

## Pricing electricity blackouts among South African households

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Lack of information about households' welfare losses could lead to incorrect policy choices. Given the ever-increasing reliance on electricity, extreme weather conditions and current energy diversification strategies, it is vital that policymakers obtain information about households' welfare losses due to power outages. According to Schmidthaler (2012), the costs associated with power outages may be direct, indirect or ongoing.

Since households are also highly affected by power outages, it is probable that households will be willing to pay (WTP) to avoid or reduce outages. The primary objective of this study is to quantify household's WTP to avoid power cuts. In this study, the contingency valuation method (CVM) is used to elicit outage costs. We subject respondents to eight outage scenarios. Furthermore, we contribute by extending basic analysis found in the literature by allowing for a proportion of the sample to have a zero WTP. A zero WTP is in many cases not unrealistic.

Face-to-face surveys were undertaken around Gauteng and the Eastern Cape provinces. The surveys were conducted using electronic equipment (gadgets/tablets) instead of the orthodox paper method. This new method has gained momentum lately because of its efficiency. It minimises human error, because the coding of the survey into the gadget occurs in advance, to make it easier and less time-consuming for the enumerator when collecting data.

The picture that emerges is that WTP increases with duration, which was expected. When making a comparison of planned and unplanned scenarios, the results that respondents prefer paying more for planned outages than for unplanned outages (i.e. in contrast with Carlsson and Martinsson, 2007). We argue that there are a number of relatively low cost measures that can be implemented to mitigate economic and social costs of electricity blackouts such as improved planning and communication with households. Therefore, the relatively higher WTP for planned compared to unplanned outages reflects household's preference for a low cost measure as a mitigating strategy towards the costs of blackouts. This suggests that households prefer effective communication channels prior to planned outages.

It is not surprising that WTP for peak periods is significantly more than for off-peak periods (more than double), because peak period is the time when electricity is used the most. The same applies to summer and winter outages: more power is used in winter. The finding that WTP is more for winter relative to summer is consistent with those in other studies (see Reichl, Schmidthaler, and Schneider, 2013). The share of zero WTP is slightly higher for summer outages than it is for winter outages. There is not a very big difference in WTP for weekends and weekdays. Having power on weekends and on weekdays has similar importance, though weekdays do have preference.

Power outages is a social good, hence it is imperative that the government becomes aware of public opinions and preferences about possible solutions to power outages or preferred energy technologies. South African households are generally WTP for improved reliability of power supply. Overall, South African households place a significant value towards avoiding the interruption. This study gives a snapshot of household WTP to avoid power outages. The study generates insight into welfare loss due to power outages.

The value that society places on avoiding electricity blackouts is an important first step in energy planning and policy. Although the level of electricity security has improved over time, maintaining this degree of reliability in future is going to be difficult. Efficient electricity infrastructure investments decisions are possible only if the values associated with electricity blackouts is determined. The findings in the study could have much more implications than for the pricing, in particular for the investments in infrastructure and the quality assurance of the network.

The massive blackout has left millions of people without power. South Africa's power crisis has widespread effects on both social and economic development. South African households would like more investment on electricity infrastructure, and their WTP to avoid blackouts implies that they would not want to leave the future of the electricity grid to chance. Some argue that Smart Grids could help reduce the cost of outages. The electricity infrastructure has to account for multiple objectives, including quality assurance of the network (i.e. reliability), affordability and security of power supply.