domestic pressures and ebbing confidence in the economy, resulting in huge shifts and market turbulence. While the strength of the US dollar fused with worsening current account and fiscal imbalances have propagated a depreciation in most resource dependent currencies, the kwacha's decline stands out (figure 2).

There have been three distinct phases to the kwacha to US dollar exchange rate between January and November 2015 (figure 7). There was the gradual depreciation between January and mid-August, where the kwacha depreciated by 21% over 30 weeks, moving from ZMW 6.4 to ZMW 7.9 per US\$. Next followed huge volatility and a steep decline in the exchange rate and in the 10 weeks to end-October, the kwacha depreciated

At the end of November, annual inflation reached 19.5%.

Figure 7 The kwacha has depreciated considerably in 2015



Source: Bank of Zambia

by 69% to ZMW 12.5 per US\$. By November 11, 2015, the exchange rate reached ZMW 14.2 per US\$ but by the end of that month had recovered to ZMW 10.3 per US\$, an appreciation of 27% in 19 days. The net effect is that the kwacha depreciated by 61% over the 11 months to end-November 2015. Put differently, the kwacha lost 38% of its value.

Over the 11 months to end-November 2015, the kwacha lost 38% of its value.

The recovery in November is linked to a belief that the decline of the kwacha had been over-blown, as well as better targeted and timed intervention by the Bank of Zambia (BoZ), who look to calm the volatility in the foreign exchange market but not set its rate. Furthermore, it was recognized in September and October that the rule governing foreign exchange trading did not perform well during days of thin markets and large shifts in the exchange rate.

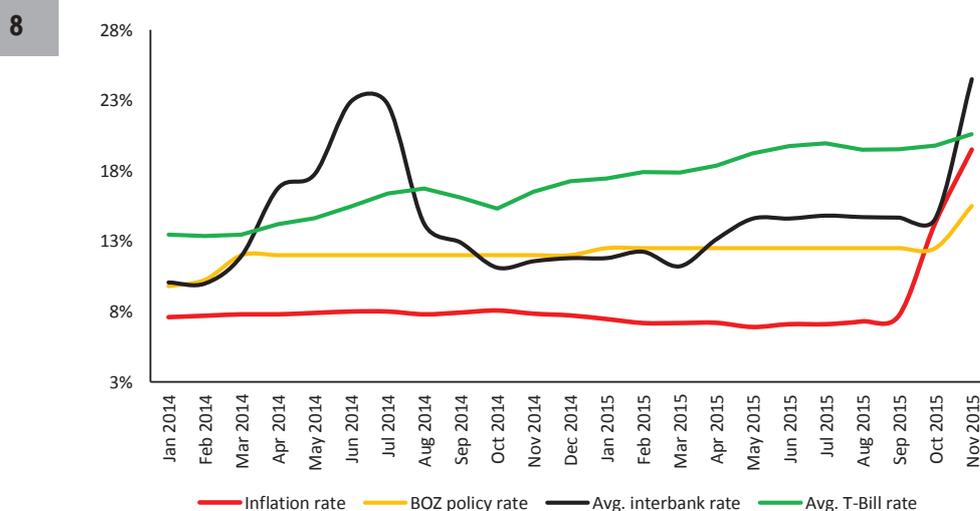
Between January 2012 and September 2015, inflation remained stable at an average rate of 7.2%. Low inflation was attributed to low oil prices, a stable currency, and prudent monetary policy by the BoZ. In 2015, inflation fell consecutively during Q1 and Q2. However, since mid-2015, inflationary pressures began building up due to the depreciating kwacha. However, October inflation (year-on-year) jumped to 14.3% and November inflation to 19.5% (figure 8), a shift driven by food inflation that increased to 16.2% in October and 23.4% in November, from 8.1% in August 2015. The basket of food measured includes both domestically produced foods, where price is largely dependent on the quality of the harvest, and imported foods where prices are impacted by the depreciation of the kwacha. Non-food inflation also rose to 15.5% in November from just 7.3% in September, on the back of increased transport costs as vehicles and car parts became more costly to import.

The big jump in inflation is consistent with expectations about the pass-through from currency depreciation to inflation in Zambia.

The big jump in inflation is consistent with expectations about the pass-through from currency depreciation to inflation in Zambia. There is often a lag in pass-through and the effects can still be felt up to 9 months after an episode of depreciation. Zambia is viewed as having a relatively high rate of pass-through as even firms producing goods for the domestic market rely on the import of parts and intermediary goods. Many food products are also imported. Food inflation has been a big factor and in response to concerns about the affordability of core staples, the government, via the Food Reserve Agency, has announced its intention to sell grain below market prices to mills that are contracted to sell mealie-meal to consumers at lower cost (the target price is ZMW 65 for a 25 kg bag, while actual prices ranged between ZMW 65 to 105 across the country in November 2015).

Fiscal policy has been expansionary, monetary policy shouldered the burden of moderating inflation.

Figure 8 Inflation increased substantially in Q3 2015



Source: Bank of Zambia and Central Statistical Office

In 2014 and 2015, while fiscal policy has been expansionary, monetary policy shouldered the burden of moderating inflation. In Q1 2015, the BoZ increased the statutory reserve ratio to 10% from 14%, but kept the policy rate constant at 12.5% until November 3, 2015 when it was increased to 15.5% (figure 8). Caps on lending rates were removed to improve the functioning of the credit market. The rising interest rates

have helped moderate inflation, but at a cost. Higher interest rates increase the cost of borrowing and make it even harder for firms and individuals to access credit. In a 2013 published Enterprise Survey of 720 Zambian firms, access to finance was highlighted as the largest business environment constraint.⁴

Fiscal policy has been loose, and expenditure has increased from around 22% of GDP in 2012 to an average of 24.5% since then.

Fiscal policy continues to be expansionary

Over the past few years, fiscal policy has been loose, and expenditure has increased from around 22% of GDP in 2012 to an average of 24.5% of GDP since then (table 1). To fund these higher levels of expenditure, that have exceeded revenues and grants, large fiscal deficits of 6.7% and 5.5% of GDP (cash basis) were realized in 2013 and 2014 respectively. The underlying fiscal deficit has been higher still (10.6% in 2014), reflecting an accumulation of VAT refund claims and expenditure arrears.

External borrowing has plugged this gap between what was spent and what was earned in tax. External financing was 5.3% of GDP in 2014 and is expected to end 2015 around 6.6% following the issuance of Eurobonds in each of the two years.

The increased expenditure in 2015 has been absorbed in several areas. First is an increase in public investment from 5.6% to 6.0% of GDP, focused on tackling core infrastructure bottle-necks. Second is the increasing costs of debt servicing, as a result of the non-concessional borrowing at high interest rates and depreciation of the kwacha (the external debt is serviced in US dollars). Third is a huge unbudgeted outlay on subsidies, especially fuel, but also for emergency power; up to 4.3% of GDP 2015 from 2% of GDP in 2014.

Fuel subsidies have cost the government US\$300 million in 2015 and some payments will be carried over into 2015 (box 1). This subsidy is equivalent to ZMW 3,300 million, ZMW 220 for every Zambian. The cost of emergency power in 2015 has reached ZMW 493 million (US\$45 million) (discussed in *Section 2*).

