TRADE & INDUSTRIAL POLICY STRATEGIES

TIPS REPORT FOR THE
DEPARTMENT OF TRADE, INDUSTRY AND COMPETITION

MEASURES TO PREVENT THEFT OF SCRAP METAL

FINAL.

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ABBREVIATIONS

AMSA	ArcelorMittal South Africa
DMRE	Department of Mineral Resources and Energy
dtic (the)	Department of Trade, Industry and Competition
EPA	Economic Partnership Agreement
EU	European Union
ITAC	International Trade Administration Commission
NPA	National Prosecuting Authority
OECD	Organisation for Economic Cooperation and Development
PPS	Price Preference System
PRASA	Passenger Rail Agency of South Africa
SACU	Southern African Customs Union
SADC	Southern African Development Community
SAPS	South African Police Service
SARS	South African Revenue Service
SEIAS	Socio-Economic Impact Assessment System
TPNC	Trade Policy, Negotiations and Cooperation (the dtic)
WTO	World Trade Organization

SUMMARY OF PROPOSALS

The proposals made in this report derive from analysis of the scrap metal value chain, taking into account the significant differences between copper, steel and aluminium. They have the following main premises.

1. The proposed measures will in some cases prove costly to some scrap traders and producers. They are nonetheless worthwhile if they reduce metals theft while incidentally cutting input costs for local metals refineries and fabricators. The costs for society will be comparatively limited because the scrap industry is relatively small and employs relatively few people.
2. Effective proposals must target the systemic factors across the copper scrap value chain that enable theft. These systemic factors arise in four areas: securing vulnerable metals from theft; the scrap metals trade, including backyard copper smelters; the legal framework and the allocation of resources in the criminal justice system; and controls on illegal exports.
3. Copper theft imposes the biggest costs because it is concentrated in critical rail and electricity infrastructure. As a result, interruptions due to theft impose economic and social burdens that far exceed the value of the stolen metal. While copper should continue to be the top priority, most of the proposals to limit copper theft will also help restrain theft of other metals.

Analysis of each of the proposals using the theory-of-change and socio-economic impact assessment system (SEIAS) methodologies, provided separately, suggests that they are likely to be effective, and that the benefits will outweigh the costs and risks. The analysis of the options is provided separately.

Proposals:

Hardening sites against theft by intensifying existing efforts to replace and brand valuable materials, improve security and support for whistleblowers, and improve inventory control.

1. Municipalities and infrastructure companies should be required to report every significant cable theft, for instance with a value of over R20 000, and publish an annual report on the incidents, the impact on electricity and rail services, and the cost of repairs.
2. Every state agency should have a properly staffed hotline for copper theft, and whistleblowers should be guaranteed both protection and a percentage of the value of any recovered material, say 15%.
3. The procurement specifications for copper infrastructure elements should include markings that show ownership by default, that is unless the procuring agency can show it is not possible or too expensive to include them.
4. The national government should commission a study of frequently stolen infrastructure elements to identify ways to reduce the risk of theft, for instance by using alternative materials, improving fastenings or protective walls. It should then ensure that agencies and potential local suppliers are aware of the recommendations.
5. The national government should conduct research to identify ways to improve municipal and company systems to control inventory.

Limiting processing and fencing of stolen material through much more rigorous requirements for registration under the Second-Hand Goods Act; ending cash payments for metal scrap; and effectively banning small induction furnaces used to melt stolen copper into ingots for export.

1. Registration should ensure only relatively large and well-established businesses can trade in scrap by requiring:
    a. A deposit of R1 million to ensure the company does not need illegal business;
    b. Every employee to be vetted to ensure they do not have a criminal record; and
    c. Proof that the company has a system, backed by adequate equipment and skills, to register suppliers digitally and to pay them online.
2. The state should require registered companies to pay for all copper scrap by online bank payment to ensure traceability.
3. Both registration under the Second-Hand Goods Act No. 6 of 2009 and municipal by-laws should ban smelting in residential areas or houses; only registered recyclers or copper manufacturing companies should be permitted to import small induction furnaces.
4. Sellers of copper scrap should have to prove that they obtained the goods legally, rather than requiring the authorities to prove that they were stolen.
5. Transnet should be encouraged to avoid selling its ferrous scrap inventory until regulations are in place that increase the benefits for domestic manufacturers rather than intermediaries.

Strengthening state security efforts by improving investigation and prosecution capacity and more strategic enforcement of the Second-Hands Goods Act.

1. The Non-Ferrous Metals Crime Combating Committee should be complemented by dedicated investigative capacity, with a dedicated team at the National Prosecuting Authority (NPA) to deal with copper theft, and a special crimes court.
2. Officers with responsibility for second-hand goods inspections should be instructed to prioritise metal scrap, and especially copper, over other goods.
3. Every police station should have a hotline to report cable theft and illegal scrapyards and smelters. Councillors, Ward Committees and other social structures should be trained in identifying illegal yards and smelters.

Blocking illegal exports

1. Copper scrap exports – including all copper alloys – should be banned outright as long as copper theft remains high, and steel scrap exports should be banned at least until the registration of scrap dealers is improved. Substantially higher penalties should be introduced for mislabelling scrap for export.
2. Exports of raw copper should only be permitted if they are certified by a South African copper mine. The mine should have to copy the certification to both the South African Revenue Service (SARS) and the police to ensure coordination at the ports.
3. Raw copper exports should have to go through a single port in order to simplify oversight.

1 PROBLEM STATEMENT

Theft of scrap metal, especially copper cable, imposes costs far beyond the actual value of the material taken. These costs, mostly in the form of disruptions to rail transport and electricity, effectively cut production and foreign sales worth tens of billions of rand a year. In response, in the 2022 State of the Nation Address President Ramaphosa committed to scaling up efforts to combat scrap metal theft. He said that:

> *"The damage caused by the theft of scrap metal and cable on our infrastructure like electricity, trains and other vital services is enormous. We will take decisive steps this year both through improved law enforcement and by considering further measures to address the sale or export of such scrap metal."*

Scrap metal is also a critical input for most metals refineries, including both copper fabrication and basic steel. In consequence, illegal exports effectively raise input costs for local producers across these value chains, which are among South Africa's most advanced. They effectively both incentivise theft and facilitate export-parity pricing for scrap metals, with the resulting rents going to scrap traders instead of boosting local manufacturing.

The Department of Trade, Industry and Competition (the dtic) commissioned TIPS to evaluate the economic and legal effectiveness and viability of measures to limit the theft of scrap metal. To that end, the analysis includes the following.

1. An assessment of the economic impacts of the thefts, which sets key parameters for weighing the costs of proposed solutions against the benefits.
2. An investigation of systemic vulnerabilities that enable theft to continue in the scrap metal value chain, from suppliers to traders to final buyers at home and abroad.
3. A set of proposals to narrow the scope for theft of scrap metal. These proposals fall into four categories: improving security around vulnerable metal products; limiting opportunities for smelting and fencing stolen scrap; increasing the capacity of the criminal justice system to obtain convictions; and reducing access to export markets.

The implications of trade rules for the proposals on regulating the scrap metal market are included in a separate section, with more detail in Appendix 3.

Copper, iron and steel and aluminium theft vary substantially in their economic impacts, extent and targets. This report examines them separately, although the proposed measures around security, the domestic scrap trade, and the legal framework for prosecutions are largely cross-cutting.

This assessment derives from extensive interviews with and written inputs from experts and stakeholders in the scrap value chain; analysis of the available data, which is limited because of the relatively small size of the scrap industry; a review of international experience; and a systematic evaluation of proposals using the theory-of-change and SEIAS methodologies. A list of key informants is attached as Appendix 1.

2 COPPER AND COPPER ALLOYS

Copper – used in this report to refer both to copper itself and to alloys[1] – generally has a high price per tonne and is critical for electricity transmission. That combination makes theft of copper material both attractive to syndicates and highly disruptive to the economy and society. Copper theft has increased markedly in rail transport in the past few years, and apparently in many municipalities as well.

This section first lays out the available information on the impact of copper theft. It then considers systemic factors in the value chain that make theft possible. The final part proposes a range of interventions to minimise it.

2.1 The impact of copper theft

When copper theft interrupts electricity and rail transport systems, it imposes economic and social costs several times as high as the value of the actual metal stolen. There is no centralised database on the problem, but the available information suggests that the value of the material stolen was around R2 billion in 2020. The cost in terms of repairs to infrastructure and interrupted services was closer to R10 billion. The following subsections summarise the available information for rail transport and electricity transmission, and then briefly consider the implications for copper fabricators.

2.1.1 Rail transport

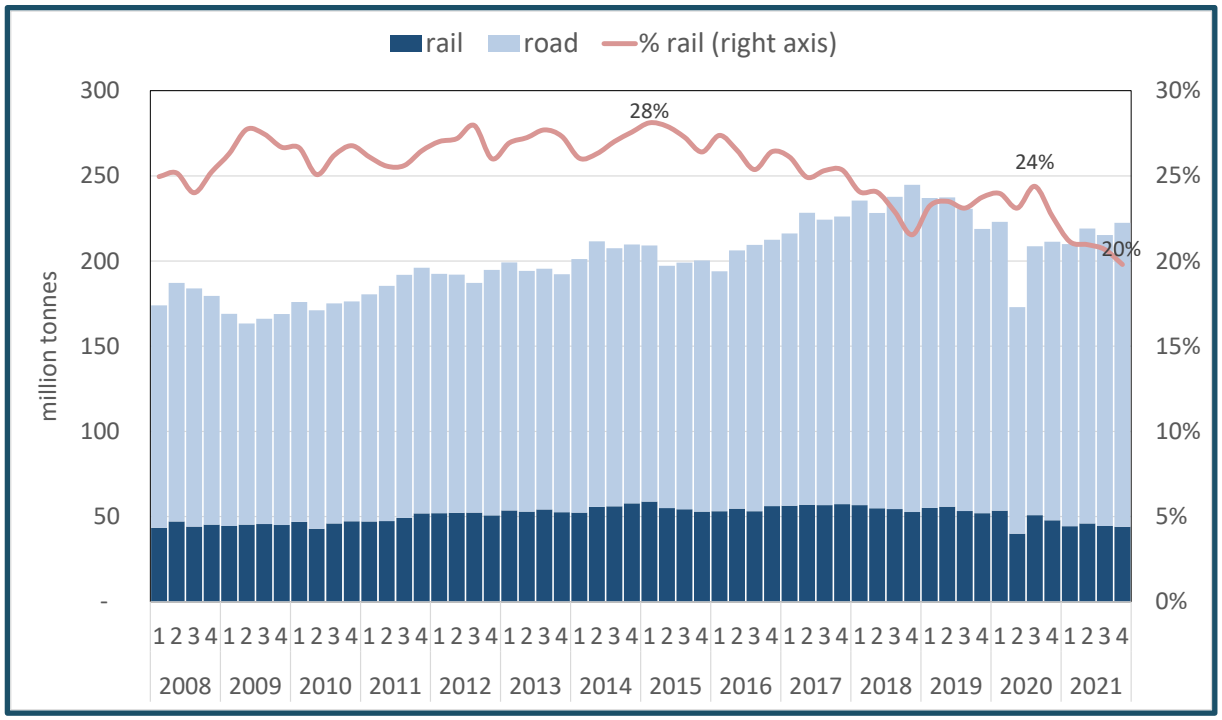
South Africa has around 25 000 kilometres of rail under operation. Of that, the Passenger Rail Agency of South Africa (PRASA) owns 2 280 kilometres, almost exclusively in Gauteng, eThekwini and Cape Town, while Transnet operates the remainder. Before the COVID-19 pandemic, rail accounted for a quarter of both freight and public transport in South Africa (excluding airfreight), but the majority of shipping for most mining products and for grain. Transnet's efficiency has historically been crucial to maintaining national competitiveness by providing dedicated bulk lines for leading commodity exports (especially coal, iron ore, chrome and manganese) as well as facilities for auto exports.

Transnet and PRASA argue that theft of cable for electric trains and signalling has vastly slowed their recovery from the COVID-19 lockdown in March and April 2020. As Graph 1 shows, the share of rail in total freight transport fell from 28% in 2015 to 24% in 2020, and dropped to 20% in December 2021. The share of rail in passenger journeys fell from 60% in 2015 to 26% in 2020, then collapsed to 11% in December 2021. In 2019, the railways carried 200 million tonnes in freight, valued at R50 billion; in 2020, the tonnage fell to 180 million for just R40 billion. For personal transport, the figures are even more disastrous. In 2019, passengers took a total of 175 million personal rail journeys and paid R2,4 billion. Two years later, they took only 22 million journeys for R0,5 billion.

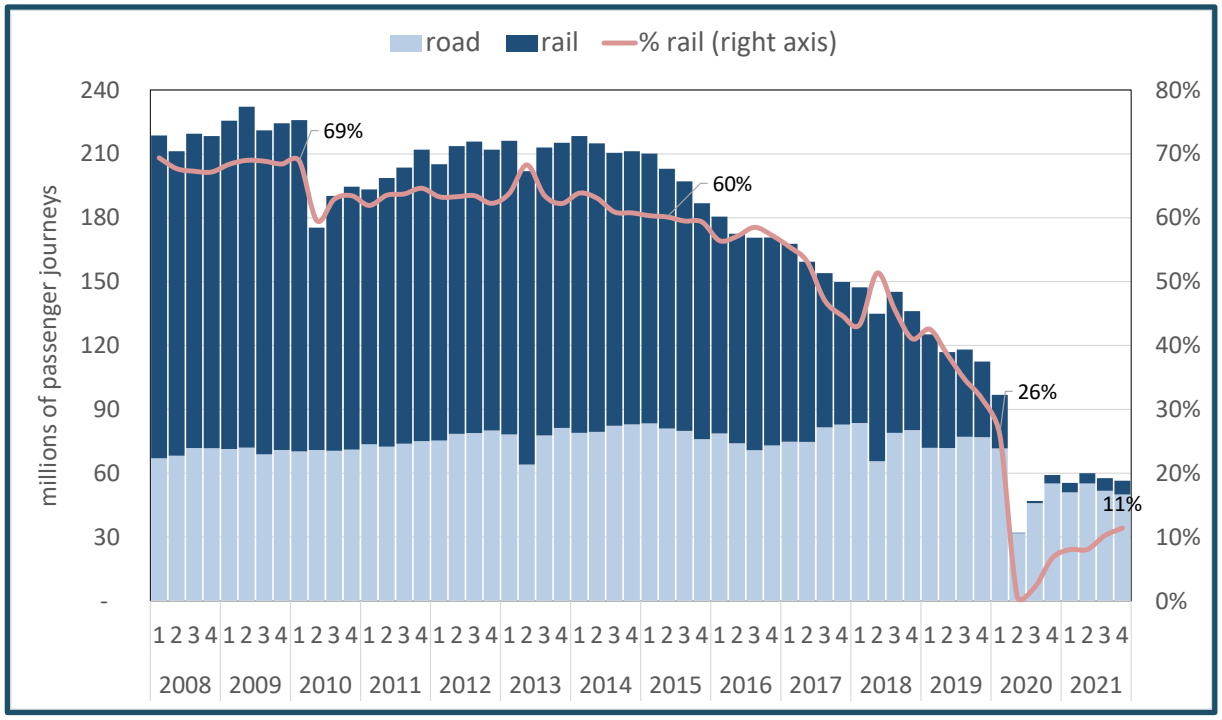
[1] That is, for ease of understanding, copper is used to refer to all red metals.

Graph 1. Quarterly volume of freight and personal transport by rail and road and share going by rail, 2008 to 2021, seasonally adjusted

A. Freight transport in millions of tonnes of cargo



B. Personal transport in millions of journeys

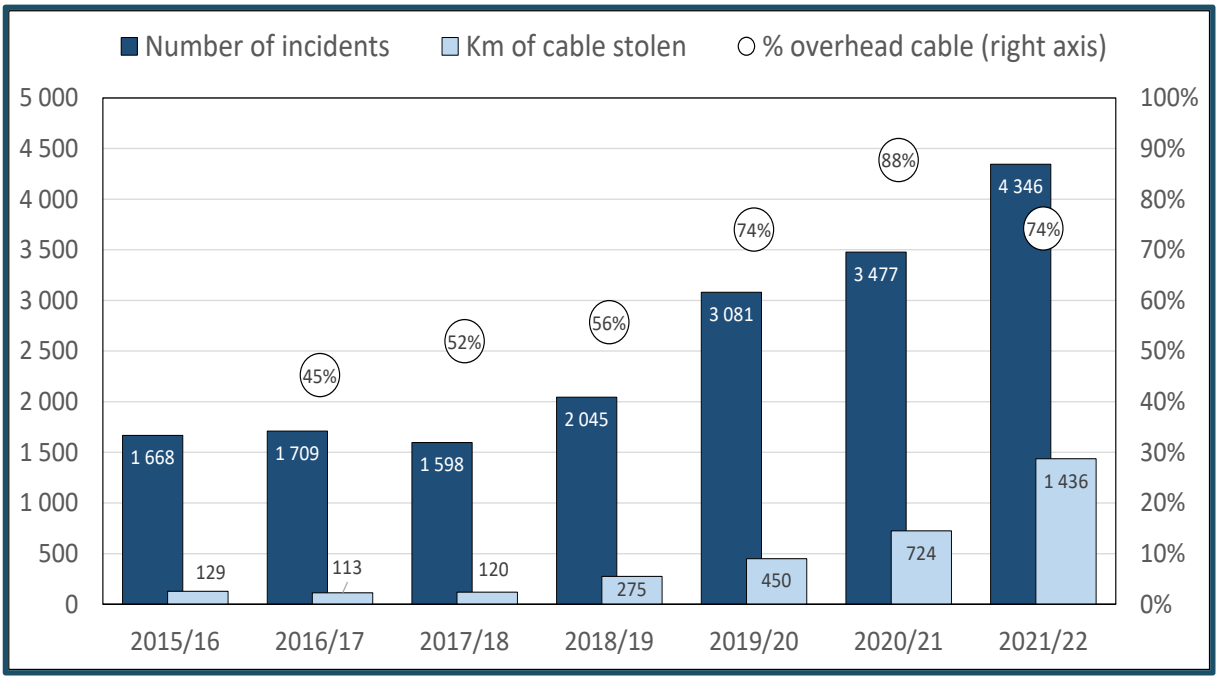


Source: Calculated from Statistics South Africa. Land Transport Survey, January 2022. Publication P7162. Excel spreadsheet. Downloaded from www.statssa.gov.zain March 2022.

Transnet[2] reported that the length of cable stolen from its lines rose sixfold from 2017 to 2021. The amount of cable stolen from Transnet climbed from 120 to 724 kilometres, after remaining virtually unchanged for the previous three years. The number of incidents increased from over 1 500 to almost 4 500 in the same period. On average, the length of cable stolen in each incident almost tripled, from 75 to 200 metres (Graph 2).

Overhead cable accounted for virtually all of the increase in theft. The criminals needed substantial knowledge, equipment and personnel to steal these thick high-voltage cables, which cover very long distances. The thefts centre on the lines from KwaZulu-Natal to Gauteng and Mpumalanga. (Goddard 2021) The coal mines in Mpumalanga and Limpopo have borne the bulk of the damage.

Graph 2. Cable theft incidents at Transnet

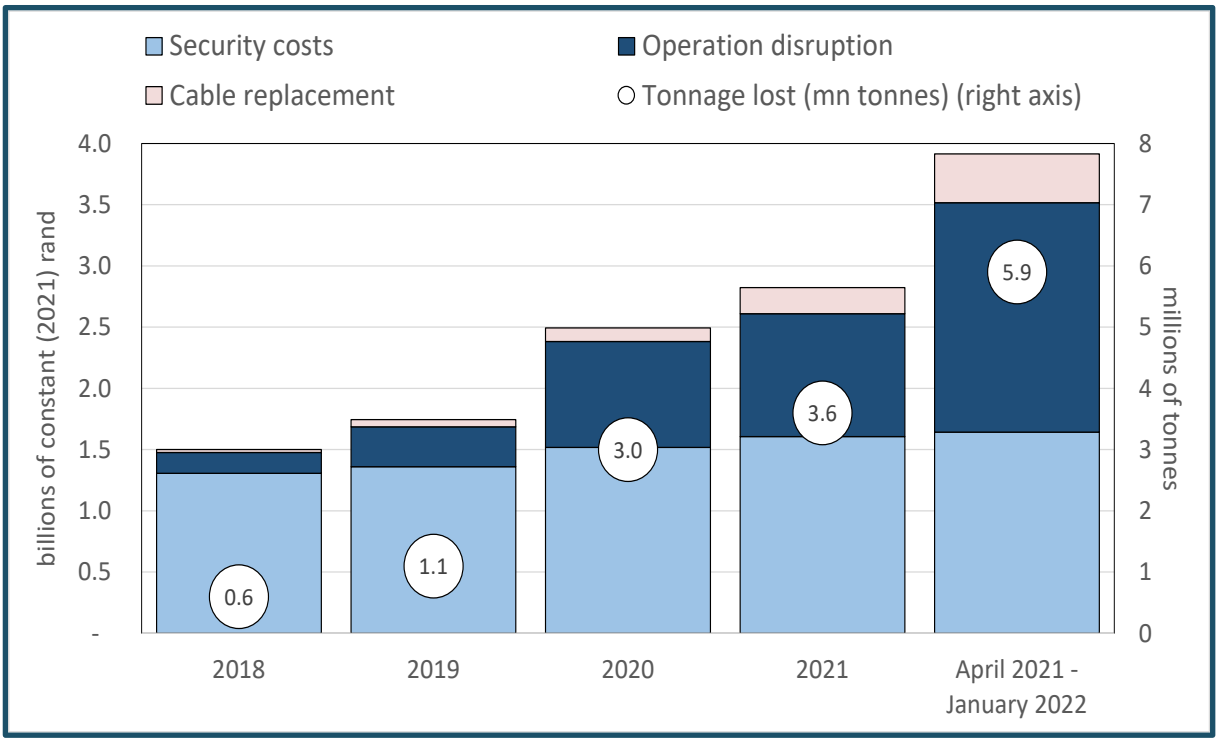


Source: Information provided by Transnet in February 2022.

Transnet estimated that its total costs from copper theft came to R3,9 billion in the 10 months to January 2022 – around 25% more than in the full year to March 2021 (Graph 3). The replacement of stolen material accounted for only around a tenth of the total loss. The largest and fastest growing cost for Transnet arose from lower revenues as customers moved to road carriers while others faced long delays. Transnet estimated that from April 2021 to January 2022, it lost R1,9 billion in sales – around 10 times as much as five years earlier, in constant rand terms. In volume terms, coal exports accounted for 70% of the lost freight. In addition to lower revenues, Transnet's security costs in the 10 months to January 2022 came to R1,6 billion, 26% higher in real terms than five years earlier.

[2] Unless otherwise noted, information and data on Transnet derives from an input kindly provided in February 2021.

Graph 3. Impact on Transnet of cable theft by type of cost in billions of constant rand (a) and estimated lost freight tonnage, year to March 2018 to 2021 and from April 2021 to January 2022

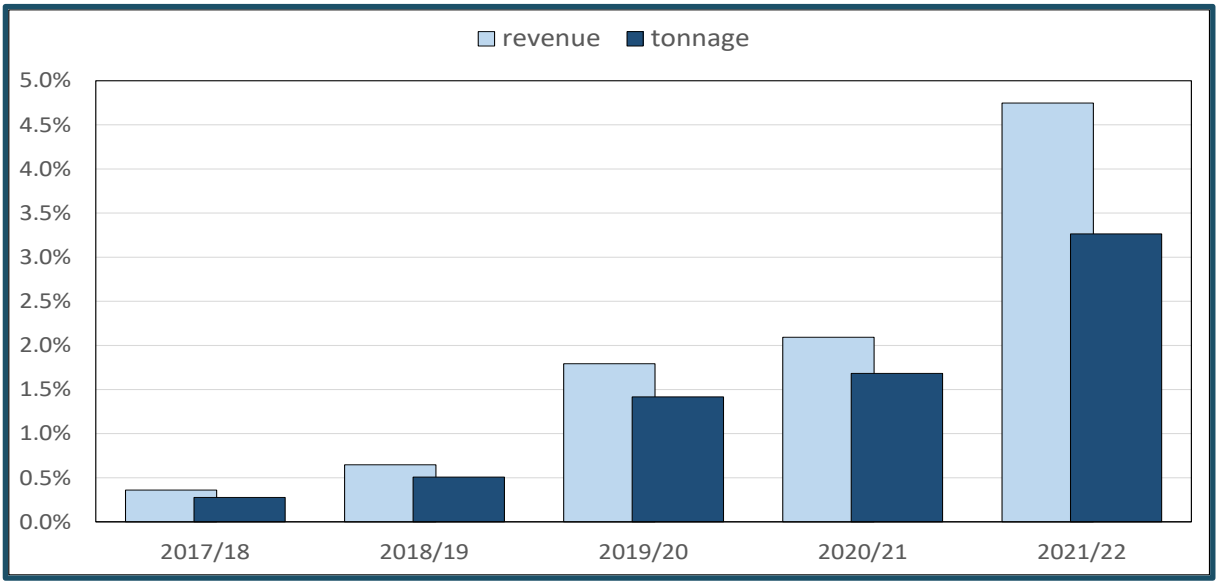


Note: (a) Deflated with average CPI to March. *Source*: Calculated from inputs provided by Transnet in January 2022.

Transnet calculated that the loss of freight due to cable theft climbed from 600 000 tonnes in 2017/18 to almost six million tonnes in 2020/21, of which 3,7 million tonnes was export coal. That meant the tonnage lost rose from 0,3% of Transnet's total rail freight to 3,3%. Soaring international mining prices in 2020 and 2021 meant losses escalated even faster in rand terms. Transnet's estimates of lost revenue in constant 2021 rand[3] increased from R0,16 billion in 2017/18 to R1,9 billion in 2020/21, or from 0,4% to 4,7% of its freight rail revenue. That said, Transnet's figures reflect its estimates for foregone custom, not actual payments. Factors other than cable theft may have also affected Transnet's efficiency and sales over the past five years.

[3] Reflated with average CPI for the financial year to March, rebased to 2021.

Graph 4. Transnet estimated loss of business due to cable theft as percentage of freight rail revenue and tonnage carried, 2017 to 2021



Source: Calculated from information provided by Transnet in February 2022 and its Annual Reports for relevant years.

The cost of lost shipments was even higher for Transnet's customers. The Minerals Council estimated the cost for all lost or delayed mining shipments at R30 billion. (Faku 2022) Coal exports fell from 80 million tonnes in 2019 to 66 million in 2021 – the lowest level in 20 years – even as coal prices rose by 31%. If exports had remained at 2019 levels in volume terms, South African coal companies would have earned an additional R17 billion in 2021, or around 25% more than their actual returns. (Calculated from Quantec 2022).

Increasing cable theft also disrupted private coal lines. Reports by ArcelorMittal South Africa (AMSA), the dominant steel company, did not mention cable theft until 2020. Then its Annual Report noted that the effect on shipments of coal to its Newcastle plant "severely hampered coke production". (AMSA 2020:39) Transnet reported that theft from some coal mines' private feeder lines affected shipments to the coast. (Transnet 2021:15) These impacts undermined the national policy of shifting from road to rail for coal transport in order to avoid the devastation of provincial roads and to reduce emissions.

The direct and indirect costs of cable theft for Transnet do not capture the ultimate impacts on its customers and the economy as a whole. Historically, mining companies outside of precious metals, as well as the auto industry, have relied on dedicated, low-cost Transnet facilities to sustain international competitiveness. Rising cable theft over the past two years has challenged this vital advantage in a variety of ways. In addition to the costs to coal exporters, they include:

- Higher freight costs for companies that moved from bulk rail lines to road freight, among others for domestic iron ore, manganese and cement.
- Interruptions to production of steel, autos and cement due to delays in input shipments, with ArcelorMittal for instance reporting "escalating incidents of cable theft which played havoc with the delivery of raw materials to our plants by rail" in 2020. (AMSA 2020:4)
- Increased damage to national and provincial roads by heavily laden trucks.
- Higher emissions per tonne from road freight than from rail.

- Disruptions to long distance passenger rail, which is mostly managed by PRASA but uses Transnet lines. (PRASA 2022:24)

PRASA also saw soaring costs from cable theft in the past two years.[4] Looting of its urban commuter lines, including extensive cable theft, prolonged the closure of its Central Line in Cape Town and delayed restoration of its other services after the initial COVID-19 lockdown in March and April 2020. In February 2022, PRASA's services remained at around 16% of capacity.

Even before the lockdown, PRASA's figures indicated around 10 times as many thefts per kilometre of rail as Transnet. It reported, however, that the number of incidents fell by a quarter in 2020/21, which it attributed to improved security measures. (PRASA 2022:27)

In February 2022, PRASA placed the cost of replacing electrical and signalling cable since the lockdown in early 2020 at R3,3 billion. That equalled half of all assets stolen from its rail lines and stations. Its other losses included station furnishings, telecommunications equipment and railway tracks ("perway").

PRASA estimated the loss of revenue due to closure of its commuter trains, under its Metrorail division, at between R800 million and R1 billion. It lost another R200 million from the associated commercial rents. In addition, it estimated that the closures cost its employees around R400 million in foregone wages in 2021 alone.

The sharp reduction in PRASA services affects its customers by increasing the cost of commuting and reducing the reliability of trains. PRASA estimated that taxis charge around 2,5 times the rail fare. That figure aligns with findings from Statistics South Africa's Land Transport Survey.[5] Assuming all of the customers who could not take trains following the lockdown ended up in taxis, their commuting costs would increase by around R1,5 billion a year. If they stayed with PRASA, they endured more delays, around half of them due to cable theft. If workers ended up arriving late to work, they could get lower pay or even disciplinary action, and their employers lost from depressed production.

