Highland Park Water Conservation and Efficiency Initiative

Background
The City of Highland Park established a water conservation and efficiency initiative with the following core elements.

- Establishment of a 3-tier "Conservation Rate" Water Pricing Plan
- Implementation of Odd/Even Sprinkling Schedule
- Requirement of Smart Sensors on (new) Lawn Sprinkler Systems
- A Public Education Plan

Approach
The main component of this initiative, the 3-tier conservation water pricing plan, presented a number of challenges. The City's charge was to devise a revenue neutral pricing structure which would also result in conservation of water through reduction in lawn irrigation. While there is a wealth of information available on conservation rate implementation, there is little in the way of models to predict the consumer response. Review of the literature indicated that response is widely variable, influenced considerably by regional and demographic factors. This introduces an element of uncertainty into the development of the rate plan. It was agreed that annual reviews would be necessary to assess the program’s influence on conservation behavior and on revenue and make necessary adjustments to the rate structure.

Results
The City implemented the new tiered water rate plan effective July 1, 2014. Citizens utilizing a higher volume of water may see changes in water rates. The majority of single-family customers in the City consume water at a rate that will remain unaffected by the new initiative.
Sprinkling restrictions, which are effective May 15 until September 15 of each calendar year, prohibit sprinkler use between the hours of 12:00 p.m. and 6:00 p.m. and limit lawn irrigation to odd/even days that correspond with the property's address (odd numbered properties are permitted to use sprinklers on odd numbered days and even numbered properties are permitted to use sprinklers on even numbered days).

The installation of smart sensors will prevent sprinklers from running during rain events. Effective May 1, 2013 all newly installed lawn irrigation systems are to be equipped with weather-based sensors that meet USEPA WaterSense standard.

UPDATE: In June 2014, Highland Park was awarded the 2014 Wege Small Cities Sustainability Best Practices Award by the Great Lakes and St. Lawrence Cities Initiative for it Water Conservation Initiative. More information about this award and this year’s recipient can be found here: [http://highlandpark.suntimes.com/2014/06/26/great-lakes-mayors-honor-highland-park-water-conservation-measures/](http://highlandpark.suntimes.com/2014/06/26/great-lakes-mayors-honor-highland-park-water-conservation-measures/)

**Contact**
Highland Park water conservation and efficiency initiative:

**Contact**
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Title of Project or Activity
Water Conservation and Efficiency Initiative

Start date of project
February 2013

Status of Project
On-Going

Description of Project
This initiative is the culmination of much research and deliberation. Its core elements are:

- Establishment of a 3-tier “Conservation Rate” Water Pricing Plan
- Implementation of Odd/Even Sprinkling Schedule
- Requirement of Smart Sensors on (new) Lawn Sprinkler Systems
- A Public Education Plan

On the face of it, these seem to be simple actions, easily implemented. Once we our task force discovered that this would be far from reality.

Establishment of a 3-tier “Conservation Rate” Water Pricing Plan
The main component of this initiative, the 3-tier conservation water pricing plan, presented a number of challenges. Our charge was to devise a revenue neutral pricing structure which would also result in conservation of water through reduction in lawn irrigation. While there is a wealth of information available on conservation rate implementation, there is little in the way of models to predict the consumer response. Review of the literature indicated that response is widely variable influenced considerably by regional and demographic factors. This introduces an element of uncertainty into the development of the rate plan. It was agreed that annual reviews would be necessary to assess the program’s influence on conservation behavior and on revenue and make necessary adjustments to the rate structure.

Challenge #1 Target Customer Classifications:
The first step in developing the tiered rate structure was to identify which customer groups should be targeted. Within our community the bulk of the water customers are single-family residential homes. This group was identified as having the greatest opportunity to reduce discretionary water use as compared to the other groups such as multifamily residential, commercial, industrial and institutional customers.

Approximate one half of the water produced by the Highland Park water utility is sold to nearby communities under long-term water delivery contracts. These contracts did not provide for changes in the rate structure.

