South African Policy Options for Reducing Metal Theft

Report submitted to DTIC and TIPS

01 May 2022

G:ENESIS
UNLOCKING VALUE

Contact Person

Stephan Malherbe

Email	stephanm@genesis-analytics.com
Telephone	+27 11 994 7000
Mobile	+27 83 284 8206

TABLE OF CONTENTS

EXECUTIVE SUMMARY ..... **V**

1. INTRODUCTION **1**

2. THE ROLE OF SCRAP IN THE METAL SECTOR **3**

2.1. HOW SCRAP IS USED IN METAL PRODUCTION 3

2.2. ADVANTAGES OF SCRAP-BASED PRODUCTION 4

2.2.1. Cost advantages 4
2.2.2. Environmental advantages 4

2.3. SCRAP USAGE IN SOUTH AFRICA 6

3. METAL THEFT IN SOUTH AFRICA **8**

3.1. HOW STOLEN METAL ENTERS THE FORMAL ECONOMY 8

3.2. HIGH PRICES ARE A KEY DRIVER 10

3.3. COST OF THEFT TO SOUTH AFRICA 14

3.3.1. Cost of copper theft 14
3.3.2. Cost of steel theft 15

4. APPROACH TO THE ASSESSMENT **16**

4.1. ANALYTICAL APPROACH 16

4.2. CLASSIFICATION OF METAL CODES 17

5. INTERNATIONAL EXPERIENCE **19**

6. TRADE BANS **24**

6.1. A COPPER BAN? 24

6.1.1. Impact on theft 24
6.1.2. Impact on copper mills and foundries 25
6.1.3. Discussion 29

6.2. A STEEL BAN? 31

7. EXPORT BANS **33**

7.1. BANNING SCRAP EXPORTS 33

7.1.1. An export ban on copper scrap 33
7.1.2. An export ban on steel scrap 35

7.1.3. An export ban on other scrap metal 36
7.1.4. Summary 36

7.2. BANNING SEMI-FINISHED EXPORTS 37

7.2.1. An export ban on semi-finished copper 37
7.2.2. An export ban on semi-finished steel 42
7.2.3. An export ban on semi-finished other metals 46
7.2.4. Summary 46

7.3. PROBLEMS WITH AN EXPORT-ONLY APPROACH 47

8. PROPOSED TRADING REGIME FOR SCRAP METAL 50

8.1. MOTIVATION 50

8.2. OUTLINE OF SOLUTION 54

8.2.1. Stage 1 | Temporarily ban exports of scrap and semi-finished 54
8.2.2. Stage 2 | Ban cash for scrap 54
8.2.3. Stage 3 | Licensing 55
8.2.4. Stage 4 | Input-output reporting 59

8.3. IMPACT ON COPPER MARKET 60

8.3.1. Theft 60
8.3.2. Production 61
8.3.3. Comparison to other solutions 63

8.4. IMPACT ON NON-COPPER METAL MARKETS 66

8.4.1. Theft 66
8.4.2. Production 67
8.4.3. Comparison to other solutions 68

9. CONCLUSION 70

APPENDICES 77

APPENDIX 1: PRODUCT CODES AND BENEFICIATION STATUS 77

LIST OF FIGURES

Figure 1: Overview of South Africa's steel supply chain 8
Figure 2: HRB price, 2002 – 2022 11
Figure 3: CRC price, 2002 – 2022 11
Figure 4: Steel plates price, 2002 – 2022 12
Figure 5: Scrap price, 2002 – 2022 12
Figure 6: Export prices (R/kg) for steel, copper and aluminium scrap 13
Figure 7: Copper production and sales from mines (tonnes '000), 2009 – 2019 26
Figure 8: Copper sales from mines (Rm), 2009 – 2019 27
Figure 9: Share of the iron and steel value chain in GDP, 2000 – 2020 31
Figure 10: Formal employment in the iron and steel value chain, 2010 – 2021 32
Figure 11: Exports of copper scrap (H7404 copper waste and scrap) (tonnes), 2001 – 2021 34
Figure 12: Exports of steel scrap (H7204 ferrous waste and scrap) (tonnes), 2001 – 2021 35
Figure 13: Exports of semi-finished copper products (tonnes), 2001 – 2022 37
Figure 14: Exports of scrap versus semi-finished copper products (tonnes), 2001 – 2021 38
Figure 15: Exports of finished copper products (tonnes), 2001 – 2021 39
Figure 16: Imports of semi-finished copper (tonnes), 2012 – 2020 40
Figure 17: Imports of all copper products (tonnes), 2017 – 2021 41
Figure 18: SARS export data on scrap vs semi-finished steel products (tonnes), 2010 – 2021 42
Figure 19: Mirror data on exports of semi-finished steel products (tonnes), 2001 – 2021 43
Figure 20: ArcelorMittal production, export and local sales ('000 tonnes), 2019 – 2021 43
Figure 21: Imports of steel products (tonnes), 2018 – 2021 45
Figure 22: Total export revenue for scrap and semi-finished products, 2019 – 2021 49
Figure 23: Copper supply chains under the new trading regime 60
Figure 24: Supply chains for non-copper under new trading regime 66

LIST OF TABLES

Table 1: Overview of South Africa's steel mills, 2021 estimates 6
Table 2: Annual cost of copper theft based on 2020 to 2022 data 14
Table 3: Overview of international approaches 19
Table 4: Copper production capacity estimates for mills and foundries, 2022 28
Table 5: Supply chain impact of a complete ban 30
Table 6: Supply chain impact of an export ban on steel and copper scrap 36
Table 7: Supply chain impact of an export ban on steel and copper semi-finished 47
Table 8: Weaknesses of combined copper trade ban and scrap/semi export ban (all metals) 52
Table 9: The nine licence types under the new trading regime 55
Table 10: Impact of the new trading regime on copper theft 63
Table 11: Impact of the new trading regime on copper supply chain 64
Table 12: Impact of the new trading regime on theft of non-copper metals 68
Table 13: Impact of the new trading regime on non-copper supply chain 68
Table 14: Steel HS codes and article descriptions 77
Table 15: Copper HS codes and article descriptions 79

EXECUTIVE SUMMARY

Internationally, metal theft is a serious problem. Metal prices, including scrap metal prices, are multiple times higher than they were at the turn of the 21st century when the world entered a super commodity cycle, driven by the industrialisation of China. High metal prices are the key driver of theft: they motivate criminal syndicates to extract metal from installed infrastructure and sell it for scrap. In both developed and developing countries, there is a significant upward trend in the number of reported incidents.

Copper theft is the most serious concern. The Federal Bureau of Investigation ("FBI") recently concluded that "*copper thieves are threatening US critical infrastructure by targeting electrical sub-stations, cellular towers, telephone land lines, railroads, water wells, construction sites* […] *for lucrative profits*."[1]

It is an especially intractable problem in countries with significant infrastructure, high levels of poverty, and weak police enforcement. In South Africa, copper theft: a) constitutes a serious threat to national infrastructure, undermining the country's low-cost rail advantage and the performance of its electrical grid; b) imposes a gross annual economic cost exceeding R46 billion (2020/2021); c) leads to loss of life and disruptions to critical services (including hospitals); and d) decreases confidence among businesses and general society.

The costs imposed from the theft of steel and other metals have been less well quantified at this stage, but the problem is also serious. The damage from stolen steel lattices alone was R100m in 2020/2021. Furthermore, the trade of steel and other metals often provides a cover for stolen copper, in terms of storage, transport, local sales and export.

Stolen scrap may pass through many hands, and change form in various ways, but it is ultimately sold to mills operating in the formal economy, either locally or overseas. The mills process the scrap into new, finished metal for on-sale into formal markets. There is a well-travelled pipeline from stolen scrap to formal mills and it is used by criminal syndicates at great cost to the rest of society.

Yet scrap is crucial to the metal supply chain. It is significantly cheaper to use compared to mined ore, and it is much more environmentally friendly. **In South Africa over 50% of steel production is based exclusively on scrap.** Moreover, the other 50% of production includes both ore *and* scrap as adding scrap makes the overall smelting operation more efficient. Thus, practically all metal produced in the world contains scrap. A portion of the scrap is stolen metal that was ripped out of critical infrastructure, from South Africa and from countries all around the world.

Globally, there have been varied responses from authorities, including a) banning the use of cash in scrap transactions, b) mandating video recording of transactions, c) banning exports, d) strict licensing and e) simply placing a complete ban on all scrap transactions. We considered the viability and economic impact of various theft-reducing measures. In the end, we recommend the implementation of a "new trading regime for scrap metal", which we outline below.

[1] FBI. (2008). *Copper Thefts Threaten U.S. Critical Infrastructure*. Available at: https://www.fbi.gov/stats-services/publications/copper-thefts. (Last accessed, 13 March 2022).

A complete ban on the trade of copper scrap and semi-finished product?

A complete ban on the trade of copper scrap/semis (which would include a ban on their export) would provide a direct and administratively uncomplicated measure to limit or reduce theft. It would lower enforcement complexity since the mere possession of scrap/semis (stolen or not) would constitute grounds for arrest and censure.

A complete ban would, however, close South Africa's copper mills and foundries which, based on initial data, earn R21 billion in gross revenues per year. This is significantly less than the more than R46 billion in gross annual costs that copper theft causes the country. While further research on net cost is required, initial research suggests that even if a complete copper ban was only 50% effective, the short-run and long-run economic benefits would exceed the loss of copper production in its entirety. A copper trading ban may well be justified.

Nevertheless, a trade ban is not recommended. In our view the "new trading regime for scrap metal" captures most of the benefits of a trade ban, while still permitting a portion of legitimate copper scrap to flow down the supply chain, allowing South Africa's copper industry to survive.

A complete ban on the trade of steel scrap and semi-finished product?

Steel is a considerably more important industry to South Africa than copper. The country currently produces around 5 million to 6 million tonnes of steel. The steel value chain from iron ore to manufactured products currently contributes 4% to gross domestic product ("GDP") and provides approximately 200,000 jobs. Banning the trade of steel scrap would decimate the steel industry in South Africa, as scrap is the primary input into over 50% of South African production. A ban would cause a sharp reduction in production and eliminate all of ArcelorMittal's competitors. Moreover, compared to copper theft, the costs of steel theft have not yet been as well quantified. Accordingly, a total ban on steel scrap cannot be justified at this stage.

Export bans

Banning exports is another low-administrative solution. Permanent, well-structured export bans will likely have a significant impact on theft. But there are two basic requirements:

1. For an export ban to be maximally effective, it needs to include all metal types, in all scrap and semi-finished grades. Metal of one type is routinely smuggled out of the country under incorrect metal codes. Shipments might contain mixed metal types (e.g. steel, aluminium, copper and other) or mixed grades (e.g. different types of scrap and semi-finished product), making it difficult for customs officials to check the contents "in the middle of the shipping container". **Indeed, were the authorities to only ban scrap exports, leaving semi-finished exports open, it would have very little impact on theft reduction.** Most scrap volume leaves South Africa under semi-finished codes.

2. More generally, control of the border is crucial. In addition to scrap and semi-finished metal codes, scrap is also smuggled out of the country using codes that cannot be banned, including finished metal and codes which have nothing to do with metal (e.g., plastic). For export bans to be effective, **stronger monitoring and enforcement at the ports is required.**

If an export ban is tight enough, it promises to **divert significant tonnes of scrap metal into the local market**, equalling, according to some estimates, the size of South Africa's entire metal production. The diversion of these large volumes would lower scrap prices and decrease the incentive to steal. It would

cut off a major theft outlet and, if the ban is sustained, it would advance beneficiation. We understand that this solution would require an agreement between the countries forming part of the Southern African Development Community ("**SADC**"), though it is expected this will be secured.

But there are three weaknesses to an approach that relies only on export bans.

First, an export-only approach leaves smuggling through finished metal and non-metal codes unaddressed, or at least, it relies on enhanced enforcement at the ports to better manage leakages. In an export-only approach, criminal syndicates remain free to deal in shredded/melted metal locally: they can openly store it and truck it around the country, carefully planning their smuggling operations.

Second, an export-only approach does not address (local) whitewashing. Whitewashing occurs where stolen scrap finds its way into local mills and is then processed into finished products, which are sold locally or exported. Consider stolen volumes that are a) currently whitewashed locally and b) currently exported.

1. To the extent that stolen metal is whitewashed locally, export bans may do little to reduce theft. Recall that metal prices are multiple times higher than 20 years ago. Even if the domestic price of scrap had to drop significantly in response to an export ban, the resulting price could still be higher than a few years ago when theft was nevertheless widespread. The incentive to steal might be reduced, but not sufficiently. To the extent that stolen metal is currently whitewashed into the local metal industry, export bans will be less effective.

2. As regards stolen metal that is currently exported, the impact on theft reduction will differ between the short and long term. In *the short term*, if the volume of stolen scrap blocked from export is large relative to local metal production, whitewashing the diverted stolen scrap locally will be difficult, and theft can be expected to decrease significantly. But if the volume of stolen scrap relative to local production is relatively small (albeit extracted at great cost to society) it will be easier for syndicates to whitewash the additional stolen scrap in the local economy. Moreover**,** *in the longer term*, mills will create more capacity in response to lower scrap prices, creating new demand for local scrap, including the stolen variety. In the long run, we would expect the price of local scrap to tend towards the international price, even under a sustained export ban, because local mills can use the scrap to produce finished product which can be exported at international prices.

Third, if export bans are the only tool employed, they will need to be permanent to deter criminals. The ability to sell semi-finished product into world markets is often used as a steppingstone by mills as they build out their rolling plants. A permanent ban on the export of genuine semi-finished product is not ideal if a less restrictive measure could secure a similar reduction in theft.

All three of these problems – smuggling, local whitewashing and permanently blocked semi-finished exports – are addressed by the proposed new trading regime.

Recommendation: a new trading regime for scrap metal

The "new trading regime for scrap metal" consists of three pillars. First, a temporary ban on the export of all scrap *and* semi-finished metals. Second, a permanent ban on "cash-for-scrap", meaning any purchase of scrap or semi-finished products will only be allowed through electronic funds transfer ("**EFT**"). Third, a licensing framework, which uses strict criteria to significantly reduce the number of metal buyers, metal sellers and metal exporters.

The licensing framework can be implemented in stages, as administrative constraints allow. To create the licensing framework, Government can make amendments to existing legislation (e.g., the Second-Hand Goods Act) and utilise existing co-ordinating bodies and their members (e.g., National Intelligence Co-ordinating Committee ("NICOC") and the Inter-Agency Working Group on Illicit Trade, which includes SARS, DTIC and ITAC) to manage the initial stages of licensing. Once the licensing framework is complete, the existing metal supply chains will be fundamentally transformed:

1. Pure traders and middlemen will be completely excluded in most cases.

2. For copper, buyer licences will only be given to the few qualifying mills and foundries (and potentially a few major recyclers) that are active in the market. Licensees will need to pay a large deposit (e.g., R2,000,000) and submit input-output reports to a central database, i.e., data tables showing all purchases and sales.

3. For other metals, buyer licences will be given more liberally, but licensees will still need to pay a large deposit (e.g., R150,000) and submit input-output reports.

4. When the temporary export bans are relaxed, export licences will be given to a still smaller subset of the licensed buyers, with high deposit requirements.

5. Finally, sellers of high-risk metals (copper scrap and semi-finished product of *any* metal) will be strictly limited to the specific lists published by the authorities, and a large deposit will be required from all sellers of semi-finished metal.

The new regime will deal a powerful blow to existing stolen metal syndicates and networks. These syndicates currently operate "in the open": *openly* storing, trucking, and coordinating the sale and purchase of shredded/melted metal both locally and across the border. The new regime will challenge the syndicates' ability to operate, sell and export their stolen goods.

1. ***Much easier monitoring and control*.** No person will be allowed to be in possession of melted or shredded metal unless they have a licence to buy. This will significantly reduce enforcement complexity since the mere possession of scrap or semi-finished metal (stolen or not) would constitute grounds for arrest and censure.

2. ***Substantially reduced whitewashing, especially in copper.*** Under the new regime, the ability to whitewash stolen scrap is fundamentally curtailed. This is due to the use of a) highly restricted buyer licences, b) highly restrictive copper seller licences, c) a ban on cash, d) input-output reporting, and e) highly restricted export licences for all metals, including finished metals. If licensed buyers are caught buying stolen scrap (or in the case of copper, if they buy from an unlicensed source), they will lose their licence and in most cases their business as well. The stakes are high, and licensed scrap metal buyers are likely to comply, especially when each of their purchases are recorded by EFT and subject to input-output reporting.

3. ***Sellers will be highly restricted***. For copper, buyers will only be able to buy scrap from sellers on the published list, which will include state-owned enterprises ("SOEs"), municipalities, large businesses, and over time, smaller businesses. The informal supply of copper scrap will be shut down. For all metals, the sale of semi-finished product will be limited to licensed mills. If a buyer purchases from an unlicensed source it will result in the loss of the buyer licence, which will lead to business closure in most cases.

4. ***Exports will be tightly controlled***. Exports will at first be banned and then opened to a subset of buyers that have a buyer licence. Mills (and only mills) will be given a licence for the export of semi-finished and finished product. If conditions allow in the medium term, some licensed recyclers might be given a licence to export scrap. Temporary export bans should only be relaxed when the country has reached an appropriate stage of licensing. Export bans can also be reimposed if it is found that their relaxation caused a spike in theft.

Overall, by imposing the new regime, Government can expect a significant reduction of the more than R46 billion in estimated theft costs.

What about the impact on industry and employment?

The proposed solution allows legitimate metal production to continue, albeit in a formalised environment. The final impact on metal production will depend on a host of factors, and it bears noting that if production based on stolen scrap declines, this would be a net positive to society.

1. *Temporary block on semi-finished exports.* The block on semi-finished exports will, in the short term, cause a reduction in mill production, which will last until a) mills successfully beneficiate downstream, or b) the semi-finished export ban is relaxed. It is difficult to estimate the size of semi-finished exports because the semi-finished export category is routinely used to smuggle scrap. But it is likely to be large and significant – estimated to reach at least a third of total production in the case of copper.

2. *Scrap feedstock supply.* The local restrictions will limit the supply of scrap from informal sources, especially for copper. But export restrictions (temporary bans and export licensing) will divert substantial volumes of scrap into the local market. Thus, despite imposing strict regulations across the trade in all metals, **the net result of the new trading regime might be that the scrap supply to local mills and foundries <u>increases</u>**, dropping the price of scrap and increasing the rate of beneficiation into finished product.

3. *Informal collectors* will lose the ability to sell copper scrap, but they will still be able to earn revenue from glass, plastic, paper, and non-copper scrap.

In the short term, the negative production impact of the semi-finished export ban will likely outweigh any positive impact from increased scrap supply, because mills will take time to expand into more finished products. If Government can quickly replace semi-finished export bans with local restrictions and export licensing, the prospect that the new regime will have a positive impact on *both* theft reduction *and* production/employment, increases.

But even if local production decreases to some extent, this does not undo the rationality of the regime because efforts to decrease the nationwide costs of metal theft justify imposing additional costs on the metal industry. **The strong possibility that in the long run the new regime will both decrease theft *and* increase production is good news.**

The proposed solution is, however, associated with an increased administrative burden on the state. To some extent this is alleviated by a staged licensing design, which provides room for Government's licensing capacity to build slowly while the country is protected by export bans. Moreover, the proposed new regime has several benefits relative to low-administrative solutions.

1. Relative to a copper ban, the new trading regime captures most of the benefits of a full ban on copper trade, while allowing the copper industry to remain open. It is true that a trade ban would

eliminate local whitewashing completely. However, under the new regime, the ability to get copper scrap into the licensed supply chain will be substantially reduced, if not eliminated.

2. A permanent export ban leaves smuggling through finished metal and non-metal codes unaddressed (unless it is combined with increased enforcement at the ports), and it does not deal with local whitewashing. The new trading regime pushes syndicates underground, making it much more difficult for them to whitewash their product locally and much costlier and riskier to get their stolen goods to the port *in the first place*. Finally, in the new trading regime, the ban on exports need not be permanent. It can be lifted once the local restrictions have been sufficiently established, including the granting of semi-finished export licences (which will only be given to active mills). This will provide relief to the milling industry by allowing them to use semi-finished revenues to build more advanced plants that focus on finished products.

Compared to both a copper ban and a permanent export ban, the new trading regime is also more robust against litigation and should benefit from the support of industry.

1. First, the new regime will be difficult to challenge in the courts. Afterall, the approach does not close copper milling and it does not permanently ban semi-finished metal exports. The approach merely attempts to regulate the industry to address what must be acknowledged as a massive national issue. Even if the costs of theft are significantly overstated, and the benefits of milling significantly understated, this would hardly suggest that local restrictions were irrational.

2. Second, if the new regime fails to significantly reduce metal theft, Government will be forced to implement even stricter polices, potentially including a complete ban on copper and a permanent ban on exports. Industry has every incentive to help make the new regulations work, and to expend resources to actively assist Government in stopping copper and other metal theft.

We conclude by noting Kenya's experience. In 2010, Kenya implemented an export ban on scrap metal that was formalised into law in 2015. However, this was insufficient to stop the rising tide of metal theft. In 2022, the Kenyan Government implemented a full ban on the trade of <u>all</u> scrap metal, which was only relaxed after the Government had created a new trading regime which included a host of local restrictions and licensing requirements.

It is our recommendation that South Africa implements a temporary export ban on all scrap and semi-finished metal products, and quickly proceeds to formalise the scrap metal industry through banning cash and implementing a strict licensing regime.

1. INTRODUCTION

1. Globally, there has been a widespread increase in the theft of metal, especially copper. Metal is extracted from existing infrastructure, causing unprecedented economic losses, including interruptions to key services. The stolen metal is then sold as scrap and eventually ends up in a mill, where it is processed into new metal product and sold in formal and legal markets. In South Africa the problem is rife. It causes significant economic damage and service interruptions, especially across the country's rail system and electrical grid. It harms Government finances as well as its ability to fulfil its service delivery obligations.

2. It is within this context that Trade and Industrial Policy Strategies ("**TIPS**"), in partnership with the Department of Trade, Industry and Competition ("**DTIC**"), have sought to identify plausible policy responses to address the theft of scrap metal in South Africa.

3. As part of this process, TIPS has requested Genesis Analytics ("**Genesis**") to provide an expert economic report that: a) evaluates the economic effectiveness and viability of measures which might limit or reduce metal-for-scrap theft; and b) proposes recommendations which might solve or alleviate the problem.

4. This report answers the TIPS request. In the end, it presents a detailed proposal for the creation of a new, strict trading regime targeting local activity and exports for copper, steel and other metals. We devised these recommendations by analysing the impact of potential policy interventions on both the copper and steel value chain. The measures analysed include a **ban on the trade of scrap** metal in the domestic market, a **ban on the export of scrap** (and semi-finished metal products), and **various other local and export restrictions**.

5. The report is structured as follows. Section 2 provides important background on the role of scrap in the metal supply chain. We discuss the cost and environmental advantages of using scrap, and we show the portion of South African production based on scrap. In this discussion we focus on steel, which is the most important metal for the South African economy, though the implications of the analysis are applicable to copper and other metals as well.

6. Section 3 focuses on metal theft, outlining how stolen metal is inserted into formal markets, and how high metal prices drive theft. We conclude by detailing the economic costs of metal theft in South Africa, first for copper and then for steel.

7. Section 4 describes Genesis' approach to the analysis and provides important information on how we have classified different metal codes under the Harmonised System ("**HS**") Convention.

8. Section 5 outlines the policy interventions and approaches used by overseas authorities.

9. Section 6 explores the impact of complete trading bans, first for copper then for steel. Section 7 provides the impact assessment for export bans on both scrap and semi-

finished product. In both section 6 and 7, we track: a) the likely impact on theft; and b) the production impact at different levels of the supply chain, including informal collectors, buyback centres, metal recyclers, mills and foundries and downstream manufacturing.

10. Armed with the lessons from this analysis, section 8 details our proposed new trading regime for scrap metal. We motivate the solution by carefully considering the strengths and weaknesses of trading and export bans. We also provide a detailed 4-stage implementation framework, which focuses on first implementing interventions that have a big impact on theft, but entail the lowest administrative burden.

11. Section 9 concludes.

2. THE ROLE OF SCRAP IN THE METAL SECTOR

12. Metals are arguably the most important materials in a modern economy. Metals like steel, aluminium and copper are crucial inputs into mining, manufacturing, and construction. Metals also play a key role in the transmission and distribution of electricity, water, physical goods, and information.

