

# **Monitoring and Verifying Performance of Projects Funded by Innovative Municipal Green Building Program**

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## **Overview**

This poster presents monitoring and verification techniques for assessing energy, water, and stormwater impacts for diverse green building projects. The City of Portland's Green Investment Fund (GIF) is a competitive awards program that supports early project activities for innovative and comprehensive green building projects. The City's monitoring and verification evaluation contractor has assessed the impacts of GIF projects selected from 2005 through 2009 to determine costs, benefits, and educational value of projects. The evaluation focuses on energy and municipal water saving measures, stormwater runoff reduction, and construction and demolition waste reduction, while attempting to balance issues of rigor, accuracy, and cost.

The evaluation has resulted to date in final reports on five projects constructed with GIF support. The projects include single family, multi-family, and commercial buildings. Verification site visits documented the installation of sustainable, innovative features. Metering, modeling, and billing analysis are being used to determine savings from the sustainable features in the areas of energy, municipal water, and stormwater runoff.

## **Study Scope**

The primary evaluation issue involved determining whether the GIF program yielded measurable, comprehensive energy and municipal water savings, but the GIF program also placed considerable emphasis on measures that mitigated stormwater runoff through on-site infiltration, green roofs, or re-use. The evaluations require cooperation with the City and developers from an early stage in the building process to track proposed measure impacts. Evaluators controlled costs by leveraging the experience of engineering professionals to oversee modeling and evaluation work performed by engineering interns through Portland State University.

## **Study Challenges**

A variety of challenges have resolved during the evaluation process. One involved determining the appropriate projects and measures to target for monitoring and modeling within budget constraints. The evaluation team worked with the City to develop criteria for targeting projects and measures within each funding cycle. Other issues included ensuring quality control with the analyses conducted by engineering interns and the inability to model certain measures in eQUEST. The latter issues were resolved through various methods by the evaluation contractor's team of experienced engineers. Finally, nomographic tools were developed to simplify analysis of stormwater reduction and minimize costs.