

CITY OF NEWTON

IN BOARD OF ALDERMEN

PUBLIC FACILITIES COMMITTEE REPORT

WEDNESDAY, APRIL 9, 2008

Present: Ald. Schnipper (Chairman), Lennon, Albright, Salvucci, Gentile, Yates, Mansfield and Lappin

Also present: Ald. Baker, Brandel, Coletti, Danberg, Fischman, Freedman, Harney, Hess-Mahan, Johnson, Linsky, Merrill, Parker, Sangiolo, and Swiston

City staff present: Thomas Daley (Commissioner of Public Works), David Turocy (Deputy Commissioner of Public Works), Karen Griffey (Public Works Director of Administration), Ryan Ferrara (Chief of Commissioner of Public Works), Fred Russell (Director of Utilities), Ted Jerdee (Superintendent Finance and Budget; Public Works), Lou Taverna (City Engineer), A. Nicholas Parnell (Commissioner of Public Buildings), David Tannozzini (Energy Officer; Public Buildings), Josh Morse (HVAC Technician), Michael Cronin (Operations Manager; School Department), Carol Bock (School Department), Fran Towle (Parks and Recreation Commissioner) and Shawna Sullivan (Committee Clerk)

REFERRED TO PUBLIC FACILITIES & FINANCE COMMITTEE

#118-08 HIS HONOR THE MAYOR requesting an appropriation in the amount of twelve million five hundred thousand dollars (\$12,500,000) from bonded indebtedness for the purpose of the purchase and installation of new water meters and an automated water meter reading system. [03-11-08 @ 5:10 PM]

ACTION: **APPROVED 6-0-2 (Lennon and Gentile abstaining)**

NOTE: Commissioner Daley, several of the Public Works staff, two representatives from the consultants, Weston and Sampson, and several interested Aldermen joined the Committee for discussion of the item. Commissioner Daley gave a PowerPoint presentation, which is attached. The City began seriously investigating water meter system replacement in 2002 and formed a task force in January of 2003. In 2004 Weston and Sampson was contracted to do a study on water meter replacement. The study was completed in 2005; a large meter survey was then initiated and completed in September of 2006. Weston and Sampson developed an RFP for the meters and automatic meter reading system. In August 2007, the Department of Public Works gave a presentation on the meters and automatic reader system to the Board of Aldermen. Since that time, the Public Works Department has been working on finalizing the RFP.

The Commissioner and Ted Jerdee spoke on the condition of the existing meters and reading system. The majority of the current meters were installed in the early 1980s; however, the technology is from the 1970s. It is very difficult to make repairs to the meters. The replacement of parts requires disassembly of the entire meter. The meters lose accuracy, as the parts deteriorate over time. The Public Works Department tested the water meter accuracy of 49 meters at low, medium and high flow rates. Most of the residential consumption is between one to eight gallons per minute and meter degradation begins at low flow and proceeds to high flow.

Meter reading is also an issue. Only two of the five readers are working and the manufacturer no longer services the readers. It is impossible to purchase new readers or parts for the readers, as they are no longer manufactured. Access to properties to do a meter read is becoming more difficult due to heightened security and the availability of the homeowner. Almost all of the water meters are incompatible with available meter reading systems.

There has been a marked increase in estimated bills over the last few years. Twelve percent of the accounts have been consecutively estimated due to equipment failure. Abatements for false actual reads have increased over the past few years. The value of abatements has increased substantially from 2006 to 2007 and it looks like that trend will continue in 2008. One in four meter reads are estimates due to equipment malfunction.

The presentation also included information on meter reading systems in other communities. The average age of the meters in 49 MWRA communities is 11 years. There was a breakdown of the water meter reading options chosen by several communities. The options included touchpad, mobile and fixed network reading systems. Communities that have recently replaced their meters have opted for a fixed network solution and that is the recommended solution for the City of Newton. The fixed network sends meter readings for each household or business to City Hall over a wireless network. There are many pros to a fixed system such as reading failures are easily detected, billing frequency can be increased to monthly, potential to review consumption online, improved ability to identify system leaks and access to properties no longer required. The three meter readers will be reassigned within the Utilities Division.

The estimated cost for the replacement meters and reading system is \$12,500,000. There will be an approximate impact of \$4.59 per month to most households. The hope is to award the contract in October 2008 and begin installation in April of 2009 with a completion date of April 2011.

Several Aldermen had questions regarding the water meter presentation. Ald. Lappin asked if changing to monthly billing would cost the city additional money. The Commissioner responded that there will be some minor mailing costs but the benefit of going to monthly billing from the customer's standpoint of it is a smaller bill each month and easier to budget and also the city benefits from the standpoint of the time value of money. She also asked if the system would allow for a second water meter for irrigation. The decision of a second water rate for irrigation is a policy decision that the Board needs to make. The fixed system would allow the City to differentiate between readings during the peak time of year for irrigation and the average use. However, the City may opt to go with a separate meter to avoid any confusion.

Ald. Coletti and Lennon expressed concern regarding the increase in abatements for 2008. The Commissioner will provide exact figures and backup information at the Finance Committee meeting. Ald. Mansfield asked for a copy of the data used to make the decision of what water meter reading system best met the needs of the city. Commissioner Daley stated that he would provide that information. Ald. Mansfield also asked what the antenna for the wireless system generally looks like. It was explained that if the city were to mount the antenna on rooftops, the antenna would be about 10' tall. However, if they are to be mounted on telephone poles it would be smaller but more would be needed to capture all of the data.

Ald. Lappin moved approval of the item, which carried with five in favor and two abstentions.

REFERRED TO PROG&SERV, PUB FACILITIES & FINANCE COMMITTEES

#86-07 HIS HONOR THE MAYOR requesting an appropriation in the amount of \$2,300,000 from bonded indebtedness for the purpose of funding the construction of a new synthetic turf recreation complex at Newton South High School. [03-13-07 @ 7:04 PM]

ACTION: **HELD 8-0**

NOTE: The City Engineer introduced Bill Seymour, Paul Tyrell, and Nathan Connors from Gale Associates. Gale Associates was chosen to do the requested drainage study for the Newton South High School fields. They also provided a Master Plan for the fields. Both of the reports are available online at <http://www.ci.newton.ma.us/Aldermen/news.htm>.

Paul Tyrell, P.E., Gale Associates presented the drainage study. During the initial site visit it was observed that the fields are heavily used, poorly graded, water puddles and there is an inefficient drainage system. The test pits confirmed that the top layer of soil is heavily compacted. The top layer is loaded with silts and clays, which absorb water but will not allow it to pass through them. The fields do not have adequate aeration or sand content. The result is that the water ponds on the fields. The South Meadow Brook Culvert is in good shape and is more than adequate to handle a twenty-five year storm event. There is eight feet of fill over the groundwater.

If the fields were replaced with natural fields, the new fields would have a much higher sand content. If the fields are to be synthetic turf, it will allow the water to go into an under layer of soil and slowly drains into the soil or the drain system. Both solutions will improve the drainage in the area. Properly designed athletic fields will not shed water onto the abutting properties. The turf field will retain all the water; however, a properly designed natural field does result in some runoff but it would have a properly designed drainage system that would catch that water before it left the fields.

Ald. Lappin was concerned because it was her understanding that the study requested was for drainage; however, the study also includes a Master Plan. Ald. Lappin was hoping that Gale Associates would provide an independent recommendation without the city directing them to consider artificial turf.

The Committee had an in depth conversation regarding the information contained in the master plan. Gale Associates recommends three synthetic turf fields and one natural turf field, either the baseball field or football field. They are making that recommendation due to the heavy use of the fields, the durability of the artificial turf and the low maintenance costs of artificial turf.

The Committee held the item for public input at the next committee meeting on April 23, 2008.

Re-appointment by Board President

#46-08 PRESIDENT BAKER recommending Robert O. Smith, P.E., 55 Chester Street, Newton Highlands be re-appointed as an Aldermanic appointee to the DESIGN REVIEW COMMITTEE, term of office to expire 12/31/09. [01-17-08 @ 3:48 PM]

ACTION: **HELD 8-0**

NOTE: Mr. Smith was not present for the discussion of his reappointment. Therefore, the Committee opted to hold Mr. Smith's reappointment until he is available to meet with the Committee.

Re-appointment by the Board President

#48-08 ALD. BAKER recommending Lawrence Bauer, 42 Eliot Memorial Road, Newton, be re-appointed as an Aldermanic appointee to the DESIGNER SELECTION COMMITTEE, term of office to expire 12/31/09. [01-17-08 @ 3:48 PM]

ACTION: **HELD 8-0**

NOTE: Mr. Bauer was not present for the discussion of his reappointment. Therefore, the Committee opted to hold Mr. Bauer's reappointment until he is available to meet with the Committee.

