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INNOVATIONS IN RETAIL WATER SERVICES TARIFFS

Kim Walsh*, Leluthu Bodlani*, Jay Bhagwan**

*Palmer Development Group, **Water Research Commission

An estimated 60 to 80% of water-supply costs incurred by South African municipalities are fixed, and do not decline as the volume of water sales decreases, but many municipalities still rely heavily on volumetric charges for revenue. This means that the structure of water tariffs is not aligned with the structure of expenditures incurred in providing water, leading to potential negative impacts on financial sustainability if water consumption patterns change. One solution to this is to include a fixed charge in the water tariff. This is a fixed amount that does not vary with volume of water consumption and therefore mimics the structure of expenditures and provides revenue stability in times of changing consumption. Fixed charges, however, can be regressive: they place a greater burden on poor households than they do on wealthy ones. This places water service providers in a difficult position, needing to balance revenue stability with affordability to their customers.

There has been little innovation in water tariff structures in South Africa for decades. The WRC therefore commissioned a study to identify innovative tariff structures applied internationally, select three for further investigation, and provide guidance to municipalities on when an alternative structure might be appropriate for them. The focus of the study was on tariff structures that support revenue sufficiency for municipalities while promoting conservation.

Three alternative tariff structures were identified for study:

- **A Consumption Based Fixed Charge (CBFC):** this is

a theoretical water pricing mechanism, not yet applied in practice. A CBFC is structured as three components: a 'fixed-fixed' charge, a 'fixed-volumetric' charge and a volumetric charge. The 'fixed-fixed' portion is relatively small and covers costs that are not related to the volume of water supplied or to the infrastructure used to do so. These costs are charged as the same fixed monthly charge to each customer. The 'fixed-volumetric' component covers costs associated with systemwide peak demand, largely those related to infrastructure operation and maintenance. These costs are charged as a fixed monthly charge to customers, but with the

size of that monthly charge dependent on the overall demand that the customer places on the system. Overall demand can be estimated based on peak seasonal use, or after each billing cycle. The variable component covers costs that vary with water use, such as purchases, pumping and treatment costs. This is charged based on the volume consumed.

- **A Property Value Band Based Fixed Charge (PBFC):** this is a tariff that includes a volumetric charge plus a fixed charge that varies for properties falling in different property value bands. Unlike the CBFC, which attempts to charge customers a fixed charge that reflects the overall demand that they place on the water-supply system, the PFCS attempts to charge customers based on their ability to pay, with property value bands providing a proxy for wealth.
- **A Tariff Menu (TM):** this option offers customers multiple pricing options or tiers based on their water consumption. Each pricing tier has a different rate structure that can be designed to encourage conservation or reflect the costs associated with different levels of water use. The innovation is allowing users to be able to select their own pricing strategy. For example, a water provider may offer two tariff options: a 'high-volume' service with a high fixed charge and a low volumetric charge, and a 'low-volume' service with a lower fixed charge but a higher volumetric charge. Consumers can choose the option that suits their anticipated water consumption.

The study adopted a case study approach, gathering detailed data from the billing databases of four case study municipalities, all located in the Western Cape. Four criteria were considered when designing tariffs to be tested and comparing tariff performance:

- **Revenue stability:** The ability of the water service authority (WSA) to cover its operational expenses and sustain its revenue streams under scenarios of reduced demand. The optimal tariff design will have the highest cost coverage under a scenario of reduced demand.
- **Reduced disincentive to WSA to promote conservation:** It is important that the tariff structure minimises disincentives for WSAs to encourage water conservation. This criterion assesses how well a tariff structure supports WSAs in promoting water-saving behaviours among consumers without risking their financial health.
- **Conservation incentives:** This criterion evaluates the effectiveness of the tariff structure in promoting water conservation among consumers. This measures the capacity of a tariff structure to encourage responsible water usage behaviours.

- **Affordability:** This measures the impact of the tariff on low-income households' ability to pay for their water usage without financial strain. A key aspect of sustainable tariff design is ensuring that water bills are affordable for all segments of the population, particularly those who are economically vulnerable.

Key findings of the analysis are summarised below.