In short, the escalation in cable theft in the past two years centred largely on Transnet and to a lesser extent PRASA. The result was significant disruption especially in the export of coal as well as commuter transport in Cape Town and Gauteng. The expenses to Transnet and Prasa of repairs are significant, but the economic and social costs for the affected businesses and households are several times larger.

2.1.2 Electricity

The electricity system is filled with copper, from transmission cables to transformers to grounding wires. As a result, the main distributors – Eskom and municipal governments – face a continual attack from thieves. Eskom supplies 3 500 large electricity-intensive companies, mostly in mining and refining, as well as around half of all households, almost all in working-class communities. It also supplies the 278 municipal governments that deliver electricity to the remaining seven million households plus almost all industrial and commercial sites. The

[4] Unless otherwise noted, information and data on PRASA derives from an input kindly provided in February 2022.

[5] The average cost per journey in the Land Transport Survey for public road transport is between two and 2,5 times as high as the rail fare. Calculated from Statistics South Africa, 2022.

municipalities supply nearly 800 000 formal enterprises, including virtually all small businesses and most of manufacturing outside of the mining value chain.

Cable theft from electricity infrastructure imposes a variety of costs on businesses and households. As with rail transport, the indirect costs for both electricity suppliers and their customers far outweigh the value of the material stolen.

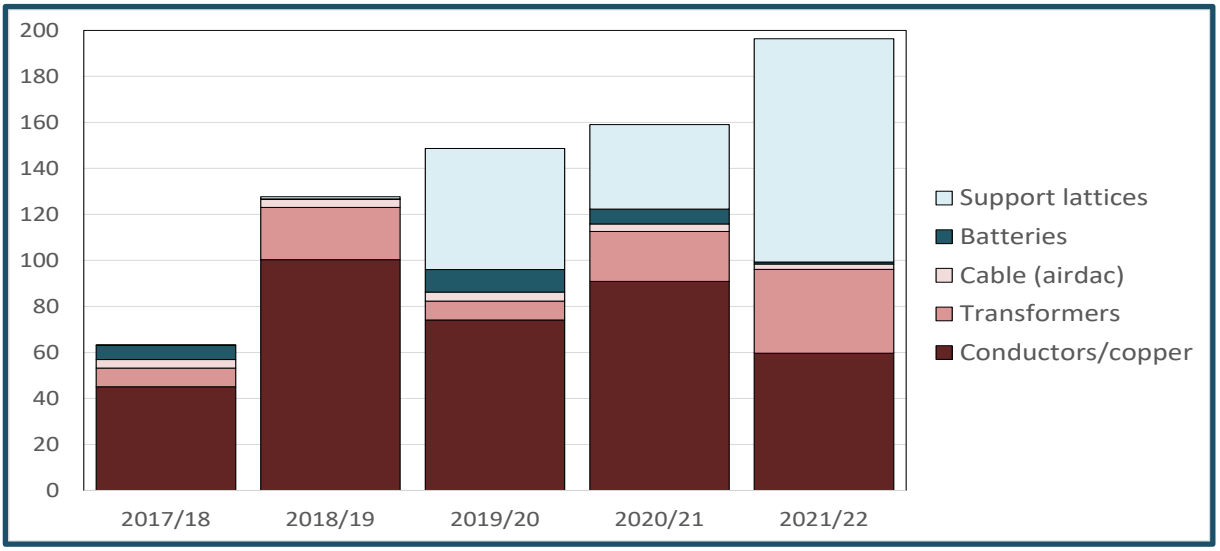
- Eskom and the municipalities lose revenue when copper theft causes blackouts. In addition, the increased unreliability of both Eskom and municipal grids incentivises both businesses and households to explore alternatives, mostly solar power.
- The theft of copper often damages the associated structures and equipment, with the cost of repairs equalling up to 10 times the value of the stolen material. Eskom and municipalities have also had to increase security budgets. They have adopted a range of measures, from putting identifying marks on cable to deploying armed guards and drones.
- Cable thieves have beaten and in some cases even killed guards at electricity infrastructure.
- Customers suffer from unplanned blackouts, which may last for days, when sensitive infrastructure is stolen. That said, outages from municipal cable theft often affect only a few households or businesses at a time. Sometimes cable theft disrupts telecommunications and internet networks. It can also cause voltage fluctuations that damage equipment and appliances.
- In several municipalities, copper theft has led to water and sewage shut-offs. Sometimes the result is sewage backups or dumping in rivers.
- In some cities, including Johannesburg, thieves have targeted streetlights and traffic robots, increasing the risk of car accidents.
- The theft of cable from electric infrastructure imposes substantial safety risks. It can leave behind live unmoored cables, including on roads, which can cause serious injuries. In addition, a number of thieves have suffered severe burns or even died while trying to steal copper from electricity installations.

The available evidence suggests that copper theft from municipal, but not Eskom, infrastructure increased during the pandemic. The numbers are harder to quantify than for rail, however, mostly because municipalities do not report consistently, and Eskom has only provided broad estimates. Moreover, both Eskom and the municipalities often conflate the theft of electricity through illegal connections with cable theft. From the standpoint of impacts and perpetrators, however, these two activities are very different.

Eskom provided information on the impact of cable theft in February 2022, but the figures were difficult to parse.[6] It pointed to fluctuations in the value of copper theft over the past five years, without a pronounced spike during the pandemic. In contrast, steel theft from pylons increased sharply. The Eskom input estimates of the cost of cable theft at R7 billion for the entire country and R2 billion just for Eskom, compared to R10 billion for all theft from the company. Yet Eskom only reported R100 million in cable theft to the police for 2020/21, as Graph 5 shows.

[6] Unless otherwise noted, information and data on Eskom derives from an input kindly provided in February 2021.

Graph 5. Cost of stolen copper and steel infrastructure at Eskom, 2017/18 to 2021/22, in billions of constant (2021) rand (a)



Note: (a) Deflated with CPI. *Source:* Calculated from information provided by Eskom in February 2022.

The Eskom input provided only very vague information on the indirect costs of cable theft. It noted that the process often damaged the surrounding infrastructure, with costs running "up to ten times" the value of the cable stolen. It said its total security costs came to R1,8 billion a year. It did not attempt to quantify the extent of disruption to electricity supplies and the associated costs to business and households.

In contrast to Eskom, cable theft in municipalities appears to have spiked during the pandemic, although the level was already high before then. From Polokwane to Cape Town and Upington to Umhlanga, virtually all municipalities reported repeated theft from electricity infrastructure. Information about the impact on communities and businesses is only anecdotal, however, because there is no central monitoring of cases.

City Power in Johannesburg provided a list of its insurance claims for asset theft and vandalism for the year to June 2021 and from July to February 2022. The number of reported thefts remained virtually unchanged over the period, at around 225 a year, with the lost material valued at around R15 million. In both years, the five largest incidents accounted for close to half of the total claimed, with a single claim in each year running over R3 million. The remaining claims averaged around R50 000 each. That is, the claims suggested a few very large claims and a host of much smaller crimes.

While comprehensive data are not available for other cities, a few examples illustrate the impact of copper theft from municipal electricity infrastructure. More cases are described in Appendix 2.

- In Gqeberha, the Chamber of Commerce said copper theft led to 254 electricity outages in the first eight months of 2021.
- In Rand West City in Gauteng, cable theft in 2021 led to power outages in five suburbs, with one suffering from a loss of water as well. In one case, thieves stole 80 metres of medium-voltage cable, leaving the affected communities without lights for 18 hours; in another, they wrecked Eskom pylons by cutting their stays so that they collapsed in order to get to the copper cable; in a third, they stole the main feeder cable to a substation, which meant the switchgear exploded.

- Govan Mbeki municipality hired armed guards for its substations, but copper thieves got in anyway, leading the sewage system to fail and back up. In Emfuleni, thieves killed two armed guards at a substation, while in Matlosana they beat the guards, who ended up in hospital. In George, a man died trying to steal cable.
- The Kimberley Chamber of Commerce said repeated outages due to cable theft meant businesses could close down, while a new social housing project had its infrastructure repeatedly stolen.

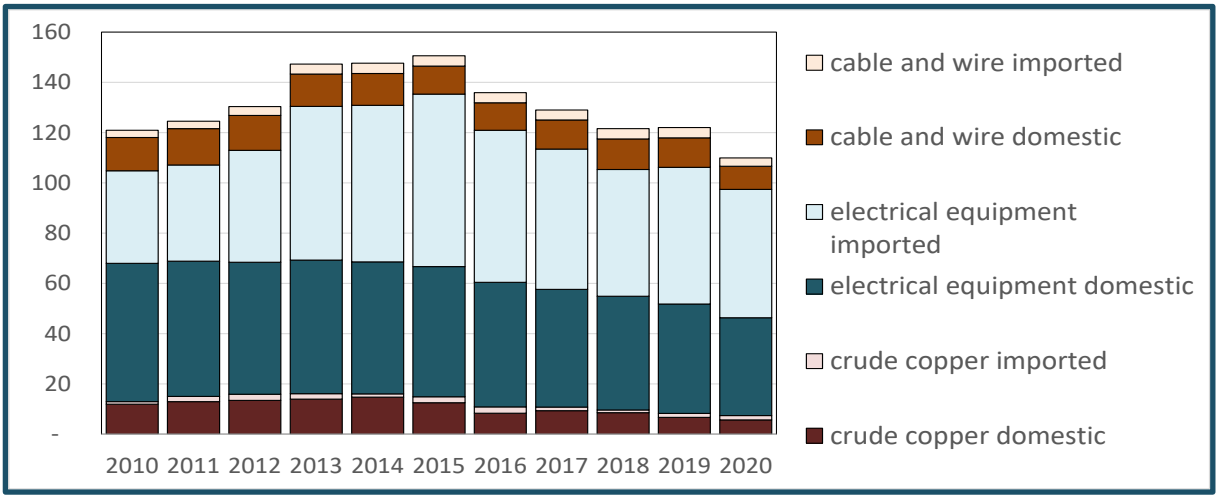
Municipalities do not report consistently on the fiscal costs of cable theft, and they often combine expenses from cable theft with illegal connections. Figures provided to the media range from R1 million a year in Mthatha to R60 million in eThekwini.

2.1.3 Copper manufacturing

Scrap copper is an important input in the manufacture of copper products, in part because it is easier to refine and cheaper than raw copper. In the 2010s, however, criminals and associated dealers diverted a growing share to illegal exports, as discussed in section 2.2.2. The practice effectively limited access for local manufacturers and raised their costs. The local Copper Development Association Africa argues that this is an important factor behind the decline in copper manufacturing in the past five years. Its membership fell by half from 2017 to 2021, and its chair blamed a shortage of scrap copper due to illegal exports. (Castings SA 2021:35)

The local copper industry is fairly small, with copper mining plus manufacturing of electrical equipment and cable contributing only 0,3% of the GDP in 2020, down from a peak of 1% in 2007. In 2019, before the pandemic, South Africa mined R6 billion in copper; manufactured R40 billion worth of electrical equipment, while importing R50 billion; and produced R12 billion in copper cable, with foreign purchases of R4 billion. In constant rand (deflated by CPI), basic copper production fell by almost half from 2015 to 2019, and electricity equipment by a seventh. Cable production expanded by 5%. Cable imports also rose 1%, but imports of other electrical equipment declined. Both local production and imports shrank significantly in the pandemic depression in 2020.

Graph 6. Sales of domestic and imported copper and copper products, 2010 to 2020, in billions of constant rand (a)



Note: (a) Deflated with average annual CPI. *Source:* Calculated from Quantec. EasyData. Interactive database. Accessed at www.quantec.co.za in March 2022.

2.1.4 Conclusions

The information on copper theft from the rail and electricity system remains patchy, which makes analysis of its extent and the overall economic and social costs difficult. It is clear that it remains a widespread problem, with a sharp spike in cable theft from PRASA and Transnet and both large and small cases across the municipalities, leading to rising costs for both repairs and security. It is also evident that the indirect costs to businesses and households are an order of magnitude higher than the immediate fiscal impacts. In addition, the illicit trade in copper scrap has been associated with rising exports, depriving local manufacturing of an important input.

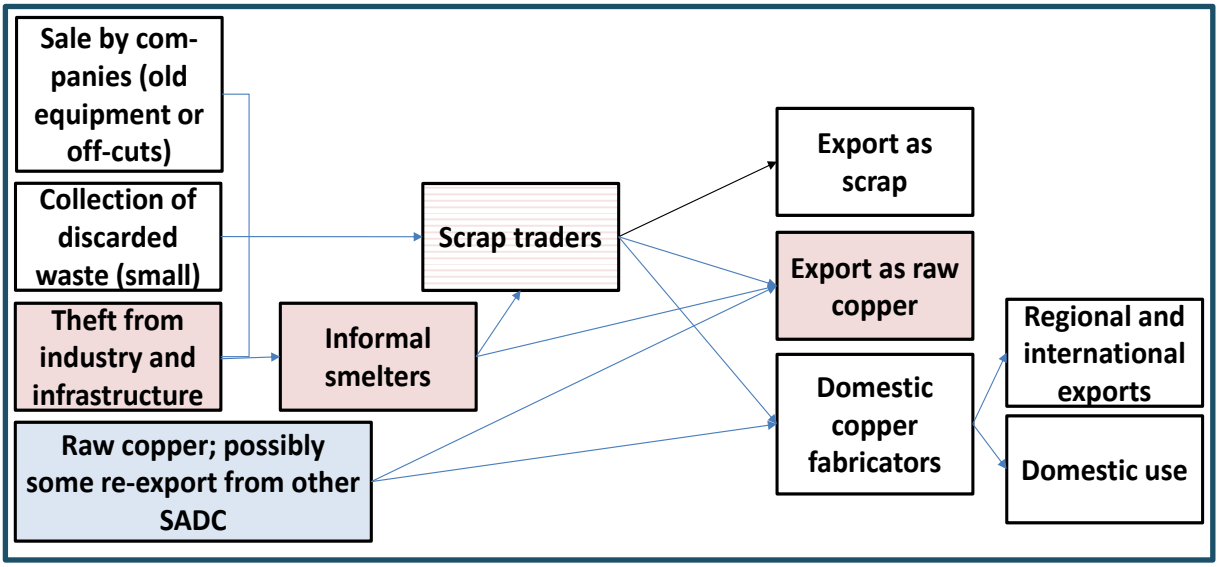
The transition to new kinds of energy in the coming years will likely increase the ramifications of copper theft from electricity infrastructure. Renewable energy and electric vehicles both use substantially more copper than conventional fossil-fuel based systems.

2.2 Factors that enable copper theft

Policies to address the theft of copper from infrastructure have to deal with the systemic factors that facilitate it. Enabling mechanisms exist at every phase of the scrap copper value chain, from the suppliers to dealers to consumers at home and abroad. The available information suggests that copper theft became entrenched when copper prices soared during the global commodity boom from the early 2000s to 2011. Although copper prices fell thereafter, the systems set up to trade in illegal scrap remained. As a result, copper theft remained persistently high, supported by a network of syndicates linked to small informal smelters, scrapyards and export relationships. [7]

The following diagram indicates the main phases and types of business in the copper value chain.

Figure 1. The copper scrap value chain



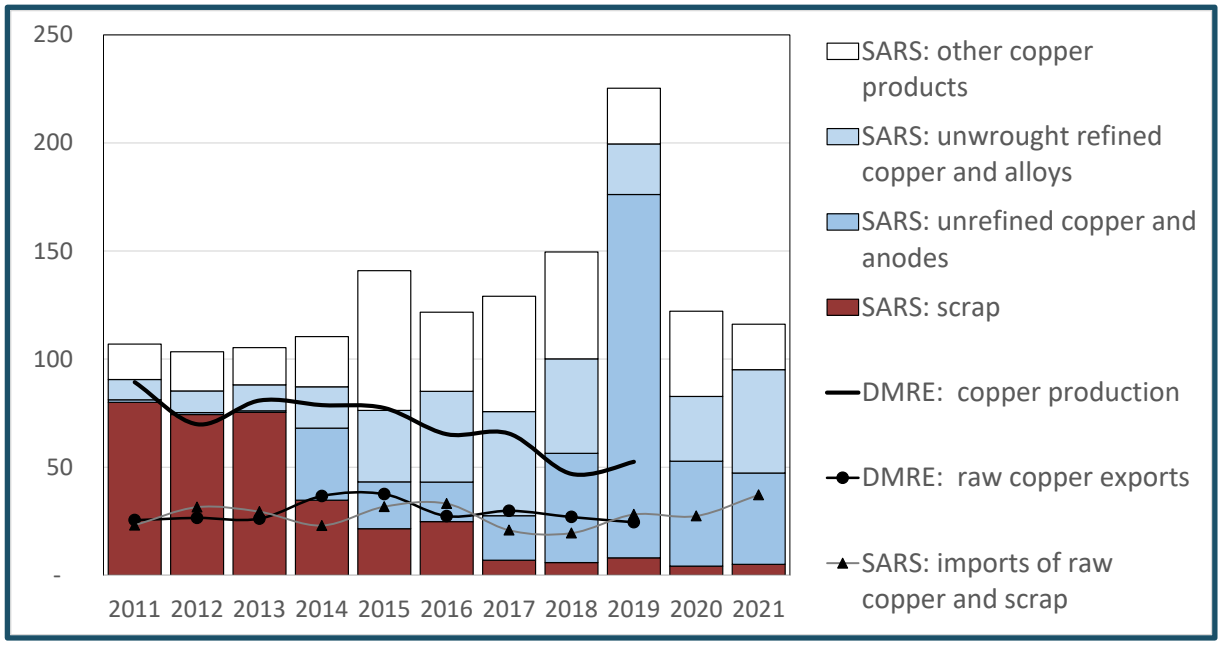
[7] In terms of basic economic theory, the supply curve for stolen copper shifted up, leading to greater theft at every price.

It seems likely that 150 000 tonnes of copper scrap is sold in South Africa annually, worth over R10 billion a year. Around two thirds of the total is exported illegally. The total is an estimate based on local sales plus scrap exports apparently mislabelled as raw copper.

Legal copper scrap sales were estimated by the Metal Recyclers Association at 55 000 tonnes in 2020. (WOW 2021:15) Based on the average unit price of South African scrap exports in 2021 of just under R80 000 per tonne, that means the value of scrap copper sold legally was around R4,5 billion. By volume, copper scrap traded legally equalled only 2% of all metal scrap. It accounted for over 15% of revenues from metal scrap, however, because it was worth far more per tonne than most other non-precious metals.

Industrial-scale underinvoicing of copper scrap exports mean the Metal Recyclers Association's figures for scrap copper sales are underestimates. As Graph 7 shows, exports of crude copper reported by SARS fluctuate around 120 000 tonnes a year. That amount has remained largely stable over the past decade. From 2013, however, when International Trade Administration Commission (ITAC) regulations restricted scrap exports under the Preference Price Scheme (see section 2.2.4), the reported share of scrap fell to near zero. Simultaneously, exports labelled as raw copper rose sharply, exceeding 100 000 tonnes a year from 2017 to 2021 according to SARS data, which derive from reports by exporters. In contrast, the Department of Mineral Resources and Energy (DMRE), which gets information from the mines themselves, reports only 25 000 tonnes of raw copper exports in 2019, from total domestic production of raw copper at 50 000 tonnes. It seems probable that the bulk of the raw copper exports reported by SARS are in fact copper scrap that has been smelted and exported with a false label.

Graph 7. Exports of raw and scrap copper reported by SARS and DMRE, and copper imports reported by SARS, 2011 to 2021, in thousands of tonnes



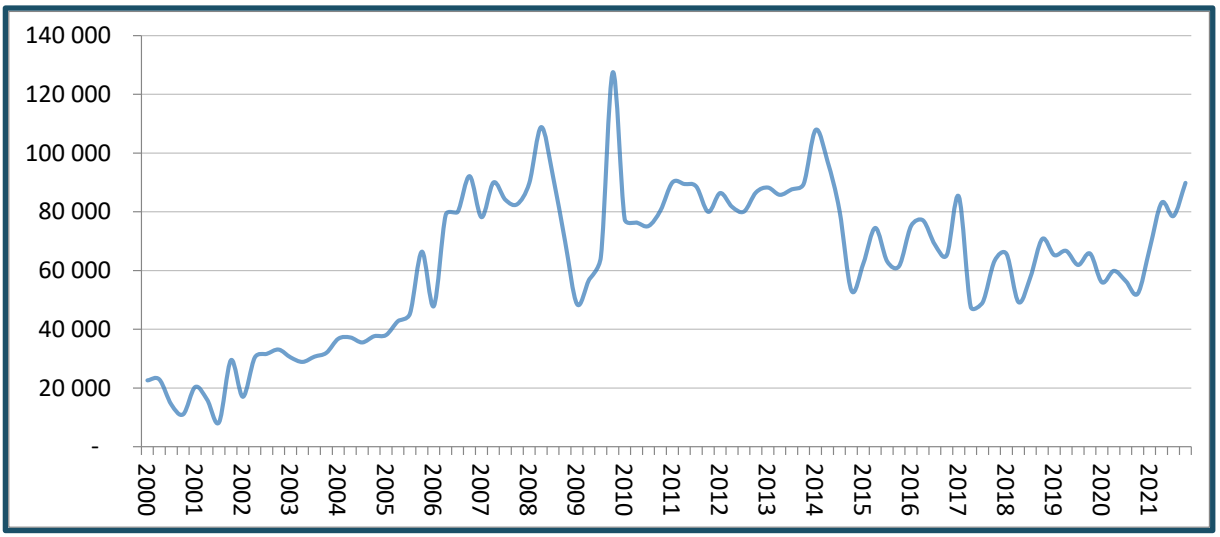
Source: SARS and DMRE data accessed through Quantec. EasyData. Interactive database. Accessed at www.quantec.co.za in March 2022.

This section explores the factors that enable copper theft in each phase of the value chain: the supply of scrap; the role of informal smelters; the scrap dealers; and the ability to export stolen material.

2.2.1 Incentives and opportunities for theft

Trade in scrap copper surges nationally and internationally when global commodity prices are high. As Graph 8 shows, copper scrap prices escalated during the global metals price boom in the 2000s, then stagnated through the 2010s. They then increased sharply in 2021, although they remained well below 2014 levels. Speculative price rises due to the invasion of Ukraine may lead to a further spike.

Graph 8. Quarterly unit export price of copper scrap from South Africa in constant rand (a), 2001 to 2020



Note: Reflated with CPI. *Source:* Calculated from Quantec. EasyData. Interactive dataset. Accessed at www.quantec.co.za in March 2022.

Copper theft is dualised between small-time criminals and syndicates. Large-scale theft from existing infrastructure, especially from Transnet's overhead cable lines, appears to be the province of syndicates. Individuals and less sophisticated groups of thieves lack both the necessary technical competencies and capacity to transport heavy cable to dealers. They are more likely to steal material from depots and lighter cables and equipment from municipal grids. Illegal mining operations have also been associated with cable theft from both abandoned and operational mines and from surrounding communities. (See Minerals Council 2020:73)

Various systemic factors facilitate copper theft by both organised and unorganised criminals. They include the long distances covered by national network industries; continued use of copper where less sought after materials might substitute; poor management in many municipalities; assistance from employees and security guards for both national and local utilities; and relatively unregulated access to smelters and scrapyards, which is discussed in the following section.

Transnet has to police 20 000 kilometres of rail, and Eskom has 30 000 kilometres of transmission lines. Much of it goes through relatively sparsely settled rural areas. Remote lines are safe from casual thieves, but easier targets for syndicates with the capacity to remove and transport large amounts of copper equipment. The coal companies and Transnet have tried to counter attacks on the coal line from Mpumalanga to Richards Bay with monitoring by drones and increased patrols, but they have to cover 750 kilometres. (Faku 2022)

For some vulnerable equipment, alternative materials or designs would deter theft. Among others, Transnet is already replacing overhead cables with tiger wire to discourage theft, and the Johannesburg Roads Agency is shifting to low-copper cable in robots.

Poor management in many municipalities also opens up opportunities for theft. It takes a variety of forms, from inadequate inventory control to poor security on facilities to human resources practices that alienate employees. Both syndicates and small-scale thieves often work with the employees and security guards of municipalities and state-owned companies, who walk off with both installed and inventory material. (See Liebenberg, 2020:92) For instance, in March 2021, eThekwini found R4 million in cable stolen from its depots in homesteads in Illovo and Isipingo, following the arrest of members of the same syndicate with R6 million in cable in 2020. The police believed the thieves had high-level connections inside the municipality because they had been able to steal up to 20 rolls of cable in a day. (Rondganger, 2021) In May 2020, the Hawks arrested four Transnet employees for stealing cable from a depot in Silverton and selling it to a local scrapyard. (SAPS, 2021) In October, three Vereeniging security guards were caught stripping copper from transformers while on night duty. (Lowvelder, 2021) In 2022, in separate incidents, Eskom security personnel were arrested for stealing copper cable in Mpumalanga and the Free State. In both cases, they were selling the metal to a local scrapyard. In Mpumalanga, the investigation started when a major transmission line was attacked, leading to loss of electricity for thousands of people, significant damage to pylons, and live cables on the roads. (TimesLIVE, 2022, and Gifford 2022)

Research in the Mangaung electricity utility in the mid-2010s tried to explain why staff would tolerate or engage in cable theft. A survey found that just under half of the utility's employees would report a colleague for stealing cable, and only just over half said they would report anyone at all. Black employees more likely to say they would report a colleague than white workers. (Mathe 2017:81 ff) The research argued that employees felt that management would not prosecute internal wrongdoing in any case. Moreover, half of them did not see the employer as "fair." (Mathe 2017:90ff) Given South Africa's unusually deep inequalities, including in pay scales, it seems likely that many employees assume the employer can afford the loss.

Utilities often call on communities to help catch cable thieves. Several municipalities have set up hotlines for residents to report cable theft, and some have urged them to establish WhatsApp groups to track crime. But they also treat illegal connections as an equivalent crime, even in areas that have waited years for electricity. In these circumstances, it seems municipal employees often encounter community hostility when they try to pursue cable thieves. (See for instance Magubane, 2022; Brakpan Herald 2020).

From an economics standpoint, a core challenge arises from the discrepancy between the cost of cable theft to companies, and their employees, and the impacts on businesses and communities. Infrastructure providers do not bear the biggest costs, so they are less likely to find resources to improve security. While the value of stolen cable at Transnet rose exponentially in the past five years, its security spending climbed 25%. Even worse, PRASA removed all security from many lines in 2020 over a contract dispute, which vastly accelerated looting of its facilities. In 2020/21 a survey of employees at the electricity utility in Tshwane ranked cable theft third from last in importance. They saw inaccurate metering as the biggest problem. (Khonjelwayo and Nthakheni, 2021)

2.2.2 Copper scrap trade

Copper thieves need intermediaries to get their product into a more or less legitimate market, with the bulk apparently going for export. Virtually every report of stolen cable involves a link to a small, often residence-based, metal trader. The Second-Hand Goods Act requires scrap metal dealers to register and record their suppliers, but the system remains fragmented, paper based, and largely unenforced. Rapid growth in very small backyard smelting operations has made it easier for thieves and fences to misrepresent stolen scrap as raw copper.

In 2021, the Metal Recyclers Association had 100 members with 250 scrap yards. The Who Own Whom database (WOW, 2022) indicates that the majority of formal traders have between 50 and 100 employees, although a few have over 500. The larger companies generally also have metal manufacturing capacity as well as trading in recycled metals. Still, all of formal recycling, which includes paper and plastic as well as metals, employed only around 20 000 people in 2019, according to both the Quarterly Labour Force Survey and the Quarterly Employment Survey. (Statistics South Africa 2022a; 2022b)

Interviews with industry stakeholders suggested multiple small illicit smelters and traders operated in the copper value chain. As noted, virtually every major arrest appears to have a link with a home-based scrap yard. Eskom estimates the number of informal metal traders and recyclers at over 3 000. Still, the small size of these establishments meant they employed relatively few people. Informal recycling of all kinds employed between 10 000 and 30 000 people, according to the Quarterly Labour Force Survey (Statistics South Africa 2022a), but the metals subsector was much smaller.

The Second-Hand Goods Act requires scrap yards to register at the local police station. To do that, the owners need a clean criminal record as well as proof of identification and tax status. There does not, however, appear to be a centralised, easily accessible registry that would enable the authorities to look up problematic dealers quickly. In 2020, there were 25 000 registered second-hand dealers for all products, not just scrap, but the police reported only 382 compliance inspections. (SAPS, 2020:151) At that rate, it would take over 50 years to inspect every dealer. Moreover, systems to leverage community support to identify and shutdown unregistered backyard smelters and traders appear to be limited. For instance, there are no publicised rewards for whistleblowers or guides on how to identify and report illegal metal smelters.

The law requires registered scrap yards to maintain records on suppliers, report possible theft, and show their records and copper holdings to police on demand. Industry actors say, however, that many dealers do not write down identification or car registration numbers for deliveries. They often pay in cash even for large deliveries, making it harder to track suppliers. (See also Lieberman 2020:56) The Act only requires that dealers report cable with burn marks, rather than including other indicators of theft. These indicators could include, for instance, a receipt from the original owner and unusually large amounts of uniform cable in single shipments.

