2006 market Study on the South and Southern African Zinc Market

International Zinc Association Southern Africa
(Rob White June 2007)
EXECUTIVE SUMMARY.

The (apparent) local zinc demand for 2006 is estimated as 109 000 tonnes, as zinc tonnes. Current per capita zinc consumption has risen to 2.0 kg/person. In contrast, southern Africa’s per capita consumption remains low at under 0.5kg for the SADC region and even lower for the rest of sub-Saharan Africa.

Growth rates in South Africa are now exceeding GDP growth. This is despite a continued degree of Rand volatility and a significant zinc price rise. It is suggested that the zinc price will stabilise at a lower value as global production and demand comes back into balance. However, the timing of this is difficult to predict accurately.

The market demand for galvanizing remains in excess of 2/3 of local demand. This is set to continue as extra continuous galvanizing capacity comes on stream. However, proposed government expenditure on infrastructure and revived mining investment will result in new galvanizing opportunities that current capacity will be stretched to meet. Wire and tube continued to be plagued by the high local steel price and exports were lower than anticipated. Whether increased infrastructure and industrial investment will provide room for GDP+ growth in these industries remains to be seen.

The zinc alloys business remains in decline. In contrast, the brass industry has shown excellent growth as local demand has grown with the construction boom and due to the size of this industry, as part of the copper industry, it has managed to secure local secondary arisings.

The chemicals industry has grown substantially and, although seasonal use in fertilizer additions is rainfall dependant, the industry should continue with its growth trend.

Real GDP growth appears to have shelled up to in excess of 5% as a new yearly base. Government expenditure and mining investment indicates that the percentage of GDFI will grow to around 25% of GDP in the short term. This should allow for double GDP figure growth in the galvanizing industry in particular. Whilst GDP+ growth in other zinc value adding industries will continue, local opportunities may be limited due to lack of capacity. Thus, imports of finished products will provide the bulk of local supply. Estimates indicate that local demand will rise to 150 000 tonnes by 2010. This represents a growth rate 9% per year.

Opportunities exist for the galvanizing industry in the SADC region and beyond into sub-Saharan Africa. Growth rates are not uniform but Botswana, Namibia, Swaziland, Mauritius, the DRC, Zambia and Angola are worthy of future interest. The challenges in addressing the poverty issues in the region indicate that zinc can play a role in community upliftment. However, whether a real market of 2kg per head consumption (representing 350 000 tpy for the region) can be achieved remains a challenge.
FIGURES AT A GLANCE.

ZINC FLOWS IN THE SOUTH AFRICAN MARKET FOR 2004 - zinc tonnes equivalent

The global demand for zinc in 2006 was of the order of 11.06m tonnes. This can be further analysed by the various First User market categories and is shown in Figure 1. Whilst the percentage contribution has remained largely constant over the past decade or so, it is worth noting that around 50% of the zinc market is used for the protection of steel against corrosion, i.e. galvanizing. The remaining market segments are similar in size and represent the value adding industries typical of developed countries. It can be seen that, in South Africa galvanizing represents 68% of the First User apparent consumption figure. However, this has dropped from the figure of over 70% measured in 2004.
Figure 1. First User market demand for zinc (Global 2004, South Africa 2006)

Per capita consumption is used to indicate remaining market potential (Figure 2). South Africa whilst still showing significant growth opportunities has succeeded in raising its per capita consumption of zinc from 1.6 to 2. In comparison for the SADC region it is less than 0.5kg and even lower for the rest of Africa as a whole.

Figure 2. Zinc consumption per capita for selected countries.

The change in First User sector breakdown over a 10+ year period are shown overall and per use sector in Figures 3 & 4.
Figure 3. First User (apparent consumption) percentage changes since 1995.

Figure 4. Estimated Final market Demand percentages

It has been shown that the local zinc consumption has been tied to local production sales for some time. Reference to Figure 5 indicates that this is still the case but, as local production fails to meet local demand and the economy continues to grow at over 5% per
annum, the disjoint between GDP growth and local apparent consumption becomes noticeable. More rapid infrastructure spend as reflected in Gross Domestic Fixed Investment will, if fully realised, place a considerable burden upon the local zinc value adding industry.

