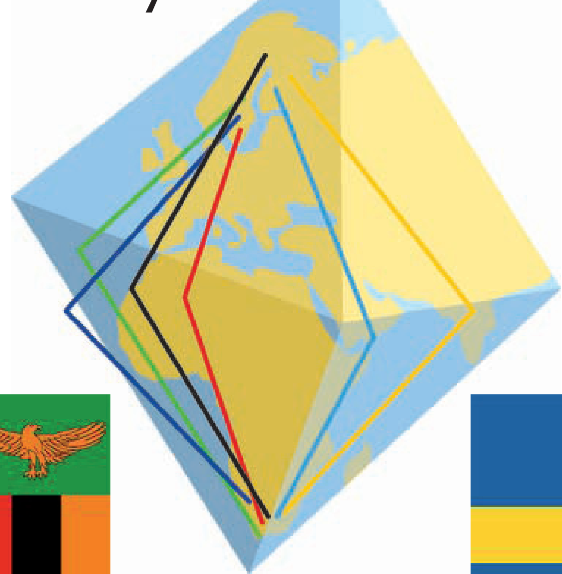
Pre-study of the mining sector in Zambia for Geological Survey of Sweden



Swedish Trade Council
Gaborone, September 6th, 2011

DISCLAIMER

This market study was conducted by the Swedish Trade Council, June–September 2011, on behalf of MeetingPoints Mining at the Geological Survey of Sweden. Views or opinions expressed are solely those of the author and do not necessarily represent those of the Geolocial Survey of Sweden.

PREFACE TO THE PRESENTATION

- This report contains information presented to the Geological Survey of Sweden (hereinafter referred to as SGU) in September 2011. The report is based on the agreed proposal that SGU signed in April 2011.

- The material is not complete without the oral presentation

- The project was carried out by the Swedish Trade Council Gaborone (STC) during May-August 2011

AGENDA

OBJECTIVE AND KEY ISSUES OF THE PROJECT

EXPORT RÅDET
SWEDISH TRADE COUNCIL

- The overall goal is to increase Swedish business presence and involvement in Zambia and to facilitate cooperation between Sweden and Zambia in the mining sector

- The objective of the quoted project is to:
  - Conduct research and provide SGU with information on opportunities for Swedish companies and organizations within the mining sector in Zambia

- STC will address four key issues in order to meet the objective:
  - What are the key market characteristics, trends, size and potential growth?
  - Who are the main market players?
  - What are the regulatory framework and legislations?
  - What are the main challenges, business opportunities and potential areas for cooperation between Sweden and Zambia?

THE MINING MARKET OFFERS MANY OPPORTUNITIES

- Immature market but mining generate more potential than mature markets

The mining industry is growing substantially	• Trend shows increasing output of copper, cobalt, manganese and uranium. The mining sector is forecasted to grow from US$590m (2010) to US$1.35bn (2015) • Sales of mining equipment is growing
There are challenges within infrastructure, capacity and CSR	• Poor communications and unreliable energy supply is limiting potential growth • Capacity is limited, both in technical and business-related terms • Measures on CSR, e.g. safety, labour and anti-corruption are limited • Environmental consciousness is low among local and foreign investors
Good business climate for foreign actors	• Low tax regime compared to equivalent countries boosts foreign investments • The government encourages foreign investment within mining and training • Corruption has become a part of the business climate
Opportunities for Swedish mining related companies	• Exploration and extraction activities will foster further sales of equipment • Great need of infrastructure development, energy, water and ICT • Broader opportunities within skills development as well as CSR
Recommended next steps	• Verify demand and build network through site visits • Promote market potential to Swedish companies • Establish partnerships with public sector and/or academia • Consider establish project survey to channel to Swedish SME´s • Consider broader brand building activities such as CSR, Mining efficiency

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- Introduction and Key Findings
- Overview of Zambia
- Mining Industry
- Infrastructure and Capacity
- CSR and Environmental Aspects
- Regulatory Framework and Business Climate
- Opportunities for Swedish companies
- References

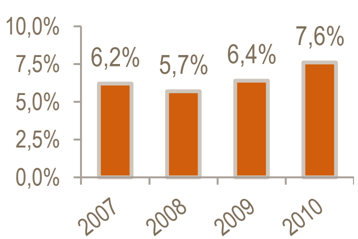
OVERVIEW OF ZAMBIA

Basic facts

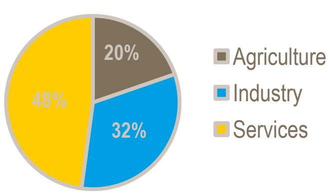
Population:	13.9m (July, 2011 est.)
Area:	581,730 km²
GDP (PPP):	US$20.0bn (2010)
GDP/Capita (PPP):	US$1,500 (2010)
Mining share of GDP:	11 % (est.)
Inflation:	8.5 % (2010)
Currency:	Kwacha (ZMK) (US$1 = ZMK4,800)
Religion:	Christianity, indigenous beliefs
Languages:	English (official), Bemba, Nyanja, Lozi, Tonga, Kaonde, Luvale as well as 72 dialects
Exports:	Copper, cobalt, cotton, tobacco
Imports:	Machinery, fuel, transportation equipment, food, electricity, clothing
Swedish Export 2009:	SEK332.0m
Swedish Import 2009:	SEK8.3m

Zambia

Real GDP growth (est.)



GDP composition by sector



Main Industries

- **Mining**
- **Agriculture**
- **Telecom**
- **Power & Energy**
- **Transport Infrastructure**

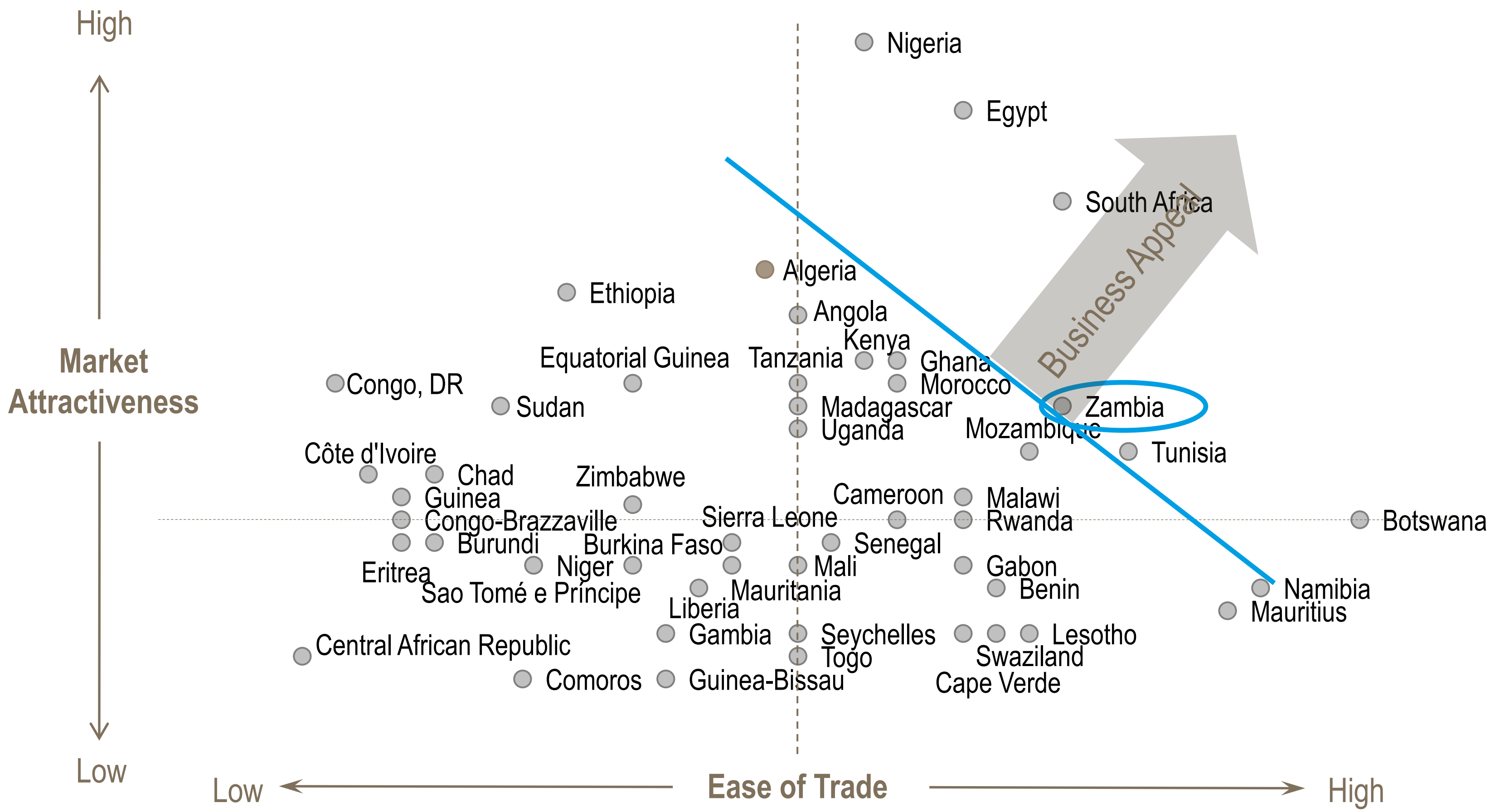
SCB, CIA World Factbook 2010, Ministry of Mines and Mineral Development, National Board of Trade