Backyard smelters reportedly have a critical role in the illegal export of scrap, enabling dishonest dealers to pass it off as raw copper for export. (See Castings SA 2021:35) In effect, the smelters play a role equivalent to chop shops in the used auto trade. They use small electric induction furnaces, mostly imported from China, that can operate in a home. The current legal framework appears to permit this kind of smelter, although in many

communities setting one up in a residential area violates zoning and environmental rules. Small smelters are advertised for sale on internet platforms like Alibaba, UBuy and PC Link, with prices ranging from US$800 to over US$20 000.

Infrastructure companies are a significant source of legal scrap. Currently, they are required to sell it to the highest bidder, often an intermediary who then makes a profit either by exporting it or by selling it to a local manufacturer with a markup. Treasury is apparently contemplating reforms to enable state-owned companies to sell directly to local manufacturers. This reform should be accelerated. As noted in section 3.2.2, it is particularly important for ferrous scrap, but would also help in avoiding illegal exports of copper.

Ultimately, domestic sales of copper scrap are important to sustain the metals fabrication industry. The smaller, less formal scrap yards and smelters are, however, more likely to be involved in illegal exports of scrap rather than supplying the local industry. The available evidence suggests that the industry as a whole generates only limited employment directly, but illegal activity in it slows overall economic growth and job creation across the economy.

2.2.3 The criminal justice system

The criminal justice system has recognised copper theft as a priority crime for many years. A coordinating team was first set up in 1993. It was replaced with the Non-Ferrous Metals Crime Combating Committee in the 2010s. The Committee aims to bring together the main stakeholders – essentially large public and private companies and business associations – under the leadership of the South African Police Service (SAPS). Research in 2020 found that the Committee fostered improved coordination and information flows, but was not capacitated to drive investigations. It fell under the SAPS visible policing unit rather than detectives. (Liebenberg 2020:99 ff)

All the state-owned companies and the Richards Bay Coal Terminal pointed to other areas of cooperation with the state security forces around cable theft. Transnet Freight Rail worked with the Hawks, National Intelligence and SAPS to make 500 arrests in connection with the theft of petroleum products and rail equipment, according to its 2020/21 report. (Transnet 2020:4)

Police stations have Designated Second-Hand Goods Officers. Reportedly, however, they do not prioritise metal scrap over other goods such as paper and plastic (Liebenberg 2020:117), although copper theft imposes the greatest cost to society.

In these circumstances, the annual number of prosecutions remains in the low hundreds, despite tens of thousands of cases of copper theft every year. Transnet, PRASA and Eskom together pointed to an average of almost 11 000 incidents a year from 2018 to 2022, with many more in municipalities. Yet the number of convictions for copper theft averaged 200 a year, or around 2% of the incidents reported just by the state-owned companies.[8] The SAPS only closed down 10 unlicensed scrap dealers a year from 2018 to 2022. Still, it confiscated around 11 tonnes of stolen copper in 2022 (Cele, 2022:2), which equated to roughly a tenth of all copper exports.

2.2.4 Illegal exports

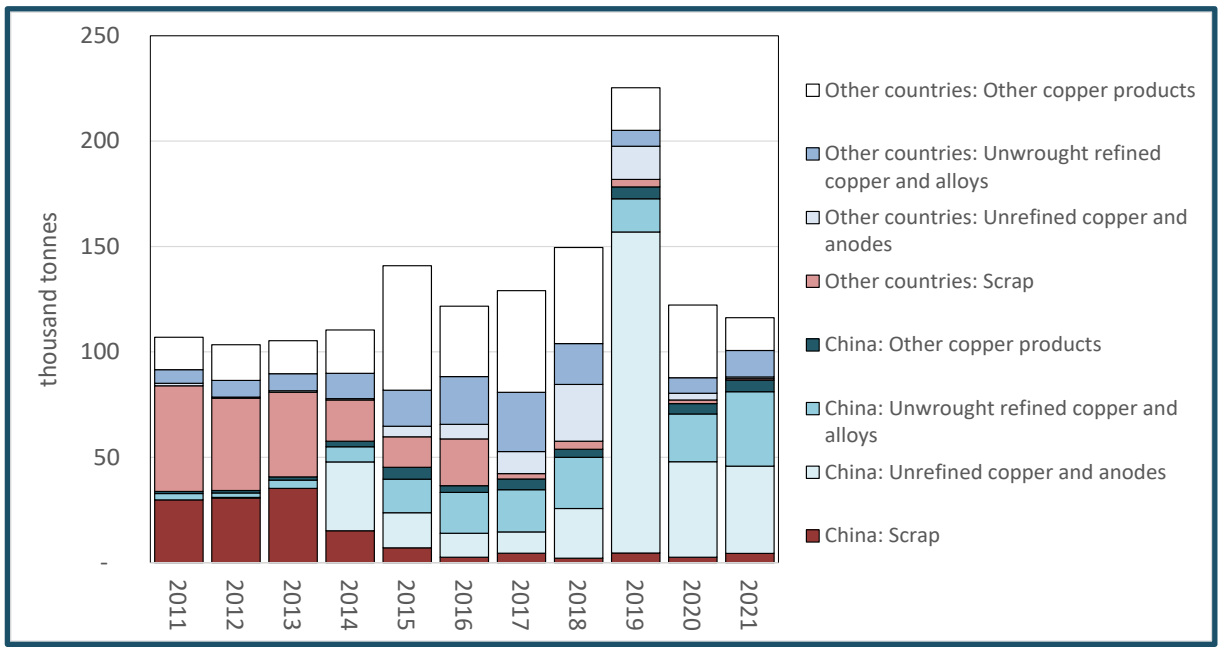
As noted, it appears that exports have become the main source of demand for copper scrap, accounting for almost two thirds of total sales. China is the dominant export market for South African copper exports, as the following graph shows. The sharp surge in global metals prices

[8] Incidents from information provided by Eskom, PRASA and Transnet; prosecution figures from Cele 2022:3-4.

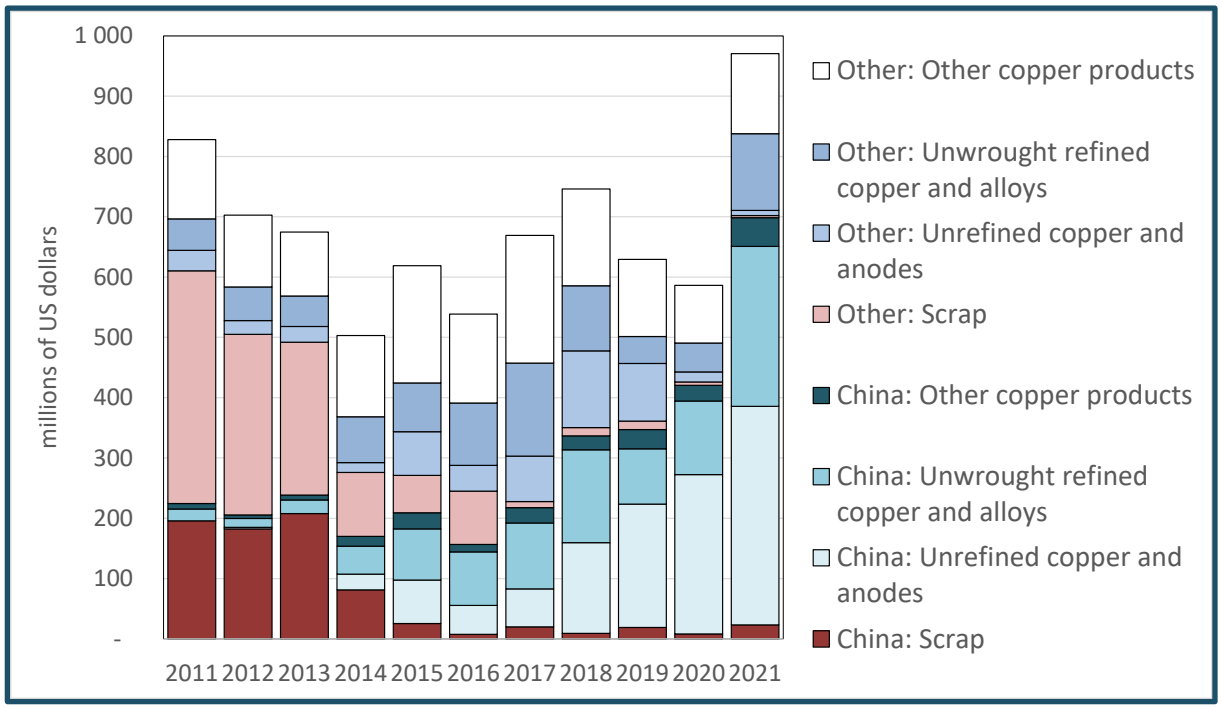
in 2021 meant the value of copper exports climbed by almost a third, although the volume was lower than in 2020.

Graph 9. Exports of copper to China and other countries, 2010 to 2021, in thousands of tonnes and millions of constant US dollars (a)

A. Thousands of tonnes



B. Millions of constant U.S. dollars



Note: Reflated with US CPI rebased to 2020. *Source:* Calculated from ITC. Trade Map. Interactive dataset. Accessed at www.trademap.org in February 2022.

The government has introduced two trade measures to deter exports of metal scrap in general, mostly to recapture the rents for local steel and copper producers. A Price Preference System (PPS) governs legal copper scrap exports. ITAC introduced the system in 2013 and recently extended it to 2023. In addition, from 2021 copper scrap exports are liable for a 10%

ad valorem export tax. Broadly, the PPS requires scrap metal dealers to offer metal first to local foundries and fabricators at discounted prices. They can turn to exports only if they cannot find a local customer. In 2015, the PPS set a discount of 20% for copper for coastal buyers, with an additional 10% for inland customers. As discussed, following the introduction of the PPS, the amount of copper scrap exported legally dropped from over 70 000 tonnes a year in the early 2010s to under 10 000 tonnes a year in the early 2020s. The decline was, however, entirely offset by a simultaneous rise in nominally raw crude copper exports.

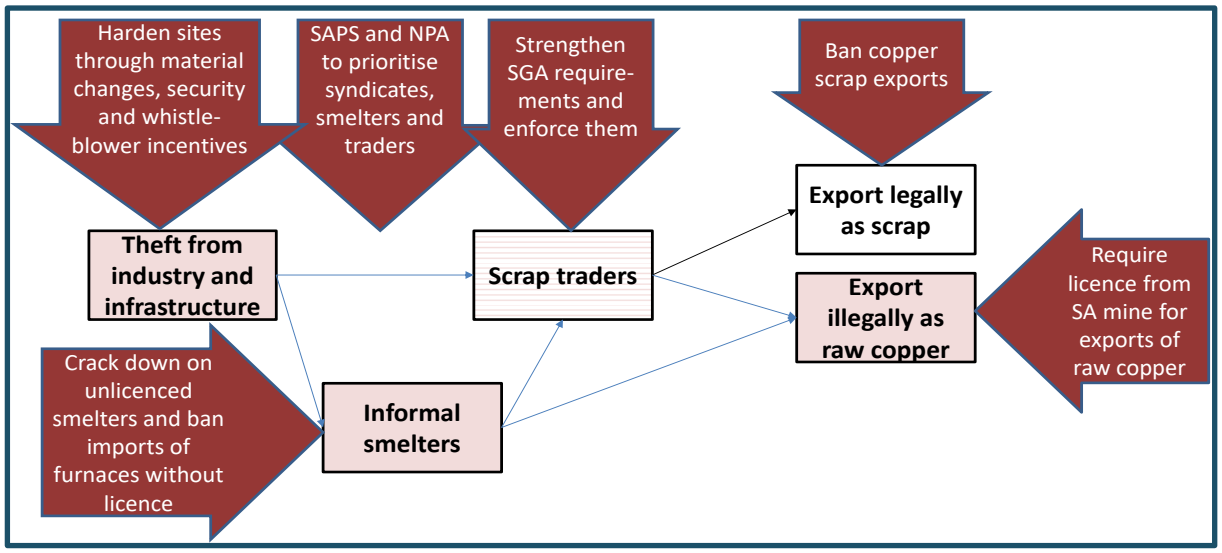
It should be possible to limit the mislabelling of scrap as raw copper. South Africa only has a few copper mines, all of which are small by global standards. Over half of copper production comes from Phalaborwa, followed by Anglo American's Mogalakwena Mine, African Rainbow Mineral's Nkomati, Vedanta's Black Mountain and the Bafokeng-Rasimone platinum mine. Exports labelled as raw copper do not, however, require certification from a South African producer. That said, ending mislabelling of scrap as other products will be difficult. Raw and fabricated copper accounts for 0,1% of South Africa's total exports by weight, and under 1% by value. Moreover, copper is shipped in containers through all South Africa ports. That makes it very hard to stop mislabelling. Industry experts say that some copper scrap is already exported as clothing or shoes.

2.3 Proposals

The proposals are premised on the following:

1. The cost of copper theft to the economy and society far outweighs the value of both the stolen metal itself and the export of copper scrap, especially in light of the limited employment in the metal recycling industry. Measures that are costly to some scrap producers, even legitimate ones, are therefore worthwhile if they will effectively limit copper theft. Moreover, because much of the cost of copper theft is external to the owners, the state may have to assist in minimising them.
2. Effective proposals must target the systemic factors across the copper scrap value chain that enable theft, as illustrated by Figure 2.
3. Analysis of each of the proposals using a theory-of-change and a SEIAS, provided separately, suggests that they are likely to be effective, and that the benefits will outweigh the costs and risks.

Figure 2. Proposed measures along the copper scrap value chain



2.3.1 Hardening sites against theft

Major companies and municipalities have already introduced a range of measures to harden sites against theft. They include replacing copper with aluminium, which has lower value, where possible; marking copper wire and cable; increasing patrols, armed guards at substations, and using drones; and collaborating with other stakeholders through the Non-Ferrous Crime Combating Committee as well as other more or less permanent forums. That said, the main economic and social costs of copper theft are borne, not by the direct victims of theft, but by their customers and society as a whole. That in part explains why Transnet has not increased its security spending in step with the growth in copper theft over recent years, while PRASA removed security altogether for several months in 2020. Given the extent of externalities associated with copper theft, it is appropriate for the government to set standards and in some cases to assist in financing security measures.

Critical standards include the following:

1. Municipalities and infrastructure companies should be required to report every significant cable theft, for instance with a value of over R20 000, and publish an annual report on the incidents, the impact on electricity and rail services, and the cost of repairs.
2. Every state agency should have a properly staffed hotline for copper theft, and whistleblowers should be guaranteed both protection and a percentage of the value of any recovered material, say 15%.
3. The procurement specifications for copper infrastructure elements should include markings that show ownership by default, that is unless the procuring agency can show it is not possible or too expensive to include them.
4. The national government should commission a study of frequently stolen infrastructure elements to identify ways to reduce the risk of theft, for instance by using alternative materials, improving fastenings or protective walls. It should then ensure that agencies and potential local suppliers are aware of the recommendations.
5. Repeated reports of theft from inventories underscores the importance of improving stock control. Here, again, the national government could conduct research to identify ways to improve municipal and company systems.

National resourcing for security should centre on improving the conditions for effective policing and prosecutions, as discussed below.

2.3.2 Limiting processing and fencing

The government should regulate domestic scrap trading far more stringently. Ideally only formal and efficient medium and large companies should be registered, to improve oversight and reduce the pressure to buy stolen material. Registration should require:

- A deposit of R1 million to ensure the company does not need illegal business;
- Every employee to be vetted to ensure they do not have a criminal record; and
- Proof that the company has a system, backed by adequate equipment and skills, to register suppliers digitally and to pay them on-line.

The state should require registered companies to pay for all copper scrap by online bank payment to ensure traceability. Cash and cryptocurrency payments for copper scrap should be entirely banned.

Copper smelting counts as recycling and in theory requires registration under the Second-Hand Goods Act, but enforcement appears to be spotty. Both registration under the Act and municipal by-laws should ban smelting in residential areas or houses. Copper smelters of any size should only be allowed on industrial sites. Only registered recyclers or copper manufacturing companies should be permitted to import small induction furnaces.

As far as possible, a seller of copper scrap should have to prove that they obtained the goods legally, rather than requiring the authorities to prove that they were stolen. In particular, the law should specify that where a seller has large amounts of a single product, say 10 kilograms or more, they must have a letter from the original owner, with contact details and identification. Transnet and other state-owned companies should be required to ensure that they only sell scrap to registered dealers.

2.3.3 Strengthening state security efforts

The Non-Ferrous Metals Crime Combating Committee should be complemented by dedicated investigative capacity. The investigative team should be enabled to specialise in the scrap industry for at least five to 10 years so as to gain knowledge and experience. The NPA should also set up dedicated teams to deal with copper theft. A special crimes court should be established for copper theft, and for any other metal theft that disrupts infrastructure or production on a large scale. SAPS and the NPA should target a significant increase in the number of prosecutions while maintaining the current (high) rate of success.

Officers with responsibility for second-hand goods inspections should be instructed to prioritise metal scrap, and especially copper, over other goods.

Every police station should have a hotline to report cable theft and illegal scrap yards and smelters. Councillors, Ward Committees and other social structures should be trained in identifying illegal yards and smelters.

2.3.4 Illegal exports

Copper scrap exports – including all copper alloys – should be banned outright as long as copper theft remains high. This kind of ban is legal under international rules as long as it aims to protect the national interest in this case by limiting incentives for copper theft. (See Appendix 3.) Substantially higher penalties should be introduced for mislabelling scrap for export, whether or not it has been smelted into ingots or alloys.

Exports of raw copper should only be permitted if they are certified by a South African copper mine. The mine should have to copy the certification to both SARS and the police to ensure coordination at the ports.

Raw copper exports should have to go through a single port. The copper mines should be consulted on which port makes sense, but presumably it would be either Durban or Richards Bay.

3 IRON AND STEEL

3.1 Impact of steel theft

Steel theft appears to be less targeted and disruptive than copper because the metal is more widespread, and the cost per tonne is around one fifteenth that of copper. Ferrous scrap comes largely from equipment, including cars, construction material, and manufacturing offcuts and waste. As a result, the theft of steel from major infrastructure is both smaller and less damaging than the theft of copper. Internationally, 20% of steel scrap comes from household waste; 30% from manufacturing production; and 50% from obsolete machinery and equipment, including cars. (Nichols and Basirat 2021:12)

Steel is far less important for electricity than copper. Still, Eskom reports that in constant rand terms, theft of support lattices increased a hundredfold from 2018 to 2020, as shown in Graph 5. As with cable theft, destruction of pylons and other supports for transmission can lead to widespread loss of electricity.

The theft of steel from the railway industry relates primarily to equipment and tracks ("perway"). Transnet does not refer to theft of steel as a major concern or provide detailed information on it. That said, in January 2022 a gang of thieves was caught with R1 million worth of Transnet tracks. (Singh, 2022) The company owns around 10 000 kilometres of unused line, which are particularly vulnerable to theft. Unutilised secondary lines in the Free State have reportedly been targets over the past decade. In contrast to Transnet, PRASA expects repairs to stolen or vandalised tracks to account for around a tenth of the total cost from looting. Repairs to stations will add another 22%, some of which will be for steel elements such as fencing. In September 2021, thieves were caught in Germiston with PRASA track worth R1 million, having already sold a consignment to a scrap yard. (TimesLIVE, 2021)

At the municipal level, steel theft affects mostly construction elements such as fencing and structural steel; drain covers; and streetlights. As with copper, the municipalities do not report consistently on theft of steel equipment and materials.

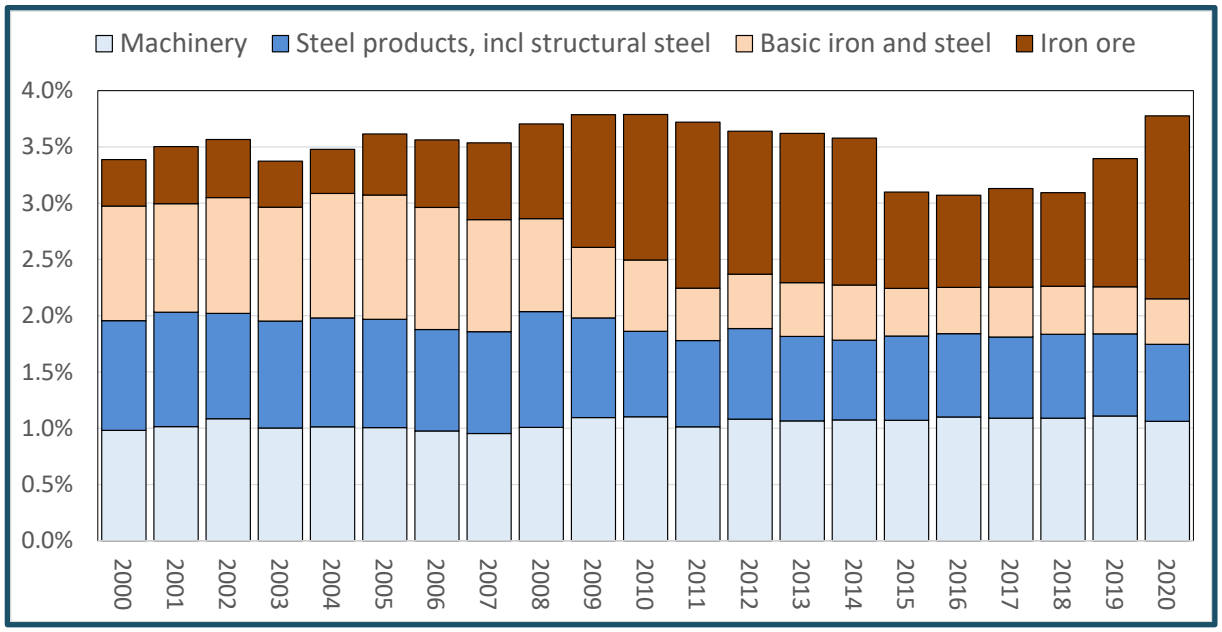
Exports of steel scrap impose a significant cost on the broader steel industry, since scrap steel is a crucial input for steel refineries and fabrication. Modern mini-mills, which are increasingly outcompeting older plants, often rely entirely on scrap.

Local demand for scrap seems likely to increase rapidly over the coming years. Agni and SA Metal have just expanded capacity; some large new scrap dealers and manufacturers are contemplating major new investments; CISCO may restart; Scaw Metals flat products is looking to expand; and AMSA's Saldanha plant may reopen, using only scrap and requiring around 600 000 tonnes a year. These plants could be halted if inadequate scrap is available, or if competing demands push the prices too high. An increase in local demand for scrap could also lead to a surge in theft.

The steel value chain is central to South African manufacturing as well as being a substantial employer. The steel value chain – iron ore, steel production and manufacturing of steel products and machinery – contributes around 4% of the GDP. It is one of the few technologically advanced sectors where South Africa has some competitive advantage, notably in capital equipment for the mines and construction. As Graph 10 shows, production of machinery has grown with the economy, but basic and structural steel products have been depressed. For iron ore, 90% goes for export, with domestic prices tied to international

markets. As a result, the dominant producer, Kumba Iron Ore, captures substantial rents when global prices are high.

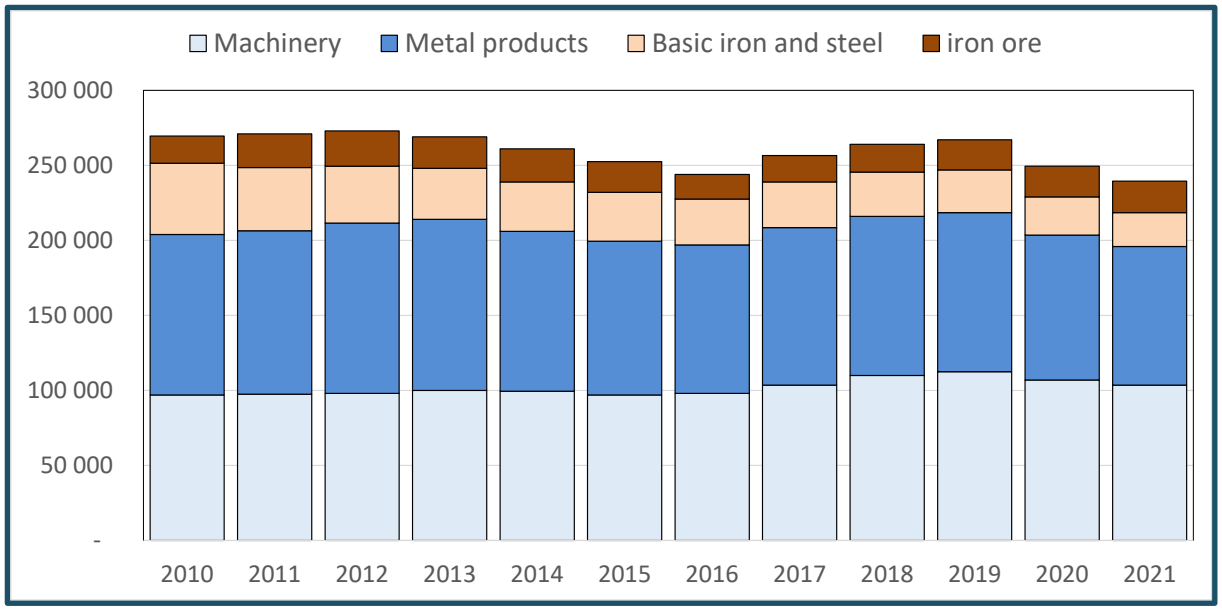
Graph 10. Share of the iron and steel value chain in the GDP, 2000 to 2020



Source: Calculated from Quantec. EasyData. Standardised industry series. Interactive dataset. Accessed at www.quantec.co.za in March 2022.

Formal employment in the iron and steel value chain was around 240 000 in 2021, almost entirely in downstream fabrication. That represented 2,3% of all formal jobs, according to the Quarterly Employment Survey. Because the value chain tends to be capital intensive, it provided little informal employment.

Graph 11. Formal employment in the iron and steel value chain, 2010 to 2021



Source: For iron ore, DMRE data accessed via Quantec. EasyData. Interactive dataset. Accessed at www.quantec.co.za in March 2022. For other industries, Statistics South Africa. Quarterly Employment Survey. Excel spreadsheet. Downloaded from www.statssa.gov.za in March 2022.

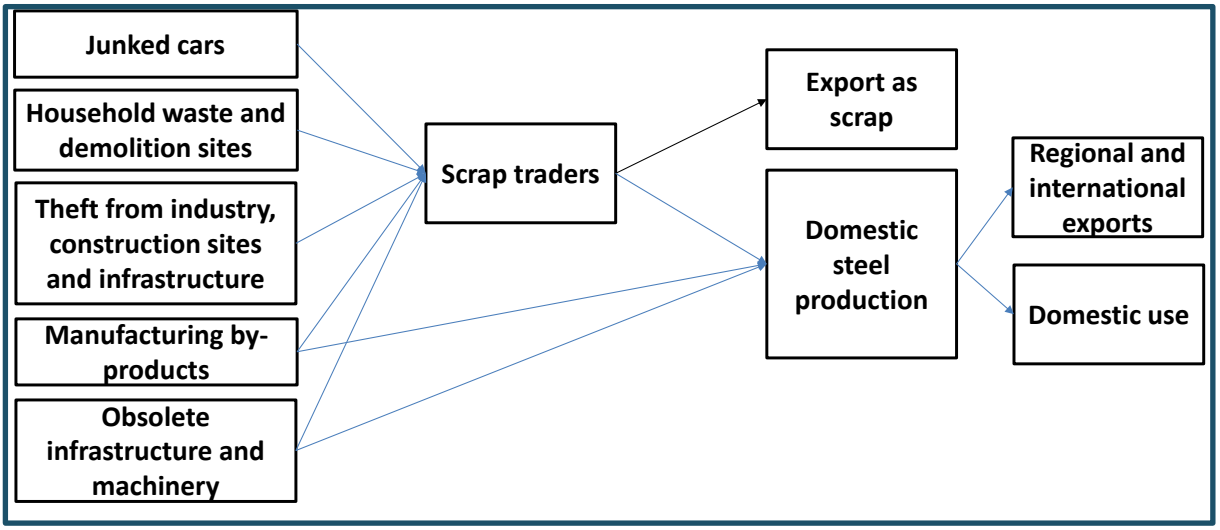
In short, steel theft has not had as visible an impact on the economy as copper theft. Exports of steel tend to raise cost for local steel manufacturers, however. In effect, they shift the rents

from steel scrap, whether stolen or not, to foreign consumers and away from a core manufacturing industry for South Africa.

3.2 Factors that enable steel theft

Many of the factors that enable copper theft also apply in the steel value chain, which is illustrated in Figure 3. The main difference from the copper chain is that thieves do not use informal smelters, and the sources of scrap are highly diverse and widespread. In addition, domestic steel production is around 10 times as large as copper manufacturing, which increases the importance of scrap for broader economic growth.

