Toilet Talk: How Replacing Toilets Can Increase Sustainability, Equity, and Quality of Life

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Background

- Seattle Public Utilities (SPU) assists its low-income customers through the Low-Income Water Conservation programs.
- These programs reduce utility bills for low-income customers while also conserving water by replacing old/inefficient toilets in low-income homes with highly efficient models.
- The purpose of this study was to determine the remaining water conservation and bill reduction potential of these programs and explore alternative program pathways to increase this potential.

Figure 1: Older toilets manufacture before 2004 can use up to 7 gallons per flush (gpf), whereas newer models can use as few as 1.1 gpf.

Research Questions

- What is the remaining potential of existing programs?
- What is the level of program participant satisfaction?
- What should the future of Low-Income Water Conservation look like?

Internship & Methods

For my internship, I assisted SPU in analyzing the Low-Income Water Conservation programs. This analysis included:

- Determining the categorization and distribution of low-income households in Seattle.
- Projecting the water conservation and bill reduction potential of the current program scope using a computer model.
- Conducting a telephone survey of program participants to determine the level of program satisfaction.
- Researching potential program alterations and estimating the conservation potential of these changes.

Results

Remaining Potential

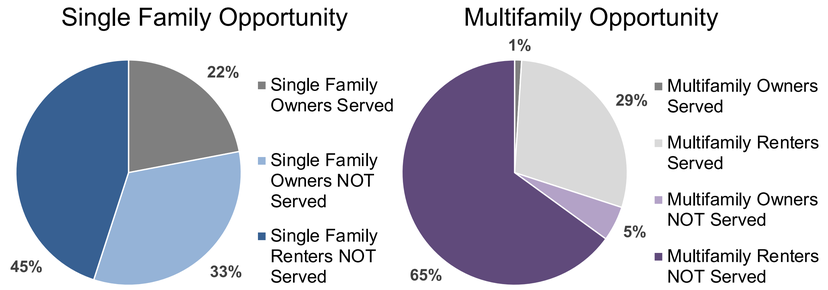

Figure 2: Low-income defined as less than 80% of state median income. Data obtained from Puget Sound Regional Council.

- As seen in Figure 2, about 22% of total single-family (SF) and 30% of total multifamily (MF) low-income households have been served by SPU's Low-Income Water Conservation programs.

Participant Satisfaction

Key findings from participant survey:

100% reported that the new toilet works better than the old one.
100% reported that they would recommend this service to a friend.
88% reported that they are very satisfied with the new toilet.

Future of Water Conservation

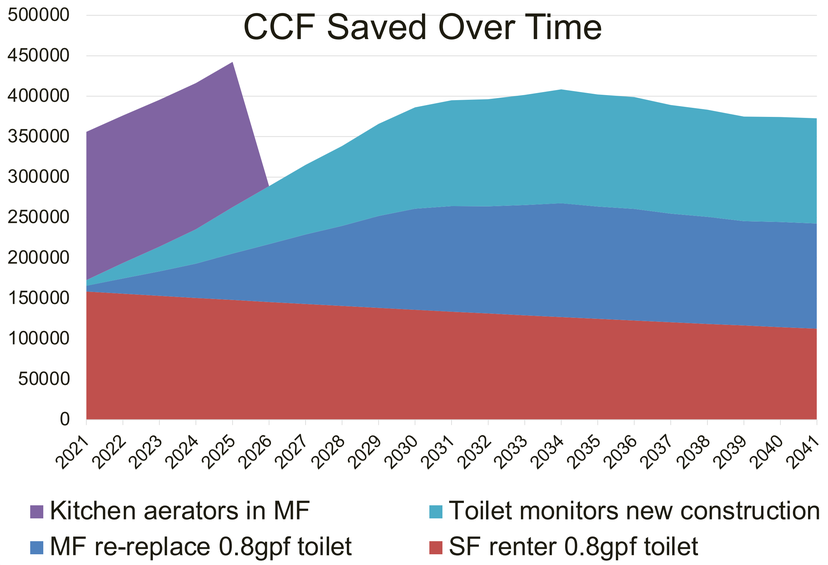

Figure 3: Centum Cubic Feet (CCF) of water saved over time for each potential alteration, as projected by Excel model. One CCF is approximately 748 gallons.

Key Takeaways

- There is still a significant level of water conservation and bill reduction potential within the current scope of the Low-Income Water Conservation programs.
- These programs have the potential to significantly increase the quality of living for participants, specifically participants who are elderly or disabled.
- There are several program alterations which could increase the water conservation and bill reduction potential, such as expanding program qualifications and replacing additional fixtures (as seen in Figure 3).

Figure 4: The implementation of aerators in kitchen faucets holds the potential to conserve up to 450,000 CCFs of water within the next five years.

Broader Significance

- These results are important because they present an opportunity for utility companies across the world to increase system sustainability and economic equity within their communities.
- As climate change threatens the longevity of valuable natural resources, disadvantaged communities will suffer the most.
- By creating programs which conserve resources while uplifting disadvantaged communities, utility companies can help mitigate the impacts of climate change while also strengthening economic equity and environmental justice.

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