There's been a huge unbudgeted outlay on subsidies, especially fuel, but also for emergency power.

Revenues have fallen short of expectations at the time of budgeting as growth of the economy has slowed.

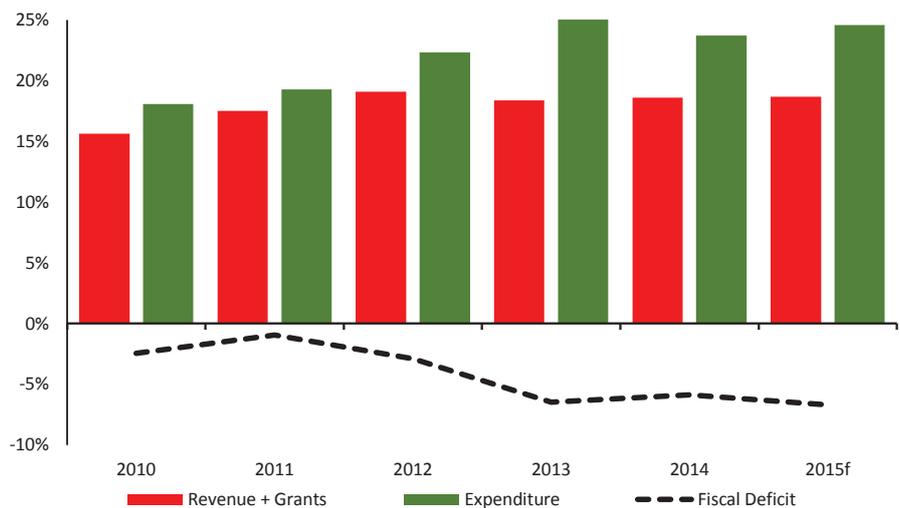
Table 1	Fiscal trends				
	2012 Actual	2013 Actual	2014 Actual	2015 Budget	2015 Proj.
Total Revenue and Grants	19.1	18.4	19.3	19.7	17.8
Tax	15.0	14.7	15.8	13.7	13.8
Non-Tax	2.4	2.2	2.7	5.3	3.6
Grants	1.7	1.5	0.8	0.7	0.4
Expenditure	22.3	25.1	24.8	24.3	25.8
OW Recurrent	16.1	18.8	19.4	18.6	19.8
<i>Personal Emoluments</i>	7.3	8.2	9.6	9.0	8.5
<i>Goods and Services</i>	3.6	3.3	3.1	2.4	2.9
<i>Interest Payments</i>	1.4	1.5	2.3	1.9	2.6
<i>Subsidies</i>	1.5	3.5	2.0	2.0	4.3
<i>Other Recurrent</i>	2.3	2.3	2.4	3.3	1.5
OW Public Investment	6.2	6.3	5.4	5.7	6.0
Fiscal Deficit (cash basis)	-3.2	-6.7	-5.5	-4.6	-8.0
Financing	5.4	-0.6	9.4	4.6	6.4
Net Domestic	1.7	-1.0	4.1	1.7	-0.2
Net External	3.7	0.4	5.3	2.9	6.6

Source: Ministry of Finance and staff projections

Revenues have fallen short of expectations at the time of budgeting as growth of the economy has slowed. Tax revenues will end the year around 13.8% of GDP, slightly above target, but non-tax revenues (that include royalties) will end 2015 at 3.5% below the target of 5.3%. Grants also fall short of the target by 0.3% of GDP. The extra expenditures and revenue shortfalls will result in an estimated fiscal deficit of 8% of GDP in 2015, considerably higher than the budgeted 5.7% and the deficits recorded in recent years (figure 9).

Figure 9 Growing and repeat fiscal deficits

9



Source: Ministry of Finance and staff projections

Typically fiscal consolidation involves lower expenditure, but in this fiscal plan, expenditure was increased to 25.8% GDP.

Substantial new expenditure pressures have also emerged since the budget, including increasing debt service costs.

In October 2015, the government presented its 2016 national budget, aimed at: *“Fiscal Consolidation to Safeguard Our Past Achievements and Secure a Prosperous Future for All”*. The Minister of Finance called for moderation of the expansionary fiscal stance of the past four years given global economic conditions. Typically, fiscal consolidation involves lower expenditure, but in this fiscal plan, expenditure was to increase to 25.8% GDP, leaving all the hard work with improving domestic revenue collection. Plans to increase domestic revenue to 20.4% in 2016 (from 17.8% in 2015), perhaps possible over the medium term, are extremely optimistic. Especially given the recent slowdown in the mining sector and deteriorating economic conditions in the second half of 2015.

Substantial new expenditure pressures have also emerged since the budget, including increasing debt service costs and a planned increase in emergency power imports. If the government is to reduce the fiscal deficit in 2016, the framework will require close review. At a press conference on November 26, 2015, the President of Zambia announced some ‘austerity measures’ including expenditure reductions, and reiterated the government’s commitment to cost-reflective tariffs for electricity and to removing the subsidy on fuel. The expenditure measures included now new capital projects, a review of government emoluments and benefits (including cars), and restricted overseas and domestic travel. No time frame was given, but the announced measures would help in the move towards fiscal sustainability.

Box 1 Huge recent subsidy bills for government

When asked about fuel subsidies, many people respond that they are cost-reflective prices and no subsidies are in place in Zambia. However, a consequence of the rapidly depreciating kwacha has been a mismatch between revenues from electricity tariffs and pump prices (paid in kwacha) and the cost of supply of emergency electricity and fuel (paid in US dollar). This leaves the Ministry of Finance having to pay the difference.

The Energy Regulation Board (ERB) sets wholesale and retail fuel prices according to a formula that marks up the landed price of each shipment of oil as it arrives in Dar es Salaam by the cost of transporting, refining, and distributing fuel in Zambia. The stated objective of ERB’s cost-plus pricing model is to ensure that all costs relevant to procurement are recovered through sales of petroleum products.

Fuel pump prices were increased on July 13, 2015, but between then and end-November, the kwacha-US dollar exchange rate depreciated by 31%, and no changes have been made by the ERB. This meant that the government had to contribute US\$50 million in October alone to cover the cost of supplying fuel. In October and November, prices were less than US\$1 per liter, an event that last occurred beyond the memory of most fuel consumers. These expenditures are not pro-poor and are arguably unaffordable as the economy slows down and the cost of borrowing increases.

The repeat fiscal deficits of the past four years have been financed by external non-concessional borrowing.

Public debt looms large

Large exchange rate depreciations carry the risk of balance sheet effects, especially where there is substantial offshore foreign currency borrowing by the government and corporations. Foreign currency risks have become a reality in Zambia in 2015, as the weakening kwacha has increased the level of external debt and cost of servicing the borrowing.

The repeat fiscal deficits of the past four years have been financed by external non-concessional borrowing. In July 2015, Zambia issued its third Eurobond for US\$1.25 billion (with an average tenor of 11 year) at a considerably higher cost (the yield at issue was 9.375%). These Eurobond issues now total US\$3 billion and have sharply increased overall debt levels. The recent and rapid depreciation has also pushed the kwacha cost of repaying and servicing this external debt much higher. In consequence, public debt is now around 55% of GDP, representing a near doubling of debt levels (as measured in local currency) since 2012, raising important issues of debt sustainability.

