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Load shedding in South Africa: Another nail in income inequality?

Significance:

South African households have been affected by load shedding for over a decade. Low-income households are the most heavily impacted by unreliable electricity supply, rising electricity prices and lack of financial means to absorb such shocks, subject to their living conditions. Marginalised communities struggle to access the advantages of urban areas, deepening the country's income inequalities. Policymaking needs to address the uneven distribution of the impact with policies and programmes that will improve access to finance and technologies for sustainable future solutions. However, there is a catch in the implementation of such policies, as, potentially, measures such as subsidies may exacerbate inequalities and create more problems in the system. Innovative financial programmes are essential to support low-income households and ensure fairness in dealing with load shedding effects while promoting socio-economic development and improving living standards.

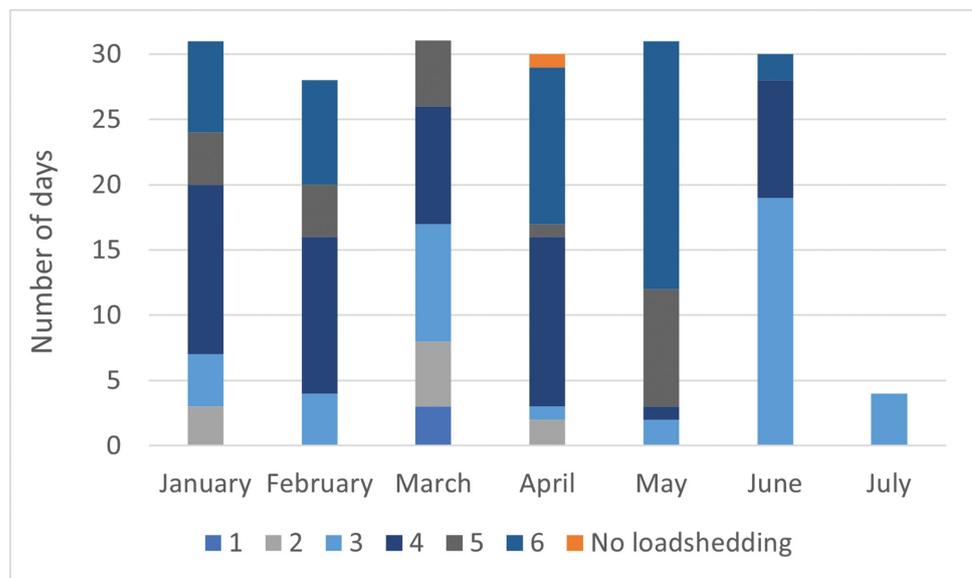
The South African energy crisis is ongoing, with the country experiencing widespread rolling blackouts (load shedding) as supply falls behind demand, threatening to destabilise the national grid.¹ Load shedding started in the late months of 2007 and is ongoing. Eskom, the government-owned national power provider and principal generator, has blamed the rolling blackouts on insufficient generation capacity. These rolling blackouts, or load shedding, are defined as the action to reduce the load on something, especially the interruption of an electricity supply, to avoid excessive load on the generating plant. Such 'load shedding' is conducted at any time that generating units are taken offline for maintenance, repairs, or refuelling (in the case of nuclear plants) with a reserve margin of 8% or less.

Even though load shedding is not the crisis but the *response* to it – a way to mitigate it – persistent load shedding is, understandably, causing much frustration for South African households and businesses, which experience frequent power interruptions. Whether frequent or prolonged, power outages are assumed to limit the economic well-being of households and enterprises by lowering the output of existing electrical equipment and discouraging investments in new welfare-improving and income-generating ones.

Figure 1 demonstrates the number of days of load shedding per month of 2023.² The country has barely experienced a day without some stage of load shedding implemented since September 2022, with the average stage in a day continuously rising.

More reliable energy is needed to lower operating expenses and raise productivity and profitability in enterprises. Power outages in South Africa have resulted in sales losses for many businesses, from the retail and service sectors to manufacturing and industry. The expected loss to South Africa's businesses and industries from scheduled power outages is ZAR1 billion per stage daily. As a result, many small and medium-sized enterprises have struggled and eventually closed down, with a loss of thousands of employment positions.

