



**Contextual (Driver)
Analysis: An Occupationally
Directed Study on the
Greening of Skills
associated with the
Production of Catalytic
Converters in SA.**

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green skills
Building capacity for a sustainable future

Introduction and Context

- Study Aims: To understand the demand for green skills in the automotive components industry (with a focus on Catalytic Converters (CCs)), responding to the need for efforts to analyse, plan for and develop 'Green Skills'. It will support skills planning and employment by describing 'Green Occupations', and establishing the demand for them.
- Where the study is currently: Desk top review (literature and policy document review and analysis), and a site visit to an automotive components manufacturing firm producing CCs (among other components).
- In 2014 South Africa's automotive manufacturing industry contributed 7,2% to Gross Domestic Product (GDP), and the export value of Catalytic Converters exported in 2014 came to R19 479 million in 2014 (DTI, 2015).
- 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 (Dewar, 2012).

Finding 1: Value Chain, GDP, Export Earnings

- Platinum Group Metals (PGMs), mainly platinum, palladium and rhodium, are the main active component of CCs. PGMs are extremely rare: total world production is only about 400 tons. The majority of PGMs production comes from Russia and South Africa (de Man, 2015).
- The value chain for production begins in the Minerals Sector, and ends with the export of CCs to Original Equipment Manufacturers (OEMs) in the European Union, Africa, Japan, Australia, South Korea and India (DTI, 2015). Therefore, Globalization has led to the strong emergence of Global Value Chains (GVCs).
- A site visit reveals the local supply chain: 1. Precious Metals are mined and refined; Platinum applied as catalyst in CCs; Recycling of metal cut offs and old CCs.

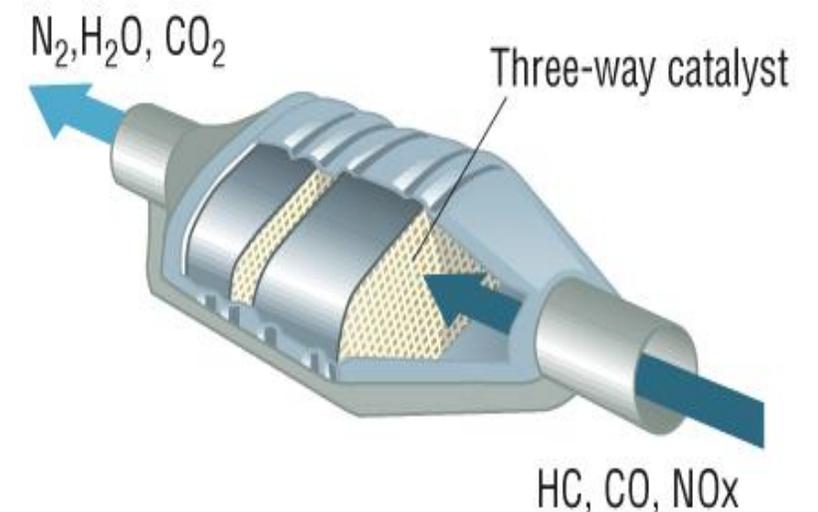


FIGURE 1: A Catalytic Converter for a Light Motor Vehicle

Finding 2: Green Aspects and Skills

- At the end of various stages on the production line, various waste by-products result. These include: air pollutants released in the form of smoke (or smog), cleaning off of the oil application used on the metal before it's pressed, conditioning (using detergents) of the waste water, and then disposing of this waste water (or sludge).
- In addition, at each point in the production process, residual metal cut offs are separated in waste baskets for recycling. Old Catalytic Converters can be recycled too.
- Occupations in factory operations i.e. plant machinery operators, welders, etc. on the plant floor need the competences to carry out duties and responsibilities that emerge in response to the Environmental/Safety/Sustainability aspects of factory operations. Through a workplace skills plan, the firm disseminate the education and skills required by labourers in response to 'Green' needs.
- Factory HR describes the labour as primarily low-skilled and semi skilled on the factory floor (e.g. machine operators, welders, electricians), with intermediate skill level occupations being the supervisors on the floor. Generally this group holds qualifications NQF Levels 1 to 5 (Grade 9, to Higher Certificates or Advanced National Certificates).
- The industry is a substantial generator of semi-skilled employment, with over 5 000 direct jobs, and an estimated 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 technical training at the 'low', 'semi' and 'intermediate' skill level occupations (DTI, 2014).

Finding 3: Technology and Implications for the Industry

- The role of technology is central to the competitiveness of firms if they wish to thrive in the global economy. R&D activity in SAs automotive sector is under pressure, despite growing investment by the South African government in innovation projects (DST, 2014).
- Local R&D has been limited primarily to the development of diesel filter particulates (DFPs), and the electric car.
- In 2009, Japanese car manufacturer Mazda Motor Corporation launched the world's first market application of single-nanocatalyst technology in automotive catalytic converters – altering the need for precious metals in the making of the component. And hence mining. Similarly, in 2014, Kingsburg developed a new design for catalytic converters that uses up to 80% less rare metal (i.e. platinum).
- These developments have the potential to reduce costs (and increase competitiveness) - precious metals currently account for up to 60-70% of each Catalytic Converter – meaning that this development would increase the competitiveness of the firms to implement it.
- Considerations for analysis because of Sustainability constraints: Skills to shift from a lock-in in platinum; to drive innovation; revitalization; etc.