



# AMR/AMI for Water Utilities

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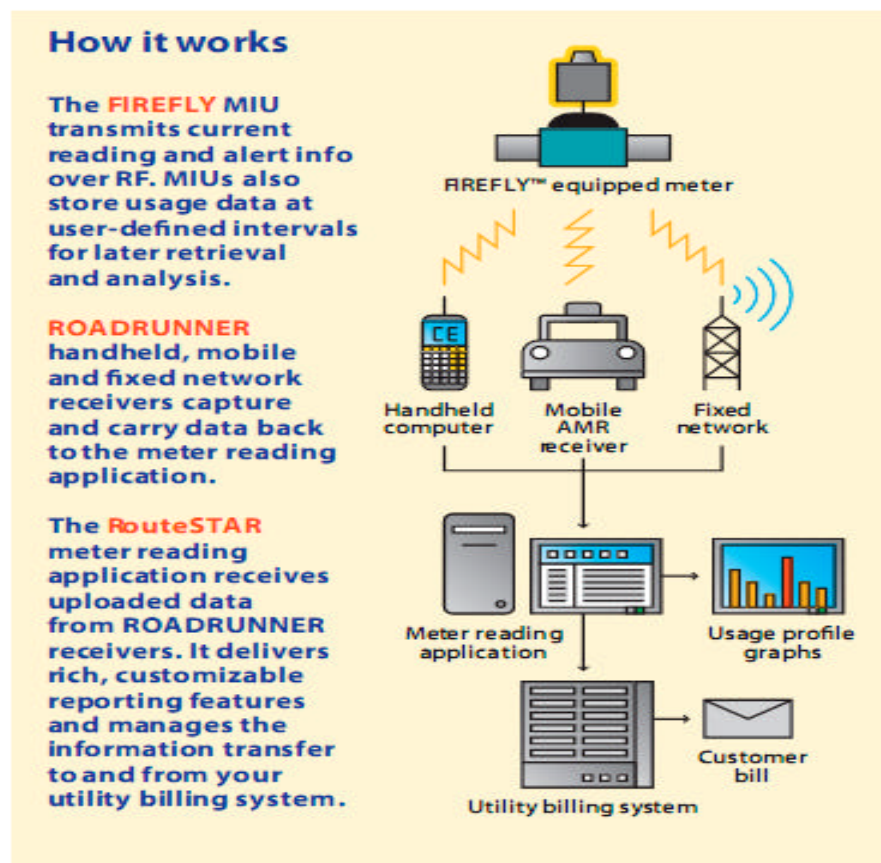
Monterey, CA

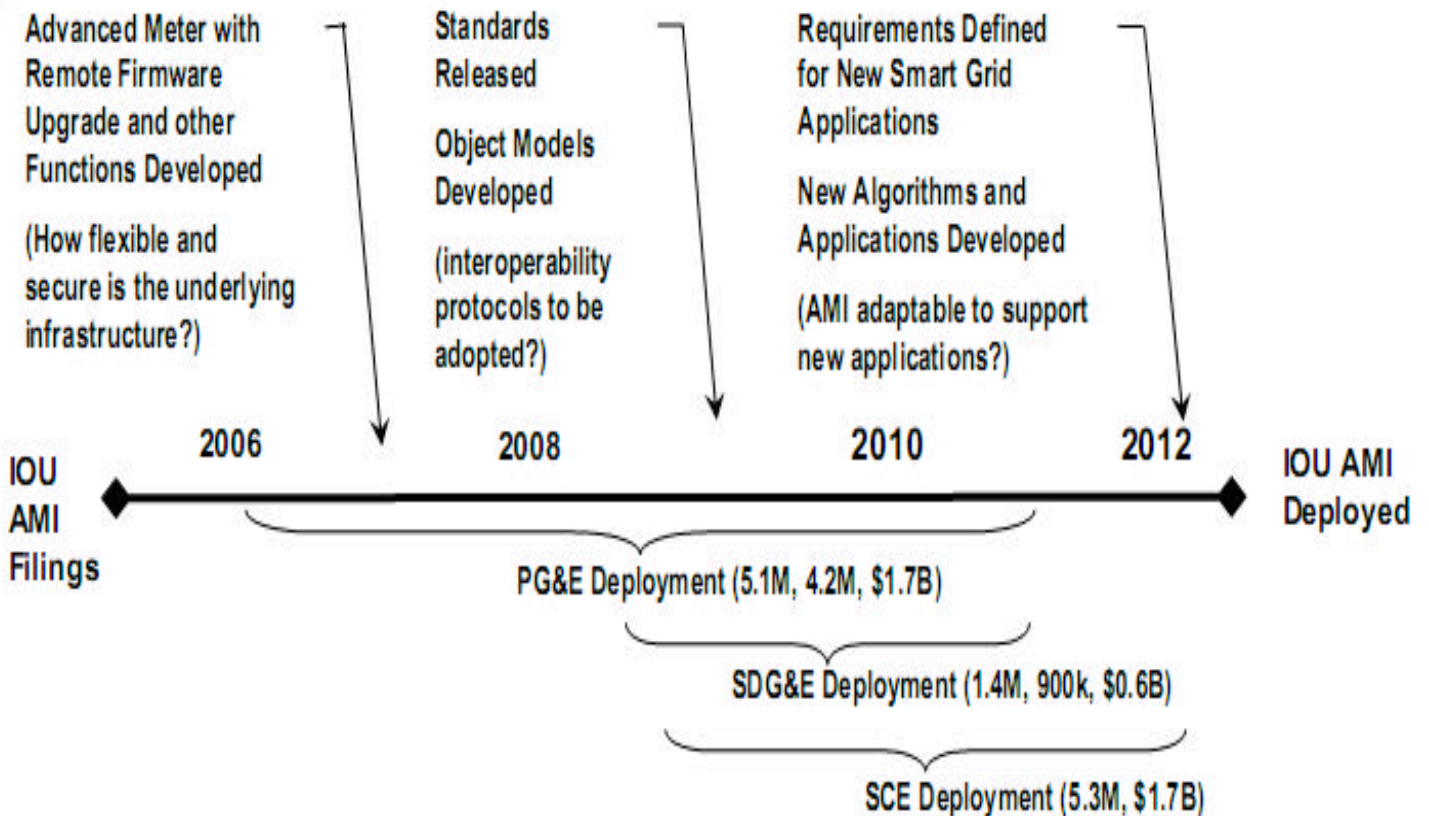
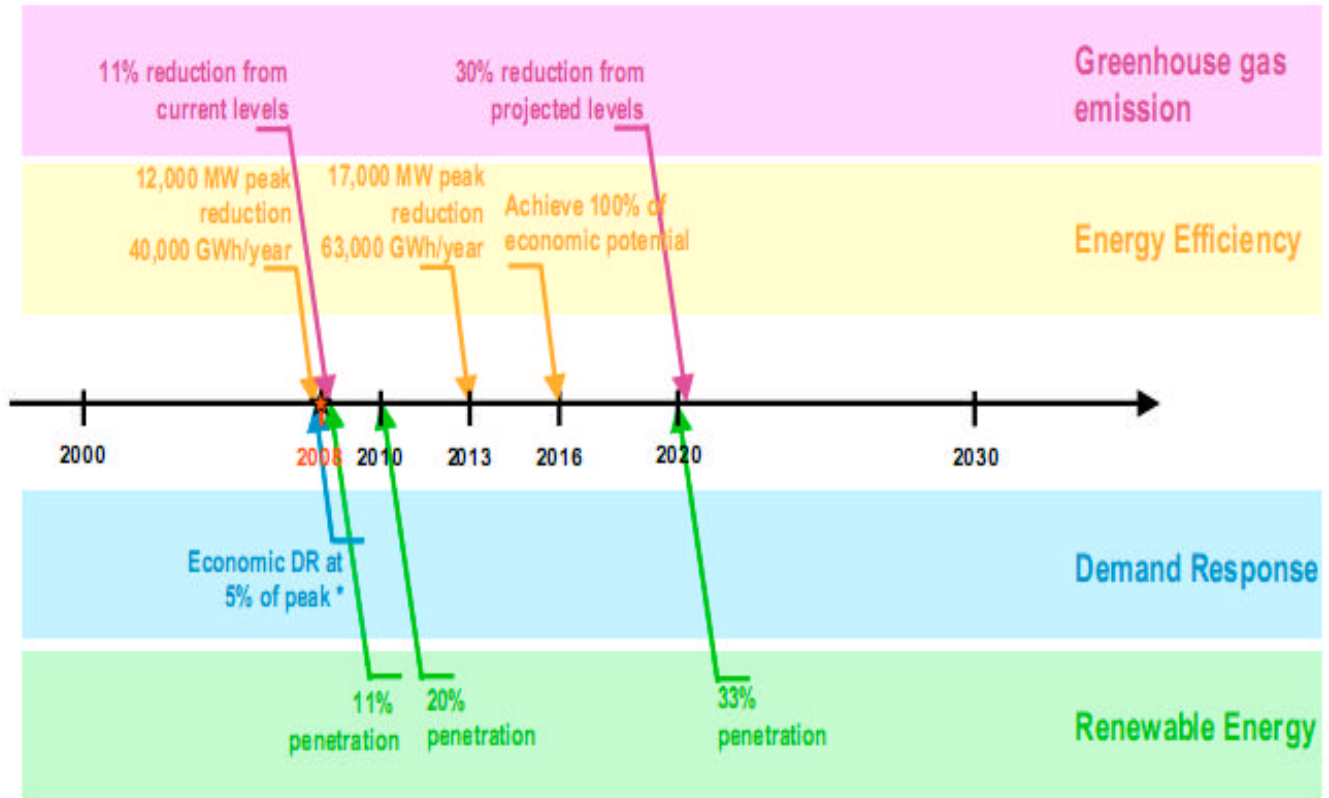
- **AMR - automated meter reading**