The consequences and impacts of power cuts are not evenly distributed across regions and population groups, which potentially worsens income inequalities that are historically high in South Africa. In this Commentary, the



Data: News24²

Figure 1: Number of days of load shedding by stage per month, 2023.

uneven impact of load shedding on South African electricity consumers is discussed, as well as how it has and will further exacerbate income inequalities in the country. The discussion is informed by theoretical literature and data on how different income groups respond to load shedding incidents. The analysis also takes into consideration suggested and implemented policies for the residential sector within the energy sector and how these can assist or exacerbate existing income inequalities. The ultimate aim is to highlight the uneven impact of load shedding and stimulate discussion on how such disparities can be addressed.

Looking deeper into the socio-economic context of load shedding and its long-term effects on underprivileged groups is critical. Load shedding, a long-standing problem in the country, has intensified pre-existing disparities. Vulnerable households, which account for a sizable part of the population, are disproportionately affected by power outages due to restricted access to backup power sources, insufficient financial resources to deal with protracted outages and dependency on energy for a living. These already-disadvantaged households are further disadvantaged as load shedding disrupts income-generating activities, restricts access to education and healthcare facilities, and reduces overall economic production. The inability to sustain persistent economic activities and acquire a steady income exacerbates the wealth disparity between disadvantaged households and more privileged parts of society. As a result, load shedding adds to the cycle of poverty and impedes upward social mobility, eventually leading to income inequality on a larger scale. Load shedding exacerbates income inequality in the country by maintaining differences in economic opportunity and inhibiting socio-economic advancement. As a result, it is critical to acknowledge the vital role that load shedding plays in perpetuating and growing the gap between different segments of society, needing a thorough grasp of its consequences for income distribution.

How do households choose where and how to consume energy?

Households in high-income countries have a different energy use profile from those in middle- and low-income countries. Such differences are observed among households with varying income levels, even within the same country. The commonly used theoretical concept of the 'energy

ladder' explains the preferred household energy sources at various income levels and how that evolves (Figure 2).³

Very low-income households prefer wood and biomass (crop waste and dried dung) as a fuel for cooking, but sometimes also use coal and charcoal. This preference is attributed to a lack of access to the national electricity grid, affordability issues and easiness of use. Fossil fuels are usually burnt on open stoves which results in significant indoor air pollution and exposes household members to pollution and affects their health. According to the 'energy ladder' hypothesis, households evolve from solid fuels to cleaner forms of energy and particularly electricity.

The theoretical concept of the 'energy ladder' is criticised in the literature, mainly for the argument that the only underlying factor for the shift between fuels is the household income level. Although income is indeed an important factor, other conditions and factors play a role in these households' decisions, including access and affordability to technology, availability of resources, urbanisation and living standards. Additionally, fuel-switching depends on price changes, supply reliability, habits and culture, education and demographics of the households.⁴

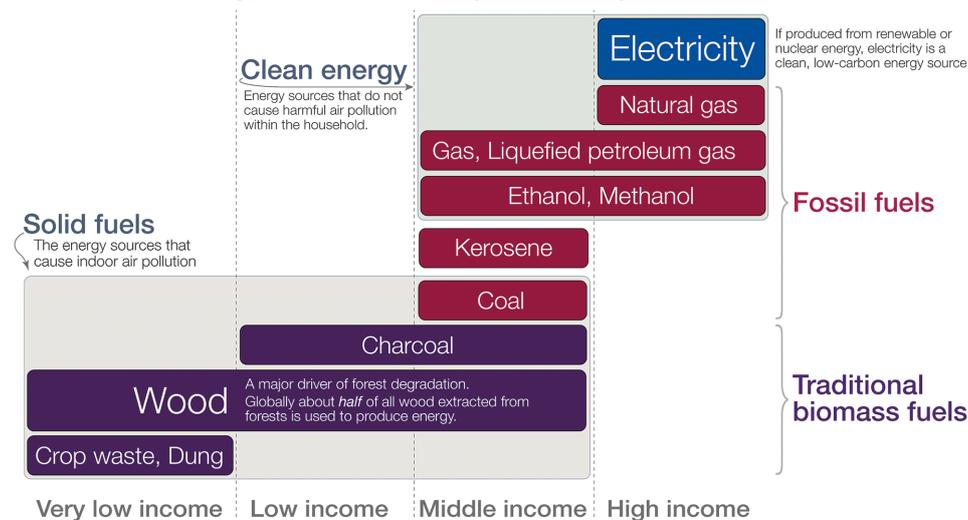
The fuel preference path is not a series of unconnected steps but a more dynamic and connected system. Also, in practice, fuel-switching only occurs in one direction, from dirty to clean energy alternatives. The concept of 'fuel stacking' advocates that households choose a mix of fuels that change proportions between clean and dirty fuels as their income increases.

