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Article

Cable Theft: Root Causes and Approaches to Its Reduction by Local Governments in South Africa

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Abstract

Cable theft is a major infrastructure security issue in South Africa, especially in Gauteng municipalities, where poverty is spatially concentrated to the extent that it has given rise to large-scale theft of electricity distribution infrastructure components. This essay focuses on the complexity of the reasons behind cable theft, including unemployment-related desperation, organized crime syndicates, governmental corruption, and international commodity markets. The study involved 19,919 reported cases from around the country and 5,914 cases from Gauteng since April 2019. It is found that cable theft is not limited to property crime, but also poses a threat to basic service delivery in the electricity, water, health, and education systems. The study reveals that effective mitigation should involve combined interventions using advanced technology (intrusion detection systems, smart meters, and mechanical barriers), enhanced law enforcement and prosecution, community involvement, and socioeconomic development measures. Evidence-based policies, such as special detection offices, scrapyards control, dedicated prosecution, and legitimacy programs that integrate infrastructure security and affordability approaches, are proposed as critical elements of sustainable reduction strategies. This study concludes that the solution to cable theft is closely connected to the constitutional obligation of South Africa to progressively fulfil socioeconomic rights; thus, municipal, provincial, and national governments must act in collaboration to address this issue.

Keywords: cable theft; infrastructure security; electricity distribution; service delivery; municipal governance; Gauteng municipalities; organized crime; socioeconomic inequality; copper theft; community participation; technological solutions; law enforcement; institutional corruption; informal settlements; illegal electricity connections; scrapyards regulation; infrastructure resilience; sustainable development.

Executive Summary

One of the most problematic infrastructure challenges in South Africa is the theft of electricity distribution infrastructure cables, which has had a particularly strong impact in Gauteng municipalities, where the spatial legacies of apartheid planning have led to concentrated poverty in townships and informal settlements. This essay addresses the causal factors, implications of service delivery, and evidence-based reduction strategies based on the South African institutional and development realities. The research shows that cable theft is a reflection of intersecting socioeconomic stressors, markets, and institutional failures that require a multifaceted intervention comprising technology, law enforcement, community participation, and economic development. The scale of this problem demands urgent municipal action since the decay of infrastructure threatens the central systems on which people—especially historically marginalized communities—depend upon for provision of the basic services guaranteed by the constitutional democracy of South Africa.

Introduction

Cable theft is an epidemic in South Africa, with Gauteng Province recording 5,914 cases since April 2019, which is nearly one-third of the nationwide total of 19,919 cases reported for the power distribution networks of the country (Michalakis, 2023). The state-run national electricity utility, Eskom—which generates about 95% of the electricity in South Africa—has reported losses of over ZAR 2 billion through cable theft alone. City Power in Johannesburg and the Ekurhuleni Metropolitan Municipality, the city of Tshwane, and smaller municipalities within Gauteng have similarly been decimated by the same extent of destruction to their already strained financial means for municipal utilities. This crisis has developed in the context of the post-apartheid environment in South Africa, in which municipalities were left with disjointed, spatially disintegrated infrastructural systems based on decades of spatial planning that actively marginalized Black communities in terms of service provision. In addition to direct financial losses, cable theft has cascade effects on important service systems: the water supply is disrupted, posing risks to public health; healthcare facilities are unable to attend to patients who need life-support systems; educational institutions close schools, affecting learning; and economic processes are halted, taking away jobs. These effects are concentrated in poor communities, which are mainly located in Gauteng townships such as the Alexandra, Soweto, and East Rand communities in Ekurhuleni, and the growing informal settlements in Tshwane and Sedibeng. The cascading impact of infrastructure theft causes additional degradation as less utility revenue is raised to invest in needed maintenance, and infrastructure degradation increases in the areas where the municipal capacity to respond is most limited. This essay discusses the problem of cable theft as it specifically impacts the electricity distribution infrastructure in the Gauteng municipalities (e.g., overhead distribution lines, underground cables, transformer infrastructure, and substation equipment), and explores the underlying causes of cable theft based on the realities of South Africa, as well as its effects on service delivery within the water, health, and education systems, and evidence-based prevention methods that can be applied at the municipal government level. The urgency of this issue can hardly be overemphasized in the context of South Africa's development. Every month of inaction enables cable theft networks to become more established, more organized, and more lucrative. This problem goes well beyond property crime and poses a fundamental challenge for municipal service provision and the ability of South Africa to provide socioeconomic rights to all its citizens. The analysis of this crisis in the South African context is complex, involving a high unemployment rate (above 40%) in Gauteng townships and the desperation of people who are unemployed; the existence of organized criminal syndicates that take advantage of the global markets for copper commodities; and the systemic corruption in state institutions and law enforcement that allows perpetrators to act with relative impunity.