THE MACRO SITUATION FOR ZAMBIA IS BETTER THAN EVER

Politics	Economy	Social	Technological
• The ruling party (MMD) has realized an investor-friendly ideology, encouraging mining investments since the privatization of the mining industry in the 90s. Elections in September 2012 could possible change this. • The tax environment is considered to be among the most attractive compared to neighbouring countries and copper-producing countries	• Zambia's debt burden has eased and its export market for copper has boomed with China's increased demand • The economy has moved from stagnation towards stable growth (real growth of 7.6% 2010) but the it relies heavily on one commodity: copper • Foreign aid still represent the majority of the governmental income	• Zambia has a relatively large domestic market comprising a population of about 12m • Lack of skill is a general problem which is also associated with the culture of corruption • Zambia's location offers trading opportunities with eight neighbours, plus South Africa (the main trading partner in SADC*	• Both road and energy infrastructure are underdeveloped, creating big differences between the provinces. Improvements has started though. • Mines drive the development of technology, including transport and energy infrastructure • Minimum wages are low and skilled labour scarce are challenges

* SADC: Southern African Development Community

ZAMBIA IS IN THE TOP SIX OF BUSINESS APPEAL IN AFRICA



Zambia offers a very attractive market and is very easy to access in an African perspective

Source: STC research. Note: Dotted lines indicate median market score. The study was performed prior to the turmoil in northern Africa.

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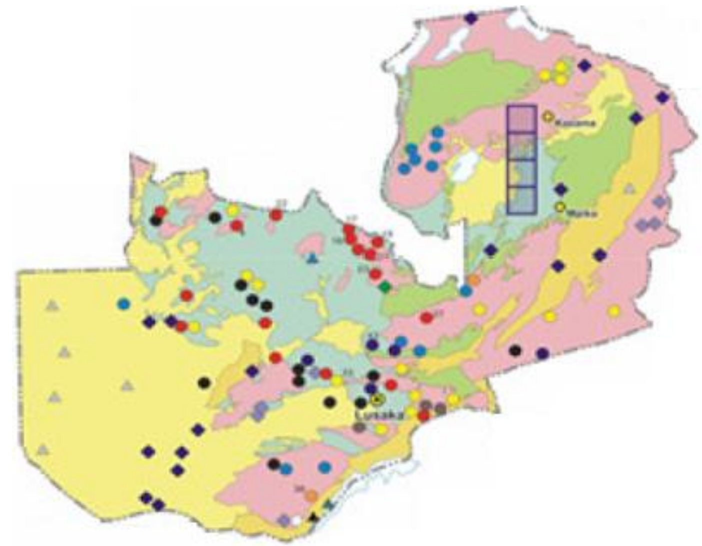
METALS AND MINERALS ARE MINED ACROSS THE COUNTRY

Regional Differences

- Copper and cobalt has been mined in Zambia since the 1920s. They are chiefly mined in the Copperbelt region
- Manganese has recently attracted investments, especially to the Luapula region, where potentials likely are bigger than presently known
- The Western province – also known as Barotseland – is largely unmapped. The region is thought to contain both minerals and oil, but poor infrastructure, political instability and land ownership issues prevent exploration.

Distribution of Mineral Deposits and Occurrences



- Copper / Cobalt
- Gold
- Lead / Zinc
- Nickel
- Tin
- Aquamarine
- Emerald
- Diamond
- Coal
- Oil / Gas
- Manganese
- Iron
- Uranium
- Amethyst

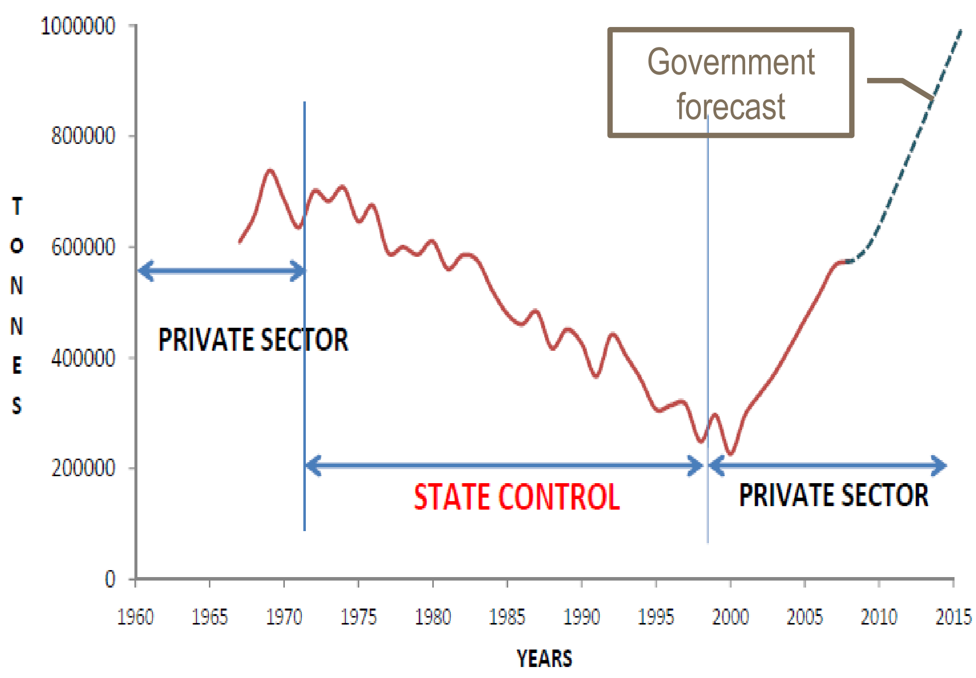
Rich known deposits of metals and minerals exist in Zambia, but far for everything is yet mapped

Source: Ministry of Mines and Mineral Development, interviews

ZAMBIA IS EXPERIENCING A REVIVAL OF COPPER MINING

- Recent investments by private actors are rapidly boosting the mining sector

Zambian Copper Production 1966-2010 (kt)



Improved output and efficiency

- Zambia's mining sector was nationalised after independence, aiming at retaining the revenues from copper in Zambia
- Following national bankruptcy in the 90s, the mines were privatized
- Efficiency has improved tremendously since the 90s, which implies increased demand for equipment, services and infrastructure
- Presently, the big Swedish mining companies are established in Zambia. With the positive trends, there is a market also for medium sized actors.

The privatization of the copper mines a decade ago is now paying off and opening up for increased demand

Source: Ministry of Mines and Mineral Development, BMI

ZAMBIA IS A LEADER ON THE WORLD'S COPPER MARKET

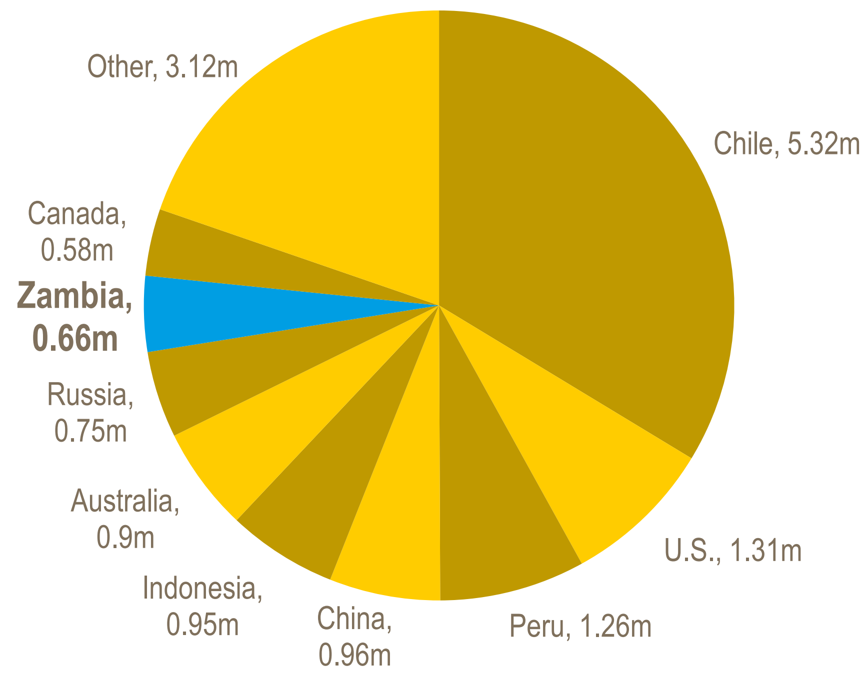
- Favourable tax regime and huge reserves makes Zambia attractive

