

This presentation premiered at WaterSmart Innovations

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Advanced Meter Fort Collins.



Empowering Customers to Act

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Fort Collins Utilities



Agenda

- Background on Fort Collins Utilities
- Project details
- Web portal
- Conservation and AMI





Fort Collins Utilities

- **Water, Electric, Wastewater and Stormwater Utilities**
- **Water Utility**
 - Serves 85% of City limits
 - Service population ~130,000
 - Conventional treatment plant
 - Two main sources of surface water



Fort Collins Utilities

- **1882: Start of water utility**
- **1977: Water Conservation Program**
- **2003:**
 - 2nd year of major drought
 - Completed water metering project
 - Began water restrictions
 - Implemented IBR rate structure
 - GPCD dropped 25% over next 10 years

Fort Collins Utilities

Water Source: Horsetooth Reservoir, CBT project



Fort Collins Utilities

Water Source: Poudre River





Affects of 500-year rain event on mulch



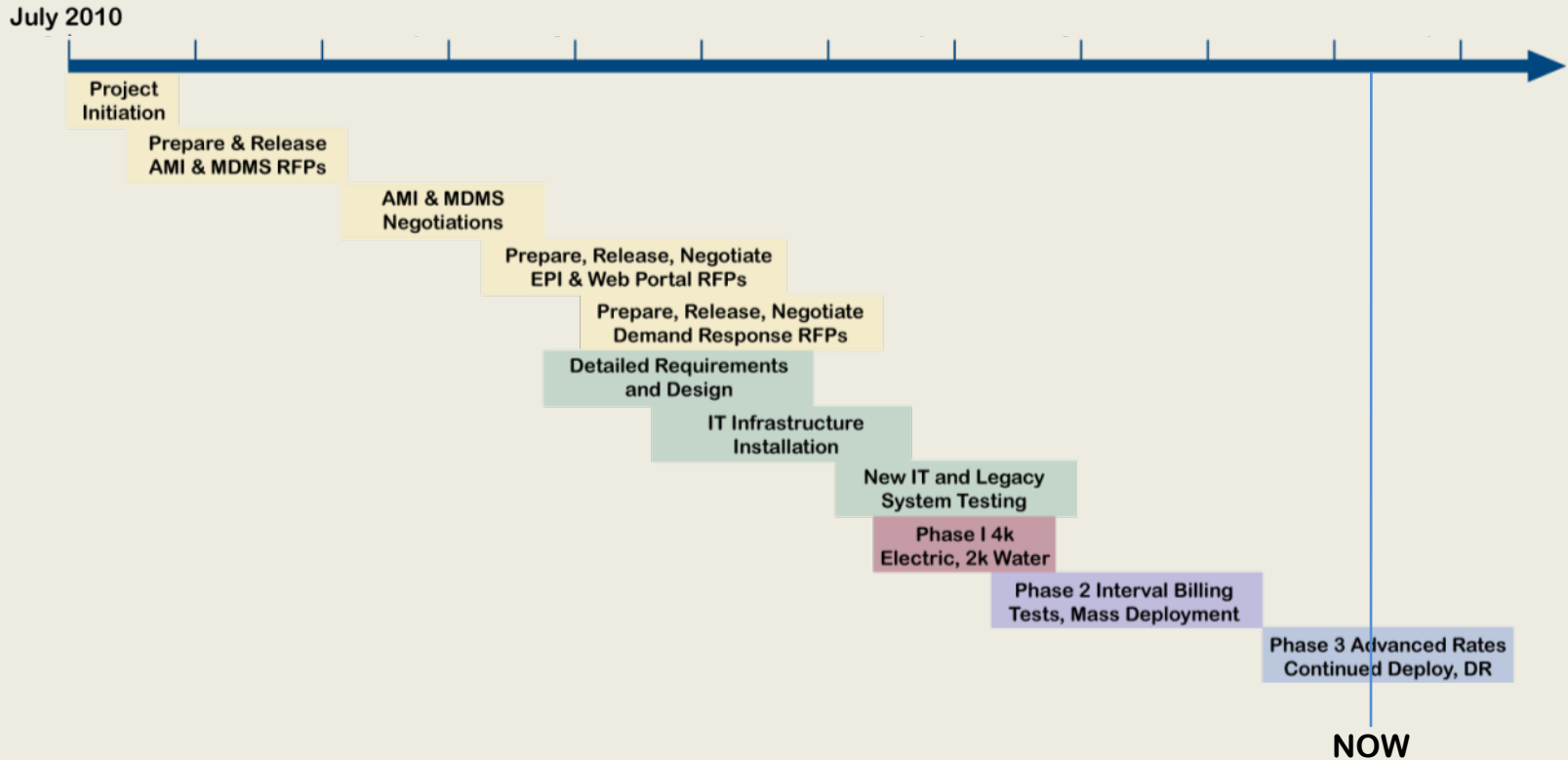


