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Abstract: Water conservation is often the most cost effective source of additional water supply for water stressed regions to maintain supply reliability with increasing population and/or demands, or shorter-term droughts. In previous research we demonstrated how including energy savings of conserved water can increase willingness to adopt conservation measures, at the same time that increases energy and GHG emissions savings. But the capacity to save water, energy and GHG emissions depends fundamentally in the economic benefits for customers and utilities.
Utilities have traditionally used rebates, subsidies or incentives to enhance water conservation. But the economic benefits originated by these rebates depend on the actual savings of the water, energy and GHG emissions. A crucial issue that is not considered in the financial analysis of these rebates is the heterogeneity in water consumption, resulting in rebating households that actually do not need improvements in certain appliances.
Smart meters with end-use disaggregation allow to consider this heterogeneity and to target rebates. By using an optimization approach that minimizes water and energy residential costs—accounting for retrofit costs and individual benefits according to previous levels of consumption—we are able to assess economically optimal rebate programs both for customers and utilities.
Three programs are considered: first, same economic incentives are provided to all households and then they do their optimal decisions; second, traditional appliance-focused rebates are assessed; and third, utilities provide only rebates to those households that maximize water, energy or GHG emissions savings.
Results show that the most economically efficient options for households are not the best options for utilities, and that traditional appliance-focused rebates are much less optimal than targeted rebates.

Keywords*:* water conservation; water-energy nexus; urban water use; water policy; water utilities.