**Figure 5. Figure Zinc Consumption and Economic Growth in South Africa**

**SUPPLY, DEMAND AND PRICING**

Southern Africa has two of the four zinc smelters in Africa, viz. Zincor in South Africa and Skorpion Zinc in Namibia. The other smelters are Algeria’s Ghazaouet smelter and the Kolwezi smelter, in the Democratic Republic of Congo (DRC).

Skorpion is a single site mine and refinery. Other local concentrate supply is from Rosh Pinah (owned by Exxaro) in Namibia and Black Mountain (owned jointly by Anglo American Base Metals and Exxaro). Other sources are currently limited to some supply from the DRC (Kipushi) and Zambia. In the rest of Africa activity is centered on the Tala Hamza deposit in Algeria and the new developments in Burkina Faso (the Perkoa Project) and possibly Botswana (the Kihabe Project). Africa could well become a major zinc producer over the medium term.

The zinc price has risen significantly over the past few years. **Figure 6** shows the Rand Dollar exchange rate and the local (base) zinc price from January 2003 until April 2007.
**Figure 6.** Rand exchange rate and local zinc price since 2003.

It is extremely difficult to predict where the price of zinc is headed. As with all commodities, demand is strong but this has had the effect of providing the necessary stimulus for mine development. Exploration budgets have increased by more than double over the past two years. South American capacity will increase by 300 000 tonnes per year this year alone, in Canada capacity will increase by 120 000 tonnes per year (and another 120 000 tonnes per year in 2009), in Australia mine production is estimated to grow by 800 000 tonnes per year by 2011 and it is expected that by 2012 global production of zinc metal will reach 14m tonnes.

In terms of the global demand side of pricing, China and India will drive demand. Chinese growth will focus on construction and manufacturing. The construction boom which has largely focused upon infrastructure over the past 10 years will become more focused on urban development due to population migration. In India, consumption will largely focus on infrastructure development – road, rail, electricity transmission, utility poles, ports and refineries. Direct zinc demand (non-imported product) in the US and Europe is expected to at best remain constant but, more likely, show a modest decline in coming years.

In terms of pricing, the all time high of November 2006 is unlikely to be repeated, although stock draw-down in 2007 will continue. As new production comes on stream a pragmatic view on prices is $1500 to $2500 per tonne by the end of 2008. Upside price pressure will depend upon Chinese and Indian demand.
MARKET OBSERVATIONS

General

Overall, the South African zinc industry continues to be driven by:

- Business Cycle
- Exchange rate affecting capital projects relating to mining
- Exchange rate affecting export competitiveness
- Interest rates
- Scrap exports
- Government GDFI (transport and construction)
- Building and Construction activity
- Agricultural commodity cycles

The galvanizing market continues to represent well over 50% of the local zinc demand. This is likely to continue as other value adding uses are developing off a low base. Supply of zinc has been maintained through imports for the past couple of years and this looks likely to continue due to zinc plant upgrades and increasing local demand. Local value adding continues to be of concern as imports of finished goods continue to enter the market displacing existing value added products and introducing new products. Despite government protestations, and not affected as badly as other industries, loose scrap controls continue to affect the alloys and brass industry with the removal, from the local market, of potential input cost reducing secondary arisings. New technologies such as thin wall die-casting will not be adopted locally until these matters are addressed allowing basic investment in new facilities. Specifically, the auto industry could benefit from local providers if the situation was addressed.

The current economic boom in the country is driving growing demand in the construction and mining sectors particularly. Investment in construction grew by 13.3% over 2005. Similarly, mining investment grew by 7.1% in 2006 compared to a decline of 13.1% in 2005 and 20% in 2004. This growth was despite ongoing concern over potential regulatory constraints. However, mining investment growth has not matched that of countries such as Australia for example where it grew by 38% during 2005-6!

Continuous galvanizing.