In light of the economic difficulties and deterioration of fiscal metrics, Moody’s downgraded Zambia’s government issuer rating from B2 to B1, and its outlook from negative to stable (25 September 2015), thereby aligning their rating with those of other rating agencies. The consequence of higher levels and lower ratings is that access to international debt markets, where opportunities are already narrowing for frontier markets, will be more costly for Zambia in 2016 and going forward.

Trade imbalances emerge

Zambia relies on copper for 77% of its exports and as global prices have fallen, the current account surpluses enjoyed between 2009 and 2012 have been replaced by small deficits. Trade deficits have been recorded in each of the first three quarters in 2015, led by a decline in the amount and value of copper exported to international commodity firms and directly to China, following lower global demand, softer global copper prices, and an increase in the value of imports following the depreciation of the kwacha (figure 10).

The BoZ’s November 2015 monetary policy statement highlighted a widening of the current account deficit in Q3 to US\$401 million.

Figure 10 The trade balance has become negative in 2015



Source: Central Statistical Office

Preliminary data suggested year-to-date copper exports were valued at US\$4.1 billion in September, down 28% from US\$5.7 billion the previous year. Non-traditional exports (i.e. goods other than copper and cobalt) declined sharply in 2014, reversing a trend of previously steady growth and similar levels of performance have been recorded in 2015 as other trading partners’ economies continue to grow slowly. Key non-copper export destinations are the Democratic Republic of Congo (7.7% of exports and mainly sulphuric acid for mining) and South Africa (6.8% of exports).

The BoZ's November 2015 monetary policy statement highlighted a widening of the current account deficit in Q3 to US\$401.0 million from US\$305.9 million recorded in Q2, on account of higher import related service payments and the increase in income on equity payments by foreign-owned enterprises .

The benefits of recent GDP growth have accrued mainly to the population in urban areas.

The cost of imports increased in Q2 and Q3 2015, following the depreciation of the kwacha. Given the rising costs of imported goods, consumers will, where possible (e.g. imported food items), shift to domestically produced goods and otherwise reduce their consumption, serving to reduce the trade imbalance.

Poverty levels and shared prosperity

The benefits of recent GDP growth have accrued mainly to the population living in urban areas. Almost 90% of Zambians living below the extreme poverty line are concentrated in rural areas, and the poverty gap index (a measure of how far average incomes fall below the poverty line) is far higher for the rural population than their urban counterparts (20% and 3.7%, respectively, as of 2010). Real income growth between 2006 and 2010 was greatest among those with higher incomes and relatively weak for those with lower incomes. Incomes of the poor have not been growing rapidly enough, or at all, to lift them out of poverty, with households at the bottom 40% experiencing very modest real consumption growth below 1%. As a result, although poverty rates were declining until the mid-2000s, poverty in Zambia remains high, with an estimated 62% of Zambians living on less than US\$1.90 per day (2011 PPP). Forthcoming results of the 2015 Living Conditions Monitoring Survey will provide the first firm update on poverty levels since the 2010 survey.

Zambia also has one of the most unequal distributions of income in SSA, with a Gini coefficient of 57.5. Many of the gainful economic activities in the country are concentrated primarily along the rail line in the highly urbanized Copperbelt and Lusaka regions. The rest of the country is fairly underdeveloped, and its labor depends primarily on subsistence agriculture.

C. ECONOMIC OUTLOOK, RISKS AND POLICY CHALLENGES

The outlook for 2016 has become more somber following announcements of expected mine closures, the severity of the power crisis and the rapid depreciation of the kwacha. Given the external and domestic challenges, we expect GDP growth to drop to 3 to 3.5% this year and next, before returning to potential (5 to 6%) by 2018, as copper prices stabilize and domestic pressures ease. Tough action is required in 2016 to curb runaway expenditures, double digit inflation and growing twin deficits. Fiscal policy should be put center stage and efforts made to shift the country back onto a sustainable fiscal path.

Reflecting the external headwinds and domestic pressures, the expectation is that GDP growth will remain in the region of 3 to 3.5% in 2016.

Medium-term outlook

The outlook for the Zambian economy is underpinned by three main trends.

- i.** The current low price of copper, on which the economy depends for revenue and foreign currency, will pressure fiscal and current account balances. World Bank forecasts suggest commodity prices, including copper, are likely to stay in the doldrums throughout 2016, but should start to pick up in 2017 and beyond.
- ii.** There is huge uncertainty about whether persistent and growing fiscal deficits can be reined in. Zambia has been able to issue three Eurobonds in four years to fund its exuberance, but as markets tighten and Zambian debt levels have soared, the costs of borrowing will remain much higher than when the Eurobonds were issued in 2012 or 2014.
- iii.** The severity of the power crisis, and the government's ability to mitigate it by sourcing emergency power and ensuring the cost is affordable via tariffs that better reflect the rising cost of supplying electricity.

Reflecting on the external headwinds and domestic pressures, the expectation is that GDP growth will remain in the region of 3 to 3.5% in 2016, before reaching potential (between 5 and 6%) in 2017 and 2018, as new power generation capacity comes fully online and global copper prices stabilize. Despite the current problems, long-term investment in the mineral and non-mineral sectors in Zambia remains attractive.

The outlook is subject to downside risks, both domestic and external.

Commodity-exporting countries' policy makers face increasing challenges across the globe.

Fiscal adjustment would put less pressure on monetary policy.

The government remains committed to a target of single digit inflation, set as part of the 2016 budget, but this appears ambitious given the recent rapid depreciation of the kwacha. However, given the extent of the recent depreciation, it is likely that prices will increase and peak in Q2 2016 before recovering to an average of around 15-20% for 2016.

Risks to Zambia's economic outlook

The outlook is subject to downside risks, both domestic and external. Externally, lower than predicted growth in China would weigh on the demand for Zambia's exports, further reducing copper prices, and would severely affect Zambia's prospects. Furthermore, strengthening of the US dollar, in the event the Federal Reserve increase interest rates, would also likely add volatility to the exchange rate.

The main domestic risks are threefold. First, that the power crisis will worsen. This could occur via delays in new generation coming online or a further reduction of generation capacity at the main hydropower plants, serving to reduce both mining and non-mining activity, increase joblessness and push the economy into contraction. Second, a deterioration of confidence in the economy, leading to further weakening of the currency and increased levels of inflation. This might result in the absence of measures to curtail runaway expenditure, especially in the run-up to the 2016 elections, that would make any substantial dent in the fiscal deficit. In this event, external financing would also become more costly and would put further pressure, via increased debt service obligations, on the 2016 budget and for years to come. Lastly, another bad harvest that serves to increase food prices and reduce rural and agricultural incomes, with the greatest impact falling on the poorest households.

Policy challenges

Commodity-exporting countries' policy makers face increasing challenges across the globe. Zambia is no exception and must grapple with multiple challenges as the economy slows down. Falling copper prices and a power crisis could be met with fiscal buffers, but in Zambia, no savings were made or stabilization measures carried out when the economy was prospering. Furthermore, debt levels have soared following repeat non-concessional borrowing making it more expensive to borrow from international debt markets.