AMFC Project Details



- \$36M total cost, \$16M from Department of Energy grant
- 11-year payback from operational savings (e.g., meter reading)
- Device installations early 2012 through mid-2013

Status: Project Schedule





What are the parts to the system?

- Meters that are capable of transmitting data
- Advanced Meter Infrastructure, or communication network, from meters to utility
- Data management system built to interface with billing system and any customer portals
- Web platform to allow customer interface
- Demand response system to allow automatic signaling to electronic devices based on use or system demands



New Electronic Electric and Water Meters

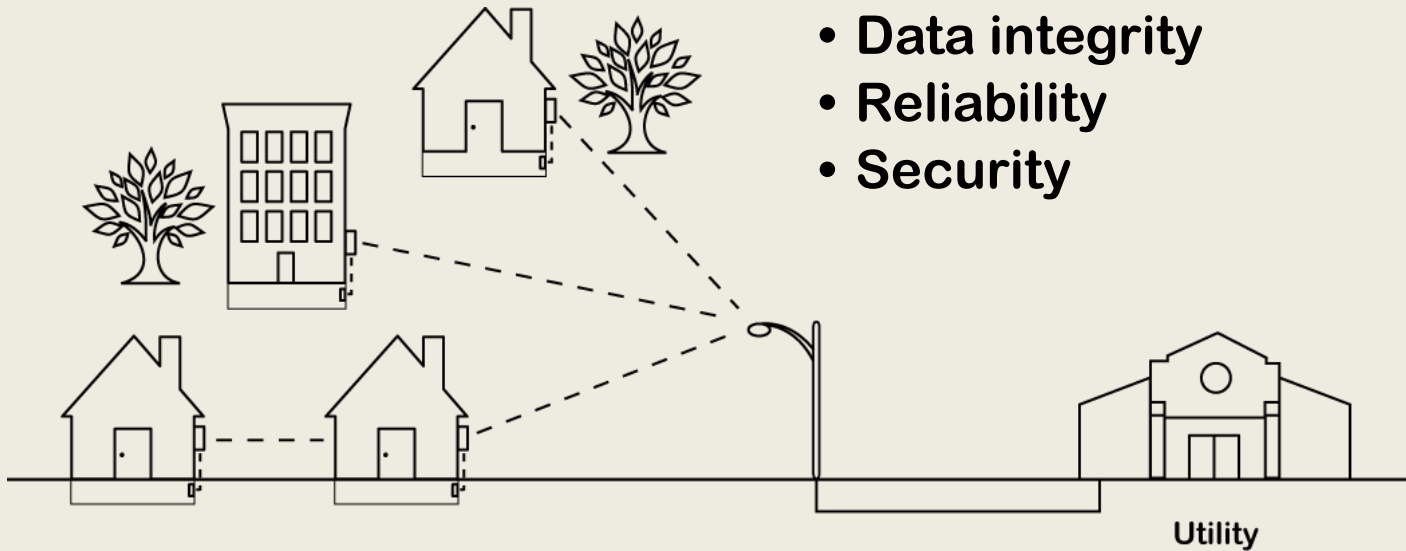


- Replace mechanical meters
- Enable two-way digital communication between the meter and the utility
- Allow Utilities to provide better service to the community
- Water meters are battery powered, sending signal through electric meters



Communication Network

- A field proven, end-to-end network
- Authentication
- Confidentiality
- Data integrity
- Reliability
- Security