Re-appointment by Board President

#50-08 PRESIDENT BAKER recommending Joseph Michelson, 94 Park Avenue, Newton be re-appointed as an Aldermanic appointee to the DESIGNER SELECTION COMMITTEE, term of office to expire 12/31/09. [01-17-08 @ 3:48 PM]

ACTION: **HELD 8-0**

NOTE: Mr. Michelson was not present for the discussion of his reappointment. Therefore, the Committee opted to hold Mr. Michelson's reappointment until he is available to meet with the Committee.

REFERRED TO PROG&SERV, PUB FACILITIES & FINANCE COMMITTEES

#85-08 DANIEL PROSKAUER et al. filing on February 7, 2008 a group petition pursuant to Section 10-2 of the City Charter for a public hearing regarding the cost of construction of Newton North High School, specifically requesting the Board of Aldermen to establish a Guaranteed Maximum Price for the said project prior to the installation of foundations of the said school; and establish a maximum cost of construction of the said project that, in the opinion of the honorable Aldermen, the City can afford without sacrificing the repair and construction of other public buildings. ***NB: Board action shall be taken not later than three months from the date the petition was filed.***

ACTION: **HELD 8-0**

NOTE: This item was held without discussion, due to the length of the other discussions.

REFERRED TO PUBLIC FACILITIES AND FINANCE COMMITTEES

#144-08 HIS HONOR THE MAYOR requesting bond authorization of two million thirty-one thousand dollars (\$2,031,000) for the costs related to energy savings improvements to be undertaken by NORESCO, an Energy Services Company, at the F.A. Day Middle School; said savings are designed to generate savings sufficient to offset the cost of the project. [4-08-08 @ 5:31 PM]

ACTION: **HELD 8-0**

NOTE: Commissioner Parnell, David Tannozzini, Josh Morse, Carol Bock and Michael Cronin joined the Committee for discussion of the item. The concept of an energy services company is that the savings that are generated should cover the cost of the project and after it is paid for the savings are accrued by the city. Mr. Tannozzini began the presentation of the item and provided the Committee with a PowerPoint presentation, which is attached. Approximately a year ago, the Public Facilities Committee discussed an item related to municipal energy conservation and performance contracting. The reports from each of the discussions are attached. The item has matured to the selection of an energy services committee, who has recommended NORESCO for negotiations for a comprehensive energy services agreement. He introduced the Committee to John Kauppinen from NORESCO. The Public Buildings Department would like to do a pilot project at F.A. Day Middle School, which is the school that all the vendors interviewed used to do an audit. The potential is there to invest about \$2 million and have a yearly savings that provides a modest net positive present value. It also, to some extent, protects the city against escalating energy costs.

Ald. Yates asked for the annual energy cost at Day Middle School. Mr. Tannozzini provided the electrical cost, which was \$272,000 for 2005 and the cost of gas for 2005 was \$111,000. When the project is completed, the savings generated will be about \$100,000 a year. The payback for the project is twenty years. Several Aldermen questioned how the project would be financed. Commissioner Parnell could not provide the answer and the letter provided by the Mayor was not specific in regards to financing. Mr. Kauppinen stated that he believed the funding would be done through a municipal loan program. The Committee would like further information on the funding of this item; therefore, a motion to hold carried unanimously. Ald. Gentile also requested a draft of the contract and Ald. Lappin would like the life cycle of the equipment.

REFERRED TO PUBLIC FACILITIES AND FINANCE COMMITTEES

#145-08 HIS HONOR THE MAYOR requesting authorization to appropriate and expend twenty-nine thousand seven hundred thirty eight dollars and fifty- seven cents (\$29,738.57) received from the Town of Wellesley to the Sewer Fund. This sum is a payment pursuant to the New/Wellesley Inter-Municipal Agreement for the Cochituate Aqueduct and will be used for the maintenance of the Cochituate Aqueduct Sewer. [4-01-08 @ 5:31 PM]

ACTION: **APPROVED 8-0**

NOTE: The Committee reviewed the backup material attached to the agenda provided by the Executive Department and the Public Works Department. The payment from the Town of Wellesley is a portion of a reimbursement stipulated in the inter-municipal agreement between

Newton and Wellesley regarding Cochituate Aqueduct Sewer repairs. The Committee had no questions regarding the payment; therefore, on a motion to approve the item carried unanimously.

#385-07 ALD. SCHNIPPER AND GENTILE updating the Public Facilities Committee on the progress of the Newton North High School Project. [11-21-07 @ 10:23 AM]

ACTION: **HELD 8-0**

NOTE: Due to the lateness of the hour, the Committee opted to hold the update until the next meeting.

Respectfully submitted,

Sydra Schnipper, Chairman

IT'S ALL IN
THE NAME!



**Water Meter
Replacement
Program
April 9, 2008**

DEPT. OF PUBLIC WORKS₂

Historical Timeline

- 1) **January 2003 – Water Meter Task Force (10 members)**
- 2) **March 2004 – W&S Contracted**
“Study of Water Meter System Replacement Evaluation”
- 3) **February 2005 – W&S Completed**
“Water Meter System Replacement Evaluation”
- 4) **November 2005 – W&S Contracted - “Large Meter Survey”**
- 5) **September 2006 – W&S Completed - “Large Meter Survey”**
- 6) **February 2007 – W&S develops RFP for meters and AMR system**
- 7) **August 2007 – First presentation to the Alderman**
- 8) **August 2007 to present – Finalize issues and RFP**

Agenda

1. Existing Meters

- Commercial/Residential Meters
- Installation Dates
- Water Meter Accuracy

2. Existing Reading/Billing System

- Estimated Bills and Abatements

Agenda cont'd

3. Proposed Automated Reading System

- Meter Reading Programs in Other Communities
- Recommended Meter Reading System

4. Requested Funding

5. Summary

- Next Steps
- Proposed Project Schedule

Existing Meters

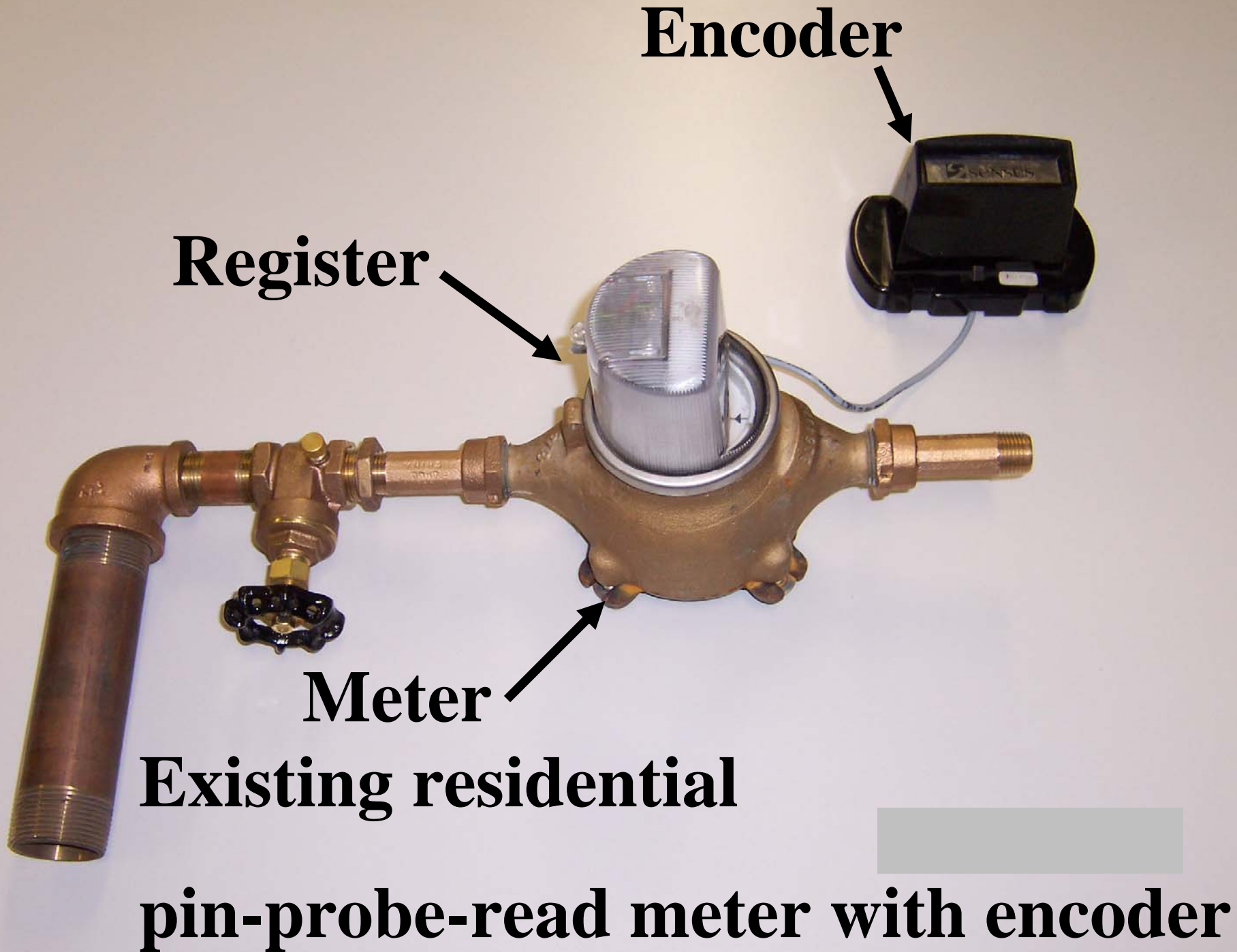


Residential

Existing Meters and Reading System

- Currently 72% of existing meters were installed in the early 1980s
- Eliminated the need for city personnel to access meters located inside homes/businesses