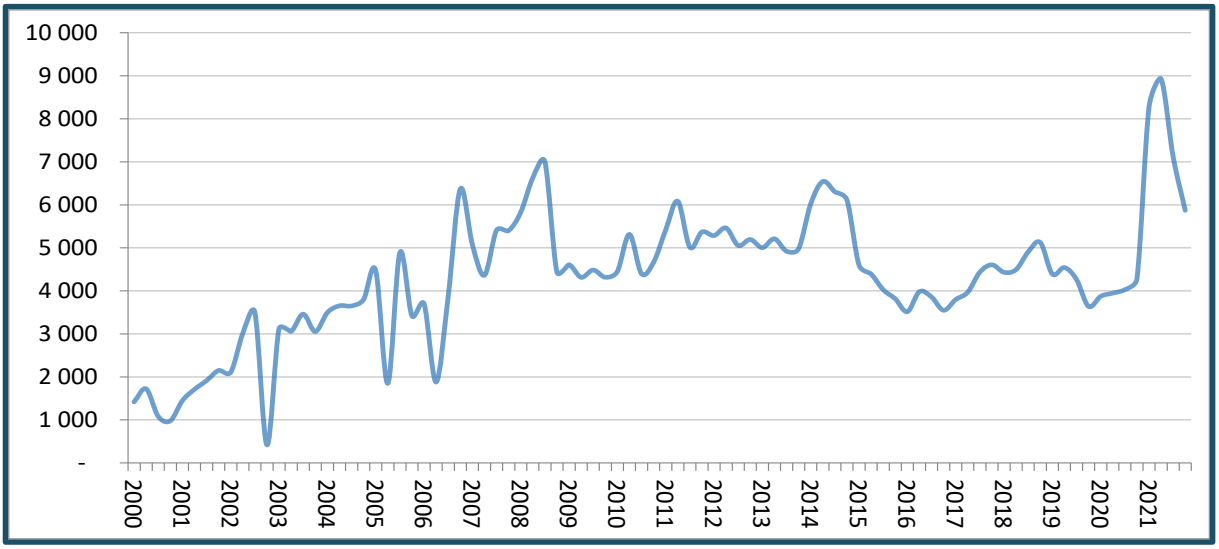
Figure 3. The steel scrap value chain



3.2.1 Incentives and opportunities for theft

Steel is more widespread through the economy, but less valuable than copper by weight. As a result, it appears to attract fewer dedicated syndicates and thieves. Still, as Graph 12 shows, the price of steel rose further than copper in 2020, reaching a 50-year high. It fell sharply in 2021, but remained at historic heights. The first month of the invasion of Ukraine did not see as steep a rise in steel prices as in other metals, presumably because the anticipated downward pressure on global growth outweighed concerns about a shortage.

Graph 12. Quarterly unit export price of steel scrap from South Africa in constant rand (a), 2001 to 2020



Note: Reflated with CPI. *Source:* Calculated from Quantec. EasyData. Interactive dataset. Accessed at www.quantec.co.za in March 2022.

The factors that facilitate copper theft also apply to steel. The main difference is that syndicates have less incentive to specialise in steel theft, since stolen material brings a far lower price per kilogram than copper.

3.2.2 Steel scrap trade

Steel accounts for the bulk of traded scrap metal, estimated at over 90% by volume although probably less than 75% by value. Most dealers in copper scrap also buy and sell steel, for which the larger companies have separate divisions. Informal smelting appears to be insignificant for steel, however, since it requires higher temperatures, with much lower returns for the effort.

There are more sources of old scrap for steel, with junked cars and structural steel contributing a significant amount. That said, foundries usually prefer new scrap – that is, waste and offcuts from manufacturing – over "old" scrap from discarded equipment.

Transnet is one of the largest suppliers of new scrap. In 2021, for instance, Transnet Engineering advertised for buyers for over 16 000 tonnes of ferrous scrap metal (Transnet, 2021:15). Transnet has indicated that it has built up its inventory of ferrous scrap and wishes to dispose of it. It is negotiating with National Treasury to finalise changes to the legal requirements, in part to enable it to sell scrap directly to steel producers. That would both alleviate the risk of excessive exports in the short run, at the cost of the planned investments in the medium term. It would also reduce the cost to local users by cutting out the intermediaries.

The regulations on trade in copper scrap also apply to steel. That said, because it appears that a smaller share of scrap steel is stolen, the weaknesses in the system are less costly to the economy and society.

3.2.3 The criminal justice system

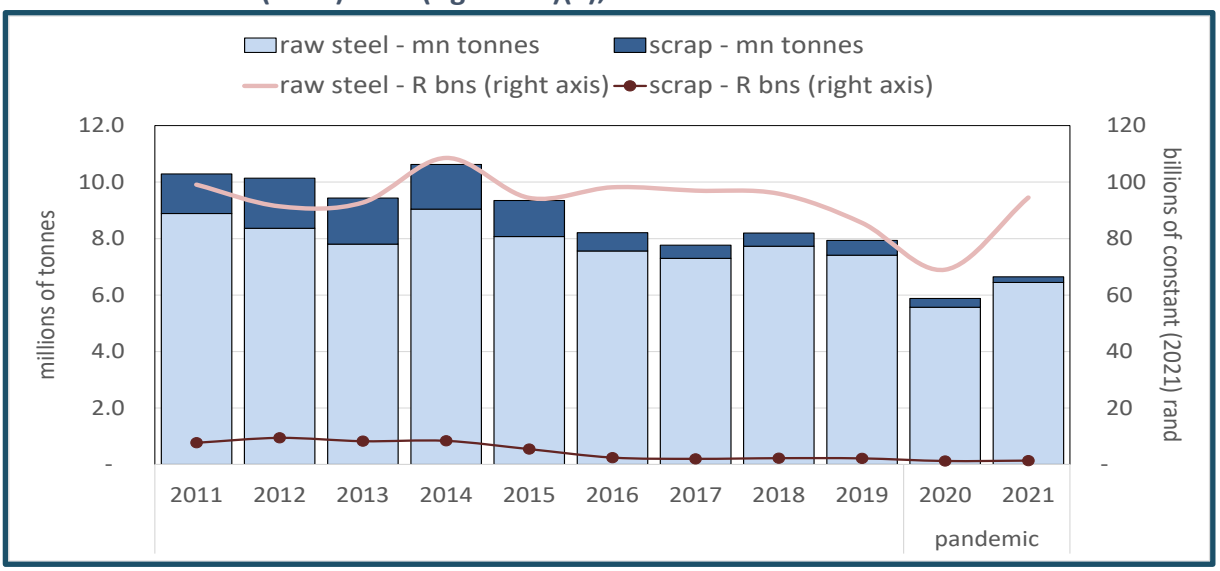
Theft of iron and steel does not count as a priority crime for either SAPS or the NPA, judging by their Annual Reports. They do not provide information on arrests, or have a dedicated

structure to address it. This situation reflects the reality that steel theft affects the economy and society less than copper theft.

3.2.4 Illegal exports

Like copper, steel scrap is subject to the PPS, as well as an export duty at 20%. In contrast to copper, however, there is no obvious evidence that mislabelled exports offset the decline in legal scrap sales abroad after the introduction of the PPS. South African exports of raw steel are comparatively large, however, at R70 billion in 2019 and R95 billion in 2020. That would easily mask any mislabelling of steel scrap. Steel scrap exports dropped from 1,3 million tonnes in 2013 to 200 000 tonnes in 2021, while raw steel exports fell from eight million tonnes to 6,5 million.

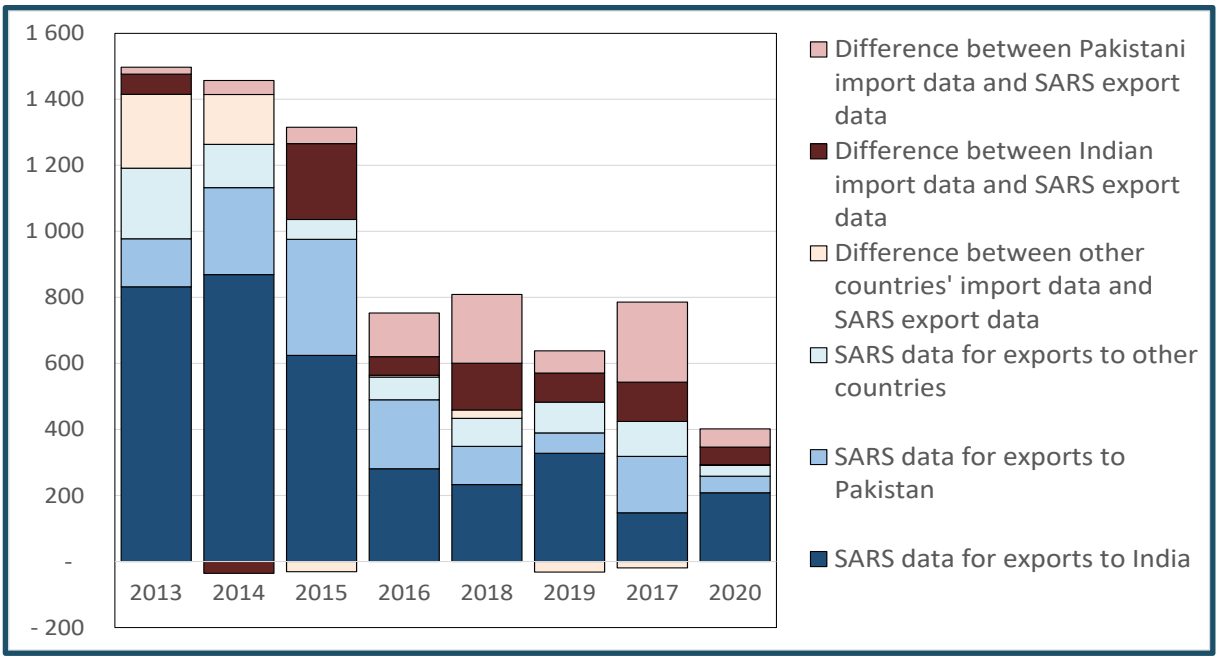
Graph 13. Exports of scrap and raw steel as reported by SARS in millions of tonnes and billions of constant (2021) rand (right axis)(a), 2011 to 2021



Note: (a) Reflated with average annual CPI. *Source:* Calculated from Quantec. EasyData. Interactive dataset. Accessed at www.quantec.co.za in March 2022.

After the PPS was introduced anomalies did emerge in the value of steel scrap reported as exported from South Africa and the figures for imports published by key trading partners, dominated by India and Pakistan. As the PPS cut into legal steel exports, these trading partners began to report around 40% higher imports of steel than South Africa reported in exports. The trend only began after the PPS was introduced. It did not appear for other regions that had imported South African steel scrap on a significant scale before 2013. Still, the amount of underinvoicing was not enough to reverse the decline in steel scrap exports after 2013.

Graph 14. SARS data on exports of steel from South Africa to India, Pakistan and 25 other major trading partners compared to their national data on imports of steel from South Africa, in thousands of tonnes, 2013 to 2020



Source: Calculated from ITC. Trade Map. Interactive dataset. Accessed at www.trademap.org in March 2022.

Analysis of PPS permits provided by ITAC for 2020 shows the following.

- 47 firms applied for export permits for ferrous scrap. Their applications totalled 89 000, with approval given for export of 61% (55 000 tonnes).
- Export permits were requested for 28 ISRI grades of steel. Grade 206 (No 2 heavy melting scrap) came to 22 700 tonnes, and Grade 201 (No 1 heavy melting steel) to 13 900. Mini mills, which are increasingly important in the domestic steel industry, use both these grades. A single company, AfroIndia Recyclers in eThekwini, exported 9 400 tonnes of these grades, or over a quarter of the total.
- Based on the average price of exported scrap in 2020 at R2 800 a tonne, the total value of these exports amounted to R152 million.

3.3 Proposals

3.3.1 Hardening sites against theft

The same measures apply as with copper. The owners of steel assets may be less willing to spend substantial amounts to reduce theft, however, because the targets of steel theft are more diffuse.

3.3.2 Limiting sales of stolen material

Except for the proposals on smelting, the measures to regulate scrap companies described above would also benefit the steel industry. The question is whether the regulatory burdens to legitimate scrap suppliers and dealers are excessive given the relatively limited costs imposed by most steel scrap.

Regulations to enable state-owned companies to sell steel scrap directly to foundries and refineries might assist in limiting the illicit trade by cutting out the intermediaries. Care needs

to be taken that Transnet does not sell off its scrap stock before reforms are introduced so as to safeguard the material for new steel production.

3.3.3 Strengthening state security measures

Since the costs of steel theft are not disproportionately high for the economy and society, there is no pressing reason to make it a priority crime. That said, the proposed measures to improve oversight of scrap metal dealers and sales would also help limit theft of steel.

3.3.4 Illegal exports

A ban on exports of new ferrous scrap could be considered, at least until a stronger registration system for scrap dealers has been established. The amount of steel scrap exported legally is fairly small, so the economic costs should be manageable.

As with copper, channelling all scrap through a more limited number of ports should facilitate oversight of exports. Because the value of steel is relatively low, however, the cost of freighting scrap to a single port has to be taken into account. In addition, SARS could try to work with the relevant Indian and Pakistani authorities to analyse the differences in data on the steel scrap trade.

4 ALUMINIUM

4.1 Impact of aluminium theft

Aluminium theft appears to be an order of magnitude less than the theft of copper and steel scrap. Eskom, however, uses aluminium conductors on major transmission lines, which could become a target.

The export of aluminium scrap amounted to 52 000 tonnes valued at R1,3 billion in 2020. That compared to raw aluminium exports valued at R16 billion for around 500 000 tonnes. All aluminium ore is imported from Australia; South Africa mostly adds electricity, the largest input into aluminium refining.

Aluminium fabrication uses considerable aluminium scrap. In 2021, Hulamin produced 222 000 tonnes of product, mostly rolled aluminium. Exports of aluminium sheet, tubes and containers were worth around R10 billion in 2020. The closure of Bayside smelter and processing plant has left a shortage of aluminium rod for drawing. Eskom imports the aluminium cable that it uses.

Aluminium production is highly energy and capital intensive. As a result, the value chain uses 10% of all South African electricity but employs relatively few people – to the order of 20 000. Using scrap vastly reduces the energy requirements of the value chain.

4.2 Factors that enable theft of aluminium

The economic environment for aluminium theft and scrap use resembles that of steel, except that there is a surplus of scrap for the local market. Aluminium is also unique in that informal waste pickers serve a significant section of scrap, from beverage cans. Hulamin has invested R300 million in a facility to recycle used beverage cans. In 2019, the Hulamin recycling centre processed almost 40 000 tons of recycled material, of which 30 000 tonnes were from external customers and pre-consumer manufacturing scrap.

There is potential for investment in added-value aluminium castings to take up excess availability of aluminium scrap. Further research in this regard is recommended.

4.3 Proposals

The proposals for managing the built environment and the scrap market to deter theft apply to aluminium as well.

On exports, there is surplus scrap to local industry consumption, so a ban on aluminium exports is not recommended.

5 THE INTERNATIONAL CONTEXT

5.1 The legal framework

Under the rules of the World Trade Organisation (WTO), states have more latitude to restrict exports than imports. As with all trade regulations, there is more scope to impose limits for security and to a lesser extent environmental reasons than to advantage local producers. A more detailed discussion of trends in global scrap markets and case studies of efforts to regulate the domestic and international scrap trade is available in a separate TIPS report.[9]

The WTO carve-out for trade restrictions in the name of national security is quite broad. It provides that members may take action to protect their "essential security interests." (Article XXII of GATT 1994) The question becomes whether theft by armed syndicates constitutes a threat to national security. In addition, South Africa's history of state capture arguably elevates security concerns about criminal syndicates of all kinds. Interruptions to basic services, including infrastructure and water, can also undermine national security by fuelling protest action.

From an environmental perspective, the use of scrap to produce basic metals and metal products reduces demand for energy, and in the case of steel specifically for coal. That in turn cuts greenhouse gas emissions, although success depends in part on the nature of the electricity system. In South Africa, the use of coal-fuelled electricity blunts the effect. The EU has justified proposed restrictions on waste exports primarily on environmental grounds, including to promote a shift to scrap-based steel production.

Specific regulations would have to be tested by legal experts. Affected scrap traders or importers can challenge restrictions in the South African courts or in WTO tribunals. In terms of South African law, the regulation has to be demonstrably proportionate to the desired aims as well as adhering to legally required procedures. Critically, the costs to scrap exporters should be demonstrably less than the benefits to the economy and society as a whole. For international arbitration – a very slow process – the government would have to show that restrictions flow from genuine national security or environmental concerns, or that they respond to temporary market conditions. That is, it has to be able to show that environmental and security concerns are not a cloak for efforts to provide sustained protection to local metals refineries at the cost of foreign competitors.

[9] Makgetla, N. *et al.* 2022. *International experiences with regulation of scrap metal trade*. TIPS. Pretoria. April.

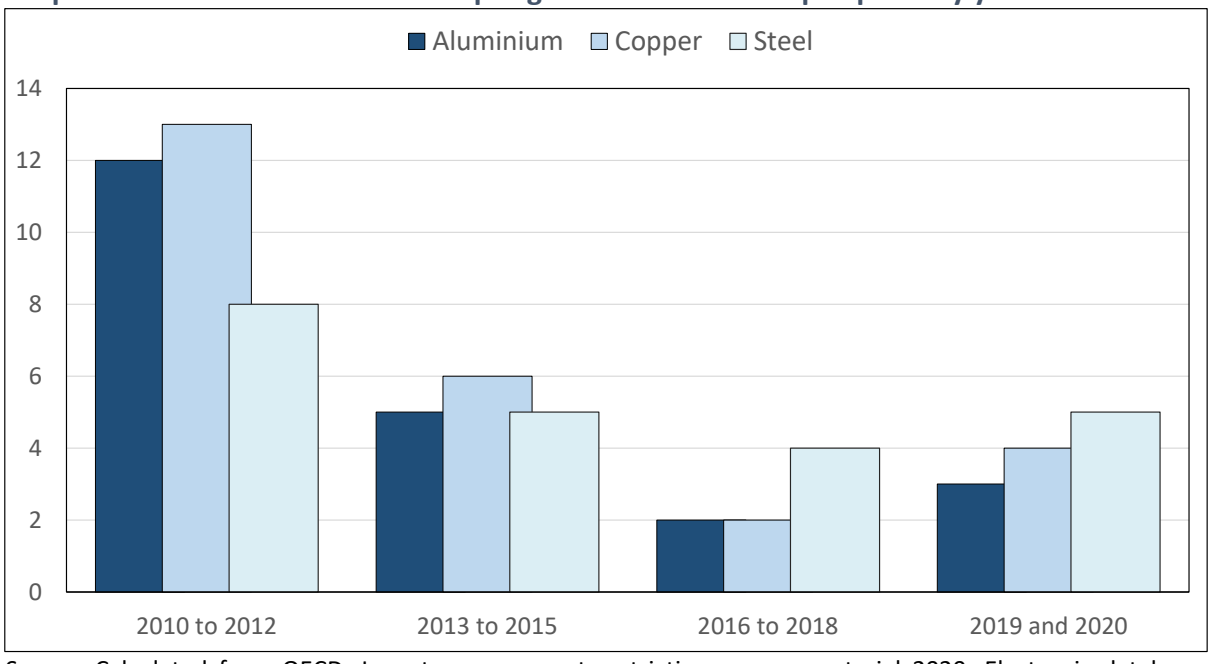
A discussion of the full range of rules affecting restrictions on scrap exports is included in Appendix 3.

5.2 Experiences with restrictions on exports

Over the past decade, a relatively small number of countries in the global South – a total of 26 as of 2020 - restricted exports of scrap metal. Taken together, the countries involved account for under 6% of global scrap exports. Just over half of the group saw a decline in their scrap exports from 2010 to 2020, with South Africa accounting for most of the decline after it adopted the PPS.

According to a database maintained by the Organisation for Economic Cooperation and Development (OECD), nine countries had formally banned copper scrap exports by 2020. Seventeen had instituted quotas or licencing requirements, including South Africa's PPS; 13 imposed taxes; and five introduced other measures. The restrictions generally covered ferrous and aluminium scrap as well. Well over half of the countries involved acted in the early 2010s as soaring international metals prices brought higher scrap exports. A third of all the countries were in Africa, and the only high-income economies were petrostates (Saudi Arabia and the UAE).

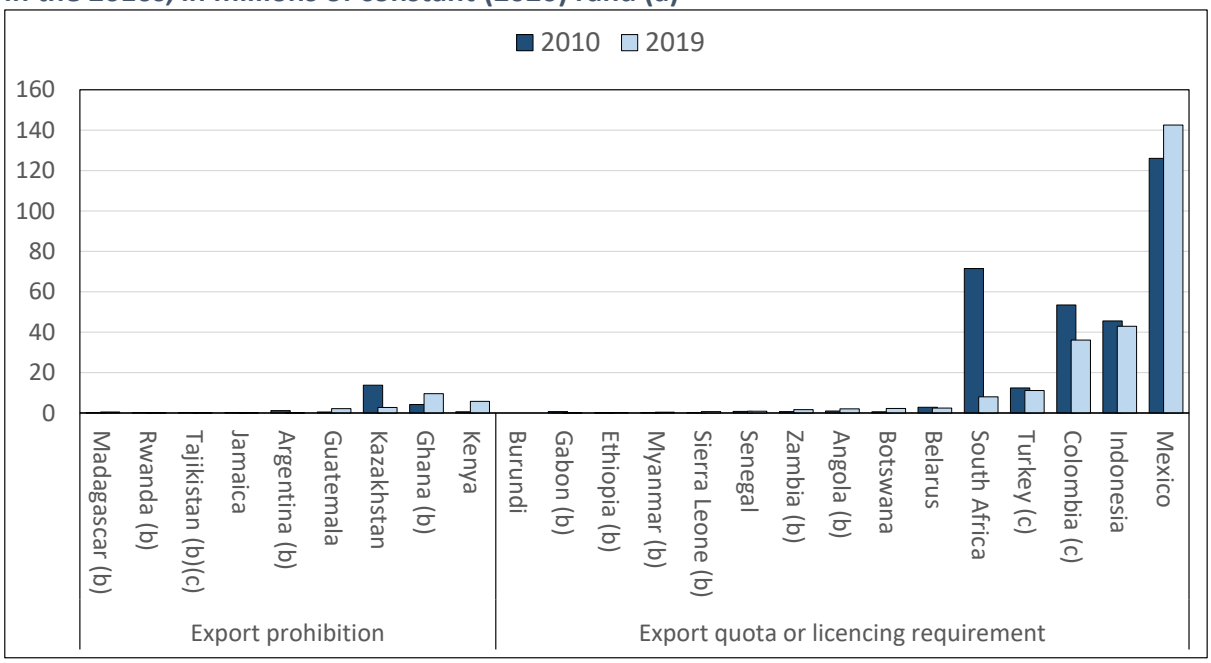
Graph 15. Number of countries adopting restrictions on scrap exports by year



Source: Calculated from OECD. Inventory on export restriction on raw material 2020. Electronic database. Downloaded from https://qdd.oecd.org/ in March 2022.

For copper alone, 24 countries, including South Africa, imposed a ban, quota or licencing for copper scrap exports in the ten years to 2020. As a group, they supplied 5% of global copper scrap exports, but the bulk came from South Africa and four other countries (Graph 16). Of the 20 countries that adopted restrictions before 2019, only eight saw a fall in copper exports by volume, with South Africa accounting for most of the decline. Four more countries introduced restrictions in 2019 and 2020. Of these, Turkey saw a sharp fall in copper scrap export but Tajikistan's climbed. Data were not available for Gabon and Colombia.

Graph 16. Exports of copper scrap in 2010 and 2019 by countries that introduced restrictions in the 2010s, in millions of constant (2020) rand (a)

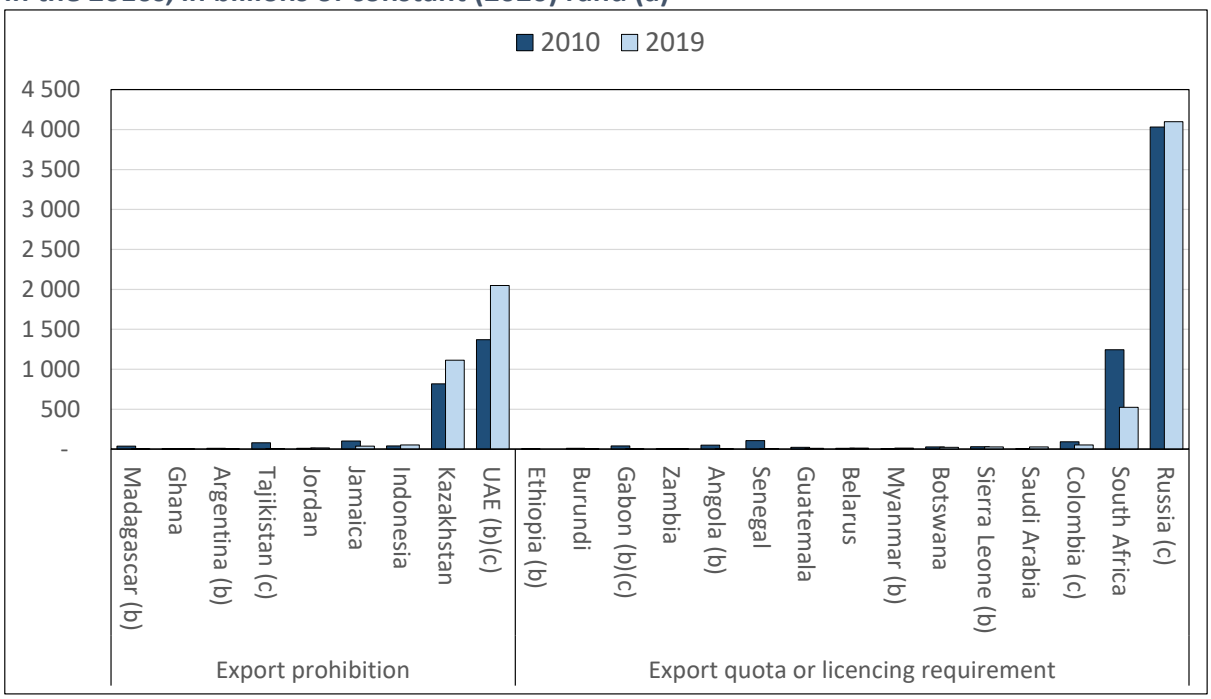


Notes: (a) Reflated with CPI rebased to 2020. (b) Mirror data used as country data not available. (c) Measure adopted in 2019 or 2020, so trends do not show impact. *Source:* Calculated from ITC. TradeMap. Interactive dataset. Accessed at www.trademap.org in April 2022.

A similar pattern emerged for steel, as Graph 17 shows. Nineteen countries adopted restrictions before 2019, and five after that. Together, they provided 8% of global steel scrap exports. Of the countries that introduced the measures before 2019, 11 saw a fall in exports. As with copper, the fall was steepest for South Africa. Of the five countries that adopted bans in 2019 and 2020, the UAE saw a decline from two million tonnes in 2019 to only 10 000 in 2021.[10] Scrap steel exports from Gabon fell from 1600 tonnes to 300, but increased for Russia and Tajikistan. Data were not available for Colombia.

[10] The data are from the UAE's trading partners published at TradeMap, an interactive data set published by the ITC at www.trademap.org. The UAE's own export data are only available through 2020.

Graph 17. Exports of steel scrap in 2010 and 2019 by countries that introduced restrictions in the 2010s, in billions of constant (2020) rand (a)



Notes: (a) Reflated with CPI rebased to 2020. (b) Mirror data used as country data not available. (c) Measure adopted in 2019 or 2020, so trends do not show impact. *Source:* Calculated from ITC. TradeMap. Interactive dataset. Accessed at www.trademap.org in April 2022.

The available information shows that few countries have adopted quantitative restrictions. In this group, most have seen very little visible decrease in scrap exports. South Africa has been far more successful than most others, although as discussed above the fall in legal copper scrap sales abroad were offset by an increase in exports labelled as raw copper. These experiences point to the critical importance of stricter regulation of the domestic scrap trade and processing in addition to measures to limit cross-border transactions.

REFERENCES

AMSA. 2020. ArcelorMittal Integrated Report 2020. Accessed at: https://arcelormittalsa.com/Portals/0/ArcelorMittal%20IR%202020_HR.pdf in March 2022.

Brakpan Herald. 2020. Illegal connections in Plastic City cut off. 8 July 2020. Accessed at https://brakpanherald.co.za/234515/illegal-connections-in-plastic-city-cut-off/ in March 2022.

Castings SA. 2021. Theft of copper is sapping South Africa. In *Castings SA. Vol 22 Number 4.* December. Accessed at https://www.castingssa.com/wp-content/uploads/2021/Castings%20SA%20December%202021/Castings%20SA%20December%202021%20PDF.pdf in March 2022.

Cele, B. 2022. Question 489 for written reply. National Assembly. NW554E. March 2022.

Faku, D. 2022. Coal exports plunge due to cable theft. In *Business Times.* 30 January 2022. Accessed at https://www.businesslive.co.za/bt/business-and-economy/2022-01-30-coal-exports-plunge-due-to-cable-theft/ in March 2022.

Gifford, G. 2022. Eskom Security Guards Bust at Scrapyard with Stolen Copper Cables. 19 February 2022. Accessed at https://www.dispatchlive.co.za/news/2022-02-19-eskom-security-guards-bust-at-scrapyard-with-stolen-copper-cables/ in March 2022.

Goddard, E. 2021. Spike in bulk load theft on rai. In *Southern Africa's Freight News*. 5 July 2021. Accessed at https://www.freightnews.co.za/article/spike-bulk-load-theft-rail in March 2022.

Khonjelwayo, B. and Nthakheni, T. 2021. Determining the causes of electricity losses and the role of management in curbing them: A case study of City of Tshwane Metropolitan Municipality, South Africa. In *J. Energy in Southern Africa.* XXXII.4 (November)

Liebenberg, A.S. 2020. An Evaluation of the Impact of the Non-Ferrous Metals Crime Combating Committee on Copper Cable Theft. Ph.D. thesis. University of South Africa. November.

Lowvelder. 2021. Vereeniging municipal security guards arrested for copper theft while on duty. In *Lowvelder*. 12 October 2021. Accessed at https://lowvelder.co.za/lnn/1158920/vereeniging-municipal-security-guards-arrested-for-copper-theft-while-on-duty/ in March 2022.