The Scope and Prevalence of Cable Theft

South Africa is considered one of the hardest-hit countries concerning cable theft (Enlit, 2023). Cable theft refers to the theft of copper and aluminum conductors used in electricity distribution systems in overhead lines, underground conductors, distribution infrastructure, primary conductors of poles and transmission towers, secondary distribution conductors, and internal building wiring and copper parts in substations. The magnitude of this issue is something that has not been witnessed in the history of South African infrastructure. According to recent statistics, the average number of cases of cable theft in municipalities is about 444 cases every quarter, with January often characterized by more than 200 reported cases, translating to an average of five cable theft incidents per day in major Gauteng municipal areas.

The offenders range from subsistence thieves motivated by short-term economic desperation to major criminal syndicates with provincial and international operations. These syndicates bribe government officials, open up well-developed supply networks to unscrupulous scrapyards, and connect South African copper theft to international criminal markets, especially in China and India where stolen materials are re-processed and sold. The global aspect of cable theft suggests that local

municipal initiatives should be aligned with national law enforcement and global trade surveillance organizations in order to disrupt these supply chains.

The economic consequences include much more than the cost of the stolen copper. The removal of cables from functioning infrastructure requires municipalities to grapple with emergency repairs, lost time, loss of services, compensation claims, and administrative expenses in cases of significant outages. These indirect costs can be considerably higher than direct replacement costs, and the actual cost of cable theft can be much greater than the scrap metal value.

Causes of Cable Theft in Gauteng Municipalities

Cable theft is influenced by several related factors, indicating a wide structural issue in South Africa. The major contributor is the extreme socioeconomic distress in South Africa. The national unemployment rate is more than 30%, with greater levels in Gauteng townships and informal settlements. One kilogram of copper would fetch ZAR 90-120 in black markets, which would provide unemployed people with a source of instant revenue when other jobs are unavailable. To individuals with rent commitments, food insecurity, and simple survival needs, cable theft is a fast source of income that requires little skill or capital investment. Studies have shown that theft cases rise at a faster pace during an economic recession—especially during the 2020 COVID-19 lockdown, when unemployment rates increased significantly and social support networks were overwhelmed.

Petty cable theft is strongly associated with substance abuse, as addicts may need urgent funds to buy drugs. Addiction creates daily desperation where people are motivated to obtain the drugs without considering the long-term consequences, and cable theft is an easy way to obtain quick money. The combination of unemployment, poverty, and addiction leads to conditions where stealing infrastructure is an accepted survival strategy and not an extraordinary crime.

The level of cable theft is directly related to the international price of commodities via a market mechanism. In South Africa, cable theft cases surged sharply when copper prices doubled from April 2020 to June 2021 (Irish-Qhobosheane, 2023). This price sensitivity shows that organized syndicates observe commodity markets in a systematic fashion and increase their activities when the copper valuation is high. The level of theft also decreases with the price, implying that the criminal organization is highly organized and responds to the market; thus, this petty crime is not random.

The scrapyards business in South Africa has enabled cable theft, as 85% of exported scrap metal is processed with little scrutiny of the material's source. Numerous dealers take the stolen materials without verifying ownership, thus providing guaranteed markets for stolen cables. This demand certainty is essential; thieves will take great risks as they are sure that the stolen materials can be sold in the market at a predictable price. Thus, the theft-to-international-reprocessing supply chain cannot be interrupted without effective scrapyards regulation.

Poor infrastructure security is a contributing factor to vulnerability. Eskom has 395,419 kilometers of overhead lines with little barrier protection and extensive physical security is not economically viable using traditional methods. There are numerous high-risk cables serving remote locations that have little surveillance or patrol personnel. Informal settlements often have underground conduits that are not adequately protected, and access to substations is often based on old security systems that are easily penetrated by the skilled offenders.

Cable theft has become a highly organized crime that involves insiders such as Eskom contractors, municipal employees, and police officers. These insiders give information regarding the location of valuable cables and assist in the execution of thefts, transportation, and sales. This institutional corruption is especially devastating, as it sends the message to lower-tier offenders that they are not likely to face any consequences even when caught. The deterrent effect of the police is completely broken when police officers can be bribed to turn a blind eye to thieves or to not perform arrests.

