



THE UNIVERSITY OF TEXAS AT AUSTIN

McCOMBS
SCHOOL OF BUSINESS

BizIT 2007 Business Case Competition

February 2007

Background

Although we generally believe water conservation is an issue for the plains of Africa, the United States is increasingly finding itself falling victim to a shortage of water, one of the nation's most precious resources. Initially a problem for desert communities such as Las Vegas or Phoenix, water shortages have spread as the population has shifted and grown and water demand has increased. These changes not only affect quality of life, but have significant economic and social implications that will increasingly weigh upon the United States. Historically, local and state governments have attacked the problem through forced regulation, and in some cases rationing. These methods are typically passive and rely on manual efforts such as "patrolling" of neighborhoods and commercial properties. Unfortunately, the use of technology has not yet made widespread inroads to reduce waste and enable users to better manage their water use.

The city of Austin mirrors the expanding national concern. Austin receives most of its water supply from the Colorado River via the Lower Colorado River Authority (LCRA), which supplies numerous municipal, state, and commercial factions. Austin has purchased rights to a set amount of water, but faces financial penalties and shortages if it exceeds that amount. While supply might be set, demand continues to increase as demographics and use patterns change. On the peak day in 1996, Austin consumed about 195 million gallons of water (excluding industrial usage). Even with conservation efforts, this grew to about 240 million gallons of peak day use in 2006. (See *Chart 1 in the Appendix for Historical Peak Demand*)

The City of Austin

The city of Austin owns the water system for the city and has two primary focuses for water conservation – total usage and peak day.

- *Total usage* represents total water consumption over one year. Austin purchases water from the LCRA according to annual use and will pay a penalty when it exceeds a certain amount. Therefore, reducing total usage will delay hitting that payment trigger.
- *Peak day* represents the day of the year which recorded the most water use of any single day. Austin's water treatment capacity must be able to meet that peak day. Expanding peak day capacity would require significant investment in new water processing facilities.

Water use impact goes beyond direct financial implications. The city's ability to grow and attract new businesses is dependant on demonstrating sustainable access to water. Water use also impacts quality of life and the local environment. For example, the city of Austin estimates that reducing water use by 25 million gallons per day would have an air quality effect equal to removing 5000 cars from the road through the reduction of inputs such as water treatment.

Water use in Austin is similar to other Southwestern cities. For example, single family residences represent the largest users of water, consuming about 40% of Austin's water during an average summer. Commercial usage and multi-family usage follow at 29% and 18% respectively.

Summer water usage in the City of Austin as a percent of total water usage:

Residential	40%
Commercial	29%
Multi-family	18%
Wholesale	8%
Industrial	5%

Source: City of Austin¹

¹ *City of Austin Web Site*

Outdoor Usage

While much of the focus of water conservation has been on indoor use such as toilet flow and leaky taps, the percentage of outdoor water use has increased. Chart 2 in the Appendix shows that, in a sample of cities, over 58% of residential water use was outdoor. As with Austin, a majority of the cities in this sample were in arid, southern locations. This not only has a major effect on total water used, but has an overwhelming effect on peak day usage.

In a University of Colorado report entitled "Nature of Residential Water Use and Effectiveness of Conservation Programs," James Heaney notes:

For residential areas in the more arid and warmer parts of the country, lawn watering is the largest single use on an annual average basis and is the dominant component of peak daily and hourly use during the summer months. A growing number of people are installing automatic sprinkling systems. These systems tend to use more water than manual systems (Mayer 1995). Also, the timers on these systems are seldom adjusted. Thus, lawn watering occurs even during rainy periods. Experience with soil moisture sensors to control sprinkling use has been mixed. Automatic sprinkling systems do offer the potential for more efficient use of water if they are properly calibrated and operated (Courtney 1997).²

Grant Competition

In 2006, Austin, Texas created a Water Conservation Task Force to define initiatives that could achieve Austin's goal of reducing water use by 1% per year. On January 12, 2007, the Task Force presented their final summary and conservations strategies analysis.

In addition to the initiatives proposed, the city decided to spur new solutions by offering a grant of \$500,000 dollars as part of a competition to reduce outdoor water use³. The winner will be the submission that provides an implementation plan for the most innovative and economically viable landscaping conservation solution.

The goal in funding the competition is to drive new innovation in conservation. The competition does not require that the city itself be the recipient or developer of the technology. In fact, there is no requirement that the city play any part in the proposed solution if the city's goals are met. The competition does require financial and market viability, with a technology and market plan that could be expanded to other cities.

