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THE CATALYTIC CONVERTER INDUSTRY IN SOUTH AFRICA

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Abstract

The catalytic converter industry is composed largely of global multinational manufacturers who supply to vehicle manufacturers (original equipment manufacturers – OEMs) from facilities strategically located internationally, including plants in South Africa. The South African catalytic converter production facilities were established at the request of the OEMs and commenced manufacture in the early 1990s.

This near 100 per cent export focused industry exists in South Africa because of the incentives offered by the Motor Industry Development Programme (MIDP), which ultimately provide the OEM with import duty rebates.

The South African catalytic converter industry is a complex vertically-integrated supply chain with a local content in excess of 85 per cent, substantially more than any other exported automotive component. The industry remains one of the very few downstream manufacturing industries where South Africa has a significant global footprint. This is even more important when it is considered that this industry is the key end-user for two of South Africa's most important mineral resources, namely platinum group metals (PGMs) and chromium, and is in an industry which will see massive global growth as the developing nations of the BRICs grow their auto industries. In over 15 years of existence in South Africa, the catalytic converter industry has achieved remarkable growth, averaging compound growth in the region of 14 per cent per annum. The industry is the highest contributor to automotive component export revenue.

South Africa holds >8 per cent% of global PGM reserves. During 2011, South Africa supplied 59 per cent, 29 per cent, and 72 per cent of the global demand for platinum, palladium, and rhodium respectively, as well as over 50 per cent of the global chromium demand.

Global autocatalyst production remains the largest consumer of PGMs, and South Africa alone beneficiated 15 per cent of locally mined PGMs in the production of catalytic converters – all is converted from PGM sponge (powdered metal) into PGM solutions for coating onto catalysts. Beneficiation of PGMs also takes place via the production of jewellery and electronic goods; but compared to catalytic converters, this volume is negligible. The industry is also the largest consumer of locally produced stainless steel (>50 000 t/a), exceeding 38 per cent of local consumption.

The industry is a substantial generator of highly skilled employment, with over 5 000 direct jobs (excluding OEMs and stainless steel manufacture) and an estimated more than 30 000 indirect jobs resulting from upstream and side-stream suppliers. The industry places a high focus on skills transfer and development, with all companies providing high-tech training and education both locally and overseas.

The industry has invested in excess of R5 billion in plant, equipment, people development, and process development over the last 15 years to support transfer of production and new technologies to South Africa. This has resulted in significant skills development in the support industries as well as within the catalytic converter industry.

The current projections for local PGM beneficiation via catalytic converters reflect a downward trend as a result of production being moved to other global locations due to uncertainty around changes to government incentive programmes. The industry is currently capacitated to support 23.7 million units per annum. During 2011 it utilized about 70 per cent of this capacity, but forecast projections suggest that this will be at 46 per cent of this level by 2016. At full capacity the industry would represent 19 per cent of global autocatalyst production compared with the current 13 per cent in 2011.

The industry believes that there is potential to make South Africa the preferred location for catalytic converters worldwide, given suitable support from the mines and Government.

Introduction

The catalytic converter industry is arguably one of the biggest success stories of recent South African industrial Policy. There are few, if any, complex, high-volume manufactured products that have achieved similar global significance – this industry had a global market share of some 15 per cent, with peak export revenues of almost R20 billion. However, out of this success come the potential seeds of its own destruction, which will be discussed below.

This near 100 per cent export focused industry exists in South Africa because of the incentives offered by the Motor Industry Development Programme (MIDP), which ultimately provides the vehicle manufacturers (original equipment manufacturers – OEMs) with import duty rebates. This programme is, however, self-regulating, in that the OEMs can receive MIDP benefits only within the duty demands of their imported vehicles and components. As the Government's automotive incentive regime moves from the export-focused MIDP to the value-added Automotive Production Development Programme (APDP), the reliance of the OEMs on component exports will decline. This places the decisions on where to manufacture catalytic converters firmly in the hands of the OEMs, rather than in the interests of South Africa. There is currently no incentive programme that supports this industry on its own merits.

The catalytic converter industry is composed largely of global multinational manufacturers who supply to the OEMs from facilities strategically located internationally, including plants in South Africa. The South African production facilities were established at the request of the OEMs and commenced manufacture of catalytic converters in the early 1990s. In its over 15 years of existence in South Africa, the catalytic converter industry has achieved remarkable growth, averaging compound growth in the region of 14 per cent per annum. The industry is the highest contributor to component export revenue and has the highest local content at over 85 per cent. Figure 1 reflects the contribution from components to export revenues since 1995, comparing catalytic converters with other components.