- 1970's technology pin probe reading system:
 1. Meter
 2. Meter Register
 3. Encoder
 4. Pin Probe Reader
 5. Hand Held Computer



Encoder

Register

Meter

Existing residential

pin-probe-read meter with encoder



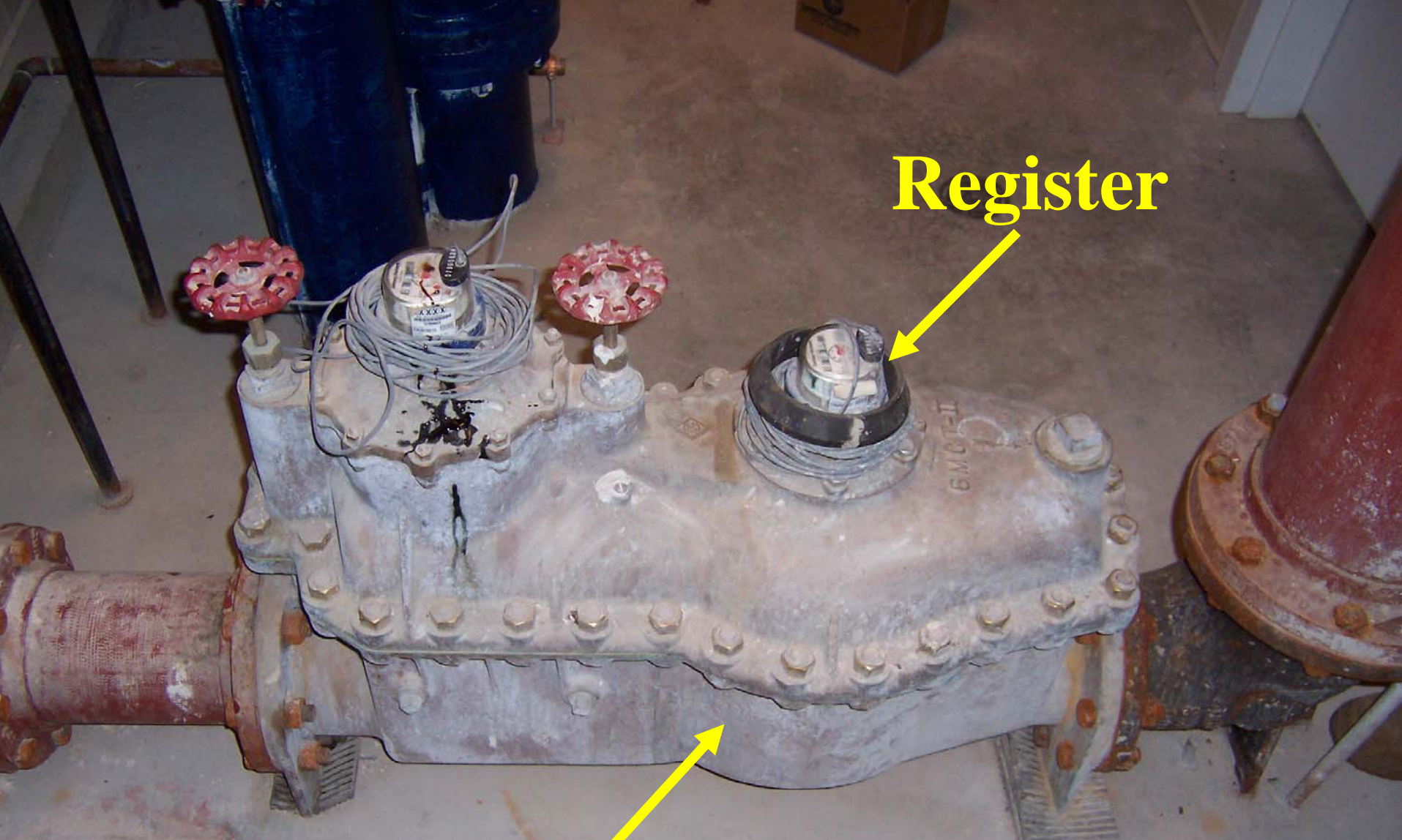
**Handheld
computer**



**Pin-probe
reader**



**Encoder wired to meter
inside house**



Register

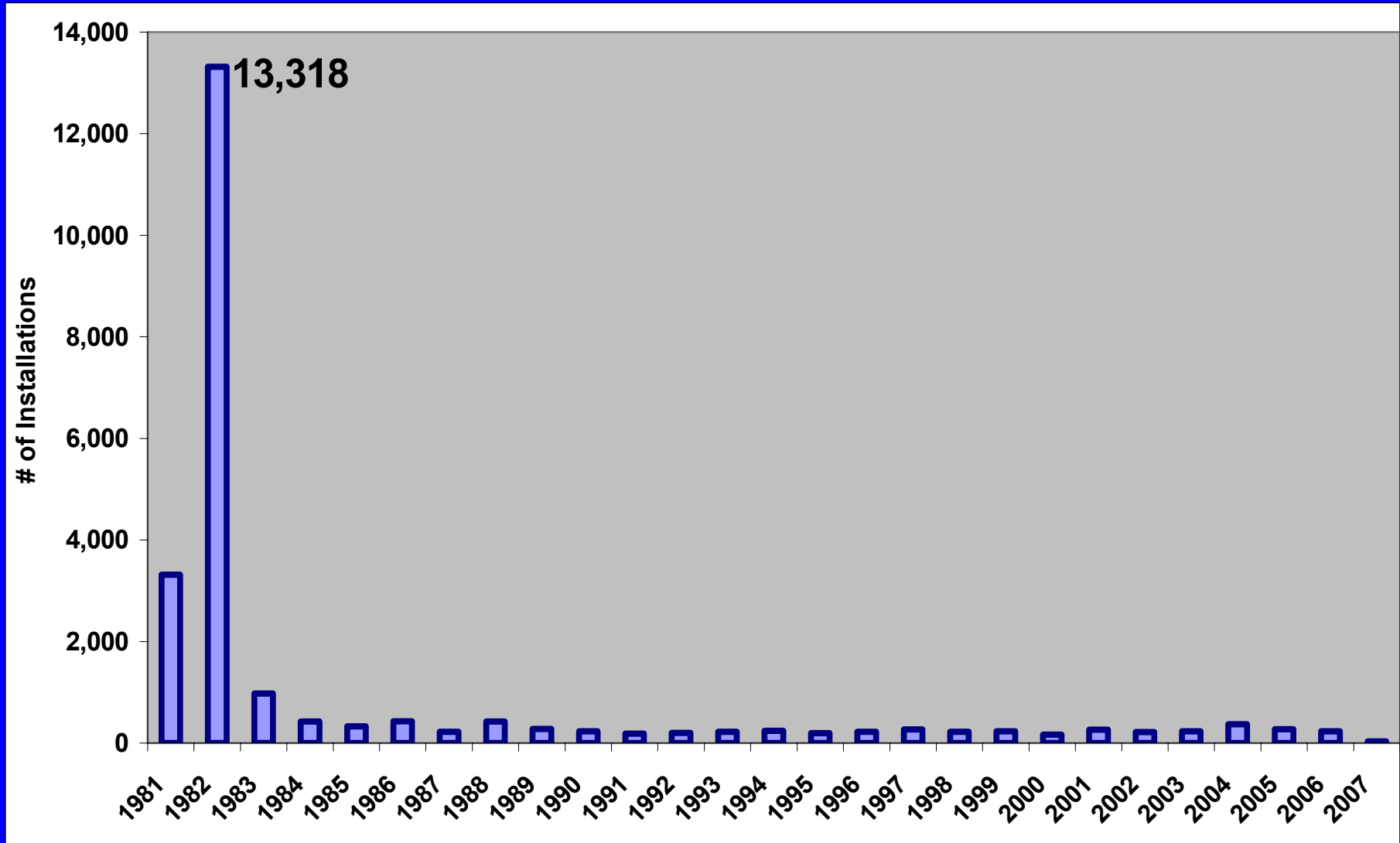


Meter



Commercial Meters

Residential-Commercial Water Meter/Reader Installations



LET'S GET SOME AGE PERSPECTIVE....



