

This presentation premiered at WaterSmart Innovations

watersmartinnovations.com



Helping Homeowners Conserve Water by Providing Access to Hourly Water Consumption Data

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Zachry Department of
CIVIL ENGINEERING
TEXAS A&M UNIVERSITY



TEXAS A&M
AGRI LIFE
RESEARCH | EXTENSION

TWRI Purpose

- ⦿ **Plan, facilitate, and conduct research** to aid in the resolution of State and regional water and natural resource related issues
- ⦿ **Promote technology transfer** and dissemination and application of research results
- ⦿ **Provide for training** of scientists and engineers

Background and why AMI?

- ⦿ Municipal conservation is expected to provide 19% of 2060 municipal supply needs in Texas (*2012 Texas State Water Plan*)
- ⦿ Ongoing conservation programs include rate structure, rebates, educational curricula, drought stage restrictions
- ⦿ Can providing consumers with data be used as another conservation program?

Additional Research Question - Can existing data be used to target conservation programs?



Page Select

Customer Water Usage

View your personal water usage

[View Usage](#)

Customer Support

As a customer service representative, you have the ability to view other customers' water usage etc.

[View Dashboard](#)



Customer Support

View Customer Usage

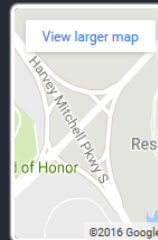
Enter a customer's account ID or email address to view their usage dashboard the way they would see it.

Account ID/Email

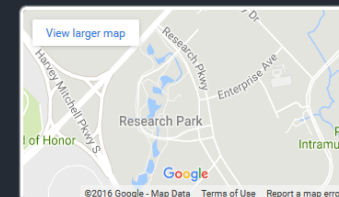
[Open Dashboard](#)

View Support Questions/Feedback

Texas Water Resources Institute
1500 Research Parkway A110
2260 TAMU
College Station, TX 77843-2260
meterstudy@tamu.edu



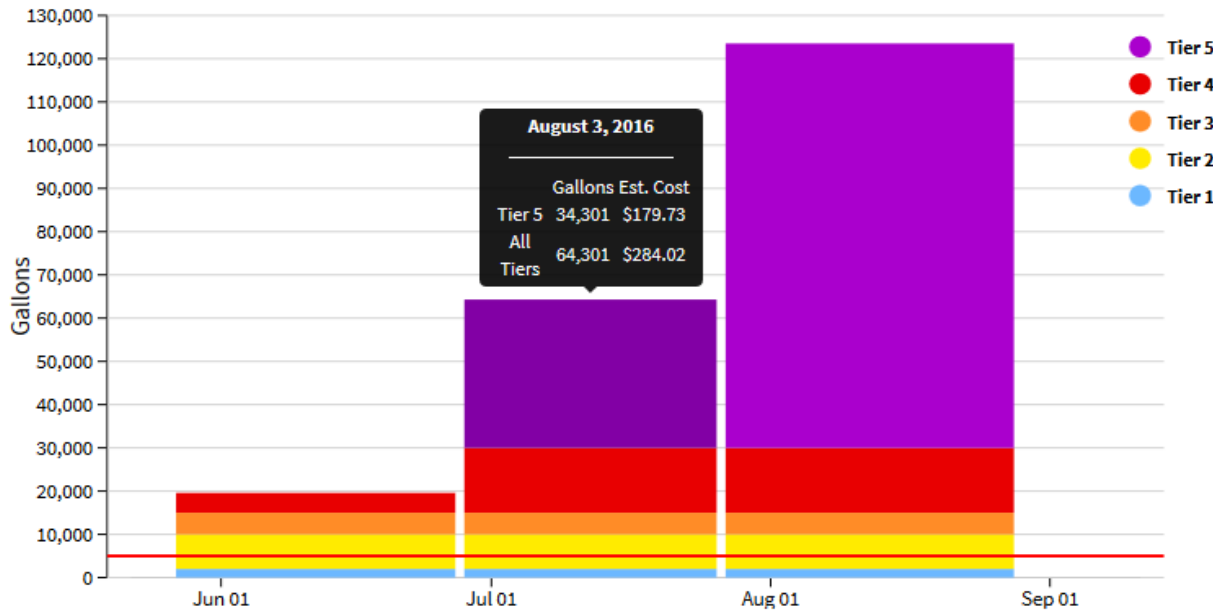
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View Cost Change Meters ▾ Download ▾