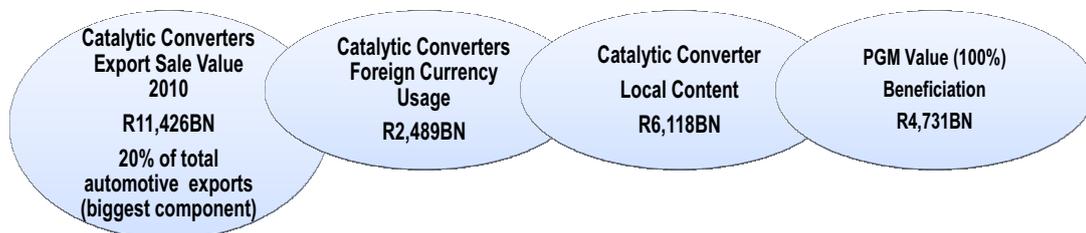
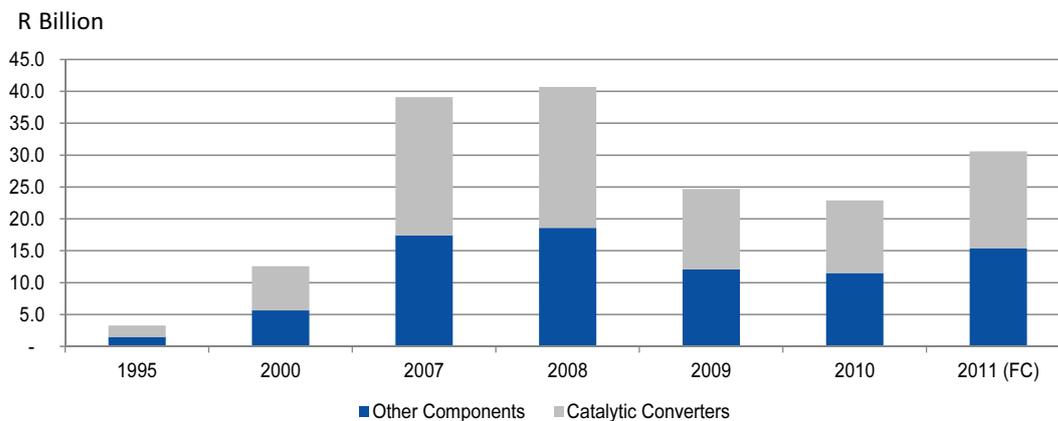


Figure 1. Contributions of automotive components to export revenues

The South African catalytic converter industry is a complex vertically-integrated supply chain comprising some more than 50 manufacturing plants (Figure 2). The industry remains one of the very few downstream manufacturing industries in which South Africa has a significant global footprint. This is even more important when it is considered that this industry is the key end-user for two of South Africa's most important strategic mineral resources (PGMs and chromium), and is in an industry that will see massive global growth as the developing nations of the BRICs grow their auto industries.

The companies comprising this supply chain are the global leaders in their respective areas, and have invested in current state-of-the-art production facilities equivalent in both scale and technology to those in their overseas operations.