2.1. HOW SCRAP IS USED IN METAL PRODUCTION

Traditional production using iron ore

13. Globally, iron ore is still used as the primary input for most steel production. There are three basic parts to the steel production process: mining, smelting, and rolling.

    13.1. **Mining**. The iron ore is mined from the ground and shipped to a steel mill.

    13.2. **Smelting**. At the steel mill, the ore is combined with coking coal and limestone, added to a Blast Furnace-Basic Oxygen Furnace ("**BF-BOF**" or "**BOF**"), and exposed to extreme heat and pressure until liquid steel emerges, which is then cast into basic forms of crude steel, typically ingots which can weigh hundreds of tons each.

    13.3. **Rolling**. The crude steel is then taken to a mill rolling plant (typically integrated) where it is first processed into semi-finished products (called blooms, billets or slabs) and then into finished products, of which there are two basic types: long products (various types of steel bars) and flat products (various types of sheets).

Pictures of the different stages of steel, from the top: 1) ingots, 2) blooms (square) & billets (round), 3) slabs (flat), 4) finished long products and flat products

Use of scrap metal as the primary input

14. Steel and other metals can be made without the need for iron ore. Instead, scrap metal – discarded products, discarded structures, and the offcuts from various production processes – can be recycled and turned back into new metal products. In South Africa, both iron ore and scrap are used in steel production.

15. Two types of furnaces are used in the production of steel using scrap as an input: an electric arc furnace ("**EAF**") and, on a smaller scale, an electric induction furnace. Both use electricity, as opposed to coking coal, as the primary energy source. In the EAF, scrap metal is melted directly by electric arcs which are generated by electrodes within the furnace. In an induction furnace, an electrically generated reversing magnetic field induces a circular electric current into the scrap metal, melting it into liquid form.

16. Note that even BOFs use a portion of scrap in the production processes. Adding a portion of scrap helps make the blast furnace process more efficient, with scrap also acting like a cooling agent. For example, ArcelorMittal currently uses a 79:21 ratio of ore and scrap, and the ratio is expected to evolve further in favour of scrap.

2.2. ADVANTAGES OF SCRAP-BASED PRODUCTION

2.2.1. Cost advantages

17. Scrap has four core advantages that make it an increasingly used alternative to iron ore.

    17.1. ***Recycling metal does not degrade it.*** Most metals can be recycled with "no loss of property". After it is heated, it can be poured, and with the right grade of scrap, it can produce perfect billets with the required chemical and structural properties.

    17.2. ***Cheaper to transform into semi-finished products.*** Relative to iron ore, scrap starts the process much closer to the final product. Iron ore must be purified under extreme heat and heavy pressure. Scrap, in many cases, is already chemically identical to the final product. The scrap-fed electric arc furnace is smaller, cheaper, and more efficient that the iron-ore fed blast furnace.

    17.3. ***Lower capital installation costs.*** Compared to BOFs, EAFs have lower capital set-up costs, can be turned off when required (whereas BOFs must be run continuously, 24/7), and require less manpower. Induction furnaces are the cheapest to install and run, but they have a far lower maximum output relative to BOFs and EAFs.

    17.4. ***Collection replaces mining.*** Scrap does not need to be mined from the ground, so it saves the energy and cost of mining, and replaces it with collection from numerous sources, including obsolete scrap (dumped scrap from all over society) and production waste (the cut offs from manufacturing firms, including steel mills and foundries).

2.2.2. Environmental advantages

18. Using scrap reduces the overall environmental footprint of steel production.

    18.1. First, it obviates the need to mine iron ore, which creates significant environmental savings.

    18.2. Second, the EAF process or induction furnace process uses less energy.

    18.3. Third, using scrap reduces the incidence of metal pileup in scrap landfills.

    18.4. Fourth, converting production waste and obsolete scrap back into fresh materials offers proven methods to reduce greenhouse gas ("**GHG**") emissions while maintaining economic competitiveness.

19. Scrap-based metal production is a prime example of how a circular economy (one that recycles and reuses waste) helps secure environmental goals.

20. Many jurisdictions have explicitly recognised the important role of scrap-based metal production in reducing GHG emissions and in lowering the overall impact of production on the environment, and their metal policies are crafted in accordance. For example, **the EU is currently proposing rules that will help keep scrap metal within the EU to help promote environmental efficiency.**

    Environmental vs economic efficiency

21. Once scrap metal or iron ore has entered a mill, EAF and induction furnaces offer a more cost- and environmentally efficient way to produce steel. Relative to iron ore, scrap metal has higher technical or resource efficiency and eco-efficiency.

22. However, the economic efficiency of a scrap-to-steel versus ore-to-steel process depends on the input costs of scrap metal versus iron ore. If the price of scrap metal relative to iron ore rises significantly, it can ultimately be cheaper to produce steel using iron ore.

23. It is noteworthy that as a developing economy progresses through its development cycle, the availability of both obsolete and production scrap increases as there is a deepening of downstream production (hence an increase in production scrap) and an increase in discarded produced as products reach their end-of-life state (hence an increase on obsolete scrap).

2.3. SCRAP USAGE IN SOUTH AFRICA

24. Approximately 30% of the world's steel production is based on scrap metal recycling.[2] However, in many countries, including South Africa, scrap metal has become the dominant input.

25. Table 1 shows a breakdown of South Africa's steel mills with their production levels, available capacities, furnace types and input sources.

Table 1: Overview of South Africa's steel mills, 2021 estimates

Company	Current production ('000 tons)	Capacity ('000 tons)	Production method	Input
ArcelorMittal Vanderbijlpark / Newcastle	2,950	4,800	BOF	79% iron ore and 21% scrap
ArcelorMittal *Vereeniging*	150	300	EAF	100% scrap
Scaw Metals	550	**600**	EAF	100% scrap
Cape Gate	450	450	EAF	100% scrap
Fortune Steel	120	120	Induction furnace	100% scrap
SA Steel Mills	220	300	Induction furnace & EAF	100% scrap
Veer Steel Mills	100	150	Induction furnace	100% scrap
UNICA Iron and Steel	160	**160**	Induction furnace	100% scrap
CISCO (just come out of business rescue)	200	350	EAF	100% scrap
Agni Steels (just doubled their capacity)	160	**160**	Induction furnace	100% scrap
SA Metal Group	100	100	Induction furnace	100% scrap
Evraz (just taken on by new consortium)	0	1,000	EAF	100% scrap
Columbus *(Stainless Steel)*	460	750	EAF	78% scrap
Saldanha bay (ArcelorMittal)	0	700	EAF (CONARC)	100% scrap
South Africa Total steel production	**5,620**	**9,940**		**Current production: 57% scrap**
				Upcoming capacity: 60% scrap

Sources: Genesis discussions with the South African Iron and Steel Institute and ArcelorMittal; 2015 South African Institute of Foundrymen, Presentation to the Portfolio Committee on Trade and Industry.
Notes: The table requires further research or industry confirmation. The extent to which Saldanha can process direct reduction iron should be considered further. The table excludes approximately 100,000 tonnes from foundries.

[2] According to McKinsey (2015) "The Growing importance of steel scrap in China" available at https://www.mckinsey.com/~/media/mckinsey/industries/metals%20and%20mining/our%20insights/the%20growing%20importance%20of%20steel%20scrap%20in%20china/the-growing-importance-of-steel-scrap-in-china.ashx in 2015, scrap metal accounted for 34% of steel production. See also the report by the Bureau of International Recycling (2019) "World Steel Recycling in Figures 2015 - 2019" available at https://www.bir.org/publications/facts-figures/download/643/175/36?method=view#:~:text=The%20proportion%20of%20steel%20scrap%20used%20in%20the%20country's%20crude,declined%20to%2069.1%25%20in%202019 p. 10, which suggests that EAF processes accounted for 27.9% of total steel production.

26. The table unpacks the importance of scrap metal in South Africa's steel industry. In 2021, scrap metal constituted the feedstock for approximately 57% of the steel produced in South Africa and 60% of the available capacity. Moreover, scrap metal was used as the exclusive input into almost all mills except for ArcelorMittal. This means scrap metal is essential for the maintenance of multi-firm competition.

27. However, this table understates the importance of scrap metal because it does not take into account the contribution of foundries which, like mini mills, use scrap metal as their exclusive input, relying on cheaper induction furnaces for smelting. Instead of using rolling technology, foundries cast liquid metal into very specific forms for use in virtually all sectors of the economy, including manufacturing, construction, and transport.

28. According the National Foundry Technology Network ("**NFTN**"), South Africa has 134 foundries (mainly located in Gauteng) of which 123 were operational as at June 2020.[3] Just under half of the foundries (47%) deal exclusively in ferrous products, 32% deal only in non-ferrous products, and 21% deal in both ferrous and non-ferrous products.[4] Three quarters of the industry use an induction furnace, "*which vary in size from 0.05 tonnes to 46 tonnes*."[5]

[3] NFTN. (2021). Quarter 4 and Annual Report of 2020/21. Available at https://www.nftn.co.za/wp-content/uploads/2021/02/NFTN-2019-20-Q4-and-Annual-Report_Web.pdf, (Last accessed, 13 March 2022).

[4] *Ibid*.

[5] *Ibid*. Other furnaces that are used include crucible, EAFs, and combustion based furnaces (fuel oil or natural gas).

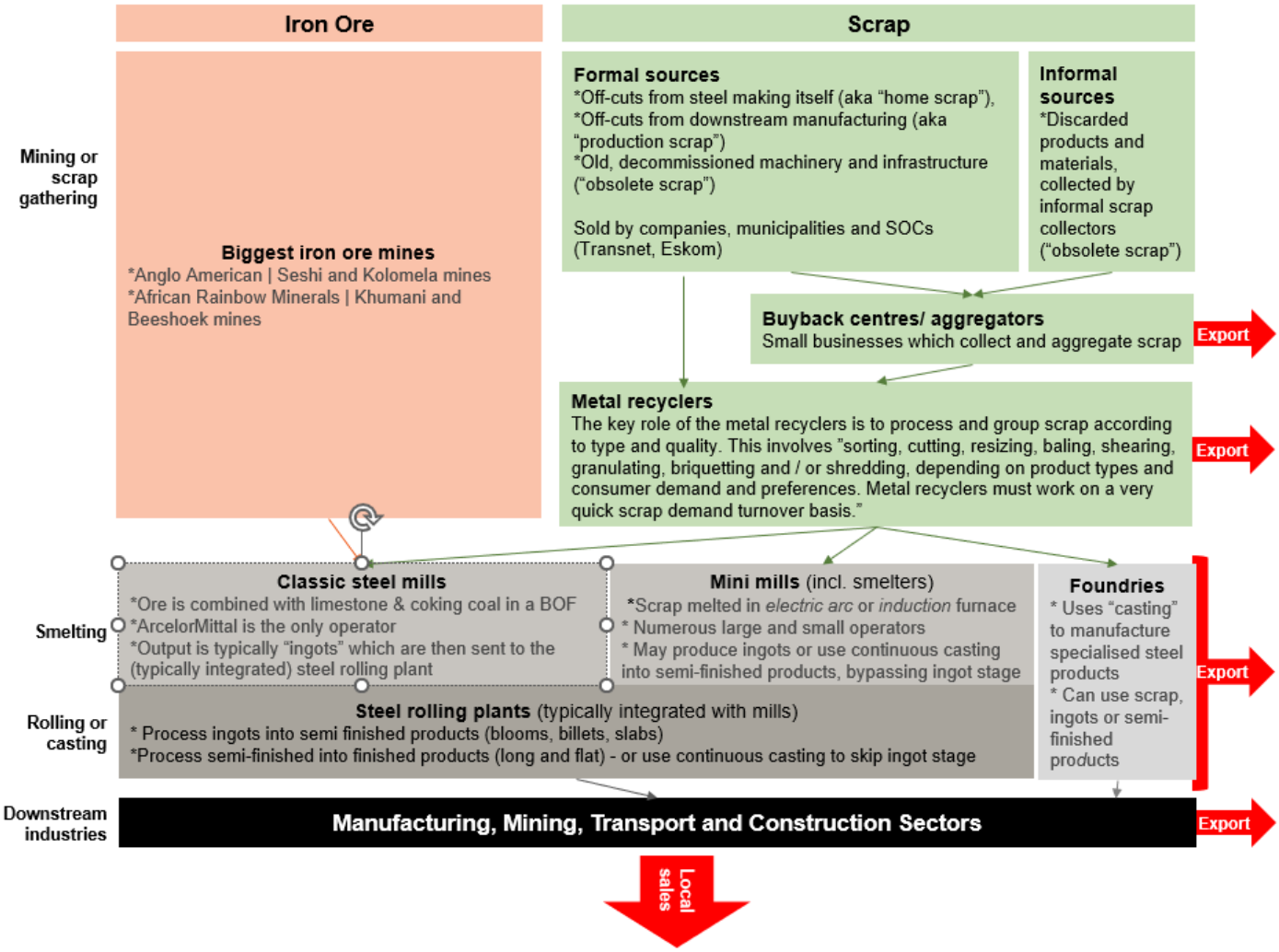
3. METAL THEFT IN SOUTH AFRICA

3.1. HOW STOLEN METAL ENTERS THE FORMAL ECONOMY

29. Scrap metal plays a crucial role in South African metal production. Relative to ore, it is more cost efficient and environmentally cleaner. But the ability to transform scrap metal into new metal has created a major problem. It has facilitated the rise of widespread theft of "metal-for-scrap" which has led to a significant destruction of national infrastructure.

30. To understand how stolen scrap enters the formal supply chain (or simply gets exported), consider the diagram below which sets out the broad sweep of the steel supply chain in South Africa, considering the use of both iron ore and scrap. While the diagram is focused on steel, very similar chains are present in the context of copper and other metals.

Figure 1: Overview of South Africa's steel supply chain



Source: Genesis analysis. Notes: Not shown in the table is the more limited, direct route from formal and informal sources of scrap supply directly into mini-mills and foundries.

31. We divide the supply of scrap metal into two categories, namely formal and informal sources.

    31.1. **Formal sources of scrap**. There are three formal sources of scrap: off-cuts from the steel making process itself; off-cuts from downstream manufacturing (including shavings, trimmings, etc.); and retired machinery and infrastructure that has reached its end-of-life. These formal sources of scrap are sold by companies, mines, municipalities and SOEs such as Transnet and Eskom. The scrap is typically sold to metal recyclers who may go to the company to collect the scrap, but more recently there have also been direct sales to mills.

    31.2. **Informal sources of scrap**. Obsolete scrap includes discarded products and materials that are collected and sorted by informal collectors. Informal collectors sort through waste in dustbins, informal dumping areas, and (when allowed) municipal landfills. The collectors gather a range of recyclable materials such as plastic, paper and metal. They sell these materials to so-called "buyback centres" who in turn sell the scrap metal to metal recyclers.

32. The main route through which stolen scrap enters the supply chain is through the informal channel. Criminals can sell their goods to buyback centres and aggregators (or even directly to small smelters, a notable route in the case of copper).

    32.1. ***Scrap exports.*** Currently each of these buyers can export the scrap out the country provided they comply with the Price Preference System ("**PPS**") and pay the export tax if applicable. As we will discuss further, these buyers can also smuggle the scrap out the country as semi-finished or finished metal products, or even using non-metal codes. These smuggling routes allow exporters to avoid the PPS and the export tax.

    32.2. ***Semi-finished exports.*** Alternatively, stolen scrap might be sold to smaller smelters, who melt the scrap into a crude semi-finished product which is then exported "legitimately" under a semi-finished code. The scrap can also make its way into the formal supply chain: metal recyclers sell shredded or melted scrap to classic or mini mills. The mills can then – inadvertently or advertently – process the stolen scrap into semi-finished products for formal export.[6]

    32.3. ***Finished products (local sales or exports).*** Finally, the mills might beneficiate the stolen scrap further, processing it into finished products for sale in the local market or for export into global markets.

33. Note that illegal scrap metal can often, but by no means always, be readily identified. *But once the metal has been shredded or smelted into billets, the original source is no longer identifiable, and the product can be freely traded.*

[6] Similarly, the mills might simply sell semi-finished product to local buyers (e.g. foundries) who further process the product into different forms

3.2. HIGH PRICES ARE A KEY DRIVER

34. In this context, the core reason for the increase in metal theft offences, is the rising cost of metals in world commodity markets. Indeed, metal prices have reached record highs in recent years. The high prices provide the payoff for extracting metal from existing infrastructure, melting it, and turning it into new metal products for sale in high-priced markets.

35. The world is currently in what is known as a super commodity cycle, when demand for raw material pushes commodity prices above their long-term trends. This cycle, which has lasted for more than 20 years, has been driven primarily by China's rapid industrialisation and China joining the World Trade Organisation in 2001.

36. The price trends of finished steel products and steel scrap products are shown in the figures below, respectively.

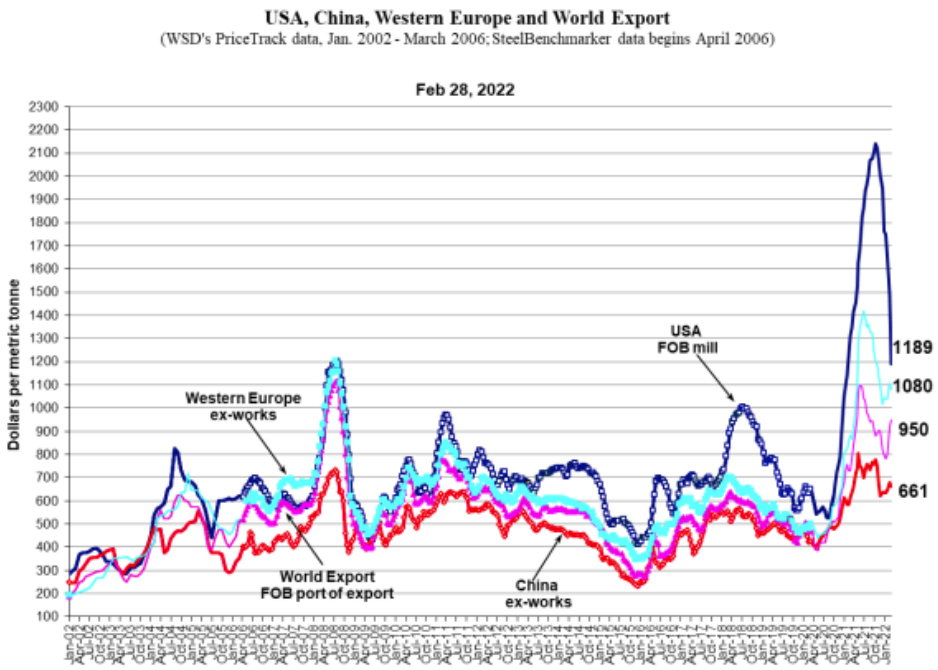
    36.1. ***Hot-rolled bars.*** The United States of America ("**USA**") free on board ("**FOB**") mill price of hot-rolled bars ("**HRB**"), a core steel product, has increased from $300 per tonne in January 2022 to around $1,200 per tonne in February 2022, after peaking at over $2,100 in October 2021.

    36.2. ***Cold-rolled bars.*** Cold-rolled carbon steel sheets increased from around $350 per tonne in January 2022, to $1,700 per tonne in February 2022, after a recent peak at $2,400.

    36.3. ***Steel plates.*** The price of steel plates has increased from around $350 per tonne to over $2,000 per tonne in Feb 2022.

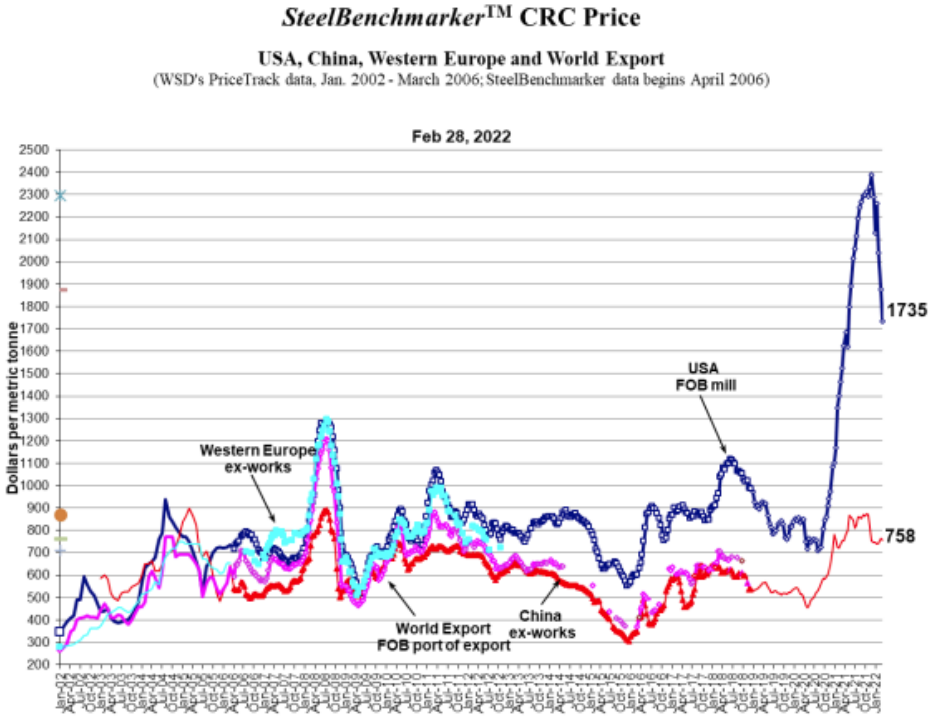
    36.4. ***Scrap.*** As a surplus demand caused the steel price to increase, the price of scrap followed, with shredded scrap increasing from just under $100 per tonne in January 2002 to nearly $500 per tonne in February 2022.

Figure 2: HRB price, 2002 – 2022



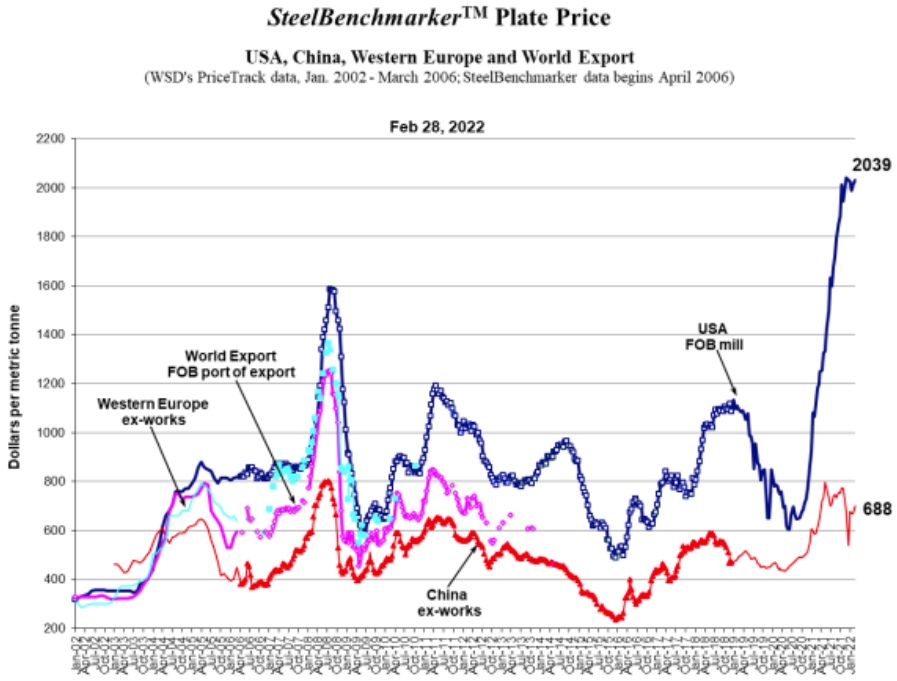
Sources: SteelBenchmarker, Price History, Tables and Charts.