Top grossing film of 1982... **E.T.**

SOME SCARY PERSPECTIVE.....



**Top selling single of 1982...
Physical – Olivia Newton-John**

TECHNOLOGICAL PERSPECTIVE....



Top computers of 1982...
Apple II and Atari 800

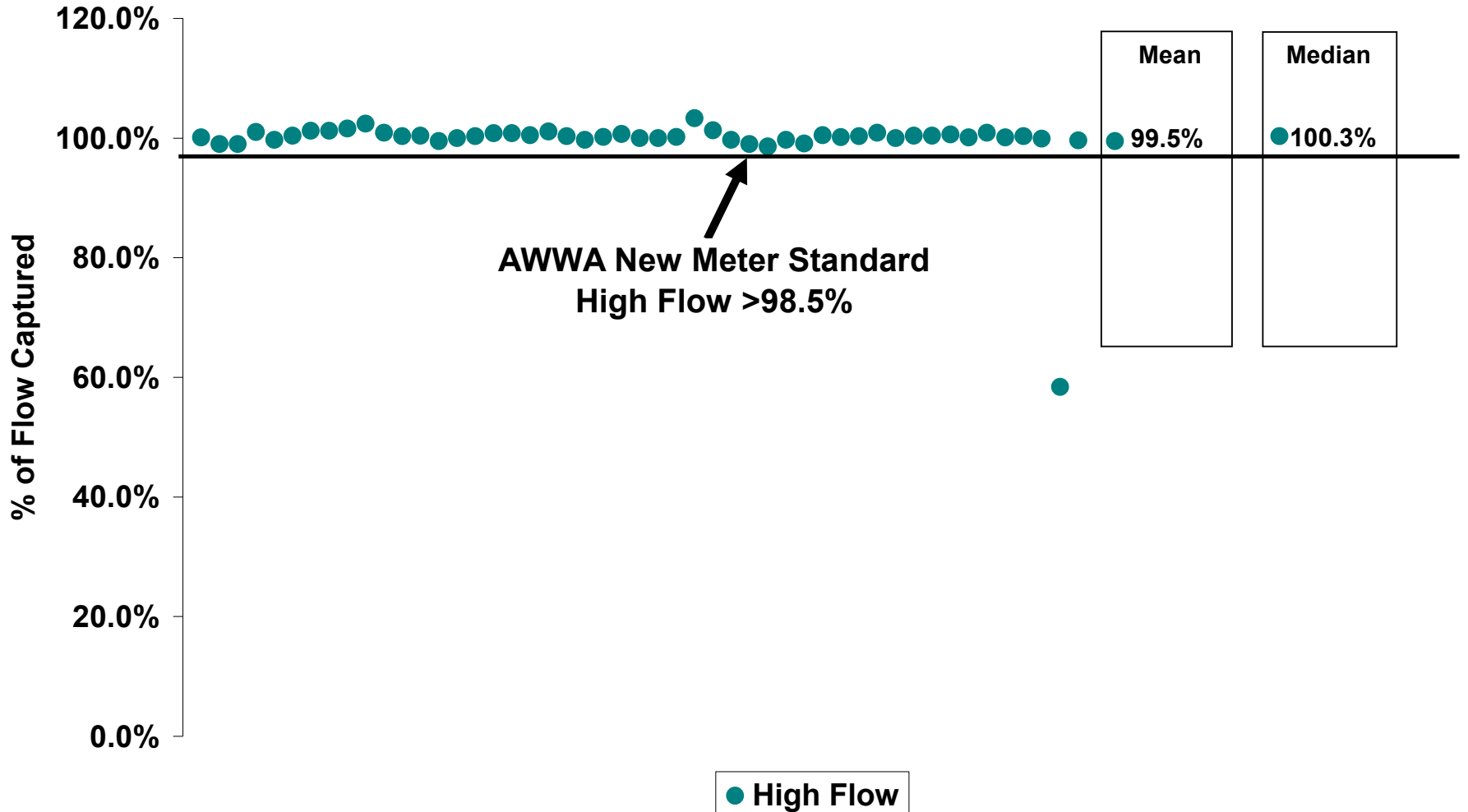
Existing Water Meter Accuracy

- Meter accuracy depends on:
 - Age of Meter
 - Total quantity of water through the meter
 - Water quality (chemical build up and abrasive materials carried in the water)
 - Flow rate

- Meters are tested at low, medium and high flow rates
- Research shows approximately 80% of domestic consumption falls within 1-8 gallons per minute
- Meter degradation begins at low flow and proceeds to high flow

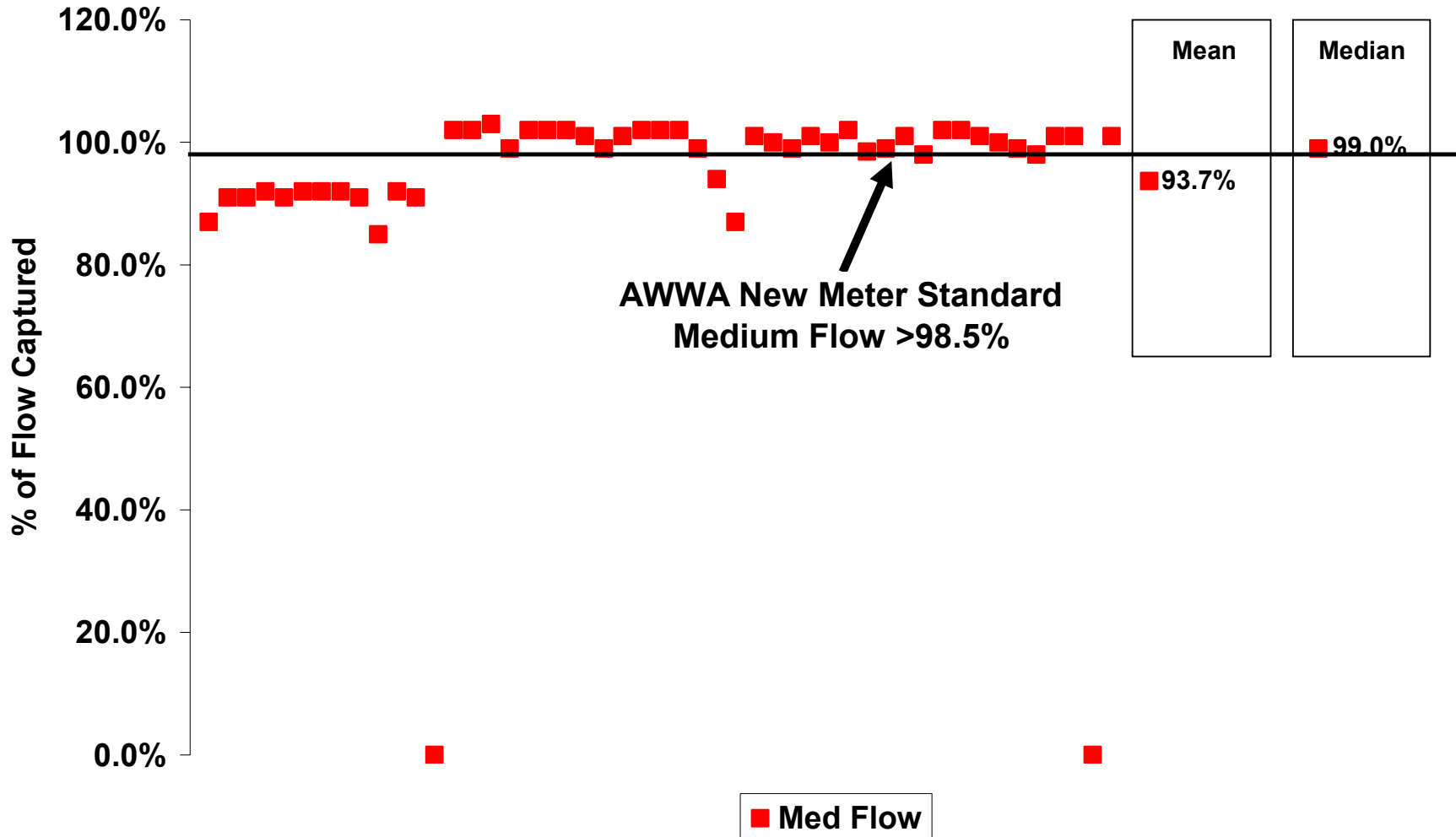
Water Meter Accuracy – Flow Tests on 49 Meters