Magubane, T. 2022. EThekwini pleads with communities, upset over service delivery issues, not to attack its workers In *IOL.* Accessed at https://www.iol.co.za/mercury/news/ethekwini-pleads-with-communities-upset-over-service-delivery-issues-not-to-attack-its-workers-fa62b0be-267e-47f4-98ce-d9ba6b180c87 in March 2022.

Mathe, L.S. 2017. Perceptions and Attitudes of CENTLEC Maintenance Employees Towards Theft of Copper Cables. MTech in Business Administration. Central University of Technology, Free State. Accessed at http://ir.cut.ac.za/bitstream/handle/11462/1424/Mathe%2C%20Lerato%20S.pdf?sequence=1&isAllowed=y in March 2022.

Minerals Council. 2020. Integrated Annual Review 2020:#MakingMiningMatter. Johannesburg.

Nicholas, S. and Basirat, S. 2021. *New From Old: The Global Potential for More Scrap Steel Recycling.* Institute for Energy Economics and Financial Analysis. Accessed at http://ieefa.org/wp-content/uploads/2021/12/The-Global-Potential-for-More-Scrap-Steel-Recycling_December-2021_2.pdf in April 2022.

PRASA. 2022. Annual Report 2020/21. Passenger Rail Agency of South Africa. Accessed at https://static.pmg.org.za/Annual_Report_2021_21_Feb_Final_prasa.pdf in March 2022.

Quantec. 2022. International Trade Service. RSA National Trade. Interactive dataset. Accessed at https://www.easydata.co.za/service/international-trade-service/ in March 2022.

Rondganger, L. 2021. KZN cops bust major cable theft syndicate 'with ties to eThekwini officials'. In *IOL*. 20 March 2021. Accessed at https://www.iol.co.za/news/south-africa/kwazulu-natal/pics-kzn-cops-bust-major-cable-theft-syndicate-with-ties-to-ethekwini-officials-a1bd9a13-3162-465c-880a-5a80613cf9b4 in March 2022

SAPS. 2020. Annual Report 2020/21. Pretoria. Accessed at https://nationalgovernment.co.za/department_annual/378/2021-department-of-police-(saps)-annual-report.pdf in March 2022.

SAPS. 2021. Transnet employees arrested for copper cable theft. Hawks media statement. 3 May 2021. Accessed at https://www.saps.gov.za/newsroom/msspeechdetail.php?nid =32346 in March 2022.

Singh, K. 2022. 7 suspects arrested outside PMB with stolen Transnet railway tracks. In *The Mercury.* 12 January 2022. Accessed at https://www.iol.co.za/mercury/news/7-suspects-arrested-outside-pmb-with-stolen-transnet-railway-tracks-b4f4aeb8-b0ea-4bc6-8431-897a1867a7e8 in March 2022.

Statistics South Africa. 2022a. Quarterly Labour Force Survey. Electronic database. Accessed at Nesstar facility at www.statssa.gov.za in March 2022.

Statistics South Africa. 2022b. Quarterly Employment Survey. QES Details_BreakDown_200909_202109. Excel spreadsheet. Accessed at http://www.statssa.gov.za/?page_id=1854&PPN=P0277&SCH=72994 in March 2022.

TimesLIVE. 2021. Railway thieves nabbed by Germiston police. In *TimesLIVE*. 23 September 2021. Accessed at https://www.timeslive.co.za/news/south-africa/2021-09-23-railway-line-thieves-nabbed-by-germiston-police/ in March 2022.

TimesLIVE. 2022. We pay the price: Scrap dealer among 14 bust for cable theft from Eskom. In DispatchLIVE. 10 March 2022. Accessed at https://www.dispatchlive.co.za/news/2022-03-10-we-pay-the-price-scrap-dealer-among-14-bust-for-cable-theft-from-eskom/ in March 2022

Transnet. 2021. Freight Rail. In *Integrated Report 2021*. Accessed at https://www.transnet.net/InvestorRelations/AR2021/Transnet%20Freight%20Rail.pdf in March 2022.

WOW. 2021. Recycling of Waste and Scrap. Johannesburg. Accessed at www.wow.co.za in March 2022.

WOW. 2022. Woweb Report Generator. Interactive database. Accessed at https://reportgenerator.woweb.co.za/Companies in March 2022.

APPENDIX 1

INTERVIEWS AND CORRESPONDENCE

Aluminium Federation of South Africa

Non-Ferrous Metals Association

ReClam

Columbus Steel

South African Iron and Steel Institute

Genesis

Copper Development Association

Industrial Development Corporation

SARS

AMSA

the dtic

APPENDIX 2

EXAMPLES OF IMPACT OF CABLE THEFT FROM MUNICIPAL INFRASTRUCTURE

The examples in the follow table draw on media reports. That means that smaller and poorer communities and minor cases are under-represented.

MUNICIPALITY	REPORTED INCIDENTS	SOURCE
Ballito	Escalating cases in 2020, with six cases in two weeks in August, leading to blackouts. Blame on a local syndicate, but has not opened cases at SAPS.	North Coast Courier 7 August 2020
Emalahleni	Replacement cost at millions of rands annually – "the current rate has the potential to collapse the ability of the municipality to provide its communities with the necessary basic services and grow the municipality's economy and attract investment to the city…" Sewage spills with environmental damage to rivers.	Press Release 5 November 2020
Kenton on Sea, Eastern Cape	Cable theft at reverse osmosis plant belonging to Amatola Water leading to cut off in water. Amatola now replacing cables weekly at cost of thousands of rand.	Amatola Water press release 16 September 2020.
Tshwane	Cable theft leads to substantial interruptions to water and electricity.	Media release 16 January 2020
Benoni	Theft of cable worth R4 500 cost R9 000 in repairs, leading to blackout. Perpetrators caught digging trench, with tools to cut cable.	Benoni City Times 27 June 2021.
Ekuhuleni	Supply to Ekurhuleni Municipality's Germiston customers affected due to an attempted oil cable theft from the Eskom side. Video shows an underground fire.	Twitter @City_Ekurhuleni 22 November 2021
Ekurhuleni	Boksburg particularly affected. Complaints that power cuts for hours or days due cable theft. Three attacks in a month on one substation resulting in "massive power cuts" in Boksburg. Cripples industrial site at Lilianton. Early warning devices on substations not working.	Eskom press release. 1 December 2021; Southern Courier. 21 December 2021.
Emfuleni	Two guards at substation killed by cable thieves. Two days earlier guards had been beaten up.	Press release. 20 May 2021.
Emfuleni	Theft of cable at substation leading to blackouts in four suburbs for at least a day.	Vaal Weekblad. 16 November 2021
eThekwini	R60 million p.a. losses due cable theft, including rail, communications and electricity networks.	IOL. 30 March 2021
George	George opened 20 cases of cable theft and vandalism in four months; R1 million for repairs due theft/vandalism over six months. Man died after trying to steal copper earth bare conductor.	George Herald. 5 November 2021
Govan Mbeki	Cable theft affecting sewage pumps from communities to water treatment works, so sewage not flowing in outfall lines; the city had hired special security guards for plant	Ridge Times. 1 July 2021

MUNICIPALITY	REPORTED INCIDENTS	SOURCE
Gqeberha	Nelson Mandela Bay Business Chamber: 254 electricity outages in the city were caused by cable theft in the first eight months of 2021.	Daily Maverick .8 November 2021
Gqeberha	Five-day outage due cable theft in Summerstrand, because thieves stole 50-year-old cable that needed specialists from the Western Cape to fix. Cost of R3 million for repairs plus security upgrades.	Daily Maverick. 8 November 2021
Johannesburg	Theft of cable for fruit and vegetable market cut the cold chain for 5 000 farmers and 10 000 customers. After two days of no electricity, R20 million in stock lost.	News 24. 30 October 2021; Joburg Newsroom. October 2021
Johannesburg	Theft of streetlight fittings for scrap, but also to cut light to enable other crimes. City Power says streetlights "mown down" in Lenasia and along Malibongwe Drive.	Northcliff Melville Times. 28 October 2021
Johannesburg	Selby transformer stolen from substation. Transformer worth R600K; three days of blackout in area	IOL, 7 February 2021
KwaZulu-Natal	Theft of telecommunications cable leading to slower/more disrupted communications centred on Pietermaritzburg	The Witness. 5 July 2021.
Matjhabeng	R5 million in cables stolen in September, leaving five Welkom suburbs in dark – looting generally worse as gold mines closing down leaving mass joblessness	Engineering News. 6 September 2021
Port Elizabeth	Businesses saying power disruptions due to cable theft interrupt production and services.	DispatchLIVE. 20 January 2021
Phalaborwa	Increase in cable theft leading to blackouts.	Mopani News. 26 July 2021
Rand West City	Copper theft costs municipality at least R5 million a year. Cable theft led to power outages in five suburbs, and water outage in one. Power outage e.g. 18 hours due theft of 80 metres of MV cable; in another, thieves cut wires on Eskom pylons to get to cable, wrecking them – so Eskom trying to find another link up altogether; in another, stole main feeder cable leading the switchgear to explode.	Randfontein Herald. 1 September 2021.
Thembalihle, KwaZulu-Natal	Theft of copper from pumping station leading to water outage.	COGTA KZN press release. 19 October 2021
uMvoti	Cable theft leading to black outs in community for several days; elsewhere, cut off street lights	Greytown Gazette. 27 October 2021
Drakenstein	R 5 million p.a. to replace stolen cable	Muni press release. 20 January 2022
Sol Plaatjie	Blackouts for days due cable theft	OFM . 16 February 2022
Matlosana, North West	Stolen cable in three townships in one week; cost of millions to municipality; guards in hospital after beating when thefts stole cable from water pump station at Ellaton	OFM 28 January 2022
Kimberley	Chamber of Commerce says blackouts threatening business closures as cannot afford generators if need to refill every second	SABC News. 5 March 2022

MUNICIPALITY	REPORTED INCIDENTS	SOURCE
	or third day. Social housing project says syndicate regularly takes infrastructure.	
Jeffreys Bay	Unplanned outages due cable theft affecting hospitals and people who need oxygen and other healthcare at home, as well as losses to businesses.	Press release. 24 March 2022
Mthatha	R2 million over past two years for cable theft leading to increasing outages, with loss of food for households as well as streetlight blackouts.	DispatchLIVE. 11 February 2022
Johannesburg	City Power reporting various small-scale arrests over a week; each led to hours-long blackouts affecting under 25 households.	Roodeport Record. 19 January 2022
Maluti-a-Phofung	Mayor says cable theft at an "alarming rate" leading to "constant power outages." [oh the irony]	The Guard. 17 March 2022.
Mashashane, Limpopo	Broadly saying very common.	Mashashane.com. 26 February 2022
Middelburg	Cable left city without internet due cable theft.	Middelburg Observer. 11 February 2022
Polokwane	Street lights out on major route (R71) with serious damage to infrastructure so will take time to restore; also left live cables that risk people. Municipality faces huge costs due cable theft.	Polokwane Observer. 17 March 2022
Polokwane	Cable theft led to loss of power to suburb for a day.	Press release. 20 February 2022
Saldanha Bay	Cable theft leading to blackouts.	Press release. 22 March 2022.
Silver-mine	R850 000 in radio communication equipment stolen for copper, leading to spending of R10,5 million for fencing plus increased security	DispatchLIVE. 24 March 2022
Paarl	Theft of 120m of overhead cable causing damage to essential electrical infrastructure and to agricultural production.	Municipal press release. 20 January 2022
Gqeberha	Pumping station in Zwelitsha hit leading amongst others to closure of magistrate's office at 11 every day. Means longer delays in domestic violence cases.	DispatchLIVE..28 February 2022

APPENDIX 3

INTERNATIONAL TRADE RULES AND REGULATION OF SCRAP EXPORTS

The Trade Policy, Negotiations and Cooperation (TPNC) Division of the dtic and Johan Human provided insights into the international trade rules that might affect regulation of scrap exports. They stressed that the advice summarised in this Appendix is not a legal opinion. More rigorous analysis should be obtained as the policy options are refined.

1. WTO rules

The World Trade Organization (WTO) prohibits quantitative export restrictions (Article XI)[11] other than duties, taxes, or other charges. A plain reading of Article XI would suggest bans of exports are WTO illegal. However, several the provisions of Article XX could justify an export ban, for example sub-sections (a), (d), (i) and (j). According to Johan Human "If the reason for imposing an export ban is the protection of the national infrastructure, Article XX(a) could be relevant. Article XX(a) allows for an exception to the prohibition on quantitative measures if measures are necessary to protect public morals. 'Public morals' has not been defined in WTO dispute settlement."

Human states that panels have almost entirely deferred to Members' own determination of what constitutes a public moral within their territory. The critical issue for a panel will be that there must be evidence demonstrating that the policy objective is a public moral issue in the value system of South Africa. It could probably be argued that preventing criminals from profiting from their crimes, or preventing the theft of a key product used in developing South Africa's infrastructure, are public moral issues. Evidence to show that this is a public moral issue could include laws, regulations, and statements by officials. For the successful invocation of Article XX(a) it must be shown that the measure contributes to that objective – in this case it would be necessary to show that the export ban will, or does, have the intended effect. An important hurdle will be the question of 'reasonably available alternatives' – Government would need to show that is has tried other measures without adequate success, such as increasing policing, or that increasing policing is not possible (for instance due to budget/finance constraints, or South Africa's developing country status). The limited impact of the export duty and the PPS on the destruction of the infrastructure will have to be explained. If Article XX(a) is invoked as justification, it will have to be made clear that the measure is not taken for economic/trade reasons to protect or improve the competitive position of the domestic recycling industry or the mini-steel mills, but exclusively to stop the destruction of the national infrastructure.

Article XX(d) states that "measures necessary to secure compliance with laws or regulations which are not inconsistent with the provisions of this Agreement, including those relating to customs enforcement, ... and the prevention of deceptive practices". According to Johan Human this clause "might be more challenging. The laws/regulations that are not inconsistent

[11] GATT 1994: **Article XI:1** imposes a general ban on quantitative restrictions: No prohibitions or restrictions other than duties, taxes, or other charges, whether made effective through quotas, import or export licenses or other measures, shall be instituted or maintained by any contracting party on the importation of any product of the territory of any other contracting party or on the exportation or sale for export of any product destined for the territory of any other contracting party. **Article XI:2(a)** makes an exception to the general ban: The provisions of paragraph 1 of this Article shall not extend to the following: (a) Export prohibitions or restrictions temporarily applied to prevent or relieve critical shortages of foodstuffs or other products essential to the exporting contracting party. **Article XI:2(a)** permits quantitative export restrictions to be applied to foodstuffs and essential products to prevent or relieve critical shortages, although only temporarily.

with the WTO would presumably be laws against theft." Human adds that that it is difficult to "see how an export ban 'secures compliance' with that criminal law but it is not inconceivable". A panel might agree that the factual circumstances of South Africa mean an export ban would indeed help to secure compliance. An analogy could be made to rhino horn – an export ban that is specifically designed to secure compliance with criminal law in relation to high-theft/high-export products. Finally, again the issue of the "reasonably available alternative" issue described above would have to be dealt with – such as "why is increased policing not a reasonably available alternative".

According to Human, "both (a) and (d) could be used in the context of the destruction of the infrastructure (particularly where copper 'scrap' is involved) argument. It is difficult to envisage that a member will be sanctioned for protecting its infrastructure, particularly if an export ban is imposed on a temporary basis and for a limited period (a year or two) to allow government to develop and introduce an alternative policy."

Human states that the following two sub-articles deal more with the adequate/equitable supply of raw material to the domestic industry, rather than the degradation of the infrastructure.

Article XX(i) refers to measures "involving restrictions on exports of domestic materials necessary to ensure essential quantities of such materials to a domestic processing industry during periods when the domestic price of such materials is held below the world price as part of a governmental stabilising plan" while not enhancing the competitive edge of the domestic industry in the international market. It can be argued that this is the objective of the PPS.

Article XX(j) deals with measures "essential to the acquisition or distribution of products in general or local short supply, provided that any such measures shall be consistent with the principle that all contracting parties are entitled to an equitable share of the international supply of such products, and that any such measures, which are inconsistent with the other provisions of the Agreement shall be discontinued as soon as the conditions giving rise to them have ceased to exist". A key issue would appear to be showing that the export ban is essential to the "acquisition" or "distribution" of copper. It would need to be shown that ownership/holding-on-to-the-products falls within the scope of "acquisition or distribution". If that could be done, it would then need to be shown that copper is in local short supply, specifically because of the problem of excessive theft and export. This could be a complicated issue, with economic data required to show that there is enough copper in the global market that the export ban does not overly harm other Members. The last requirement (the measure is discontinued as soon as the conditions have ceased to exist) seems to be easily satisfied if the ban is temporary.

Human makes the point that it is very important "to keep the chapeau of Article XX in mind: Subject to the requirement that such measures are not applied in a manner which would constitute a means of arbitrary or unjustifiable discrimination between countries where the same conditions prevail, or a disguised restriction on international trade, nothing in this Agreement shall be construed to prevent the adoption or enforcement by any contracting party of measures: ..."

Article XX's restrictive measures must be applied in a non-discriminatory way to all WTO Members where the same conditions prevail. This was interpreted by the Appellate Body in the Brazil in a tyres case to mean that trade agreement partners also must be subjected to

the Article XX measures. In the Brazil case, Brazil excluded its Mercosur partners from the scope of the measures. This is very relevant in the context of South Africa's trade agreements

Article XXI of GATT1994: This is the so-called "security exception" and deals with action which a member "(b) considers necessary for the protection of its essential security interests (i) ...(ii) ... (iii) taken in time of war or other emergency in international relations; ...". This provision is very controversial, and the subject of several dispute settlement panels with their origins in certain trade measures which former US President Donald Trump imposed. Government will have to think long and hard before invoking Article XXI, particularly as there are far less controversial options available.

2. Trade agreements

The TNPC makes the following points about the Southern African Development Community (SADC) Economic Partnership Agreement (EPA) Article 26, which sets out rules on export duties or taxes. Within this framework, it is highly constrained (WTO plus). The European Union (EU) agreement with Botswana, Eswatini Lesotho, Mozambique, Namibia and South Africa prohibits the introduction of new export duties and prohibits any increase in export duties already applied in trade among the parties to the EPA. (Amita67)

There are several exceptions which deal with the imposition of export taxes for specific revenue needs and protection of infant industries or the environment, or where it is essential for the prevention or relief of critical general or local shortages of foodstuffs of other products essential to ensure food security. These are, however, provided only to other Southern African Customs Union (SACU) countries and Mozambique, not South Africa.

The EPA allows for temporary export taxes on industrial products where the SADC EPA states can justify industrial development needs. The EU must be notified, and all relevant motivation and information must be provided. Such temporary duties or taxes shall only be applied for a maximum of eight products, as defined at an HS6 tariff line level, or in case of "ores and concentrates" at an HS4 tariff line level and may only be in place for a maximum of 12 years in total. A further extension is subject to agreement by the EU.

There are further conditions: for the first six years the EU is exempt for an annual amount equal to the average volume of exports to the EU of that product based on the preceding three years. From the seventh year, until expiry, the EU would be exempt from export taxes amounting to 50% of the average volume of exports to the EU over the three years preceding the application of the duty; and export duties or taxes shall not exceed 10% of the ad valorem export value of the product.

There are also rules to minimise the risk of transshipments of good subject to export taxes.

3. The concurrent application of the Price Preference System and the ad valorem tax on scrap exports.

There is no provision in the WTO to suggest that the measures cannot run concurrently. While the PPS and an ad valorem export tax may overlap, and while both may be considered restrictions on international trade, their purposes are not identical. They will not impose a double financial burden on a would-be exporter: if the scrap metal is offered for sale to the domestic market, and the offer is accepted, the would-be exporter will be obliged to give a discount on the price, as has been the case up till now, but will not in addition have to pay export duty. Conversely, if the offer is not taken up by the domestic industry, and the scrap

metal is exported, the exporter will be required to pay the export duty but will not be obliged to sell the scrap metal at a discount.

4. The alteration of an ad valorem tax to a progressive excise tax rate

There are no provisions to suggest that a progressive tax rate would be WTO illegal. There are two types of export taxes: ad valorem, which tax a percentage of the value of the exports, or specific taxes, which levy a given monetary amount per unit or weight of the exported product. Export taxes can be progressive, implying a higher tax when the price of the good export is high and a lower tax when the price is low. A change from ad valorem duties to progressive duties would not be WTO inconsistent per se. In this scenario, an export tax tariff could be determined based on a reference price set by National Treasury.

There are questions around the selective application of a progressive export tax. For example, could an export tax on ferrous scrap and ingots and billets be applied at the same time as a simultaneous ban on the export of semi-processed copper ingots and billets (which in the view of the research, suggests is the critical export avenue for illicit copper exports)?

A selective application of a progressive export tax will be difficult to apply in the scenario specified above. It is also necessary to bear in mind the specific constraints on exports to the EU. Different mechanisms can be used to achieve substantially the same result. For example, export taxes can also be differential; for example, charging a higher tax on the unprocessed export and a lower tax on the processed version of the export to encourage domestic processing. Differential export taxes on ferrous scrap and ingots and billets could be combined with and outright ban on the export of semi-processed copper ingots and billets, subject to the necessary justification. Another alternative is to administer a non-automatic export licensing scheme for said products by approved firms to export such goods. Government can restrict exports by simply refusing to approve new licences or by forbidding the signing of new export contracts.

5. Measures under SACU and SADC agreements to deal with imports of stolen scrap

The SACU Agreement of 2002 specifically provides the SACU Council of Ministers with the authority to restrict or prohibit exportation based on economic, social, cultural, or other reasons, giving that body's broad powers to control exports. Article 25.1 states: "Member States recognize the right of each Member State to prohibit or restrict the importation into or exportation from its area of any goods for economic, social, cultural or other reasons as may be agreed upon by the Council."

Furthermore, Article 25.2 provides: "Except in so far as may be agreed upon between the Member States from time to time, the provisions of this Agreement shall not be deemed to suspend or supersede the provisions of any law within any part of the Common Customs Area which prohibits or restricts the importation or exportation of goods." SACU permits the imposition of export restrictive measures and pays deference to measures implemented by Member States. Any Member can request measures to prevent exportation or unrestricted exportation from its area to a state outside the Common Customs Area of such prohibited or restricted goods imported from the area of other Member States.

The SADC Trade Protocol of 1996 has a general prohibition against the application of export duties in Article 5.1 of the protocol. This prohibition is ameliorated by Article 5.1 that

provides: “This article shall not prevent any Member State from applying export duties necessary to prevent erosion of any prohibitions or restrictions which apply to exports outside the Community, provided that no less favourable treatment is granted to Member States than to third countries.” For instance, SADC member Tanzania currently maintains export bans on the waste and scrap of antimony, cobalt, copper, chromium, indium, manganese, and nickel.

To what extent and with what possible objective can national security provisions be invoked in terms of South Africa’s WTO and trade agreement obligations? For example, could national security issues be invoked with respect to the theft and smuggling of copper?

National security concerns can be raised but such concerns could be challenged. Recent case law suggests that even though members are free to establish what its essential security concerns are, the position that this is entirely “self-judging” can be challenged. This is so since the chapeau of Article XXI(b) qualifies the determination of the sets of circumstances described in the enumerated subparagraphs of Article XXI(b). Actions taken pursuant to Article XXI must be taken in relation to and during times of war or other emergencies in international relations. An emergency in international relations would, therefore, appear to refer generally to a situation of armed conflict, or of latent armed conflict, or of heightened tension or crisis, or of general instability engulfing or surrounding a state. Measures taken to address issues of national, as opposed to international security, may not necessarily be covered by Article XXI.

Provisions under the General Exceptions Article XX (i and j) may offer an alternate basis for justification. So long as the measure does not constitute a means of arbitrary or unjustifiable discrimination between countries where the same conditions prevail, or a disguised restriction on international trade, Members can introduce a measure (i) involving restrictions on exports of domestic materials necessary to ensure essential quantities of such materials to a domestic processing industry during periods when the domestic price of such materials is held below the world price as part of a governmental stabilisation plan; (j) essential to the acquisition or distribution of products in general or local short supply – provided that any such measures shall be consistent with the principle that all contracting parties are entitled to an equitable share of the international supply of such products, and that any such measures, which are inconsistent with the other provisions of the Agreement shall be discontinued as soon as the conditions giving rise to them have ceased to exist.

6. Environmental considerations

GATT Article XX on General Exceptions lays out several specific instances in which WTO members may be exempted from GATT rules. Two exceptions relevant to the protection of the environment: paragraphs (b) and (g) of Article XX. Pursuant to these two paragraphs, WTO members may adopt policy measures that are inconsistent with GATT disciplines, but necessary to protect human, animal or plant life or health (paragraph (b)) or relating to the conservation of exhaustible natural resources (paragraph (g)). WTO members have the autonomy to determine their own environmental objectives but must prove not only that such a measure is necessary but also that it relates to a particular policy objective. If government wants to rely on the exception that relates to the conservation or exhaustible natural resources, such as limiting harmful emission, objective evidence to this effect must be presented.

7. The Standards and Technical Standards system

A variety of International Standards Organisation Standards exist for safety and health in the scrap metal processing industry. As far as can be ascertained, and based on information obtained from the South African Bureau of Standards, there are no standards which govern the trade of scrap metal. However, if the import of scrap is an issue because, especially in the case of South Africa's neighbouring states, it most likely includes scrap material which is illicit scrap, then a measure against imports should be imposed.

This could take the form of a Technical Standard (referred to in South Africa as a Compulsory Standard.) This would allow the National Regulator for Compulsory Standards working with SARS/Customs to inspect and prohibit imported scrap if it does not comply with the specifications of the Compulsory Standard.

TRADE & INDUSTRIAL POLICY STRATEGIES

TIPS REPORT FOR
DEPARTMENT OF TRADE, INDUSTRY AND COMPETITION

INTERNATIONAL EXPERIENCES WITH REGULATION OF SCRAP METAL TRADE

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CONTENTS

6 AIMS AND CONTEXT

Increased theft of scrap, especially copper, threatens substantial damage to society, above all by interrupting rail and electricity services. Understanding international trends in scrap metal production and sale, as well as experiences in regulating it, should help identify ways to address the problem more effectively. This paper therefore first outlines trends in global demand and supply of scrap. It then summarises international experiences with efforts to ban or restrict scrap exports. The final section explores the policy choices made in Kenya, which recently prohibited all dealing in scrap metal, and in India and the European Union, which are major scrap importers.

The Kenyan case study underscores the legal and political-economic difficulties of regulating the scrap market. It points in particular to the ability of scrap dealers to mobilise against regulations, while most beneficiaries – individuals and companies whose lives are interrupted by the theft of cable from utilities and railways – remain comparatively voiceless. The review of experiences in India and the European Union helps understand the implications of rising demand for scrap as a result of industrialisation in the global South, on the one hand, and efforts to minimise greenhouse gas emissions, on the other.

7 TRENDS IN GLOBAL SUPPLY AND DEMAND

Demand for metal scrap in South Africa and internationally responds principally to fluctuations in international metals prices; the shift in metals production to China and more recently India over the past 20 years; and technological developments in both energy and metals refining that require more scrap. These developments have initiated a world-wide search for comparatively high quality scrap, which in turn increases the incentives for criminal syndicates. For copper, the largest flows are from the US and other industrialised countries to China and Europe. For steel, they are from the global North to Turkey and to a much lesser extent India and Pakistan. Analysis of copper scrap flows internationally are harder to define, however, because of widespread by underinvoicing and mislabelling.

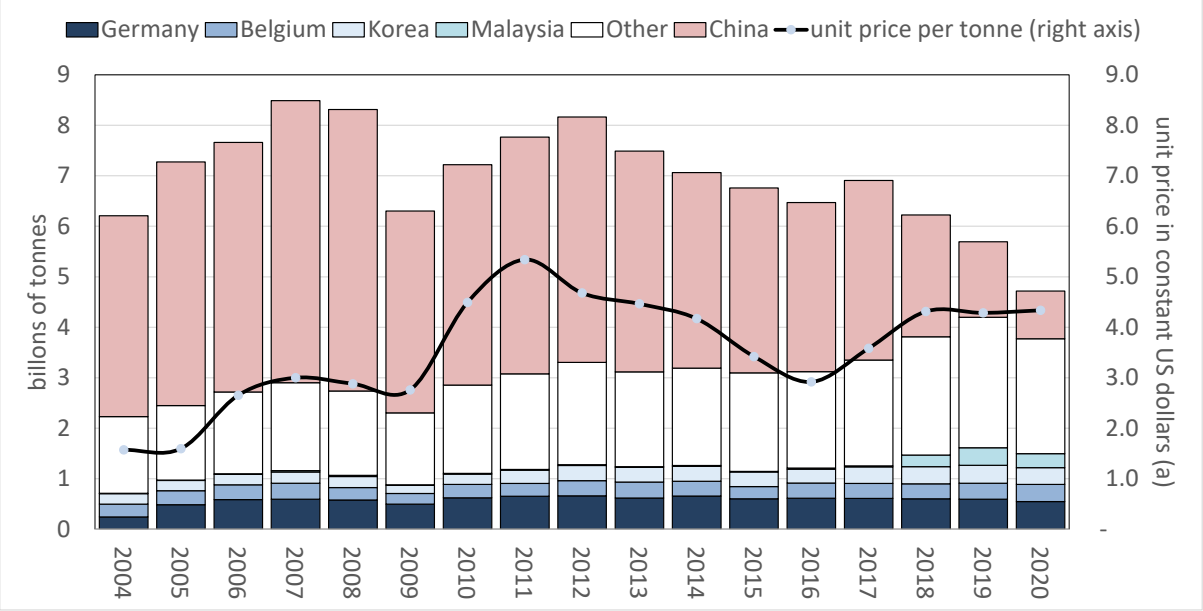
South African scrap is in high demand because the local metals industry has capacity to process and export quality metals on a very large scale relative to the economy's size and level of industrialisation. The impact has been particularly noteworthy for steel scrap, as falling domestic production of raw steel in the past decade opened space for exports. That situation is expected to reverse in the near future, however, as a number of mini-mills plan to step up production.