Figure 3: CRC price, 2002 – 2022



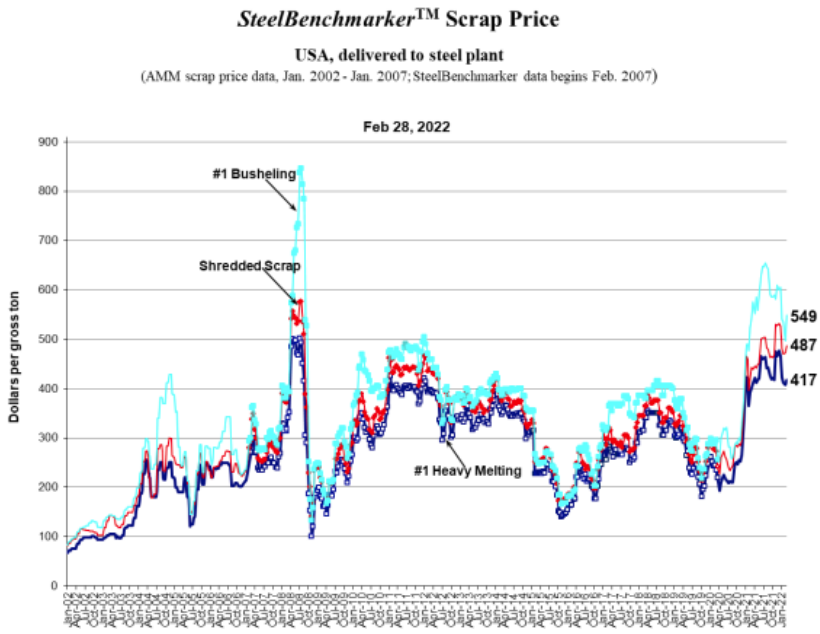
Sources: SteelBenchmarker, Price History, Tables and Charts.

Figure 4: Steel plates price, 2002 – 2022



Sources: SteelBenchmarker, Price History, Tables and Charts.

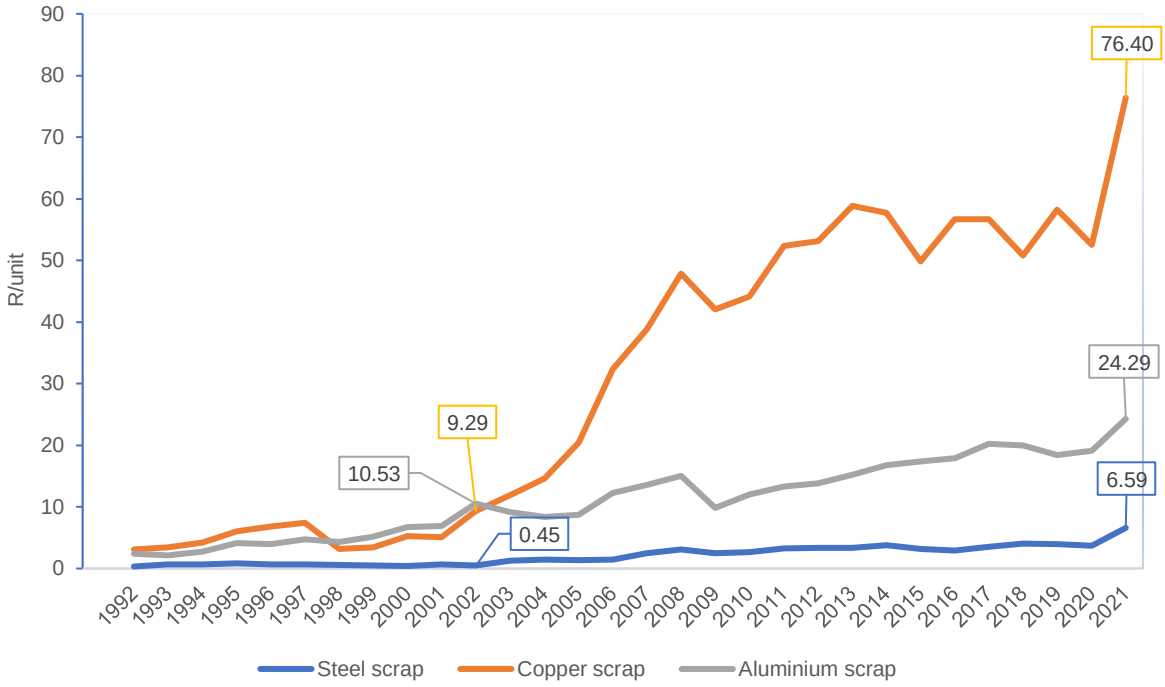
Figure 5: Scrap price, 2002 – 2022



Sources: SteelBenchmarker, Price History, Tables and Charts.

37. A depreciating Rand-US dollar exchange rate has further amplified the global high metal prices in ZAR terms. From 2002 to 2021, the average price of steel scrap increased from R0.45 to R6.59 per kilogram, the price of aluminium scrap increased from R10.53 to R24.29 per kilogram, and the price of copper scrap increased from R9.29 to R76.40 per kilogram, respectively.

Figure 6: Export prices (R/kg) for steel, copper and aluminium scrap



Sources: DTIC; Genesis calculations.

Note: The prices shown are average prices for all grades of exported scrap and do not represent a specific export grade as shown in the figures above.

38. The incentive to steal metal has increased dramatically. It is also important to note from the outset that even if South Africa's scrap metal prices had to decrease significantly due to policy interventions, the resulting price might still be higher than the price that prevailed only a few years back, when theft was still widespread. Further, if traders successfully smuggle the stolen scrap out the country, they can reach markets where the global price prevails.

39. **Interventions which are based exclusively on lowering local scrap prices (e.g., export taxes) are unlikely to be sufficient in the long run.**

3.3. COST OF THEFT TO SOUTH AFRICA

3.3.1. Cost of copper theft

40. TIPS has recently completed research on the economic costs of copper theft to South Africa. It is clear from the report that copper theft constitutes a serious threat to South Africa's national infrastructure, undermining both South Africa's low-cost rail advantage and its electrical grid. The table below summarises the key findings.

Table 2: Annual cost of copper theft based on 2020 to 2022 data

Theft item	Cost per year	Notes
Theft from Transnet		
Security, metal replacement, repair, lost service revenue	R4.6 billion	Transnet; for full year based on 10 months to Jan 2022
Gross forgone revenue faced by mines	R30 billion	Minerals Council
Additional costs faced by other business (including stoppages due to delayed inputs)	+R…	Likely to be significant; further research required
Theft from PRASA		
Metal replacement and repair	R1.6 billion	Pro rata of two years to Feb '22
Lost service revenue	R1.2 billion	
Lost employee wages	R0.4 billion	
Increased commuter costs (use of taxis)	R1.5 billion	
Increased road maintenance	+R…	
Theft from electricity networks of Eskom and Municipalities	R7 billion	Eskom country wide estimate
Theft from other businesses & associated costs	+R…	
Total costs from copper theft	**> R46.5 billion**	

Source: TIPS report (2022).

41. If only rail and electricity related theft is considered, the initial research suggests total gross economic costs exceeding R46 billion per annum. This figure excludes: a) rail service interruption costs faced by businesses outside the mining sector; b) increased road maintenance costs faced by the Government and/or service providers; and c) the costs from all copper theft outside the rail and electricity networks, including theft from mines, construction sites, factories, general businesses, and residential property.

42. Moreover, the R46 billion figure does not include other major society-wide costs, including:

    42.1. The long-term costs associated with decreased business and general confidence (from repeated, rail and electricity interruptions).

    42.2. The long-term costs associated with the loss of South Africa's low-cost rail advantage.

42.3. Loss of life including from: a) disrupted essential services (e.g. hospital power supply); b) attacks on security guards; c) explosions; d) transport-related accidents; and e) the death of the thieves themselves as they attempt to dismantle high-powered electrical infrastructure.

42.4. Environmental costs from the need to replace damaged infrastructure, and the fact that road transport causes higher emission than rail transport.

43. As discussed above, this is a world-wide problem. In both developed and developing countries, there is a significant upward trend in the number of incidents being reported each year, with varied responses from authorities that range from banning cash-for-scrap, mandating video recording of transactions, imposing stricter reporting requirements, to banning exports, strict licensing and banning trade completely.

44. The FBI recently concluded that "*copper thieves are threatening US critical infrastructure by targeting electrical sub-stations, cellular towers, telephone land lines, railroads, water wells, construction sites* […] *for lucrative profits*."[7] It is an especially intractable problem in countries with significant infrastructure, widespread poverty and weak police enforcement, like South Africa.

3.3.2. Cost of steel theft

45. While the theft of copper poses the most immediate and fundamental problem to South Africa, the problem of steel theft is also serious. The cost of steel theft has not yet been as clearly quantified as the cost of copper theft, but note the following:

45.1. The main steel assets being targeted include pylons and supporting lattices (for electrical transmission cables), streetlights, street robots, manhole covers, balustrades and railings.

45.2. The TIPS report (2022) shows that while Eskom managed to reduce copper theft relative to 2020/2021, the cost of theft of supporting steel lattices increased significantly to nearly R100 million.

45.3. In addition, in terms of local buying and selling, local storage, local transport and exports, non-copper metals (especially steel) are routinely used as a cover for stolen copper metal.

[7] FBI. (2008). *Copper Thefts Threaten U.S. Critical Infrastructure*. Available at: https://www.fbi.gov/stats-services/publications/copper-thefts. (Last accessed, 13 March 2022).

4. APPROACH TO THE ASSESSMENT

4.1. ANALYTICAL APPROACH

46. Genesis' assessment of the various policy options that might reduce metal theft was based on the following approach.

    46.1. First, we considered the overall costs of theft to South Africa and the main sources (metal type, infrastructure type) of these costs.

    46.2. Second, we considered how stolen metal finds its way into the formal local economy, either locally ("whitewashing"), or through exports ("smuggling").

        46.2.1. *Smuggling*. There are multiple smuggling routes for exporting stolen scrap, including using false metal codes, under-declaring value and getting scrap to small smelters after which it is then exported as semi-finished product.

        46.2.2. *Whitewashing*. Similarly, there are multiple entry points for scrap to find its way to large mills where it is processed into finished metal and sold locally or exported.

    46.3. Third, we considered how other jurisdictions approached the issue of metal theft.

    46.4. Fourth, we investigated the extent to which potential regulations would reduce metal theft, taking careful account of how crime syndicates might respond.

    46.5. Fifth, we analysed how different stakeholders in the South African scrap metal value chain are likely to be impacted by different regulations. The stakeholders included informal collectors, buyback centres and aggregators, metal recyclers, mills, foundries and downstream manufacturers.

    46.6. Sixth, for each proposed regulation (and combination of regulations) we compared the impact on: a) theft reduction; b) industrial stakeholders and metal production; and c) administrative burden.

    46.7. Seventh, on the basis of this analysis, we devised a proposed "new trading regime for scrap metal" in South Africa. The motivation for this set of recommendations is to secure the greatest reduction in theft, whilst: a) limiting any negative impact on the metal sector; and b) ensuring that regulations are practical from an administration perspective.

47. We have drawn on the following sources of information:

    47.1. To carefully study imports and exports, we used publicly available trade data from DTIC, SARS and global mirror available from trademap.org.

    47.2. To estimate the relevant sizes of the domestic steel and copper industries in terms of production, revenue, and employment; we used various sources of publicly available data. Data relating to certain parts of the copper industry was unavailable.

For instance, it was not possible to precisely determine the contribution of the foundries and mini mills because there is no specific industry category for such businesses. Nevertheless, based on data from the mines combined with interviews with two major copper mills, a preliminary estimate for the size of the copper industry was established.

47.3. We also engaged various stakeholders in the scrap metal industry using interviews and email correspondence. Stakeholders included industry associations, various mills, and recyclers.

47.4. We reviewed international approaches to reducing the theft of scrap metal based on publicly available information.

47.5. We reviewed previous work done by Genesis and TIPS in the scrap metal industry.

47.6. Finally, we also relied on the TIPS report (2022) to the DTIC which includes a detailed evaluation of the cost of metal theft.

4.2. CLASSIFICATION OF METAL CODES

48. There are various metals that have different market dynamics (e.g., copper vs steel vs aluminium). Each metal type in turn consists of thousands of different product specifications (e.g., long products vs short products and the different grades thereof).

49. Under the HS Convention, to which South Africa is bound, each product specification is allocated a 6-digit code. Through a careful consideration of code description and placement, we classified all HS metal codes by metal type and beneficiations status.

50. We considered 4 metal groupings:

    50.1. ***copper*** – which includes all red metals, including brass, bronze and nickel silvers as well as those mixed metals covered in the HS “72”;

    50.2. ***steel*** – including all ferrous metals;

    50.3. ***aluminium***; and

    50.4. ***other*** – all other metals, including zinc, magnesium, nickel, lead, tin, tungsten, molybdenum, tantalum, cadium, antimony, manganese, beryllium, chronium, germanium, vanadium, gallium, hafnium, indium, and niobium.

51. We considered 5 levels of beneficiation:

    51.1. scrap;

    51.2. semi-finished (e.g., billets, blooms, slabs);

    51.3. finished (e.g., long rods and flat metal sheets);

    51.4. structured (e.g., doors, windows, roofs and tanks); and

    51.5. fabricated (e.g., screws, bolts, hooks, needles).

52. In the end, this produced 20 categories of metal (4 metal groupings by 5 beneficiation levels). These 20 categories were the basic units used in our analysis. For a detailed list of all HS codes included in each of our analytical units, see Appendix 1.

53. Note, our classification of *scrap* codes matches the existing scrap codes used under the PPS. It is possible to argue that a specific 6-digit code should rather be classified as semi-finished as opposed to scrap or vice versa. The final codes included under scrap, semi-finished and finished products are important under our proposed solution as different regulations apply to the different levels of beneficiation. **The topic should be considered carefully in the implementation the final regulations.**

Semi-finished terminology

54. In numerous cases the analysis and the proposed regulations are the same for both scrap and semi-finished products. For ease of reading, we often employ the term “semis” to refer to semi-finished product, and the term “scrap/semis” to refer to both scrap and semi-finished product.

Metal focus in this report

55. The main metals of concern under this assessment are steel and copper. This is primarily due to their primary importance as a source of metal theft. Metals such as aluminium, magnesium, lead, zinc and others play less of a role in the domestic market as a source of theft and also contribute less to overall production. Accordingly, the sections that follow do not include a detailed analysis for these metal types.

5. INTERNATIONAL EXPERIENCE

56. To address increased levels of theft and associated infrastructure damage overseas, authorities have responded with various measures including banning cash-for-scrap, mandating video recording of transactions, imposing stricter reporting requirements, banning exports, strict licensing, and banning all trade.

57. The table below shows some[8] of the main theft-mitigation interventions imposed by authorities in overseas jurisdictions.

Table 3: Overview of international approaches

Country	Cash ban	Complete ban	Export ban	Reporting
Kenya	No	Yes	No	No
Italy	No	No	No	Yes
Kyrgyzstan	No	No	Yes	No
European Union ("EU")	No	No	No	Yes
United Kingdom ("UK")	Yes	No	No	Yes
Alberta, Canada	Yes	No	No	Yes
Victoria, Australia	Yes	No	No	Yes
Minnesota, USA	Yes	No	No	Yes
Zambia	No	No	Yes	No
Kuwait	No	No	Yes	No

Sources: Alberta. (2020). Scrap Metal Transactions. Available at: https://www.alberta.ca/scrap-metal-transactions.aspx. (Last accessed, 14 March 2022); UK Scrap Metal Dealers Act (2013); Future Recycling. (2018). Cash for Scrap Metal Banned. Available at: https://www.futurerecycling.com.au/cash-for-scrap-metal-banned. (Last accessed, 14 March 2022); Minnesota Statutes. (2021). 325E.21 Dealers in Scrap Metal: Records; Reports and Registration. Available at: https://www.revisor.mn.gov/statutes/cite/325E.21 (Last accessed, 14 March 2022); Kenyatta, U. (2022). President Kenyatta Announces Government Moratorium On Scrap Metal Trade. Available at: https://www.president.go.ke/2022/01/20/president-kenyatta-announces-government-moratorium-on-scrap-metal-trade/. (Last accessed, 14 March 2022); Osmonalieva, B. (2022). Kyrgyzstan temporarily bans exports of scrap metal outside EAEU. Available at: https://24.kg/english/219250_Kyrgyzstan_temporarily_bans_exports_of_scrap_metal_outside_EAEU/. (Last accessed, 14 March 2022); European Commission. (2021). Proposal for a new regulation on waste shipments. Available at: https://ec.europa.eu/environment/publications/proposal-new-regulation-waste-shipments_en. (Last accessed, 14 March 2022); Recycling International. (2011). Scrap export ban worries Zambian traders. Available at: https://recyclinginternational.com/business/scrap-export-ban-worries-zambian-traders/9087/. (Last accessed, 28 April 2022); Arab Times. (2022). Kuwait bans export of scrap iron. Available at: https://www.arabtimesonline.com/news/kuwait-bans-export-of-scrap-iron/. (Last accessed, 28 April 2022).

[8] The table should not be regarded as an exhaustive list of all countries.

Ban on cash transactions.

58. Various jurisdictions have banned the use of cash for certain (or all) scrap metal transactions. This includes Alberta (Canada),[9] the UK,[10] Victoria (Australia),[11] and Minnesota (USA).[12]

Complete ban (Kenya)

59. In Kenya, an export ban on scrap metal has been in effect since 2010[13]. It was made official law in 2015.[14] On 20 January 2022, despite the existence of a 12-year export ban, the Government of Kenya imposed a moratorium on the trade of scrap metal, which includes sourcing, dealing, exporting, buying, and selling. The purpose of the ban on scrap trade was to help end the rising cases of vandalism of key public infrastructure.[15]

60. The Kenyan Government has since devised a strict new trading regime. While the trading ban will be lifted, only registered and licensed businesses will be allowed to operate.[16] The Government has developed rules and regulations to guide the trade in consultation with relevant Government Ministries, Departments and stakeholders in the industry.[17] The rules will apply to collectors, agents, dealers, millers, smelters, transporters, steel fabricators, stockists of second-hand metal parts, motor vehicle salvage operators, electrical re-winders and Kenyan welding machines fabricators. The following outlines key new rules.

    60.1. All those who apply for licences will be specially vetted by a multi-agency team.

    60.2. A non-transferable licence fee will be payable and must be displayed conspicuously at each licensed site.

    60.3. Licensees will also be required to be registered members of certain organisations, which will establish self-regulating mechanisms to prevent traders from buying vandalised public infrastructure and stolen private property.

[9] Alberta. (2020). Scrap Metal Transactions. Available at: https://www.alberta.ca/scrap-metal-transactions.aspx. (Last accessed, 14 March 2022).
[10] UK Scrap Metal Dealers Act (2013).
[11] Future Recycling. (2018). Cash for Scrap Metal Banned. Available at: https://www.futurerecycling.com.au/cash-for-scrap-metal-banned (Last accessed, 14 March 2022).
[12] Minnesota Statutes. (2021). Dealers in Scrap Metal: Records; Reports and Registration. Available at: https://www.revisor.mn.gov/statutes/cite/325E.21 (last accessed, 14 March 2022).
[13] Recycling International. (2010). East African countries to ban scrap metal exports. Available at: https://recyclinginternational.com/business/east-african-countries-to-ban-scrap-metal-exports/8867/. (Last accessed, 28 April 2022).
[14] The Scrap Metal Act (2015).
[15] Kenyatta, U. (2022). *President Kenyatta Announces Government Moratorium On Scrap Metal Trade*. Available at: https://www.president.go.ke/2022/01/20/president-kenyatta-announces-government-moratorium-on-scrap-metal-trade/. (Last accessed, 14 March 2022).
[16] *Ibid*.
[17] *Ibid*.

60.4. Furthermore, every licensed dealer will only be allowed to transport scrap metal between half-past six in the morning to half-past six in the evening.

60.5. Specific licences must be displayed on the vehicles being used to transport any scrap metal.

60.6. Scrap metal from critical national infrastructure must be disposed to the Government-owned Numerical Machining Complex Limited and Kenya Shipyards Limited for smelting into billets.

60.7. Any person who undertakes scrap metal trade without a licence commits an offence and is liable for prosecution.[18]

61. On 26 April 2022, three months into the imposition of the complete ban, the Government announced a gradual lifting of the ban.[19]

Export bans

62. In addition to Kenya, in 2022 the Government of Kyrgyzstan imposed a temporary six-month export ban on ferrous scrap and waste to regions falling outside the Eurasian Economic Union area.[20] The measure is aimed at preventing the illegal export of ferrous waste and scrap. During 2011, the Zambian Government banned the export of scrap metal to protect the domestic steel industry.[21] In 2015 the Government took a decision to maintain the ban.[22] During March 2022, the Government of Kuwait issued a ministerial decision to ban the export of iron scrap for a period of 3 months from 17 March to 17 June 2022.[23]

63. Other countries that have imposed temporary or permanent export bans on scrap metal during the last 20 years to curb metal theft include Jamaica, Uganda and Fiji. Currently, there are calls for export bans in Zimbabwe and Australia.

Reporting and other requirements

64. Certain countries require all high-risk transactions to be actively reported to a central database. For example, Alberta (Canada) requires dealers to "*report transactions*

[18] *Ibid*.

[19] Mulinge, M. and Abdiaziz, M. (2022). *State to lift ban on scrap metal trade*. Available at: https://www.kenyanews.go.ke/state-to-lift-ban-on-scrap-metal-trade/. (Last accessed, 28 April 2022).

[20] Osmonalieva, B. (2022). *Kyrgyzstan temporarily bans exports of scrap metal outside EAEU*. Available online: https://24.kg/english/219250_Kyrgyzstan_temporarily_bans_exports_of_scrap_metal_outside_EAEU/. (Last accessed, 14 March 2022).

[21] Recycling International. (2011). *Scrap export ban worries Zambian traders*. Available at: https://recyclinginternational.com/business/scrap-export-ban-worries-zambian-traders/9087/ (Last accessed, 28 April 2022).

[22] Ploumis, P. (2015). *Zambia: Ban on scrap metal exports to continue*. Available at: https://www.scrapmonster.com/news/zambia-ban-on-scrap-metal-exports-to-continue/1/11236 (Last accessed, 28 April 2022).

[23] Arab Times. (2022). Kuwait bans export of scrap iron. Available at: https://www.arabtimesonline.com/news/kuwait-bans-export-of-scrap-iron/ (Last accessed, 28 April 2022). No other details are available at the time of submission of the report.

involving certain common forms of metal – including high-theft items like copper wire and catalytic converters – to law enforcement through a central database."[24] In Minnesota scrap metal dealers are required to register with the State, to video-record all purchase transactions, and to pay sellers by cheque or EFT rather than by cash.[25]

65. The UK requires dealers to record the details of any transaction involving scrap, and the failure to maintain complete details constitutes a criminal offence.[26] In Italy, scrap metal companies are required to notify Italian authorities of every export sale.[27] If export deals are not declared, an administrative sanction of 30% may be levied on the value of the transaction, with a minimum of not less than €30,000 for each individual transaction.[28]

66. The EU have recently proposed new measures on the export of waste, which includes scrap metal.[29] The proposal facilitates the shipment of waste within the EU to promote a circular economy and to address the export of illegal waste outside the EU. The proposal aims to achieve this by proposing stronger rules on the export of its waste challenges to non-EU countries, a more efficient system for the circulation of waste as a resource within the EU and better action against waste trafficking.

    66.1. The European Commission defines a circular economy as a transition "*where the value of products, materials and resources is maintained in the economy for as long as possible, and the generation of waste minimized*".[30] The objective of a circular economy is to maintain the value of resources in the economy for as long as possible.[31] According to the European Commission, a transition to a circular economy will bring the following benefits: alleviate some of the risks related to the supply of raw materials; boost the EU economy; increase the competitiveness of European businesses; create new business opportunities in the re-use sector and bring about innovative products, technologies and services, which can create new jobs in the EU; and contribute valuable benefits to the environment, including less waste and GHG emissions.[32]

[24] Alberta. (2020). *Scrap Metal Transactions*. Available at: https://www.alberta.ca/scrap-metal-transactions.aspx. (Last accessed, 14 March 2022).

[25] Minnesota Statutes. (2021). *325E.21 Dealers in Scrap Metal: Records; Reports and Registration*. Available at: https://www.revisor.mn.gov/statutes/cite/325E.21. (Last accessed, 14 March 2022).

[26] Dye, J. (2012). *Scrap Metal Cash Transactions are Banned*. Available at: https://resource.co/article/Latest/Scrap_metal_cash_transactions_are_banned-2518. (Last accessed, 14 March 2022).

[27] Capra, N. (2022). *Italian steelmakers, merchants clash over scrap exports*. Available at: https://eurometal.net/italian-steelmakers-merchants-clash-over-scrap-exports/. (Last accessed, 30 March 2022).

[28] *Ibid*.

[29] European Commission. (2021). *Proposal for a new regulation on waste shipments*. Available online: https://ec.europa.eu/environment/publications/proposal-new-regulation-waste-shipments_en. (Last accessed, 14 March 2022).

[30] European Commission. (2015). Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions: *Closing the Loop-An EU Action Plan for the Circular economy*. COM (2015) 614/2: Brussels, Belgium.

[31] *Ibid*.

[32] *Ibid*.