Zambia's Copper Production

- Zambia is the world's 7th producer of copper (3.3 % of world production 2010). Copper is generally mined together with cobalt and Zambia is the 2nd producer of cobalt (19.7 %, 2010).
- Zambia's copper output is likely to rank among the top five (BMI forecast: 1.3m tonnes in 2015) due to:
  - massive demand from China & India expected
  - favourable tax regime in Zambia compared to other copper nations
  - unlike Zambia, other copper nations see their production declining due to decreasing reserves
  - investments the past ten years are paying off
  - new actors entering the market while existing projects are being expanded

World Copper Output Distribution 2009

100 % = 15.8m tonnes



Zambia is growing relatively other copper nations

Source: BMI, Copper Development Association, Scotiabank

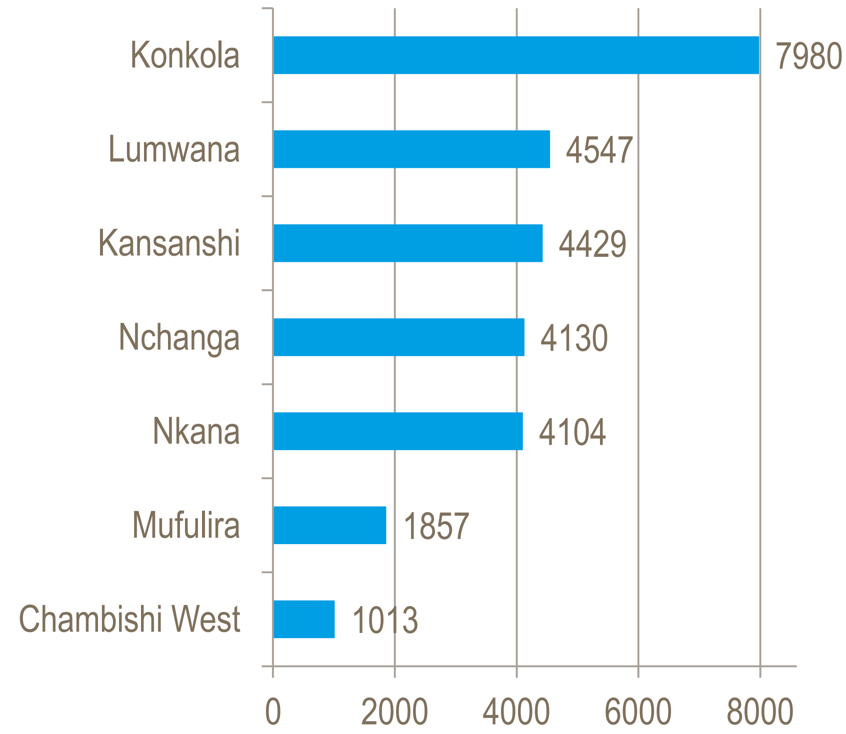
ZAMBIA'S ECONOMY RELIES ON COPPER

- Increased output expected but decreasing copper prices is a threat

Zambia's Economy Relies on Copper

- Zambia's mining sector is forecasted to grow from US$590m (2010) to US$1.35bn (2015)
- The direct contribution by the mining sector to the GDP is estimated to 11 % (2010); indirect probably up to 50 %
- The economy depends on copper prices. Following growing prices in 2009-2010, prices are volatile for 2011 due to concerns raised about growth in China.
- The government forecasts the copper output to exceed 1m tonnes in 2012. This number is still modest compared to the estimates of reserves in the major mines (cf. diagram).

Estimated Contained Copper in Major Mines (kt)



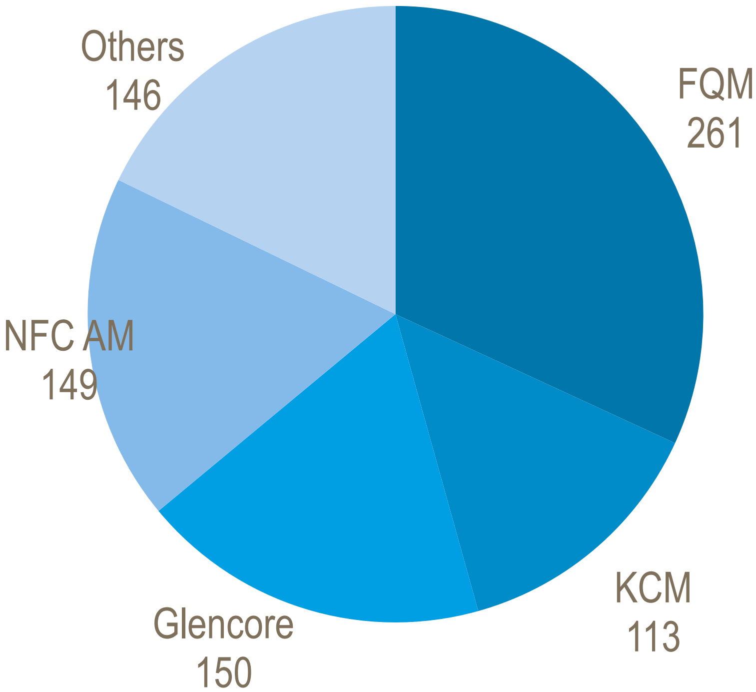
With growing copper output and demand expected over the long term, outlooks are good for Zambia's economy

Source: BMI, Vedanta Resources plc, Ministry of Mines and Mineral Development

FOUR PLAYERS ARE DOMINATING THE COPPER MARKET

Distribution of copper production/company 2010

100 % = 819kt



Concentrated ownership of mines

- Presently, there are four owners of the largest mines in Zambia, who account for over 80 % of the copper output
- Due to several large scale expansions and newly developed pits, the distribution will change in coming years, as well as the output numbers, which yield increased demand for mining equipment and services

Contacts and references to the big four mining companies is essential for success in Zambia

Source: Ministry of Mines and Mineral Development, BMI

Abbreviations: KCM=Konkola Copper Mines (Vedanta), FQM=First Quantum Minerals, NFC AM=NFC African Mining

LARGE MULTINATIONAL MINING COMPANIES OPERATE ZAMBIA'S COPPER MINES SINCE PRIVATIZATION

Company	Comment
First Quantum Minerals Ltd. (CAN)	• Majority owner of Kansanshi Mining plc (ZCCM-IH: 20.6 %) • Operates the Kansanshi Mine (18 mt) and develops the Fishtie Copper Project
Vedanta Resources (IN)	• Majority owner of Konkola Copper Mines (ZCCM-IH: 20.6 %) • Operates the Chingola Open pit A and Nchanga open pit (4.5 mt), Nchanga Underground Mine (2.8 mt) and Konkola Mine in Chililabombwe (2.4 mt)
Glencore (CH)	• 100 % owner of Luanshya Copper Mines Ltd • Operates several mines in Kitwe (e.g. Nkana Mine, Mindola Mines, in total 5.5 mt) and also the Mufulira Mine (2.5 mt)
NFC Africa Mining plc (CHN)	• 100 % owner of Luanshya Copper Mines Ltd • Operates several mines in Luanshya and Chambishi (e.g. Baluba Underground Mine, Chambishi Mine and Muliashi Mine, in total 3.4 mt)
Barrick Gold (CAN)	• 100 % owner of Lumwana Mining Company Ltd • Operates the Lumwana Mine, running since 2011
Metorex Ltd. (SA)	• Majority owner of Chibuluma Mines plc (ZCCM-IH: 15 %) • Operates the Chibuluma West and South Mine in Kalushi (0.6 mt)

Source: USGS. Note that the number in bracket refer to the ore mined in 2009

BOTH OPEN-PIT AND UNDERGROUND COPPER MINES ARE FOUND IN ZAMBIA

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Major Underground Mines

- Nkana (Kitwe)
- Baluba (Luanshya)
- Chibuluma (Kalushi)
- Mufulira
- Nchanga (Chingola)
- Konkola (Chililabombwe)

Major Open-Pit Mines

- Kansanshi (Solwezi)
- Lumwana
- Chingola Open Pit
- Nchanga Open Pit (Chingola)
- Konkola Open Pit
- Chambishi (Luanshya)

New Major Mining Projects

- Sentinel (open pit)
- Expansion of Kansanshi (open pit)
- Expansion of Konkola (open pit)
- Konkola North (underground)

Zambia has a strong tradition in underground mining but open pits are on the rise

Source: USGS

ZAMBIA HAS HIGH-GRADE DEPOSITS OF MANGANESE

- Several prospecting and a few extracting activities ongoing

High-grade ore in sub-vertical veins

- Mining of manganese is deemed very favourable in Zambia, given the ore's high-grade containment of manganese (up to 50 %)
- Manganese occurs in a number of areas within Zambia, mainly in the Northern and Central provinces, generally as sub-vertical veins or in low-angle faulting
- Mineralisation is generally quite shallow, ranging from exposed at surface to depths of 50 metres
- Manganese mining is levied with lower taxes than copper mining, which has attracted both investments and criticism from the opposition and NGO's

Actors in Zambian manganese projects

- A number of players (e.g. Australian Ethan Minerals Ltd. and Uran Ltd.) have recently started mining manganese ore
- Several medium-scale miners are moving their prospecting projects to the bankable stage. Output is expected to rise within coming years.
- The ore is currently stockpiled and shipped to South Africa for beneficiation. However, Taurian Manganese Ltd. plans to invest US$150m to build a manganese processing plant, which is planned to process 720k tonnes of manganese a year by 2014 if power supply can be provided.