High Flow Meter Accuracy @ 15 Gallons Per Minute



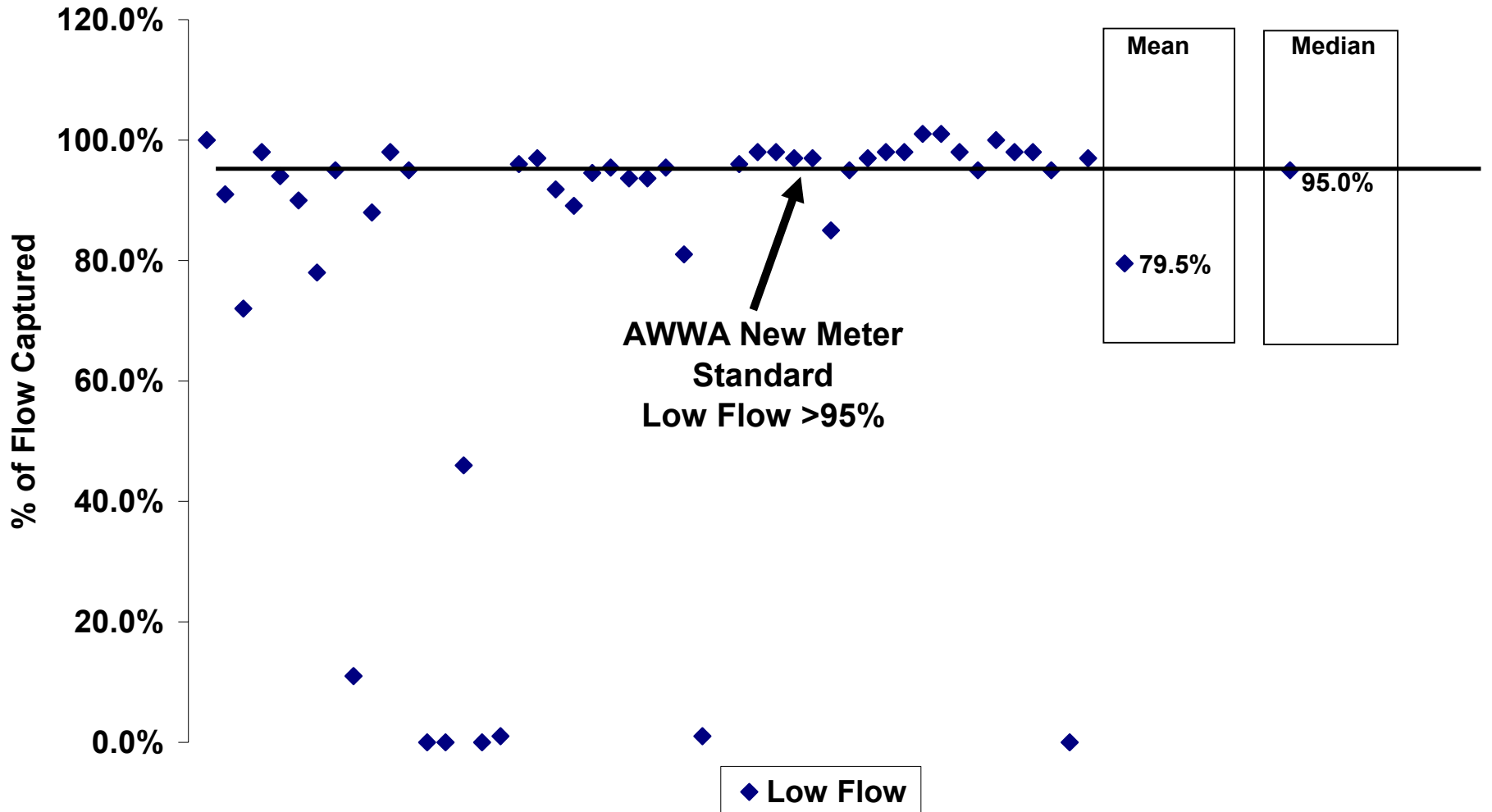
Water Meter Accuracy – Flow Tests on 49 Meters

Medium Flow Meter Accuracy @ 2 Gallons Per Minute



Water Meter Accuracy – Flow Tests on 49 Meters

Low Flow Meter Accuracy @ 1/4 Gallons Per Minute



Existing Reading System



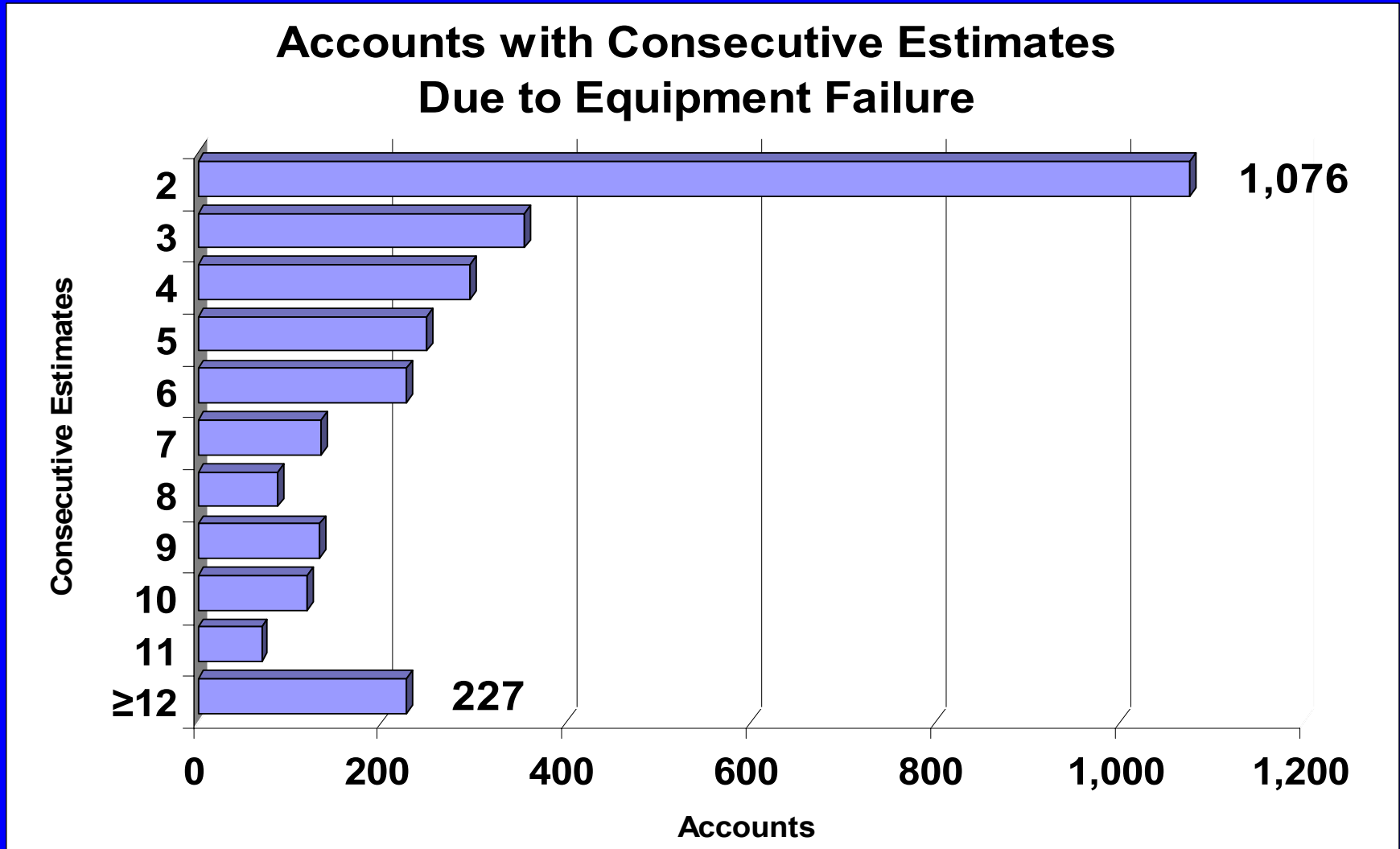
Current Meter Reading Issues

- **Meter Reading - Labor**
 - Three meter readers; three meter repairmen; three clerical staff
 - Delays (weather, vacation/sick leave)
 - Access to property becoming more problematic
(i.e. security, homeowner availability)
 - Overtime required