Over the past few years extra capacity has been brought on line and old lines taken out of service. Mittal Steel commissioned their new Galv Line 5 (capacity 100 000 tpy) during 2006. Consideration is being given to the development of an auto galv line to meet the expanding needs of the auto industry. Mittal currently holds 50% of this market as electro-galv is their only output. If a 200 000 tpy plant was installed then 10 000 tpy of zinc would be required. Current estimates are that an installed capacity of 500 000+ of product would be likely by 2010. This represents around 35 000 tonnes of zinc used
A small congalv plant is being commissioned in Cato Ridge. It is anticipated that its main focus will be Al55%/Zn alloy and production figures range between 100 000 and 150 000 tonnes of coated sheet which would represent a zinc consumption of 5 000 to 8 000 tpy. No current expansions are envisaged at Defurco Steel Processing (DSP).

**General galvanizing**

The general galvanizing industry has shown good growth over the past few years as shown in Figure 7. There appears to be an observation that the general galvanizing tonnes fell between the high of 2002 and 2004. It is often recognised that at the capacity peak customers look for alternative corrosion protection solutions if access to galvanizing is denied (either through capacity or long lead times). In addition, although recent growth is significant, it appears as if it does lag behind the sales of steel. This would indicate that either greater demand could be met if capacity was available or that the recent high zinc price is impacting upon the industry. In addition, regional differences do occur in demand as would be expected but the overall sector demand is shown in Figure 8. Mining industry consumption is included in the construction sector for reporting purposes but can be said to represent around 30% of this demand.

![Figure 7. Growth in general hot dip galvanizing (excl wire) in comparison to steel sales growth.](image)

Figure 8. Market sector demand for the General Hot Dip galvanizing industry (excl wire)

The general galvanizing industry has increased capacity with new plants distributed throughout the country.

**Wire galvanizing**

The galvanized wire industry continues to be dominated by three major players: Consolidated Wire Industries (CWI) which is publicly owned, Cape Gate (Sharon Wire works) and Allensmescho (both privately owned). In 2006, some tonnes 88 000 of zinc coated wire was exported, some 20 000 tonnes imported and local production reached 180 000 tonnes. This represents an apparent local consumption figure of 112 000 tonnes (or 5 500 tonnes zinc). It is difficult to estimate the breakdown of the wire sales into light and heavy in terms of zinc coating. Discussions with the industry indicates that pick-up is of the order of 2% for light and 8% for heavy coatings (including a 20% allowance for scrap, and zinc waste – ahm and spelter). The current plethora of wire specifications has led to an initiative to rationalise specifications in-line with international standards where appropriate. A local standard for Galfan (95%Zn/Al coated wire) exists and there is already some local demand with activity to develop the market further.

**Galvanized Tube**

Pipe production in South Africa is handled by Macsteel Tube (part of the Macsteel group) and Pipe, Robor (now an independent company) and Trident Tube (owned by Trident Steel). Galvanizing facilities are present on-site at Macsteel and Robor. From zinc
supply, the estimated local production of galvanized tube and pipe is of the order of 75,000 tonnes. This would include significant production of irrigation and galvanized mining/industrial pipe. The local market sector remained buoyant although exports opportunities were constrained by the local steel price.

Zinc Alloys

This market continues to decline for a variety of reasons broadly categorised as a lack of investment (by local companies and their potential clients) and the lack of a suitable enabling environment (secondary material regulations and poor industry support). Despite many initiatives, it is difficult to see a development route forward for this industry without structural changes.

Brass Alloys

The brass industry has grown over the past few years despite suffering from the poor enabling environment constraining the zinc alloy business. The industry is of sufficient size and concentration to negotiate with the secondary market and deliver the material inputs required. However, imports of finished goods continue to be an issue.

Battery Industry

This industry is dominated by a single local producer Ever Ready based in Port Elizabeth. The company is now independent of the Gillette Group and has become active in exporting zinc callots (into Africa and the Far East) and is developing new business interests. Market take-off has increased over the past few years and the new company is committed to growth.