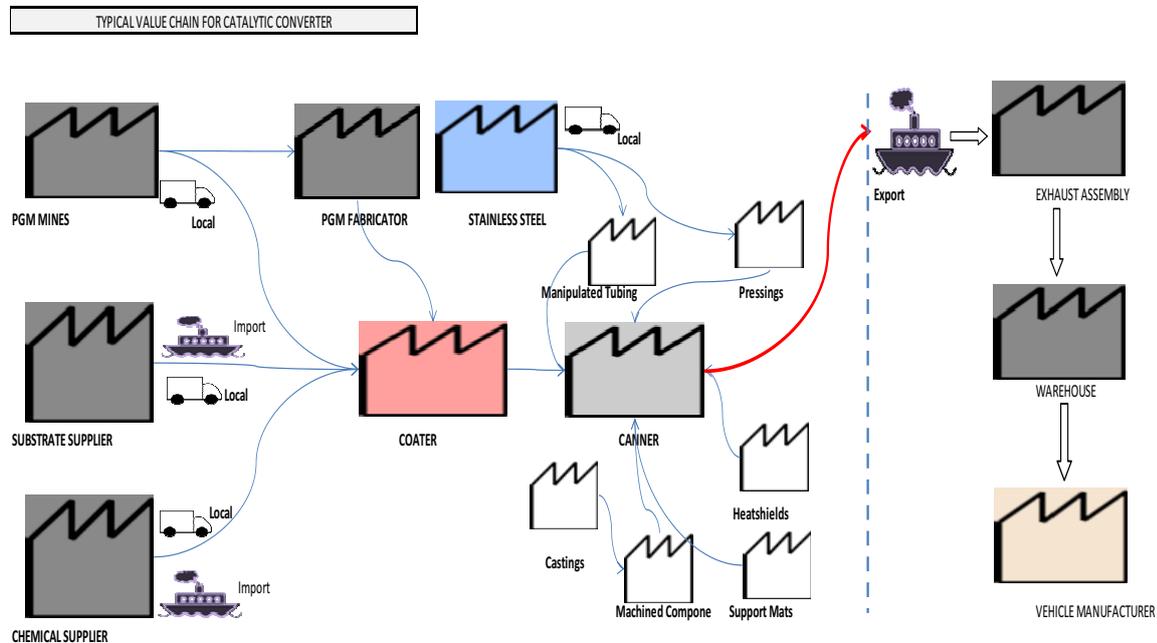


Figure 2. The catalytic converter industry supply chain

Current reality

South Africa holds >80 per cent of global PGM reserves. During 2011, South Africa supplied 59 per cent, 29 per cent, and 72 per cent of the global demand for platinum, palladium, and rhodium respectively.

Autocatalyst production remains the largest global consumer of PGMs, consuming some 8 million troy ounces per annum. South Africa alone benefited 15 per cent of locally mined PGMs (approximately 37 t) in the production of catalytic converters – all is converted from PGM sponge (powdered metal) into PGM solutions for coating onto catalysts. Beneficiation of PGMs in the production of jewellery and electronic goods is negligible compared to catalytic converters.

The current projections for local beneficiation via catalytic converters reflect a downward trend as a result of programmes being relocated to other global production locations, which will be discussed later.

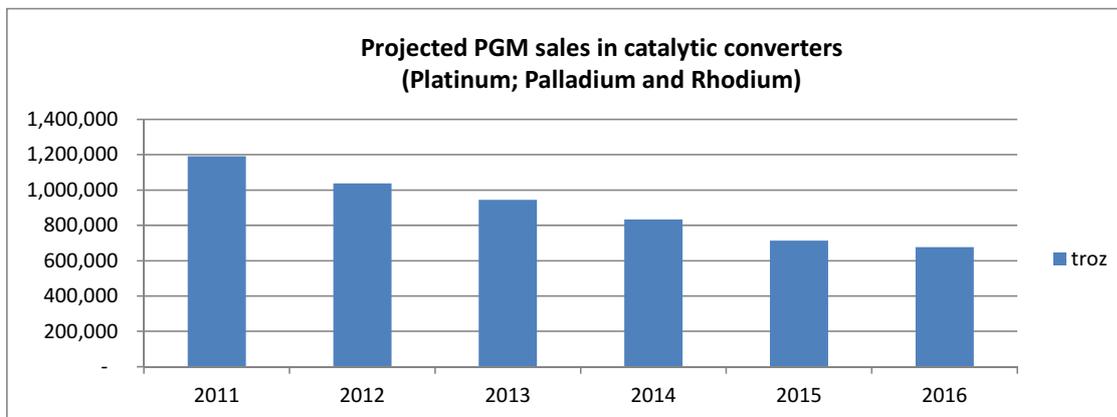


Figure 3. PGM demand predictions for catalytic converters produced in RSA, 2011 to 2016 (source: CCIG)

The industry is also the largest consumer of locally produced stainless steel (>50,000 t/a), exceeding 38 per cent of local consumption. The key component of the grades of stainless steels used in autocatalyst production is chromium, of which South Africa is also the largest producer in the world, with over 70 per cent of known reserves. The vast majority of this chromium is exported in unbeneficiated form as either chromite ore or as ferrochrome.

The industry is a substantial generator of highly skilled employment, with over 5 000 direct jobs (excluding OEMs and stainless steel manufacture) and an estimated more than 30 000 indirect jobs resulting from upstream and side-stream suppliers. The industry places a high focus on skills transfer and development, with all companies providing high-tech training and education both locally and overseas.