Current Meter Reading Issues

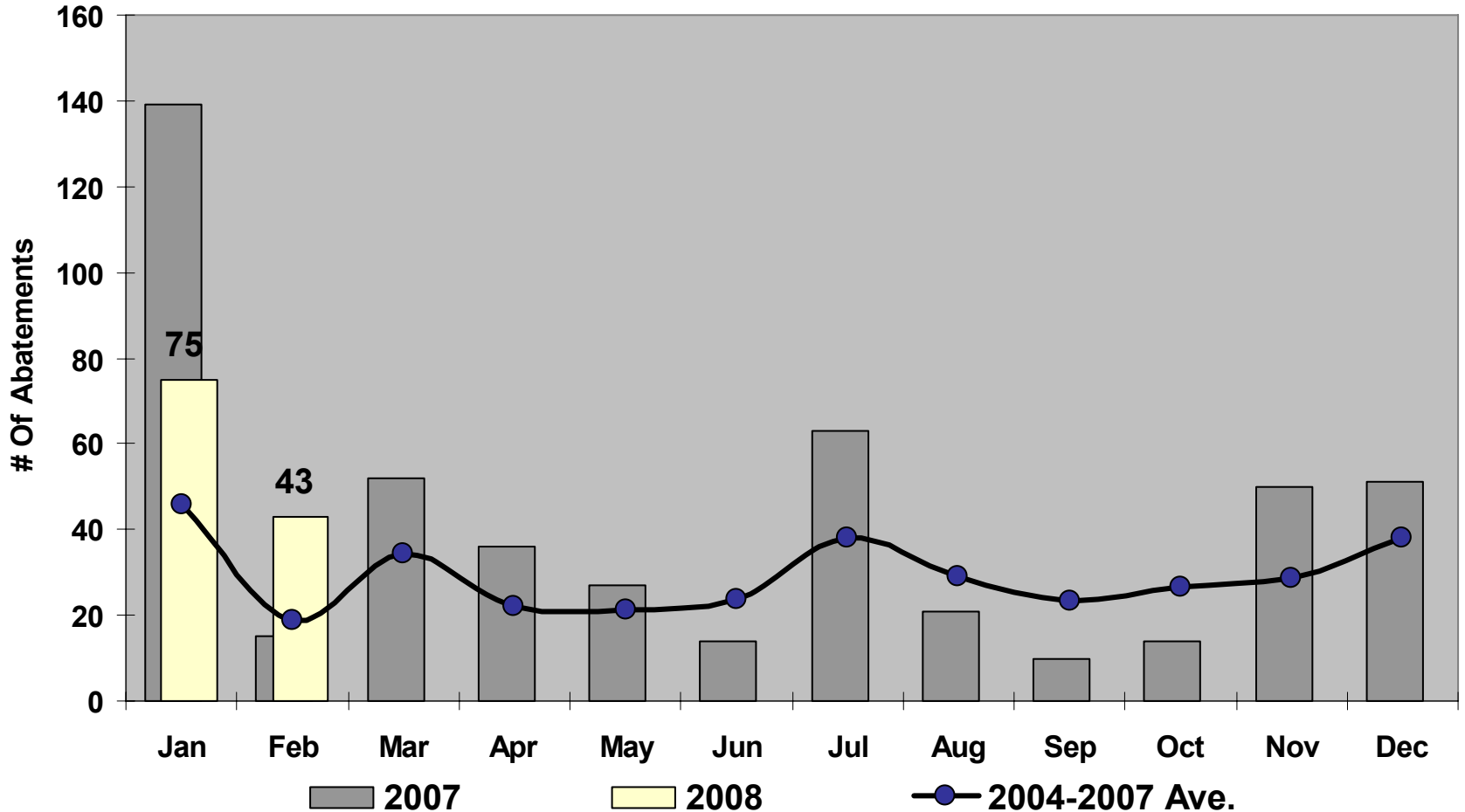
- **Meter Reading - Equipment**
 - Only 2 of 5 pin probe guns working
 - Manufacturer no longer services equipment
 - Unable to purchase replacement parts

Estimated Bills as of December 2007



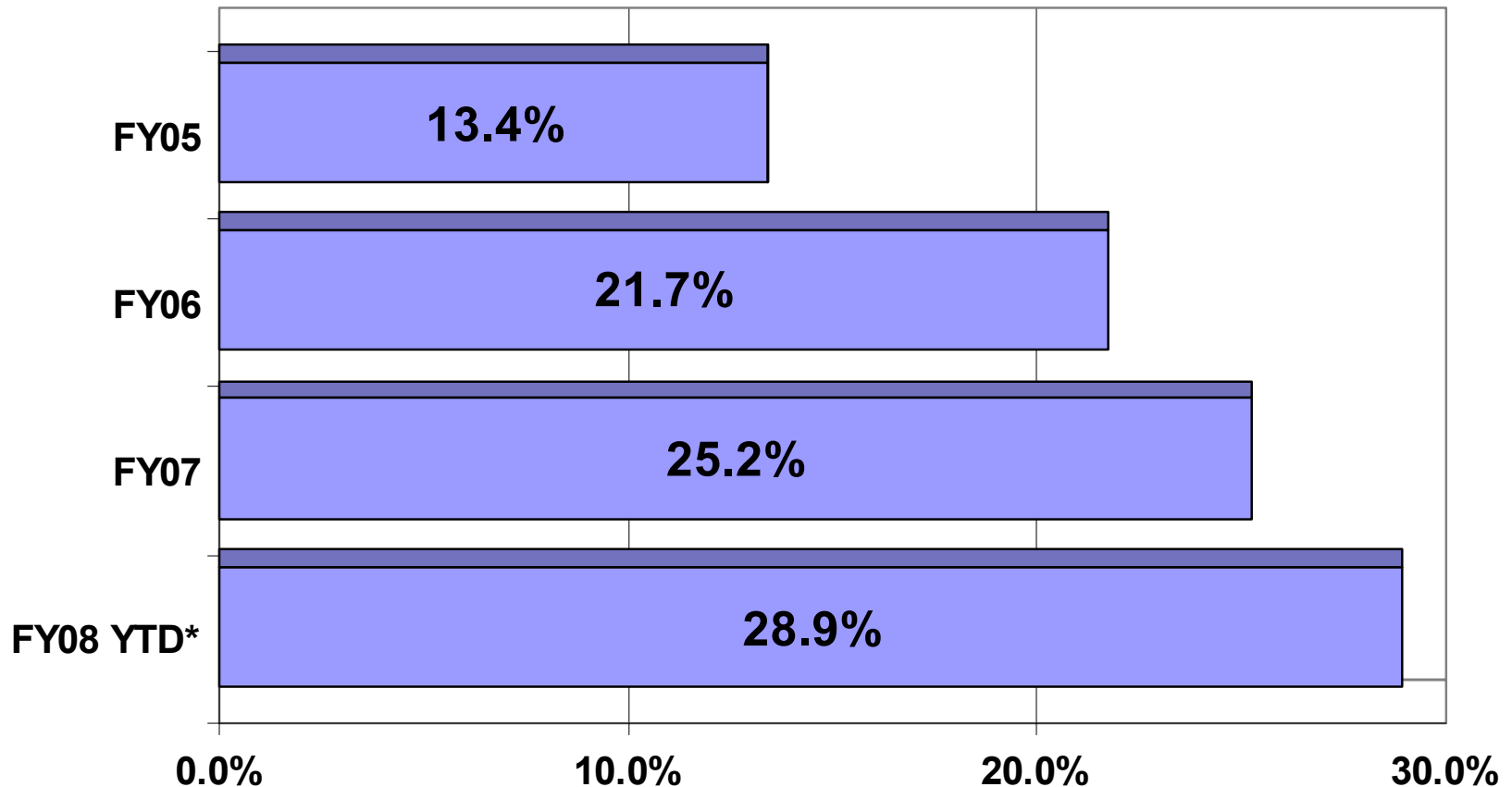
- **12% of all accounts have two or more consecutive estimates**
- **“Estimated Bills” are generated when equipment fails to register a reading**