66.2. The export of waste to non-Organisation of Economic Cooperation and Development ("**OECD**") countries will be made conditional on an official request from the country to import non-hazardous waste (green-listed waste) from the EU. These countries will also be required to demonstrate their ability to recover and treat this waste in an environmentally sound manner. Waste exports to OECD countries will be monitored and can be suspended if they generate serious environmental damage in the country of destination. All EU companies that export waste will be required to conduct independent audits in the facilities where they intend to ship waste to show that those facilities are operating in an environmentally sound manner. As regards waste being illegally presented as "used goods", the EU proposes to establish specific, clear, and binding criteria to differentiate between waste and used goods for specific commodities of a particular concern. The aim is to ensure that items such as end-of-life vehicles, which are often labelled as used commodities, are not exported outside the OECD where they are likely to create a sizeable negative impact on the environment.

66.3. Within the EU, the proposal further strengthens action against waste trafficking, including setting up an EU waste shipment enforcement group, empowering the European Anti-Fraud Office to support investigations carried out by different EU Member States on waste trafficking, and providing stronger rules on administrative penalties.

6. TRADE BANS

6.1. A COPPER BAN?

67. The very high cost of copper theft raises the question of whether the ban of all copper scrap trading – both locally and though imports/exports – might be justified.

    67.1. *Exports of copper scrap/semis under a complete ban.* Note, a complete ban on the local trade of cropper would include a ban on the ability to export copper scrap/semis.

    67.2. *Imports of copper scrap/semis under a complete ban*. We also assume it would eliminate scrap/semis imports, because if these were allowed into the country it would undo the simple effectiveness of a complete ban – as traders could then more easily argue that their scrap/semis were from a legitimate source. To the extent that exceptions are made (allowing certain mills/foundries to import copper scrap), this moves the solution from a complete ban into a licensing-type regime which is discussed under our recommended solution in section 8.

68. In essence, a complete ban on copper scrap/semis would see South Africa sacrifice the benefit accrued from copper milling (which relies on scrap/semis) for the savings resulting from a reduction in copper theft.

69. The potential theft reduction and industrial impact are addressed in turn.

6.1.1. Impact on theft

70. A complete ban on all copper scrap and semis (for both local trade and exports) would deal a significant blow to existing stolen copper syndicates and networks. These syndicates currently operate "in the open": a) *openly* keeping yards full of shredded/melted copper; b) *openly* trucking shredded/melted copper around the country; c) *openly* coordinating the sale and purchase of copper scrap/semis both locally and across the border; and d) *openly* exporting the product out the country.

71. A ban would change the operating environment in two fundamental ways.

    71.1. It would **make local enforcement much simpler** – both for the police and for public prosecutors. *All* copper scrap and *all* semi-finished product would be completely banned. Any person or business caught in possession of copper scrap/semis (stolen or not) would be automatically subject to the penalties stipulated under the ban.

    71.2. It would **make border enforcement simpler** – as customs officials would only need to identify copper scrap/semis to prove that the shipment was illegal.

72. *Arguably*, the border enforcement problem would remain, to some extent, unresolved. There are two reasons for this.

72.1. ***Smuggling copper through "other metal" codes would remain open, unless these too were banned.*** It is a widely held view among stakeholders that copper scrap/semis are routinely smuggled out the country under other metal codes. Shipments might contain mixed metal types (e.g., steel, aluminium, copper and other) or grades (e.g., different types of semi-finished product), making it difficult for customs officials to check the contents "in the middle of the container".

72.2. ***Smuggling copper through "non-metal codes".*** There is evidence that smugglers have used non-metal codes that are completely unrelated to metal. Claiming the shipment consists of "polymers and ethylene" is one example that has resulted in conviction.[33]

73. Clearly, a ban on all copper trade would be bolstered if the exports of scrap/semis of all metal types were also banned. We return to the issue of smuggling in section 7 where export bans are analysed in detail. It is also discussed in section 8 where the proposed new trading regime is outlined.

74. But even putting aside enforcement at the ports, a complete copper ban would have a significant impact on theft.

74.1. It would push syndicates far deeper "underground" raising both: a) the chance and the cost of being caught; and b) the criminals' operating costs, thereby decreasing the net payoff for stealing copper.

74.2. It would cut off *local whitewashing* routes completely (as no legal business would be able to buy scrap/semi-finished product or produce finished product).

74.3. While a ban would not completely cut-off the ability to smuggle copper out of the country under a non-copper code, it would: a) make it substantially more difficult to get the copper to the port in the first place; and, once there, it would b) be easier for officials to identify an illegal shipment – i.e., any container with copper, (or any scrap/semis metal, if non-copper exports were also banned).

75. It is reasonable to conclude that a local ban on copper trading would work to substantially reduce copper theft, especially if the local ban was combined with an export ban of scrap/semis of all metal types.

6.1.2. Impact on copper mills and foundries

76. The local copper industry consists of the three types of producers.

76.1. Mines, which extract ore from the ground and combined with copper scrap, mill it into semi-finished and finished copper products.

[33] Sibanyoni, M. (2022). *Scrap metal dealer gets a hefty R600,000 fine*. Available at: https://www.sowetanlive.co.za/news/south-africa/2022-03-04-scrap-metal-dealer-gets-a-hefty-r600000-fine/. (Last accessed, 29 April 2022).

76.2. Mills, who rely exclusively on copper scrap to produce semi-finished and finished copper products.

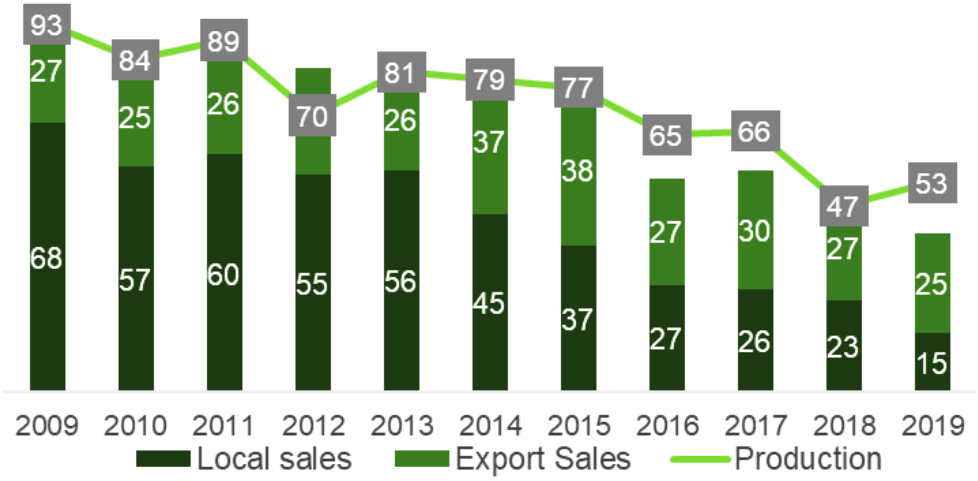
76.3. Foundries, who convert scrap or semi-finished into various products.

77. We consider each segment in turn.

6.1.2.1. Mines

78. As shown in the figure below, production from finished product from the mines has been declining over the last decade.

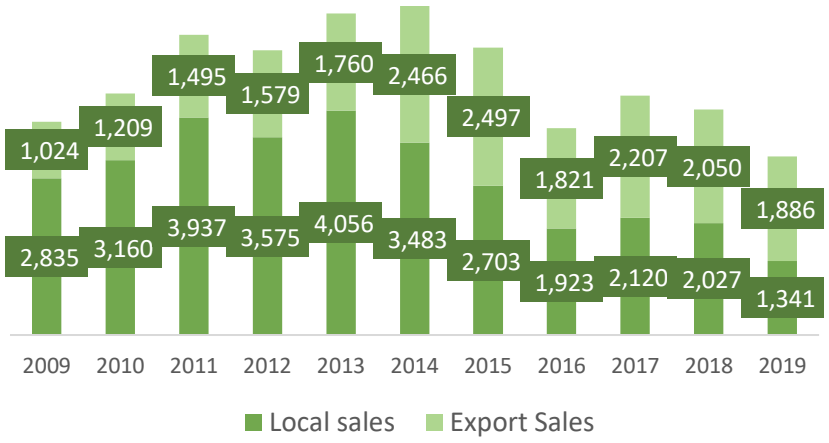
Figure 7: Copper production and sales from mines (tonnes '000), 2009 – 2019



Source: Mining data from the Mineral Council of South Africa; Facts and Figures 2019.

79. In 2019, SA mines produced 53kt of finished copper products. In the same year, the mines sold R1.8 billion worth of product locally, and R1.8 billion worth of product was exported, for total sales of R3.2 billion. The sales trend, shown in the figure below, shows a softer decline, as the volume drop has been cushioned to some extent by higher copper prices.

Figure 8: Copper sales from mines (Rm), 2009 – 2019



Source: Mining data from the Mineral Council of South Africa; Facts and Figures 2019.

80. We understand that even if a local ban was implemented, an exception would be devised for mines.

6.1.2.2. Mills and foundries

81. The table below sets out the current copper production capacity from mills and foundries (non-mines). This table is based on discussions with one of the copper mills and as such requires further industry confirmation. We understand that annual production levels are close to capacity.

Table 4: Copper production capacity estimates for mills and foundries, 2022

Copper mill	Capacity ('000 tonnes)	Notes
Reclamation Group	120,000	Import 60,000 tons of scrap + buy 36,000 locally; large majority of output exported as copper rods
Pioneer Metals	14,000	Specialised copper alloys; cupro nickel; brasses and bronzes
Capalcore	6,000	Branches in Cape Town, PE, Durban, Wadeville and Pretoria; produce copper tubing (LPG refrigeration coils); wire; flatbar; busbar + high copper alloys (electrolytic, phosphorus, etc)
Maksal Tubes	12,000	Tubes and fittings
Gold Circle Metals	6,000	Brass extrusions, Cast Iron, SG Iron, Minnox, Cast Bronze, Copper Extrusions, Ingot Alloys
Thos Begbie & Co.	12,000	
Aluminium Granulated Products	3,600	
Highveld Non-Ferrous Smelters	3,600	
Non ferrous Metal Works SA	18,000	Copper and copper alloys; advanced finished products
SA Metal Group	18,000	
Total medium size (non-mine) mills	213,200	
Total copper production from mills and foundries (excluding mines and smaller smelters)	222,300	

Sources: Non-Mine mill data from discussions with a scrap recycler; 2015 South African Institute of Foundrymen, Presentation to the Portfolio Committee on Trade and Industry.

Note: Genesis received copper production data from a metal recycler. Although the recycler controls a large market share, data from all mills and foundries is necessary in order to confirm the copper production capacity from mills and foundries.

82. The table excludes smaller smelters producing under 1kt per annum. It was suggested by one industry player that there may be over twenty smaller companies operating in South Africa, for a total production of 20kt[34]. The 220kt from mills and foundries combined with the 50kt from mines, and the 20kt from smaller smelters, suggests a total annual production of roughly 300kt (based on 2019 to 2022 data).

83. If 40,000 tonnes of mining sales secured R3.2 billion, total copper production of 300,000 tonnes would be worth R24 billion. Note, while this requires confirmation, the mines may be more focused on finished products, which earn higher revenue than semi-finished products. In fact, the ratio of tonnage to revenue from the mines was similar to the ratio enjoyed by another copper mill we interviewed, and that mill exclusively produces advanced finished products. Accordingly, the total revenue for the 300kt industry estimate may be lower given the grade and portion of semi-finished products in South Africa (e.g., 120kt of semi-finished from Reclamation Group).

[34] This is a very rough estimate, which requires further research.

6.1.3. Discussion

84. A complete ban on copper scrap/semis would cause the closure of copper mills and foundries.

    84.1. *Mines.* We understand that, as with BOF-based production in steel mills, a portion of copper production from the mines is based on copper scrap. If no exception was granted for mines to purchase copper scrap, the mines would face a significant increase in costs to reset their production processes to handle a feedstock that contained 100% ore and no scrap.

    84.2. *Non-mine mills and foundries.* We understand that the majority of non-mine mill and foundry production is based on copper scrap, though a portion is based on semi-finished product purchased from the mines or imported from international mills. If no exceptions were granted, this production would be shut down.

85. Considering that the copper industry generates an estimated R24 billion in revenue, or R21 billion excluding the mines, a complete ban might be justified given the more than R46 billion in gross economic costs from copper theft. While further research on net cost is required, the initial research suggests that even if a complete copper ban was only 50% effective, the short-run and long-run economic benefits would exceed the entire contribution of copper production to South Africa.

    An exception for mines

86. We expect that if a complete ban was considered, mines would be granted an exemption. There would be three important parts to this.

    86.1. Allowance would be made for mines to purchase scrap for feedstock, either by importing it from overseas or by allowing purchases from specific local sources (e.g., Eskom, Transnet, Municipalities).

    86.2. Allowance would also be made for mines to export semi-finished (and finished) product.

    86.3. Further, allowance may be made to allow mines to sell semi-finished product to very specific local buyers (and they would also be allowed to sell finished product locally).

    Further exceptions lead to a licensing regime

87. To the extent that further exemptions are granted to other major copper mills, the solution moves from a “complete ban” to a “licensing regime” approach, which we recommend and outline in section 8. A licensing approach will reduce, *to some extent*, the “ease of enforcement” benefit of a complete ban, as it will mean that the local trade of scrap/semis is sometimes legal, making it *somewhat* more difficult to catch and

prosecute illicit trade. But the major benefit of a licensing regime, as opposed to a complete ban, is that it allows local copper mills and foundries to survive.[35]

Summary

88. A complete ban would provide a direct and administratively uncomplicated measure to reduce theft. It would lower enforcement complexity since the mere possession of scrap/semis (stolen or not) would constitute grounds for arrest and censure. Government can expect a significant reduction of the more than R46 billion in theft costs outlined above. A complete ban would, however, close South Africa's copper mills and foundries, which based on initial data, are worth R21 billion in gross revenues.

89. While this may be justified given the size of copper theft, it is not recommended at this stage. The solution outlined in section 8 captures the key elements of a ban though it relies on **highly restricted trade** as opposed to a complete ban. Its major benefit is that it permits legitimate copper scrap/semis to continue to flow down the local supply chain, allowing South Africa to maintain its copper production base.

90. The table below highlights the theft and supply chain impacts of a trade ban. Further research questions are relegated to the footnotes.[36]

Table 5: Supply chain impact of a complete ban

Impact area	Complete ban on trade of copper scrap both locally and internationally
Theft	**Large savings from reduction in scrap-for-metal theft.** The remaining route out of the country would be to hide the scrap while in South Africa and then smuggle it out under a non-metal code (or a metal code if these were not also banned).
Informal collectors and buyback centres	**Loss of revenue** These providers would lose copper revenues, but could still trade in glass, plastic and paper (and other metals if these were not subject to a local ban).
Metal recyclers	
Mills	**Eliminated**
Foundries	**Eliminated**
Downstream manufacturing	**Negative impact** Would need to rely on imports.

Source: Genesis analysis.

[35] We note that the final exception to the mines – the ability to sell semi-finished product locally – will already soften the "ease of enforcement" benefit to some extent, although in a more limited manner than if exceptions were more generally applied within a licensing regime.

[36] To what extent do mill and foundries get feedstock from: a) South African mines; and b) imports of scrap vs c) locally supplied scrap? How much employment is generated in the non-mine copper mills and foundries and what is the labour impact across the value chain? To what extent does stollen copper account for local production and exports? Under a complete ban, how would South Africa deal with the build-up of unclaimed copper scrap, and would this be a problem given copper volumes?

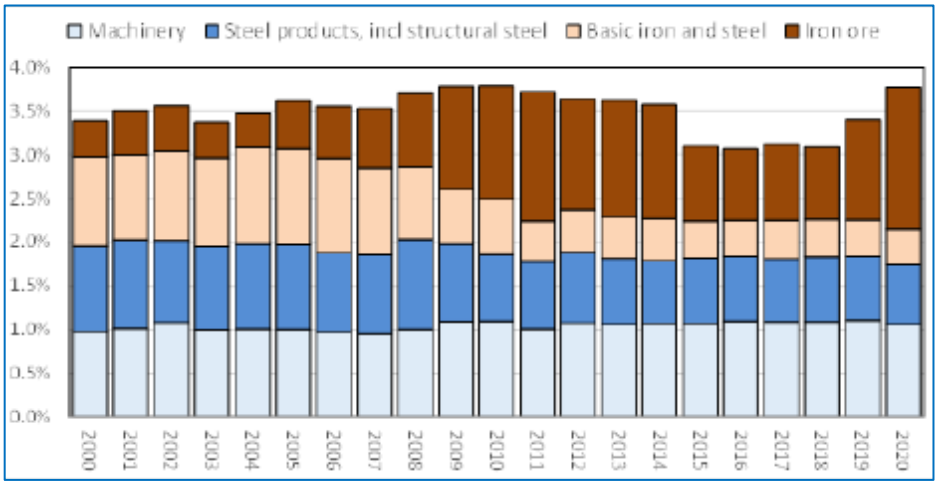
6.2. A STEEL BAN?

91. While a trade ban on *copper* scrap/semis is potentially reasonable, we do not believe that a trade ban on *steel* scrap/semis could be justified.

First, the importance of steel to South Africa

92. Steel is a considerably more important industry to South Africa than copper. The country is currently producing around 5m to 6m tonnes of steel annually. The steel value chain contributes 4% to GDP and provides approximately 200,000 jobs. The breakdown of the different parts of the steel industry are shown in the figure below.

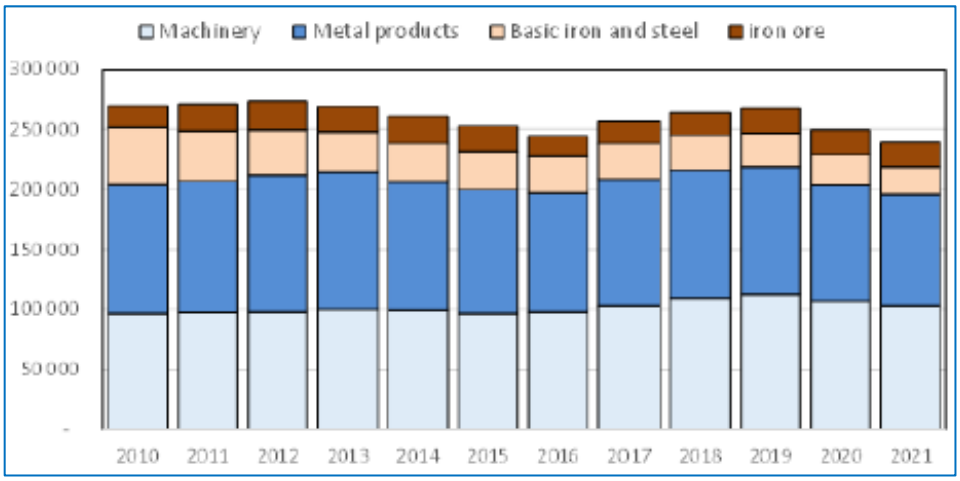
Figure 9: Share of the iron and steel value chain in GDP, 2000 – 2020



Source: TIPS Report (2022).

93. Formal employment in the iron and steel value chain was around 240,000 in 2021, with downstream machinery and metal products contributing almost entirely to this number.

Figure 10: Formal employment in the iron and steel value chain, 2010 – 2021



Source: TIPS Report (2022).

Second, the importance of scrap to South African steel

94. As shown in table 1, over 50% of South Africa's steel volume is produced from scrap metal. Banning the trade of steel scrap would decimate the steel industry in South Africa. It would cause a sharp reduction in supply and eliminate all of ArcelorMittal's competitors. We note that it would also raise the cost of ArcelorMittal's production, as they use a 79:21 ore to scrap ratio in order to secure low cost, an optimisation that could not be sustained under a total scrap ban.

95. All the arguments that Government used to justify the PPS and the export tax policy could be used against Government if they sought to implement a complete ban on scrap metal trading.

96. In particular, making scrap metal readily available at low prices promotes downstream beneficiation because it lowers the cost of the overall metal supply chain. In turn, this better enables manufacturers to compete against their international rivals. This is precisely the intention behind the current PPS and export tax policy. A complete ban on steel scrap would move starkly against all these objectives.

Third, the costs of steel theft are lower and less well articulated

97. Finally, given that copper is the central source of metal theft costs, and steel costs have not been as well articulated at this stage, it is highly unlikely that a total ban on steel scrap can be justified.

7. EXPORT BANS

98. The banning of exports offers Government an "administratively simple" tool to tackle theft. We consider two potential bans: a) a ban on scrap and b) a ban on semi-finished product. We also comment on the extent to which smuggling might occur even if both these categories were banned.

99. What constitutes an effective export restriction? Merely increasing **export taxes** is unlikely to constitute a sufficiently bold move against theft. Export taxes rely exclusively on the price incentive, but relative to an export ban the fundamental physical channel remains open. Recall, even if the domestic price of scrap had to drop significantly in response to an export tax, the resulting price could still be higher than a few years ago when theft was also widespread. Traders can also respond to an export tax by increasing evasion tactics like under-declaring. An export tax would add incrementally to the fight against theft because it would cause a drop in the average price of local scrap, but if scrap and semi-finished metal export codes remain open, syndicates will use these to reach international markets where a global price prevails.

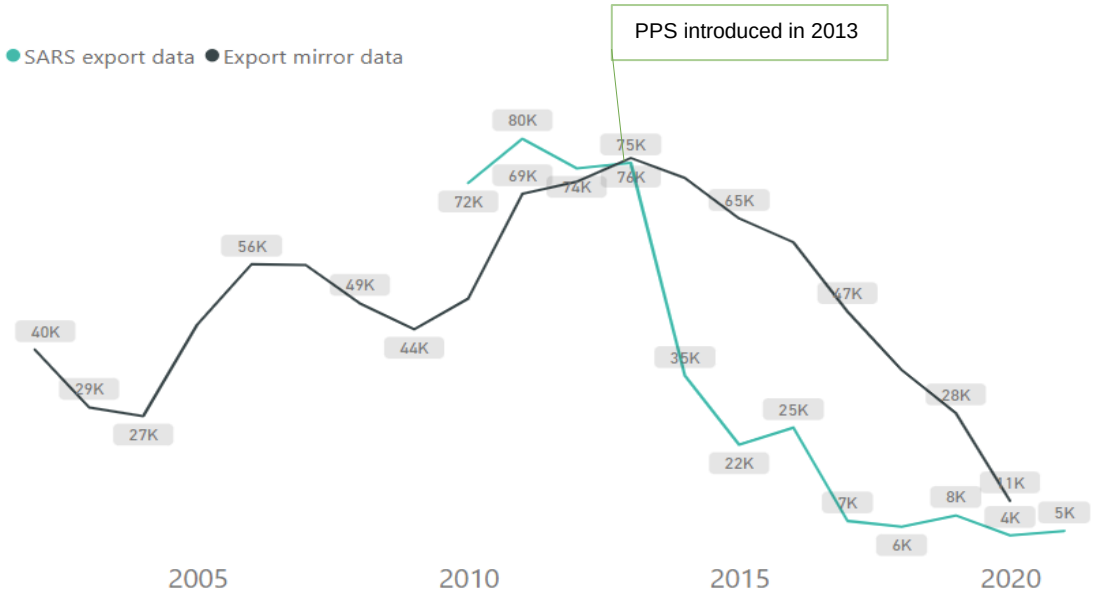
100. Accordingly, this report focuses on full export bans.

7.1. BANNING SCRAP EXPORTS

7.1.1. An export ban on copper scrap

101. South African exports of copper scrap have plummeted since 2013, decreasing from around 75kt per year to around 10kt per year. According to the export data captured by SARS, South Africa only exported approximately 4kt of copper scrap in 2021. And as shown in the figure below, the global mirror data shows an amount of approximately 11kt in 2020.

Figure 11: Exports of copper scrap (H7404 copper waste and scrap) (tonnes), 2001 – 2021



Sources: SARS; Trademap; Genesis calculations.

102. The fundamental driver of the decrease in the export of copper scrap was the introduction of the PPS. While it clearly drove a wedge between declared and actual exports of copper scrap, overall exports of copper scrap still declined rapidly, and the "declaration gap" has narrowed significantly.

103. Given that South African copper production is around 300kt tonnes, a large majority of which is based on scrap, the diversion of 4kt to 11kt of scrap to the local market will not have a significant impact on the domestic prices of copper scrap in South Africa.

104. However, there are still benefits to the imposition of a ban on the export of copper scrap.

    104.2. An export ban will not lead to a significant negative effect to the industry, because the small number of legitimate exports of copper scrap can easily be pushed downstream into more beneficiated products. Through under declaring, the category might be used to export more scrap than is currently shown in the mirror data.