This leaves the government with little room to maneuver, limited fiscal space to compensate for slower growth and recent job losses and only hard choices. Trade-offs exist between cushioning people from the impact of the depreciation and power crisis by subsidizing the cost of fuel and electricity and reducing the fiscal deficit to restore confidence, and fixing the underlying problems in the economy. These trade-offs are particular stark in 2016, given that it is an election year.

The 2016 budget puts all the pressure on revenue, but year-on-year increases to public expenditure, funded by borrowing, should be center stage. Large fiscal deficits and inefficient government spending persist as sources of vulnerability for Zambia. It is necessary to strengthen the fiscal position and restore fiscal buffers to increase confidence in the economy, reduce the need for costly borrowing and build resilience against further exogenous shocks.

Fiscal adjustment would also put less pressure on monetary policy and potentially make space for interest rates to be reduced, easing the pressure on individuals and firms. Keeping inflation expectations anchored in single digits remains critical to maintaining macroeconomic and wider development objectives.

Any adjustment should involve a shift in spending priorities that supports both the efficiency of public expenditures and long-term inclusive growth. While in many areas this is difficult to achieve, there are obvious areas for attention including the growing cost of fuel subsidies. Policy announcements have been made for cost-reflective electricity tariffs and fuel prices, but the reality is a huge outflow of subsidy from the Ministry of Finance. If the stated intentions for meeting the cost of supply with tariffs were realized, then fiscal pressures would ease considerably. Much better, pro-poor cushioning can be achieved via investment projects targeted at regions, and via targeted cash trans-

fers, rather than with fuel subsidies.

The targeted 2016 fiscal deficit of 3.8% presented in the budget may prove too optimistic given the slowdown, but fiscal adjustment is required and would signal the government's commitment to fiscal sustainability.

With market access comes greater scrutiny and policy responses are judged by real action that affects the interest rate paid on new borrowing.

With market access comes greater scrutiny and policy responses are judged by real action that affects the interest rate paid on new borrowing. Eurobond issuance has also increased international interest in the Zambian economy and events are being watched much more closely than prior to 2012. To help maintain confidence in the economy, and Zambia as an investment destination, better dialogue on the economy should be targeted and confusing messages avoided.

In addition, the commodity price shock highlights the need for Zambia to reduce its dependency on copper, a challenge it has been grappling with for over 50 years. Talk about diversification and growing manufacturing needs to be met by a clear and realistic strategy and structural reforms aimed at removing impediments to private sector activity and improving the business environment.

SECTION 2 POWERING THE ZAMBIAN ECONOMY

D. THE ELECTRICITY CHALLENGE

Economic progress since 2000, driven by mining production and services, has substantially increased the demand for electricity in Zambia. A growing shortfall in supply has been exacerbated in 2015 by a reduction in hydroelectric generation due to low water levels at the country's main reservoirs. This has increased power outages and impacted on all aspects of the economy, contributing to slower economic growth in 2015 and higher production costs.

Approximately 95% of generation capacity is linked to hydropower plants, hence the electricity supply is heavily dependent on hydrology.

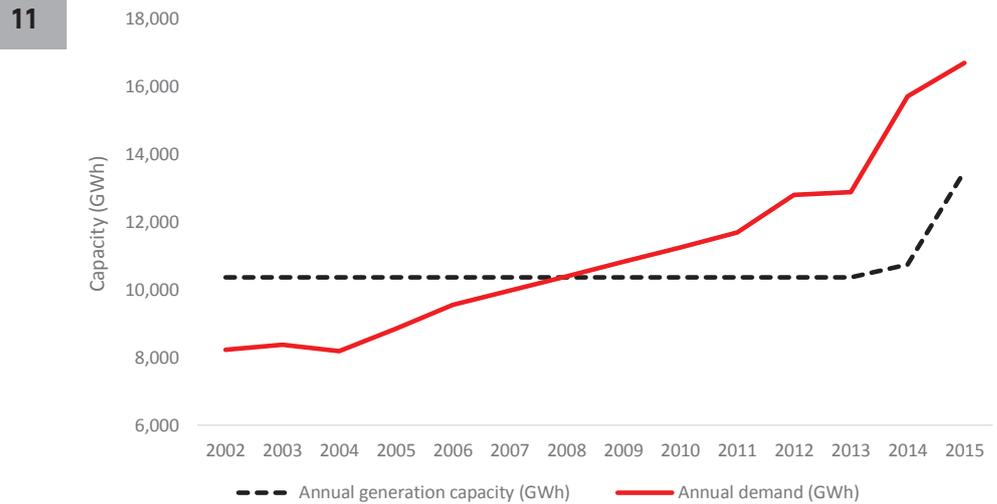
Zambia's economy has expanded by an average of 6.4% per year between 2010 and 2014, and 7.4% over the last decade. This economic expansion has lifted the demand for electricity by 4% per annum over the same period. With very little new generation capacity being brought online in the past 30 years, Zambia has been experiencing a power deficit over the past 4-5 years, characterized by power outages commonly referred to as load-shedding.

Approximately 95% of generation capacity is linked to hydropower plants, hence the electricity supply is heavily dependent on hydrology. This puts the country at risk in the event of drought, more so recently as the gap between generation and demand has closed.

The mining industry consumes the majority of Zambia's electricity (55%) using it not only for mining itself, but also processing (e.g. concentrating, smelting and refining) and other associated services such as water pumping. Most mines in the Copperbelt Province receive their power via the Copperbelt Energy Corporation (CEC) based on prices agreed in long-term Power Supply Agreements (PSAs) that run back-to-back with Bulk Supply Agreements (BSAs) between CEC and ZESCO Limited. For legacy reasons, these agreements are not overseen by the ERB. The ERB does however set tariffs for other consumer categories and provides its consent to ZESCO's other long-term bulk power agreements.

While installed capacity, measured in Mega Watts (MW), has been higher than existing peak demand, available energy generation, measured in Giga Watt Hours (GWh) and which has an approximate linear relationship to the water used, has remained below the country's total energy demand (figure 11). This has been exacerbated in 2015 due to low water levels in the main reservoirs used for hydroelectric generation (box 2).

Despite plenty of warning about dependency on hydro power and rising power demand, there has been very little improvement in generation capacity. Until 2006, Zambia had surplus power and this partly explains why prior to the 360MW Kariba North Bank Extension that was completed in 2015, the last major plant to be commissioned was the Kariba North Bank in 1977. The history of surplus has also contributed to low

Figure 11 Electricity generation capacity fallen below demand

Source: ZESCO and World Bank staff calculations

Load-shedding has been increasingly common since 2006, but it has got much worse in 2015.

tariffs which have been one of several barriers to investment in the grid and new generation capacity to meet rising demand.

Load-shedding has been increasingly common since 2006, but it has got much worse in 2015. The shortfall in energy supply has impacted on manufacturing and industry (including mining), increasing the costs of production, and is negatively impacting on the quality of life of Zambians with access to grid electricity. The power crisis adds to the list of negative shocks impacting on the Zambian economy in 2015 as discussed in Section 1.