The Criminal Matters Amendment Act of 2015 created harsh punishments (30-year maximum imprisonment) in cases of infrastructure damage, but prosecution of these crimes is ineffective. Between March 2019 and March 2022, out of thousands of incidents, only 1,200 suspects were arrested

and only 40 of them were convicted—a conviction rate of less than 3.3%. This incredible disparity between law and its successful execution leads to crimes being committed with impunity. Factors contributing to this include backlogs in the court, a lack of forensic resources, lags in investigations, and a limited capacity to gather evidence. Most criminals are released on bail and end up disappearing or returning to crime as they await the resolution of their charges.

Moreover, about 8% of South African households do not have access to electricity and informal settlements are growing at a rate faster than the increase in infrastructure connection. High power bills drive marginal households toward illegal connections, forming feedback loops that both decrease utility revenues and increase the motivation to steal due to desperation. In cases where locals are unable to afford the cost of legal connections, they form parallel networks with cable theft, generating enormous demands for stolen materials.

Service Delivery and Network Performance Impacts

Cable theft can directly cause massive power outages at several supply nodes, affecting the interconnected systems. In early 2023, City Power Johannesburg recorded 444 cable theft incidents in three months, necessitating immediate repair, which postponed other important infrastructure projects. The Ekurhuleni metropolitan area had to face severe power outages after cable theft cut off transmission lines serving various substations that provide water to five municipalities, including Tshwane and Lesedi. In a different case, structural collapse due to stolen metal rungs on transmission towers operating the 132 kV powerlines impacted traffic systems, businesses, and residents in a wide geographic region.

The provision of water relies on the availability of electricity to treat, pump, and distribute the water. The theft of cables from water infrastructure leads to an acute supply crisis with direct health impacts on the population. Millions of residents were impacted by a cable theft as the cable thieves destroyed essential supply equipment, resulting in disruptions to the supply from Rand Water. Metsimahlo announced that ZAR 1.9 million worth of cables were stolen from water systems, which caused immediate service failures that compelled communities to find other water sources. Prolonged outages lead to sewage retention, posing health risks to populations and introducing the risk of spreading diseases in instances when communities turn to alternative sources of water that may be contaminated. When water systems become ineffective, cholera, typhoid, and gastrointestinal diseases can spread quickly, requiring interventions from health facilities that are already hampered by the power interruptions due to cable thefts.

Hospitals and clinics rely on a continuous supply of electricity to power life-support machines, surgery theaters, diagnostic services, and medication refrigeration. Cable theft that leads to power outages in healthcare facilities prevents the use of equipment needed in critical procedures, directly compromising patient health. Cable theft at Bongani Regional Hospital in Free State province led to the emergency transfer of 21 critical care patients to private sector facilities at a staggering cost, showing how infrastructure theft can directly cause failure of health systems (Mabuza, 2023). Emergency services such as police stations, fire departments, and ambulances are also vulnerable, with infrastructural damage decreasing their capacity to respond to collapses at the time when the needs of the population are the most pressing; i.e., during power interruptions or outages.

Electricity is needed in schools to provide lighting and power computers and laboratory equipment. Long-term interruptions due to cable theft lead to educational discontinuity, causing learning losses that disproportionately affect poor communities whose home learning environments do not provide access to these resources. Learners waste time in the process of learning and instructors encounter extra administrative costs to address emergency shutdowns. Such learning interruptions exacerbate intergenerational poverty by lowering the formation of human capital among already disadvantaged groups of people.

Business ventures close down when outages occur, leading to lost production, wasted materials, and order cancellations. Manufacturing processes lose revenue and incur costs due to damaged materials. Retail businesses are faced with loss of sales and security threats due to power outages.

Businesses in service sectors such as banking, telecommunications, and hospitality are brought to a standstill. The aggregate effects are felt as macroeconomic contraction since investors consider infrastructure unreliability to be a systemic governance failure, discouraging foreign direct investment and lowering capital formation. The competitive position of South Africa in international markets is already weak, and can be expected to decrease further if the reliability of its infrastructure is unpredictable.