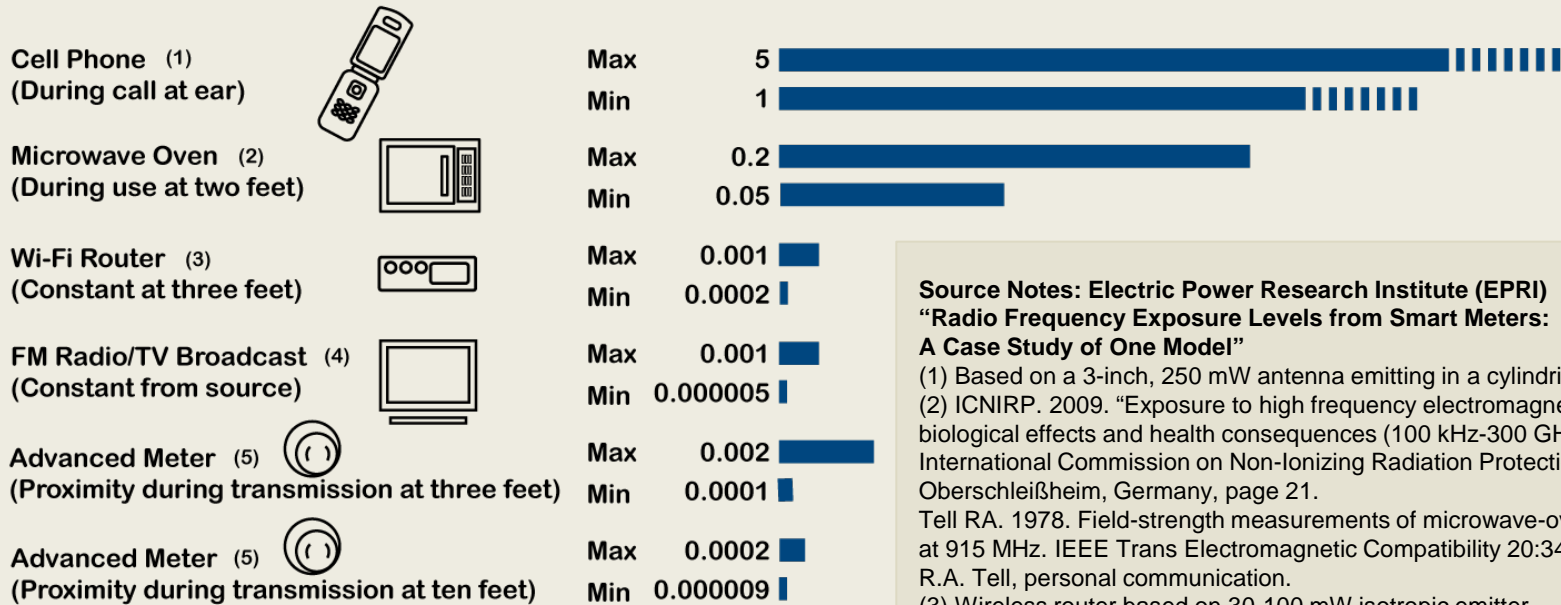
Health



- *There appears to be no health reason to avoid the use of smart meters.”*
 - Excerpt from Dr. Bruce Cooper, Health District of Northern Larimer County, based on his review of various studies
- Levels are significantly less than those from cell phones, microwaves, wireless routers, cordless phones and other common devices.
- Meters transmit only occasionally via a brief signal.



Radio Frequency Exposure Levels*



*All values are shown in milliwatts per square centimeter (mW/cm²).