Manganese might become the most important mined product in Zambia after copper in coming years

Source: Mr. Noah Ndumingu, Ethan Minerals Limited, Livemint.com, Taurian, Uran Ltd.

ZAMBIA HOLDS POTENTIALS FOR URANIUM EXPLORATION

- The government aims for Zambia to become a major uranium supplier

Uranium in Zambia

- There are several deposits known to contain high-grade uranium. The government aims at becoming Africa's 3rd biggest uranium supplier after Namibia and Niger.
- The mining legislation was recently upgraded to take account for uranium and it started issuing uranium mining licences late in 2008
- There are a currently a few exploration licences and more than 100 prospecting licences (large and small-scale) which include uranium
- Zambia is a member of the IAEA and signatory to the NPT (Nuclear Non-Proliferation Treaty)

Examples

- Barrick Gold Corporations' Lumwana copper project is undergoing a feasibility study on uranium exploration, in addition to present copper licence
- Uranium ore is presently stockpiled until a uranium plant has been built
- Denison Mines (Canada) is exploring its Mutanga uranium project in southern Zambia, with mine construction to start in 2011 and production in 2012
- The Chirundu project near the Zimbabwe border is under exploration by Australian Albidon Ltd

Good prospects for uranium , but the uncertainty on the global uranium market will determine the development

Source: World Nuclear Association, Wise Uranium Project, Uran Limited

COAL MINING IS EXPANDING IN ZAMBIA BUT HAS CHALLENGES

- Zambia's largest coal producer Maamba Collieries is owned by Singapore's Nava Bharat Pte and ZCCM-IH
- The Maamba Mine contains low-grade coal and was recently opened after having been closed since the 80s, after having undergone modernization
- A washing plant and a 300 MW power plant are being planned. There are however concerns that the mine will not reach operation stage due to poor management and low-grade coal.

- Prospects of exporting the coal (like Mozambique and South Africa) are limited with today's infrastructure

"I don't think the Maamba station will be a major electricity contributor since the veins in the coal fields are very shallow"

- Mr. Trevor Robson, Consultant

Coal mining and coal-fired power plants hold potential because of investments and government support

Source: Mr. Mooya Lumbasha, Miningreview.com, Miningsafety.co.za, Mining-technology.com, Mr. Trevor Robson

INVESTMENTS STRENGTHENS THE PROCESSING INDUSTRY

- Several plants are however limited by frequent power shortage

Processing and smelting of copper and nickel

- Most major copper mines have adjacent processing facilities such as crushing, milling and flotation to produce copper in concentrate
- Smelting is supported by the Government. Foreign investments (Chinese and European) have been made to increase capacity. There will be a shortfall of smelting capacity in coming years and further investments are needed. Power shortage also limits the processing and smelting capability.
- Simpler technologies are used than in the Swedish smelters. With increased copper production and higher environmental requirements, opportunities may arise for future smelters and upgrading of present.

Zambian melters

- There are four major smelters with a joint capacity of 750kt anode copper per annum, located in:
  - Mufulira
  - Kitwe
  - Ndola
  - Luanshya
- The Munali underground nickel mine (run by Albidon) feeds a simple processing plant for nickel
- Taurian plans for a large-scale manganese plant

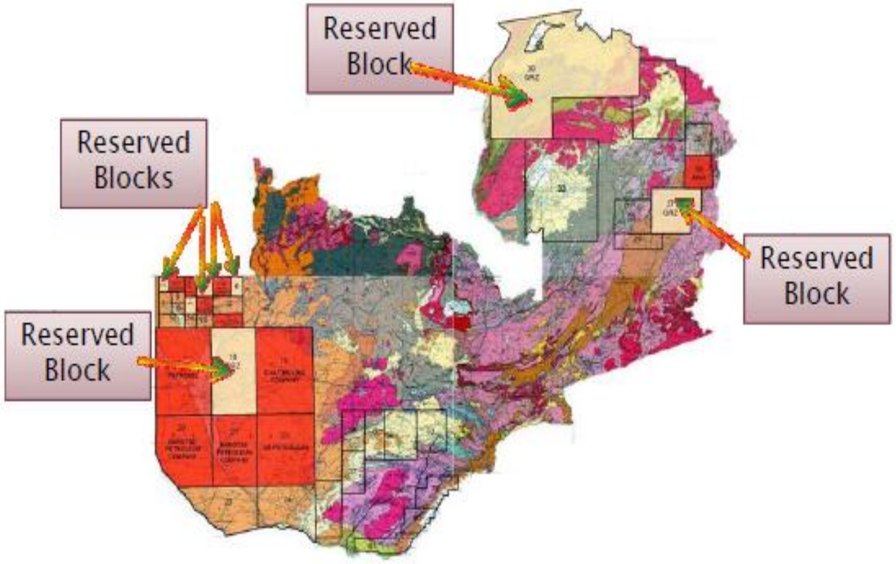
Technology for the processing industry might be an upcoming opportunity

Source: Ministry of Mines and Mineral Development, iSchool,zm, EIB

EXPLORATION FOR OIL AND GAS HAS RECENTLY STARTED

- Still at an early stage and no major investments are known to be underway

- Initial oil and gas exploration has been carried out by the government in the indicated blocks; it has shown indications of the presence of oil and gas
- Despite delegations and governmental encourages, no major investors consider the reserves economically viable yet
- The Western province where poor infrastructure are main issues is in focus for the exploration
- The only oil refinery in the country, the partly state-owned Indeni Oil Refinery is fed from the Tazama Pipeline from Tanzania



Although opportunities for petroleum are limited, better mapping could change the picture

Source: Dr. Goodwin Beene, eStandardForum, Mr. Trevor Robson

SMALL SCALE MINERS ARE COMMON

- Accounts for a large part of the mining operations, yet small production

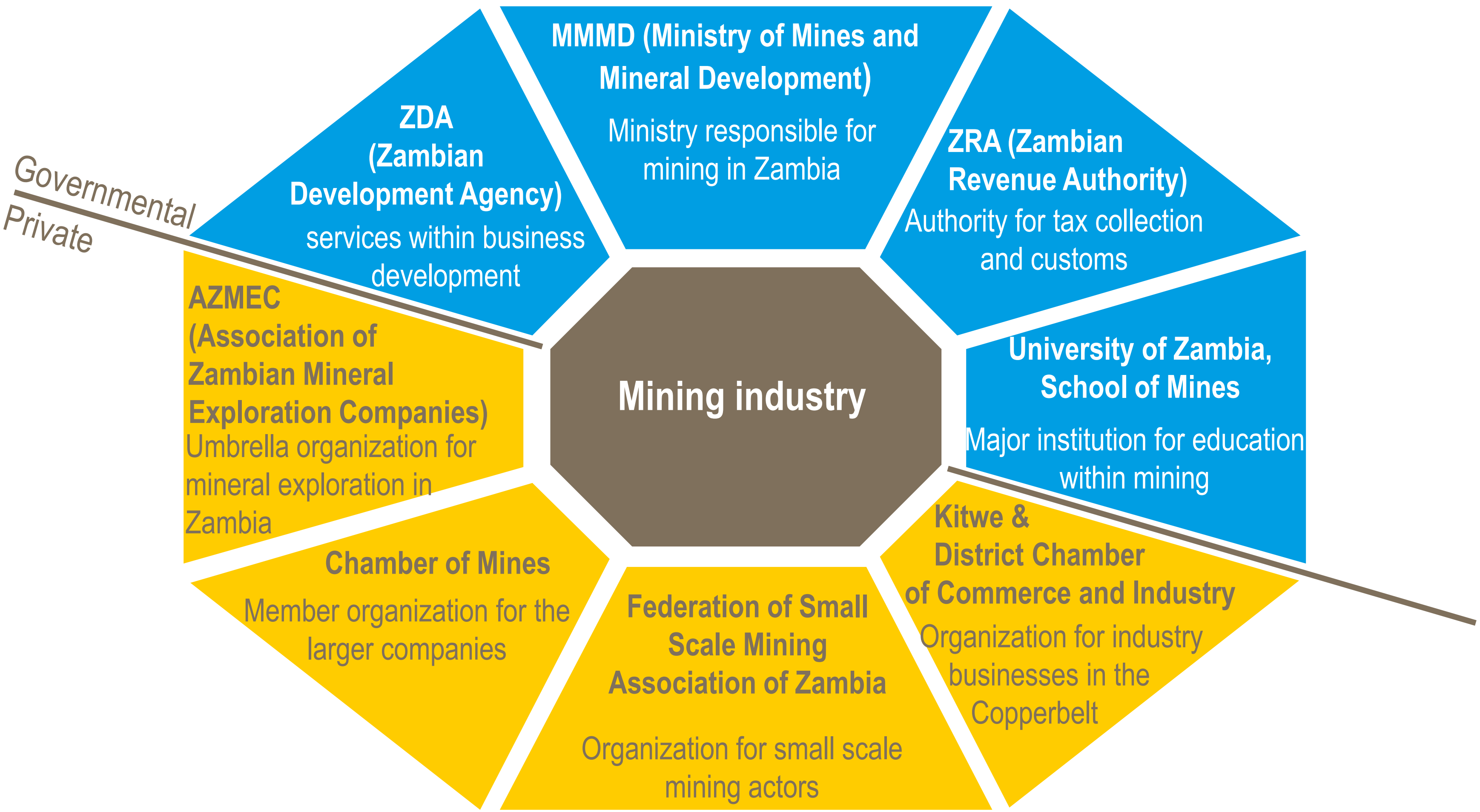
- Small scale mining in Zambia covers base metals, uranium, limestone and gem stones. The mines are often run by families, rural communities and often by women.
- Very basic technologies are used due to lack of funds and knowledge. Small scale miners are also facing problems with power shortage, rainfalls and poor infrastructure.
- Partnerships with bigger adjacent mines and processing plants are common, which also create boundary issues and schisms (see further on slide 30)
- Knowledge of both mining methods, metallurgy and geology as well as business and financing is poor
- The Federation of Small Scale Mining Association is promoting better knowledge in the sector and is open towards educational partnerships