- a technology which automatically collects metering data and transfers that data to a central database for analysis and billing purposes, generally called “smart meters”. Detailed water usage data can be collected continuously at regular intervals (for example, every 30 minutes) and can be read remotely via an automated process, with the usage data sent to the utility’s management and billing system. AMR can consist of a number of various methods, ranging from a simple drive-by meter (where the meter reader cruises down the street automatically downloading the meter data) to one way communications with the utility.

- **AMI - advanced metering infrastructure**

- starts with smart meters and adds two-way communication between the meter and utility, and between the meter and consumer. This means that in addition to providing readings, the meter can also receive (and often act on) instructions sent from the utility or consumer





# Similar Operational Benefits



- reduced meter reading costs
- reduced costs associated with field visits and customer calls
- improved billing accuracy and improved cash flow
- improved outage information and response
- more efficient asset management and distribution engineering design .

<b><u>Benefits ascribed to installation of an AMR system</u></b>				
- Increased revenue from previously unaccounted for water				
- Reduced meter reading costs including both regular cycle reading and special reads				
- Reduction in safety / security issues				
- Reduced GHG				
- Increased customer service				
- Help identify and pinpoint losses (customer and system)				
- Help detect theft of service				
- More efficient billing				
- Improved cash flow				
- Conservation/Efficiency Improvements				
- Provide outage management and detection				
- Intangible benefits				

# The Use of Water Smart Meters

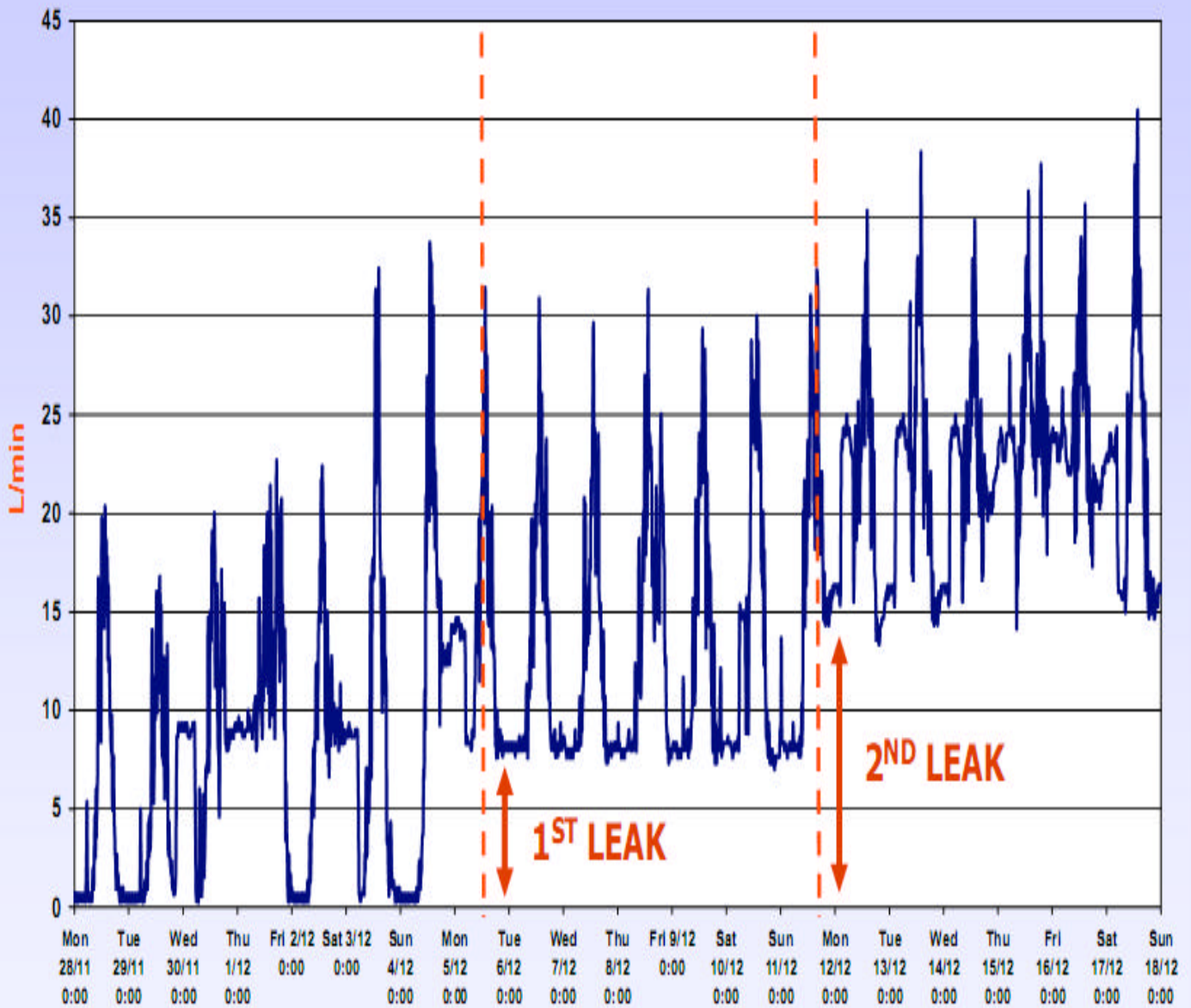
- Improve the understanding of water consumption and flow patterns
- Track and predict changes in trends and demands
- Highlight anomalies
- Warn of high or low flows
- Identify leaks or other waste minimization opportunities
- Shift water consumption to other parts of the day