The industry has invested in excess of R5 billion in plant, equipment, people development, and process development over the last 15 years to support transfer of production and new technologies to South Africa. This has resulted in significant skills development in the support industries as well as within the catalytic converter industry.

The industry is currently capacitated to support 23.7 million units. During 2011 only some 70 per cent of this capacity was utilized, and forecast projections suggest that we will be at only 46 per cent of this level by 2016. At full capacity the industry would represent 19 per cent of global autocatalyst production compared with the current 13 per cent in 2011 (Figure 4).

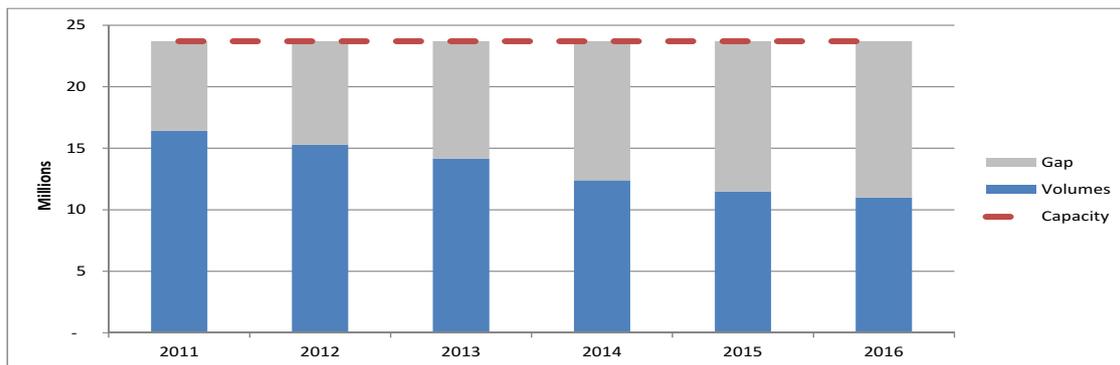


Figure 4. Catalytic converter industry capacity utilization 2011 to 2016 (source: CCIg)

The conundrum

The decline in capacity utilization in this potentially massive industry has resulted largely due to loss of confidence emanating from the process of changing from the MIDP to the APDP, which has been designed to be World Trade Organization-compliant as it is production- rather than export-driven. The future levels of support for component production under the APDP are such that South Africa may no longer be a preferred location for the global production of catalytic converters, as the resultant benefits are becoming insufficient to offset the costs and risks associated with the distance to our primary export markets. The reality is that direct export of unbeneficiated PGMs is cheap in relation to their value, but generates no additional jobs.

The incentives provided by the automotive development programmes are designed to grow all components of the auto industry so as to achieve global scale and international price competitiveness. The catalytic converter industry in South Africa currently meets both of these objectives. Volumes are such that South Africa produces some 20 million units per annum and costs, ex-factory, are equivalent or lower than from most competing regions (Figure 5).

Region	South Africa	W Europe	E Europe	Asia	Latin America
Normalized cost	100%	115%	102%	97%	105%

Figure 5. Comparative costs of catalytic converter production by geographic area

However, a key fact is that this industry in South Africa is virtually 100 per cent export focused, and the logistics cost to export to the global OEMs are above 3 per cent of cost, ignoring the other very significant risks of supply from a destination situated some 5 000 km and 6 weeks away from the customer.

The catalytic converter industry is composed of global multinational manufacturers who have facilities located internationally, both close to their customers and in new low-cost countries. The reality is that these companies will source product from South Africa only if the total cost, including logistics costs and perceived risk, is less than that sourced from their sister plants, which are often on the doorstep of the OEM’s plant. The South African industry therefore sits with a delivered cost disadvantage compared to the most competitive manufacturing countries, resulting in the OEMs choosing to rather place new business to these locations.

South Africa’s location disadvantage and the associated logistics and financing costs need to be overcome to ensure that we remain a globally competitive player. This is currently provided by the MIDP and, while benefits under the revised APDP, due to start in 2013, will be more or less equivalent to current MIDP levels, the stated pare-down of benefits means that incentives post-2016 are expected to become insufficient to cover the locational disadvantages of South African manufacture. Although it has been stated that the programme will be reviewed at the end of 2014, there remains a level of uncertainty that hampers sourcing decisions favourable to South Africa. The realities of OEM design, sourcing, and manufacturing programmes are such that a 10-year window of certainty is required when deciding on sourcing decisions. The current South African incentive programmes do not offer this; so many new programmes have been awarded to other locations, resulting in the evident declines in local capacity utilization.