Requirements

- To design a smart landscaping irrigation system that meets the needs of commercial, residential, or multi-family property. The solution could be applicable to more than one property-type.
- To identify the non-recurring engineering (NRE) costs to design, build and deploy prototypes.
- To estimate potential ROI for at least one market segment (commercial, residential, or multi-family) over a three-year period including purchase, installation and maintenance.
- To provide an execution plan that indicates partners and sales channels.

Rainwater Inc

Rainwater Inc sells irrigation systems for commercial and home uses. With products ranging from sprinkler and drip irrigations systems to electronic control systems, Rainwater develops, manufactures, and markets various products lines through different channels and to different

² <http://bcn.boulder.co.us/basin/local/heaney.html>

³ Although the Water Conservation Task Force is real, the grant competition and Rainwater Inc are fictional.

customers. Rainwater ranks fourth in the irrigation industry and has a national distribution network and customer base.

The CEO and founder of Rainwater, Anne Wilkinson, is convinced that the next step for market penetration lies in product differentiation. With this strategy in mind, she has attended a semester-long University of Colorado workshop on water conservation and added Professor Andrew Clew an agriculture irrigation expert from Texas A&M to the Rainwater board. At a recent board meeting, it was decided to use the strategic conservation initiative as an initial target to investigate pursuing enhanced technology beyond basic electronic control systems such as timers. After a search, Rainwater hired Robert Anderson as the Rainwater Chief Technical Officer. Robert has an extensive background in IT systems level design, development and product integration.

Anderson believes that the grant opportunity for the City of Austin is a good opportunity to apply their new path blending technology and conservation. The CTO has hired you 1) to develop a proposal to secure the grant and 2) to provide a plan on how Rainwater can execute your proposal.

To help you get started, the CTO has provided some notes from a recent brainstorming session that was held with various disciplines within the company. The CTO emphasized that these notes are not necessarily correct or pertinent, nor should you assume that a solution should have any of these elements. These notes are simply to provoke the thought process.

Notes from Rainwater brainstorming session:

- Does the weather matter? By season? By city? By customer?
- Does it matter when people water? By month? By day? By hour? To the city? To the owners? To the plants?
- Different plants have different needs, but is there a way to incorporate that?
- Can watering best practices be incorporated?
- The city might know when a peak day is coming. Maybe a day in advance.
- Do we need to include other companies or entities? Is that good or bad?

Rainwater also provided a few preliminary links to begin to think about the problem. There are many more resources out there, and the CTO encouraged you to go further in your research.

Additional background information:

