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Load-shedding has severe consequences for supply of electricity

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Consistent load shedding-related, or major electricity disruptions can have severe consequences for the continuous treatment and supply of water services. Systems across the Municipal and Water Board sector remain vulnerable, as per a recently completed Water Research Commission (WRC) study and compromise both infrastructure and water quality. The study has found that the high assurance of electricity supply until recently, did not warrant municipalities to have backup plans on its key water services infrastructure based on the preparedness of a large Municipality of Tshwane. This is a huge concern that many large Metros and municipalities have no preparedness to deal with outages and extended outages. The consequences of electricity outages for potable water supply can be severe, in extreme cases disrupting supply completely. This is especially true of much of the Gauteng water-supply area, which straddles the continental divide, with most of the water supply having to be pumped and raised before it can be distributed to users. The water sector is highly vulnerable and there is no regulation which ensures the continuity of supply due to energy.

Historically, the risk of electricity supply failure did not play a significant role in the design and operation of water-supply and distribution systems. In 2010, the introduction of load shedding prompted the (WRC) to initiate a high-level study of the effect of electricity interruptions on water supply. A follow-up study, which was recently concluded, explored the implications of such in greater detail and took account of new concerns that have arisen.

The study used and was based on the preparedness of the Tshwane Municipality, which makes up a significant portion of the Rand Water supply area. Some 80% of the municipality's water supply is derived from Rand Water and Magalies Water while the remaining portion is derived from the city's own sources at Rietvlei Dam, Roodeplaat Dam along with various dolomitic springs and wells.

The study made use of risk analysis methods and selection was based on a quantitative approach and the duration and likelihood of the various hazards identified were estimated based on the available information. The likelihood of the worst-case scenario (total black out for 30 days) was found to be highly improbable (1: 155-year probability). However, the other scenarios highlighted that there is a lack of or no preparedness of key water supply infrastructure points at the Municipal level. Water will stop flowing if there is an extended loss of electricity. Further the scenario analyses provided the following insights:

- For short-term electricity disruption events: It is crucial to ensure (firstly) that reservoirs and elevated towers are large enough to be able to supply at least two days' annual average daily demand (AADD). Secondly, reservoirs and towers' operating rules should be adhered to in order to ensure that water levels are maintained within the fluctuation volume of the reservoirs/towers.

- For medium- to long-term electricity disruption events: The volume of water stored is less important since the water stored in reservoirs will almost certainly run out of water is not supplied into the reservoir.

- Backup power generations (both mobile and permanent) will require ongoing servicing and maintenance – this will have to be incorporated into the city's water department's operational and maintenance schedules.

- Providing emergency storage capacity for sewerage inflow in wastewater treatment works is more expensive than providing backup power generation at wastewater treatment works. Emergency storage will not be practical for medium- to long-term duration electricity disruption events.

- The supply and delivery of fuel to the city's water- and sewer pump stations and its water- and wastewater treatment works will have to be planned.

- Alternate energy and power generation at wastewater treatment and works can reduce, if not eliminate, the costs associated with standby power.