Chemicals Industry

Zinc is used in a wide variety of chemical applications ranging from pharmaceutical applications such as ointments and creams, to nutrition supplements, to paint additives to fertilizer products. The latter are generally derived from secondary arisings, namely galvanizing wastes. This market has grown considerably but requires some changes to ensure regulatory alignment. Overall, the chemicals market appears to be growing significantly representing the third most important market sector. Further development and market refinement is likely.

MARKET PROSPECTS

Some 86% of the local zinc market is influenced either directly or indirectly by Gross Domestic Fixed Investment (GDFI). Government wishes to increase this to 25% of GDP from the current 12-14% over the next few years. This will represent a doubling of investment and whilst difficult to determine the impact upon the industry, it is clear that opportunities exist, specifically in the hot dip galvanizing industries to increase output by at best 100% but realistically double GDP growth for the foreseeable future. Similarly,
agricultural and consumer prospects are good and are also likely to at least match GDP growth figures. The volatility in GDP growth appears to have lessened since 2005 (Figure 9) and, although it appears as if investment in mining remains volatile this investment is in new areas where concomitant infrastructure growth will be stimulated. So, whilst growth estimates have been overly optimistic in the past there is little doubt that capacity constraints throughout the value chain will become more pronounced. Apparent consumption will increase and consumer markets will continue to be provided by imports unless local value adding industries can deliver against the constraints discussed. However, galvanizing capacity may compromise the opportunities presented and the protective coatings industry could easily take greater market share as imported products flood into the market. An apparent demand forecast is given in Table 1.

![Graph showing real GDP growth in South Africa](image)

**Figure 9.** Real GDP growth in South Africa

**Table 1.** Apparent demand forecast to 2010 (zinc tonnes).

<table>
<thead>
<tr>
<th></th>
<th>Forecasts (low)</th>
<th>Forecasts (high)</th>
<th>Apparent Local Demand</th>
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<tbody>
<tr>
<td><strong>GDP growth, yoy</strong></td>
<td></td>
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<tr>
<td>Wire 1</td>
<td>5.60%</td>
<td>5.00%</td>
<td>5.00%</td>
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<tr>
<td>Tube &amp; Pipe 2</td>
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<td>4545</td>
<td>4636</td>
</tr>
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<tr>
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<td>14658</td>
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<tr>
<td>Battery 6</td>
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<td>3650</td>
<td>3833</td>
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<tr>
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<td><strong>TOTAL</strong></td>
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<tr>
<td><strong>growth yoy</strong></td>
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<td>1 Wire industry export, exchange rate dependant</td>
<td>Wire to follow GDP</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 T&amp;P exports exchange rate &amp; steel price dep.</td>
<td>T&amp;P to follow GDP</td>
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</tr>
<tr>
<td>3 Expect growth to track at GDP growth</td>
<td>Expect growth to track GDP at 1 x GDP growth</td>
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<tr>
<td>4 Dependant upon auto supply (new line)</td>
<td>Dependant upon auto &amp; GDP growth + new lines</td>
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<tr>
<td>5 and new 55%Al/Zn line to come onstream</td>
<td>Dependant upon auto &amp; GDP growth + new lines</td>
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<td>6 Zn alloys stagnant, brass grows at 50% GDP</td>
<td>Zn alloys stagnant, brass grows at GDP</td>
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<td></td>
</tr>
<tr>
<td>7 Battery growth depends upon GDP</td>
<td>Growth increases</td>
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</table>

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REGIONAL OPPORTUNITIES

It is estimated that Southern African consumption is of the order of 150 000 tonnes. The majority of demand is largely driven by GDP growth and, as with South Africa, GDFI (or Government Capital Formation which is easier to measure in these countries) will largely dictate where opportunities exist. Table 2 provides some economic indicators for the SADCC countries.

Table 2. Some selected economic data on the SADC countries

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<td>5.4</td>
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<td>799,380</td>
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<td>7.7</td>
<td>1 500</td>
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<td>3.6</td>
<td>7 400</td>
<td>70.7</td>
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1. countries with significant industrial base, 2. index dated (1990s).

