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A New Tool Can Help Commercial-Building Owners Make Better Water-Efficiency Decisions

Commercial buildings require water as part of their essential services, yet the amount of water a typical commercial building needs to provide such services as restrooms and cooling systems is highly variable. It depends on a number of factors, including the technology employed in water-using devices, system maintenance, and the intensity of building use. Commercial-building owners have many options to improve water-use efficiency. For example, they can replace or retrofit water-using devices, such as toilets and urinals, with new models that use significantly less water than did their predecessors.

Unfortunately, not all efficiency investments will make financial sense to a building owner, especially given the substantial uncertainties about the future costs and benefits of such options. In particular, the cost of water, wastewater services, and energy will affect efficiency-investment performance. Owners need an effective way to weigh decisions about whether and how much to invest in new technologies, retrofits, or repairs to improve water efficiency.

In work sponsored by the Jane and Marc Nathanson Family Foundation, RAND Corporation researchers developed an analytical framework and an easy-to-use, spreadsheet-based tool—the Building Water Efficiency Analysis Model, or BEAM—to help building managers, consultants, and efficiency service representatives make sensible water-use efficiency investments. After laying out the approach, the study illustrated how it works using a case study based on the RAND Corporation headquarters building to examine the potential to improve restroom efficiency.

- The case study considered two baseline efficiency conditions, one typical of an older building constructed prior to 1992 and one modeled on the current building which was constructed in 2004 with post-1992 fixtures.
- For those two conditions, the analysis evaluated a range of efficiency investments and the financial performance of these investments under a broad range of scenarios reflecting different trends in water, wastewater, and energy utility prices.
- For the first condition (pre-1992 fixtures), the spreadsheet tool suggested that all efficiency packages yield favorable investment returns but that one in particular is more desirable than the others in terms of net present value and payback time.
- For the second condition (post-1992 fixtures), the spreadsheet tool showed that, because the current building is already relatively water efficient, some upgrades (such as to high-efficiency toilets) do not save enough water to warrant the investment costs. Other upgrades, however, are cost-effective and limit the impact of rising water and energy prices on operating costs.

The study concluded that the framework and tool provide users with a convenient way to consider the potential value of water-efficiency investments under price uncertainty without collecting extensive data or hiring a consultant.

A copy of BEAM is available from the document product page (see reverse).

This fact sheet is based on work done for RAND Infrastructure, Safety, and Environment documented in *Evaluating the Benefits and Costs of Increased Water-Use Efficiency in Commercial Buildings*, by David G. Groves, Jordan Fischbach, and Scot Hickey, TR-461-NAT, 2007, 80 pp., available, along with the BEAM model, at http://www.rand.org/pubs/technical_reports/TR461/. The RAND Corporation is a nonprofit research organization providing objective analysis and effective solutions that address the challenges facing the public and private sectors around the world. RAND's publications do not necessarily reflect the opinions of its research clients and sponsors. RAND® is a registered trademark.

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