# Finding Leaks

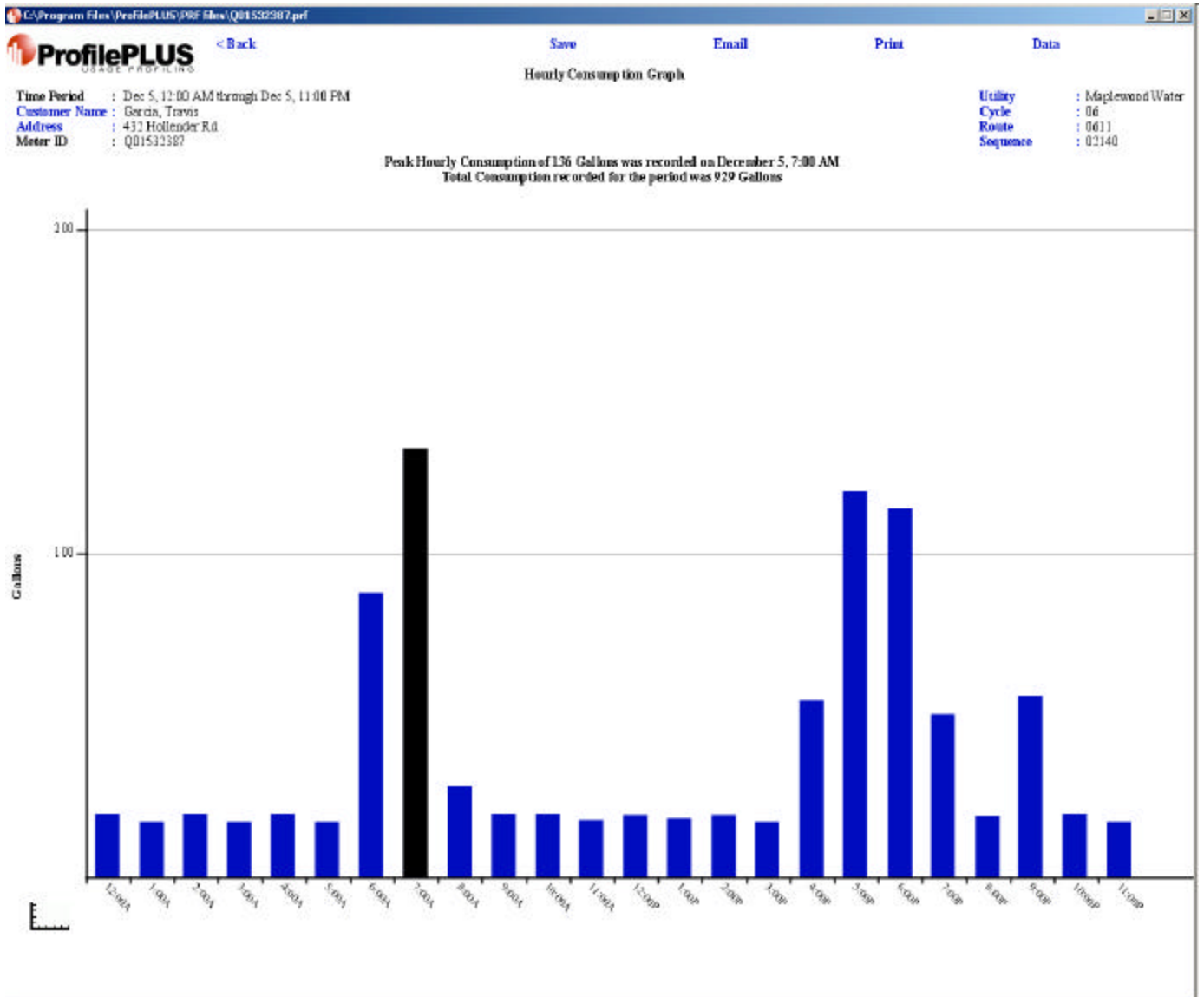


Water Consumption of a Shopping Centre's Female Toilets  
from Monday 28/11/05 to Sunday 18/12/05