Abatements For "False" Actual Reads Calendar 2007 vs. 2008 vs. 2004-2007 Average



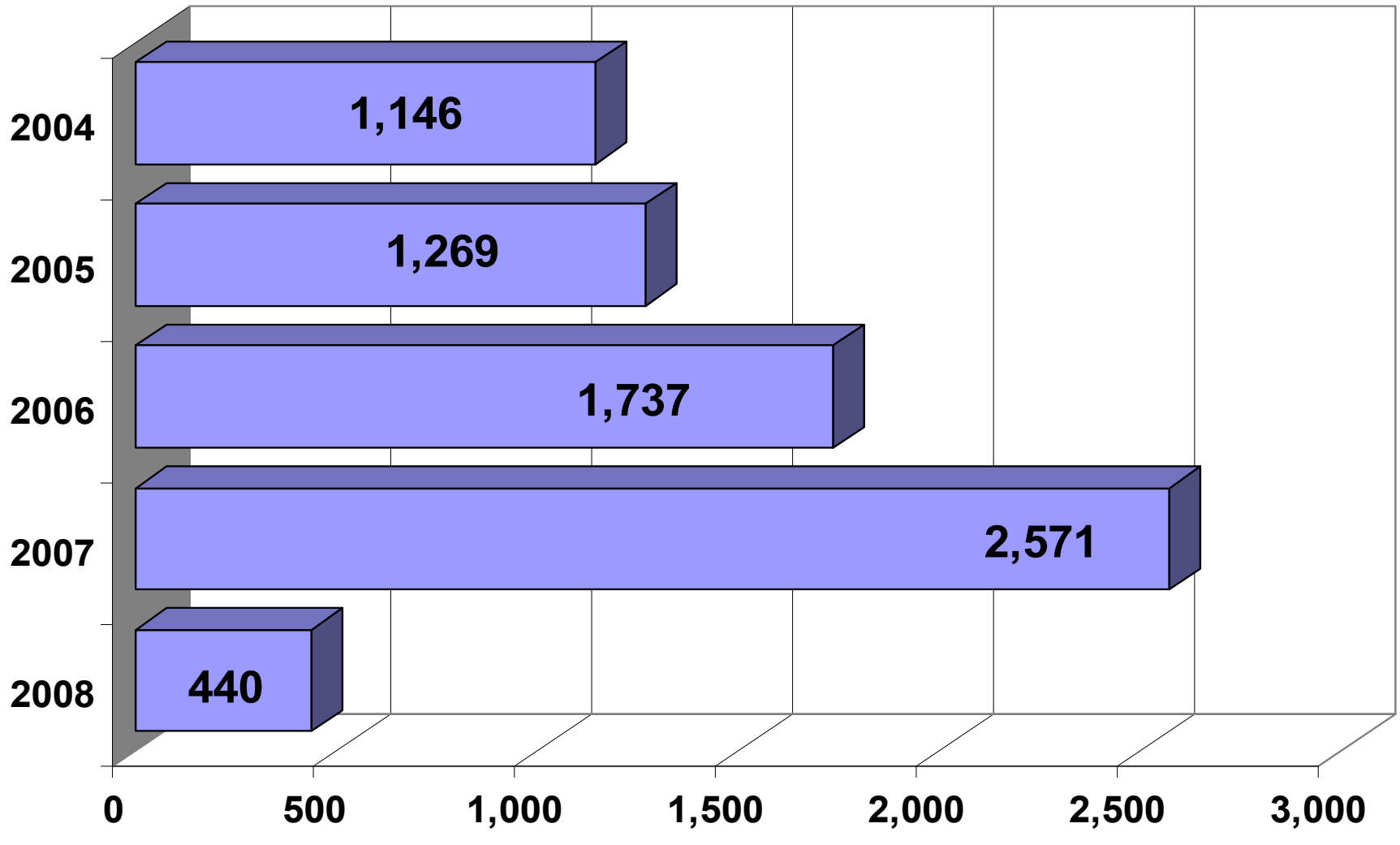
“False” Actual Reads are readings that ultimately prove to be incorrect after billing. The true number of false actual reads is unknown; these data reflect only the cases which were reported by the property owner to the Billing Office.

Estimated Bills as of February 2008



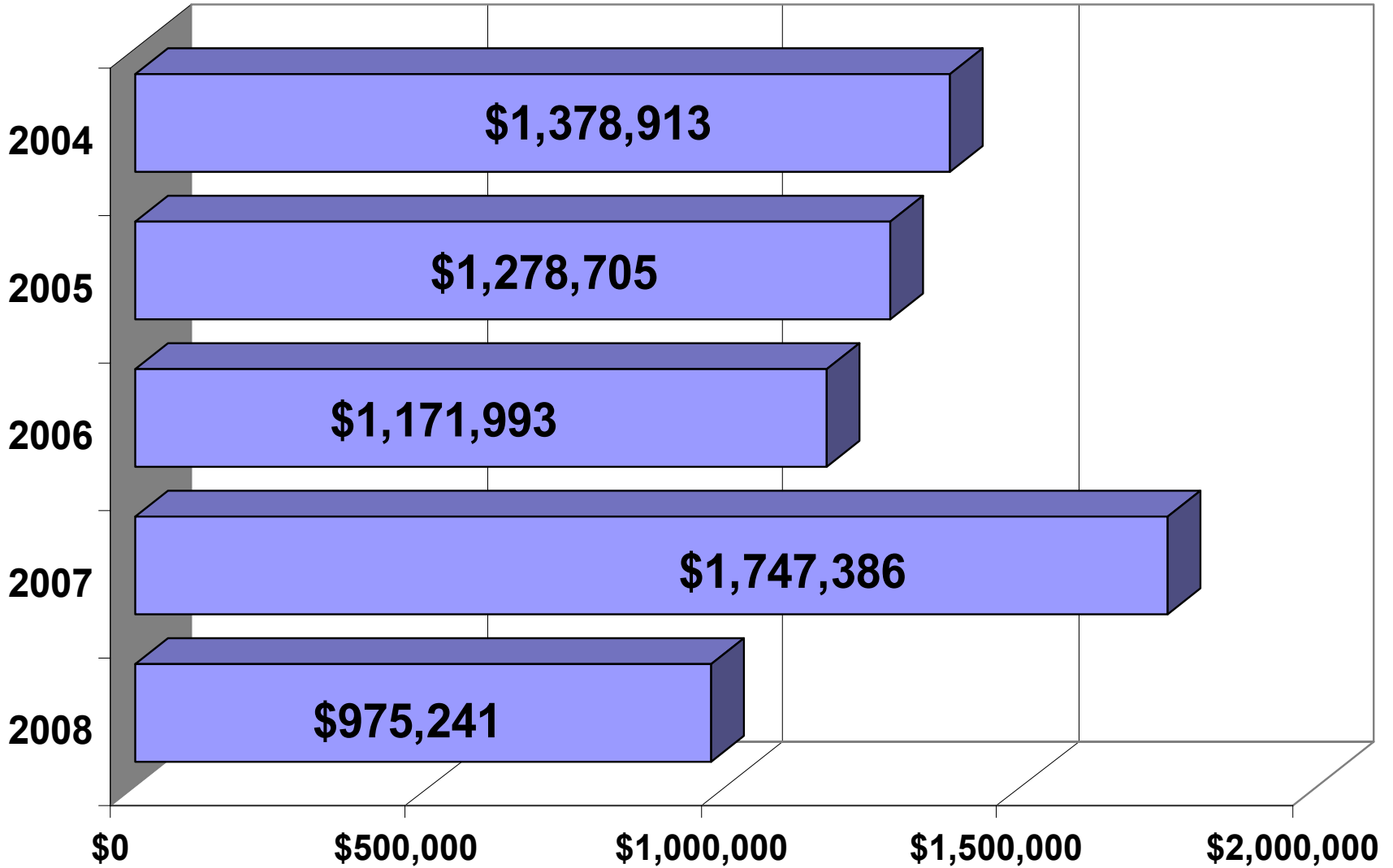
*FY08 data is through Feb 2008. Bills are estimated due to failed, manually adjusted or missed reads.

Total Abatements - Calendar Year



Abatements are triggered either by 1) the customer reads meter; customer read is different than the registered read; or, 2) Work order is generated for repair or cleaning of encoder; read on repaired equipment is different than billed figure.