Cable theft is catastrophic for distribution operations within municipalities in terms of revenue loss. Cable theft can result the loss of customers for networks, reducing their revenue. At the same time, the municipality is forced to finance emergency repairs using already exhausted funds. This establishes unsustainable fiscal processes in which the decreased revenue due to theft and rising expenditures for repairs drain municipal reserves in a short amount of time. According to City Power Johannesburg, in a period of eight months, the theft and vandalism costs amounted to ZAR 380 million, which constitutes a significant portion of the operational budget (TimesLive, n.d.). These expenses divert the funds for system upgrades, maintenance, and customer service enhancement in order to perform reactive damage repair. In turn, municipal administrators cut funding for other services such as pothole repair, street lighting repair, and vegetation management, which results in apparent infrastructure decay and further diminishes public trust in the municipal government.

In addition to the direct impact of cable theft on service continuity, cable theft lowers network performance by decreasing the network's redundancy and capacity. In the case of the theft of high-voltage transmission cables, the new infrastructure has to run at a lower capacity, which reduces grid reliability. Recurring thefts of the same cable routes ultimately lead to the loss of repeat investment and the eventual decommissioning of these routes and services. Transformer theft also leads to a decrease in capacity as well as distribution capacity. The remaining transformers may become overloaded and fail prematurely, causing cascading service failures.

Comprehensive Reduction Strategies

Cable theft requires a multi-dimensional solution involving the application of technology, law enforcement, community participation, and socioeconomic development. The use of intrusion detection systems based on Internet of Things is the new technology frontier. A G-Matrix RAMAC system combined with the Sigfox 0G network allows for the detection of underground cable tampering in real-time and delivers silent alerts before the cables are stolen. These systems use underground sensors that monitor for any disturbances and instantly report them to central monitoring facilities, preventing delays in responses, which was a key issue with CCTV systems in the past. Every theft prevented will save about ZAR 5,000 per meter in replacement costs and the prevention of theft of 1,000 meters of cable will save ZAR 5 million in expenditure avoided. The cost of installing these systems varies between ZAR 50,000 and 150,000 per kilometer and the payback time is also short, making such technological investments worthwhile even in resource-limited municipalities.

The implementation of smart meters accomplishes two roles: preventing meter tampering through anti-tampering technology and allowing consumption to be monitored granularly to detect illegal connections and bypasses. The smart prepaid split meter that operates in Eskom was shown to be effective in reducing theft by ensuring that meter tampering is detected in real-time and reported to the central system. Municipalities should focus on installing smart meters in distribution systems, especially in informal settlements where illegal connections are concentrated.

CableGuard clamping systems and truck-tire protection barriers are examples of mechanical barriers which protect against vehicular withdrawal of cables from underground conduits. Installing these barriers around vulnerable cables at 5- to 10-meter intervals is cost-effective; testing has shown that motorcycles and heavy machinery cannot pull out cord-wrapped cables, forcing thieves to manually cut the wires, which is time-consuming and significantly increases their risk of being detected.

Long-term plans for replacing infrastructure should focus on designs that are resistant to theft. Anti-theft bolts installed on transmission towers would reduce systematic rung removal. Critical infrastructure can be equipped with unique identification markers that can be used to recover stolen goods. These infrastructure changes can have high capital costs, but provide long-lasting protection beyond short-term security enhancement.

Large cities such as Tshwane and Ekurhuleni have established dedicated cable theft detection departments with some success. These specialized departments are proficient in gathering evidence and identifying perpetrator networks and organized crime links. Multi-agency task forces are formed through coordination with SAPS specialized units as well as the Hawks, which have capacities beyond those of individual organizations. Proper staffing of detectives, access to forensic equipment, and coordination of prosecutors are critical success factors. Organized syndicates, and not individual petty thieves, should be the primary target of these units as they are the points in the supply chain where the financial incentives are concentrated.

Scrapyards must be strictly monitored to close the market connections for stolen cables. Municipalities and economic development departments should develop licensing systems for scrapyards that require them to keep records of material sources. Copper origins should be recorded in electronic tracking systems, which would allow suspicious purchase patterns to be identified. Frequent checks of facilities that are close to locations where infrastructure crimes occur could prevent supply chain disruptions before the stolen materials are moved out of the municipality's jurisdiction.

Prosecutors need training and resources to effectively implement the current harsh punishments. Special prosecution units that deal with infrastructure crimes should also be provided with more funding and forensic assistance. Case management improvements in magistrate courts should minimize the time wasted on trials. Creating specialized infrastructure crime courts in large municipalities could have more definite outcomes, which would heighten the deterrence effect.

Education programs in the community should emphasize the links between theft and service interruptions, health effects, and economic and safety risks to residents. Campaigns should utilize the influence of community leaders, community schools, and religious organizations, focusing on community cohesion and not on punitive strategies.