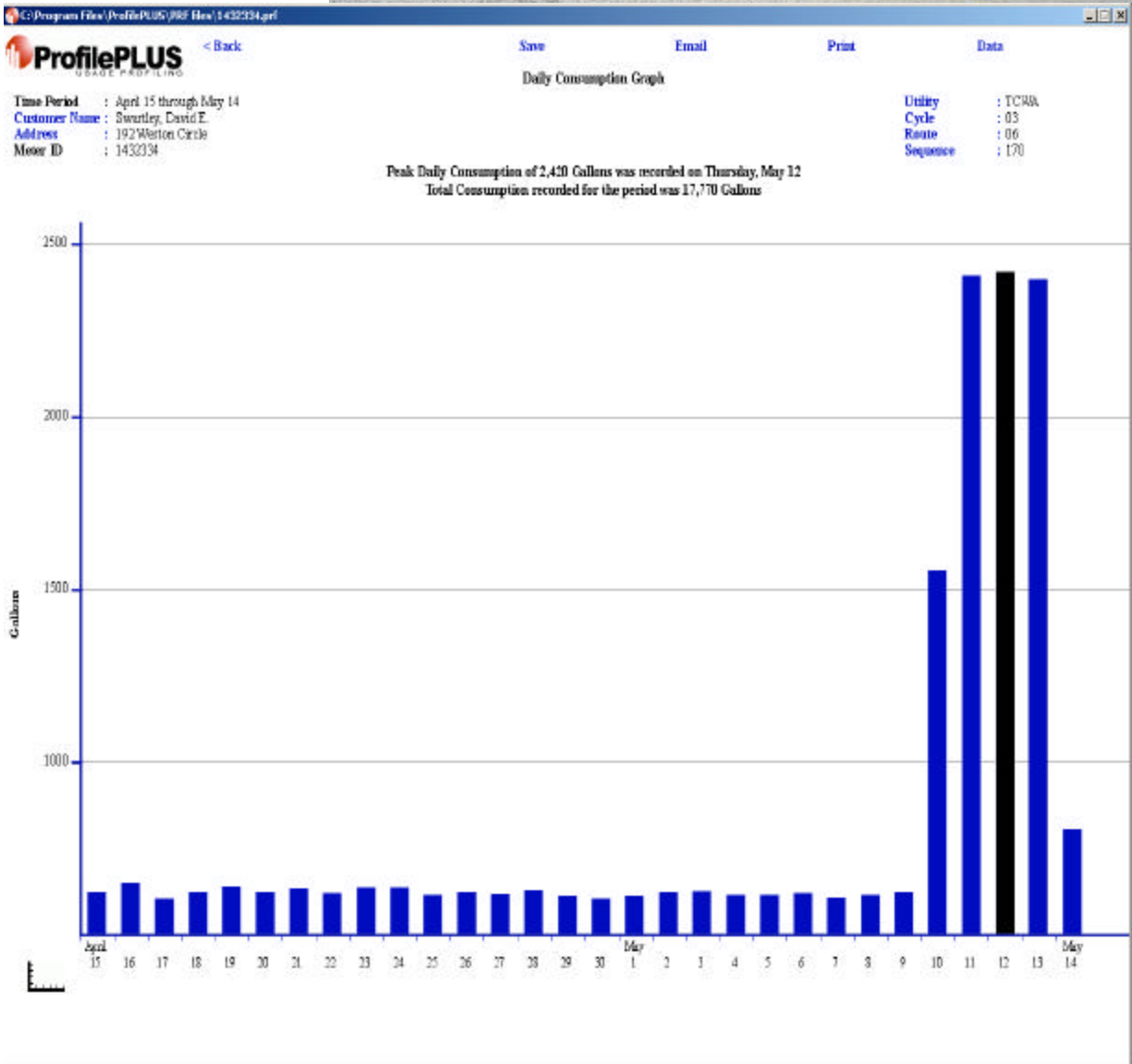


Date and Time Logged

# Finding Leaks

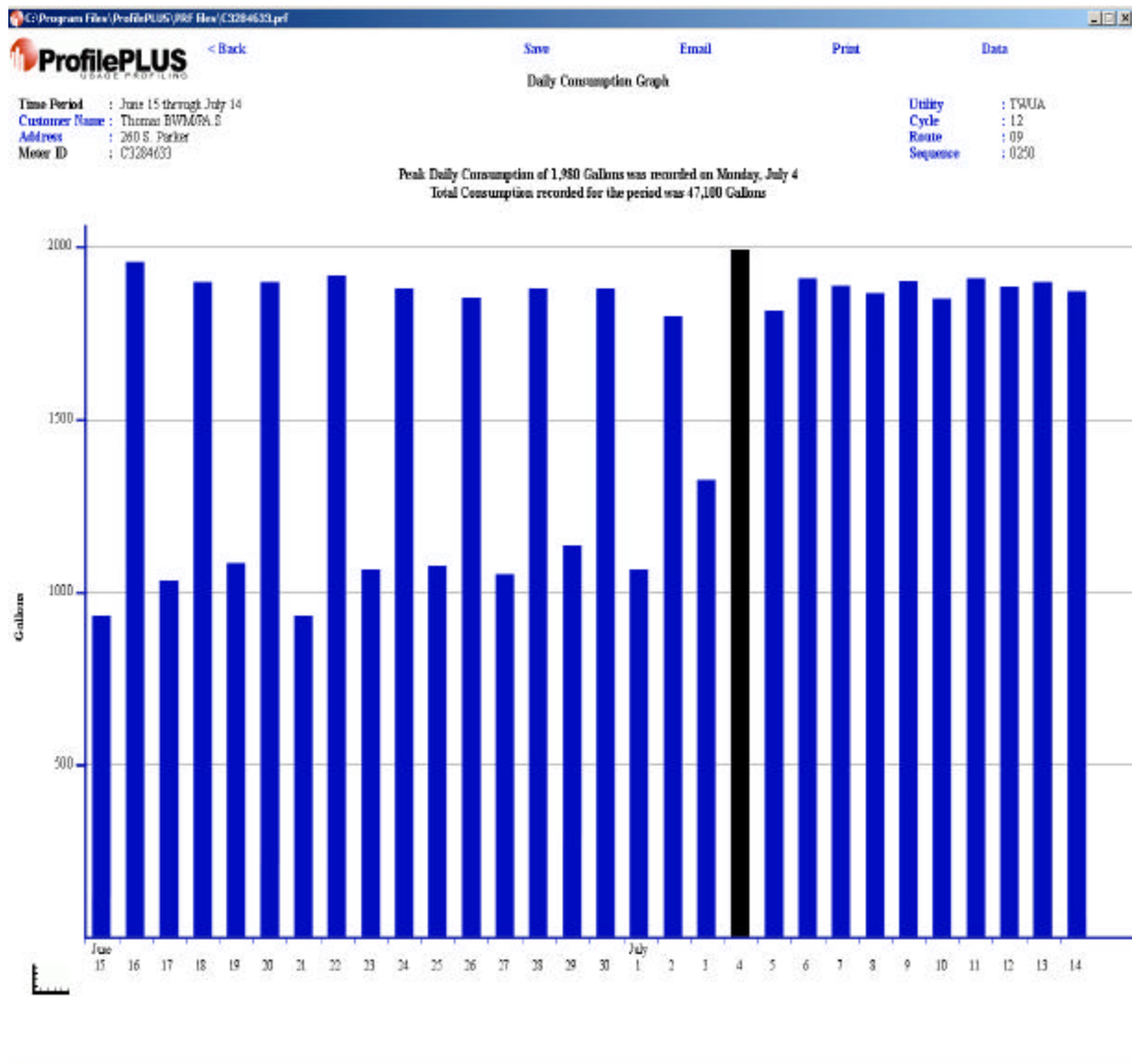


# Billing Disputes

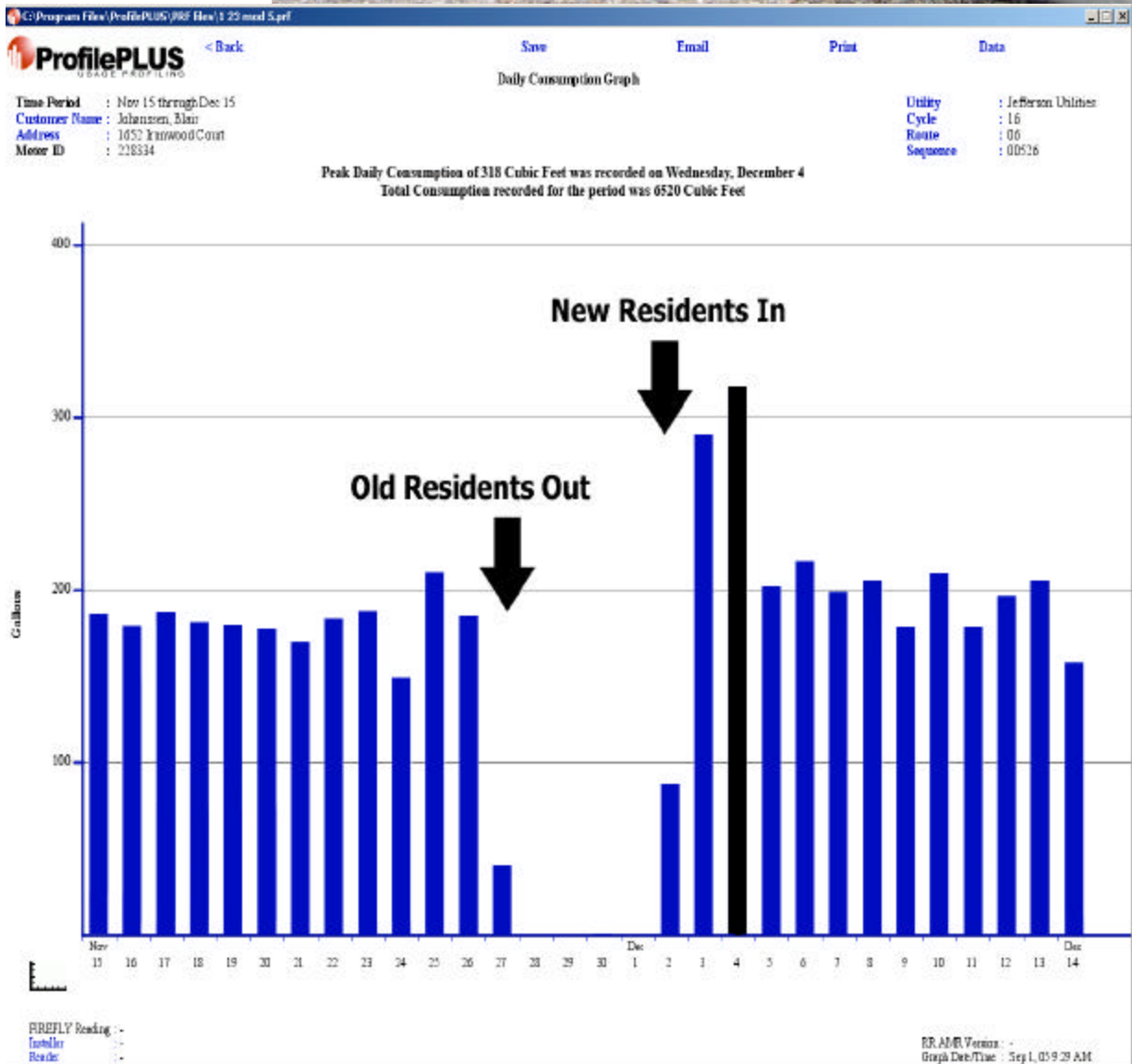




# Conservation Program Violations



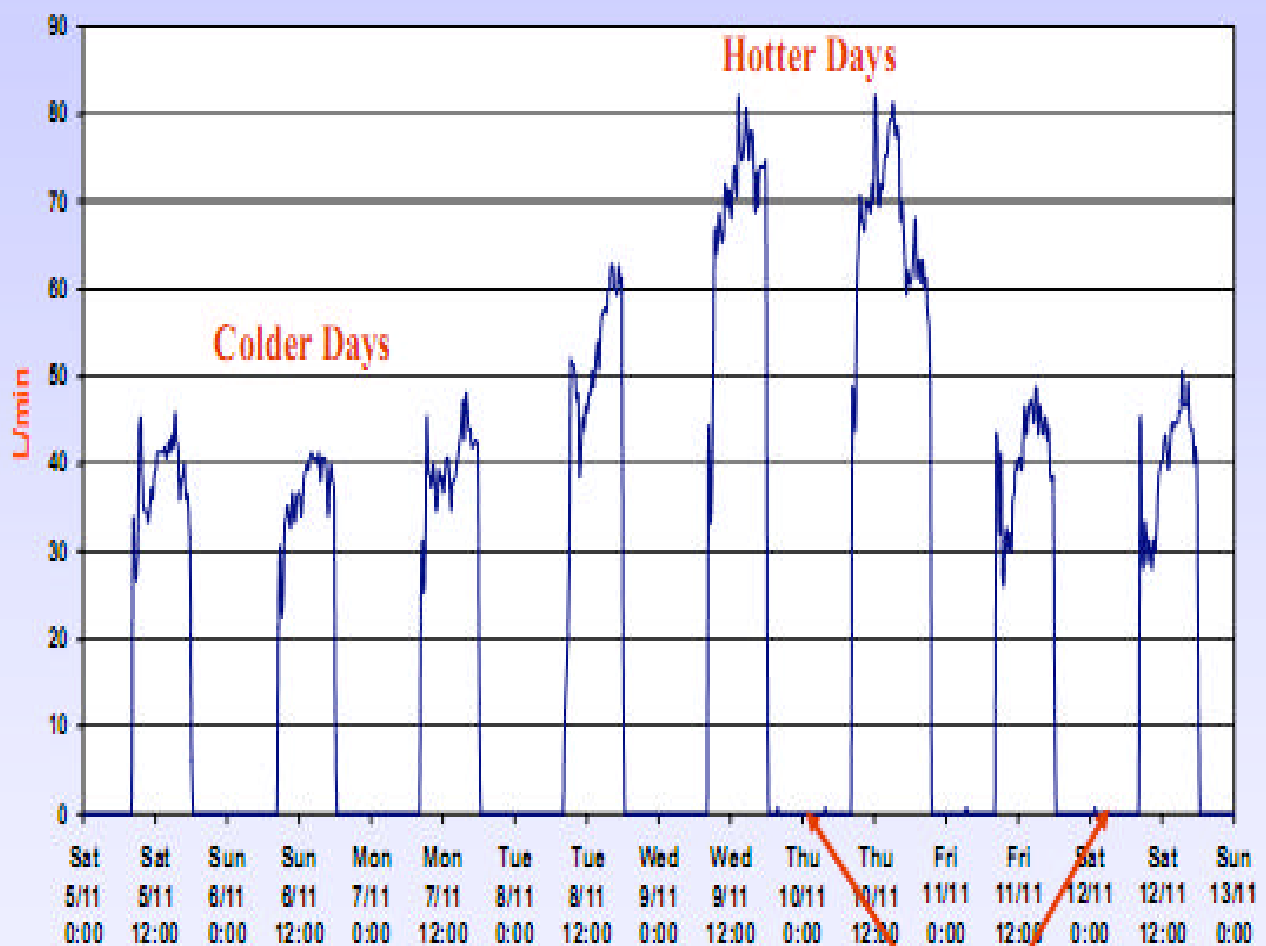
# Remote (Virtual) Turnoff



# Better Water Use Prediction



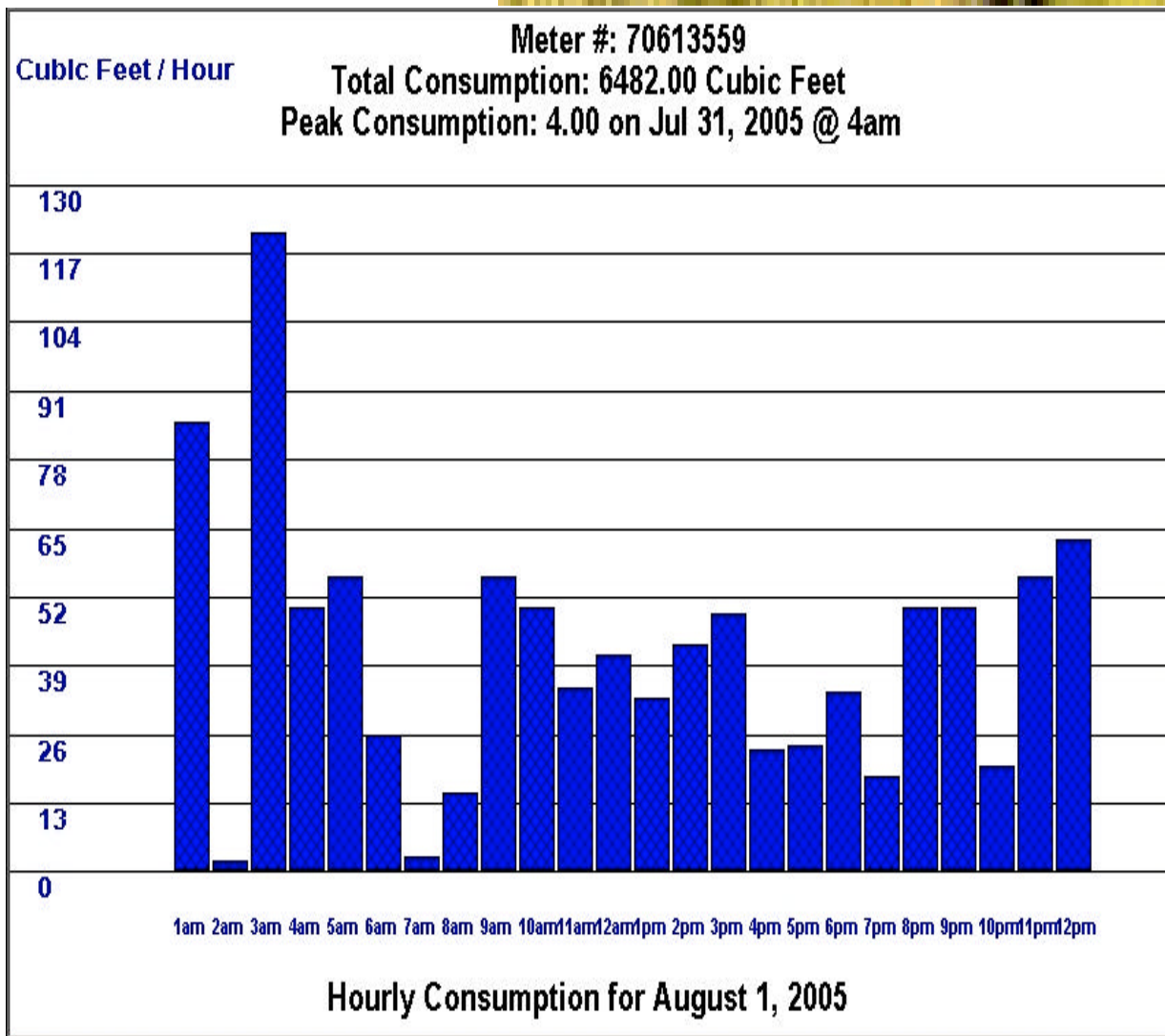
Water Consumption of Cooling Towers  
from Saturday 05/11/05 to Saturday 12/11/05



Date and Time Logged