Adequate power supply and coverage is central to Zambia's development strategy. Zambia's 2030 Vision highlights that: *"Energy is one of the important driving forces behind the development of an economy as it cuts across most economic and social activities."* The Sixth National Development Plan also stresses that: *"Poor and inadequate infrastructure remains the major constraint to economic development and poverty reduction"*. Preliminary results from the Living Conditions Monitoring Survey (LCMS) show the number of households reporting to have an electricity connection grew from 584,000 in 2010 to 948,000 in 2015, an increase of 364,000 households. However, almost all the new connections haven't taken place in urban areas and just 75,000 or 4% of rural households are connected, compared to 67% of urban households (there are approximately 3 million households in Zambia).

Zambia's challenges are mirrored in other African countries. Countries across the continent are grappling with the challenge of supplying reliable electricity to meet the needs of a growing economy and providing universal access to electricity in order to improve the quality of life of citizens. The key issues faced in the power sector include poor reliability, low access, and insufficient capacity to meet existing demand; some 24% of the population of SSA has access to electricity versus 40% in other low income countries. Excluding South Africa, the entire installed generation capacity of SSA is only 28 GW, equivalent to that of Argentina.

**Box
2****Hydro-Electricity in Zambia**

Zambia is reliant on four hydroelectric power stations:

- Victoria Falls, commissioned in 1938 with an installed capacity of 108 MW (since 1972).
- Kariba North Bank, commissioned in 1960 with an installed capacity of 600 MW that provides power to both Zambia and Zimbabwe.
- Kafue Gorge, commissioned in 1971 with an installed capacity of 900 MW since 1977.
- Kariba North Bank Extension, commissioned in 2014 at 360 MW.

In the 1970s and following the commissioning of Kafue Gorge, Zambia experienced a period of power surplus, during which power was sold and exported to Zimbabwe and South Africa. Falling and low copper prices and a lack of investment (mines were nationalized in 1972) meant there was reduced demand for power. Mining firms are the biggest users of power and as production began to pick up in the late 1990s, and the economy grew robustly, the power surplus slowly decreased.

Source: Kapika (2013) and Whitworth (2014)

E. ZAMBIA'S POWER CRISIS

Since July 2015, ZESCO has increased the extent of rolling black-outs (load-shedding) to at least 8 hours per day on a rotational basis for the majority of its household, commercial and industrial consumers. And although they are not subject to rotational load-shedding, ZESCO has requested the mining industry to curtail its load by 30%. This is in order to manage a power deficit of around 591 MW each month (September to December 2015), representing approximately 34% of demand.

The reason for the low water levels is a combination of lower rainfall (during the 2014-15 rainy season) and increased water usage.

The decision by ZESCO to limit electricity generation is due to the historically low water levels at the country's reservoirs (including Kariba, Itezhi Tezhi and Kafue Gorge) that store water for hydroelectric generation. Prior to the start of the increased load-shedding in July, ZESCO generation capacity was in the range of 1,800 – 2,000 MW. The reason for the low water levels is a combination of lower rainfall (during the 2014-15 rainy season) and increased water usage.

Zambia's and Zimbabwe's water allocation at Kariba dam is regulated by the Zambezi River Authority (ZRA) and in both 2013 and 2014, ZESCO exceeded its allocation by 5% and 22% respectively. The commissioning of the Kariba North Bank Extension project in 2014 contributed to increased water use at the Kariba reservoir and the reservoir has not reached its maximum retention levels since 2010. Water levels in the reservoirs will recover somewhat during the 2015 -16 rain season, assuming usage according to allocation, but it will take several years of rainfall and balanced usage for them to recover to maximum levels.

As of mid-November 2015, most areas of Zambia had experienced low rainfall and if this trend continues (the El Niño is expected to last into Q1 2016), there will be only limited recovery in 2016. If, however, reservoir levels continue to drop, ZESCO may be forced to curtail generation at the Kafue Gorge and at Kariba North Bank (including the extension) power stations even more.

2015 load-shedding

Initially, the burden of load-shedding was only imposed on households, businesses and industry, but excluded the mining sector. In July 2015, however, a decision was made to reduce power supply to the mines by 30% and since then, the mining companies have been asked to operate within restricted power allocations, been offered additional power at higher cost and had their compliance monitored by ZESCO.

The load-shedding has typically been for 8 hours per day. Between June and August, it was restricted to six hours on the Copperbelt, but since then the country has been without power for on average eight hours per day. The load-shedding aims to reduce demand, but there is not a full saving as often consumers delay some of their consumption to times when power is available.

Given reservoir levels continue to drop, ZESCO may be forced to curtail generation further.

Given the severity of the power deficit, government announced several short- and long-term measures to alleviate the situation.

Given the severity of the power deficit, the government announced several short- and long-term measures to alleviate the situation. To supplement the country's available generation and reduce the power deficit, ZESCO has entered into contracts with Southern African Power Pool (SAPP) utilities and emergency power suppliers (including Aggreko PLC). In November 2015, these contracts totaled 172 MW delivered during different times of the day. Once domestic generation and electricity imports (as at November 2015) are taken into account, the country faces an average monthly deficit of 591 MW (September to December 2015), representing approximately 34% of demand (table 2). Given the severity of the power deficit, government announced several short- and long-term measures to alleviate the situation. To supplement the country's available generation and reduce the power deficit, ZESCO has entered into contracts with Southern African Power Pool (SAPP) utilities and emergency power suppliers (including Aggreko PLC). In November 2015 these contracts totaled 172 MW delivered during different times of the day. Once domestic generation and electricity imports (as at November 2015) are taken into account, the country faces an average monthly deficit of 591 MW (September to December 2015), representing approximately 34% of demand (table 2).

Table 2	A power generation deficit in 2015	
	September to December 2015	Monthly Average
ZESCO Generation		987.5
Lunsemfwa Hydro		22.0
Ndola Energy		41.0
Emergency Imports - Day Ahead Market		38.0
Emergency Imports - Electricidade de Mozambique (EDM)		27.0
Emergency Imports - Aggreko (148MW for 16hrs daily)		107.0
Itezhi Tezhi Power Station		-
Total Generation		1,222.5
Transmission Losses		73.4
Total Demand		1,740.0
Total Deficit		590.9
<i>Total Deficit</i>		<i>34.0%</i>

Source: ZESCO and World Bank staff calculations
Note: For the period September-November 2015

2015 tariffs and subsidy

The emergency power imported in 2015 has come at considerable cost to the government. A burden made worse by the rapid depreciation of the kwacha in 2015. Imports from Aggreko are costing ZESCO US cents (USc) 18.4 per Kwh, imports from Mozambique are priced at USc 7.6 per Kwh and the average tariff on imports from the day ahead market (DAM) has increased from USc 2.7 Kw/h in April 2015 to USc 6.7 Kw/h in October 2015, a near doubling of prices. The total cost of emergency power (cost of supply minus tariffs) is estimated at ZMW 539 million or US\$44 million in 2015. Greater transparency on what the mines are each paying relative to the cost of supply would greatly improve the public's understanding.