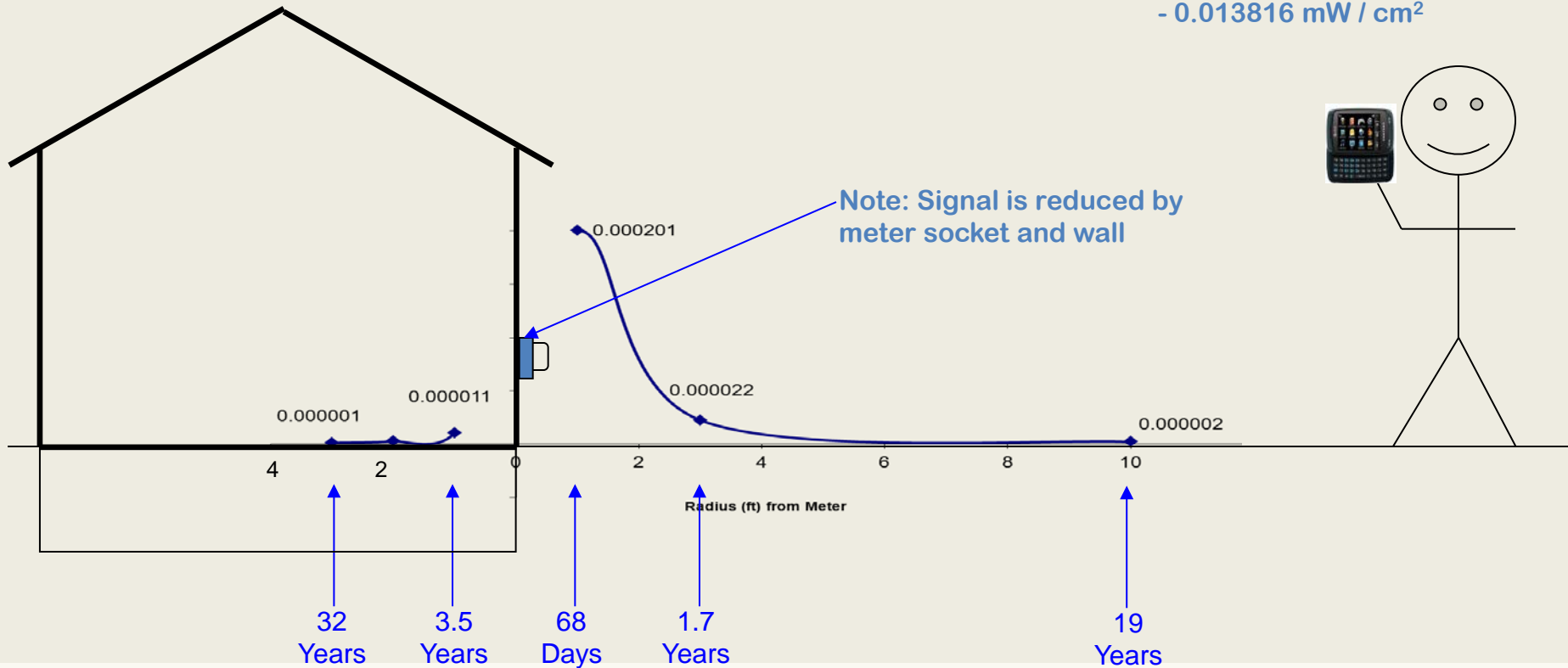
**Source Notes: Electric Power Research Institute (EPRI)
“Radio Frequency Exposure Levels from Smart Meters:
A Case Study of One Model”**

(1) Based on a 3-inch, 250 mW antenna emitting in a cylindrical wavefront.
 (2) ICNIRP. 2009. “Exposure to high frequency electromagnetic fields, biological effects and health consequences (100 kHz-300 GHz).” International Commission on Non-Ionizing Radiation Protection, Oberschleißheim, Germany, page 21.
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 (5) Based on spatial peak power density with 6 dB (x4) antenna gain. Maximum values are based on 5% duty cycle and 1W broadcast power. Minimum values are based on 1% duty cycle and 250mW broadcast power. For instantaneous power density during transmission, multiply the number for minimum values by 100, and the number for maximum values by 20.

Meter RF Exposure Comparison

How long does it take to receive the same time-averaged RF exposure from the advanced metering system that you would receive from one cellular Phone Call?

Cell phone exposure:
 - 5 Minutes at 1 cm from ear
 - 0.013816 mW / cm²



- 1) Values calculated by FCU for meter RF power density are shown in mW/cm², and are calculated based on 0.1% transmit duty cycle (86 seconds per day) and 250mW transmit power.
- 2) Cell phone 50mW transmit power based on FCC data for HTC Thunderbolt smart phone.