<http://www.ci.austin.tx.us/watercon/taskforce.htm>

<http://www.texaswatermatters.org/conservation.htm>

<http://www.cabq.gov/waterconservation/insert.html>

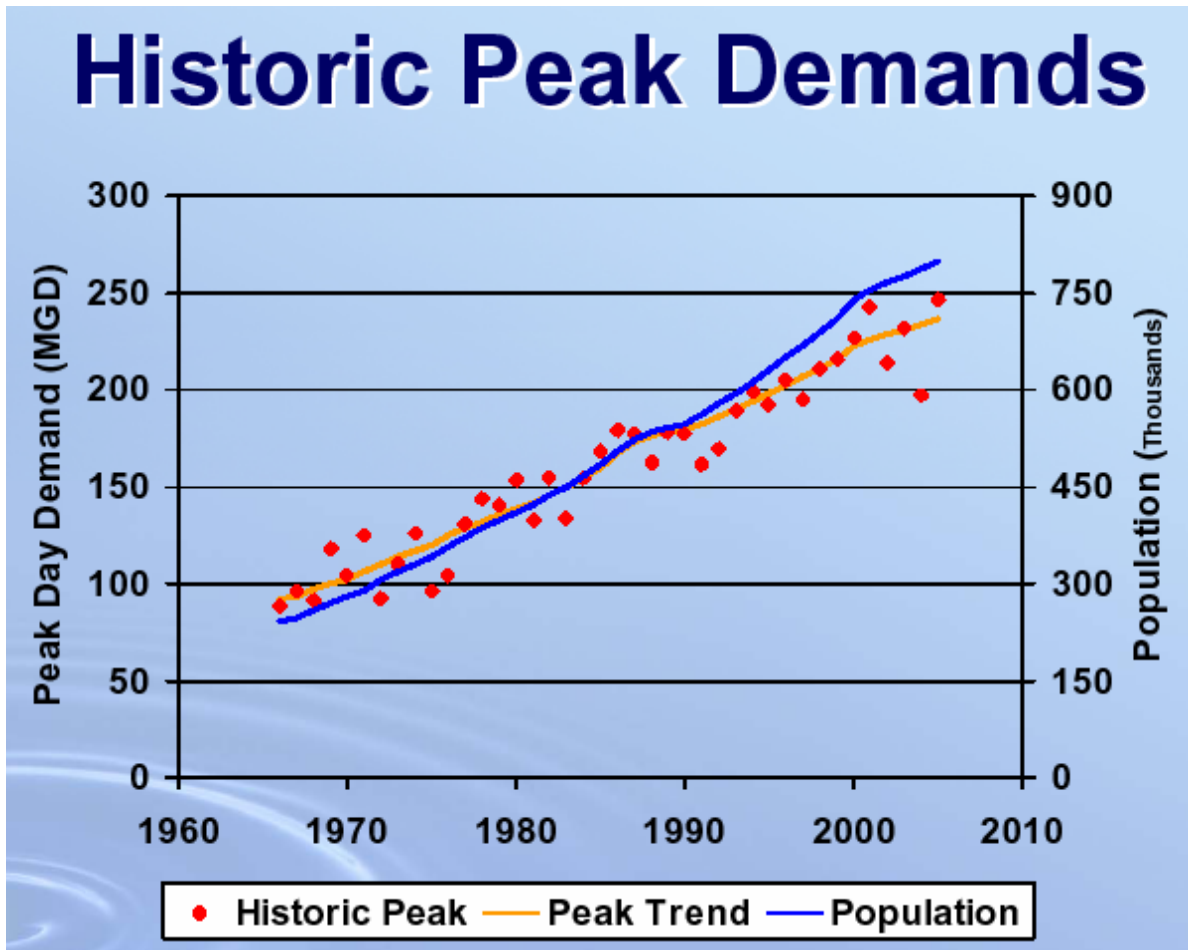
<http://www.cabq.gov/waterconservation/outdoor.html>

Proposal Evaluation

Your proposal to Rainwater, Inc. will be evaluated based on, but not exclusively limited to:

- Soundness of the business plan/proposed solution
 - Understanding of the market, sales channels, and customers
 - Understanding of who Rainwater would need to work with to execute your proposal
 - Understanding of the competitive environment/alternatives in the market
 - Understanding of the business model/value for Rainwater
 - Soundness of business case and risk analysis
- Financial viability
 - Soundness of cost analysis
 - Soundness of ROI and payback assertions
- Solution viability
 - Whether proposal meets Rainwater's requirements
 - Whether the proposal meets the City of Austin's needs
 - Usability (ease and method of use)/reliability/scalability of proposed technical solution
 - Soundness of creativity
- Innovation and product differentiation
- Presentation quality on all points listed above and presentation persuasiveness

Chart 1:
City of Austin Historical Peak Water Demands⁴



Source: Austin Water Utility, June 8 2006

⁴ Austin Water Utility, Presentation to City of Austin June 8 2006

Chart 2.
Annual indoor and outdoor water use for 1,000 houses in each of 12 cities. ⁵

	1,000 gallons per house per year			%	%
Study Site	Total	Indoor	Outdoor	Indoor	Outdoor
Boulder, CO	134.1	57.4	76.7	42.8%	57.2%
Denver, CO	159.9	64.4	95.5	40.3%	59.7%
Eugene, OR	107.9	63.9	44	59.2%	40.8%
Las Virgenes, CA	301.1	71.6	229.5	23.8%	76.2%
Lompoc, CA	103	62.9	40.1	61.1%	38.9%
Phoenix, AZ	172.4	71.2	101.2	41.3%	58.7%
San Diego, CA	150.1	55.8	94.3	37.2%	62.8%
Scottsdale/Tempe, AZ	184.9	61.9	123	33.5%	66.5%
Seattle, WA	80.1	49.5	30.6	61.8%	38.2%
Tampa, FL	98.9	53.9	45	54.5%	45.5%
Walnut, CA	208.8	75.3	133.5	36.1%	63.9%
Waterloo, ON	69.9	54.3	15.6	77.7%	22.3%
Average	147.6	61.8	85.8	41.9%	58.1%
Standard Deviation	64.80	8.00	58.98		
Coefficient of Variation	0.44	0.13	0.69		
<p>Estimates are based on one year of monthly meter readings. Indoor water use is estimated by averaging water use during the non-irrigation season.</p>					

⁵ <http://bcn.boulder.co.us/basin/local/heaney.html>