Fluctuations in metals prices mean that trends diverge significantly for the value and volume of scrap exports. In volume terms, scrap exports climbed rapidly during the metals price boom of the 2000s, then stabilised for steel and dropped steadily for copper. Both trends translated into a sharp fall in value after 2011 as metal unit prices fell. Metals prices have surged again due to the pandemic and, more recently, the invasion of Ukraine, but it is still too early to see the impact on the international scrap trade.

Graph 18 shows copper scrap exports in tonnes and in constant US dollars from 2004 to 2020. By volume, exports climbed sharply during the commodity boom in the 2000s. After that, Chinese imports of copper scrap steadily, fell while the rest of the world gradually increased

their purchases. The unit price fluctuated substantially in this period, so the value of the international scrap copper trade was far more volatile.

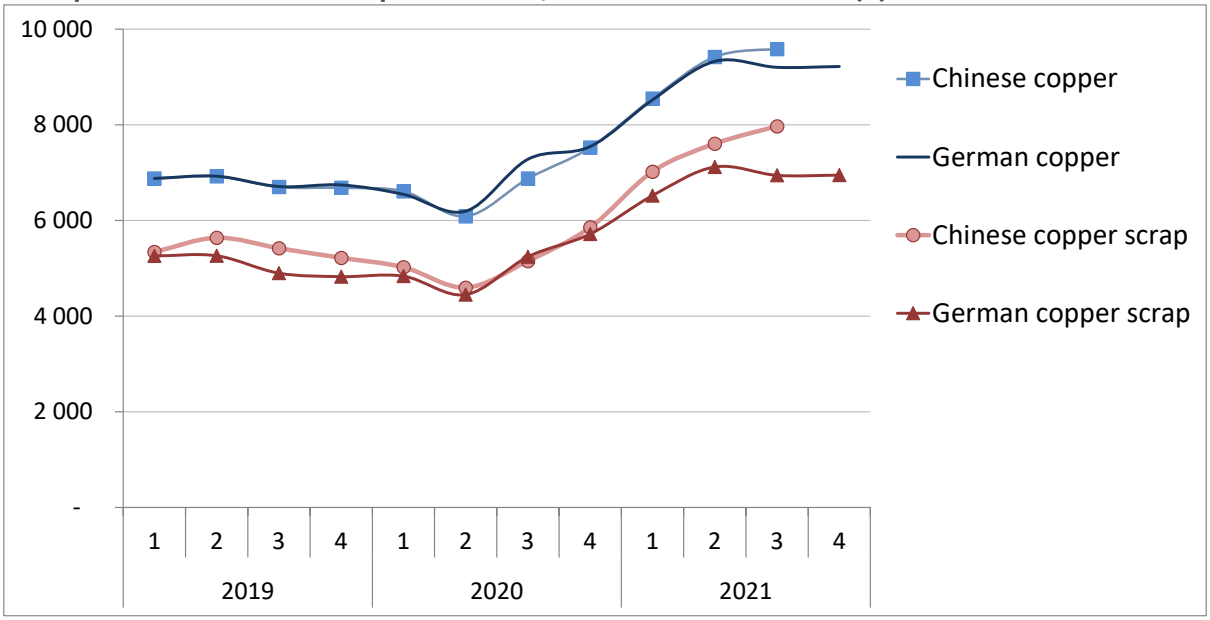
Graph 18. Imports of copper scrap by country in millions of tonnes, and unit price in constant (2020) US dollars per tonne (a), 2004 to 2020



Note: (a) Reflated with US CPI rebased to 2020. *Source:* Calculated from ITC. TradeMap. Interactive dataset. Accessed at www.trademap.org in April 2022.

In recent months, the pandemic and more recently the invasion of Ukraine brought a sharp recovery in copper prices, as Graph 19 shows. From mid-2020 to the end of 2021, the unit price of scrap copper almost doubled in constant US dollar terms.

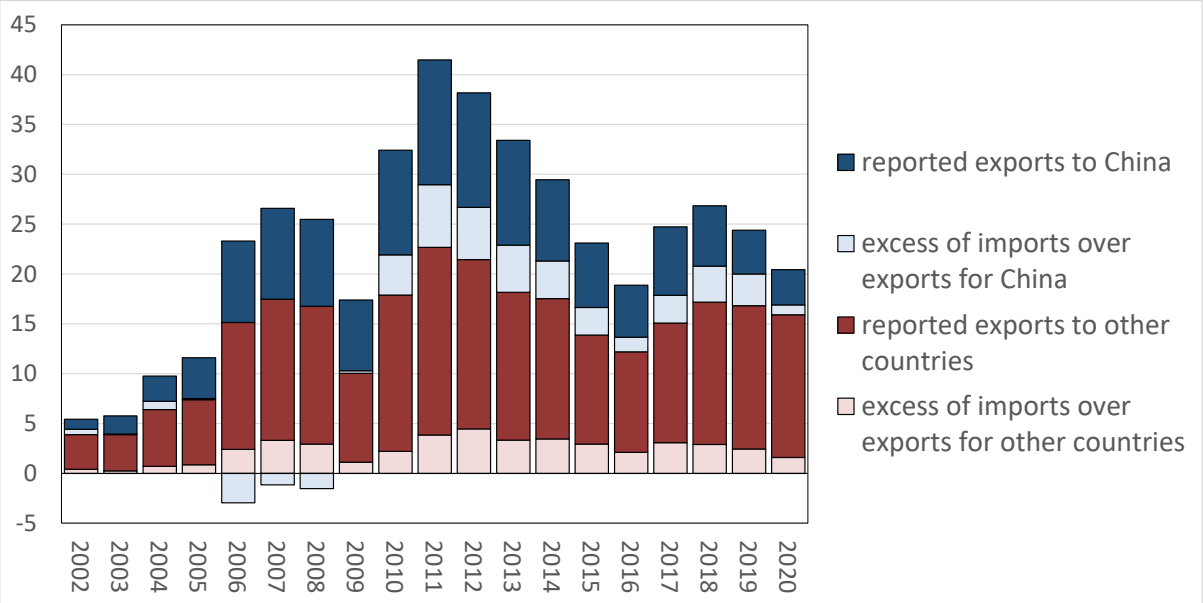
Graph 19. Quarterly Chinese and German unit import prices for copper and copper scrap, first quarter 2019 to fourth quarter 2021, in constant US dollars (a)



Note: (a) Reflated with US CPI rebased to fourth quarter 2021. *Source:* Calculated from ITC. TradeMap. Interactive dataset. Accessed at www.trademap.org in April 2022.

Countries reported that they imported US$20 billion in copper scrap in 2020, down from US$33 (in constant US dollars) [12] in 2012, at the tail of the global metals price boom. Figures for copper scrap trade by value diverge substantially between reported imports and exports, however. Exporters show total global sales at US$17 billion in 2020, following a US$40-billion peak in 2012. Steel scrap does not show a similar divergence in the value of reported exports and imports, which suggests that the difference for copper scrap probably reflects under-invoicing rather than transport costs. As Graph 20 shows, China accounted for over half of the divergence between reported imports and exports from 2016 to 2020.

Graph 20. Reported value of copper scrap exports and imports by China and other countries, in billions of constant (2020) US dollars (a), 2002 to 2020

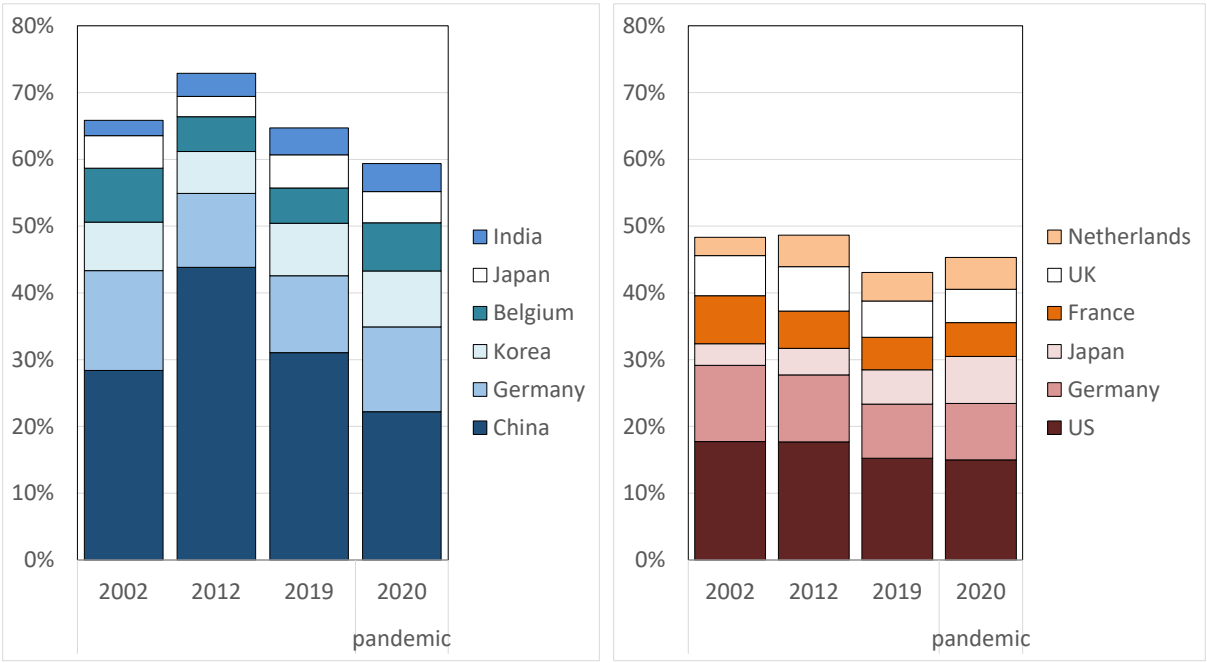


Note: (a) Reflated with US CPI rebased to 2020. *Source:* Calculated from ITC. TradeMap. Interactive dataset. Accessed at www.trademap.org in April 2022.

As the following graphs show, copper scrap importers were more concentrated than exporters, and less likely to belong to the global North. China accounted for 20% of all imported copper scrap in 2019, down from 40% in 2012. The second largest importer, Germany bought 10%. In 2019, the US sold 15% of copper scrap exports, and Germany 10%.

[12] Constant US dollars reflated with US CPI rebased to 2020.

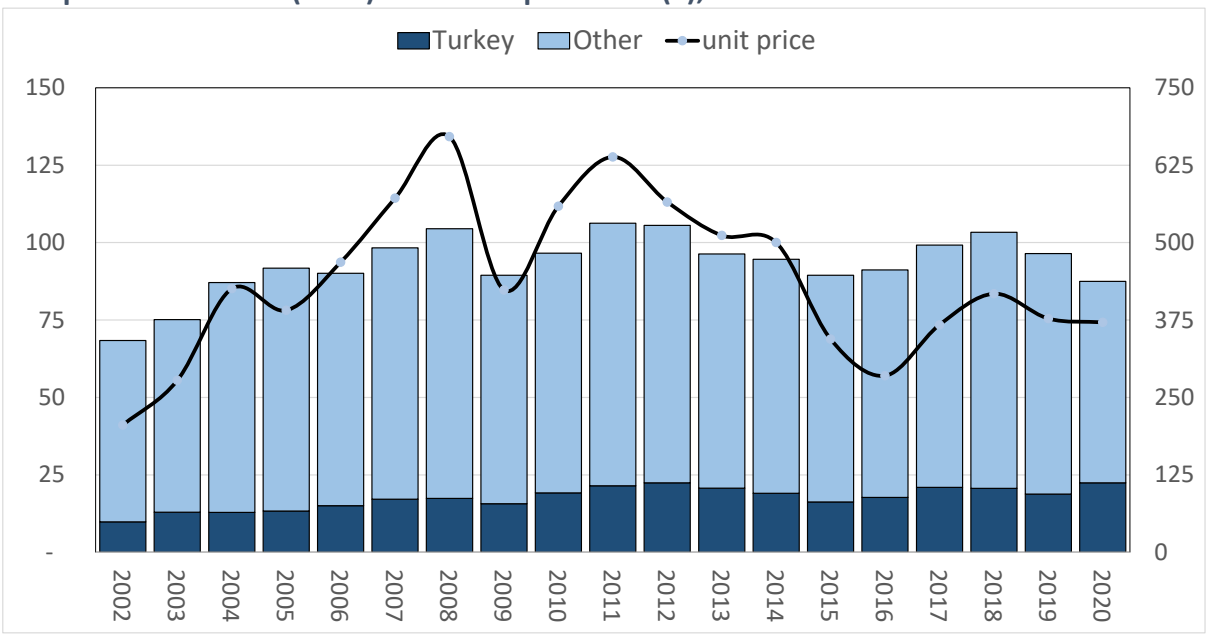
Graph 21. Copper scrap exports by destination and source (percentage of total by country), 2002, 2012, 2019 and 2020



Source: Calculated from ITC. TradeMap. Interactive dataset. Accessed at www.trademap.org in April 2022.

Global steel scrap exports were far more stable than copper over the past two decades, although the unit price was even more volatile. In 2020, global steel imports came to 65 million tonnes, down from 80 million before the pandemic and a peak of 85 million in 2011, at the end of the metals price boom. The average unit import price for steel scrap climbed 50% from 2002 to 2011, but dropped 42% through 2020, before the pandemic surge in metals prices began.

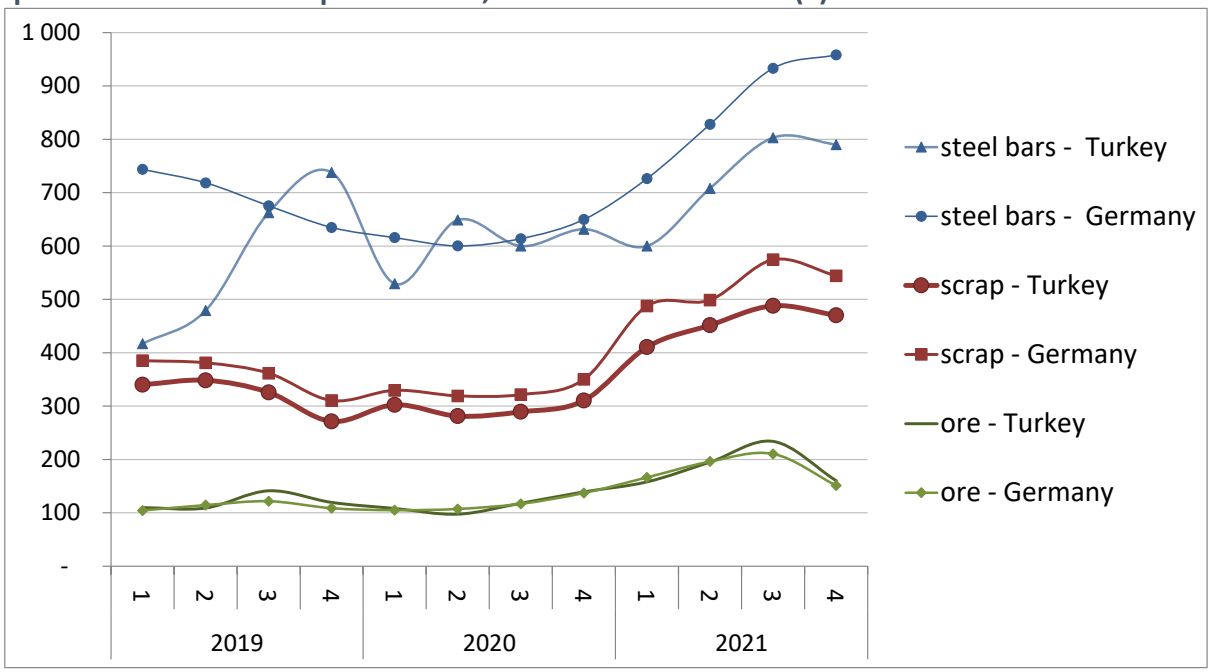
Graph 22. Imports of steel scrap by Turkey and other countries in millions of tonnes, and unit price in constant (2020) US dollars per tonne (a), 2002 to 2020



Note: (a) Reflated with US CPI rebased to 2020. *Source:* Calculated from ITC. TradeMap. Interactive dataset. Accessed at www.trademap.org in April 2022.

Even more than copper, iron ore and steel have seen extraordinary fluctuations in price as a result of the pandemic and the invasion of Ukraine. Scrap prices respond to both downstream and upstream prices, and both steel bars and iron ore saw a sharp increase from mid-2020 before dropping sharply in the fourth quarter of 2021. Data for the first half of 2022 are not yet available, so they do not reflect the impact of the invasion of Ukraine.

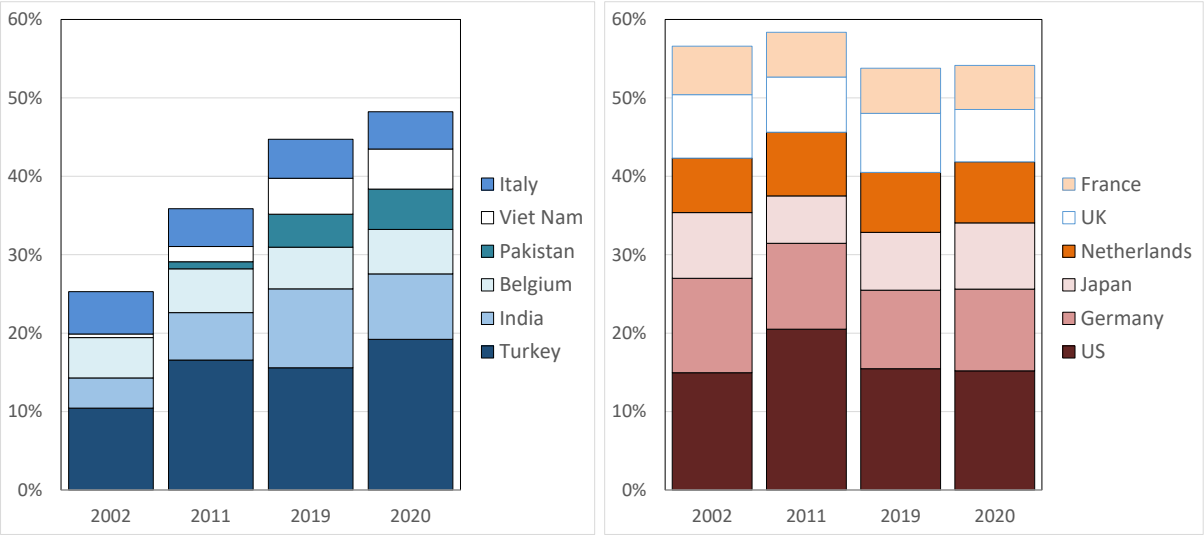
Graph 23. Quarterly Turkish and German unit import prices for steel and steel scrap, first quarter 2019 to fourth quarter 2021, in constant US dollars (a)



Note: (a) Reflated with US CPI rebased to fourth quarter 2021. *Source:* Calculated from ITC. TradeMap. Interactive dataset. Accessed at www.trademap.org in April 2022.

Turkey accounted for over 15% of all imports of steel scrap. It produced only 2% of the world's steel, but 3,5% of steel produced in mini-mills. As a steel scrap importer, India came second, climbing from 4% of total imports in 2002 to 10% in 2019. The top six exporters of steel scrap, generating almost two thirds of total foreign sales, were all highly industrialised economies – the US, Japan, and four European countries.

Graph 24. Steel scrap exports by destination and source (percentage of total by country), 2002, 2012, 2019 and 2020



Source: Calculated from ITC. TradeMap. Interactive dataset. Accessed at www.trademap.org in April 2022.

The price of scrap and the quantity traded internationally have tended to align with the broader metals price cycle, as the trade data for copper and steel scrap above show. In effect, the general increase in metals prices in the 2000s pushed up the price for scrap, then levelled out in the following decade. Metals prices spiked again during the pandemic and, more recently, the invasion of Ukraine, which led to intense speculation in commodity prices. The invasion of Ukraine will probably affect scrap markets primarily through the effects on the steel price. Ukraine and Russia together were significant producers of raw steel, copper and aluminium, but much less important for scrap. In 2020, Ukraine and Russia together accounted for 5% of global crude steel production and 7% of exports. Russia alone contributed 4% of refined copper production and exports, and 6% of global aluminium plus 3% of aluminium exports. (USGS 2020; ITC 2022) In 2020, Russia sold 4% of global steel scrap exports, but neither Russia nor Ukraine were significant exporters of copper or aluminium scrap. (ITC 2022)

The pricing of steel scrap is more complex than for copper because the quality and sources are more diverse. The highest quality comes from manufacturing off cuts, which account for 30% of global scrap steel. (Nichols and Basirat 2021:12) Construction and junked machinery, appliances and cars generate the remainder, and requires far more processing to ensure consistent quality.

Technological shifts linked to the climate crisis seem likely to bring about a more durable increase in demand for all kinds of scrap in the coming decade. Many solutions in the energy transition require more copper and aluminium. In addition, scrap-based mini-mills[13] are set to expand more rapidly as countries seek to reduce emissions from steel production.

For copper and aluminium, the energy transition should bring about a structural increase in global demand because it entails a move from fossil fuels to electricity. Estimates indicate that measures to limit temperature increases to 1,5 degrees Celsius would increase demand for copper from 30 million tonnes in 2020 to between 50 and 70 million tonnes in 2050.

[13] The concept of mini-mills here refers to steel processing using only electric arc furnaces rather than the larger scale and older oxygen blast furnaces that use mostly iron ore and rely on coking coal.

(Gielen 2021:15; see also Hund 2020) Demand for aluminium would increase by over 9%. (Hund 2020:12) The main increases are expected to arise in solar generation – already a major source of demand for copper – as well as electricity transmission and electric vehicles. Estimates suggest that electric vehicles use around three times as much copper as petrol-based cars. (Copper Alliance 2017)

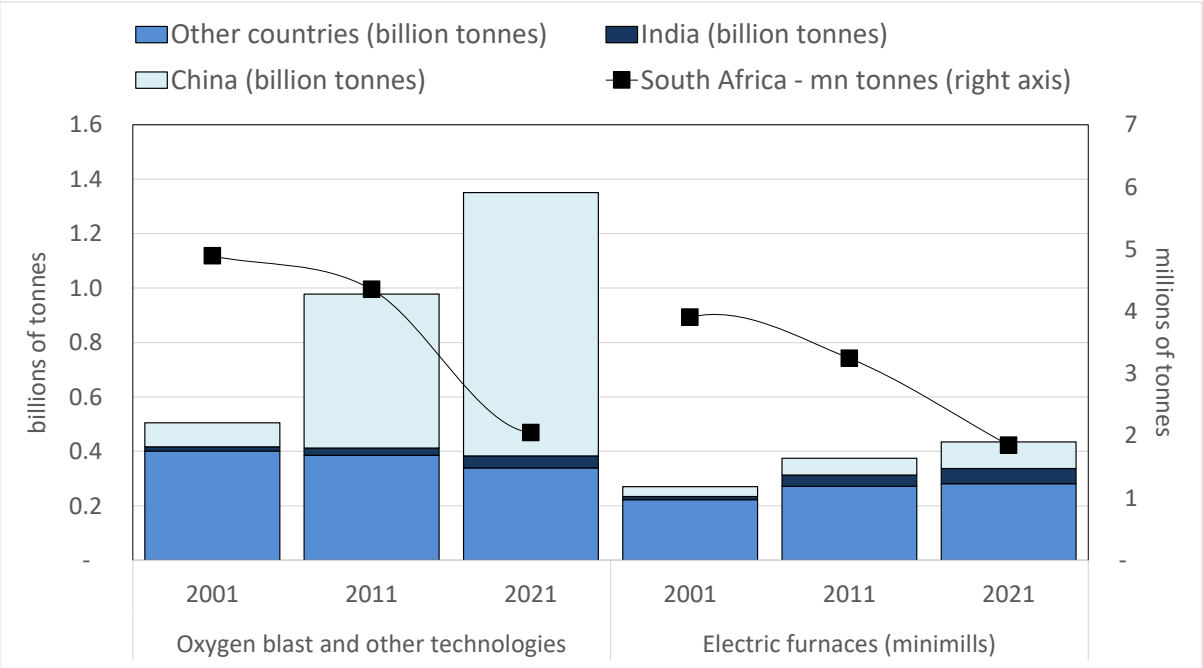
The actual increase in demand for copper and aluminium will depend on technology choices over the coming decades. For instance, wind turbine technologies range from 950 to 5000 tonnes of copper per gigawatt hour. (Gielen 2021:28) Similar differences emerge for batteries.

Increased use of copper and aluminium will in turn boost demand for scrap. Estimates on the share of recycling in worldwide copper and aluminium production in the early 2020s varied between 25% and 40% (Hund 2020:81; Gielen 2021:15) As a rule, when demand for a commodity leads to a structural increase in its price, manufacturers find ways to reduce its use, either through substitutes or by cutting the amount required in their products. These pressures may see greater substitution of aluminium for copper in the coming decade. In addition, recycling can effectively replace raw copper as existing mines run out of high-quality ore grades. It also has lower costs and emissions than producing and shipping raw copper. (See for instance Hund 2020:80; European Environmental Agency 2021)

For steel, the climate crisis is likely to accelerate investment in electric mini-mills that use primarily scrap, although around a third of them (largely in China and India) rely on reduced raw iron instead. The scrap-based steel value chain emits around a seventh as much greenhouse gases per tonne as the larger scale conventional process, which uses oxygen blast furnaces to refine iron ore with coking coal. Furnaces that use green hydrogen would also cut emissions, but the technology is still under development. (Nichols and Basirat 2021:10) As a result, most analysts expect scrap-based production to accelerate in the medium term. Despite some exceptions, the product is usually not as high quality as steel from raw materials, but it is adequate for structural steel products (that is, for long steel rather than flat steel). (Nichols and Basirat 2021:17; Laguna et al:19)

The anticipated expansion in scrap-based production would step up the share of mini-mills in global production. The use of this kind of mill, based on electric arc furnaces, expanded in the 1990s especially in the US and to a lesser extent the EU, but their share in global steel production remained almost unchanged at just under 30% over the past ten years. The average hides divergent trends by region, however. Investment in mini-mills climbed in Europe and most other countries, including South Africa, to an average of 40% (with a dominant 70% position in the US). But China accounted for almost all growth in steel production in the 2000s, and it produces under 10% in mini-mills, as Graph 25 shows. Moreover, around half of the feedstock in Indian and Chinese mini-mills is primary iron, not scrap. (Hasanbeigi 2022:20) Estimates suggest that just under a quarter of global steel production derives from scrap. (Laguna *et al.* 2022:27)

Graph 25. Production of steel by technology type (electric arc furnaces or oxygen blast) for China, India, South Africa and other countries, 2001, 2011 and 2021, by weight



Source: Calculated from World Steel Association. *World Steel in Figures* for 2001, 2011 and 2021. Accessed at https://worldsteel.org/steel-by-topic/statistics/world-steel-in-figures/ in April 2022.

The use of iron ore in mini-mills in China and India results, in part, from their limited production of quality steel scrap. Africa and India generate less than a tenth as much scrap per person as the global North. (Nichols and Basirat 2021:17) In part, that reflects lower levels of industrialisation and household consumption. In addition, in some countries, including India, scrap dealers do not have capacity to process waste metal into standardised, quality inputs (see section 8.4 below). That in turn has fostered Indian demand for South African steel scrap.

In South Africa, mini-mills now account for over 40% of steel production. AMSA produces the rest, with iron ore from Kumba. Columbus Steel, the main local producer of steel alloys, employs a 100-ton electric arc furnace, with 80% of production based on scrap. Scaw Metals uses an electric arc furnace to process approximately half a million tons of liquid steel each year from both recycled steel and directly reduced iron. Cisco processes around 280 000 tonnes of scrap a year. Large formal metals recyclers such as the South African Metal Group also produce steel from scrap. The Industrial Development Corporation has played a central role in funding new mini-mills, both to replace imports and to support black industrialists. (Castings SA 2021:2)

While investment in mini-mills is expected to increase, they struggle to meet demand for quality flat steel, which is a significant part of the market in South Africa. (Castings SA 2021:5) In addition, AMSA argues that its electric furnaces are hindered by a shortage of scrap steel as well as unreliable and increasingly expensive electricity. (AMSA, 2019). It planned to place its electric mill in Vereeniging under care and maintenance at the end of December 2020, but instead increased production there as local and regional demand for structural steel products, mostly for construction, increased in 2021 with the recovery from the pandemic downturn. (Eurometal 2021).

In sum, over the coming decade both global and domestic demand for quality scrap are likely to rise. Absent effective policy interventions, that will effectively enhance the rewards for criminal syndicates that steal South African infrastructure. In the case of steel, it could also deprive emerging local steel mini-mills of critical inputs. The impact is likely to be particularly strong in South Africa because the domestic metals industry generates a high quality, standardised product by international standards.