Electrical apprenticeship programs could provide youth with an opportunity to gain employment and help address the skilled labor shortages. Cities can collaborate with Eskom to create paid apprenticeship programs in electrical maintenance, which would offer short-term income and create a longer-term capacity for employment. Microenterprise development that offers capital and business training would provide legitimate income opportunities. Cooperative business development in informal settlements would create economic activity and enhance affordability allowing electricity consumer cooperatives to negotiate bulk rate discounts.

Legitimacy and consistency could be achieved through community-based monitoring systems such as neighborhood watch groups that are given infrastructure threat identification training. Municipal responses should be coordinated efforts involving Eskom, metropolitan authorities, provincial government, SAPS, Hawks, prosecutorial services, and representatives of communities. Municipalities need to establish strong internal investigative units to deal with corruption and disciplinary processes to send strong messages that corruption that enables stealing will not be tolerated.

Periodic infrastructure monitoring could determine points of vulnerability before thefts occur. Municipal electricity companies should adopt vigorous revenue loss minimization policies, including advanced metering and cost accounting to localize the effects of theft to individual segments. Reducing cable theft in the long-term involves making electricity affordable to underserved populations through lifeline electricity programs that offer a subsidized supply of electricity to people to meet their basic needs.

Case Studies and Lessons

In Alexandra, Johannesburg, City Power recovered 10,000 kilograms of stolen cables, which enhanced the electricity supply network (Mathobela-Nhlapo, 2024). However, the enforcement was not sufficient; the residents who are illegally connected to electricity often report tariff unaffordability as the reason. The success of Ekurhuleni in disconnecting 4,500 illegal connections in Benoni showed coordination effectiveness, yet the rate of re-establishment of illegal connections in the following months showed that enforcement in the absence of other options to obtain electrical connectivity created repeat offenses (City of Ekurhuleni, 2024). The regions that combined enforcement, job creation programs, and subsidized access to electricity programs have shown more sustainable impacts.

Conclusions

Cable theft from electricity distribution infrastructure is the greatest infrastructure security issue that Gauteng municipalities are facing in the complicated development environment of South Africa. Root causes include unemployment-related desperation, organized crime, laxity in enforcement, and susceptibility of infrastructure, indicating that successful solutions should combine the use of technology, law enforcement, community involvement, and socioeconomic development that addresses historical inequalities. While the National Development Plan of South Africa has promised to eradicate energy poverty and to provide universal service delivery, cable theft remains a direct challenge to these constitutional and policy promises. Disruption of municipal services includes water, health, education, and emergency services, having cascading effects on the welfare of the population which, in turn, disproportionately impacts historically marginalized communities that have yet to see the dividends of the post-apartheid service delivery promise. Cable theft suppression is directly related to the financial sustainability of municipal utilities because the loss of revenue and replacement costs are both resource-consuming and detrimental to the fiscal capacity of municipalities already grappling with the complex inherited service delivery backlog. Evidence-based reduction methods should focus on holistic solutions that involve the use of technology, specialized policing, community involvement, and socioeconomic options to address the underlying causes. The experience of Johannesburg and Ekurhuleni shows that multi-stakeholder coordination can deliver tangible improvements, but technological and enforcement interventions cannot work without dealing with the underlying economic desperation and affordability impediments that may impact desperate populations. In South African systems of governance, sustainable cable theft mitigation requires dedicated leadership by both national and provincial governments and municipalities; sufficient provision of resources and prosecution capacity to specialized investigation units; cross-organizational coordination across institutional silos; and basic acknowledgement of the fact that infrastructure protection is linked to socioeconomic development and historical redress commitments. Cities that adopt a holistic approach of combining short-term security measures with long-term economic opportunity generation can gradually develop secure infrastructure for platforms to deliver stable services. This demands a concerted effort to reduce unemployment through apprenticeships and skills training; improve affordability through the implementation of lifeline electricity schemes; reduce corruption through increasing institutional accountability; and increase infrastructure investment through adopting protective technologies and design changes. The democratic promise of South Africa lies in its ability to provide services to all communities equally. Cable theft undermines this promise by compromising the infrastructure in the communities that rely on state service provision the most. Addressing this challenge requires the multi-dimensional responses described in this essay, which are based on the understanding that infrastructure security supports the foundational human rights to water, electricity, healthcare, and education that the South African Constitution promises but cable theft now denies to millions of citizens.

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