Table 5.33 Comparison of water savings found in previous billing research studies

Study	Description of Analysis	Savings Attributed to Billing Method		
		Sub.	RUBS	HWH
National Submetering and Allocation Billing Program Study (2004)	Statistical Model #2*	15%	-†	-‡
Wilcut (2002)	Paired Comparison	31%	3%	-
Strub (2000)	Pre-Post Conversion	-	-	5 to 12%
Koplow and Lownie (1999)	Paired Comparison	18% to 39%	6 to 27%	-
Dietemann (1999)	Paired Comparison	27%	-	-
	Pre-Post Conversion	8%	-	-

* This model provides the "best estimate" of expected water use and savings based on a preponderance of the data (see Model #2 in Chapter 6 for details).
† Average savings was found to be 1.4%, but was not statistically significant.
‡ Sample size was deemed to small to provide reliable results.

Koplow and Lownie found higher water savings for both submetering and RUBS compared with the National Submetering and Allocation Billing Program Study (current study). Although the sample size in the Koplow and Lownie study was small (n=32 compared with n=953 in this study), the statistical methods employed were generally sound. However, a critical assumption by Koplow and Lownie to combine the water savings from fixture conversion and water billing appears to have impacted their results. Surprisingly this assumption was not made explicit in Koplow and Lownie's report. However, recent personal communication with Doug Koplow revealed that the savings estimates in his 1999 study *included* savings attributable to fixture upgrades, as well as to the billing system itself. Doug Koplow wrote in a memo dated January 2004:

> "Based on discussions with building managers and property owners during our research, it became evident that the billing conversion and the capital upgrades were actually linked decisions in many cases. In order to make the billing for water more palatable, many buildings upgraded water using capital. It is therefore proper to attribute these capital-related reductions in consumption to a shift in billing methods, rather than deducting them from observed changes."

In contrast, the research from this study did not find any linkage between converting to a separate billing system and capital water fixture upgrades. To the contrary, results from the manager survey suggested comparable fixture change-out rates in properties built before 1995