F. MANAGING THE COST OF MITIGATION

Power is essential for the Zambian economy to function. Despite new generation projects, the modelling of different hydrology conditions shows that even in a wet (above average rainfall) scenario, current power shortages will continue through to at least 2018. For 2016, the authorities have made the difficult choice to increase the import of expensive emergency options. This puts huge pressure on the budget at current tariff rates, in tough economic conditions, and unless tariffs are revised upwards, the government's subsidy of the sector will rise dramatically and will be unaffordable. At November 2015 tariff rates, the government will need to provide ZESCO with an additional US\$ 340 million in 2016 to meet the cost of emergency power. However, the financing requirement can be substantially reduced if the average tariff is increased.

At present there are six power plants at various stages of preparation/development, some of which have been in the pipeline for more than a decade.

At present there are six power plants at various stages of preparation/development, some of which have been in the pipeline for more than a decade. The total capacity of these plants is about 1,730 MW (table 3). Generation of between 150 and 300 MW is expected in 2016 from Maamba Collieries (depending on the speed of project completion and the quality of coal used), along with 70 MW from Itezhi Tezhi (60% of its potential capacity due to low reservoir levels) starting in early to mid-2016. The largest, Kafue Gorge Lower (750 MW), has gone through several procurement/contracting phases, and has recently been contracted at a cost of US\$ 2 billion and is scheduled to be commissioned in 2020. The remaining three projects are negotiating power purchase and other support agreements with ZESCO and the government.

In addition, there are good prospects for solar generation in 2016 and beyond (box 3). The International Development Corporation (IDC) has been working to attract private sector partners for two 50MW solar PV projects, with support from the World Bank Group as transaction advisor. These projects should provide a diversified form of generation in early 2017.

There is also potential for thermal power generation by Independent Power Producers (IPP) for 200 MW worth of generation over the coming years, assuming the potential revenues, partly determined by the level of electricity tariffs, are sufficient to attract interest and that other constraints such weak management of the tendering process can be addressed.

The prospect of solar and thermal generation in the next few years will help diversify Zambia's power generation and make it slightly less dependent on hydro. Climate change has increased the frequency of floods and droughts in Zambia, and the Zambezi river basin will remain sensitive to global warming, adding further justification for a gradual diversification to other renewable sources of generation such as solar.

Despite these projects, the modelling of different hydrology conditions shows that even in a wet (above average rainfall) scenario, current power shortages will continue through 2018.

3	Project	Capacity (MW)	Primary Fuel	Estimated Cost (US\$ m)
	Itezhi Tezhi Power Station	120	Hydro	240
Maamba Coallieries	300	Coal	750	
Lunzua Power Authority	210	Hydro	n/a	
Ndola Energy Extension	50	HFO	75	
EMCO	300	Coal	750	
Kafue Gorge Lower	750	Hydro	2,000	
Total Capacity		1,730		

Source: ZESCO and World Bank staff calculations

Despite these projects, the modelling of different hydrology conditions shows that even in a wet (above average rainfall) scenario, current power shortages will continue through 2018. In a dry (lower than average rainfall) scenario, power shortages may continue through 2020. It should be noted that the assumptions in these scenarios do not include tackling the large portion of the population without access to electricity ser-

VICES, which remains an additional and core priority of government which will require even more generation capacity.

Box 3 Scaling solar in Zambia

Scaling Solar is an open, competitive and transparent approach that facilitates the rapid development of privately-owned, utility-scale solar PV projects in sub-Saharan Africa. It is capable of rapid implementation support, and offers a 'one-stop-shop' package of advisory services, contracts, financing, guarantees and insurance. This enables governments and utilities to procure solar power transparently and at the lowest possible cost.

The government and IDC hope that this initial 100 MW procurement round for solar generation will ultimately lead to a rapid scale-up of solar PV capacity, forming a natural complement to Zambia's extensive hydro resources. If they and the other public sector stakeholders adhere to the risk allocation under Scaling Solar, it is hoped that these projects will qualify for WBG financing, political risk insurance and partial risk guarantees.

A substantial increase in tariffs will be required to meet the cost of supply in 2016 and any gap between revenues and the costs of supply will need to be met by the government.

Emergency power imports in 2016

Notwithstanding the risk that ZESCO may be forced to curtail generation completely at the Kafue Gorge and at Kariba North Bank, reduced generation is likely from these sources (assuming water quotas are followed) for at least the first half of 2016 until rainfall helps replenish the reservoirs. Maamba Collieries and Itezhi Tezhi, when completed, will provide some relief, but to prevent a large increase in load-shedding ZESCO is contracting further emergency imports (table 4). In 2016, 300 MW is likely to be available from two Karpower ships (to be docked off Mozambique), further use of the day ahead market and a continuation on imports from Aggreko PLC (reduced to 40MW 16 hours daily in 2016).

The importation of power is complex given the number of wheelers (i.e. number of countries the power must pass through to get to Zambia). Power from Mozambique typically passes South Africa, then Botswana or Zimbabwe, to get to Zambia. Some power can arrive directly across the Zambia-Mozambique border, but the grid capacity there is limited to small volumes. The imports are also expensive, with Aggreko tariffs at USc 18.8 per Kwh, Karpower at USc 16.7 per Kwh, and the day ahead market remaining around USc 6.5 per Kwh. If further emergency inland power is sought, then the cost of supply might be as high as USc 25 per Kwh.

The new generation and emergency measures will result in an average deficit of 496 MW in 2016 or 26% of demand. The deficit is likely to be highest in Q1 2016, but improve as emergency power and new generation comes online (figure 12) in Q2. The

The imports are expensive, with Aggreko tariffs at USc 18.8 per Kwh, Karpower at USc 16.7 per Kwh, and the day ahead market remaining around USc 6.5 per Kwh.

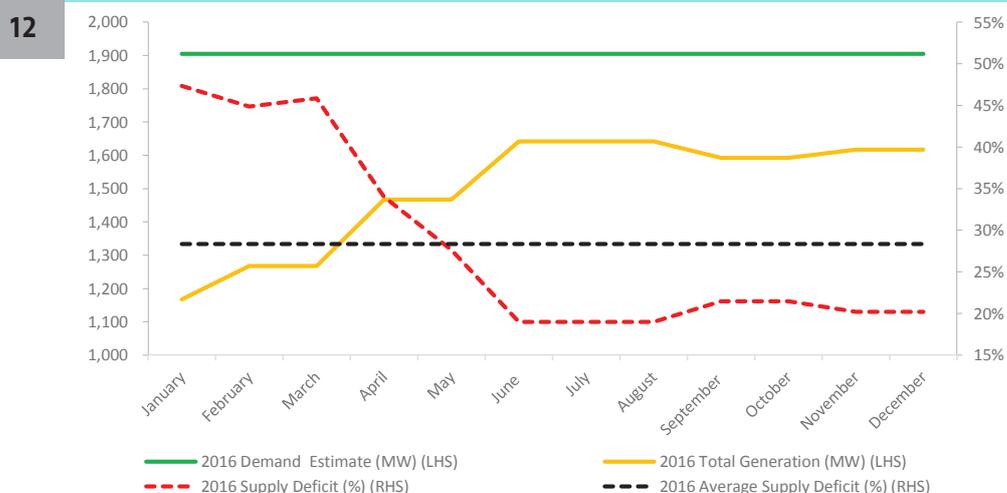
	2016	Monthly Average (MW)
ZESCO Generation		950.8
Lunsemfwa Hydro		22.0
Itezhi Tezhi Power Station		70.0
Ndola Energy		41.0
Reduction in Aggreko Imports (40 MW for 16 hrs daily)		40.0
Emergency Imports - Karpower Ship (100 MW for 24 hours)		91.7
Emergency Imports - Day Ahead Market		44.0
Emergency Inland power (200MW for 24 hours daily)		-
Maamba Coal		88.8
Emergency imports -Karpower ship (200MW 24 hours)		150.0
Total Generation		1,498.3
Transmission Losses		89.9
Total Demand		1,905.0
Total Deficit		496.6
<i>Total Deficit</i>		<i>26.1%</i>

Source: ZESCO and World Bank staff calculations

new generation and emergency measures will result in an average deficit of 496 MW in 2016 or 26% of demand. The deficit is likely to be highest in Q1 2016, but will improve as emergency power and new generation comes online (figure 12) in Q2.