8 INTERNATIONAL EXPERIENCES

This section first looks at international trade rules on restricting scrap exports, with an overview of the use of this kind of intervention in other countries. It then considers experiences in Kenya, India and the EU in more detail. These three very different case studies illustrate the divergence in international responses to changing pressures in the international trade in scrap.

8.1 The legal framework

Under the rules of the World Trade Organisation (WTO), states have more latitude to restrict exports than imports. As with all trade regulations, there is more scope to impose limits for security and to a lesser extent environmental reasons than to advantage local producers. In practice, however, fewer than a dozen countries have sought to ban scrap exports, while less than 25 adopted other restrictions. Scrap exports did not decline by much, or even increased, after most of the countries introduced restrictions. South Africa stands out for its success in limiting legal exports, although the available evidence suggests that scrap continues to flow out of the country, mostly labelled as raw copper.

The WTO carve-out for trade restrictions in the name of national security is quite broad. It provides that members may take action to protect their "essential security interests." (Article XXII of GATT 1994) The question becomes whether theft by armed syndicates constitutes a threat to national security. In the past two years, reports of attacks on armed guards at infrastructure installations, especially municipal substations, has increased and even led to deaths. (See TIPS 2022) In addition, South Africa's history of state capture arguably elevates security concerns about criminal syndicates of all kinds. Interruptions to basic services, including infrastructure and water, can also undermine national security by fuelling protest action.

From an environmental perspective, the use of scrap to produce basic metals and metal products reduces demand for energy, and in the case of steel specifically for coal. That in turn cuts greenhouse gas emissions, although success depends in part on the nature of the electricity system. In South Africa, the use of coal-fuelled electricity blunts the effect. As discussed below, the EU has justified proposed restrictions on waste exports primarily on environmental grounds, including to promote a shift to scrap-based steel production.

Specific regulations would have to be tested by legal experts. Affected scrap traders or importers can challenge restrictions in the South African courts or in WTO tribunals. In terms of South African law, the regulation has to be demonstrably proportionate to the desired aims as well as adhering to legally required procedures. Critically, the costs to scrap exporters should be demonstrably less than the benefits to the economy and society as a whole. For international arbitration – a very slow process – the government would have to show that restrictions flow from genuine national security or environmental concerns, or that they respond to temporary market conditions. That is, it has to be able to show that environmental

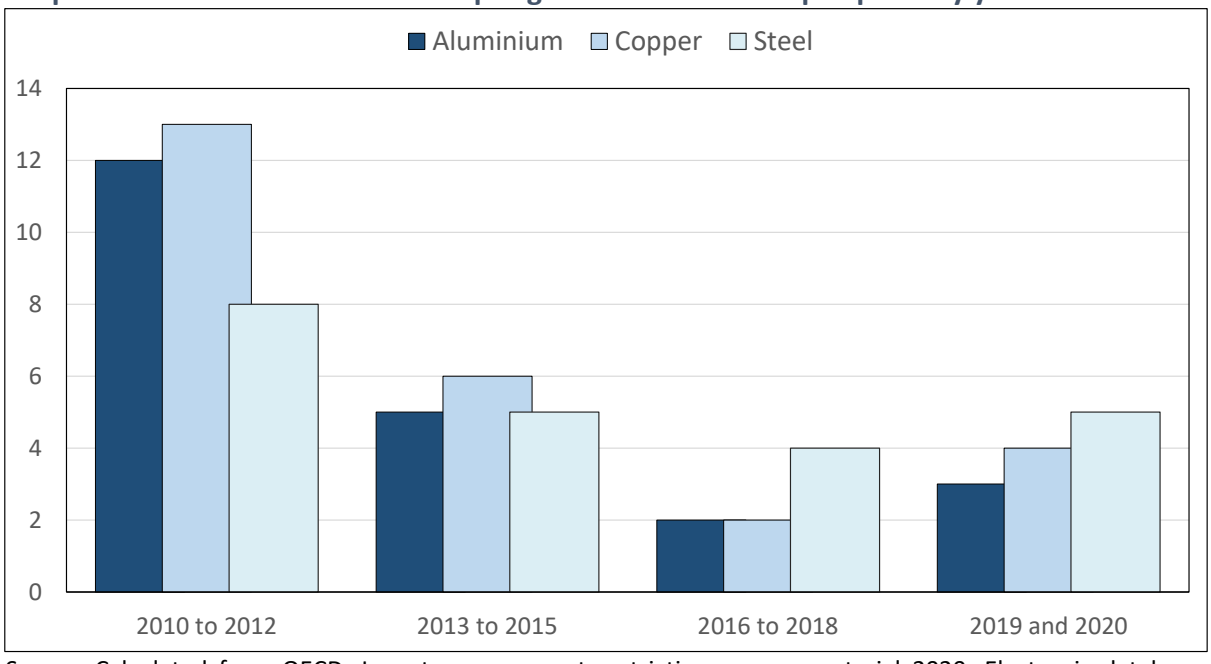
and security concerns are not a cloak for efforts to provide sustained protection to local metals refineries at the cost of foreign competitors.

8.2 Experiences with restrictions on exports

Over the past decade, a relatively small number of countries in the global South – a total of 26 as of 2020 - restricted exports of scrap metal. Taken together, the countries involved account for under 6% of global scrap exports. Just over half of the group saw a decline in their scrap exports from 2010 to 2020, with South Africa accounting for most of the decline after it adopted the Price Preference System (PPS).

According to a database maintained by the Organisation for Economic Cooperation and Development (OECD), nine countries had formally banned copper scrap exports by 2020. Seventeen had instituted quotas or licencing requirements, including South Africa's PPS; 13 imposed taxes; and five introduced other measures. The restrictions generally covered ferrous and aluminium scrap as well. Well over half of the countries involved acted in the early 2010s as soaring international metals prices brought higher scrap exports. A third of all the countries were in Africa, and the only high-income economies were petrostates (Saudi Arabia and the UAE).

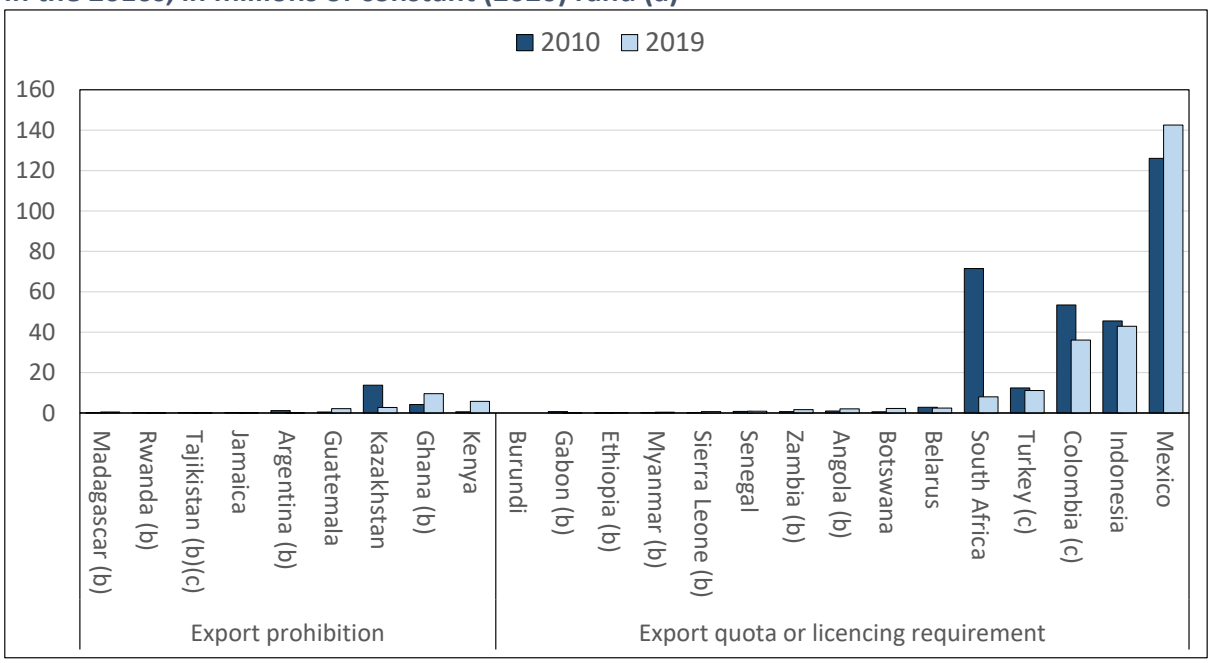
Graph 26. Number of countries adopting restrictions on scrap exports by year



Source: Calculated from OECD. Inventory on export restriction on raw material 2020. Electronic database. Downloaded from https://qdd.oecd.org/ in March 2022.

For copper alone, 24 countries, including South Africa, imposed a ban, quota or licencing for copper scrap exports in the ten years to 2020. As a group, they supplied 5% of global copper scrap exports, but the bulk came from South Africa and four other countries (Graph 16). Of the 20 countries that adopted restrictions before 2019, only eight saw a fall in copper exports by volume, with South Africa accounting for most of the decline. Four more countries introduced restrictions in 2019 and 2020. Of these, Turkey saw a sharp fall in copper scrap export but Tajikistan's climbed. Data were not available for Gabon and Colombia.

Graph 27. Exports of copper scrap in 2010 and 2019 by countries that introduced restrictions in the 2010s, in millions of constant (2020) rand (a)

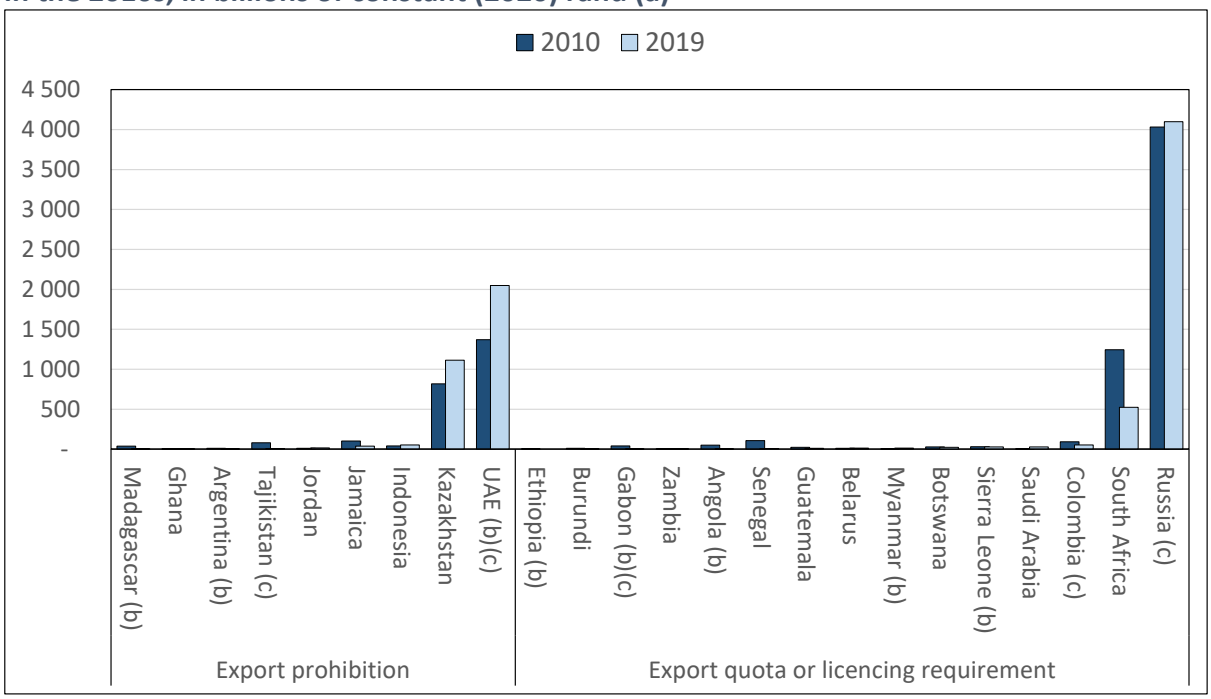


Notes: (a) Reflated with CPI rebased to 2020. (b) Mirror data used as country data not available. (c) Measure adopted in 2019 or 2020, so trends do not show impact. *Source:* Calculated from ITC. TradeMap. Interactive dataset. Accessed at www.trademap.org in April 2022.

A similar pattern emerged for steel, as Graph 17 shows. Nineteen countries adopted restrictions before 2019, and five after that. Together, they provided 8% of global steel scrap exports. Of the countries that introduced the measures before 2019, 11 saw a fall in exports. As with copper, the fall was steepest for South Africa. Of the five countries that adopted bans in 2019 and 2020, the UAE saw a decline from two million tonnes in 2019 to only 10 000 in 2021.[14] Scrap steel exports from Gabon fell from 1600 tonnes to 300, but increased for Russia and Tajikistan. Data were not available for Colombia.

[14] The data are from the UAE's trading partners published at TradeMap, an interactive data set published by the ITC at www.trademap.org. The UAE's own export data are only available through 2020.

Graph 28. Exports of steel scrap in 2010 and 2019 by countries that introduced restrictions in the 2010s, in billions of constant (2020) rand (a)



Notes: (a) Reflated with CPI rebased to 2020. (b) Mirror data used as country data not available. (c) Measure adopted in 2019 or 2020, so trends do not show impact. *Source:* Calculated from ITC. TradeMap. Interactive dataset. Accessed at www.trademap.org in April 2022.

The available information shows that few countries have adopted quantitative restrictions. In this group, most have seen very little visible decrease in scrap exports. South Africa has been far more successful than most others in this regard.

8.3 Case studies

This section explores how national policies on scrap metal in Kenya, India and the European Union respond to shifts in domestic scrap demand and supply, on the one hand, and policy goals and the local political economy of regulation, on the other. The review of Kenya's experience provides a more nuanced understanding of the technical and political obstacles facing quantitative bans. The experiences of two major steel producers – India and the European Union – point to structural factors that are likely to bolster international trade in scrap in the coming decade.

8.3.1 Kenya: The practicalities of restricting the scrap metal industry

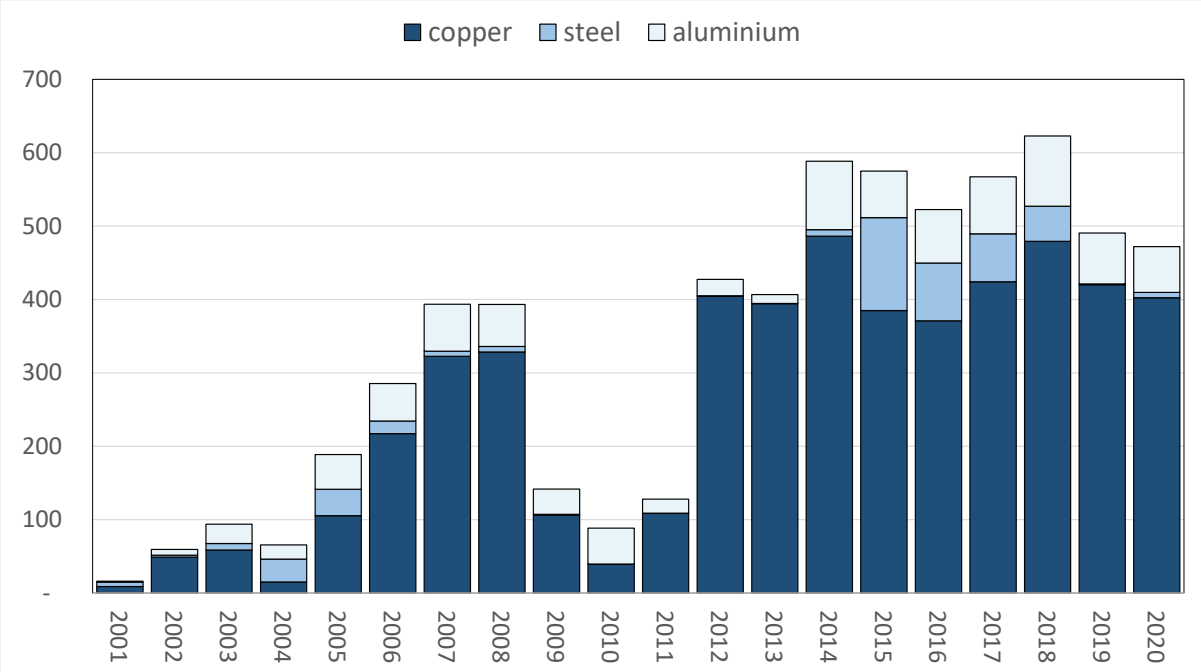
Kenya banned scrap exports in 2010, together with the rest of the East African Community (Tanzania and Uganda). In January 2022, it outlawed the entire domestic scrap trade, with plans to re-open it in the future following implementation of stricter regulations on dealers. As in South Africa, the 2010 export ban aimed mostly to reduce the cost of inputs for the local steel industry, while the 2022 moratorium targeted infrastructure theft.

Implementation of both measures was inconsistent. After the ban in 2010, scrap exports initially declined, but they more than recovered after 2015. It was harder to evaluate the impact of the 2022 prohibition on domestic scrap dealing. As of mid-April, the future of the measure remained uncertain as government struggled to fast-track regulation of the industry in response to intense lobbying and protests from scrap metal traders.

8.3.1.1 The 2010 export "ban"

The 2010 restrictions on scrap metals exports relied on the East African Community Customs Management Act of 2004, which enables the Community to "provide that the exportation of any goods or class of goods is prohibited, either generally or in relation to a partner state." Although widely reported as a ban, in practice the measure was more like South Africa's PPS. It enabled the Kenyan government to licence the foreign sale of scrap where there was no domestic demand. As Graph 29 shows, reported exports of scrap metal plummeted from almost 20 000 tonnes in 2005 to around 2 500 in 2010. In 2015, a new Scrap Metals Act re-iterated the licencing procedures, and exports soon climbed to 25 000 tonnes.

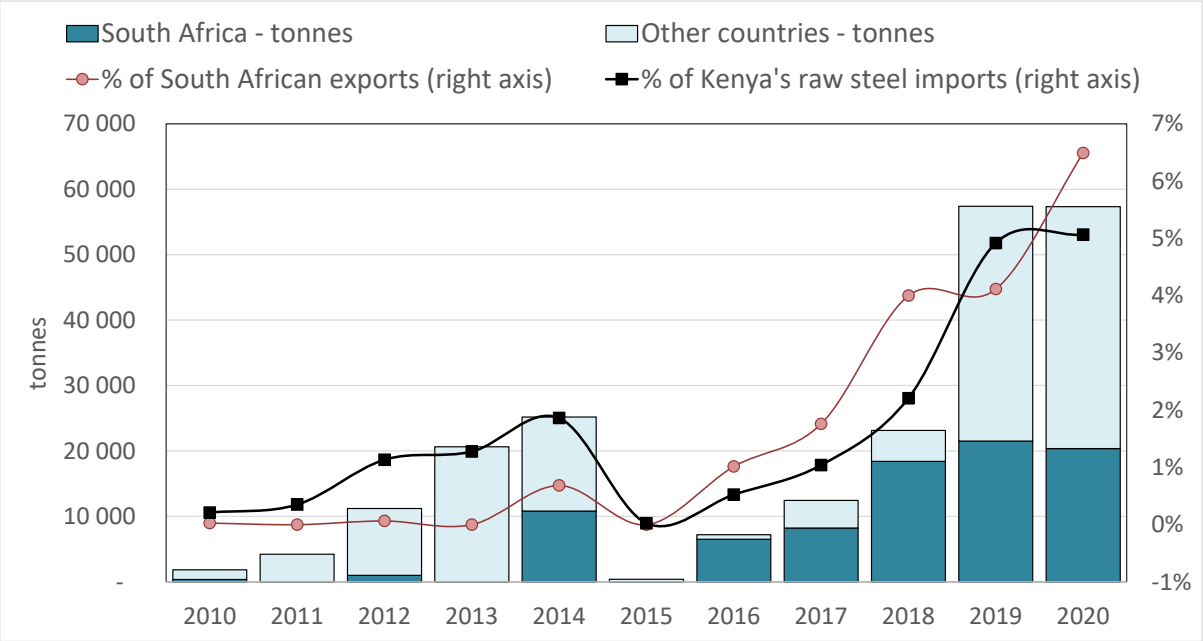
Graph 29. Kenyan exports of scrap metal in millions of constant (2020) rand (a), 2001 to 2020



Notes: (a) Reflated with CPI rebased to 2020. *Source:* Calculated from ITC. TradeMap. Interactive dataset. Accessed at www.trademap.org in April 2022.

Kenya has limited iron ore deposits and no mines. As a result, it depends mostly on imported raw steel plus local scrap production to produce hardware, structural steel products and rods, amongst others. (Ministry of Industrialisation 2022) From 2016 to 2020, the OECD estimated Kenya's steel capacity was flat at 600 000 tonnes a year (compared to 12 million in South Africa and a total of 2,5 billion tonnes globally). (OECD 2021:44) The quality of local scrap is poor, so the steel mills prefer to procure new steel and scrap from abroad. As Graph 30 shows, imports of scrap – largely from South Africa - have risen rapidly in recent years. That depressed the price of local scrap, but reportedly theft of steel and copper infrastructure remained high (Kahongeh 2022).

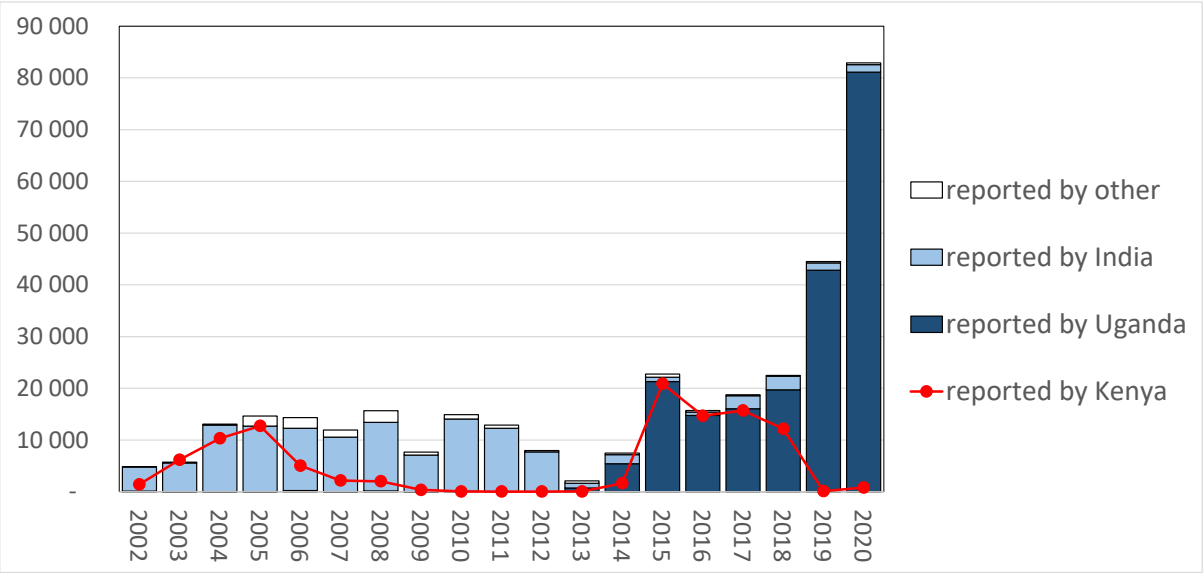
Graph 30. Kenyan imports of steel scrap from South Africa and other countries, in tonnes and as percentage of South African steel scrap exports and Kenya's raw steel imports, 2010 to 2020



Notes: (a) Reflated with CPI rebased to 2020. *Source:* Calculated from ITC. TradeMap. Interactive dataset. Accessed at www.trademap.org in April 2022.

In value terms, according to Kenyan customs data, copper accounted for over three quarters of scrap exports from 2015 to 2020, although it was only a quarter of the total by volume. The official figures may understate steel scrap exports, however. Uganda reported much higher imports of scrap steel from Kenya than appeared in the national data in 2019 and 2020 (Graph 31). Kenyan and Ugandan data agree that the surge in exports after 2015 shifted from India to Uganda. Like Kenya, Uganda does not have ore mines and therefore relies on imported raw and scrap steel for its mills. The OECD found that it had capacity for 100 000 tonnes of steel from 2016 to 2020 (OECD 2021:44) although the Uganda National Planning Authority said it produced just over 500 000 tonnes of steel a year in 2018. (NPA 2018:4)

Graph 31. Kenyan exports of steel scrap in tonnes as reported by national data and by other countries, 2002 to 2020



Source: Calculated from ITC. TradeMap. Interactive dataset. Accessed at www.trademap.org in April 2022.

In short, although it remains on the books, in practice Kenya's putative 2010 ban on scrap metals exports was short-lived. The main reason was that the country's relatively small steel industry preferred imported raw steel and scrap over the poor quality local product. As a result, by 2015 scrap exports exceeded 2010 levels.

8.3.2 The 2022 moratorium on domestic scrap dealing

In January 2022, Kenya shut down the domestic scrap trade in an effort to disincentivise theft from infrastructure. As in South Africa, reports of high levels of theft date back to the commodity boom just over ten years ago. In 2020, Kenya Power indicated that it lost over R805 million[15] in the past decade to vandalism and theft, while Telkom Kenya said the theft of copper wire cost over R250 million annually to repair (Nation 2020) In 2022, some 10% of road maintenance spending went to replace stolen road fixtures such as streetlights. (Kahongeh 2022)

The 2015 Scrap Metal Act aimed to regulate dealers in order to deter theft, in a strategy very similar to amendments to South Africa's Second Hand Goods Act enacted in 2009. The Kenyan Act bans dealing except by people who are licenced and belong to the Scrap Metal Dealers Association. It sanctions dealers who hold scrap of unknown origin, effectively making the dealer prove the scrap was not stolen. The penalties range up to R2,7 million in fines and seven years in jail. The Act provided for a Scrap Metal Council combining government officials, dealers and fabricators to advise on measures and to register dealers.

In practice, the government effectively shelved the 2015 Act until 2022. It only appointed a chair for Scrap Metals Council in 2018. As of 2022, of the estimated almost 4 000 scrap dealers only 20 were registered, with another 91 on a waiting list. (Achuka 2022; Otiano 2022)

In the meanwhile, accelerating vandalism and theft from national infrastructure were increasingly blamed for blackouts and worsening roads. In response, in January 2022 the President of Kenya banned the domestic scrap metal trade entirely. The government then

[15] Exchange rate: 1 KES = 0.134448 ZAR as of 08/03/2022

fast-tracked efforts to finalise regulations under the Scrap Metals Act, promising to lift the ban when the Scrap Metals Council had registered dealers. (Business Daily, 2022). It established a new Scrap Metals Council and set substantial fees for registration, ranging from R30 000 a year for dealers, millers and smelters to R18 000 for agents and R6 000 for collectors. (Otiano 2022) For comparison, Kenya's GDP per capita in 2020 was around R27 000. As of mid-April, however, the regulations had not been finalised, so re-registration had yet to begin. (Were 2022)

As in South Africa, restrictions on the metal scrap trade were applauded by formal manufacturers but protested by scrap dealers and some small processors. The metals producers in the Kenya Association of Manufacturers, who represent 60% of local steel fabricators, argued that the ban protected critical economic infrastructure. (Ploumis 2022) Because the larger steel fabricators mostly relied on imported new and scrap steel, they were not concerned about the disruption to local scrap sales. In contrast, the scrap dealers objected strenuously that the ban had cut off their incomes. They lobbied, intervened in parliament, mounted legal challenges and, in mid-April, held a protest outside the Department of Trade and Industry. (Were 2022)

As in South Africa, to bolster their case against restrictions some dealers vastly exaggerated the number of waste pickers. The chair of one dealers' association claimed that metal recycling employed three million people, with two million dealers. (Omulo 2022) That would mean metals recycling alone employed almost one out of five workers in the country.

Ultimately, the prohibition of scrap metal trading in Kenya resulted from the failure to implement more consistent and rigorous regulation before 2022, even though government adopted a legal framework seven years earlier. The overall impacts of the prohibition remain unclear. Most countries only publish trade data with a few months lag, at least, and like South Africa, Kenya does not report regularly on infrastructure theft. There is no reliable data on dealers' turnover and employment, which makes it hard to evaluate the actual economic impacts while opening the door to exaggerated estimates by lobbyists.