With that in mind, Bohlmann and Inglesi-Lotz⁵ gave a more thorough picture of how South African households of different income levels control their electricity consumption due to income changes. They showed that low-income households are more sensitive than high-income ones. With the same increase in their disposable income (in percentage terms), low-income households will increase their electricity consumption proportionally higher than high-income ones.

South Africa exhibits higher electrification rates than the rest of the continent (more than 90%). Even though many rural households are considered energy poor, they cannot afford to pay their electricity bills to cover their basic needs. South African households show a behaviour typical of an 'energy ladder' where "households progressively move away from low-quality energy sources such as wood and paraffin

The 'Energy Ladder'

The dominant energy source for cooking and heating, by level of income



Based on: WHO - Fuel for life: household energy and health. OurWorldinData.org - Research and data to make progress against the world's largest problems.

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Source: CC-BY Roser³

Figure 2: The energy ladder.

towards convenient and versatile modern sources of energy such as electricity and gas as income rises⁶. Households with access to electricity use it as their main lighting source, while those without use mainly candles and paraffin. The great majority of electrified households use electricity for cooking purposes. For heating domestic space during winter, households prefer alternative sources to electricity or wearing warmer clothing.⁶

Unequal impacts of load shedding

Power interruptions lead to disruptions in daily activities, food spoilage and other challenges. Hence, load shedding forces households to make decisions differently as their electricity demand cannot be met during these power cuts. Since 2008 with the first wave of power cuts in South Africa, households have constantly re-evaluated their strategies for responding to the lack of electricity. Primarily, they aim to find alternative resources to substitute electricity. Such options vary from diesel-powered generators to solar panels or wood and charcoal. Households also sometimes decide to postpone activities until electricity has been restored. The latter looks like the least costly option, but such delays put pressure on the grid later and on the everyday life of households.

Load shedding affects all types of households but creates higher risks and poses threats to low-income households that are the most vulnerable in the South African economy. The heterogeneity of households in South Africa in factors such as income, behaviour and preferences, means they are affected differently by load shedding in South Africa.

The reasons for the differences might be internal, due to their different nature, or external, due to their **geographical location**. Frequently, low-income households are located in areas with ageing and less-reliable infrastructure. Such conditions make them prone to more frequent breakdowns that take more time to be resolved, adding to the scheduled load shedding that higher-income households and businesses, particularly in urban areas, experience.

The issue of load shedding disproportionately affects South Africa's urban poor, who are especially vulnerable to the effects of power outages. Low-income households and communities frequently require additional financial resources to finance **alternative energy sources** or other energy expenditures during load shedding. As a result, they cannot obtain fundamental amenities like health care, education, and social services, further restricting specific populations from the advantages of city living.⁷

The energy crisis contributes significantly to exclusivity in South African cities by widening existing inequalities and creating considerable impediments to accessing the benefits of urbanisation for vulnerable groups. Household financial position, in general, is constrained even more for rural low-income households. Low-income households have **limited access to finance** to fund backup power sources, such as generators or uninterruptible power supplies (UPS), which can mitigate the impact of load shedding.

The considerable **fiscal transfers** targeted at facilitating access to power through initiatives such as **'Free Basic Electricity'** for low-income households and the significant resources granted through the 'local equitable share' of around ZAR100 billion certainly play a critical role in minimising the impact of rising power rates on vulnerable areas. Recognising the positive effect of these grants in reducing the electricity expenses burden for low-income households is essential. Given these fiscal transfers, it is reasonable to believe that the direct impact of increased power prices on low-income households may be alleviated to some degree. The supply of 'free basic electricity' and other similar support measures can provide some relief by guaranteeing that financially challenged people can meet their necessary electrical demands. It is crucial to highlight, however, that the effectiveness and reach of these programmes may differ across regions and communities. Challenges such as widespread non-payment in many low-income communities could undercut the intended benefits of these fiscal transfers and prevent them from having the full impact on alleviating the burden of growing power prices. While fiscal transfers are important in tackling the affordability issue, they should not be used to dominate a

broader conversation about the implications of increasing energy prices and their possible contribution to income disparity among disadvantaged communities.