Municipalities that treat their own water have a higher share of expenditures that are fixed and are therefore likely to need higher fixed charges than those who purchase water from a bulk provider: Of the four municipalities that were analysed, two purchase water from a bulk water provider and reported that 57% of their expenditures were fixed; two treated their own water and reported that between 74% and 78% of their expenditures were fixed. Under the current approach of charging for water by bulk water providers, municipalities who treat their own water are therefore likely to need higher fixed charges than those who purchase from a bulk provider. The alternative tariff structures described in this position paper may therefore be particularly appealing for municipalities who treat their own water.

Increasing the share of revenue that is generated through fixed charges improved the performance of tariff structures in this study: Across all models studied, the proportion of revenue derived from fixed charges was the most crucial factor when designing tariffs. Higher percentages of fixed revenue consistently improved revenue stability, reduced the disincentives for municipalities to promote water conservation, and enhanced affordability. In most cases, increasing the percentage of fixed revenue improved tariff performance more significantly than switching to an alternative tariff model. The share of revenue that is generated through fixed charges should not exceed the share of expenditures that are fixed, but it should be increased to as close to that amount as is possible.

All three alternative tariff structures tested outperformed existing 'no drought' tariffs: This suggests that municipalities can improve their revenue stability, reduce disincentives for them to promote conservation, and improve conservation incentives for their users by introducing any of the three alternative tariff structures. In most cases, the CPFC and PBFC also improve affordability compared to the existing tariff structure.

The PBFC is the best performing alternative structure in the three municipalities where it could be tested: The PBFC performs particularly well in providing revenue stability and reducing disincentives for the WSA to promote conservation. These were the key focus of this study. The PBFC is the worst performing of the three alternatives in all case study municipalities regarding conservation incentives to users. This is because the fixed charges are linked only to property value band, which has no relationship to

consumption at all. In the CBFC, on the other hand, the fixed charge is linked to peak consumption and so reducing consumption can impact the fixed charge paid by a customer over time. In the Tariff Menu, fixed charges are only paid by customers with lower levels of consumption.

The CBFC was the second-best performer of the three alternatives: Of the three, it was the worst performer regarding revenue stability and reducing disincentives for the WSA to promote conservation in all case study municipalities (although it still outperformed the existing tariff structures on these parameters). It outperformed the Tariff Menu due to its significantly better performance on affordability. It performed better than the PBFC on conservation incentives to users.

The Tariff Menu is the worst performing of the three alternatives: While the Tariff Menu was the worst performing of the three alternatives tested, it still performs significantly better than the existing tariff structures. It performed better than the CBFC on revenue stability and reducing disincentives for the WSA to promote conservation in all municipalities and outperformed the PBFC on these criteria in one of the case study municipalities. Because the tariff menu has a very low (or zero) fixed charge for low-volume customers and a very high fixed charge for high volume customers, it provides a stronger conservation incentive for low-volume customers than it does for high-volume customers. This is somewhat counter to

conservation goals and is a disadvantage of this tariff structure.

The study noted key issues to be considered in the design of each alternative tariff structures, as well as possible complexities with their implementation, most notably the need to allow for mechanisms to appeal the size of fixed charges and issues with switching between options on the Tariff Menu.

In summary, In the face of a high likelihood of increased drought events and pressure to reduce water consumption, it will become more and more important for South African municipalities to include fixed charges in their water tariffs in order to recover the fixed costs associated with operating and maintaining a water supply system. The analysis undertaken in this study showed that there are alternative tariff designs available that can assist municipalities to do this while minimising negative impacts on customers. These are new designs and introduce some new implementation challenges. Their benefits suggest that they are worth consideration by municipalities, despite these challenges. When introducing any new tariff structure, it is important for municipalities to bear in mind that customers tend to be resistant to any changes in tariffs and that acceptability to customers and political principals is a key requirement for success. This can be enhanced through clear, accessible communication about why a new tariff structure is required and how it will benefit customers in the long term.

For more information, refer to **WRC Report No. 1250**, 'Innovations to water tariff structures to support revenue sufficiency while promoting conservation'.