Billing Periods for Account 999999990-S077854447



Date	Usage (gallons)
July 6, 2016	19,591
August 3, 2016	64,301
September 6, 2016	123,530

Current Billing Period

\$684.03	123,530
EST. ACTUAL COST	GALLONS USED
\$600.95	123,530
PROJ. COST	PROJ. GALLONS

How is my bill estimated?

Please take a few minutes to [take a survey](#) about your water consumption.

Current Tiered Usage

Tier 5
93,530
gallons consumed

Current Progress through Tiers



[Help](#)

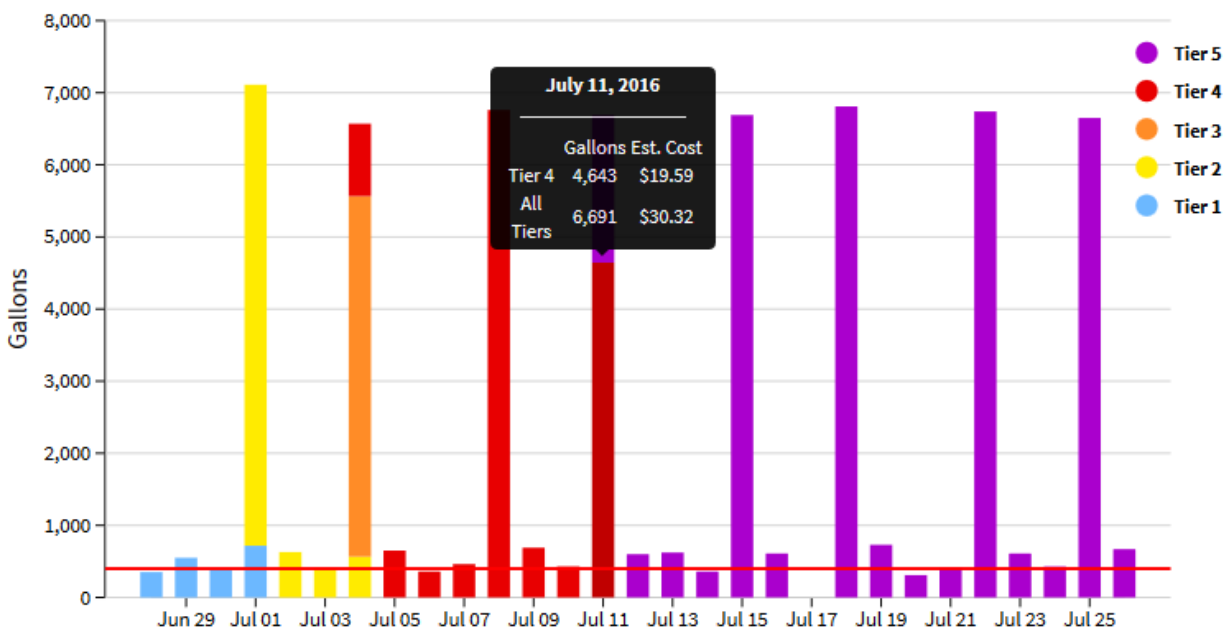
[↑ Billing Periods](#)

[View Cost](#)

[Change Meters ▾](#)

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Usage for August 3, 2016 Billing Period



[Previous](#)

[Next](#)

Date	Usage (gallons)
June 28, 2016	352
June 29, 2016	550
June 30, 2016	380
July 1, 2016	7,111
July 2, 2016	630

Current Billing Period

\$684.03

EST. ACTUAL COST

123,530

GALLONS USED

\$600.95

PROJ. COST

123,530

PROJ. GALLONS

[How is my bill estimated?](#)

Please take a few minutes to [take a survey](#) about your water consumption.