The issue of electricity tariffs has been a longstanding one and there has long been discussions of moving towards costs-reflective tariffs.

Figure 12 The power deficit in 2016



Source: ZESCO and World Bank staff calculations

Electricity tariffs

The issue of electricity tariffs has been a longstanding one and there has long been discussion of moving towards costs-reflective tariffs. In 2008, the tariff was increased 33% with the financial viability of the power supply in mind (Zambian tariffs were some of the lowest across the continent), but the prices have not been inflation linked and have reduced considerably in real terms.

On 1 July, 2014, ZESCO was permitted by the ERB to raise tariffs on all customer categories except mining. Accordingly, commercial tariffs were increased by 15.4% and residential consumers' tariffs by 24.6%. This followed a four-year period from August 2010 where no adjustments were made despite cumulative inflation of 28%. Attempts have also been made to increase tariffs paid by mining firms to cover the actual cost of supply but many hurdles have been encountered.

The cost of emergency power in 2016 will substantially increase the cost of supplying electricity as it has in the second half of 2015. In July 2015, and to improve the financial sustainability of ZESCO, the government stated its intention to revise electricity tariffs to take the cost of supply into account. This government statement was repeated several times since July 2015, but as of end-November 2015, no action had been taken.

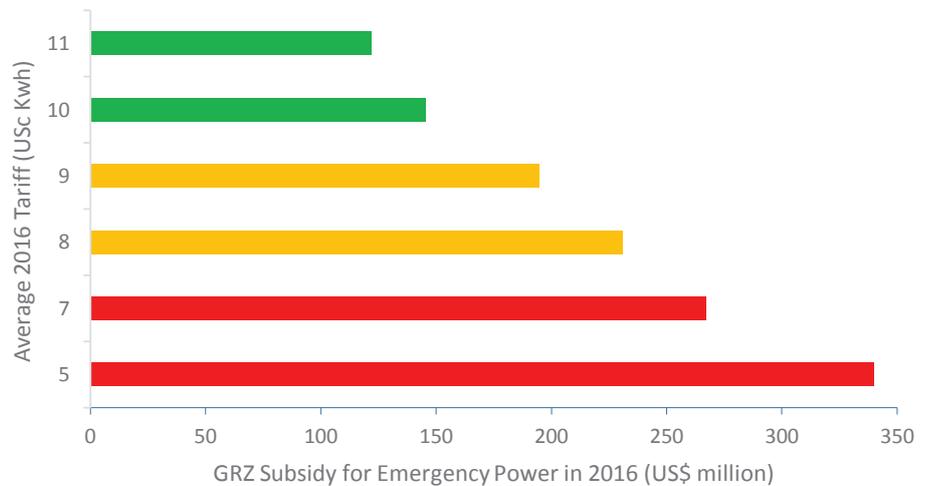
To move towards this goal, ZESCO applied to the ERB to increase most of the various non-mining tariffs and fixed charges from between 167 and 248%. Public consultations were held and as of end-November, no final decision had been made. Despite the large changes to some tariff lines, the proposal kept the R1 tariff (a 'life-line' tariff aimed at providing lower pricing to low-income consumers) at US Cents (USc) 1.5 per KWh and increased the threshold to receive this tariff from 100 Kwh up to 300 KWh of consumption. The aim of this tariff is to protect low-income residential consumers, but the move to allowing up to 300 KWh will include many of the non-poor as well. In addition, ZESCO, CEC and the mining industry began discussions to renegotiate the agreements under which bulk power sales to the mining industry are governed in order that they include the full cost of emergency power imports.

A substantial increase in tariffs will be required to meet the cost of supply in 2016 and any gap between revenues and the costs of supply will need to be met by the government. Average tariffs, including both mining and non-mining, are currently (i.e. prior to any increase) estimated at between USc 5 and 6 per KWh. At this tariff rate, the government will need to provide ZESCO with an additional US\$340 million in 2016 to meet the cost of emergency power. However, the financing requirement can be substantially reduced if the average tariff is increased and remains at that level (figure 13). For ex-

ample, if government could move the average tariff to USc 10 KWh, then the required subsidy and associated fiscal pressure will reduce to approximately of US\$146 million in 2016.

ZESCO applied to the ERB to increase most of the various non-mining tariffs and fixed charges from between 167 and 248%.

Figure 13 The cost to government of emergency power depends on the tariff



Source: ZESCO and World Bank staff calculations
Note: Does not include emergency inland power

Key to note is that an increase in tariffs to reflective levels is necessary but not sufficient to increase private investment in electricity generation in Zambia. There are many other hurdles to overcome as well. Management and regulation of the sector have been improving, but there is still substantial work to do. Particular efforts are needed to improve sector planning and the procurement processes for large power projects.

The impact of load-shedding

The costs of emergency power are considerable when compared to existing hydropower plants, as is the likely impact of increased electricity tariffs on the economy. However, so too is the impact of load-shedding. As was highlighted in **Section 1**, the economy has slowed considerably in 2015 and is expected to remain at similar levels of below trend growth in 2016. The impact of load-shedding is a key driver of the decline, along with the external headwinds and domestic pressures being faced.

At the national level, the power crisis has already caused reduced output and redundancies across businesses in the services, manufacturing and industrial sectors.

At the national level, the power crisis has already caused reduced output and redundancies across businesses in the services, manufacturing and industrial sectors. Manufacturers are reporting increased costs of production, as they are forced to run costly generators or switch shifts to when they have electricity (extra pay is often needed for night shifts) and many declare they are only meeting between 30 and 40% of scheduled production. Firms engaging in complex procedures (some machines are designed to run 24 hours and require 3-4 hours of heating before use) and those requiring refrigeration are suffering particularly badly. The mining sector, already impacted on by lower copper prices, has announced closures, laid-off 7,700 workers and postponed investment. Load-shedding of 30% and increasing costs of electricity have further weighed on mine profitability and production.

