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Can intermittent renewable energies help reduce load shedding in South Africa?

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Developing countries often have to ration electricity when demand exceeds supply. This empirical study focuses on South Africa and determines whether the increased supply of renewable energy can reduce the occurrence of load shedding, or if it actually exacerbates the problem due to the intermittent nature of wind and solar power. To address endogeneity, we employ an instrumental variables approach. Our findings indicate that for every additional MWh of wind power, up to 74% can be utilized to decrease the extent of load shedding. Wind power provides a consistent supply, effectively reducing load shedding.

However, the impact of solar power is more volatile. While it reduces load shedding in the afternoon, there is a surplus of supply around noon that meets only moderate demand. Additionally, there is no supply in the evening when demand soars. Despite these limitations, our results support the social benefits of investing in wind and solar power, as the estimated investment costs are 2.5 to 4 times smaller than the welfare gains.