    104.3. Illegally obtained items may be overrepresented in exports of scrap and waste category.

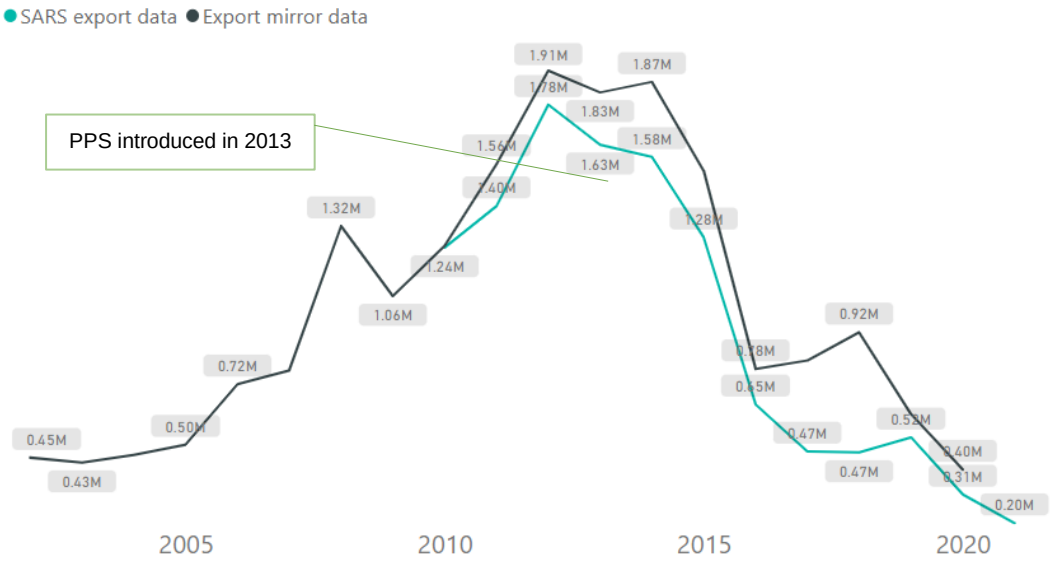
    104.4. An export ban will simplify monitoring and control.

105. Our view is that the benefit of an export ban on copper scrap outweighs any associated cost.

7.1.2. An export ban on steel scrap

106. The export trends in steel scrap closely align with those shown for copper. As shown in figure 12, the introduction of the PPS caused (recognised) steel scrap exports to plummet.

Figure 12: Exports of steel scrap (H7204 ferrous waste and scrap) (tonnes), 2001 – 2021



Sources: SARS; Trademap; Genesis calculations.

107. Relative to copper, it is less clear that the PPS drove a wedge between declared and actual steel scrap exports. Overall, both declared and actual scrap exports declined rapidly since the introduction of the PPS.

108. According to SARS export data, South Africa only exported around 200,000 tonnes of ferrous waste and scrap in 2021. If mirror data is considered, the recent trend would suggest a total of around 300,000 tonnes. Relative to South African production in excess of 5m tonnes of steel, over 50% of which comes from scrap, the diversion of 200,000 tonnes of scrap metal to the local market will have a limited impact on South Africa's domestic steel scrap prices, especially considering the extent to which PPS and export taxes have already lowered the price pressure from exports.

109. However, as with copper, there are still benefits to a temporary ban on scrap exports.

    109.1. First, it will not lead to a significant negative impact on the steel industry as the small amount of legitimate scrap exports can easily be pushed downstream into more beneficiated products. The new scrap-based steel production that is due to come online (shown in table 2) far exceeds 200,000 tonnes.

    109.2. Second, through under declaring, this category might be used to export more scrap than is currently shown in the mirror data.

109.3. Third, stolen items may be overrepresented in scrap exports.

109.4. Fourth, the steel scrap export category can be used as a cover for copper exports. **If significant amounts of copper scrap are exported within the 200kt of steel scrap that leaves the country, this would be a highly significant amount of copper relative to the 200kt local copper industry.**

109.5. Fifth, a ban on steel scrap exports will simplify monitoring and control.

110. Until Government makes progress in the implementation of the new trading regime, it is reasonable to ban the export of steel scrap, which will help to reduce an outlet for both steel and copper theft whilst providing a direct beneficiation benefit. [37]

7.1.3. An export ban on other scrap metal

111. In this report, we have not directly considered the theft costs or the export trends of other scrap metals (besides steel and copper). However, the observation that steel scrap exports provide cover for stolen copper is equally applicable to other scrap metals. This provides motivation to include all metals in a temporary ban on scrap exports – until progress has been made in the implementation of the new trading regime.

7.1.4. Summary

112. There is a reasonable argument that a ban on the export of scrap for all metals is in the public interest. Accordingly, it forms part of our recommended solution. The table below summarises the supply chain impact of an export ban on scrap metal.

Table 6: Supply chain impact of an export ban on steel and copper scrap

Impact area	Complete ban on trade of copper scrap both locally and internationally
Theft	**Limited direct impact** Scrap exports already low, but banning the category has several benefits.
Informal collectors and buyback centres	**Mildly negative** Scrap exports already low relative to overall steel scrap supply; and these players can continue to supply scrap metal to local market and earn non-metal revenues.
Metal recyclers	
Mills	**Mildly positive advance in beneficiation** Scrap exports already low, but to the extent that the scrap category is used to under declare scrap exports (which is not picked up in mirror data either) the beneficiation benefit will increase.
Foundries	
Downstream manufacturing	

[37] We note that in 2021, SARS recorded R1.31b of steel scrap exports, R1.27b of aluminium scrap exports, and R0.38b for copper scrap exports.

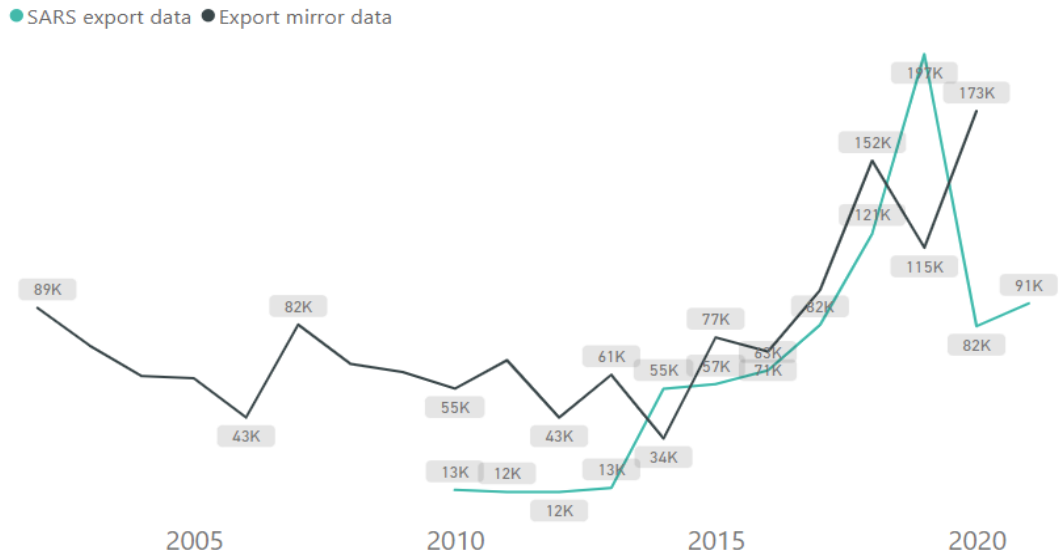
Source: Genesis analysis.

7.2. BANNING SEMI-FINISHED EXPORTS

7.2.1. An export ban on semi-finished copper

113. Semi-finished exports reached 197kt in 2019 (pre-Covid), which is highly significant. The global mirror data largely reflects the data obtained from SARS data. This is shown in the figure below.

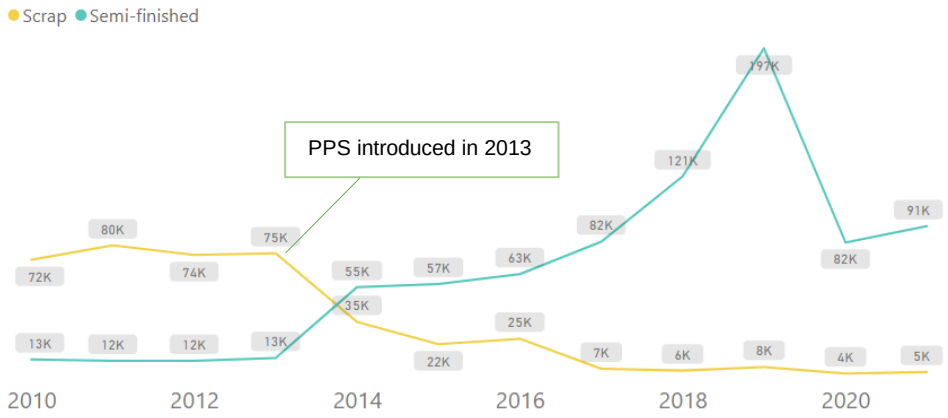
Figure 13: Exports of semi-finished copper products (tonnes), 2001 – 2022



Sources: SARS; Trademap; Genesis calculations.

114. The large upswing in semi-finished exports was sparked by the introduction of the PPS in 2013. As shown below, the PPS caused South African traders to switch from the export of copper scrap to the export of semi-finished products.

Figure 14: Exports of scrap versus semi-finished copper products (tonnes), 2001 – 2021

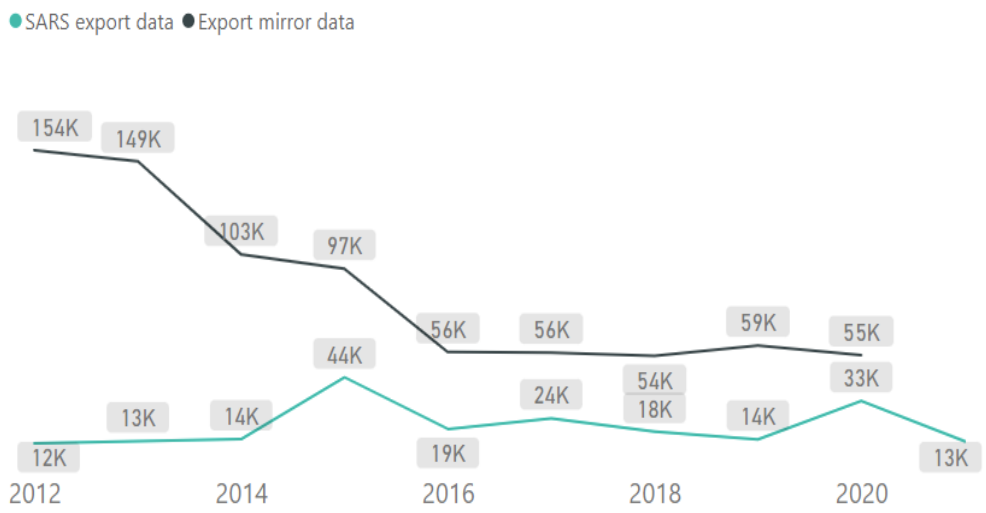


Sources: SARS; Trademap; Genesis calculations.

115. Given that South Africa has a production capacity of 300kt (semi-finished and finished combined), the fact that 200kt is exported as semi-finished requires explanation. According to SARS, South Africa also exported a further 14kt of finished copper products in 2019. As shown in the figure below, the mirror data shows 59kt of finished copper exports in the same year.

116. Thus in 2019, South Africa exported between 211kt and 256kt of semi-finished and finished copper products.

Figure 15: Exports of finished copper products (tonnes), 2001 – 2021



Sources: SARS; Trademap; Genesis calculations.

117. According to the Department of Mineral Resources and Energy, copper mines exported 25kt of product in 2019. This suggests that the balance of exports (186kt to 225kt) comes from the non-mine mills, which have a capacity of 220kt. It is implausible to suggest that practically all the non-mine mill production is exported. As with steel, it seems that a portion of the exports of semi-finished copper products received overseas will be scrap.

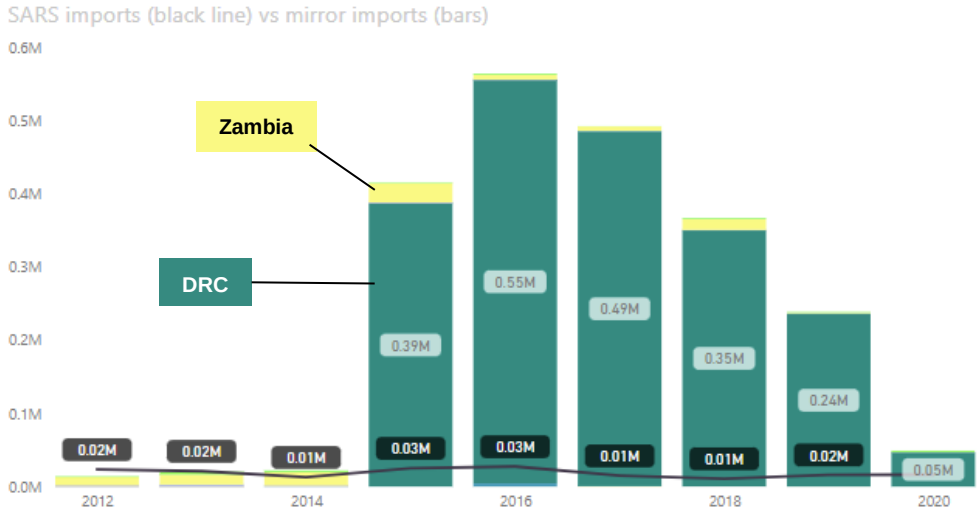
H7406

The export of granulated copper cable is one of the major concerns. Stolen copper cables are potentially granulated or cut/chopped into small pieces and declared as granules, which would fall under the H7406 product code. Granules are not regarded as scrap by SARS's Customs division under the HS codes. This product code is not included under the PPS nor is an export permit required from the International Trade Administration Commission ("**ITAC**"). The code is classified as semi-finished within this report.

Are exports of semis merely diverted inputs?

118. As shown in the graph below, the mirror data exhibits a large spike in the *importation* of semi-finished copper products from the Democratic Republic of the Congo ("**DRC**") between 2015 and 2019.

Figure 16: Imports of semi-finished copper (tonnes), 2012 – 2020



Sources: SARS; Trademap; Genesis calculations.

119. It is possible that this is the source of a large portion of the semi-finished *exports* recorded over the same period. We note that the SARS export data, which does specify the country of origin as being different to South Africa in various cases, shows 99% of exports as originating in South Africa throughout the period. This is a question that deserves further research.

7.2.1.1. Impact on theft

120. Regardless of whether the exports of semi-finished copper products are actual semi-finished products or scrap, banning semi-finished exports and diverting 200kt of copper to the local market will have a significant impact on market dynamics. It will:

    120.1. drive down the price of copper scrap, the most significant input into the production of semi-finished products, and hence decrease the incentive to commit theft,

    120.2. close off an outlet for theft, and

    120.3. advance beneficiation, as millers channel scrap and semi-finished product into finished product.

7.2.1.2. Impact on supply chain

121. A ban on semi-finished product will, however, negatively impact two parts of the supply chain, namely:

    121.1. copper mills; and

    121.2. upstream collectors and metal recyclers.

122. The negative impact of the approximately 200kt of exported semi-finished copper products will be mitigated by:

    122.1. the extent to which semi-finished exports are really imports from other countries;

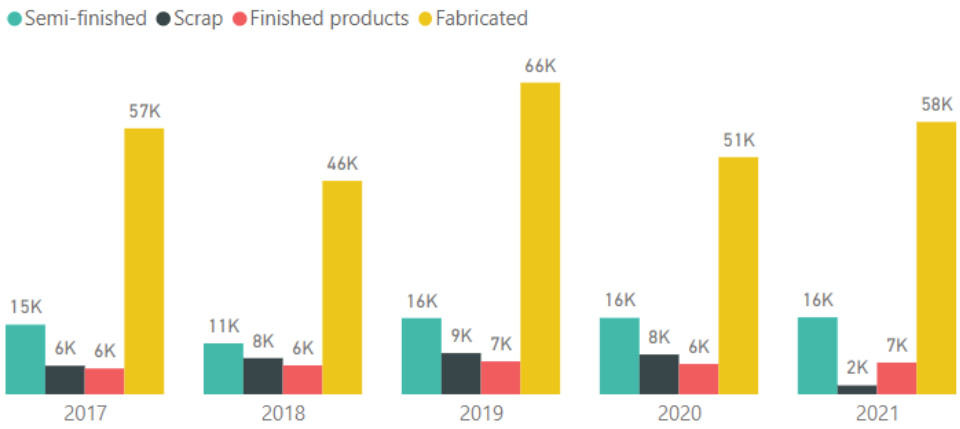
    122.2. the extent to which semi-finished exports are really (illegal) scrap exports from traders;

    122.3. the extent to which the inputs into semi-finished products are illegally obtained and hence are a net negative to society; and

    122.4. the ability of copper mills to advance beneficiation and switch from semis to finished products; finished products can be exported – or sold locally, by replacing imports of finished products.

123. The volume of existing scrap and semi-finished imports might also be replaced. As shown in the figure below, the scrap, semi-finished and finished categories amounted to 32kt in 2019. A further 66kt of fabricated products were also imported in 2019.

Figure 17: Imports of all copper products (tonnes), 2017 – 2021

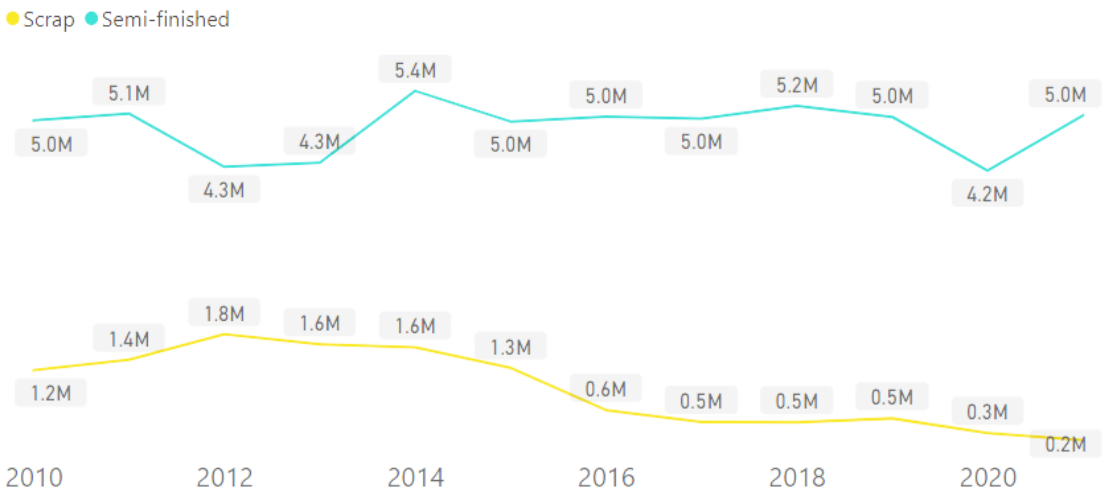


Source: SARS; Genesis calculations.

7.2.2. An export ban on semi-finished steel

124. Unlike with copper, the PPS does not appear – at first glance – to have caused a switch from scrap exports to semi-finished exports. Scrap exports declined yet semi-finished exports remained largely steady at around 5m tonnes.

Figure 18: SARS export data on scrap vs semi-finished steel products (tonnes), 2010 – 2021



Sources: SARS; Genesis calculations.

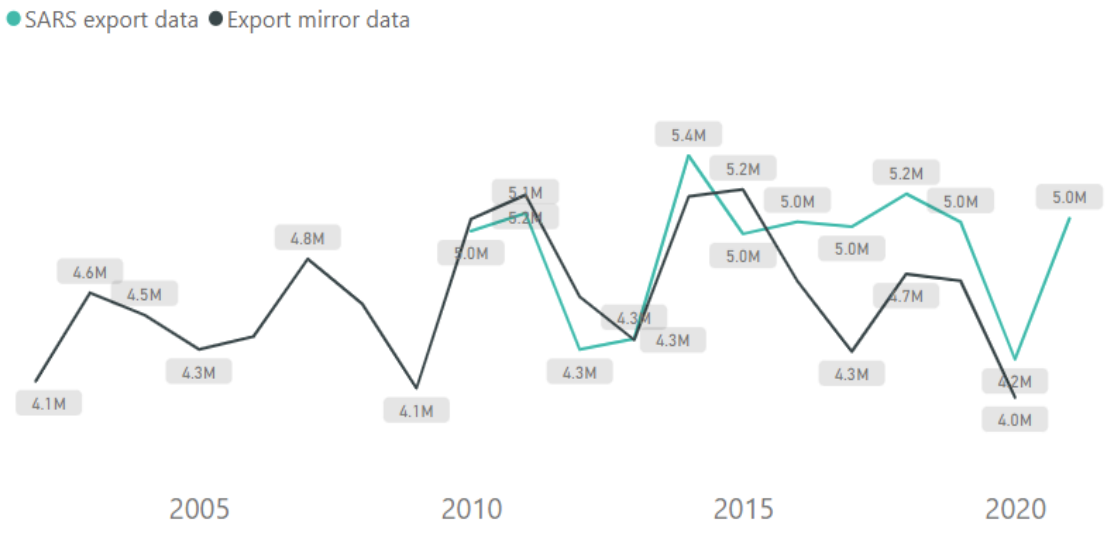
125. Yet, relative to South Africa's production capacity of between 5m and 6m tonnes, South Africa's 5m tonne export of semi-finished steel in 2021 requires explanation.

126. First, note that as shown in the figure 19, the mirror data largely reflects the high rate of semi-finished exports.

127. Second, the 2020 export data shows an additional 1.1m tonnes (mirror) to 1.3m tonnes (SARS) of *finished* product, and a further 1.2m tonnes of *finished* product in 2021 (SARS). In 2021, this implies that South Africa exported over 6m tonnes, more than the country's entire production capacity.

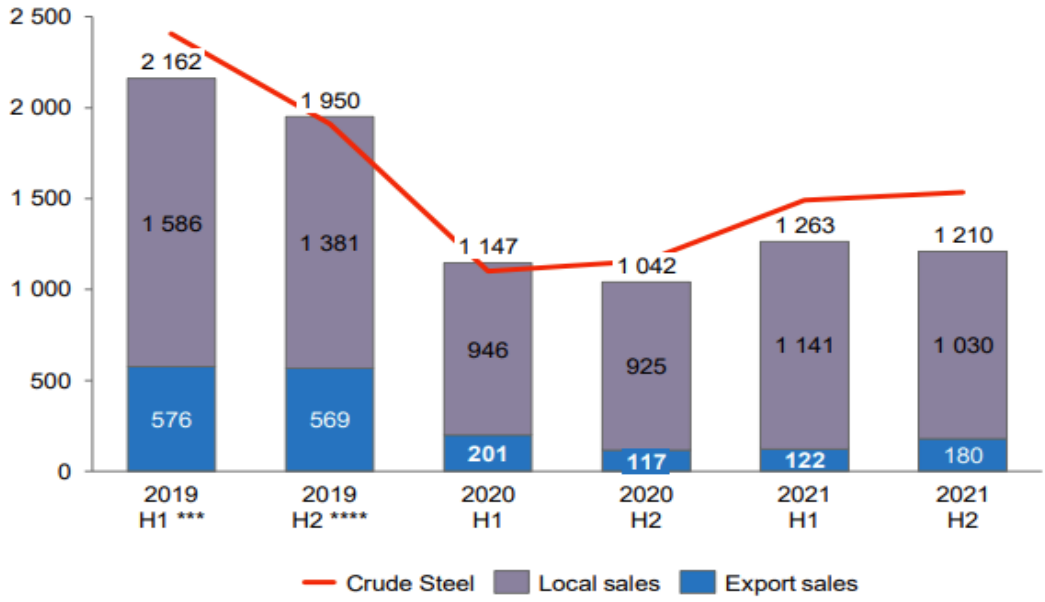
128. Third, as shown in figure 20, ArcelorMittal only exported 300kt of product in 2021.

Figure 19: Mirror data on exports of semi-finished steel products (tonnes), 2001 – 2021



Sources: SARS; Trademap; Genesis calculations.

Figure 20: ArcelorMittal production, export and local sales ('000 tonnes), 2019 – 2021



Source: ArcelorMittal financial results for the period ended on 31 December 2021.