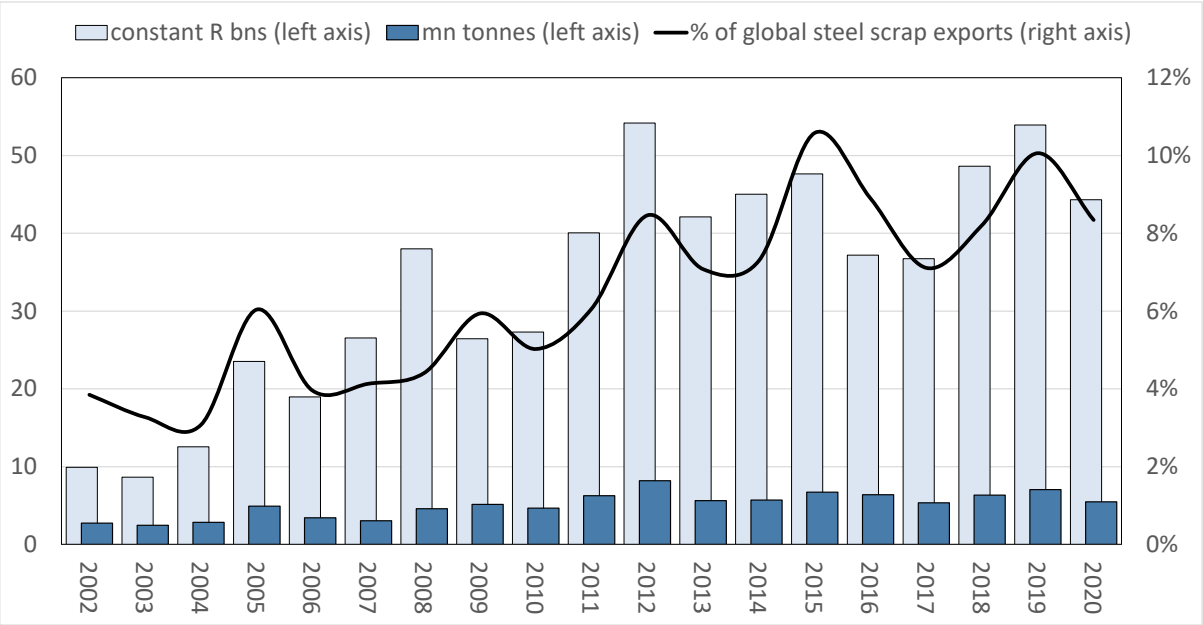
8.4 India: Managing scrap steel for local industry

8.4.1 Demand for steel scrap

India is the second largest importer of steel scrap, but a negligible market for copper and aluminium. In crude steel production is ranks after China, with capacity of approximately 100 million tonnes a year, up from 70 million tonnes in 2010. In 2019, India's primary and secondary steel producers used approximately 32 million tonnes of ferrous scrap, with demand expected to double by 2030. The government sees steel as an important part of India's industrial policy, and aims to maintain a sufficient supply of affordable, quality scrap. (See Ministry of Steel 2017)

In volume terms, India's imports of crude steel almost tripled in the 2010s, but they flattened out after the international commodity boom ended in 2011.

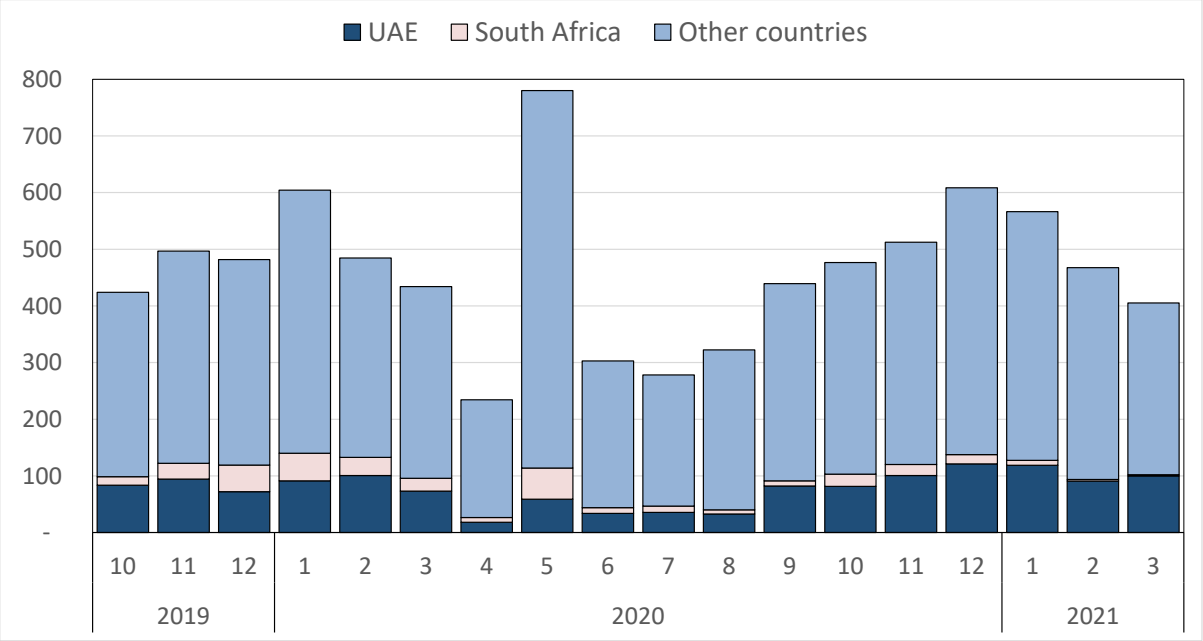
Graph 32. India's imports of steel scrap in millions of tonnes and constant rand, and as a percentage of global scrap imports, 2002 to 2020



Source: Calculated from ITC. Trade Map. Interactive database. Downloaded www.trademap.org in April 2022.

India's scrap steel imports fell sharply in mid-2020 but then recovered. The decline was largely due to the disruption from the pandemic. It was aggravated by stronger enforcement of restrictions on exports from several major suppliers, including South Africa but mostly the UAE. (Graph 33) The decline in imports from 2019 was associated with higher scrap demand and prices as the Indian steel industry recovered from the pandemic downturn at home and abroad (Fastmarket MB 2022).

Graph 33. Monthly Indian imports of steel scrap in thousands of tonnes from South Africa, the UAE and other countries, September 2019 to March 2021

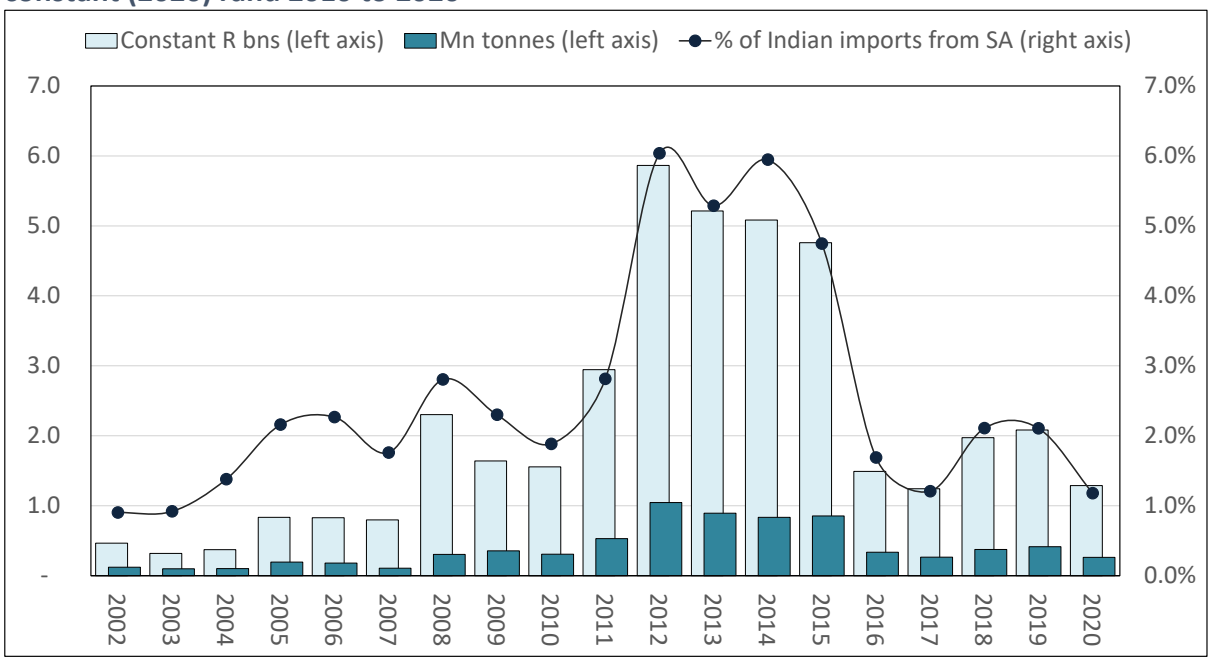


Source: Calculated from ITC. Trade Map. Interactive database. Downloaded www.trademap.org in April 2022.

South Africa was an important source of metal scrap for India. Its share in Indian scrap imports climbed from 4% of the total in 2002 to a high of 15% in 2014, then fell to 5% in 2016 and

flattened out. In the mid-2010s it was briefly India's top scrap supplier, but fell to fifth place in the late 2010s. Scrap dropped to 1% of Indian imports from South Africa in 2020, down from a high of 6% in 2012. South Africa's top exports to India (according to Indian data) were precious stones and metals plus coal.

Graph 34. Indian steel scrap imports from South Africa in thousand tonnes and millions of constant (2020) rand 2010 to 2020



Source: Calculated from ITC. Trade Map. Interactive database. Downloaded www.trademap.org in April 2022.

8.4.2 India's scrap-metal policies

The Indian government has focused on expanding the domestic scrap industry to replace imports without increasing the price or reducing quality. Low levels of industrialisation and household incomes mean the country generates relatively little scrap per person, estimated at around a tenth the level of the EU. In addition, local scrap dealers face myriad challenges, including lack of standardisation, reliance on informal recyclers, and inadequate processing skills. In contrast, South Africa exports comparatively high quality scrap to India. (Fastmarket MB 2020) In 2020, India initiated a Steel Scrap Recycling Policy that foresees the establishment of 70 scrap processing centres to expand collection and improve processing. The processing centres will require an estimated 300 collection and dismantling centres (Ministry of Steel, 2020).

India has an import duty of 2,5% on most scrap, with a 5% charge for copper. In February 2021, however, it eliminated import duties on ferrous scrap and cut copper import duties to 2,5% in an effort to stimulate downstream growth. The new rates will remain in place until March 2022. (Recycling International, 2021).

India has not banned scrap metal exports, which remain small, but in 2010 it imposed a 15% tax on them. The government imposed the tax under the Customs Act of 1962, which gives the authority to the government to impose export or import duties. The government did not specify its rationale. India has also periodically subjected scrap to a 20% congestion charge, as part of measures to reduce freight traffic in order to free up ports and rail where required. The congestion charge mainly affects traffic to Bangladesh and Pakistan, although exports of scrap to these countries remains small. The congestion charge is imposed under the Railways

Act of 1989, which states that "the central government may, from time to time, by general or special order fix, for the carriage of passengers and goods, rates for the whole or any part of the railway and different rates may be fixed for different classes of goods and specify in such order the conditions subject to such rates shall apply" (Railways Act, 1989).

The available data suggest that the export tax has not significantly affected the structure of steel production. The share of mini-mills in steel production has remained essentially unchanged at around 60% since 2010.

8.5 The European Union

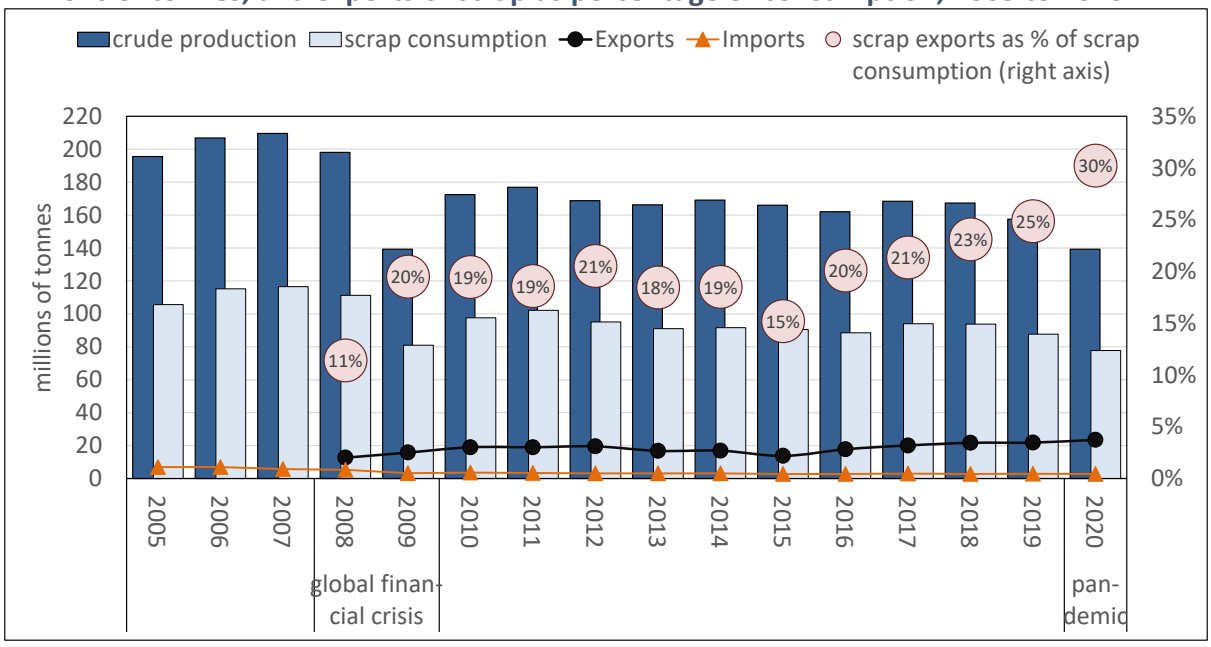
The EU's experience illustrates the rapid changes in the international steel scrap market and policies toward it. Through the 2010s, EU scrap consumption fell, tracking its shrinking crude steel production, while its scrap exports climbed. In 2021, however, the European Commission published strategies to promote domestic collection and use of scrap steel and to restrict exports, complemented by efforts to limit imports of more emissions-intensive raw steel.

8.5.1 Scrap production and use in the EU

Following the global financial crisis, European steel production feel sharply. For the following decade, it remained around 10% lower than pre-crisis levels, and then dropped further in the pandemic. Use of steel scrap followed this trend, since the EU's consumption of steel scrap, by weight, was stable at 55% of crude steel production.

From 2005 to 2019, EU steel production shrank by 19% in volume terms and its scrap consumption dropped 17%. Its exports of steel scrap climbed 38% from 2010 to 2019. The pandemic cut production of crude steel and consumption of steel scrap by over 10% from 2019 to 2020, while exports rose a further 8%. As a result of these trends, EU exports of steel scrap as a percentage of its consumption rose from just under 20% in 2010 to 24% in 2020. By volume, steel scrap accounts for around half of all EU exports of waste.

Graph 35. Production of crude steel and steel scrap consumption, exports and imports in millions of tonnes, and exports of scrap as percentage of consumption, 2005 to 2020

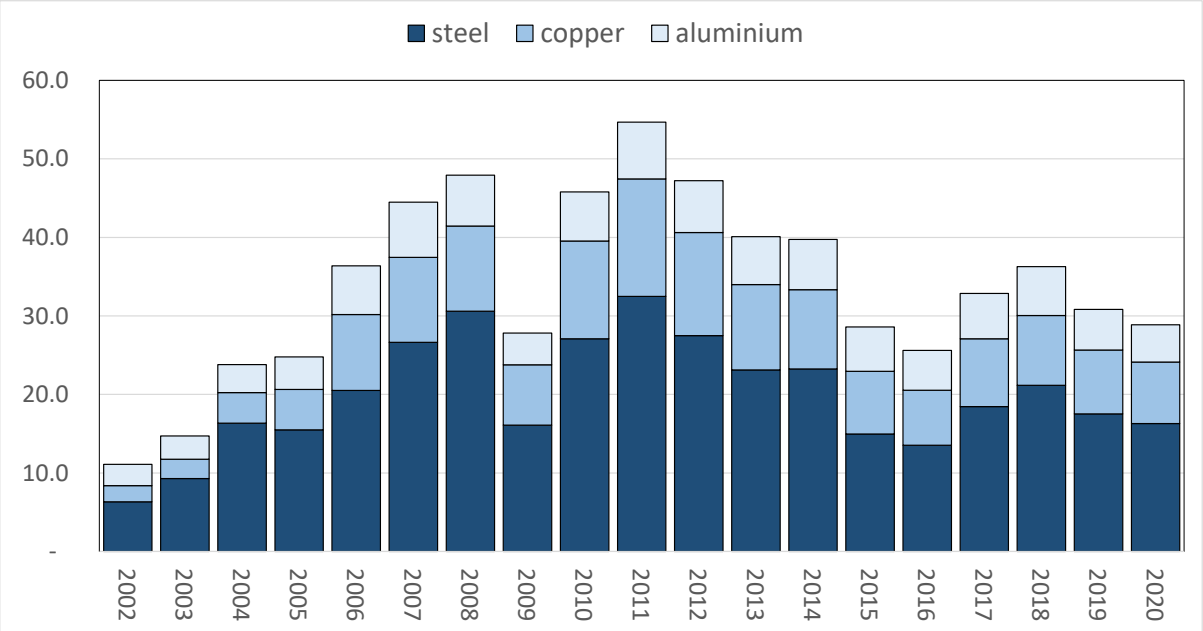


Source: Calculated from Eurofer. *European Steel in Figures.* 2009, 2011, 2016 and 2021. Accessed at www.eurofer.eu in April 2022.

Through the 2010s, the EU was a dominant exporter of bulk metals, both raw and scrap. Including internal trade, it accounted for between a third and half of all basic metal exports internationally. Excluding trade within the EU, it contributed around a fifth of all metals exports. Still, its total scrap exports, including those within the bloc, contributed only around 0,5% of its total trade. That was around the same percentage as South Africa.

As the following graph shows, steel dominates the EU's scrap exports, followed by copper. Their value climbed during the global commodity boom as prices soared, but fell when the boom ended in 2011. In contrast, exports in tonnes were fairly stable through the 2010s.

Graph 36. EU exports of metal scrap in constant (2020) US dollars (a), including trade within the EU



Note: (a) Deflated with US CPI rebased to 2020. *Source:* Calculated from ITC. TradeMap. Interactive dataset. Accessed at www.trademap.org in April 2022.

In terms of steel scrap, the EU accounts for around 50% of global exports if trade within the bloc is included, and 30% if only exports outside of the bloc are counted (up from 20% in 2005). That was higher than the EU's share of 17% in all exports internationally, excluding trade within the bloc. Sales to non-members climbed from 60% of all EU steel scrap sales in 2005 to 70% in 2020. Germany, the Netherlands, the UK, France and Belgium accounted for two thirds of total steel scrap exports by EU countries in 2019.

In contrast to steel, the EU's share in global copper scrap exports fell from 2005 to 2020. It dropped from 25% to 20% if sales within the bloc are excluded, and from 48% to 44% if they are included. Around 70% of copper scrap exports by EU countries went to other EU members. For aluminium scrap, the EU's share in exports excluding intra-European trade shrank from 20% in 2005 to 18% in 2020. It fell from 49% to 44% of total aluminium scrap exports if trade within the bloc is included.

8.5.2 The EU strategy on scrap

Over the past few years, the European Commission has published strategies on recycling, including around scrap, as well as measures to limit imports of high-emissions products, which

include raw steel. These strategies do not explicitly mention concerns around infrastructure theft. Instead, they cite a number of motivations. To start with, they seek to reduce emissions by recycling – a pillar of the European Green Deal adopted in 2020, which aims amongst others to cut net emissions in 2030 by at least 50% compared to 1990. They also reflect concerns that Europe is dumping waste in poorer countries that cannot dispose of it properly. The EU estimates that companies mislabel up to a third of waste exports in an effort to avoid regulations on waste disposal. Finally, as in South Africa, the steel industry has lobbied to curtail scrap exports in order to reduce domestic prices. (European Commission 2021b)

Measures on recycling metals in the EU initially focused heavily on steel, with the aim of moving to scrap-based production in order to reduce emissions. The availability of quality scrap steel is a challenge to increasing recycled steel content in the EU (European Commission 2021a) The steel industry has proposed that the EU adopt measures and incentives to keep ferrous scrap in the EU for subsequent treatment and quality improvement (Ling 2021).

More recently, work on the circular economy strategy has expanded to other metals, especially because of their importance for renewable technologies. These materials include copper and aluminium, as well as some relatively low-volume metals like lithium and beryllium.

In this context, the EU's 2021 circular economy strategy proposal looks to restrict scrap exports to countries outside of the EU. The central recommendation is a requirement that the EU hold waste exporters and importers to stricter standards around safe disposal. A proposed new Waste Shipment Regulation will impose stronger administrative and criminal penalties to prevent exporters from avoiding standards by mislabelling waste as second hand goods. They will also establish a "waste shipment enforcement group" combining police, customs, environmental and other inspection authorities across EU countries. At the same time, the EU strategy aims to promote trade in scrap within the EU by digitalising transactions and improving information flows. In addition, it includes measures to make it easier to recycle metals, including standardising technologies to facilitate the clean separation of metal inputs from obsolete equipment. It proposes the development of specific regulations to govern the disposal of machinery, cars and batteries.

The circular economy strategy remains at a high level, but it includes an action plan with timelines for finalising. As of early 2022, the strategy was under review by the European Parliament and Council, with finalisation expected for the end of the year.

In addition to measures on waste, in March 2022 the European Council provided in-principle approval for the Carbon Border Adjustment Mechanism (CBAM) regulation. The regulations will subject imports to the EU to a tax on embedded emissions equal to the carbon price generated by the EU Emissions Trading Scheme (European Commission 2021a). It will come into effect in January 2023 and apply to direct emissions from aluminium, cement, electricity generation, iron and steel and fertilisers.

The CBAM will start with a transitional period from 2023 to 2026. In this period, exporters will be required to report emissions to the relevant CBAM authorities, which means they will have to establish systems to measure them. They will not, however, be subjected to levies on their emissions. From 2026, however, importers will have to pay for each tonne of carbon dioxide emissions embedded in goods at a rate linked to the average price of carbon permits under the EU's emissions trading systems. (See TIPS *et al.* 2021) The system will make South African exports of raw steel less competitive but have little impact on steel scrap exports.

9 SUMMARY AND CONCLUSIONS

The global energy transition in response to the climate crisis is likely to increase global demand for scrap because energy systems will require more copper and steel production will shift to mini-mills. South African scrap will see rising international demand because of its relatively high quality and standardisation. The risk is that these pressures increase global scrap prices at the cost of local metals refineries and infrastructure. Higher incentives for theft from infrastructure could contribute to the growth in organised crime and worsening basic services. Greater scrap exports could undercut South African metals producers' ability to build more climate friendly and less energy-intensive metals industries.

Over the past 15 years, fewer than a dozen countries have restricted scrap exports, although international trade rules make it easier to limit exports than imports. Of these, the available evidence suggests that South Africa was more successful than most countries in limiting legal exports of scrap. Still, international as well as domestic experience points to the critical importance of stricter regulation of the domestic scrap trade and processing in addition to measures to limit cross-border transactions.

REFERENCES

Achuka, V. 2022. "State crafts tough new rules to control scrap metal trade", in *Nation.* 16 March. Accessed at https://nation.africa/kenya/news/tough-new-rules-for-return-of-scrap-metal-trade-3750678 in April 2022.

AMSA, 2019. *Pollution Prevention Plan for ArcelorMittal South Africa Limited.* Accessed at https://cer.org.za/wp-content/uploads/2019/12/Arcelormittal-PPP-May-2019.pdf in February 2022.

Castings SA. 2021. *South African steel industry is embracing mini mills.* Accessed at https://castingssa.com/south-african-steel-industry-is-embracing-mini-mills/ in April 2022.

Copper Alliance. 2017. *The Electric Vehicle Market and Copper Demand.* Research conducted by IDTEchEx. June. Accessed at https://copperalliance.org/wp-content/uploads/2017/06/2017.06-E-Mobility-Factsheet-1.pdf in April 2022.

Eurometal, 2021. "ArcelorMittal South Africa ramp up EAF on demand surge" in Eurometal. Accessed at https://eurometal.net/arcelormittal-south-africa-ramp-up-eaf-on-demand-surge/ in February 2022.

European Commission. 2021a. *Toward Competitive and Green European Steel.* Commission Staff Working Document. Brussels. Accessed at https://ec.europa.eu/info/sites/default/files/swd-competitive-clean-european-steel_en.pdf in April 2022.

European Commission. 2021b. "Questions and Answers on new EU rules on waste shipments." Accessed at https://ec.europa.eu/commission/presscorner/detail/en/qanda_21_5918 in April 2022.

European Environmental Agency. 2021. *Emerging waste streams: Opportunities and challenges of the clean-energy transition from a circular economy perspective.* Briefing. Accessed at https://www.eea.europa.eu/publications/emerging-waste-streams-opportunities-and in April 2022.

Fastmarket MB. 2020. “FOCUS: Steel scrap export bans curb supplies for India, Pakistan.” November 4. Accessed at https://www.metalbulletin.com/Article/3963516/FOCUS-Steel-scrap-export-bans-curb-supplies-for-India-Pakistan.html in April 2022.

Gielen, D. 2021. *Critical Materials for the Energy Transition.* International Renewable Energy Agency. Abu Dhabi. Technical Paper 5/2021. Accessed at https://irena.org/-/media/Files/IRENA/Agency/Technical-Papers/IRENA_Critical_Materials_2021.pdf in April 2022.

Hasanbeigi, A. 2022. *Steel Climate Impact - An International Benchmarking of Energy and CO2 Intensities.* Global Efficiency Intelligence. Florida, United States. Accessed at https://static1.squarespace.com/static/5877e86f9de4bb8bce72105c/t/624ebc5e1f5e2f3078c53a07/1649327229553/Steel+climate+impact-benchmarking+report+7April2022.pdf in April 2022.

Hund, K. *et al.* 2020. *Minerals for Climate Action: The Mineral Intensity of the Clean Energy Transition.* World Bank. Washington D.C. Accessed at https://pubdocs.worldbank.org/en/961711588875536384/Minerals-for-Climate-Action-The-Mineral-Intensity-of-the-Clean-Energy-Transition.pdf in April 2022.

ITC. 2022. TradeMap. Interactive database. Accessed at www.trademap.org in April 2022.

Kahongeh, J. 2022. “Inside Kenya's multibillion scrap metal underworld,” in *Business Daily.* 8 February. Accessed at https://www.businessdailyafrica.com/bd/data-hub/inside-kenya-s-multibillion-scrap-metal-underworld-3715582 in April 2022.

Laguna, J.C. *et al.* 2021. *Carbon-free steel production Cost reduction options and usage of existing gas infrastructure.* Panel for the Future of Science and Technology, European Parliamentary Research Service. April. Accessed at https://www.europarl.europa.eu/RegData/etudes/STUD/2021/690008/EPRS_STU(2021)690008_EN.pdf in April 2022.

Ling, C.H., 2021. “No EU blanket ban on scrap metal exports” in Argus Media. Accessed at https://www.argusmedia.com/en/news/2274734-no-eu-blanket-ban-on-scrap-metal-exports in February 2022.

Mwangi, A. and Otieno, D. 2022. “State accused of failure to implement scrap metal law,” in *People’s Daily.* 25 January. Accessed at https://www.pd.co.ke/news/state-accused-of-failure-to-implement-scrap-metal-law-111038/ in April 2022.

Nation. 2020. “Hunger for scrap metal derails the services of key utility firms,” in *Nation.* 13 July (updated from 19 May 2012). Accessed at https://nation.africa/kenya/news/hunger-for-scrap-metal-derails-the-services-of-key-utility-firms--812558 in April 2022.

Nicholas, S. and Basirat, S. 2021. *New From Old: The Global Potential for More Scrap Steel Recycling.* Institute for Energy Economics and Financial Analysis. Accessed at http://ieefa.org/wp-content/uploads/2021/12/The-Global-Potential-for-More-Scrap-Steel-Recycling_December-2021_2.pdf in April 2022.

Njoroge, K. 2013. “Impose a total ban on all scrap metal exports in Kenya” in *Business Daily.* 16 June. Accessed at https://www.businessdailyafrica.com/bd/opinion-analysis/ideas-debate/impose-a-total-ban-on-all-scrap-metal-exports-in-kenya--2034934 in April 2022.

NPA. 2018. *Developing the iron and steel industry in Uganda – Harnessing the low hanging fruits.* Kampala. Accessed at http://npa.go.ug/wp-content/uploads/2018/07/Iron-and-Steel-Industry-in-Uganda.pdf in April 2022.

OECD. 2021. *Latest Developments in Steelmaking Capacity 2021.* Accessed at https://www.oecd.org/industry/ind/latest-developments-in-steelmaking-capacity-2021.pdf in April 2022.

Omolu, C. 2022. "'Scrap metal dealers: We have changed, please lift the ban'" in *Nation.* 13 March. Accessed at https://nation.africa/kenya/news/scrap-metal-dealers-we-have-changed-please-lift-the-ban--3746064 in April 2022.

Opinska, L.G. *et al.* 2021. *Moving towards Zero-Emission Steel Technologies Available, Prospects, Timeline and Costs.* Study requested by the European Parliament's committee on Industry, Research and Energy. Policy Department for Economic, Scientific and Quality of Life Policies Directorate-General for Internal Policies. Accessed at https://www.europarl.europa.eu/RegData/etudes/STUD/2021/695484/IPOL_STU(2021)695484_EN.pdf in April 2022.

Otieno, B. 2022. " State plans to lift ban on scrap metal," in *Business Daily.* 16 March. Accessed at https://www.businessdailyafrica.com/bd/economy/state-plans-to-lift-ban-on-scrap-metal-business-3750198 in April 2022.

Ploumis, P. 2022. "KAM praised Kenya's ban on scrap metal trade," in *ScrapMonster*. 27 January. Accessed at https://www.scrapmonster.com/news/kam-praised-kenyas-ban-on-scrap-metal-trade/1/82353 in April 2022.

TIPS. 2022. *Measures to prevent theft of scrap metal*. TIPS Report for the Department of Trade, Industry and Competition. March. Pretoria.

USGS. 2020. Excel tables from Minerals Yearbook. Accessed at https://www.usgs.gov/centers/national-minerals-information-center in April 2022.

Were, R. 2022. "Scrap metal dealers protest against ban" in *The Standard.* Nairobi. 13 April. Accessed at https://www.standardmedia.co.ke/national/article/2001443032/scrap-metal-dealers-protest-against-ban in April 2022.