**NO LEAKS**

# Determine Timing of Water Use



# CEC 500-07-022

## ACWA Smartmeter

### Case Study

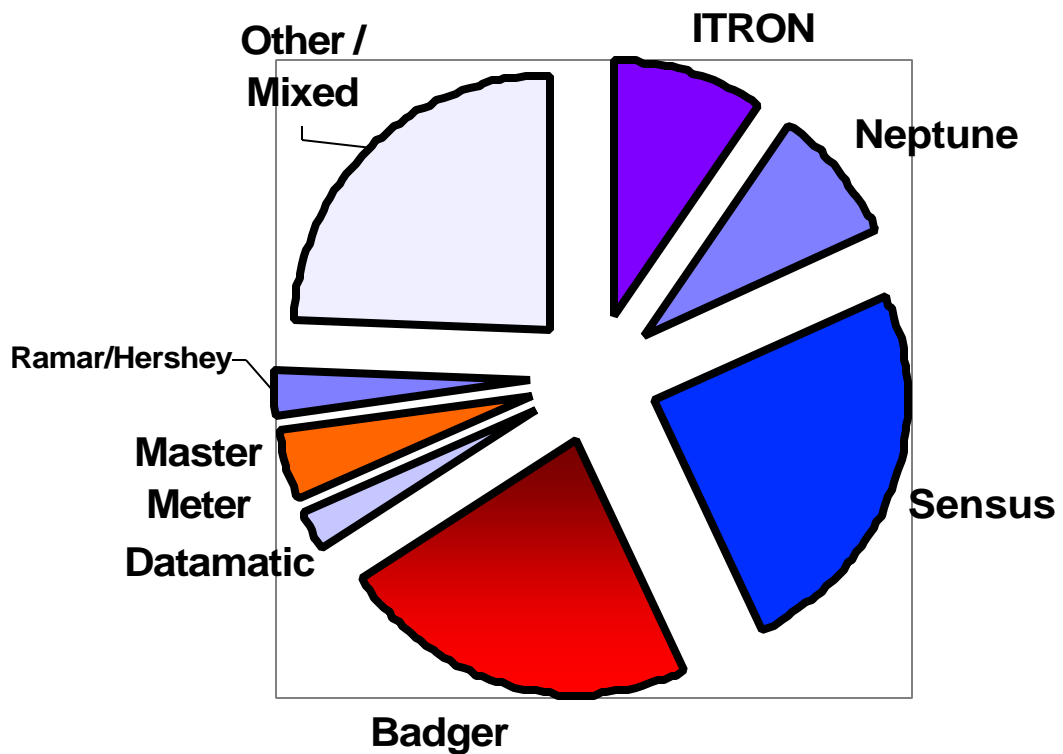


- ACWA (Association of California Water Agencies), Water & Energy Consulting, Coachella Valley Water District
- Emphasis upon peak electrical demand reductions
- Case Study
  - Installation of TOU (smart) customer water meters in City of Palm Desert
  - Catalog of water smart meters, capabilities, characteristics, costs, and installation