129. Even if mini mills exported their entire production (2.5m tonnes), this – together with the 300kt of exports from ArcelorMittal – would imply that only 2.8m tonnes of product could have been exported. This is 3.2m tonnes under the 6m tonnes of exports shown in the export data. This analysis strongly suggests that the 3.2m tonnes of semi-finished exports is really scrap being falsely declared as semi-finished product. Since it is not

correct that mini mills export the entirety of their production, **well over 3.2m tonnes of semi-finished exports are likely to be scrap falsely declared as semi-finished.**

130. This has sometimes been picked up, but only to a limited extent, by the overseas authorities. For example, in 2017 and 2018, SARS recorded average annual exports of 5m tonnes, whereas the mirror data shows 4.5m tonnes – a difference of around 0.4m tonnes. In the same period, SARS recorded just under 0.47m average tonnes of steel *scrap* export, while the mirror data recorded 0.86m tonnes – a difference of around 0.4m tonnes. So, within this period, it appears the overseas authorities correctly identified 0.4m tonnes of supposed semi-finished export as scrap. However, our analysis suggests that the overseas authorities missed millions of tonnes of falsely declared product.

131. In the context of declining steel production in South Africa since 2008, this also helps to explain why the exports of semi-finished products remained relatively stable throughout the period. The PPS likely *did* cause a switch from scrap to semi-finished exports, but the declining production since 2008 served to counter the increase, keeping overall semi-finished exports appearing flat.

7.2.2.1. Impact on theft

132. As with copper, the export of semi-finished steel products is large and significant. Regardless of the extent to which this category is actual semi-finished product or falsely declared scrap, a ban on the category will:

    132.1. lower scrap prices (the main feedstock into semi-finished products) and decrease the incentive for criminals to commit acts of theft,

    132.2. cut off an outlet for theft - both for steel and to the extent that steel semis are used a cover for copper scrap/semis, and

    132.3. provide a significant boost to beneficiation.

7.2.2.2. Impact on industry

Mills

133. Steel mills and upstream collectors and metal recyclers will be negatively impacted by a ban on semi-finished exports. However, the negative impact on the milling of semi-finished products will only concern a sub-set of mini mills. We understand from ArcelorMittal that an insignificant portion of their exports are in semi-finished form and exports themselves only represent 12% of their overall production. Further, some large mini mills do not export any semi-finished product, as they are already fully beneficiated into finished products.

134. For the remaining mini-mills that do export semi-finished product, the 5m tonne negative impact will be mitigated by:

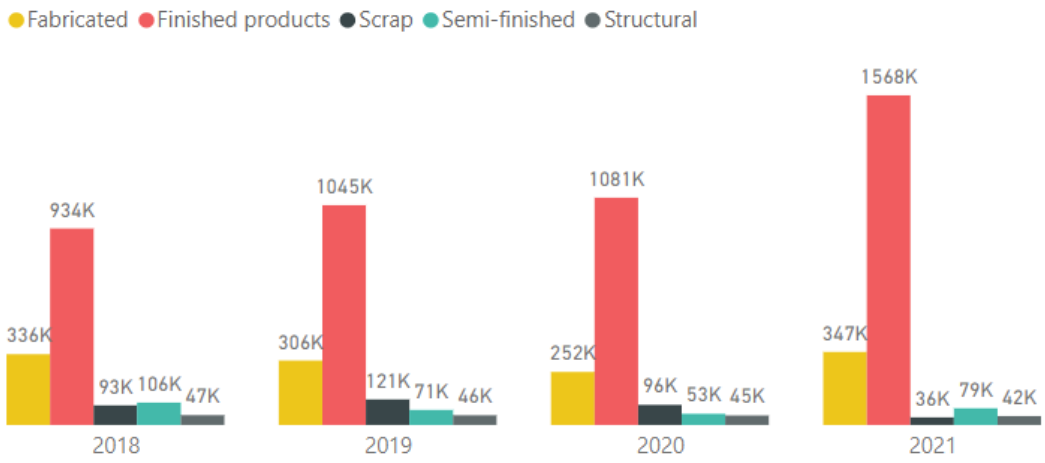
    134.1. the extent to which semi-finished exports are really scrap exports from traders, which can cut the 5m tonnes amount down by 3m tonnes or more;

134.2. the extent to which semi-finished exports are really imports from other countries[38];

134.3. the extent to which the inputs into semi-finished products are stolen goods and hence a net negative to society; and

134.4. the mill's ability to advance beneficiation, sell finished products freely on the international market, or replace imports of semi-finished products (85,000 tonnes), finished products (1.6m tonnes), and potentially products further downstream (400,000 tonnes of structured and fabricated products). See the figure below for a breakdown of recent import data.

Figure 21: Imports of steel products (tonnes), 2018 – 2021



Source: SARS; Genesis calculations.

Upstream collectors and recyclers

135. Due to a decline in demand from the mills, upstream collectors and recyclers will be negatively impacted to the extent that the mills cannot process legally acquired scrap into finished products through beneficiation. The loss of revenues from the following sources can be safely ignored:

135.1. the inability to falsely declare (illicit *or legal*) scrap as semi-finished products[39]; and

135.2. the inability to supply illicit scrap to smelters and mills for processing into semi-finished products for the export market.

[38] From 2015 to 2019, there was an import surge averaging 100kt per annum from Zimbabwe, which was reflected in the mirror data, but not in the SARS data.

[39] Even if substantial amounts of the exported scrap are not stolen, just falsely declared, it would be inappropriate for industry players to request that the stopping of this illegal activity should be included as a negative. The diverted scrap would contribute to beneficiation objectives in keeping with the PPS and recent export taxes.

7.2.3. An export ban on semi-finished other metals

136. In this report, we have not directly considered the theft costs or the export trends of other metals (besides steel and copper). However, the observation that steel scrap and semi-finished exports provide cover for stolen copper is equally applicable to other metals.

137. Traders can smuggle copper scrap/semis out of South Africa through other (non-copper) metal codes for scrap/semis. It is a widely held view among stakeholders that copper scrap/semis are routinely smuggled out of the country under other metal codes. Shipments might contain mixed metal types (e.g., steel, aluminium, copper and other) or grades (e.g., different types of semi-finished), making it difficult for customs officials to check the contents “in the middle of the container”.

7.2.4. Summary

138. For both steel and copper, a ban on all exports of semi-finished products will have a significant impact on market dynamics. It will lower scrap prices and decrease the incentive to steal. It will cut off a theft outlet and advance beneficiation. In our view, it would be appropriate to implement a ban on semi-finished metal exports, so long as it was implemented on a temporary (e.g., quarterly) basis, until – as described fully in section 8 – export licences and other local restrictions are properly established.

139. Table 7 summarises the impact of an export ban on semi-finished products on the copper supply chain.

Table 7: Supply chain impact of an export ban on steel and copper semi-finished

Impact area	Export ban on semi-finished and finished exports
Theft	**Positive impact** Likely to significantly impact the price of scrap and cut off important theft outlets.
Informal collectors and buyback centres	**Negative impact** Due the drop-off in legal demand from the mills to the extent that they cannot beneficiate downstream.
Metal recyclers	
Mills	**Negative impact** The negative impact on mini-mills will be mitigated by: a) the extent to which semi-finished exports: • are scrap exports from traders; • are imports from other countries; • are processed from stolen scrap and hence are net a negative to society; and b) the mills' ability to advance beneficiation and replace imports of scrap, semi-finished, finished and products further downstream.
Foundries	**Positive impact** Foundries would get cheaper access to semi-finished product which they can use as feedstock
Downstream manufacturing	**Positive impact** Downstream manufacturers would get cheaper access to finished product as local mills increase supply, as well as cheaper access to foundry products, as feedstock costs to foundries decrease.

Source: Genesis analysis.

7.3. PROBLEMS WITH AN EXPORT-ONLY APPROACH

140. There are three potential problems with solutions that focus exclusively on exports:

    140.1. Other smuggling routes.

    140.2. Local whitewashing.

    140.3. Lost production.

141. These issues do not undo the positive impact of an export ban, but they can significantly shape its ultimate impact and they need to be carefully taken into account. We outline each in turn.

Existence of other smuggling routes

142. Even if exports of scrap/semis are banned, two potential smuggling routes remain.

    142.1. ***Shipments of finished metal products (all metals).*** It may be that traders can utilise finished metal codes to smuggle copper scrap/semis out of South Africa. We understand that this does occur in practice, but we are unsure of the extent to which this smuggling route is used.

    142.2. ***Shipments of other non-metal goods.*** There is evidence that smugglers have used non-metal codes that are completely unrelated to metal. We understand

that it is more difficult to smuggle under a non-metal code because it is easier to check whether a shipment contains metal, using metal detection technology. This would need to be confirmed, but we do know that some smuggling occurs in this way. Claiming a shipment consisted of "polymers and ethylene" was one example which resulted in conviction.[40]

Whitewashing

143. Whitewashing occurs where stolen scrap finds its way into local mills and foundries and is then processed into finished products, which are either sold locally or exported. Consider stolen volumes that are a) currently whitewashed locally and b) currently exported.

143.1. To the extent that stolen metal is whitewashed locally, export bans may do little to reduce theft. Recall that metal prices are multiple times higher than 20 years ago. Even if the domestic price of scrap had to drop significantly in response to an export ban, the resulting price could still be higher than a few years ago when theft was still widespread. The incentive to steel might be reduced, but not sufficiently.[41] To the extent that stolen metal is currently whitewashed into the local metal industry, export bans will be less effective.

143.2. Regarding stolen metal that is currently exported, the impact on theft reduction will differ between the short and long term. In *the short term*, if the volume of stolen scrap blocked from export is large relative to local metal production, locally whitewashing the diverted stolen scrap will be difficult, and theft can be expected to decrease significantly. But if the volume of stolen scrap relative to local production is relatively small (albeit extracted at great cost to society) it will be easier for syndicates to whitewash the additional stolen scrap in the local economy. Moreover**,** *in the longer term*, mills will create more capacity in response to lower scrap prices, creating new demand for local scrap, including the stolen variety. In the long run, we would expect the price of local scrap to tend towards the international price because local mills can use the scrap to make finished product which can be sold in the world market at international prices.

Lost production

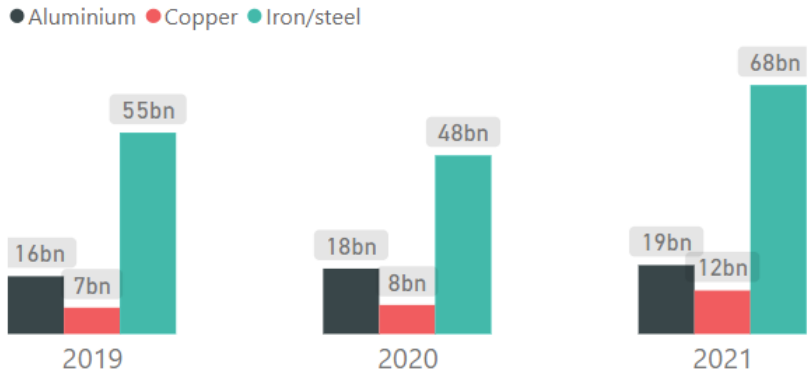
144. If only export bans are used, they may need to be permanent to deter criminals. If mills are blocked from exporting semi-finished product for long periods of time, they will lose an important source of revenue – one that is often used to smooth a mill's entry into the finished product category.

[40] Sibanyoni, M. (2022). Scrap metal dealer gets a hefty R600,000 fine. Available at: https://www.sowetanlive.co.za/news/south-africa/2022-03-04-scrap-metal-dealer-gets-a-hefty-r600000-fine/. (Last accessed, 29 April 2022).

[41] More generally, we are uncertain whether the incremental cost of supply is always higher for stolen as opposed to legal scrap.

145. The figure below shows the total export revenue for scrap and semi-finished products combined across aluminium, copper and steel. While some or much of this revenue will be based on falsely declared scrap, or illicit scrap that has been melted into semi-finished products, a portion of this revenue will represent genuine enterprise.

Figure 22: Total export revenue for scrap and semi-finished products, 2019 – 2021



Source: SARS.

146. However, it is possible that the local boost in scrap supply from blocking scrap exports might outweigh the negative effect of blocking genuine semi-finished exports. Further, in the medium term, mills will respond to an export ban on semi-finished products by beneficiating into finished products. But the extent to which this will occur in practice remains uncertain. **Moreover, the ability to sell semi-finished products into world markets is often used as a steppingstone by mills as they build out their rolling plants**.

147. For these reasons, a solution which places a permanent ban on semi-finished exports of all metal products will cause a greater decrease in production than one which uses, for example, an export license approach.

Summary

148. An export ban that includes all scrap and semi-finished products is a low administration solution that will have a significant impact on theft reduction as outlined above. But it allows criminals to continue to operate locally, unhindered. They will remain relatively unopposed in whitewashing their stolen goods locally or coordinating the smuggling of product across the border under non-metal codes. Permanent export bans will also block mills from legitimate semi-finished product revenues.

149. The trading regime that we propose below is designed to deal with these issues.

8. PROPOSED TRADING REGIME FOR SCRAP METAL

8.1. MOTIVATION

Administrative burden

150. The analysis reveals three solutions that are: a) *broadly reasonable*; and b) impose *a low administrative burden* on the state.

    150.1. a permanent export ban on all scrap/semis metal;

    150.2. a complete trading ban on copper scrap and semi-finished product; and

    150.3. a combination of the two – a permanent export ban on all scrap metal and semi-finished product plus a complete trading ban on copper.

151. These solutions would have a significant impact on metal theft, but they have weaknesses. The solution we have derived helps to alleviate these weaknesses, but at the cost of a higher administrative burden.

152. Before we outline the proposed solution, we recap the three “low administrative” solutions, highlighting their strengths and weaknesses.

A copper ban (for both local trade and exports)

153. A complete ban on the trade of copper scrap/semis would provide a direct and administratively uncomplicated measure to reduce theft. It would fundamentally undermine existing stolen copper syndicates and networks that, at various points in the chain, operate “in the open”. Those involved in the theft of copper, shred or melt copper while trying to avoid detection, but after the scrap is melted or shredded, can operate openly, if they have a second hands good licence. Armed with this easily acquired licence, illicit networks can:

    153.1. openly store shredded/smelted copper;

    153.2. openly co-ordinate the buying and selling of shredded/smelted copper;

    153.3. openly truck shredded/smelted copper around South Arica; and

    153.4. openly export shredded/smelted copper.

154. A copper ban would significantly reduce enforcement complexity since the mere possession of scrap/semis (stolen or not) would constitute grounds for arrest and censure. It would also eliminate key outlets for theft, both in terms of the export of copper scrap/semis and the whitewashing of copper scrap in the local industry. Government can expect a significant reduction in the more than R46 billion in theft costs outlined above. This is true even if there were no additional export bans on other (non-copper) metal types. Moreover, while the move will cause the closure of the R21 billion (per

year) copper industry, it is reasonable to suggest that it will result in yet greater savings from reduced copper theft.

155. The problems with this solution have been detailed above.

155.1. ***Shutters the copper millers and foundries.*** This solution arguably shutters the copper industry unnecessarily. Much of the theft reducing benefits of a complete copper ban can be captured under a strict and formalised licensing regime, and though this will impose an additional administrative burden on the state, it will save the copper milling industry.

155.2. ***Theft of non-copper metals left unaddressed.*** The analysis suggests that a complete ban on steel scrap/semis trading cannot be justified. The steel industry is too important to South Africa, and a ban steel scrap would decimate the industry, causing a sharp reduction in production and eliminating all of ArcelorMittal's competitors. Relative to the costs of copper theft, the costs of steel theft (and those for other metals) have not yet been as comprehensively detailed. As such, a ban on the trade of these metals cannot be justified at this stage. If Government only implemented a trading ban, it would need to focus on copper leaving the theft of other metals unaddressed.

155.3. ***Smuggling.*** A complete copper ban would include a ban on the export of copper scrap/semis. However, it would leave South Africa vulnerable to smuggling under "other metal codes", "finished metal codes" and "non-metal codes". That said, the solution will still help to substantially limit copper smuggling as copper syndicates are pushed underground, making it harder, more costly, and riskier to reach the ports in the first place.

A permanent export ban of all scrap/semis metal

156. A permanent ban on the export of all scrap/semis would have a significant impact on the theft of all metal types, *even if no additional restrictions were put in place.* It will divert significant levels of scrap/semis into the local market, lower scrap prices and decrease the incentive to steal. It will cut off a theft outlet and advance beneficiation. We understand that this solution would require a SADC-wide agreement, though it is expected this will be secured.

157. The weaknesses of this approach have been detailed above.

157.1. ***Smuggling.*** It leaves smuggling through finished metal codes and non-metal codes unaddressed.

157.2. ***Whitewashing.*** It does not address whitewashing – where stolen copper finds its way into local mills and foundries and gets processed into finished products, which are either sold to local industry further downstream, or simply exported. This theft outlet can be expected to increase in response to a sustained ban on the export of scrap/semis. Downstream beneficiation will occur, but absent

enhanced local restrictions, there is no guarantee the additional feedstock will be legal as opposed to stolen scrap.[42]

157.3. ***Lost production.*** Finally, as the ban is permanent, South Africa will lose any metal production that fails to be beneficiated into finished products. A permanent ban on the export of genuine semi-finished product is not ideal if a less restrictive measure could secure a similar reduction in theft. [43]

A copper ban combined with a permanent export ban of all scrap/semis metal

158. A combination of a permanent ban of all scrap/semis metal and a complete ban on copper trading would combine the benefits, but also the weaknesses of the two solutions. The weaknesses are summarised in the table below.

Table 8: Weaknesses of combined copper trade ban and scrap/semi export ban (all metals)

	Copper	Other metals
Smuggling under scrap/semi codes	*Eliminated*	*Eliminated*
Smuggling under finished metal codes	*Significantly more difficult for stolen goods to reach the port, but this channel would be needlessly left open*	*Unaddressed*
Smuggling under non-metal codes	*Significantly more difficult to reach the port*	*Unaddressed*
Whitewashing	Eliminated	*Unaddressed*
Lost production	Severe	*Permanent loss of access to legitimate semi-finished market*

Source: Genesis analysis.

Approach embodied in the new trading regime

159. The philosophy behind our approach is to deal a decisive blow to stolen metal networks and syndicates (across all metals but especially with copper), while limiting the impact on legitimate metal production. It does this through:

159.1. the implementation of a temporary export ban on all scrap/semis metal; and

159.2. the formalisation of the industry through three core regulations:

[42] Recall, even if the domestic price of scrap had to drop significantly, the resulting price could still be higher than a few years ago when theft was nevertheless widespread. More generally, we are uncertain whether the incremental cost of supply is always higher for stolen as opposed to legal scrap.

[43] That said, there is some possibility that, overall, a permanent export ban causes a net increase in production if the boost from diverted scrap supply outweighs the loss of semi-finished exports.

159.2.1. the banning of cash-for-scrap, i.e., forcing all transactions to take place through EFT;

159.2.2. the implementation of a strict licensing regime, potentially through an amendment to the Second-Hands Goods Act,[44] that substantially reduces the number of businesses that can buy, sell and export scrap/semis; and

159.2.3. the implementation of input-output reporting requirements for licensed buyers.

160. There are several benefits to this architecture, which are explored more fully below.

160.1. First, finished exports are brought under control as soon as possible, with only fully licensed mills able to export under this category.

160.2. Second, as the solution uses strict licensing as opposed to a complete ban on scrap/semis, copper milling does not have to be shut down.

160.3. Third, once local restrictions have been sufficiently developed, including through the implementation of export licensing, the temporary export bans can be relaxed. This will limit production losses from not being able to access the semi-finished export market.

160.4. Fourth, the solution directly tackles the local market for all metals, not just the local market for copper. It pushes the entire stolen metal industry underground, making it much harder for syndicates to a) engage in whitewashing; and b) get stolen metal to the ports to smuggle it out the country under a non-metal code.

[44] Export licences will be relevant when the temporary export ban of scrap/semis is relaxed.

8.2. OUTLINE OF SOLUTION

161. There are four stages to the new scrap metal trading regime:

    161.1. Stage 1 – a ban on the export of scrap and semi-finished metals.

    161.2. Stage 2 – a ban on the use of cash for buying scrap.

    161.3. Stage 3 – a licensing regime.

    161.4. Stage 4 – input-output reporting.

162. We discuss each in turn.

8.2.1. Stage 1 | Temporarily ban exports of scrap and semi-finished

163. In the first stage, we recommend the following two actions are taken with immediate effect.

    163.1. **A temporary ban on the export of all scrap metal** (with the ban on the copper likely to last up to two years, or indefinitely).

    163.2. **A temporary ban on the export of all semi-finished metal products**.

164. Temporary bans might reasonably be set in quarterly (three-month) periods. In certain cases (for certain metal codes), the temporary bans may need to be repeatedly extended, depending on the level of local licensing reached at that stage. In the case of copper scrap, the ban on scrap exports is likely to last up to two years, or indefinitely.

165. Generally, before an export ban is relaxed (or extended), Government should consider the prevailing evidence of the ban's impact on: a) theft reduction; and b) legitimate industrial output and investment. Relaxing export bans will be appropriate if there is good evidence that theft is decreasing, and the appropriate stage of the new regime has been reached (e.g., export licensing and other restrictions).

166. Finally, Government might reimpose export bans if it is found that a relaxation led to a significant increase in theft.

Administrative requirements for stage 1

167. At this stage, we understand it would be necessary to obtain a SADC-wide agreement to implement the export bans. We note that the South African Government has already implemented temporary export bans on scrap metal.

8.2.2. Stage 2 | Ban cash for scrap

168. In the second stage, we recommend the following action.

    168.1. A permanent ban on "cash-for-scrap", meaning any purchase of copper scrap or semi-finished products will only be allowed through EFT.

Administrative requirements for stage 2

169. We understand that Government will need to prepare the legal and constitutional grounds to ban the use of cash in transactions. Similar cash bans have been used in various developed jurisdictions, but we do not comment further on this topic.

Order of implementation of stage 1 and 2

170. Stage 1 and 2 can be implemented simultaneously or in any order. We have outlined two stages, because Government might clear the relevant regulatory hurdles at different points.

171. There is another benefit for a staggered approach that is worth noting. In future impact studies, it would be useful to differentiate between the impacts of export bans vs cash bans. This evidentiary point aside, as soon as Government has cleared the administrative hurdles to implement stage 1 and 2, they should be implemented.

8.2.3. Stage 3 | Licensing

172. In stage 3, we recommend the incremental implementation of a strict licensing regime.

Administrative requirements for stage 3

173. Below we detail our recommended staged approach to licensing. It is worth noting that in the initial licensing stages, the number of licences will be a strictly limited to mills and foundries (and potentially a few large metal recyclers). This will ease the administrative burden considerably.

174. At the minimum, a licensing regime will require a coordinating authority. We understand that initially two Government groups could take the lead in establishing the licensing regime:

174.1. The National Intelligence Co-ordinating Committee (“NICOC”); and

174.2. The “Inter-Agency Working Group on Illicit Trade" which consists of SARS, ITAC, DTIC and other law enforcement agencies.

Licence categories

175. There is one buying category, two seller categories and two export categories. For each of the five categories, there will be one licence for copper and a separate licence for all other (non-copper) metals. The one exception is the scrap seller’s licence, which will be required for copper but not for other (non-copper) metals.

176. There are thus nine different licence types, and these are carefully outlined in the table below. Note, it is not simply a deposit that is required to earn a licence. **For each category, the applicant will need to show that it is an active participant in parts of the supply chain allowed for that category.** In all cases except for the most lenient licence category (non-copper buyer licences), traders and middlemen will be completely excluded.

Table 9: The nine licence types under the new trading regime

Licence category	Description	Copper licence	General (non-copper) licence
Buyer licence for scrap and semi-finished products	Gives you the right to buy scrap and semi-finished product, both locally and through imports	**Highly limited** Active mills and foundries that provide a R2m deposit *It is questionable whether a highly limited number of recyclers should also be given a copper buyers licence	**Limited** Active mills, foundries, recyclers and medium size aggregators. In this case, we suggest a R150,000 deposit Applicants should be vetted and SARS complaint.
Seller licence for scrap	Gives you the right to sell scrap locally	**Highly limited** Licensed buyers, SOEs, municipalities, large businesses and, over time, smaller businesses	**Not required** No change to current status in Second-Hand Goods Act
Seller licence for semi-finished metals	Gives you the right to sell semi-finished product locally	**Highly limited** Active mills that produce semi-finished product and that provide a R2m deposit	**Highly limited** Active mills that produce semi-finished product and that provide a R2m deposit
Export licence for scrap products	Gives you the right to export scrap products **Only relevant when relevant ban on scrap exports is relaxed**	**Highly limited** Active recyclers that produce semi-finished product and that provide a R2m deposit	**Highly limited** Active mills that produce semi-finished product and that provide a R2m deposit
Export licence for semi-finished or finished products	Gives you the right to export semi-finished and finished products **Immediately relevant for export of finished products; for semi-finished products, will only be relevant when the relevant export ban is relaxed**	**Highly limited** Active mills that produce semi-finished product and that provide a R2m deposit	**Highly limited** Active mills that produce semi-finished product and that provide a R2m deposit

Source: Genesis analysis.