Figure 6 a typical time line for new business placement, and demonstrates why decisions for new programmes commencing 2011 and running beyond 2013 have already been made, and have not been allocated to South African manufacturers.

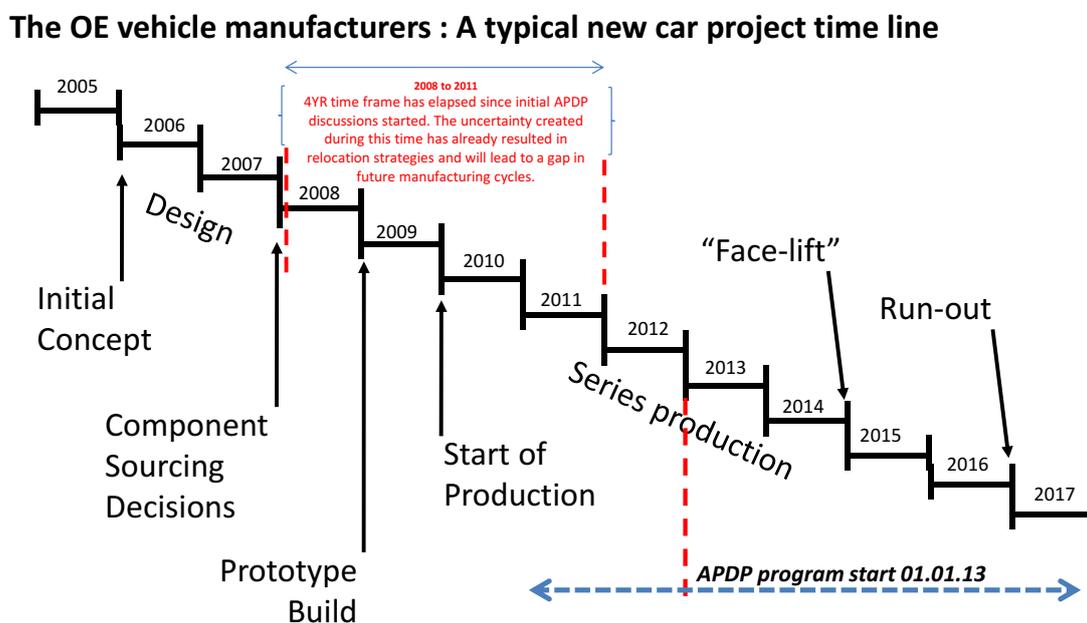


Figure 6. Typical time line for new business placement in the automotive industry

The future

Reduction of auto emissions is a rapidly growing imperative around the globe, with 'green issues' dominating policy decisions. Projections are that the demand for autocatalysts and diesel particle filters will more than double over the upcoming two decades. South Africa has a world-class industry that is already benefiting more than 95 per cent of all locally consumed PGMs. This industry has the opportunity to develop substantially given the right support from Government.

- Regulatory controls on auto emissions are being tightened even further in developed countries and introduced increasingly in the emerging new economies, including China, India, and Brazil. This will result in a continual and increasing demand for catalytic converters for vehicles. Additionally, pollution control is intensifying for larger trucks and other internal combustion engines. Global vehicle sales are expected to grow by 50 per cent by 2020
- European legislation (more than 85 per cent of catalytic converters exported from South Africa are destined for the Western European market) restricts the emission of soot particles from diesel engines, which resulted in increased requirement for fitment of diesel particulate filters (DPFs). Future European legislation currently under debate is expected to result in the need for particulate filters for gasoline engines, for implementation as early as 2014
- There has been ongoing debate as to the effect that hybrid and electric vehicles will have on this industry. Projections are that the internal combustion engine will still be the primary engine for passenger and (more definitely) heavy goods vehicles for several decades yet. Additionally, the catalytic converter industry with its currently installed capacity for coating of PGMs will be a natural springboard for the development of technologies for production of fuel cells going forward. Hybrid vehicle, which are likely to be the first of these 'green' cars to find volume production, will still require catalytic converters.

Possible interventions

Tapping into the aforementioned opportunities will require a combination of improved Industry efficiencies, reduced structural costs, and significant Government support mechanisms both within and outside of the APDP, as discussed below.