  - water use profiles for: residential, commercial (strip mall), irrigation
  - Integration of smart meters into water agency operations
  - Development of TOU water rates
  - Assessment of water use shift out of summer afternoon period
  - Impact of water use shift on agency operations
  - Peak electrical demand reduction impact



# Survey Of AMR/AMI in California Water Agencies

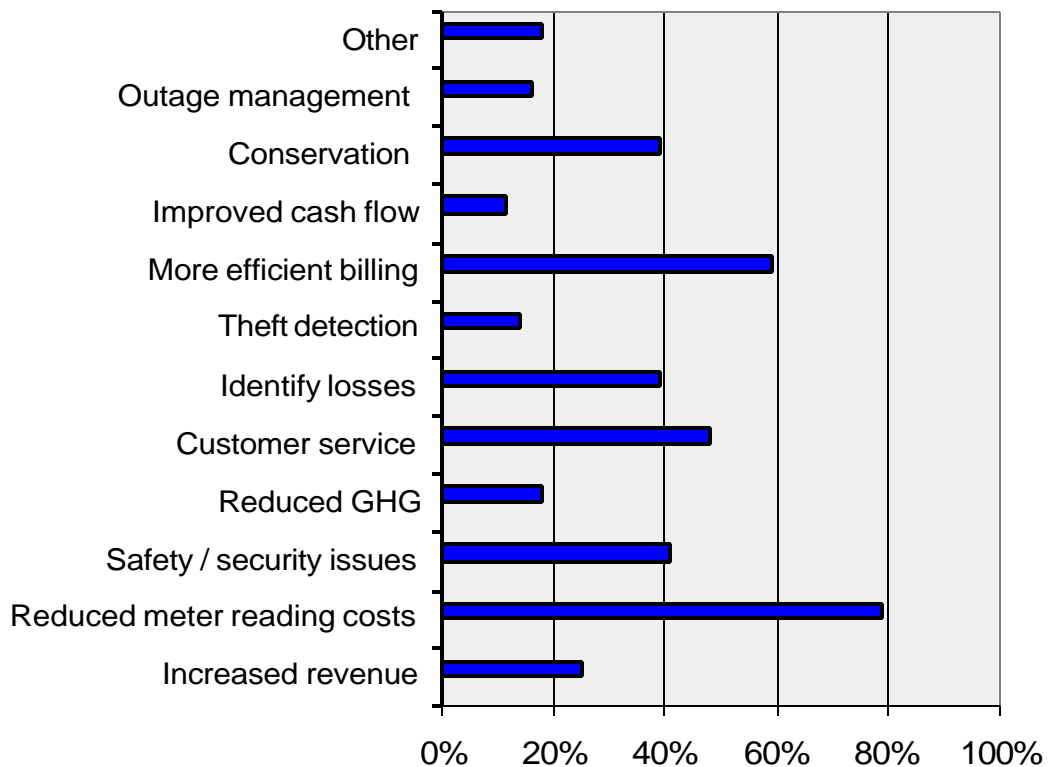
Figure 3. Predominant Water Meter Supplier