Current Tiered Usage



Current Progress through Tiers



Help

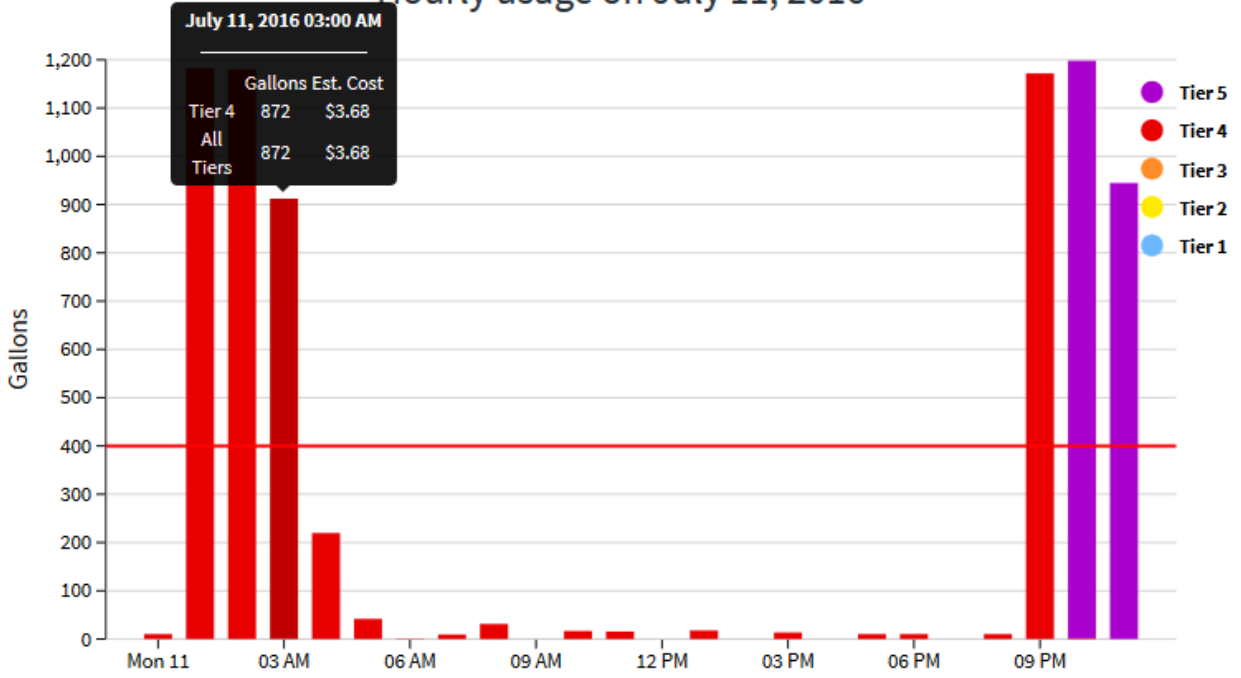
August 3, 2016 Bill

View Cost

Change Meters

Download

Hourly usage on July 11, 2016



Previous

Next

Date	Usage (gallons)
July 11, 2016 12:00 AM	10
July 11, 2016 01:00 AM	1,130
July 11, 2016 02:00 AM	1,128
July 11, 2016 03:00 AM	872
July 11, 2016 04:00 AM	210

Current Billing Period

\$684.03
EST. ACTUAL COST

123,530
GALLONS USED

\$600.95
PROJ. COST

123,530
PROJ. GALLONS

How is my bill estimated?

Please take a few minutes to [take a survey](#) about your water consumption.