Customer Options Summary

Considerations	Option 1 Standard	Option 2 Limited	Option 3 Manual
Functionality and ability to take advantage of new technology; allows full customer benefits	High	Limited	Minimal
Data collected in 15-minute to 1-hour intervals	✓		
Data collected once per day		✓	
Data collected once per month via manual read			✓
Data transmitted several times per day via a brief signal	✓	✓	
No additional customer cost	✓	✓	
No additional system cost	✓		
No monthly service call required	✓	✓	
Supports City Energy Policy	High	Limited	Minimal



Privacy and Security

- **Utilities adheres to strict policies to protect customer information.**
 - **Federal: “Red Flags Rules of the FACT Act”**
 - **Colorado Open Records Act**
 - **internal policies**
- **Security**
 - **Detailed and confidential cyber security plan adopted.**








Goals of the Web Portal

- Provide Electric and Water use information in a timely manner for customers
- Create efficient avenue for them to review and understand their current charges
- Allow easy access to efficiency programs that fit their type of facility and behaviors
- Construct it for residential and commercial accounts
- Work together with Demand Response system

3 new Alerts: [Budget\(2\)](#) , [Projected Budget](#)

  [Settings](#) 

We're on Alert!

Avoid overspending on energy with our alerts and reports [Sign up now!](#)



You've reached your budget!

Billed Energy Report: JUN 01-JUN 31

Jennifer Sanmateo
Acct# *****4219

You have purchased \$23.40 of electricity so far this bill period which exceeds your budget of \$23.00.

Sign up for energy alerts and reports

Welcome back,
FC User9
Account #: E3-FC-9


Current Bill Period ends:
AUG 31

Website updated through:
2013-07-24 01:00

[Edit Profile](#)

Water Costs

\$16
Projected



As of AUG 9
\$14

[Details](#)

Your pricing plan is currently set for Water, Single family (Rate 201)

Water Usage

Usage is normal
+1 %

[Details](#)

Current average daily usage compared to last bill period.

Environmental Impact

Bathtub
0

[Details](#)

Your usage in the current bill period could fill this many bathtubs.

Cost

Usage

Impact

Water Costs

\$16 Projected
 As of AUG 9
\$14

Your pricing plan is currently set for Water, Single family (Rate 201)

What should I be looking for?

Look for a spike in the graph below. Maybe something out of the ordinary happened that day? Look to past bill periods to see if this pattern is typical for your usage.

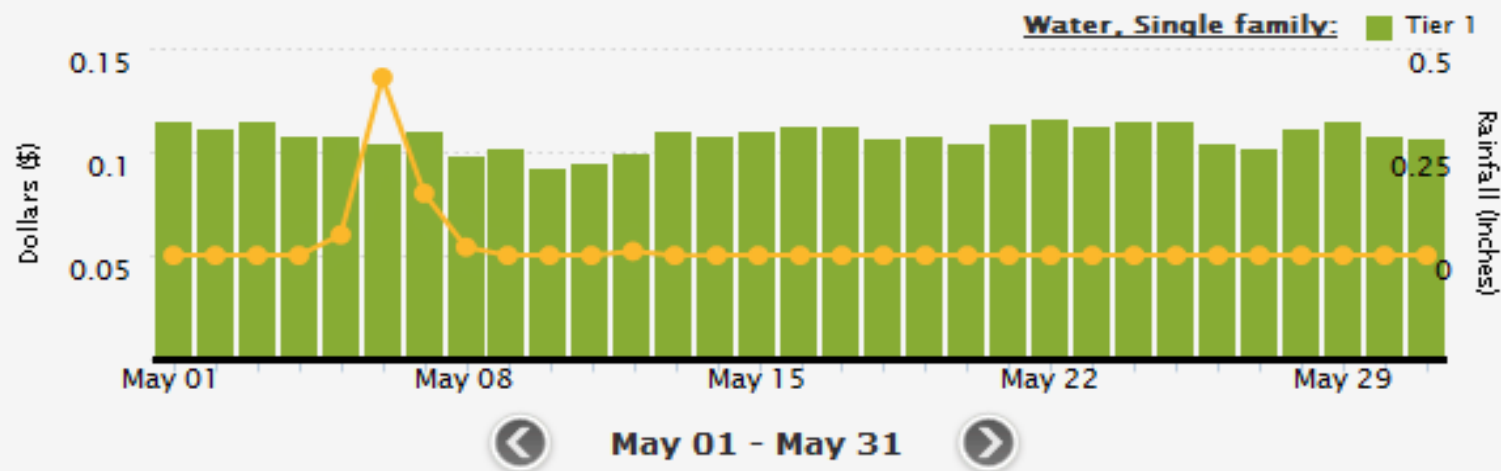
Keep in mind

- Most people tend to use more on the weekends
- Most people tend to use more on weekdays between 6 AM-11 AM and 5 PM-8 PM