Over 50% of public water agencies in CA have some AMR installed (approximately 20% are completely AMR), 60% are planning on installing/evaluating AMR in the near future. The initial main reason for AMR installation is meter reading cost



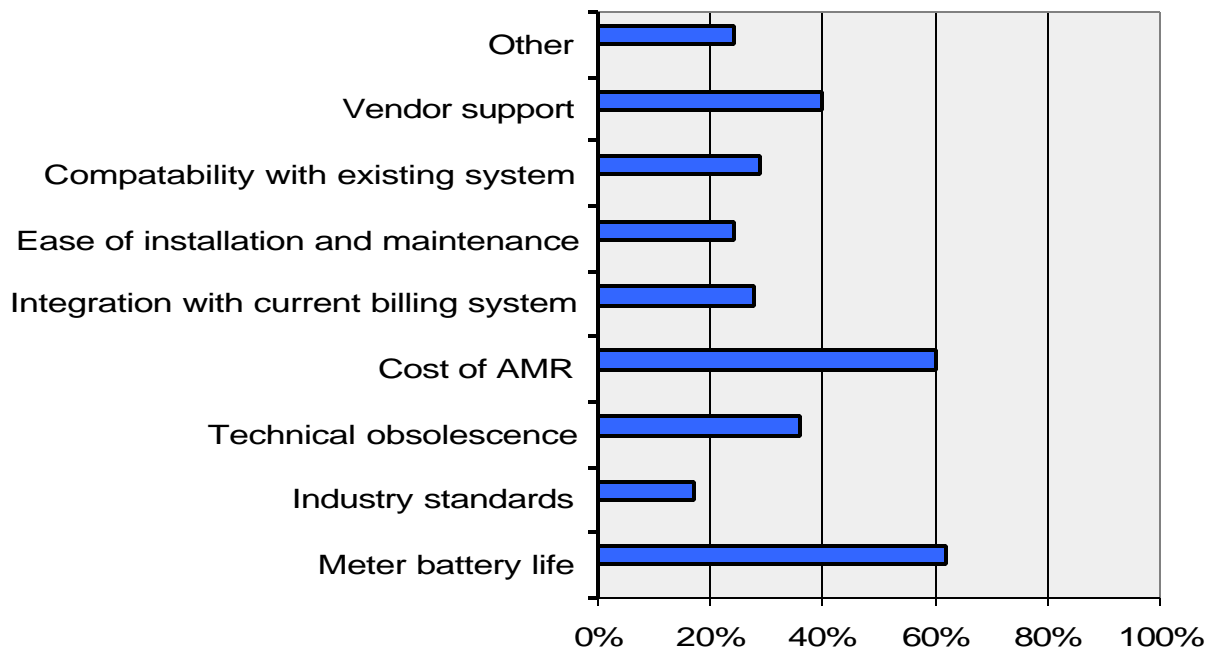
**Figure 5. Expected Benefits of AMR**



# AMR Issues



**Figure 6. Concerns About AMR**



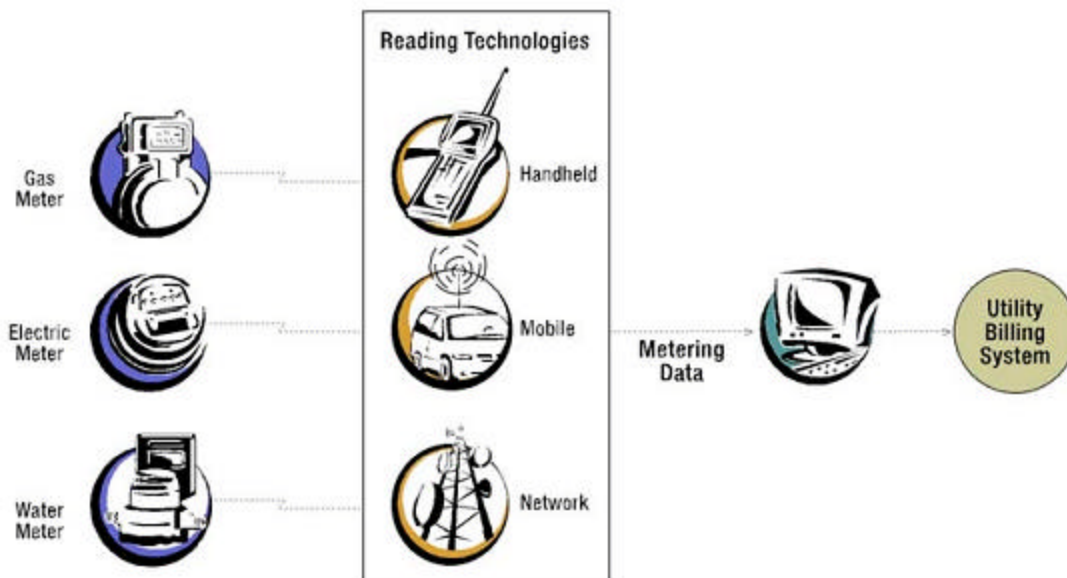
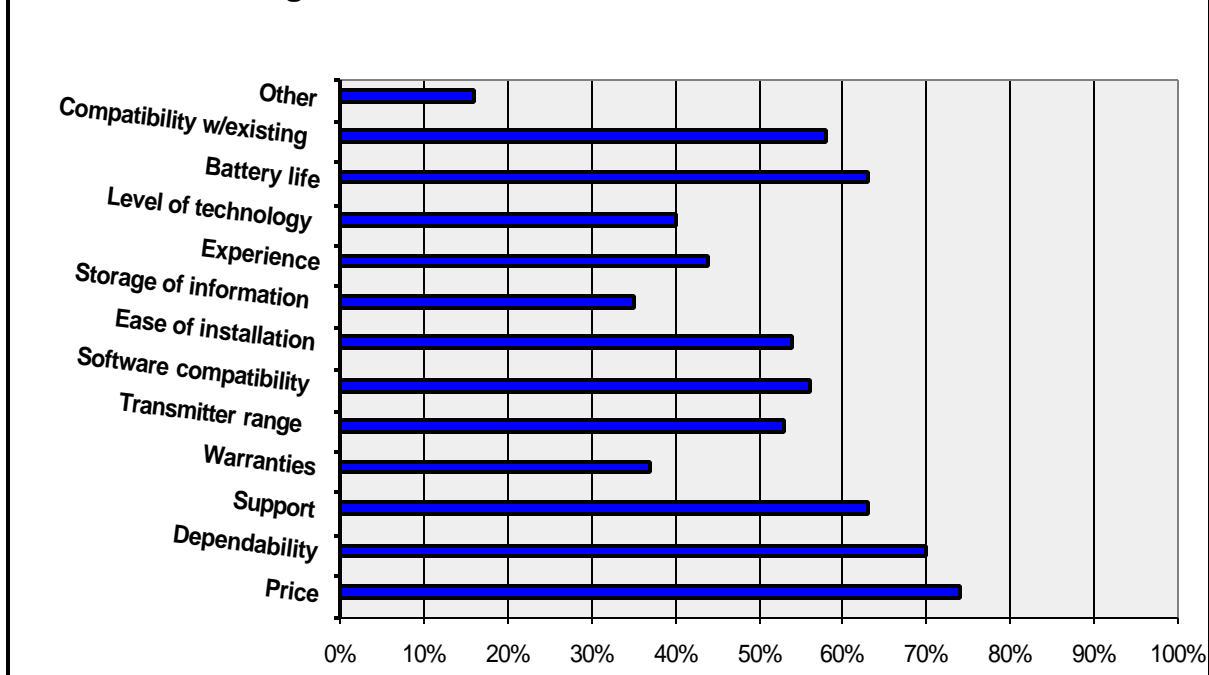