Challenge #2 number and size of steps:
The task force analyzed several years of water consumption data in order to categorize typical seasonal water use within the residential customer classification. This enabled identification of logical points for the step increases. For the sake of ease in

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Implementation and communication to the public, a simple 3-tiered structure was selected comprised of:

- Base Rate for up to 60 CCF/Quarter ($1.81/CCF 2013 rate)
- Tier 1 61-80 CCF/Quarter - 10% higher than the Base Rate ($1.91/CCF)
- Tier 2 81 & above CCF/Quarter - 15% higher than the Tier 1 ($2.08/CCF)

Challenge #3 step rate increase amount:
Determination of the amount increase for each step once again relied upon analysis of the historical water consumption data, while keeping the revenue neutral goal in mind.
The amount needed to be large enough to encourage conservation yet not unduly burdensome to our customers.

Other issues:
The residential meters in Highland Park are billed quarterly and estimated during the winter quarter because most are in Parkway meter vaults and inaccessible during winter. For this reason the tiered rate structure is applied only to meter readings during the summer months. The system can result in a lay between consumption and billing of several months. This does not result in a “price signal” to the customer at the time of consumption reducing the influence on behavior. The city's long-term capital plan provides for conversion to an automated meter reading (AMR) system which will enable more frequent meter readings.

Implementation of Odd/Even Sprinkling Schedule
While odd even spring are commonplace, unexpected problems arose in implementation in Highland Park.

Highland Park established an ordinance stipulating that homes with odd numbered addresses water their lawns only on odd-numbered days and even-numbered addresses on even-numbered days.
The most common issue is that of months with odd numbers of days. Most lawn irrigation control systems are not sophisticated enough to skip August 1 friend since where consecutive odd-numbered days occur. The systems also are commonly programmed on a weekly basis. So residents who typically water on alternate days, say Monday Wednesday and Friday, would be out of compliance every other week unless they adjusted their system manually.

2017 UPDATE
Since this initiative was implemented in 213, a number of changes and improvements have been made.

AMR: Highland Park has upgraded its metering system to a Neptune R450 fixed network AMR (Automated Meter Reading) system. This $5.5 million project began in 2014 with completing in the fall of 2017. It involves replacement of 6,000 water meters, installation of 10,000 Meter Interface Units (MIUs) and installation of 8 network collectors throughout the City. This system features software which ‘flags’ accounts with use patterns indicative leaks, enabling prompt alerting of customers.

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and reducing lost water. For technical details, see: https://www.neptunetg.com/catalogs/NTG-807-InteractiveCatalog/files/assets/common/downloads/publication.pdf  Future plans include provision of an internet consumer web portal ‘dashboard’ whereby residents can monitor their water consumption.

Leak Spy: Incorporated into the new AMR system is a network of 644 acoustic ‘Leak Spy’ devices which ‘listen’ for the telltale signature sounds of water leaks. Daily reports identify possible/suspected/probable leaks which can then be pinpointed using our leak Correlator.

Bill Inserts: Water conservation inserts are sent with bills from time to time.

Social Media: Highland Park has developed a comprehensive social media outreach program incorporating posts and ‘tweets’ encouraging water conservation with an average of 20 per year on topics such as Drinking Water Week, Imagine a Day, Smart Irrigation Month & the like.


Water Tower Display: Inspired by a display in Surprise AZ, we designed our own ‘Water Tower’ display to illustrate the amount of water that we use every day in a typical household. It is comprised of 35 five-gallon jugs (175 gallons) arranged in a five-tier pyramid with an accompanying descriptive easel board. This display is kept at the Water Plant and used for school tour groups and recently traveled to the Public Library to promote Drinking Water Week during which the Library set up a companion display and provided a water-themed reading list.

Impact of Tiered Rates: Measuring the impacts, both conservation and revenue, has proven problematic. The weather-influenced year to year variability of water demand is significant and masks variations that the Conservation pricing rate structure might be producing. An analysis with any promise of measuring this effect would require normalizing, perhaps by comparison to the water consumption fluctuations in neighboring water systems which do not employ conservation pricing. Our peak:non peak water sales ratio could be adjusted by the neighboring communities’ ratios to factor out the influence of weather. With 10,000 retail accounts which are billed on a staggered, rotating quarterly schedule, there is a great deal of data to analyze. Such analysis is beyond the skill set and available man-hours at the Water Plant and may require professional/grad student assistance.

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Highland Park ‘Water Tower Display at public Library for Drinking Water Week