Added to the economic costs are the social and environmental impacts of the power crisis. It becomes much harder to provide quality health care and education if hospitals, schools, clinics and universities are experiencing electricity power outages. The Forestry Department has reported an increase in land degradation as load-shedding has become worse. The cost of replanting trees and soil degradation must be considered in any assessment of impacts. In 2015, 32.9% of households in Zambia report using charcoal for cooking and 50.7% report using firewood. Only 16.0% report typically cooking with electricity, but a good proportion of those cooking on electricity will have switched to using charcoal, or LPG where available, when load-shedding has denied them power. Zambia produces LPG at the Indeni refinery, but 80% is exported. Encouraging and facilitating the use of LPG would help reduce the demand for electricity and help protect the forest cover around urban areas.

G. GRADUATING TO SUSTAINABLE SUPPLY

The new generation capacity and emergency measures for 2016 will help in mitigating the impact of the power crisis in the coming year, but global experience shows there is no substitute for effective planning. Furthermore, Zambia may again face a similar crisis in the near future if structural weaknesses in the sector are not adequately addressed. There remains a need to shift from being reactive to anticipatory or preemptive in dealing with reduced generation capacity. Additionally, the need to increase access to electricity in the country should not be neglected.

The long-term sustainability of the power sector to ensure an adequate, quality and reliable electricity supply requires a robust planning function.

The current power crisis, which impacts considerably on the economy, should be used to correct policy and regulatory anomalies that prevent the sector from achieving its potential.

i. Strengthening sector planning and procurement processes: The long-term sustainability of the power sector to ensure an adequate, quality and reliable electricity supply requires a robust planning function. Zambia should develop and update regularly, e.g. every two years, a Least Cost Power Development Plan (LCPDP) that lays out the investments required in all the segments of the power sector i.e. generation, transmission and distribution. For generation, the LCPDP should contain a pipeline of projects ranked by cost i.e. the most economically and financially viable projects should be developed first. The LCPDP process should be anchored by a load-forecast that is also routinely updated and, given Zambia's dependency on hydro, the relevant hydrological modelling to guide the extent to which the generation mix should be diversified.

Planning on its own is however an insufficient condition for power sector sustainability unless its outputs lead to the procurement of new generation capacity and the related investments in the transmission network. A procurement framework that ensures the transparent and competitive delivery of new plants and which is linked to planning outcomes should therefore be established. Due to the existing structure of the power sector in Zambia, such a procurement framework should also have a mechanism for allocating new build opportunities between state-owned ZESCO and the private sector through Independent Power Producers (IPPs). The current procurement method by which developers enter into lengthy post-award negotiations with ZESCO and government should be reviewed in order to reduce implementation delays. This could include the development of template agreements (power purchase agreement, implementation agreement etc.) and the establishment of indicative security arrangements.

ii. Improving financial sustainability of the power sector: The power crisis has revealed the importance of ensuring that the power sector has sufficient funds for electricity service provision. Inadequate electricity tariffs limit the extent to which the existing generation and grid network is maintained, and investments in new generation capacity and network expansion by either ZESCO or private parties can be made. Electricity tariffs that are lower than the cost of service only benefit those with existing electricity connections in the short-term and in the long-term compromise the quality and reliability of supply. Furthermore, low tariffs slow down the rate at which those without access, which is the majority of the population, can receive connections.

In addressing financial sustainability, it is crucial that an electricity tariff framework that reflects the costs of efficient service provision is established and effectively applied. ZESCO and other utilities in the sector should be allowed to collect revenues sufficient to cover efficient costs, through tariffs charged to all consumers able to pay them. These revenues should also be sufficient to fund a subsidy program (social safety net) aimed at those consumers whose ability to pay is lower than the level that reflects the full cost of supply. In the event that this is not possible wholly or in part, an affordable subsidy program should be provided through direct and transparent transfers from the government treasury.

iii. Increasing access to electricity: Given Zambia's low electrification rate (32% overall), it would also be important to complement the LCPDP with a strategy, complete with action plans to scale-up access to electricity. This should comprise the priorities for electrification, a definition of funding sources (e.g. grants, loans, national budget

It is crucial that an electricity tariff framework that reflects the costs of efficient service provision is established and effectively applied.

To complement measures to import electricity and other short-term generation interventions, demand side management measures should also be considered.

allocations, tariff levies etc.), technical options and implementation arrangements for different geographic locations e.g. urban and rural areas.

iv. Implementing demand size measures: To complement measures to import electricity and other short-term generation interventions, demand side management measures should also be considered (box 4). ZESCO previously distributed 1 million compact fluorescent lamps (CFLs) that were swapped with less efficient but cheaper incandescent light bulbs, and was able to shed-off approximately 57MW of peak demand. The possibility of a further large-scale distribution of CFLs should be considered. This would require an assessment of how widespread the use of incandescent bulbs is. It is also important to recognize that at low tariffs, there is limited incentive to use electricity more efficiently.

Box 4 Diversification and demand-side measures in Ethiopia

Ethiopia suffered a similar power crisis to Zambia in 2009-10, prior to which diversification of electricity generation, away from hydro to some degree, was not among its priorities. However, after experiencing severe load shedding, Ethiopia started to diversify its generation portfolio by investing heavily in geothermal and wind energy to complement its hydro resources.

Ethiopia has also aggressively pursued demand side management activities to mitigate the impact of its power crisis and improve the country's energy efficiency. Central to these efforts was an energy-efficiency program that distributed 350,000 compact fluorescent lamp bulbs free of charge, following lessons from similar interventions in the Philippines, Rwanda, Thailand, Uganda and Vietnam.

A recent World Bank evaluation estimates the impact of the program to be about 45-50 kilowatt hours per customer per month, or about 13.3 megawatts of energy savings in total. The study finds that the majority of beneficiaries were low-volume customers— mostly from among the poor—although the program was not specifically targeted. It also suggests that energy savings were larger for the poor. On the downside however, about 20% of the initial energy savings disappeared within 18 months of the program's completion, suggesting sustained efforts are needed to counter such rebound effects.

Source: Costolanski, P., Elahi, R., Iimi, A. and R. Kitchlu (2013) 'Impact Evaluation of Free-of-Charge CFL Bulb Distribution in Ethiopia', Policy Research Working Paper 6383, World Bank, Washington D.C

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NOTES

¹African Pulse, World Bank (2015): <http://documents.worldbank.org/curated/en/2015/10/25116683/africas-pulse-october-2015>.

²See the World Bank's previous Economic Brief (July 2015): Making Mining Work for Zambia.

³See: <http://documents.wfp.org/stellent/groups/public/documents/ena/wfp274160.pdf>

⁴See: <http://www.enterprisesurveys.org/~media/GIAWB/EnterpriseSurveys/Documents/CountryHighlights/Zambia-2013.pdf>

⁵See: http://www.boz.zm/Publishing/Speeches/MPC_Statement_Nov_2015-v2.pdf

⁶A simple way of understanding the relationship between capacity and energy is equating this to a truck. In order for a truck to carry a certain load, its engine should at least be of a certain size (capacity). But to do so over a distance, say 100km, requires that the truck has sufficient diesel (energy).

⁷Republic of Zambia, Zambia 2030 vision, p.9.

⁸These results were presented by the CSO at a 2015 African Statistics Day Event on 18th November 2015.

⁹Engineering Institute of Zambia (2015), 'Report of ZESCO Load Shedding', Technical Experts Team, September 2015.

ZAMBIA ECONOMIC BRIEF

POWERING THE ZAMBIAN ECONOMY



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