# AMR Decision:

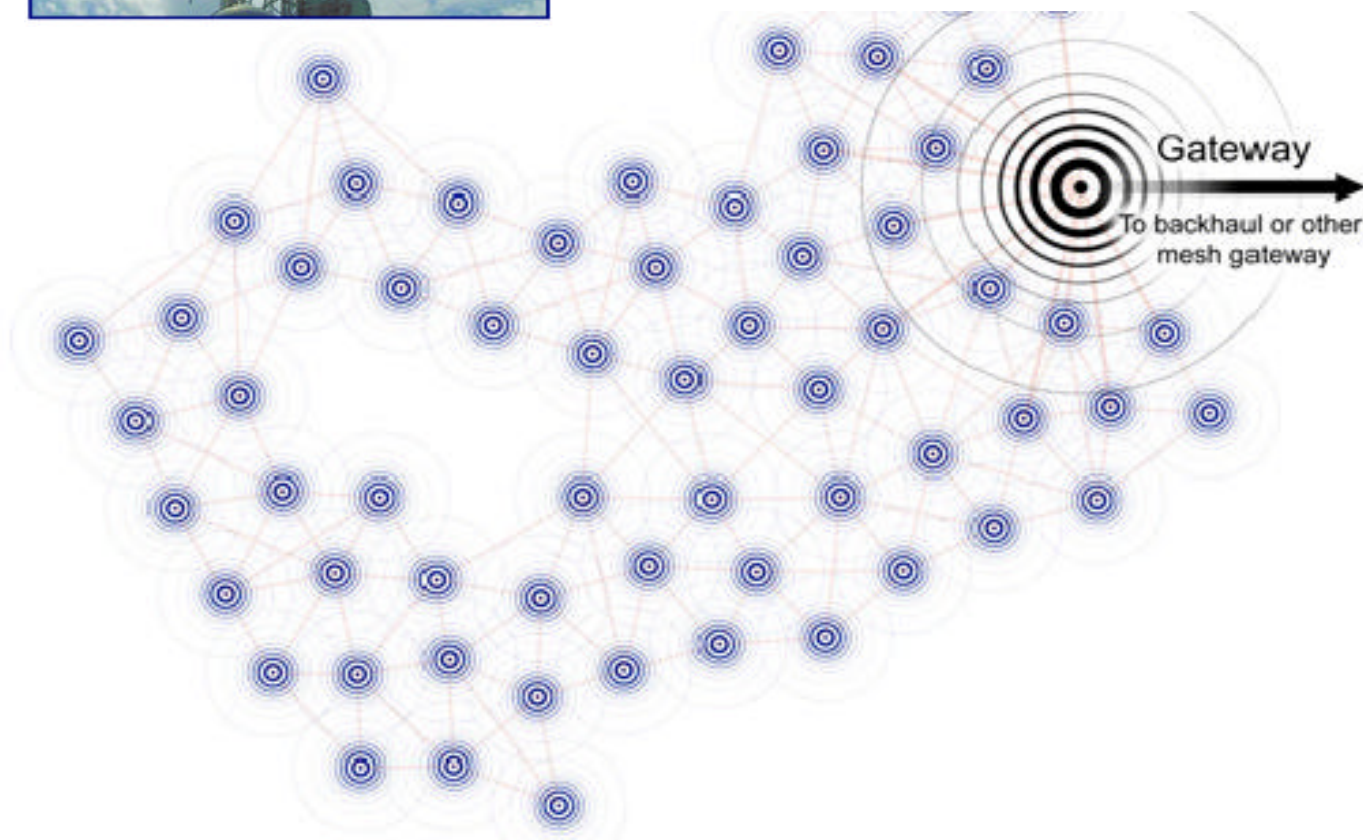
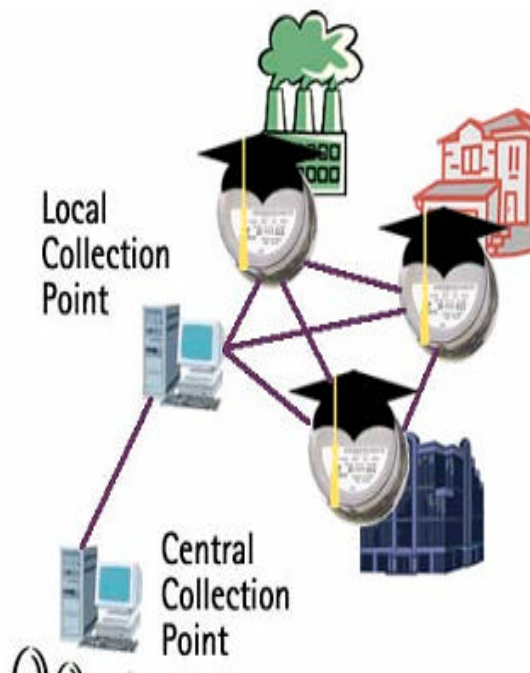
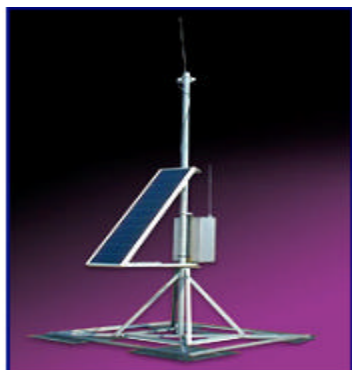
What kind of meters or meter readers,  
 where installed,  
 how read,  
 billing compatibility



**Figure 4. Evaluation Criteria for AMR Selection**



# Fixed vs. Network Configuration Consideration



# Recommendations



- If you aren't investigating AMR for your system - start
  - contact other water utilities about their experience - evaluation criteria, implementation issues, performance issues
- If you have AMR - start thinking about AMI
- If you have AMI - start think about other uses than you are traditionally used to
  - Distribution system integrity (remotely identify location and extent of water main breaks, control water loss during breaks, restore service after outages)
  - Reduce electricity use and cost ((increase off peak pumping and treatment, leak detection)
  - Provide increase customer support and involvement (web access)
  - Reduce chemical use ( predict changes in water use and timing)
  - Monitor compliance with watering restrictions/conservation programs
  - Increase theft detection
  - Remote turn-off/on