177. Below we sketch a practical, staged approach to the implementation of the licensing regime. At each stage, the Government will move closer towards a tighter and more permanent scrap solution.

8.2.3.1. Stage 3a | Export licences (all metals)

178. We anticipate that export licensing might be the easiest licence category to implement. There are two export licence types.

    178.1. **Export licence for semi-finished or finished products.** Only mills will be given export licences for semis and finished product, and both these categories can be included within the same licence. Initially, all scrap and semi-finished exports will be banned, and finished products will constitute the "closest" open category that can be used for smuggling. It will thus be important to implement licensing for the finished category to secure maximum impact from the initial export bans on scrap and semis. When the temporary bans on semi-finished products are relaxed, the semi-finished part of this licence category will be ready to use.

    178.2. **Export licence for scrap**. Similarly, when (or if) the export ban on scrap is relaxed, scrap export licensing should be ready to use.

179. For all metals, an exporter's licence will only be given to applicants who have paid a large deposit equal to R2,000,000.

8.2.3.2. Stage 3b | Buyer's licence for scrap/semis (copper)

180. Turning to local trade, the most important licence to impose is a buyer's licence for the purchase of copper scrap and semi-finished products. We consider this the second stage of the licensing regime because it is important to tackle copper theft as quickly as possible. Furthermore, because there will be a relatively low number of plausible applicants, the administrative burden will be easier.

181. This stage still needs to be planned and managed, including surveying who would likely apply for a non-copper scrap buyer's licence, and who the final qualification criteria might include or exclude. Legitimate mills and foundries will get licensed. We anticipate some smaller foundries will be borderline cases. Another question, which we relegate to the footnote, is whether large metal recyclers should be given a buyer's licence for copper scrap.[45]

182. A buyer licence for copper will only be given to applicants who have paid a large deposit equal to R2,000,000.

[45] Do recyclers need to be included as buyers of copper scrap because they are needed to break down formally-sourced scrap? It may be appropriate to give the buyer's licence exclusively to mills and foundries, who either already have their own processing capacity or must develop it. If a mill/ foundry does not have this capacity, they have to purchase it from mills/foundries that do. If Government does elect to licence a pure copper recycler, this would have to be highly selective and it would not entitle them to sell semi-finished copper.

8.2.3.3. Stage 3c | Seller licence for scrap (copper)

183. Next it will be necessary to limit the supply of copper scrap. While we have referred to a "seller licence", there is no need to issue formal licences. Instead, the licensing body need only publish a list of companies and organisations from which licensed buyers may purchase copper scrap. This list will include:

    183.1. licenced buyers;

    183.2. SOEs;

    183.3. Municipalities;

    183.4. large businesses; and

    183.5. over time, smaller businesses.

184. A licensed buyer who purchases scrap/semis from a business that was not on the published list, would forfeit its buyer's licence and employees or owners could be arrested and fined. The loss of a copper buyer's licence will in many cases mean business closure or bankruptcy. The stakes are high, and buyers are likely to study the published list closely – especially when each of their purchases are recorded by EFT (stage 2) and are subject to input-output reporting (stage 4).[46]

8.2.3.4. Stage 3d | Selling licence for semi-finished metals (copper)

185. The next logical step is to require licences for the sale of semi-finished copper. This will be a subset of businesses who have successfully acquired a buyer licence for copper scrap/semis.

    185.1. The seller's licence for semi-finished copper will be provided to copper mills exclusively.

    185.2. It will exclude foundries who do not produce semi-finished product.

    185.3. It will also exclude recyclers (if any have secured a buyer licence), as they do not produce semi-finished products. *Note that for the purposes of these regulations, shredded scrap should be considered scrap and not semi-finished product. Recyclers may produce "shredded scrap" but this is not a genuine semi-finished product.*

186. As before, there is no need to issue actual licences to sellers. It will be sufficient to publish a list of copper mills from which licensed buyers may purchase semi-finished product.

[46] Buyer licences must precede seller licences – because the buyer licence enables the restriction of sellers with the simple "publication of a seller list" as opposed to the issuing of formal licences.

187. A seller licence for semi-finished copper product will only be given to applicants who have paid a R2,000,000 deposit.

Stage 3d | Buyer licence for other scrap/semis (non-copper)

188. Compared to copper, buyer licences for non-copper metals will involve lower entry criteria and ultimately it will include many more businesses. As with copper, and taking note of the higher number of applicants, this stage needs to be carefully planned and managed.

189. For this licence category we suggest a R150,000 deposit. Applicants should also be vetted and SARS compliant.

Stage 3e | Selling licence for semi-finished metals (non-copper)

190. The final step is the implementation of seller licences for semi-finished non-copper products. This will be a subset of those businesses that have acquired buyer's licences. It will exclude all buyers except active mills who produce semi-finished product. As with all seller licences, there is no need to issue formal licences – a published list of allowed sellers would be sufficient.

191. A seller licence for semi-finished non-copper products will also require a R2,000,000 deposit.

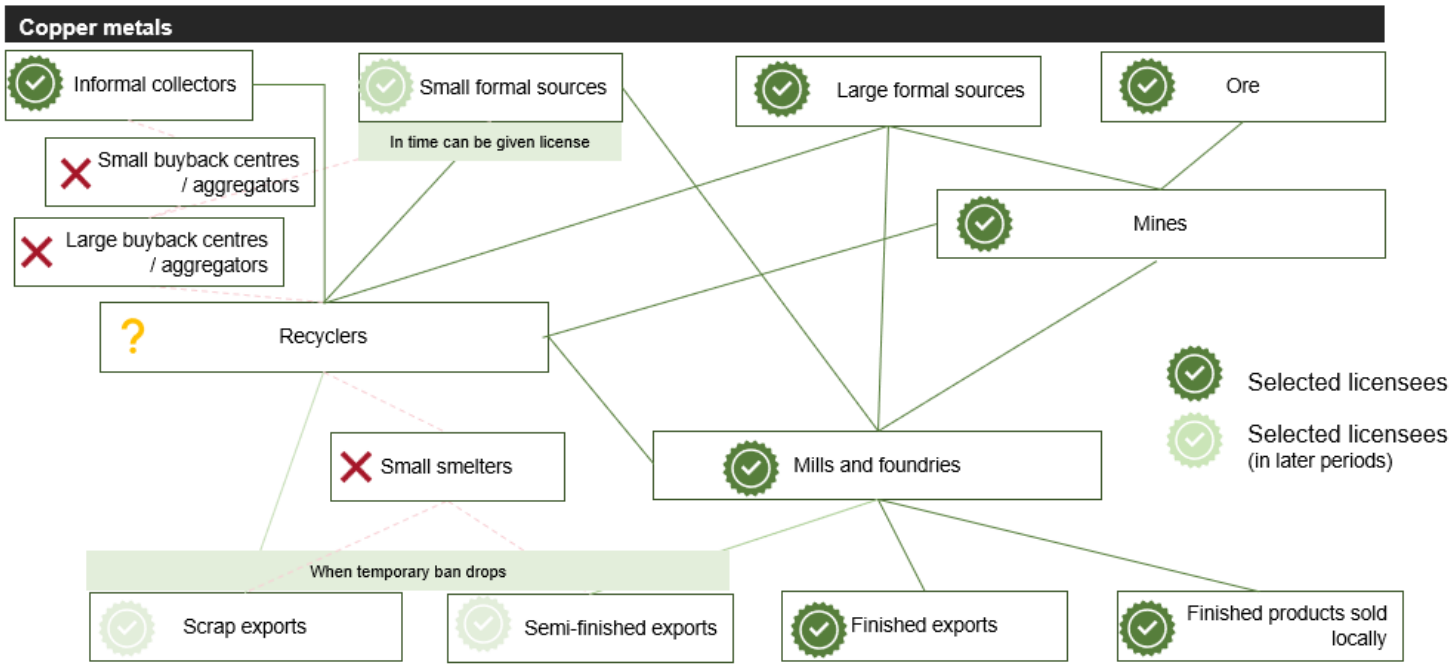
8.2.4. Stage 4 | Input-output reporting

192. The final stage of the new trading regime is to require all licensed buyers to submit quarterly reports of all purchases (tonnage and cost) and sales (tonnage and revenue) to a central database.

8.3. IMPACT ON COPPER MARKET

193. The diagram below breaks down the new supply chain for copper metals.

Figure 23: Copper supply chains under the new trading regime



Source: Genesis analysis.

194. How will the new regime impact: a) theft levels; b) production levels; and c) how do these impacts compare to other solutions reviewed above? We address each of these topics in turn.

8.3.1. Theft

195. The new regime will deal a significant blow to existing stolen copper syndicates and networks.

195.1. These syndicates currently operate “in the open”: a) *openly* keep yards full of shredded/melted copper; b) *openly* truck shredded/melted copper around the country; c) *openly* coordinate the sale and purchase of copper scrap/semis both locally and across the border; and d) *openly* export the product out of the country. In the new regime, no one will be allowed to be in possession of melted or shredded copper unless they are one of the few qualifying mills and foundries (and potentially a few major recyclers) who are given a licence to buy.

195.2. Moreover, buyers will only be able to purchase copper scrap and semi-finished copper products from one of the few formal entities (e.g., SOEs, municipalities and large businesses) that make it onto the published list of approved sellers. Purchasing copper scrap from any other person or business will result in censure, loss of licence and likely business closure.

195.3. Additionally, exports will at first be banned and then opened to a subset of those with a buyer licence. Mills (and only mills) will be given a licence for the export of semi-finished and finished product. If conditions allow in the medium term, some licensed recyclers might be given a licence to export scrap.

195.4. The use of cash in scrap/semis metal transactions will be banned.

195.5. In the final stage, licensed buyers will be required to submit input-output data to a central database.

196. Significantly disempowered, consider the two major outlets for stolen goods.

196.1. *Whitewashing, i.e., inserting stolen scrap into the licensed supply chain.* Mills and foundries will face the loss of their licence, and hence business closure, if they are caught buying from any *unlicensed* source. Note, there will be no need to prove that they purchased stolen goods. Simply purchasing from an unlicensed source should be deemed a contravention.

196.2. *Smuggling stolen scrap out of the country.* Export routes will be completely banned or, in time, limited to qualifying mills who, again, risk business closure if they are caught making false declarations at the ports. One export route, "pure smuggling", will remain. That is, hiding scrap while in South Africa and then smuggling it out under a non-metal code.

197. Our view is that, through a series of incremental regulations, the new regime will substantially reduce copper theft.

8.3.2. Production

198. The new trading regime will change the landscape for scrap collection, recycling, and milling.

Informal collectors, buyback centres & aggregators and metal recyclers

199. Upstream supply will be restricted to large formal sellers, and the informal supply chain will be *practically eliminated*.

199.1. ***Sellers*** of copper scrap will be highly limited to those on the seller list published by the licensing body.

199.2. ***Informal collectors*** will lose copper revenues, but they will still be able to earn revenue from plastic, paper, glass and non-copper metals.

199.3. ***Buyback centres and aggregators*** will lose copper revenues, but they will still earn revenue from plastic, paper and glass, and the larger buyback centres will be able to get licensed, pay the R150k deposit, and deal in non-copper scrap.

199.4. ***Metal recyclers*** will maintain their plastic, glass, and paper revenues as well as non-copper revenues (after getting licensed and paying the R150k deposit). Some large recyclers may secure a copper buyer's licence (with a R2m deposit)

if the authority decided to open this category to recyclers as opposed to just mills and foundries.

Mills and foundries

200. The impact on mills will depend on three factors.

200.1. The extent to which scrap supply decreases or increases in response to the new regime.

200.2. The length of time for which mills are blocked from selling semi-finished products in the export market.

200.3. The ability of mills to beneficiate downstream in response to a temporary (and often repeated) ban of semi-finished exports.

201. If scrap supply is positive, it could outweigh the negative impact of temporarily losing access to the semi-finished export market, especially if mills can quickly beneficiate downstream, and/or the export ban is soon replaced with export licences and other local restrictions.

Supply of scrap might be positive?

202. The new regime will have two impacts on scrap supply, one of them positive and one negative.

202.1. First, the local restrictions will cause a decrease in the supply of copper scrap from sources that cannot be licensed and or where locations are difficult to reach by the limited number of licensed buyers (mills, foundries and potentially some large recyclers). It is important to note that a portion, potentially the majority, of the supply lost from informal sources would have been stolen, whitewashed scrap. Moreover, some mills take most of their feedstock from the mines or import high quality copper billets from abroad.[47]

202.2. Second, as revealed by a careful analysis of the export data (SARS and mirror), the export restrictions will divert significant volumes of scrap into the local market. The temporary ban of all metal exports (scrap and semi-finished products), and the subsequent licensing requirement for all metal exports (scrap, semi-finished and finished), might increase scrap availability and quality, much more than can be estimated even from the mirror data. For example, one industry player provided information that the export ban from June to October 2020, increased the availability of high-quality scrap to a degree that could not be explained by either the SARS direct data or the mirror data.

[47] The extent that mills and foundries rely on scrap to produce finished products for the local market, as opposed to only exporting semi-finished product, needs further investigation.

203. In other words, despite imposing strict regulations across the trade in all metals, **the net result of the new trading regime might be that the supply to local mills and foundries increases**. This is an important added benefit gained by imposing export restrictions in concert with local restrictions.

204. Even if the impact on net supply is to some extent negative, this would not challenge the rationality of the new trading regime, because:

    204.1. some of the decreased supply will be stolen scrap; and

    204.2. efforts to decrease the nationwide costs of copper theft justify imposing some additional costs on the copper industry; indeed, in the case of copper, a good case can be made for banning it completely as already outlined.

205. An important question for a second stage intervention is whether the copper metal industry could prosper under a narrower and more formalised supply chain. The net impact of the regulations on scrap supply and mill and foundry production must be closely monitored.

8.3.3. Comparison to other solutions

206. The table below provides a concise summary of the overall impact on theft and production of the new trading regime vs the export ban and trade ban.

Table 10: Impact of the new trading regime on copper theft

Stolen scrap…..	Permanent export ban on scrap/semis of all metals	Trade ban on copper scrap/semis	New trading regime
….exported as copper scrap **(+ may have undeclared value)**	Eliminated	Eliminated	Eliminated under temporary export ban then substantially reduced
…smuggled under semi-finished metal code **(whether melted or not)**	Eliminated	Eliminated	Eliminated under temporary export ban then substantially reduced
….exported under non-copper metal code	Eliminated	Substantially reduced	Eliminated under temporary export ban then substantially reduced
….smuggled under finished metal code	Unaddressed	Substantially reduced	Nearly eliminated
….smuggled under non-metal code	Unaddressed	Substantially reduced	Substantially reduced
….whitewashed into local market for sale downstream or export as finished product	Unaddressed	Eliminated	Substantially reduced

Source: Genesis analysis.

Table 11: Impact of the new trading regime on copper supply chain

Production impact….	Permanent export ban on scrap/semis of all metals	Trade ban on copper scrap/semis	New trading regime
…on informal collects, buyback centres and aggregators	**Negative** Loss of access to international markets	**Negative** Loss of copper revenues	**Negative** Loss of copper revenues
…on recyclers	**Negative** Loss of access to international markets	**Negative** Loss of copper revenues	**Negative** Decline in copper revenues except potentially largest recyclers that secure a buyer licence
…on mills and foundries	**Uncertain** Permanent loss of semi-finished exports revenue, but in long term beneficiation is expected + will get a *supply boost* from diverted scrap	**Negative** Closure of copper mills and foundries	*Uncertain* Copper mills continue to produce, *and* semi-finished exports are eventually allowed under restrictive licensing. Further, may get net *supply boost* as diverted scrap outweighs loss from lost informal supply.
…on downstream manufacturing	**Positive** Upstream mills forced to beneficiate and push supply locally	**Negative** Eliminates all informal collection of copper products, though they still have access to plastic, glass and paper and, if allowed, other metals	*Uncertain* The temporary export ban on, and subsequent export permit system for, scrap and semi-finished products will benefit local manufacturing because it will lead to increased downstream beneficiation. Moreover, the net impact of the combined regulations may be to increase scrap supply in the long term, which will further benefit downstream manufacturers. If the combined impact of all the regulations is negative for scrap supply, this will offset, to some extent, the gains downstream manufacturers secure from the restrictions on exports.

Source: Genesis analysis.

207. Relative to an export ban, the new regime has four major advantages.

    207.1. First, the new regime only permits finished metal exports to a limited set of licensed mills, whereas this is left open under an export ban approach.

    207.2. Second, an export ban leaves smuggling through non-metal codes unaddressed. In an export-only approach, criminal syndicates remain free to deal in shredded/melted copper. They can openly store it and truck it around the country, carefully planning their smuggling operations. In the new regime, the licensing and cash restriction pushes syndicates underground, and so they will find it much more difficult, costly, and risky to get their stolen goods to the port in the first place.

    207.3. Third, an export-only approach does not address whitewashing. Whitewashing is where stolen copper finds its way into local mills and foundries and gets

processed into finished products, which are either sold to local industry further downstream, or simply exported. This theft outlet can be expected to increase in response to a sustained ban on the export of scrap/semis. In the new regime, the ability to whitewash stolen scrap is substantially curtailed, because if licensed buyers are caught buying copper or semi-finished product from unlicensed sources, they will lose their licence. The loss of a copper buyer's licence will, in many cases, mean business closure or bankruptcy. The stakes are high, and buyers are likely to study the published list closely, especially when each of their purchases are recorded by EFT (stage 2) and are subject to input-output reporting (stage 4).

207.4. Fourth, if it is the only tool employed, export bans will need to be permanent to keep criminals at bay. This means South Africa will lose any metal production that fails to be beneficiated into finished products. The ability to sell semi-finished product into world markets is often used as a steppingstone by mills as they build out their rolling plants. A permanent ban on the export of genuine semi-finished product is not ideal if a less restrictive measure could secure similar a similar reduction in theft.

208. Relative to a copper ban, the new trading regime captures most of the benefits of a full ban on copper trade, yet it allows the copper industry to remain open. It is true that a trade ban would eliminate whitewashing. However, under the new regime, the ability to get scrap into the licensed supply chain will be substantially reduced, if not eliminated.

209. Compared to both a copper ban and a permanent export ban, the new trading regime on scrap metal is also more robust against litigation and should benefit from support from the copper industry.

209.1. First, the new trading regime will be difficult for the copper industry to challenge. Afterall, the approach does not close copper milling based on scrap (which itself may in fact be justified). The approach merely attempts to regulate it in order to address what must be acknowledged is a massive national issue. Even if the costs of theft are significantly overstated, and the benefits of copper milling significantly understated, this would hardly suggest that local restrictions were irrational.

209.2. Second, if the new trading regime fails to reduce copper theft, Government may be forced to ban it completely, and this should be made clear to the copper industry. The industry has every incentive to help make the new regulations work, and to *expend resources* in *actively* assisting the Government to stop copper theft.

8.4. IMPACT ON NON-COPPER METAL MARKETS

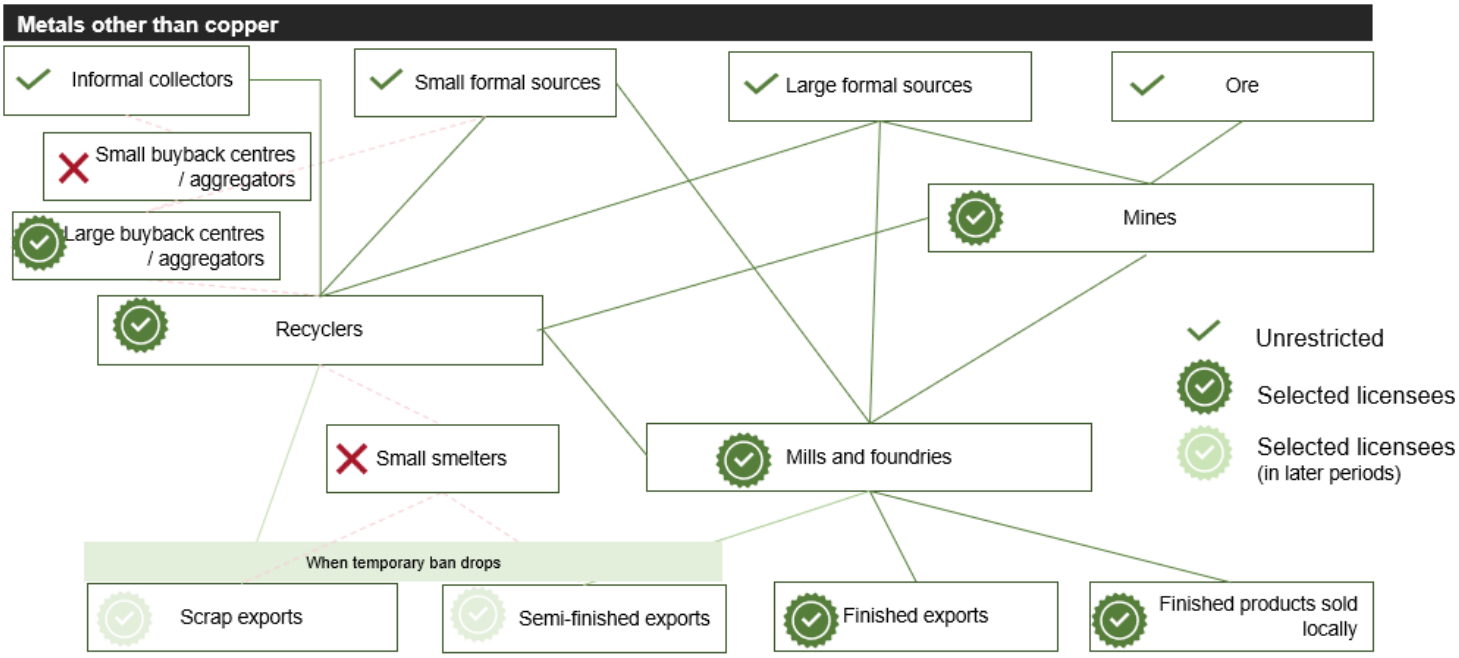
210. There are two key differences between the regulation of copper vs non-copper metals.

    210.1. First, while scrap sellers are strictly limited to those on the published list, the selling of non-copper scrap will remain unrestricted, which aligns with the current status.

    210.2. Second, a buyer's licence will be given more liberally for other metals, with lower entry requirements (e.g., a R150,000 deposit as opposed to a R2m deposit for copper) to ensure that the fundamental supply chain for steel is not undermined in the first move. Note the higher deposit amount of R2m will still be required for: a) all export licences (scrap, semi-finished and finished products); and b) the licence for the selling of semi-finished product locally.

211. The change will still remove metal revenue from potentially hundreds of smaller aggregators (buyback centres) and will force the supply chain to channel scrap through narrower, more formalised structures. The diagram below breaks down the new supply chains for non-copper metals.

Figure 24: Supply chains for non-copper under new trading regime



Source: Genesis analysis.

8.4.1. Theft

212. Compared to copper, the formalisation of the non-copper industry will take longer and there will be a greater number of entities that qualify for a buyer licence. Moreover, anyone will still be able to sell non-copper scrap without a licence. Still, in the end, the metal industry will be substantially reconfigured.

213. The number of buyers of informally sourced scrap will decrease to those who can afford the R150,000 deposit. The use of cash will be banned, and licensed buyers will be required to submit input-output data to a central database. Moreover, only mills will be able to sell semi-finished product. Finally, exports will at first be banned, and then opened to a subset of those with a buyer licence. Mills (and only mills) will be given a licence for the export of semi-finished and finished product. If conditions allow it, in the medium term, some licensed recyclers might be given a licence to export scrap.

214. With a narrow, more formalised supply chain subject to increased monitoring the opportunity for stolen goods to enter the formal economy will be significantly reduced, as a licensee risks the loss of its buyer's licence (and business closure) if it is caught buying stolen goods or making false declarations at the ports.

8.4.2. Production

215. Domestically, the supply chain becomes both narrower (with the elimination of smaller buyback centres and smelters) and more formalised (with the remaining players becoming licensed under strict qualifying criteria). This will serve to decrease the supply of scrap to the mills.