A recent study has indicated that real metals consumption growth is only achieved once GDP per capita figures of $5000 are exceeded. From Table 2, it is clear that only 5 SADC countries meet this figure. The disproportionate distribution of wealth (as represented by the Gini Index) requires some circumspect interpretation of the real growth opportunities. In addition, GDP growth rates remain disappointing. Angola, the DRC and Zambia offer specific opportunities is terms of infrastructure, mining and, in the case of Angola petrochemicals.

Galvanized products

South Africa, as the most developed country in the region has a distorted zinc market. Around 68% of the market is given over to galvanizing (wire, tube, general and continuous steel sheet). If can be assumed that the region as a whole is likely to show similar behaviour in that the use of galvanizing will dominate the market demand. This is not unexpected as infrastructure roll-out (electricity, telecommunications and construction) are likely to dominate the opportunities available. In terms of electrification, the desire to have a regional power grid provides the sort of opportunity

for galvanized transmission towers seen in South Africa some 30 years ago. Similarly, mobile phone communications are likely to dominate the telephone system as the region undergoes a technology leap, those countries having poor fixed line telephony moving straight towards mobile phone technology. Water is not particularly scarce in the region but its availability is localised. The need for water reticulation systems will be a major focus of government expenditure. Decisions of this nature are strategic and have to be taken on a country basis. The north-south carrier pipeline built in Botswana during the 1990s is a prime example of such a strategy. Whilst much of the pipeline used GRP, many of the iron and steel feeder pipes were protected by galvanizing. Continuing in this vein, to develop communities further, the delivery of water to ensure that local needs are met (both in terms of potable supply and agricultural use) provides for significant opportunities for the galvanizing industry. Similarly, the demand for steel in construction will require galvanizing for corrosion protection.

Therefore, it may safely be assumed that the key tonnage market opportunities for the next 3 to 5 years will be in galvanizing. However, for these opportunities to be met, new plants will have to be constructed. There are in excess of 40 general hot dip galvanizing plants in South Africa at present. It is estimated that this represents almost half the plants in the continent at present and, if one takes Egypt and Nigeria out of consideration, only a handful of plants exist in the whole continent. In the SADC region, with the exception of South Africa, only Mauritius, Mozambique, Zambia and Zimbabwe are known to have galvanizing plants.

The opportunity for growth is clearly seen by reference to the general hot dip galvanizing (HDG) market in South Africa over the past few years (Figure 7). One difficulty with the HDG industry is its tendency in Africa to remain not only in the SME arena but even more unfortunate, the owner/operator type of business. In essence, capital utility is often poor – few plants operate 24 hours a day, many working around 50 hours per week. Therefore, when calculating plant (and industry) capacity, it is not the potential tonnage that can be put through the galvanizing kettle that provides the benchmark, but rather the tonnage of steel that can be put through the kettle during the allocated hours of operation. Thus, unlike a continuous galvanizing line at a steel-plant, HDG operations have a low capacity ceiling that is rarely breached. In addition, at close to actual capacity, quality and lead times begin to suffer. As a result, the market looks for alternative corrosion protection solutions. Thus work moves away from the industry and the tonnes of throughput drops until there is a realisation that improvements are required at which point tonnage figures increase again. Clearly, the zinc price, as experienced recently, can also lead to substitution but in 2002/2004 this was not the case. Whether the current fever in the industry will lead to a similar pattern remains to be seen.

What is clear is that the industry needs to be local to serve the local needs. In the SADC countries there is a real need for establishment of new plants to meet the market needs. The significant investment in mining in the region should ensure added HDG capacity utilisation. In the past, the HDG industry has argued that as most of the steel is supplied from South Africa anyway, limited opportunities exist for galvanizing in the SADC
countries. However, new steel capacity coming on-stream in Zimbabwe, Zambia, Mozambique and other countries requires a review of this thinking.

Whilst HDG is first prize for the zinc industry in terms of corrosion protection, the ubiquity of zinc for corrosion protection ensures that zinc is used. Typically, where paint systems are used, a zinc primer or paint coat of some sort is used. Whether it be Inorganic Zinc (with a typical thickness of 80µm and 85% solids as zinc), Epoxy Zinc or Zinc rich epoxy, zinc finds its way into the corrosion protection system.