My Cost Details




Weather: Rain Temp Off

Zoom: 1 d 1 bp 1 year



Date	0-1000 Gal	Total	Rainfall
05/01/13 - 05/31/13	\$3.35	\$3.35	
Total with Other Charges		\$17.77	0.66 in. (total)

2 new Alerts: [Budget\(2\)](#)

  [Settings](#) 

Visualize Your Water

See how your water use effects your bill

[Check Your Usage](#)



Gain insights into your usage by viewing your meter data

Account #
E3-FC-7

Website updated through:
2013-08-08 23:00

Costs to Date

\$50.31
Bill Period ends: AUG 31

[Details](#)

Water Costs

\$16 Projected
As of AUG 9
\$14

[Details](#)

Your pricing plan is currently set for Water, Single family (Rate 201)

Electric Costs

\$109 Projected
As of AUG 9
\$36

[Details](#)

Your pricing plan is currently set for TOU Advanced Pricing (TOU Advanced Pricing)

Environmental Impact

Bathtub
 **0**

[Details](#)

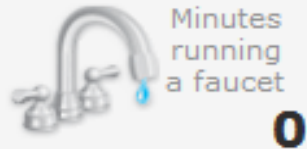
Your usage in the current bill period could fill this many bathtubs.

Cost

Usage

Impact

Environmental Impact



Your water usage this bill period equates to running the faucet this long

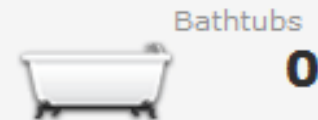
Running a faucet uses 3 gallons a minute

- Don't use running water to thaw food. Defrost food in the refrigerator for water efficiency and food safety.
- When washing dishes by hand, don't let the water run while rinsing. Fill one sink with wash water and the other with rinse water.
- Grab a wrench and fix that leaky faucet. It's simple, inexpensive, and you can save 140 gallons a week.

A bathtub filled to the brim uses 150 gallons

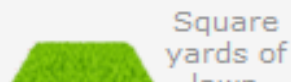
- Shorten your shower by a minute or two and you'll save up to 150 gallons per month.
- When running a bath, plug the tub before turning the water on, then adjust the temperature as the tub fills up.
- Use a water-efficient showerhead. They're inexpensive, easy to install, and can save you up to 750 gallons a month.

Environmental Impact



Your usage in the current bill period could fill this many bathtubs.

Environmental Impact



A square yard of lawn takes 5 and a half gallons to water

- Adjust your watering schedule each month to match seasonal weather conditions and landscape requirements.

High Water Consumption Alert

Advanced Meter Fort Collins.



- Only a few days after installation of water modules in our initial deployment area, a water leak was discovered through a high consumption alert.
- Alert was identified by an instructor from Elster while teaching Fort Collins Personnel how to use EA_MS.



Conservation and AMI



- Connects customers their use
- Engages them to understand how much they use
- Prompts them to save
- Connects to programs and services with the utility and new tools for energy and water at home
- Encourages them to learn more about local water (and energy) issues and resources



Conservation and AMI: Opportunities

- Too many touch points on water use may encourage customers to reach top of tier block rate*
- Make a good connection with environmental benefits or return-on-investments
- Clear description of what data is used for

**Liesel Hans' study, Colorado Water, Vol 30, Issue 2
Liesel.Hans@colostate.edu*



**This is how customers
will interact with
utilities going forward.**



Visit: *fcgov.com/advancedmeter*



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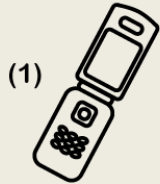
970-221-6799

**Thanks to Angel Anderson and Dennis Sumner for
your project leadership!**



Radio Frequency Exposure Levels

Source Notes



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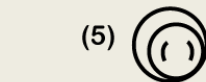


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