Capacity building is needed for the small scale mining sector to develop and contribute to the economy

Source: Ms. Rosemary N. Mundia de Boer, Mr. Ulf Pettersson, Dr. Osbert N. Sikazwe

KEY MINING ORGANIZATIONS IN ZAMBIA

- Relations with government and independent associations are key for success



Source: STC Research

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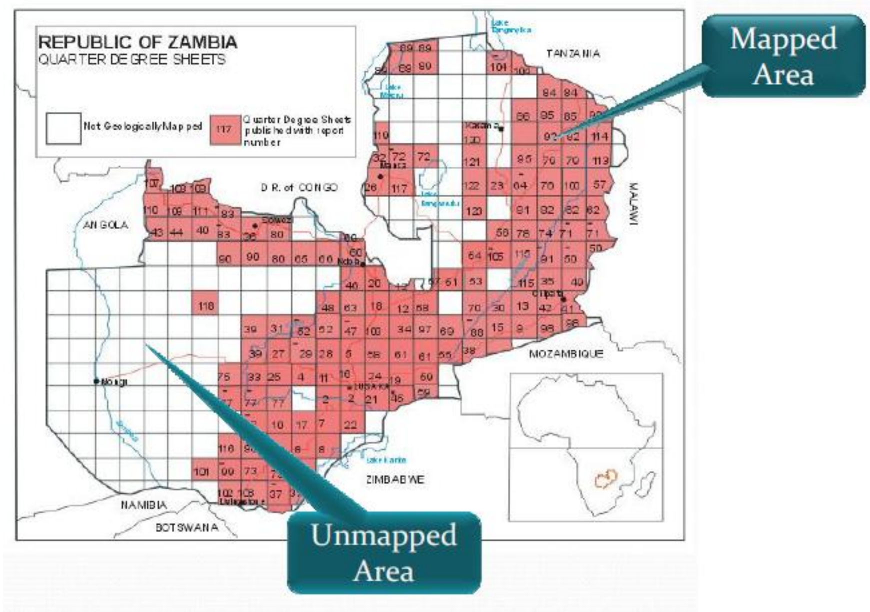
THE GEOLOGICAL MAPPING OF ZAMBIA IS NOT COMPLETE

- Unmapped areas experience conflicts of interest

Most mapping dates back to the 70s and 80s

- Approximately 60 % of Zambia´s area has been mapped by the Dept. of Geological Survey (DGS), to a great extent with funds from development aid in the 70s
- The DGS is understaffed and the government does not plan for additional funds for mapping. Hence they rely on data provided by license holders in the unmapped areas, or by future external funding.
- The lack of geological information implies uncontrolled license-handout to foreign interests, boosts corruption and hamper development

Geologically mapped areas in Zambia (in red)



"Carrying out air magnetic geological survey would benefit the mining sector and the society as a whole tremendously"

- **Ms. Rosemary N. Mundia de Boer,**
  Federation of Small Scale Mining Association of Zambia

Geological mapping is crucial to control wild license-grabbing by foreign interests and to address local interests

Source: Mr. Noah Ndumingu, Ms. Rosemary N. Mundia de Boer, Mr. Mooya Lumamba, Mr. Trevor Robson

THE ENERGY SECTOR RELIES ON TRADITIONAL FUELS

- Only 11 % of the energy used comes from electricity

- The major source of energy is still traditional use of biomass, e.g. by burning firewood or solid waste. Electrification rate is at 19 % (49 % in urban areas but merely 3 % in rural areas).
- Petroleum production is only at 160 barrels per day (bpd), but consumption is at 16,000 bpd. The only refinery, Indeni Petroleum Refinery, owned by the state and Total, is prone to break-downs and is in need of US$65m recapitalization.
- The government is addressing the access to energy and development of the energy supply as a key for development of the country

Energy Source	Share of total energy supply	Consumed by
Biomass (e.g. cow dung, wood, waste)	79 %	Chiefly households
Electricity, hydro-generated	11 %	Mines, industry and commerce
Petroleum	9 %	Transport, mining, agriculture
Coal	1 %	

"I see people burning solid waste in their backyards every day. To convert this waste into electricity would be a good opportunity and an additional 100-200 MW"

- Mr. Trevor Robson, Consultant

A shift from traditional to electrical energy generation is needed to boost development in Zambia

Source: eStandardForum, Ministry of Energy and Water Development

SHORTAGE OF ELECTRICITY IS A THREAT TO THE MINING SECTOR AND THE SOCIETY AS A WHOLE

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Electricity in Zambia

- State owned Zambian Electric Supply Company (ZESCO) stands for the majority of the electricity generated (almost exclusively hydro power). 60 % of the electricity is used by the copper mines.
- Domestic electricity generation is at 1,500 MW and electricity is imported from South Africa and Mozambique during peak load periods. The lack of energy put limits on the mines, the refining sector and the society as a whole since several sectors are competing for the scarce electricity.
- In recent years, the Energy Regulation Board has performed a number of significant increases in tariffs to cut losses and help pay for expansion projects

Example of ongoing projects

- Two hydro plants, worth US$650m were contracted to the consortium Lunzua Power Authority in August 2011. The project involves two plants (151 MW and 93 MW) and a transmission line and is set to be completed by 2016.
- The US$1.5bn Kafue Gorge Lower 750 MW hydro-power project is developed by a Chinese company and is planned to be in operation by 2017
- Small-scale pilot projects within waste-to-energy have been carried out, but no full-scale operation is in place

With large assets of hydro reserves, the energy sector may face positive development in coming years

Source: eStandardForum, Ministry of Energy and Water Development, World Bank, Mr. Trevor Robson, Zambia Weekly, Issue 34/2011

DOMESTIC INFRASTRUCTURE IS UNDERDEVELOPED

- Huge variation in development between different provinces

- There are 91,440 km (56,784 miles) of roadway of which 22 % is paved. The roads are state-controlled and generally in a bad condition, especially during the rainy season when bridges and roads are damaged by floods.
- There are 101 airports of which only 9 are paved

"The Zambian railways would probably need $10-15bn of rehabilitation to reach a decent standard"

- Mr. Trevor Robson, Consultant

- The railway system consist of 2,157 km of railway. Zambia Railway Ltd. (privatized in 2003) and consortium TAZARA are the two operators, where TAZARA operates the rail service between Zambia and the port of Dar a Salaam in Tanzania
- The railway system is considered to be in very poor condition with weak management and inadequate investment and maintenance
- As the government struggles to provide sufficient funds for both maintenance and expansion of domestic infrastructure private funding have been invested to mining companies to expand needed logistic network

Logistics slows down the expansion but potentially opens up for infrastructure & logistics providers in the future

Source: eStandardsForum, Mr. Ulf Pettersson, Mr. Noah Ndumingu, Mr. Trevor Robson