Current Tiered Usage

Tier 5
93,530
gallons consumed

Consumer Web Portal

⦿ Implemented Features

- ⦿ Usage per month, day, hour
- ⦿ Estimated bill amount
- ⦿ Multiple account support
- ⦿ Utility Dashboard
 - ⦿ For customer service

⦿ Upcoming features

- ⦿ Mobile App
- ⦿ Email alerts
 - ⦿ Leak alerts
 - ⦿ High usage alerts
- ⦿ Consumer Reports
 - ⦿ - Including Conservation tips
- ⦿ Neighborhood Comparisons
- ⦿ Indoor/Outdoor Use Estimates
- ⦿ Utility Dashboard
 - ⦿ - For spatial viewing of water use

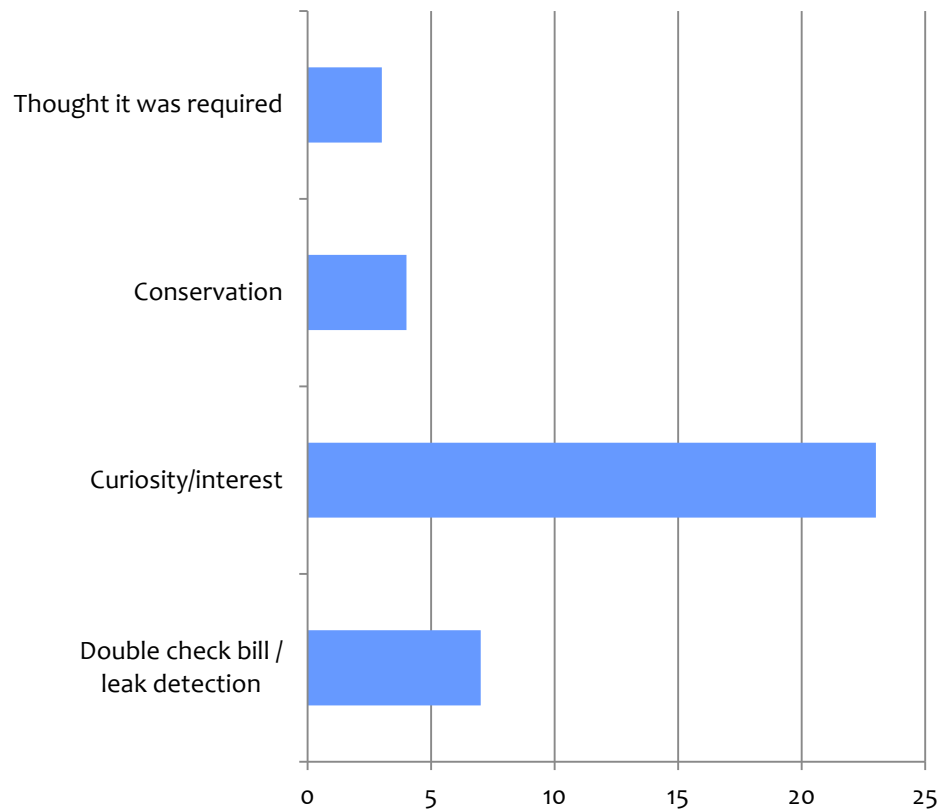
Consumer Survey

- ⦿ Conducted during June, July and August 2014
- ⦿ 9,131 invitations distributed via email
- ⦿ 1,270 respondents
- ⦿ 14% response rate