- a) Some form of incentive to encourage the beneficiation of selected raw materials would be of strong interest to a number of industry sectors.
This should be defined by the interests of the country rather than by the requirements of the OEMs. The catalytic converter industry was brought to South Africa at the behest of the automotive industry, and is sustained here by virtue of

- the auto industry incentive programs. This has little to do with the strategic value for South Africa in beneficiating and adding value to our key, globally significant mineral resources. We believe that **South Africa should be the preferred global location for manufacturing catalytic converters, DPFs, and ultimately fuel cells**. A concerted programme should be instituted to ensure that manufacture in South Africa is more cost-effective than anywhere else in the world, and then the global catalytic converter manufacturers will come to South Africa for their own economic benefit, rather than because the OEMs require it. Beneficiation of South Africa's strategic raw material resources has been identified as a key Government objective and is enshrined in existing legislation (e.g. The Precious Metals Act and in Governments beneficiation strategy document of July 2011)
- b) The South African industry is widely considered to be globally cost-competitive ex-works, but is hampered by distance-to-market costs, as described above. Industry and Government need to work together to find ways of reducing the several areas of structural costs where SA is becoming increasingly uncompetitive. These include, among others, shipping, port, and other Transnet charges, highly regulated labour costs, and escalating electricity and gas costs. A further opportunity is to assist with the shortening of the supply chain time to market
 - c) Further expansion of the catalytic converter value chain may be possible, as will be the development of fuel cell technology. The catalytic converter industry in South Africa already has among the highest local content (in excess of 85 per cent) and the highest local value addition of any automotive component category, and has a well-developed value chain. One area that has been identified as a further value chain opportunity is local extrusion of substrates. Although local extrusion of substrates is not expected to increase local value addition significantly, it would significantly reduce the length (in terms of days) of the input material pipeline and thus simplify supply chain management. It would also further assist in entrenching the catalytic converter industry in South Africa. However, there does not appear to be a viable business case for this at present, due to the high capital cost of the extrusion process, and the uncertainty of volume offtake going forward
 - d) Increased flexibility in terms of the definition of qualifying products should be investigated to allow all areas of the current supply chain to develop their own optimum volume efficiencies. We believe that all components of a catalytic converter should be classified as qualifying components in the same way that other auto components are treated (e.g. the components of an internal combustion engine)

- e) Expansion of the product range and global market share. The South African industry has enjoyed a globally significant market share in diesel and petrol flow-through catalytic converters (up to 15 per cent), but there are many other components in an automotive exhaust system that use PGMs and/or stainless steel in very large, and growing, volumes. These are:
- Particle filters for (currently) diesel and (future) petrol engines. These are generally larger and more expensive units than the simple flow-through catalysts, and will be seeing very rapid growth. Our industry has missed out on the first wave of investment into this new technology, but we can become a 'follower' if the economics of manufacture can be corrected
 - Heavy-duty catalysts and filters. These units are massive users of PGMs and stainless steel, because of their size. All heavy trucks and increasingly earth-moving equipment, marine diesels, static generators, and others will be required to fit emission control devices in the future
 - Full exhaust systems. The global companies that manufacture catalytic converters in South Africa all make complete exhaust systems in their overseas plants. These are not made here in large volume because the locational logistic cost penalties are even larger than for converters
 - Additionally, the market for conventional catalytic converters is projected to more than double by 2020 from today's volumes. Therefore, simply maintaining our market share should double the South African revenue. This has not happened, as the global industry has lost confidence in South Africa.

The companies that comprise the South African catalytic converter supply chain are currently supplying all of these products from their other international locations. They are not sourced from their South African plants in large volumes due to the factors described above, but we believe that, with appropriate support measures, this industry should be able to gain its rightful place as the preferred location for manufacturing all of these products for global markets. We believe that a tripling of current export revenue in the above product groupings should be possible in the short term, resulting in generation of some 50 000 new jobs.

Summary

South Africa can, with the right operating environment created through a close working relationship between government, industry, mines, and labour, sustain and grow its presence as a competitive and globally significant supplier of automotive emissions solutions to the major auto manufacturers worldwide. This would add substantial value to South Africa's strategic mineral resources and generate jobs and income for many thousands of people.

We must target making South Africa the global manufacturing country of choice for all catalytic converters on the back of our dominant ownership of key raw materials. This will give a kick start to the development of fuel cell technology and ultimately fuel cell manufacture in South Africa. If we lose this industry in the short term, this development will be so much more difficult.