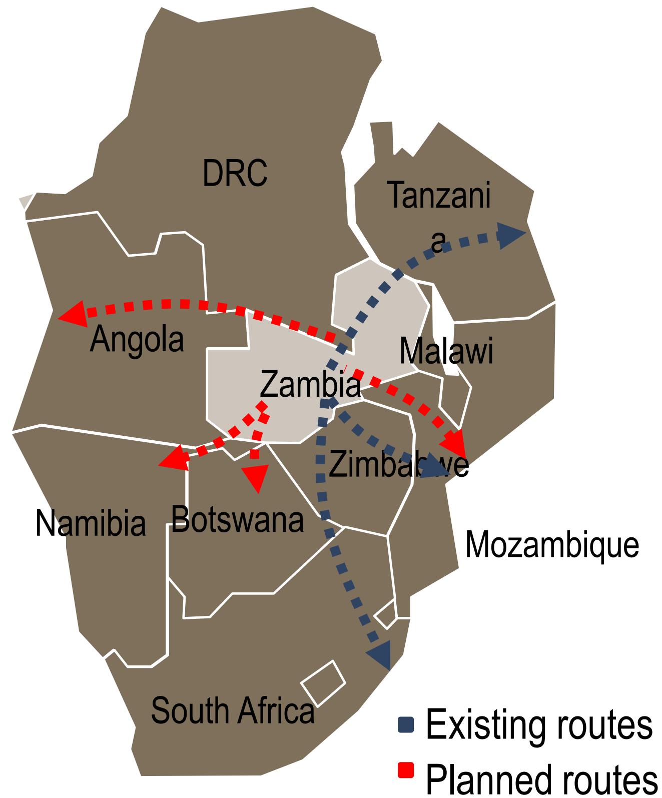
MAJOR ROUTES GO THROUGH TANZANIA AND ZIMBABWE

- Efforts are being made to readily reach harbours in the region

Regional infrastructure to ports

- Major export routes are:
  - By rail or road to the port of Dar Es Salaam, Tanzania
  - By rail or road to Durban, South Africa through Zimbabwe
  - By road to Beira, Mozambique, also through Zimbabwe
- Increased copper production and diversification of the economy will require expansion of the regional infrastructure. Planned infrastructure projects are:
  - Building of the Kuzungula bridge to reach South Africa via Botswana, whose road network is more developed than Zimbabwe's
  - Connecting the Copperbelt onto the road network of Namibia and ultimately the port of Walvis Bay
  - Connecting to the Benguela Railway (going through DRC and Angola) which is being refurbished by a Chinese company
  - Improving road network to Mozambique, to more readily access the expanded Beira port

Major trade routes from Zambia



Source: Mr. Noah Ndumingu, eStandardForum, BBC 4

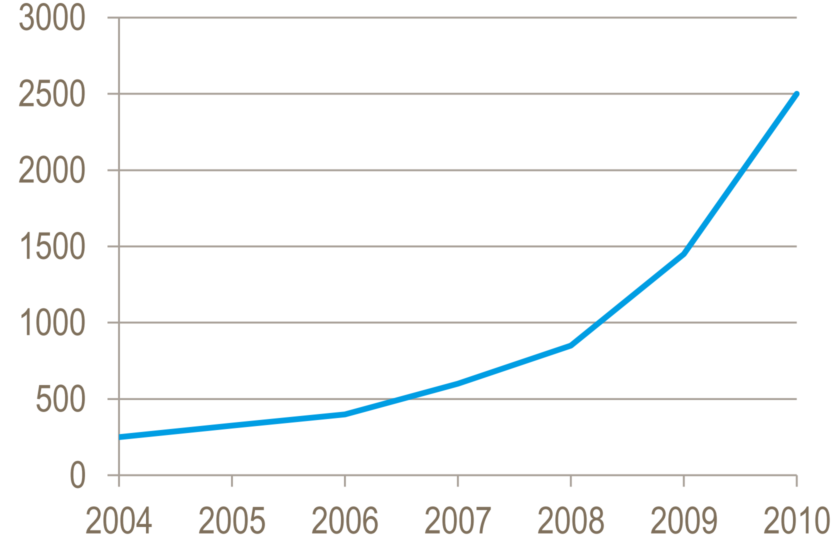
THE CHINESE PRESENCE IN ZAMBIA IS MASSIVE

- The driving factor for Chinese trade and investments is the copper deposits

An important player in Zambia's development

- Zambia and China has established a Special Economic Zone, with tax and duty concessions for Chinese firms. The Chinese engagements are often undertaken in the form of concessional loans.
- China is planning investments equalling US$3bn in Zambia between 2011-2014, for instance in:
  - Mines and processing plants
  - Power generation and distribution
  - Industrial equipment and infrastructure
  - Civil society, e.g. official buildings, hospitals, stadiums
- The Chinese impact in Zambia is huge and far from always popular. Several interviewed persons have expressed doubt or criticism over Chinese operations in Zambia.

China's total trade with Zambia 2004-2010 (US$mn)



"He is in a meeting with the Chinese…"

Common answer when trying to get hold of key officials in Zambia

Chinese presence is very strong in Zambia and Chinese companies are strong competitors in all sectors

Source: The Beijing Axle, interviews

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SOCIAL PROBLEMS SURROUND THE MINING SECTOR

- Lack of CSR awareness is a major issue

- Zambia has succeeded in attracting new mining companies and the sector is growing
- However, the state has been unable to collect a reasonable share of revenue
- Neither has it been successful in performing its role as a regulator and protector of the rights of workers and local communities and act as provider of social services

Areas of CSR to be considered

Social problems and a general lack of CSR awareness is negatively affecting the mining sector

Source: SADC Research Report, Corporate Social Responsibility in the Zambian Mining Industry, STC databases

CORRUPTION IS WIDESPREAD AND COMPLICATES GROWTH

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- There is large amount of power in the hands of low paid government officials who are responsible for reviewing mining contracts and licenses
- Most of the labour employed in mining operations are undertrained and not aware of existing anti-corruption laws. In some cases even senior management know little of anti corruption laws.
- Corruption has also increased by the use of “contractors”, people charging mine workers to get them a job in a mine
- Avoiding corruption often leads to slower service and long bureaucratic processes
- There also exist suspicion that companies are offering bribes to have government protect them

Combination of bureacracy and low paid officials tends to boost corruption

Source: SADC Research Report, Corporate Social Responsibility in the Zambian Mining Industry, Mr. Kabelo Thlapi

MINING OFTEN HAVE HISTORICALLY HAD A NEGATIVE IMPACT ON LOCAL COMMUNITIES

- Large scale mining has a huge impact of local communities in many aspects; some of them positive but also negative ones
- Effects have been dislocations, displacements of local communities health and safety, a reduction in CSR measures and involvement and an increase in environmental degradation
- Land occupied by new mines can also affect local people's access to water, firewood, agricultural land for crops, livestock and other necessities
- Some companies are often excused from maintaining social infrastructure such as roads, water and electricity surrounding the mines

"The state-run mines in the 90s ran high-end hospitals for the management and low-end hospitals for mine workers. Upon privatization, the companies shut down the high-end hospitals. The low-end hospitals are not considered at core part of the companies' operations."

- **Mr. Mooya Lumumba, Director of Mines Safety**

Disputes between establishing investors and local communities prove that CSR is not always embraced but miners

Source: SADC Research Report, Corporate Social Responsibility in the Zambian Mining Industry, Mr. Mooya Lumumba

EDUCATION, SKILLS AND DEVELOPMENT ARE HOT ISSUES

- There is a significant gap between secondary and academic education and very few other options for education exist
- The only major education in geology and mining engineering is provided by School of Mines at the University of Zambia
- Following privatization, several agreements exempted mining companies from providing education and skills development to their employees and community
- Increase in employment of casual labour since privatization has lead to a fall in skills and quality. Hence, companies do not educate their employees due to the risk of losing them.

“Skilled certified technicians with hands-on education are needed. More technicians need to reach a diploma level.”

- Dr. Osbert N. Sikazwe, Dean, School of Mines, University of Zambia

Lack in education hampers development in the mining sector

Source: SADC Research Report, Corporate Social Responsibility in the Zambian Mining Industry, Ms. Rosemary N. Mundia de Boer, Dr. Osbert N. Sikazwe, Ms Lomthandazo Mavimbela

LACK OF GUIDELINES FOR EMPLOYMENT AND LABOUR

- No guidelines regarding hiring policy means that companies have no obligation to increase the number of permanent employees
- Monitoring and auditing of companies' employment practices by the authorities are not performed correctly
- The informal economy is said to represent up to 88% of Zambia's workforce
- Although there are shortcomings in the legal protection of organized labour, the situation of the vast majority who work in the informal sector is even worse since they work without any legal protection

"Some companies are outsourcing labour in order to escape CSR responsibilities"

- **Representative, Ministry of Mines and Mineral Development**

"Workers do not see the benefits they get from us, but rather think of short term offers without considering what happens in case of illness"

- **Mr. John Oberg, Managing Director, Sandvik Zambia**

Vast majority working informally does not help labour rights situation

Source: SADC Research Report, Corporate Social Responsibility in the Zambian Mining Industry, Mr. John Oberg, Legal empowerment of the poor – Labour Rights in Zambia

HEALTH AND SAFETY IS UNDERDEVELOPED

- The standards of safety have declined since privatization and contributed to an increase in accidents and fatalities
- The enforcement of health and safety standards has been compromised by the aspiration to promote foreign investment:
  - the government has tended to turn a blind eye to the mines poor observance of safety standards
  - private mines have failed to and been allowed to neglect needs for providing social services while the government has failed to fill in the vacuum
  - many hospitals that were run by the mines before privatization have been abandoned or shut down
- Some mines however do invest in CSR through sponsoring for example the Football Association of Zambia and engaging in HIV/AIDS campaigns but internal CSR measures within the organisations are limited

There is a view that the government is overprotecting mining companies

Source: SADC Research Report, Corporate Social Responsibility in the Zambian Mining Industry, Mr. Mooya Lumamba, Mr. Ulf Pettersson

ENVIRONMENTAL AWARENESS IS STARTING TO INCREASE

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- Environmental issues were not addressed during the time of state-owned mining sector. Most mines thus have an environmental history to deal with, for instance high sulphur dioxide emissions and contaminated rivers and streams.