Load shedding **damages equipment** and makes it difficult for businesses and households to plan accordingly.⁸ It is more than evident that low-income households cannot afford to replace the damaged equipment and appliances. The majority of these households cannot afford appropriate insurance that will cover them in such cases.

Low-income households depend more on electrically powered utilities for necessities like heating, cooking, and refrigeration. Load shedding can cause significant disruptions to their daily lives, increasing their vulnerability to food spoilage, exposure to extreme temperatures, and other hazards. Their choice of alternatives, such as **wood and charcoal** for cooking, may worsen their health vulnerabilities. Stoves and other wood-generated appliances used indoors create hazardous air conditions for the members of low-income households. This backward direction in the 'energy ladder' hypothesis is not a South African phenomenon. Internationally, even in developed countries, households that experience or expect shortages from baseload electricity turn to traditional fuels with negative consequences for air quality.⁹

Low-income households need help reducing their energy consumption during load shedding. One such barrier is limited access to **energy-efficient appliances**, which can help to reduce electricity usage. Retrofitting homes with energy-saving measures can also be costly, making it challenging for low-income households to make the necessary changes. As a result, there is a need for targeted efforts to provide low-income households with access to energy-efficient appliances and support to retrofit their homes. Such efforts could help to reduce their energy consumption during peak periods, mitigate the impact of load shedding, and ultimately improve their quality of life.

Limited access to information deepens the inequalities between low- and high-income households. Low-income households need complete information on the timing and duration of load shedding, being challenged to make provisions and plan accordingly – frequent power disruptions in higher stages of load shedding lead to potential health hazards and increased distress.

Conclusion

Over a decade has passed since the first significant wave of power cuts. South Africa's load shedding has been a persistent phenomenon, causing frustrations to electricity consumers daily. Indeed, load shedding is the reaction to deeper problems in the electricity sector, such as an ageing fleet, lack of proactive maintenance, inefficient management and corruption. It is the response to the mismatches between demand and supply to avoid more extensive national blackouts. The consequences and impact of the power outages are disproportionately distributed across households, potentially worsening income inequality. Here, this uneven effect on consumers and the behaviour of low-income households was discussed. The discussion was informed by theoretical literature and data on how different income groups react to load shedding incidents. The analysis also considered suggested and implemented policies for the residential sector within the energy sector and how they can assist or exacerbate existing income inequalities. Ultimately, the aim was to highlight the uneven impact of load shedding and stimulate discussion on how such disparities can be addressed.

In conclusion, load shedding in South Africa significantly impacts households, particularly low-income households. It has the potential to exacerbate existing income inequalities, which is a concern given South Africa's high level of inequality. Policymakers need to address the uneven distribution of the impact with policies and programmes that will improve access to finance and technologies for sustainable future solutions. Innovative financial programmes are essential to support low-income households and ensure fairness in dealing with load shedding effects while promoting socio-economic development and improving living standards. However, policymakers need to be cautious in implementing such policies to avoid further exacerbating inequalities. By addressing the issue of load shedding and its impact on income inequalities, South



Africa can make strides towards promoting sustainable and equitable development for all its citizens.

The timing and scheduling of load shedding do not consider differences among households, even though there is a clear focus by energy policymakers to assist financially with promoting investment towards renewable, off-grid solutions. In the budget speech of February 2023, the Finance Minister announced new incentives for rooftop solar technologies to address challenges faced by small and medium-sized enterprises and low-income households. However, tax incentives such as this can create more significant problems than they aim to solve as only middle- and high-income households can use the subsidy which does not cover a complete energy-generating solution but only a portion thereof). In contrast, low-income households need help to finance the remaining amounts post-subsidy.¹⁰ Slowly but surely, middle- and high-income households will be off-grid and demand less from Eskom's generated electricity. Lower demand will affect Eskom's viability and profitability, with the possible passing of the burden to the remaining consumers of grid electricity. Addressing power instability is crucial for a fair and sustainable future, promoting socio-economic development and improved living standards.

Competing interests

I have no competing interests to declare.

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