Free-form survey responses

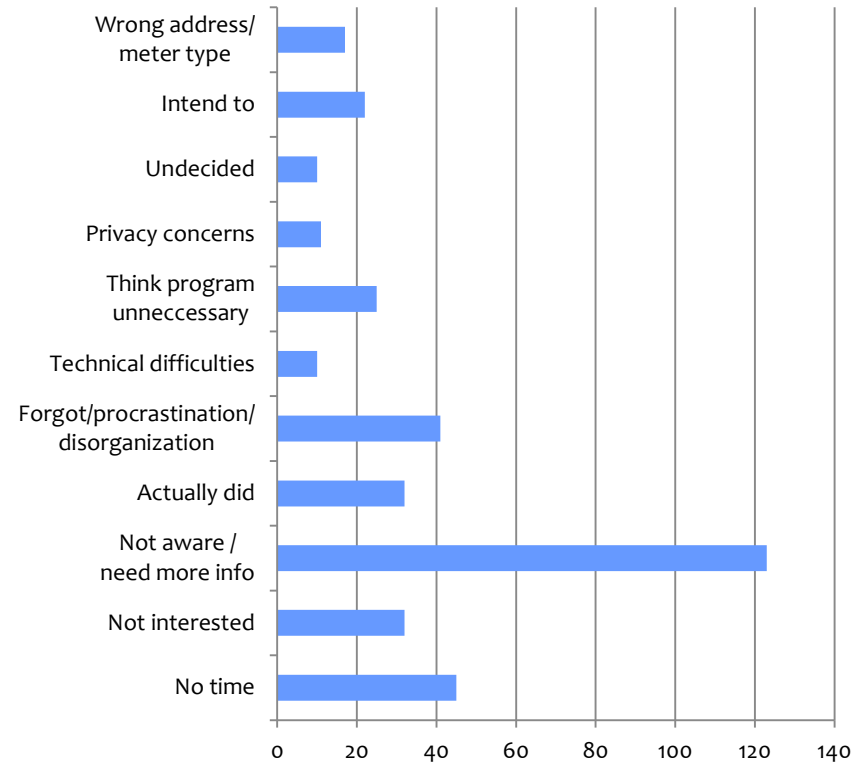
Web portal users

Reasons FOR signing up



Web portal non-users

Reasons for NOT signing up



Post Evaluation – Summer 2015

⊙ Access Web Portal Using –

- ⊙ 82% personal computer
- ⊙ 9% smart phone
- ⊙ 8% tablet

⊙ Frequency of Accessing Web Portal

- ⊙ 22% at least once a week
- ⊙ 38% at least once a month
- ⊙ 39% less than once a month

⊙ 81% have a better understanding of how much water is used in the home

⊙ 54% have changed their behavior as a result of being able to see usage

- ⊙ Using less outdoor
- ⊙ In home leak identification

n=174

Do portal users use less?

- ⦿ Analysis is currently ongoing
- ⦿ Preliminary results indicate average:
 - ⦿ Wintertime 2014/2015 reduction of 8.7% by users
 - ⦿ Summertime 2015 reduction of 17% by users
 - ⦿ Wintertime 2015/2016 reduction of 5% by users

Challenges for assessment

- ⦿ Abnormal weather patterns in Arlington in 2014
 - ⦿ Well-timed rains depressed outdoor water use for all users (AMI and non-AMI)
 - ⦿ Drought restrictions not constant

- ⦿ While adequate, smaller sample size than desired

Other Activities

Developed 2 Guidebooks

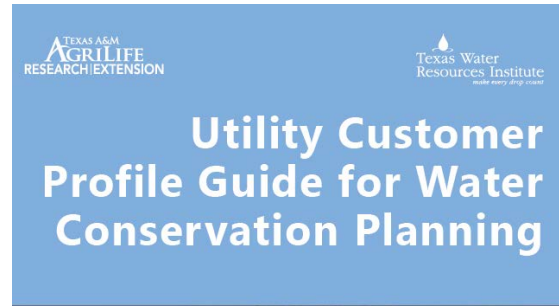
- Considerations for Adopting AMI and AMR
- Utility Customer Profile Guide for Water Conservation Planning

Publications Submitted

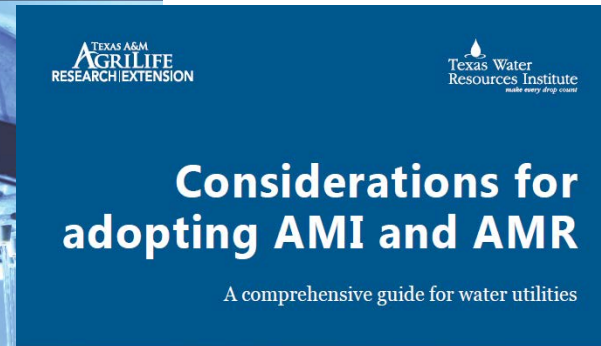
- A Comparison of Water Consumption Between Web Portal Users and Non-Users: Pre and Post Intervention Analysis
- A Review of Literature Regarding Feedback Communication to Promote Conservation

AMI Trainings (Partnering with Johnson Controls Inc.)