- Following international recommendations, Zambia recently introduced an Environmental Council, monitoring environmental aspects of mining

- Environmental Impact Assessments (EIA) are carried out by consultant firms, who can only be Zambian registered firms. The knowledge and methods of certain local firms are not up to standards and in the worst cases, the EIA's are put together without a single visit to the mine.

- The Environmental Protection Fund (EPF) was set up to protect the local environment from pollution through mining related activities. Every mine contribute to the fund to address these issues.

"We do not have enough staff to inspect all environmental aspects. We have a need of 32 inspectors but currently there are only 12 inspectors for safety and environmental audits."

- **Mr. Mooya Lumumba, Director of Mines Safety**

Source: SADC Research Report, Corporate Social Responsibility in the Zambian Mining Industry, Mr. Mooya Lumumba, Mr. Ulf Pettersson, Mr. Trevor Robson, steelguru.com

THE ACCESS TO WATER IS A CHALLENGE

- Abundant water resources are not used wisely

Water usage in mining

- Zambia has an abundance of surface water and no part of the country is considered dry
- Copper mining involves pumping water out of mines and into natural waterways, which drains the ground water and decrease the surface water quality
- Example: the Konkola Copper Mine pumps approximately 300,000 m^3 of water per day into the Kafue river
- Water treatment plants exist in conjunction with the mines but water contamination with acidic spills are still common

Regulations and projects

- Zambia has reached far in the regulation process of water, with mechanisms, measures and integrated water resource management plans in place. However, the implementation is behind.
- The Copperbelt Environment Project is addressing the water issues in the Copperbelt region and is seeking funds for investments
- There are also Water Watch Groups and National Water Supply and Sanitation Councils to monitor the water situation

Water management and operation will be crucial both for mining, energy generation and the development of the country

Source: Waterwiki.net, EIB, Mr. Ulf Pettersson, SIWI

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OVERALL, ZAMBIA SCORES WELL IN BUSINESS CLIMATE RANKINGS COMPARED TO ITS NEIGHBOURS

- Zambia ranks 76 of 183 in the World Bank's 2011 ease of doing business survey (climbing from 84 in 2010 and 100 in 2009)
- Zambia scores particularly well in "starting a business", "paying taxes" and "getting credit". It scores poorly in "dealing with construction permits" and "trading across borders".
- A small banking sector exist in the country, but credit is expensive and fees are high
- The currency, kwacha (ZMK) operates under a free floating exchange rate and dropped steeply during the financial downturn in 2008

Key Factor	Cost
Fuel	US$1.80 per litre
Electricity	US$0.08 per kWh
Water	US$0.76 per m^3
Minimum Annual Wage (40h week)	US$1,043 (2008, PPP)
Starting a company	Less than US$25

Source: Ease of Doing Business, Andrew Chipwende

THE MINISTRY OF MINES AND MINERAL DEVELOPMENT IS RESPONSIBLE FOR ZAMBIA'S MINING POLICY

- The Ministry of Mines and Mineral Development (MMMD) is responsible for Zambia's mining policy
- The mining industry was privatized in the 90s following collapse of the Zambian economy. The government still holds stakes in mining operations through the holding company Zambia Consolidated Copper Mines Investment Holding (ZCCM-IH), owned by the government (87.6 %) and private equity holders (12.4 %).

Ministry of Mines and Mineral Development (MMMD)

Department of Geological Survey (DGS)

- Provides geological data
- Prospecting on behalf of the government
- Acting as a national depository of geological information and providing support and advisory services

Department of Mines Develop-ment (DMD)

- Issuing prospecting, retention and mining licences
- Monitoring of mining operations to ensure that development is in line with the Mines and Minerals Act

Department of Mines Safety (DMS)

- Evaluating all aspects of safety in mining operations
- Divided into four technical sections: Mining, Explosives, Machinery and Environment

Source: Ministry of Mines and Mineral Development, ZCCM-IH

THE REGULATORY FRAMEWORK IS WELL DEVELOPED

- However, the government struggles to execute the legislation

- Main regulatory framework encountered when venturing into the Zambian mining industry is listed hereby
- Although being well developed, the legislation is not always realized due to lack of educated staff and funding

"The departments under the Ministry of Mines and Mineral Development are heavily understaffed, resulting in failure to comply with licenses and lost royalties and tax incomes"

- **Ms. Rosemary N. Mundia de Boer, Federation of Small Scale Mining Association of Zambia**

Mining Related Legislation	Taxation Related Legislation	Business Related Legislation
Mines and Minerals Act	Control of Goods Act	Companies Act
Mineral Royalty Tax (Repeal) Act	Customs and Excise Act	Investment Act
Petroleum (Exploration and Production) Act	Value Added Tax Act	Industrial and Labour Relations Act
Explosives Act	Income Tax Act	Employment Act
Environmental Protection and Pollution Control Act	Taxation (Provisional Charging) Act	Minimum Wages and Conditions of Employment Act

The government's role in the mining sector is clearly defined, but not always realized efficiently

Source: Southern African Legal Information Institute, Ms. Rosemary N. Mundia de Boer

TAXES AND CUSTOMS ARE KEPT LOW BY THE GOVERNMENT

- Incumbent investment-friendly government likely to survive the 2011 election

- Since privatization of the mines in the 90s, Zambia has been known to have low taxes for mining companies
- Ruling MMD party recently ruled out the reintroduction of a windfall tax on mining companies' profits, giving Zambia an advantage over other copper producing countries, e.g. Australia, Chile and Peru
- MMD is likely to win the 2011 election, scheduled September 20th, to continue its investment-friendly policy
- The opposition has promised to raise taxes if they win the election, but they remain split and polls are showing a weak support

Zambia has and will likely remain to have advantageous taxation over other copper producing countries

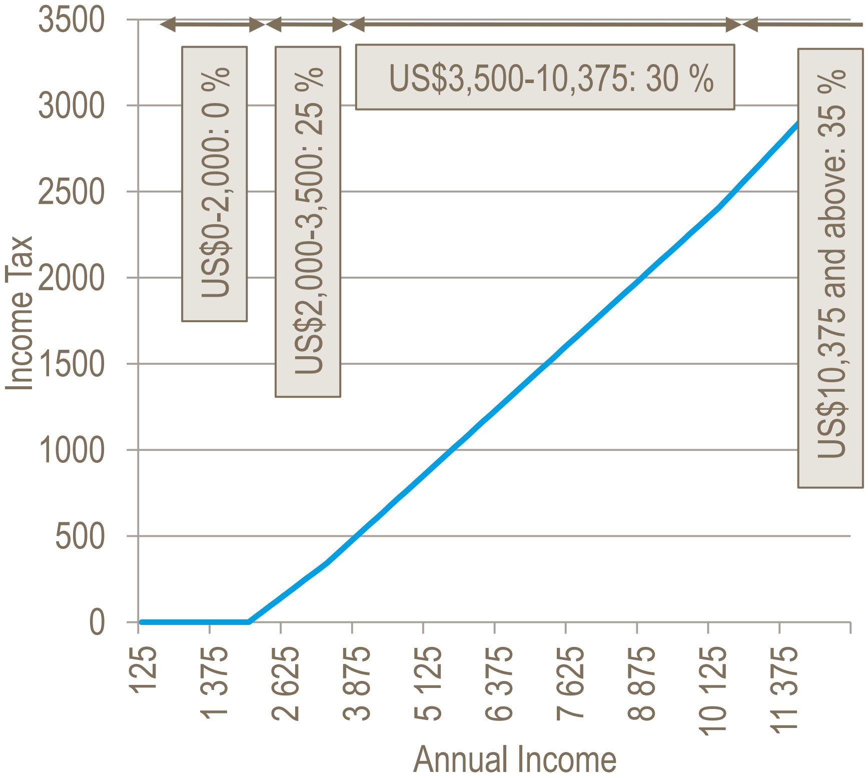
Source: BMI Zambia Mining, Q2 2011, Zambia Weekly , Issue 12, 2011

PERSONAL INCOME TAX

General Information on Income Tax

- Personal income tax is progressive up to 35 % (see figure). Spouses are taxed separately.
- Residents are taxed on any income received, including foreign-source dividends and interests
- Dividends from companies listed on the Zambian stock exchange are exempt from tax
- There is no tax on capital gains but a withholding tax of 15 % apply for interests on bank savings
- Pension contributions are deductable up to 15 %
- Real estate property is levied with 3 % of the market value

Progressive Income Tax (US$, US$1 = ZMK4,800)



Source: Taxrates.cc

CORPORATE TAX RATES ARE ATTRACTIVE

General Information on Corporate Tax

- Custom duties vary for different type of equipment. The customs division at Zambian Revenue Authority (ZRA) specifies the rates.
- Zambian Development Agency (ZDA) provides tax and custom incentives for foreign investors, but also help with e.g. licenses and work permits
- Incentive for mining companies: 100% deduction of pre-production expenses and other capital expenditures
- Foreign investors are required to form a local firm or go through a joint venture with a local company