216. A portion of this lost supply will be stolen scrap. But the industry will also enjoy a boost in supply under the new regime from the (permanent/temporary) export bans on scrap and semi-finished product. The export bans might increase scrap availability much more significantly than can be estimated even from the mirror data, which is also suggested by some industry experience in the June to October 2020 export ban.

217. In other words, despite imposing strict regulations across the trade in all metals, the net result of the new trading regime on scrap metal might be that the supply to local mills and foundries, increases. This is an important added benefit of imposing export restrictions in concert with local restrictions. Even if the impact on net supply is to some extent negative, this would not challenge the rationality of the new trading regime, because some of the decreased supply will be stolen scrap, and efforts to decrease the nationwide costs of metal theft justify imposing some additional costs on the metal industry. The net impact to theft and supply must be closely monitored.

8.4.3. Comparison to other solutions

218. The impact of the new trading regime compared to the export ban is summarised below. As these metals cannot reasonably be subject to a trading ban at this stage, only the export bans and new trading regime are shown.

Table 12: Impact of the new trading regime on theft of non-copper metals

Stolen scrap…..	Permanent export ban on scrap/semis of all metals	New trading regime
….exported as scrap (+ may have undeclared value)	Eliminated	Eliminated under temporary export ban then nearly eliminated
…smuggled under semi-finished metal code (whether melted or not)	Eliminated	Eliminated under temporary export ban then nearly eliminated
….smuggled under finished metal code	Unaddressed	Nearly eliminated
….smuggled under non-metal code	Unaddressed	Substantially reduced
….whitewashed into local market for sale downstream or export as finished product	Unaddressed	Substantially reduced

Source: Genesis analysis.

Table 13: Impact of the new trading regime on non-copper supply chain

Production impact….	Permanent export ban on scrap/semis of all metals	New trading regime
…on informal collectors and buyback centres	*Negative* Loss of access to international market	*Negative* Informal sector loses ability to deal in non-copper metal, but informal collectors can still collect and sell, and some buyback centres will get licence
…on recyclers	*Negative* Loss of access to international markets	*Negative* Decline in scrap supply from informal sector and only some will get an export licence which can only be used when temporary bans end
…on mills and foundries	*Uncertain* Permanent loss of semi-finished exports revenue, but in long term beneficiation is expected and will get a *supply boost* from diverted scrap	*Uncertain* Copper mills continue to produce, *and* semi-finished exports are eventually allowed under restrictive licensing. Further, may get net *supply boost* as diverted scrap outweighs loss from decreased informal supply.
…on downstream manufacturing	**Positive** Upstream mills forced to beneficiate and push supply locally	**Uncertain, though may well be positive** Downstream benefits from diverted scrap and semi-finished supply, and increased beneficiation which may outweigh loss from decreased informal supply.

Source: Genesis analysis.

219. Relative to an export ban, the new regime has four major advantages. This is the identical analysis which we presented for copper. We state it more briefly again.

    219.1. First, the new regime only permits finished metal exports to a limited set of licensed mills, whereas this is left open under an export ban approach.

    219.2. Second, an export ban leaves smuggling through non-metal codes unaddressed. In the new regime, the licensing and cash restriction pushes syndicates underground, and so they will find it much more difficult, costly and risky to get their stolen goods to the port in the first place.

    219.3. Third, an export-only approach does not address whitewashing. Whitewashing is where stolen copper finds its way into local mills and foundries. This theft outlet can be expected to increase in response to a sustained ban on the export of scrap/semis. In the new regime, the ability to whitewash stolen scrap is substantially curtailed, as if licensed buyers are caught buying copper or semi-finished product from unlicensed sources, they will lose their licence, which in many cases, will result in business closure.

    219.4. Fourth, if it is the only tool employed, export bans will need to be permanent to keep the criminals at bay. This means South Africa will lose any metal production that fails to be beneficiated into finished products. The ability to sell semi-finished product into world markets is often used as a steppingstone by mills as they build out their rolling plants. A permanent ban on the export of genuine semi-finished product is not ideal if a less restrictive measure could secure similar a similar reduction in theft.

9. CONCLUSION

220. Metal theft is a global problem. Metal prices, including scrap metal prices, are multiple times higher than they were at the turn of the 21st century. This has provided the driving incentive for criminal syndicates to steal metal from existing infrastructure and sell it for scrap. In both developed and developing countries, there is a significant upward trend in the number of reported incidents.

221. Stolen scrap may pass through many hands, and change form in various ways, but it is ultimately sold to mills operating in the formal economy, either locally or overseas. The mills process the scrap into finished metal products for on-sale into formal markets. There is a well-travelled pipeline from stolen scrap to formal mills and it is used by criminal syndicates at great cost to the rest of society.

222. In South Africa, copper theft: a) constitutes a serious threat to national infrastructure, undermining the country's low-cost rail advantage and the performance of its electrical grid; b) imposes a gross annual economic cost exceeding **R46 billion** (2020/2021); c) leads to loss of life and disruptions to critical services (including hospitals); and d) decreases confidence among business and general society.

223. The costs imposed from the theft of steel and other metals have been less well quantified at this stage, but the problem is also serious. The damage from stolen steel lattices alone was R100m in 2020/2021. Furthermore, the trade of steel and other metals also often provides a cover for stolen copper, in terms of storage, transport, local sales and export.

224. Yet scrap is crucial to the metal supply chain. It is significantly cheaper to use compared to mined ore, and it is much more environmentally friendly. In South Africa over 50% of steel production is based exclusively on scrap. Moreover, the other 50% of production includes both ore *and* scrap as adding scrap makes the overall smelting operation more efficient. Thus, practically all metal produced in the world contains scrap. A portion of the scrap is stolen metal that was ripped out of critical infrastructure from South Arica, and from countries all around the world.

225. We considered the viability and economic impact of various theft-reducing measures. These included a complete ban on the trade of scrap metal in the domestic market, a permanent ban on the export of scrap metal and various other restrictions.

A complete ban on the trade of copper scrap and semi-finished product

226. A complete ban on the trade of copper scrap/semis (which would include a ban on their export) would provide a direct and administratively uncomplicated measure to limit or reduce theft. It would reduce enforcement complexity since the mere possession of scrap/semis (stolen or not) would constitute grounds for arrest and censure. Government can expect a significant reduction of the more than R46 billion in theft costs outlined above.

227. A complete ban would, however, close South Africa's copper mills and foundries which, based on initial data, are worth R21 billion in gross revenues. This may well be justified given the large savings that can be generated by reducing copper theft.

228. Nevertheless, a trade ban is not recommended. In our view the "new trading regime for scrap metal" captures most of the benefits of a trade ban, while still permitting a portion of legitimate copper scrap to flow down the supply chain, allowing South Africa's copper industry to survive.

A complete ban on the trade of steel scrap and semi-finished product

229. Steel is a considerably more important industry to South Africa than copper. The country currently produces around 5m to 6m tonnes of steel. The steel value chain from iron ore to manufactured products currently contributes 4% to GDP and provides approximately 200,000 jobs. Banning the trade of steel scrap would decimate the steel industry in South Africa, as scrap is the basic input into over 50% of South African production. A ban would cause a sharp reduction in production and eliminate all of ArcelorMittal's competitors. Moreover, compared to copper theft, the costs of steel theft have not yet been as well quantified. Accordingly, a total ban on steel scrap cannot be justified at this stage.

Export ban

230. Banning exports is another low-administrative solution.

231. We note that merely increasing **export taxes** is unlikely to constitute a sufficiently bold move against theft. Export taxes rely exclusively on the price incentive: relative to an export ban the fundamental physical channel remains open. Even if the domestic price of scrap had to drop significantly in response to an export tax, the resulting price could still be higher than a few years ago when theft was nevertheless widespread. Traders can also respond to an export tax by increasing evasion tactics like under-declaring. An export tax would add incrementally to the fight against theft, but if scrap and semi-finished metal export codes remain open, syndicates will use these to reach international markets *where a global price prevails.*

232. Permanent, well-structured export bans will likely have a significant impact on theft. But there are two basic requirements:

    232.1. For an export ban to be maximally effective, it needs to include all metal types, in all scrap and semi-finished grades. Metal of one type is routinely smuggled out the country under incorrect metal codes. Shipments might contain mixed metal types (e.g. steel, aluminium, copper and other) or mixed grades (e.g. different types of semi-finished), making it difficult for custom officials to check the contents "in the middle of the container".

    232.2. More generally, control of the border is crucial. In addition to scrap and semi-finished metal codes, scrap can also be smuggled using codes which cannot be banned, including finished metal and codes which have nothing to do with metal (e.g. plastic). For exports bans to be effective on their own, **stronger monitoring**

and enforcement at the ports is required. Further work on how to optimally increase border control is recommended.

233. If an export ban is tight enough, it promises to **divert significant tonnes of scrap metal into the local market**, equalling, according to some estimates, the size of South Africa's entire metal production. **The diversion of these large volumes would lower scrap prices and decrease the incentive to steal. It would cut off a major theft outlet and, if the ban is sustained, it would advance beneficiation**. We understand that this solution would require a SADC-wide agreement, though it is expected this will be secured.

234. But there are three weaknesses to an approach that relies only on export bans.

First, an export-only approach leaves smuggling through finished metal and non-metal codes unaddressed – or at least, it relies on enhanced enforcement at the ports to better manage leakages.

235. In an export-only approach, criminal syndicates remain free to deal in shredded/melted metal: they can openly store it and truck it around the country, carefully planning their smuggling operations. In contrast, in the new regime, the licensing and cash restriction, pushes syndicates underground, and so they will find it much more difficult, costly, and risky to get their stolen goods to the port *in the first place*. Moreover, the new regime will apply highly restricted export licensing not only to scrap/semis, but to finished products as well – a category that cannot be banned without the country incurring significant losses.

Second, an export-only approach does not address (local) whitewashing.

236. Whitewashing occurs where stolen scrap finds its way into local mills and is then processed into finished products, which are sold locally or exported. Consider stolen volumes that are a) currently whitewashed locally and b) currently exported.

    236.1. To the extent that stolen metal is whitewashed locally, export bans may do little to reduce theft. Recall that metal prices are multiple times higher than 20 years ago. Even if the domestic price of scrap had to drop significantly in response to an export ban, the resulting price could still be higher than a few years ago when theft was still widespread. The incentive to steal might be reduced, but not sufficiently.[48] To the extent that stolen metal is currently whitewashed into the local metal industry, export bans will be less effective.

    236.2. Regarding stolen metal that is currently exported, the impact on theft reduction will differ between the short and long term. In *the short term*, if the volume of stolen scrap blocked from export is large relative to local metal production, locally whitewashing the diverted stolen scrap will be difficult, and theft can be expected

[48] More generally, we are uncertain whether the incremental cost of supply is always higher for stolen as opposed to legal scrap.

to decrease significantly. But if the volume of stolen scrap relative to local production is relatively small (albeit extracted at great cost to society) it will be easier for syndicates to whitewash the additional stolen scrap in the local economy. Moreover**,** *in the longer term*, mills will create more capacity in response to lower scrap prices, creating new demand for local scrap, including the stolen variety. In the long run, we would expect the price of local scrap to tend towards the international price because local mills can use the scrap to make finished product which can be sold in the world market at international prices.

237. In the new regime, the ability to whitewash stolen scrap is fundamentally curtailed. This is due to the use of a) highly restricted buyer licences, b) highly restrictive copper seller licences, c) a ban on cash, d) input-output reporting, and e) highly restricted export licences for all metals, including finished metals. If licensed buyers are caught buying stolen scrap (or in the case of copper, if they buy from an unlicensed source), they will lose their licence and in most cases their business as well. The stakes are high, and licensed scrap metal buyers are likely to comply – especially when each of their purchases are recorded by EFT and are subject to input-output reporting.

Third, if export bans are the only tool employed, they will need to be permanent to deter criminals.

238. The ability to sell semi-finished product into world markets is often used as a steppingstone by mills as they build out their rolling plants. A permanent ban on the export of genuine semi-finished product is not ideal if a less restrictive measure could secure a similar reduction in theft.

Recommendation: a new trading regime for scrap metal

239. It is reasonable for Government to act boldly and decisively against metal theft, and our recommendations are shaped by this perspective.

240. We recommend the implementation of a "new trading regime for scrap metal". It consists of three pillars. First, a temporary ban on the export of all scrap *and* semi-finished metals. Second, a permanent ban on "cash-for-scrap", meaning any purchase of scrap or semi-finished products will only be allowed through EFT. Third, a licensing framework, which uses strict licensing criteria to significantly reduce the number of metal buyers, metal exporters and metal sellers.

241. The licensing framework can be implemented in stages, as administrative constraints allow. To create the licensing framework, the Government can make amendments to existing legislation (e.g. the Second-Hand Goods Act) and utilise existing co-ordinating bodies and their members (e.g., NICOC and the Inter-Agency Working Group on Illicit Trade, which includes SARS, DTIC and ITAC) to manage the initial stages of licensing. Once the licensing framework is complete, the existing metal supply chains will be fundamentally transformed.

    241.1. Pure traders and middlemen will be completely excluded in most cases.

    241.2. For copper, buyer licences will only be given to the few qualifying mills and foundries (and potentially a few major recyclers) that are active in the market.

Licensees will need to pay a large deposit (e.g., R2,000,000) and submit input-output reports to a central database, i.e., data tables showing all purchases and sales.

241.3. For other metals, buyer licences will be given more liberally, but licensees will still need to pay a large deposit (e.g., R150,000) and submit input-output reports.

241.4. When the temporary export bans are relaxed, export licences will be given to a still smaller subset of the licensed buyers, with high deposit requirements.

241.5. Finally, sellers of high-risk metals (copper scrap and semi-finished product of *any* metal) will be strictly limited to the specific lists published by the authorities, and a large deposit will be required from all sellers of semi-finished metal.

242. The new regime will deal a powerful blow to existing stolen metal syndicates and networks. These syndicates currently operate "in the open": *openly* storing, trucking, and coordinating the sale and purchase of shredded/melted metal both locally and across the border. The new regime will challenge the syndicates' abilities to operate, sell and export their stolen goods.

242.1. ***Much easier monitoring and control of metal buyers*.** No person will be allowed to be in possession of melted or shredded metal unless they have a licence to buy. This will significantly reduce enforcement complexity since the mere possession of scrap or semi-finished metal (stolen or not) would constitute grounds for arrest and censure. Cash will be banned across all metal transactions and buyers will be required to submit regular input-output reports.

242.2. ***Sellers will be highly restricted***. For copper, buyers will only be able to buy copper scrap from sellers on the published list, which will include SOEs, municipalities, large businesses, and over time, smaller businesses. The informal supply of copper scrap will be shut down. For all metals, the sale of semi-finished product will be limited to licensed mills. If a buyer purchases from an unlicensed source it will result in the loss of the buyer licence, which will lead to business closure in most cases.

242.3. ***Exports will be tightly controlled***. Exports will at first be banned, and then opened to a subset of buyers that have a buyer licence. Mills (and only mills) will be given a licence for the export of semi-finished and finished product. If conditions allow in the medium term, some licensed recyclers might be given a licence to export scrap. Temporary export bans should only be relaxed when the country has reached an appropriate stage of licensing. And export bans can also be reimposed if it is found that their relaxation caused a spike in theft.

243. Overall, by imposing the new regime, Government can expect a significant reduction of the more than R46 billion in estimated theft costs.

What about the impact on industry and employment?

244. The proposed solution allows legitimate metal production to continue, albeit in a formalised environment. The final impact on metal production will depend on a host of

factors – and it is bears noting that if production based on stolen scrap declines, this would be a net positive to society.

244.1. *Temporary block on semi-finished exports.* The block on semi-finished exports will in the short term, cause a reduction in mill production, which will last until a) mills successfully beneficiate downstream, or b) the semi-finished export ban is relaxed. It is difficult to estimate the size of semi-finished exports because the semi-finished export category is routinely used to smuggle scrap. But it is likely to be large and significant – estimated at a third of total production in the case of copper.

244.2. *Scrap supply.* The local restrictions will limit the supply of scrap from informal forces, especially for copper. But export restrictions (temporary bans and export licensing) will divert substantial volumes of scrap into the local market. Thus, despite imposing strict regulations across the trade in all metals, **the net result of the new trading regime might be that the scrap supply to local mills and foundries increases**, dropping the price of scrap and increasing the rate of beneficiation into finished product.

244.3. *Informal collectors* will lose the ability to sell copper scrap, but they will still be able to earn revenue from glass, plastic, paper, and non-copper scrap.

245. In the short term, the negative production impact of the semi-finished export ban will likely outweigh any positive impact from increased scrap supply, because mills will take time to expand into more finished products. **If Government can quickly replace semi-finished export bans with local restrictions and export licensing, the prospect that the new regime will have a positive impact on theft reduction and production and employment increases.**

246. But even if local production decreases to some extent, this does not undo the rationality of the regime because efforts to decrease the nationwide costs of metal theft justify imposing additional costs on the metal industry. **The strong possibility that in the long run the new regime will both decrease theft *and* increase production is good news.**

247. The proposed solution is, however, associated with an increased administrative burden on the state. To some extent this is alleviated by a staged licensing design, which provides room for Government's licensing capacity to build slowly while the country is protected by export bans. Moreover, the proposed new regime has several benefits relative to low-administrative solutions.

247.1. Relative to a copper ban, the new trading regime captures most of the benefits of a full ban on copper trade, yet it allows the copper industry to remain open. It is true that a trade ban would eliminate local whitewashing. However, under the new regime, the ability to get copper scrap into the licensed supply chain will be substantially reduced, if not eliminated. This is due to the use of highly restricted copper buyer licences, highly restrictive copper seller licences, a ban on cash, input-output reporting, and highly restricted export licences.

247.2. A permanent export ban leaves smuggling through finished metal and non-metal codes unaddressed (unless it is combined with increased enforcement at the ports). It also does not address local whitewashing, which may be significant if stolen volumes are small relative to local demand or as the milling industry expands in response to lower scrap prices. The new trading regime pushes syndicates underground, making it much more difficult for them to whitewash their product locally and much more costly and risky to get their stolen goods to the port *in the first place*. Moreover, in the new trading regime, the ban on exports need not be permanent. It can be lifted once the local restrictions have been sufficiently established, including the granting of semi-finished export licences (which will only be given to active mills). This will provide relief to the milling industry, allowing them to use semi-finished revenues to build more advanced plants that focus on finished products.

248. Compared to both a copper ban and a permanent export ban, the new trading regime is also more robust against litigation and should benefit from support from the industry.

248.1. First, the new regime will be difficult challenge in the courts. Afterall, the approach does not close copper milling and it does not permanently ban semi-finished metal exports. The approach attempts to regulate it to address what must be acknowledged as a massive national issue. Even if the costs of theft are significantly overstated, and the benefits of milling significantly understated, this would hardly suggest that local restrictions were irrational.

248.2. Second, if the new regime fails to significantly reduce metal theft, Government will be forced to implement even stricter polices, potentially including a complete ban on copper and a permanent ban on exports. Industry has every incentive to help make the new regulations work, and to *expend resources* in *actively* assisting the Government to stop copper theft.

249. We conclude by noting Kenya's experience. In 2010, Kenya implemented an export ban on scrap metal that was formalised into law in 2015. However, this was insufficient to stop the rising tide of metal theft. In 2022, the Kenyan Government implemented a full ban on the trade of <u>all</u> scrap metal, which was only relaxed after the Government had created a new trading regime which includes a host of local restrictions and licensing requirements.

250. It is our recommendation that South Africa implements a temporary export ban and proceeds to formalise the scrap metal industry through banning cash and implementing a strict licensing regime.

APPENDICES

APPENDIX 1: PRODUCT CODES AND BENEFICIATION STATUS

As discussed in the report, the methodology for the product codes and beneficiation classification can be found here.

STEEL

Table 14: Steel HS codes and article descriptions

Scrap	Semi-finished products	Finished products
H7204: Ferrous waste and scrap; remelting scrap ingots of iron or steel	H7201: Pig iron and, spiegeleisen in pigs, blocks or other primary forms H7202: Ferro-alloys H7203: Ferrous products obtained by direct reduction of iron ore and other spongy ferrous products, in lumps, pellets or similar forms; iron having a minimum purity by mass of 99,94 per cent, in lumps, pellets or similar forms H7205: Granules and powders, of pig iron, spiegeleisen, iron or steel H7206: Iron and non-alloy steel in ingots or other primary forms (excluding iron of heading 72.03) H7207: Semi-finished products of iron or non-alloy steel H7218: Stainless steel in ingots or other primary forms; semi-finished products of stainless steel H7224: Other alloy steel in ingots or other primary forms; semi-finished products of other alloy steel	H7208: Flat-rolled products of iron or non-alloy steel, of a width of 600 mm or more, hot-rolled, not clad, plated or coated H7209: Flat-rolled products of iron or non-alloy steel, of a width of 600 mm or more, cold-rolled (cold-reduced), not clad, plated or coated H7210: Flat-rolled products of iron or non-alloy steel, of a width of 600 mm or more, clad, plated or coated H7211: Flat-rolled products of iron or non-alloy steel, of a width of less than 600 mm, not clad, plated or coated H7212: Flat-rolled products of iron or non-alloy steel, of a width of less than 600 mm, clad, plated or coated H7213: Bars and rods, hot-rolled, in irregularly wound coils, of iron or non-alloy steel H7214: Other bars and rods of iron or non-alloy steel, not further worked than forged, hot-rolled, hot-drawn or hot-extruded, but including those twisted after rolling H7215: Other bars and rods of iron or non-alloy steel H7216: Angles, shapes and sections of iron or non-alloy steel

		H7219: Flat-rolled products of stainless steel, of a width of 600 mm or more H7220: Flat-rolled products of stainless steel, of a width of less than 600 mm H7221: Bars and rods, hot-rolled, in irregularly wound coils, of stainless steel H7222: Other bars and rods of stainless steel; angles, shapes and sections of stainless steel H7225: Flat-rolled products of other alloy steel, of a width of 600 mm or more H7226: Flat-rolled products of other alloy steel, of a width of less than 600 mm H7227: Bars and rods, hot-rolled, in irregularly wound coils, of other alloy steel H7228: Other bars and rods of other alloy steel; angles, shapes and sections, of other alloy steel; hollow drill bars and rods, of alloy or non-alloy steel H7303: Tubes, pipes and hollow profiles, of cast iron H7304: Tubes, pipes and hollow profiles, seamless, of iron (excluding cast iron) or steel H7305: Other tubes and pipes (for example, welded, riveted or similarly closed), having circular cross-sections, the external diameter of which exceeds 406,4 mm, of iron or steel H7306: Other tubes, pipes and hollow profiles (for example, open seam or welded, riveted or similarly closed), of iron or steel H7307: Tube or pipe fittings (for example, couplings, elbows, sleeves), of iron or steel H7328: Articles of iron and steel

		H7329: Articles of iron and steel H7331: Articles of iron and steel H7332: Articles of iron and steel H7336: Articles of iron and steel H7340: Articles of iron and steel H7342: Articles of iron and steel H7372: Articles of iron and steel H7380: Articles of iron and steel H7383: Articles of iron and steel H7397: Articles of iron and steel

Sources: SARS; Trademap; DTIC; Genesis analysis.

COPPER

Table 15: Copper HS codes and article descriptions

Scrap	Semi-finished products	Finished products
H7404: Copper waste and scrap	H7401: Copper mattes; cement copper (precipitated copper) H7402: Unrefined copper; copper anodes for electrolytic refining H7403: Refined copper and copper alloys, unwrought H7405: Master alloys of copper H7406: Copper powders and flakes	H7407: Copper bars, rods and profiles H7411: Copper tubes and pipes H7412: Copper tube or pipe fittings (for example, couplings, elbows, sleeves) H7424: Copper and articles thereof H7427: Copper and articles thereof H7471: Copper and articles thereof H7473: Copper and articles thereof H7481: Copper and articles thereof

Sources: SARS; Trademap; DTIC; Genesis analysis.

Genesis Analytics (Pty) Ltd

Head Office:

Physical	50 Sixth Road, Hyde Park, Johannesburg
Postal	PO Box 413431, Craighall, 2024, South Africa
Telephone	+2711 994 7000
Facsimile	+2786 688 2247
Registration No	1998/001950/07

East Africa:

Physical	4th Floor, West Park Suites, Ojijo Road, Parklands, Nairobi
Postal	PO Box 76608-00508, Nairobi, Kenya
Telephone	+254 701 945 800
Registration No	P051570125T