Other zinc containing products

Two significant markets exist in addition to galvanized products, viz. chemicals and batteries.

According to the Copenhagen Consensus the best way of advancing global welfare, and particularly the welfare of developing countries, is related to the alleviation of disease and the provision of sanitation. All constraints are related to poverty and the inability to uplift the community.

In 2002, the WHO cited the importance of zinc deficiency as a leading cause of disease, disability and death in developing nations. Zinc ranked as 5th among the leading 10 risk factors. Globally the WHO attributes 800 000 deaths per year to zinc deficiency. Severe zinc deficiency results in stunted growth, impaired immune systems, and other disorders such as respiratory infections, malaria and chronic diarrhoea. The International Zinc Consultative Group (IZiNCG) has identified the risk of zinc deficiency based upon the prevalence of childhood growth stunting and absolute zinc content of food supply. The global picture shown in Figure 10 makes uncomfortable viewing in the SADC context. Poor zinc supply starts with the staple foods and studies on the distribution of zinc deficient soils show the SADC region to also be at risk (Figure 11).

Various initiatives have been tried in sub-Saharan Africa to address zinc deficiency such as the maize fortification programme in South Africa, the Canadian based Micronutrient Initiative activities in Africa and many others.

The soils in the SADC region are old weathered soils which require high nutrient addition to ensure good crop yields. However, this is not happening. Studies show that whilst the norm for fertilizer addition is over 200kg/hectare in developed countries, in Africa, omitting Egypt and South Africa, the average is less than 8kg/hectare. Clearly, this is one leading cause in preventing food sustainability and the low delivery of sufficient zinc to the region is a factor impairing development. Subsistence farming without sufficient fertilization is unsustainable irrespective of the good intentions of politicians. Various stakeholders are working with organisations such as the New Partnership for African Development (NEPAD) to try to address the sub-Saharan Africa situation.
Figure 10. Human Risk Deficiency Regions for Zinc

Figure 11. World zinc deficiency in soil: major areas of reported problems (orange high, green low).

The sustainability of rural communities within Africa is under threat. United Nations figures show that there is a global move to urban areas (Figure 12). In many countries in South America, for instance, almost one quarter of the inhabitants of a country live in the capital city. As a result of the preference for better education and health services for their
children there is a drift in Southern Africa towards urban centres. However, the lack of need for low skill workers forces the development of concentrated squatter camps which become rife with crime and poverty. Thus people are forced away from rural communities due to poor service availability and find themselves in a new environment no better than that they left.

![Graph showing population growth and urbanisation over time](image)

**Figure 12. United Nations prediction on world population and urbanisation versus time**

Much of Africa remains rural. A key reason for the poor living conditions in rural communities is the lack of access to power. In Malawi, it is estimated that in urban areas only 7% of the population have grid power and in the rural areas this falls to less than 1%. Even in South Africa, it is stated that there are 1.6m households that will not get electric power in the foreseeable future. The market for batteries will continue to grow as wealth increases and more electronic devices are purchased.

The lack of power ensures that sustainable communities cannot be built. Recent developments in battery technology offer a route for community development rather than community migration. Zinc Air is new technology which provides for a light-weight battery system with sufficient power for a month for rural households. This could well be sufficient for the start of community upliftment and the zinc industry in Namibia has facilitated a pilot project, which could provide a huge opportunity to cement rural communities as permanent fixtures enabling the sound development of family life and preventing family break-up due to the breadwinners having to leave their community to seek employment.
Potential zinc demand

Due to the paucity of figures, it is difficult to estimate exact demand and potential demand in the region. Beyond the SADC region it becomes even more difficult. Referring to Figure 2 indicates that if a per capita consumption of 2kg per head was reached this would represent 350 000 tonnes of annual zinc consumption taking only those countries which show a significant industrial base. Realistically, prior to any major intervention, growth should at least track double digits as infrastructure development as outlined above continues. As mentioned also, the main opportunities will be for galvanizing (primarily), chemicals and batteries (traditional and new technologies).