Corporate Tax – Brief Summary

Tax	Rate	Applies to
Import duties	varies	ZDA incentives yield 0 % on machinery / equipment for 5 years
VAT	16 %	
Mineral royalty	3 %	
Corporate tax	35 %	General rate
	30 %	Rate for mining companies and companies listed on the Lusaka Stock Exchange
	15 %	Rate for the agro-business and exporters of non-traditional products
Tax rebates	varies	ZDA provides a beneficial rebate scheme; locally listed companies with 33 % of the share owned by Zambians
Withholding tax	15 %	For mining companies: 0 %

Source: Taxrates.cc, Mr. Andrew Chipwende

ALL COMPANIES MUST GO THROUGH INCORPORATION PROCESS

- Establishing a business in Zambia in any sector starts with an incorporation of a company in Zambia under the Zambian Laws
- Mining exploration would require the company to have prospecting licence which can be obtained directly from the Ministry of Mines and Mineral Development or through a JV with an existing company holding such a licence
- It is easier through a JV as opposed to directly through the Ministry because most areas are already under licence
- Supplies to the mines would be through any business links that the company can develop with the mining companies

Swedish companies would find it easier to go through a JV or engage in direct sales

Source: Mr. Noah Ndumingu, Taxrates.cc

MINING LICENSES DIFFER DEPENDING ON SCOPE

Licenses relevant for large-scale mining

- Prospecting license
  - Exclusive rights to prospect for any mineral (may be several) over an area limited to 1,000 km^2
  - renewable every two years, maximum duration of seven years
  - An individual or company is allowed to a hold a maximum of 5 licenses
- Mining license
  - Exclusive rights to carry out mining operations over an area limited to 250 km^2
  - maximum duration of 25 years
  - Applications need to be accompanied by environmental protection plans and by proposals for the employment and training of citizens of Zambia
  - No limit to the number of mining licenses

Licenses relevant for small-scale mining

- Prospecting permits
  - Relate to areas of 10km^2 and have a duration of two years (non-renewable)
  - Restricted to citizen controlled companies
- Mining license
  - Relate to areas of 400 hectares and have a duration of ten years (renewable)
  - Restricted to citizen controlled companies
- Artisans' mining rights
  - Gives the right to local people to mine on an artisanal basis in an area of five hectares, for a period of two years (renewable)
- Gemstone License
  - Relate to areas of 1,000 hectares for mining of gemstones, for a period of ten years (renewable)

Source: Dr. Goodwin Beene, Ministry of Mines and Minerals Development

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OPPORTUNITIES FOR SWEDISH COMPANIES EXIST WITHIN FOUR AREAS

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Exploration

- Exploration of new sites
- Geological mapping tools
- New mining operation investments
- Support small scale mining

Mining Equipment

- Drilling and blasting
- Cleantech in processing plants
- Safety equipment

Education and Skills

- Consulting within mining
- Education of small-scale miners
- Education of technicians
  - Knowledge transfer and specific training courses
  - Safety education
- CSR and labour rights

Supporting infrastructure

- Energy & telecom
  - Energy distribution and remote-area electrification
  - Telecommunications
- Water and sanitation
  - Water related equipment
  - Water management
- Transport infrastructure in and between mines

OUTLOOK FOR EXPLORATION IS PARTICULARLY GOOD FOR COPPER, COBALT AND MANGANESE

Natural Resource	Outlooks	Comments
Copper and cobalt	●	• Will continue to be the backbone of Zambian mining
Manganese	◕	• Upcoming with increasing exploration & investments
Uranium	◑	• Good outlooks but uranium market is volatile
Coal	◔	• Negative, due to shallow veins & poor infrastructure
Gas and petroleum	◔	• Neutral, but possible development is far in the future
Precious and semi-precious stones	◑	• Neutral, but not viable for large-scale mining
Water	◕	• Water will be a key natural resource both for mining, energy and development

Zambia holds very good potentials for non-ferrous metals; less attractive for energy minerals

LARGE SWEDISH EQUIPMENT SUPPLIERS ARE ALREADY PRESENT AND REGARD ZAMBIA AS VERY ATTRACTIVE

EXPORT RÅDET SWEDISH TRADE COUNCIL

Mines in Zambia are large buyers of equipment

- Several Swedish and international equipment suppliers regard Zambia as the most attractive market in southern Africa after South Africa
- Since privatisation in the 90s, a lot of equipment has been upgraded. Still, a lot of obsolete equipment is still in use and would need replacement.
- To find and facilitate logistics is a challenge. Focus on finding a good solution for the aftermarket.
- As a result of regulations and increased safety control by the Dept. Of Mines Safety, safety equipment such as fire protection and personal safety are included in purchases and procurements

Present equipment suppliers are potential partners

Atlas Copco

Barloworld

Bell Equipment

Boart Longyear

Sandvik

"Ten per cent of the effort in supplying a machine was in selling it in the first place, but 90 per cent is what happened afterwards."

- **Mr. John Oberg, Managing Director, Sandvik Zambia**

Medium size companies could very well follow the big equipment suppliers into Zambia

Source: Patrick Akayombokwa, Mopani Copper Mines, John Oberg, Sandvik Zambia

GEOLOGICAL MAPPING TO GENERATE NEW EXPLORATION

- Both the government and the private sector see an interest

Still far from a complete mapping

- Only 60 % of Zambia is geologically mapped, the majority carried out with simple methods in the 70s and 80s
- Lack of reliable geological data contribute to schisms over land and unlicensed mining. It also hampers exploration activities considerably.
- The cadastre system of the Geological Survey has been upgraded, but there is a view that better management and accessibility of the data is largely needed

There have been efforts but more is needed

- Better mapping would boost exploration activities and in the long run, boost investments
- JICA (the Japanese development agency) ended a mapping project in 2010. Several persons in the government and the private mining sector have declared further foreign mapping assistance as key.
- Tranter Resources Zambia is carrying out the first airborne mapping by a local private company. The US$1m airborne mapping in the Luapula province, known for its manganese potentials, started in August 2011.

Mapping and exploration holds business potential, with both government and private sector having a strong interest

THERE IS A STRONG DEMAND FOR LOCALLY BASED CONSULTANTS

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A prime opportunity for Swedish companies with their strong knowledge base

Need of knowledge

- The lack of qualified consultants have started to attract international consultants to Zambia, but the demand is still huge. There is a clear need for expertise within:
  - Geology, surveying and exploration services
  - Environmental assessment, e.g. in the sectors of hydrogeology, emissions, mine waste & chemistry
  - Mining safety

Legal requirement for local presence

- All mines are required to carry out an EIA (Environmental Impact Assessment)
- Recently, a law was passed that enforces only Zambian based consultancies (through registration/joint venture) to be accredited for EIA

Still room for for more players

- The high demand of consultant has lead to local consultancies carrying out EIAs hasty and inadequately, sometimes without a single visit to the mine in question
- There are however competent companies established with a broad service portfolio. One example is GeoQuest, a locally established company with foreign consultants, providing both exploration contracting and EIA.

EDUCATION INITIATIVES IS HIGHLY DEMANDED

- Finding the financing might be challenging

Education of technicians is a great need

- Increasingly advanced equipment requires education of technicians. High employee turnover makes the need even bigger.
- An intermediate level is lacking in the system – e.g. a certified operator diploma – since there is a gap between the compulsory education and the university
- Within a development perspective, education of small-scale actors is also relevant. Often families and women without formal education.
- The Federation of Small Scale Mining Association seeks partnership for training and knowledge transfer within the small-scale field

Potential focus for Swedish suppliers

- Safety is a central area within mining and Sweden is a leading player in the field
- The Southern African Development Community (SADC) are looking into establishing "Schools of Excellence" in a chosen member countries with CSR being one of the focus areas
- The School of Mines at the University of Zambia has particularly asked for Swedish support

"We would be interested in any activities that uplift the training we offer"

- **Dr. Osbert N. Sikazwe, Dean of School of Mines, University of Zambia**

NEW OR EXPANDED MINES CREATE ENERGY & ICT NEEDS

- Several multimillion dollar projects are on the table

Both larger and smaller energy solution projects

- The US$650m agreement between Zambia's Lunzua Power Authority and the Ministry of Energy and Water Development will result in the 247 MW Kalungwishi plant in the Northern Province
- Following the hydro-power project, extensions of the national power grid are expected
- A planned issuance of a US$500m eurobond later in 2011 will help upgrade both energy and transport infrastructure
- Due to unreliable power supply, use of diesel generators is common. Certain mines also develop own energy distribution and transformers.

Mining drives expanded need of telecom & internet

- Infrastructure for communication will be increasingly important in the Copperbelt where demands on connectivity increases with advanced equipment
- Mobile network is generally underdeveloped and internet connection is still expensive. However, from 2011 Zambia receives 3G services from the submarine cable going through Namibia.

Energy & ICT investment is a general public need, but only the mining sector has capital to realize a lot oft the them

Source: BMI, Zambia Mining, Q2, 2011, Breakbulk

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