- 8 training statewide – 124 attendees



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EM-119

Utility Customer Profiling Guidebook

2009 Winter

Levels	1	2	3	4	5	6
1	149	224	348	383	280	401
2	478	514	739	558	233	137
3	549	840	1257	1062	506	244
4	366	616	1203	1223	708	316
5	161	315	582	763	540	303
6	83	148	334	457	381	372

2010 Winter

Levels	1	2	3	4	5	6
1	365	461	681	704	399	255
2	779	929	1072	723	225	66
3	662	985	1299	948	294	82
4	496	737	1096	828	262	79
5	260	378	687	494	174	66
6	135	221	355	333	167	76

2011 Winter

Levels	1	2	3	4	5	6
1	188	247	350	342	232	222
2	424	475	597	446	170	68
3	553	694	1006	761	350	144
4	457	739	1136	1055	488	198
5	283	548	902	909	529	189
6	170	341	690	871	574	424

2012 Winter

Levels	1	2	3	4	5	6
1	321	357	515	450	237	206
2	676	757	846	509	169	51
3	735	960	1216	864	331	104
4	564	810	1230	934	428	114
5	347	515	765	641	286	111
6	150	282	478	436	233	146

2013 Winter

Levels	1	2	3	4	5	6
1	484	594	761	749	446	415
2	761	891	1079	826	346	139
3	543	786	1178	1086	548	236
4	278	490	801	876	581	242
5	132	203	408	492	371	192
6	25	85	161	207	179	182

2009-2010

2009-2010 Winter

Levels	1	2	3	4	5	6
1	216	237	333	321	119	-146
2	301	415	333	165	-8	-71
3	113	145	42	-114	-212	-162
4	130	121	-107	-395	-446	-237
5	99	63	105	-269	-366	-237
6	52	73	21	-124	-214	-296

2010-2011

2010-2011 Winter

Levels	1	2	3	4	5	6
1	-177	-214	-331	-362	-167	-33
2	-355	-454	-475	-277	-55	2
3	-109	-291	-293	-187	56	62
4	-39	2	40	227	226	119
5	23	170	215	415	355	123
6	35	120	335	538	407	348

2011-2012

2011-2012 Winter

Levels	1	2	3	4	5	6
1	133	110	165	108	5	-16
2	252	282	249	63	-1	-17
3	182	266	210	103	-19	-40
4	107	71	94	-121	-60	-84
5	64	-33	-137	-268	-243	-78
6	-20	-59	-212	-435	-341	-278

2012-2013

2012-2013 Winter

Levels	1	2	3	4	5	6
1	163	237	246	299	209	209
2	85	134	233	317	177	88
3	-192	-174	-38	222	217	132
4	-286	-320	-429	-58	153	128
5	-215	-312	-357	-149	85	81
6	-125	-197	-317	-229	-54	36

Percentile	Bin	Code
≤ 10 th	Vlow	1
25 th	Low	2
50 th	Med	3
75 th	High	4
90 th	Vhigh	5
≤max	Outlier	6

2009-2013 Winter

Levels	1	2	3	4	5	6
1	335	370	413	366	166	14
2	283	377	340	268	113	2
3	-6	-54	-79	24	42	-8
4	-88	-126	-402	-347	-127	-74
5	-29	-112	-174	-271	-169	-111
6	-58	-63	-173	-250	-202	-190

Other Activities Continued

- ⦿ Course - ALEC 625 (Program Evaluation) – Conducted program evaluation for City of Round Rock
- ⦿ Pursuing a copyright through Texas A&M Office of Technology Commercialization
- ⦿ Pursuing NSF I-Corps grant

Future Activities

- ⊙ Measure short and long term reductions
- ⊙ Comparison of other Utilities web portal impacts
- ⊙ Publish peer-reviewed journal articles
- ⊙ Submit grant proposals to continue research
- ⊙ Host educational programs – Fall 2016
- ⊙ Continue pursuing copyright for data processing, development code, and other possibilities identified

Questions?

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