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Jeanine Townsend, Clerk to the Board
State Water Resources Control Board
Sacramento CA

Comment letter: Conservation Pricing

1) I designed the tiered water rates that Los Angeles Department of Water and Power has employed since 1993. It is generally agreed that those rates have been effective at promoting water conservation in Los Angeles, which was the express objective underlying their design.

The effectiveness of any rate structure depends on the details. LADWP's rates were designed with careful attention to the level of the two rate blocks and the choice of the consumption level at which the rate switched from the lower block to the upper block. The upper block was set equal to an estimate of LA's long-run marginal cost of water supply; the lower block was set equal to a bit less than LA's average cost of water supply, so as to ensure revenue neutrality. The result was a difference of about 100% between the two rates. The switching point between the the lower and upper rates was tailored broadly to the individual water user's circumstances -- in the case of residential single family use, there were 15 separate switching points corresponding to three separate climate zones and five different lot sizes. In each case, the switching point was based on a combination of two criteria -- one criterion was reasonable water use (an estimate of the amount of water required for indoor use and reasonable outdoor use given the temperature zone and lot size) and the other criterion was meeting or exceeding a community norm (using more than 125% of the median household consumption by households in that temperature zone and lot size).

These details matter. There is a growing literature in behavioral economics establishing that price signals have to be visible and salient before they can influence behavior. Therefore, In my opinion, a simple rate structure (two rate blocks) but with differentiated switching points is likely to be superior to a single, undifferentiated rate structure with many rate blocks.

There is econometric evidence that block rates do induce changes in user behavior and promote reductions in water use. Two such papers are:

Shanthi Nataraj and Michael Hanemann, “Does Marginal Price Matter: A Regression Discontinuity Approach to Estimating Water Demand.” *Journal of Environmental Economics and Management*, 2010.

Ken Baerenklau, Kurt Schwabe, and Ariel Dinar. "Allocation-Based Water Pricing Promotes Conservation While Keeping User Costs Low." *Agricultural and Resource Economics Update* 17(6)(2014):1-4.

2) There are certain features of water which make tiered water rates likely to be highly desirable.

Over time, most water agencies have accumulated a portfolio of water supplies from sources with different costs. One source might be local surface water and groundwater, which is relatively inexpensive. Another source could be imported surface water, which is more expensive. Conservation may be another source. And looking to the future, other sources may be treated waste water or desalination, which can be very expensive.

The fact that a water supplier can be relying on sources of water that have very different costs means that the marginal cost of water can be very different than the average cost of water. In those circumstances, charging a single, volumetric price for all units of water can be highly inefficient from an economic perspective.

On the one hand, it is desirable that, at some point, users face the marginal cost of water so that they can balance its scarcity value against the value they place on their use of the next unit of water. On the other hand, it would be unfair and impractical to price *all* units of water supplied at the marginal cost of water. Tiered water rates provide a means of reconciling these two concerns.

3) Critics sometimes overlook the fact that water is not a man-made commodity -- it is a natural resource. A retail electric utility can usually arrange to secure an additional supply of electricity at times when demand approaches generating capacity either by switching on some auxiliary generating equipment or by going out to the Western power grid and buying electricity at short notice from a distant generating facility. There is nothing comparable for water. With our Mediterranean climate, whatever water is in storage by the end of April, whether in the snow pack, in reservoirs, or in aquifers, this is the fixed water supply with which we must live during the coming summer and through the next winter – perhaps for longer if that winter turns out to be dry. Moreover, water cannot be moved around at short notice in the same way that electrons can be moved around. The network for transporting water is far more limited than that for transporting electrons, and major water transfers have to be arranged well in advance. The consequence is that a supplier can run out of water much more readily than it can run out of electricity.

The question then arises: if one faces the prospect of running out of water, how should it be allocated?

In some circumstances, tiered pricing of water can offer a valid and useful solution.

Tiered pricing is economically efficient precisely because it offers consumers flexibility. The consumer has a choice: he can choose to use a larger quantity and pay a higher price for his consumption beyond the switching point, or he can keep his use within the lower tier and avoid paying a higher price. In the context of the current drought where urban water users in California need to reduce their consumption by an average of 25%, some form of tiered pricing is a logical solution. It gives water users flexibility and freedom of choice. The alternative is a rigid command-and-control system where water users have no leeway and must uniformly comply with the required reduction; it is hard to see how this could be preferable.

4) I would like to end by making a specific recommendation for action by the Board.

By way of context for the recommendation, a striking difference between water and electricity in this country is that, while most urban residents receive electricity from an investor-owned company regulated by a Public Utility Commission, most urban residents receive water from a public (governmental) entity not regulated by a Public Utility Commission. That distinction has important consequences for the efficiency with which each commodity is supplied.

A century ago when Public Utility Commissions were first established, the rationale for regulating investor-owned utilities (IOUs) but exempting public suppliers was to prevent price gouging by the former. The assumption was that public entities would not over-price water or electricity and therefore did not need regulatory oversight. However, by the 1970s, the situation had changed. Critics argued that the conventional PUC oversight of IOUs had become ineffective: IOUs were over-optimistic in their demand forecasts, over-eager to expand their generating capacity and saddle users with those capital costs, and were using economically inefficient rate structures. This led to profound changes in how PUCs operate in many states -- their goal switched from a narrow focus on rate structure to a broad focus on efficiency in electricity supply, pricing, and demand forecasting. The change in focus was especially noteworthy in California, where in 1974 the California Energy Commission (CEC) was established as the state's primary energy policy and planning agency. For this purpose, it was given authority over public (non-IOU) electricity supply agencies.

With water, by contrast, there is no champion for efficiency. There is no regulatory oversight aimed at promoting efficiency. There is no regulatory oversight of the pricing or allocation of water from an economic perspective.

Managers of public water agencies will tell you that they are not free of oversight: they are subject to massive attention from the political process -- from elected Boards of Directors and city and county officials. This is true. But the existing political review process (and, via Prop 218, the existing judicial review process) is a poor substitute for the expert, professional, technical review that comes about through the CPUC process and the CEC process in California.
Indeed, the CPUC/CEC process, if it applied also to water in California, would provide

better cover for public water agency managers trying to navigate a way through this -- and future -- droughts.

The California water Plan process administered by DWR is also a poor substitute for the policy and planning process that we have for electricity. DWR does not have the sort of regulatory authority that is possessed for electricity by CPUC and CEC.

In my view, we ought to give serious consideration in California to crafting some framework for oversight of water supply aimed at promoting efficiency in the pricing and allocation of water.

It might be worth noting that Australia has advanced in this direction. It has long had a National Competition Council whose mandate is to ensure the competitiveness of the Australian economy. The Council has been active since 1999 in promoting water reform, including reforms in the way water is priced. In an ideal world, both the Council and its water reforms might be a good role model for California.

Closer to home, since 2005 the CPUC has been increasingly pro-active in promulgating and implementing a Water Action Plan for water IOUs in California. The goals of the CPUC's Water Action Plan include: promoting water infrastructure investment; strengthening water conservation programs to a level comparable to those of energy utilities; and setting rates that balance investment, conservation, and affordability. Those goals are undoubtedly also relevant for non-IOU water utilities in California.

To this end, my suggestion is that SWRCB consider partnering with the CPUC in a broad review of the state of the urban water industry in California, including the state of our existing water supply infrastructure; the adequacy of ongoing maintenance efforts; the potential need for new infrastructure investment in the face of population growth, economic development, and potential climate change; the strengthening of water conservation programs; and developing rates that balance investment, conservation and affordability.

Sincerely

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