\$ Value Of Abatements - Calendar Year



Water Meter Technology Issues Summary

- 1 in 4 reads are estimated due to equipment malfunction
- Water meter register replacement requires disassembly of water meters

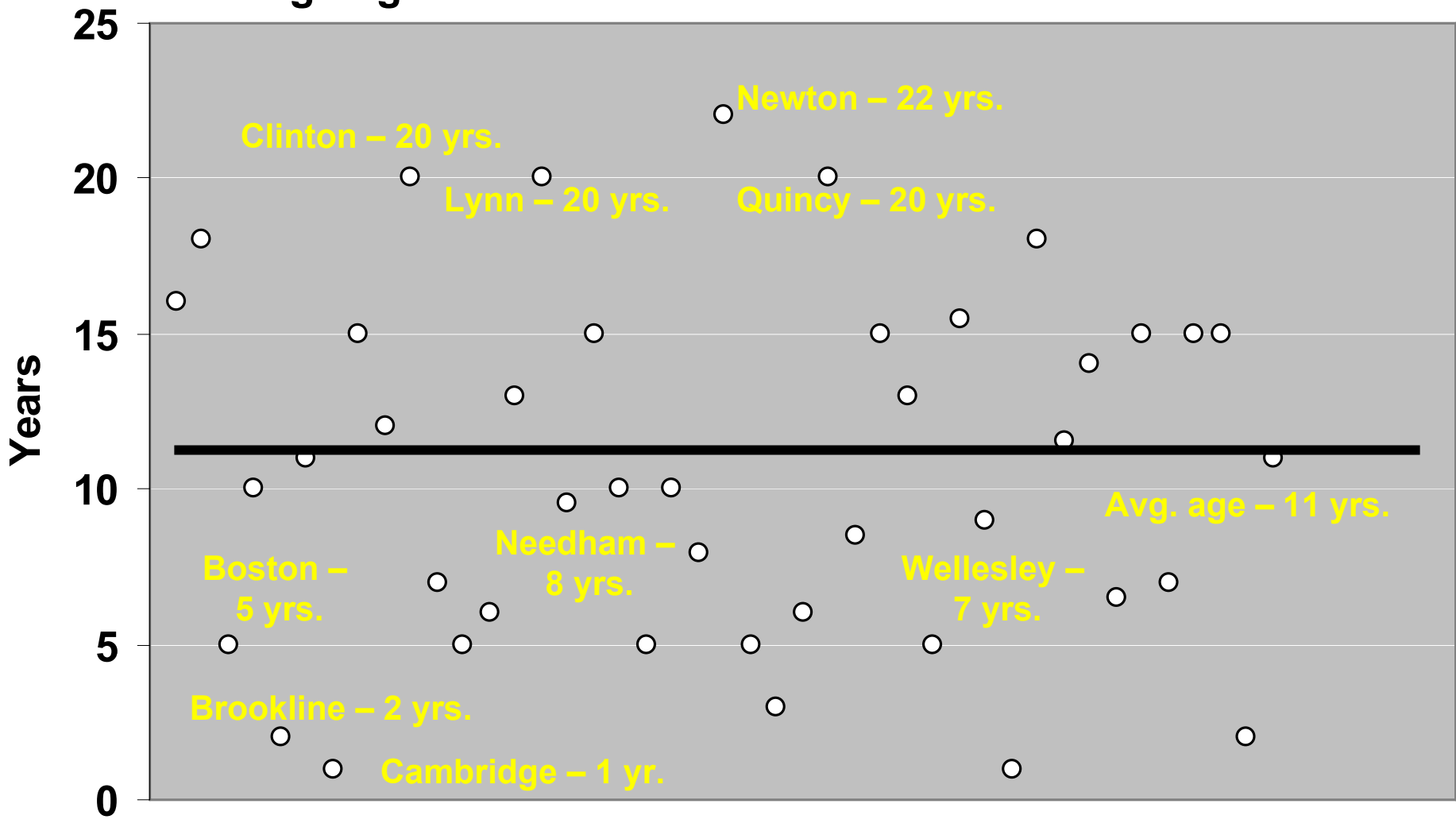
- Over 96% of Newton's water meter registers are incompatible with all available meter reading systems
 - Missing link → digital signal
- Encoder repairs have increased from 368 in CY05 to 833 in CY07; current backlog 3 months

Proposed Reading System

→ Meter Reading Systems in Other Communities

→ Recommended Solution

Average Age of Meters in 43 MWRA Communities as of 2006



Water Meter Reading Options

Technology	Touchpad	Mobile (Drive By)	Fixed Network
Time Period	Introduced in the mid – 1980's	Introduced in the early – 1990's	Introduced in the early – 2000's
Communities	Waltham, Framingham	Wellesley, Medford, Swampscott, Natick	Brookline, Boston, Norwood, Cambridge
# Meter Readers	3	1	0

Water Meter Reading Options

Technology	Touchpad	Mobile (Drive By)	Fixed Network
Potential Billing Frequency	Quarterly	Monthly	Monthly
Customer Leak Detection	Not effective	Monthly	Real-time review of outlier user patterns
Utilities Leak Detection	Not readily detected	Not readily detected	Real-time data to target system leaks
System Failures	Not readily detected	Easily detected	Immediately detected

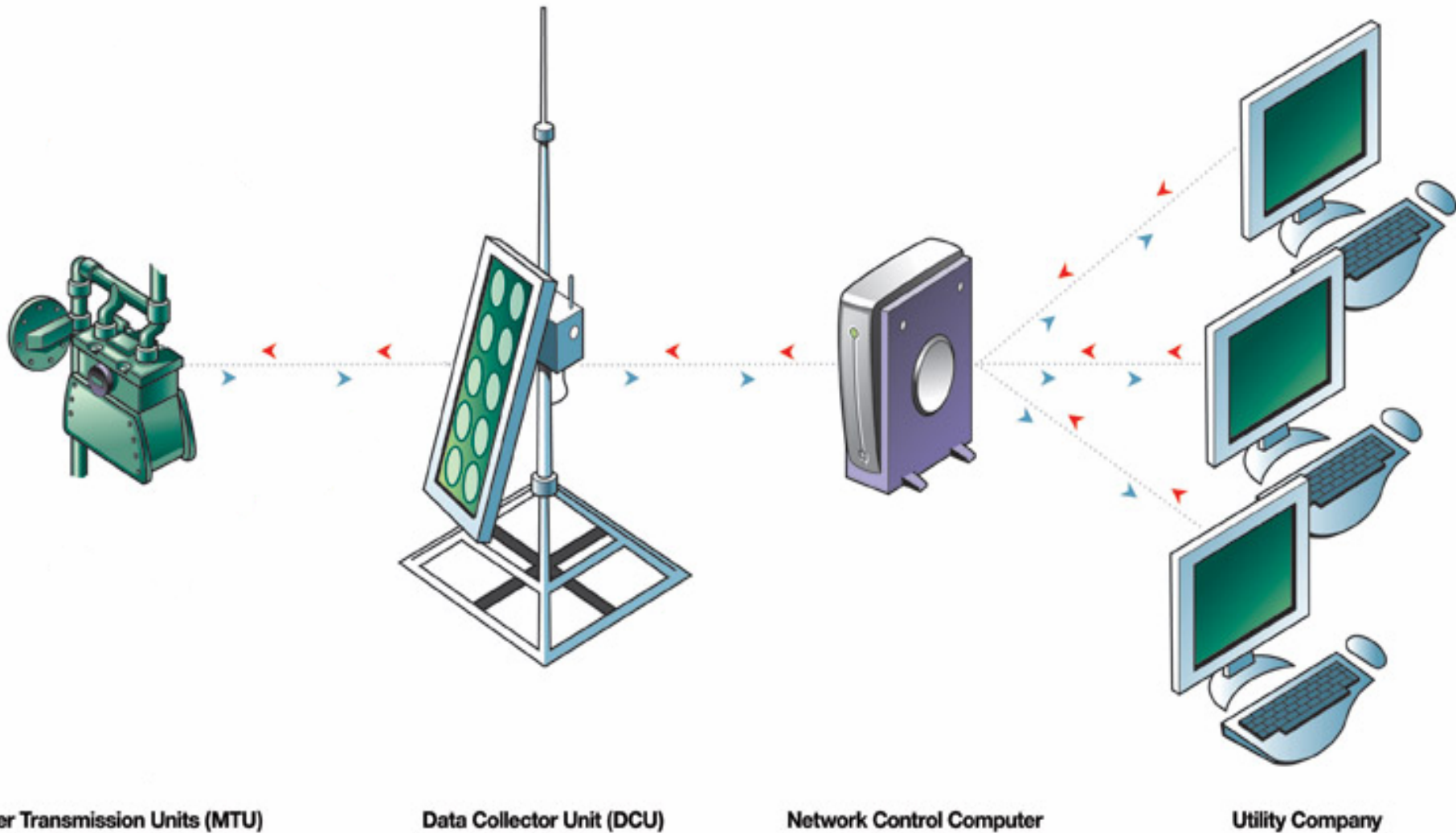
Proposed – “Fixed Network” Automated Meter Reading System

- Best solution for proactive customer service interface
 - Reading failures are easily detected
 - Billing frequency can be increased to monthly
 - Potential to review consumption online
 - Close-out reads are easily obtained

Proposed – “Fixed Network” Automated Meter Reading System

- Daily reads will improve Utilities Division capacity to identify system leaks and conserve water
 - Potential to link to existing SCADA monitoring system
- More ‘green’ alternative
- Access to Property no longer required
- Ability to reassign staff

Fixed Network Meter Reading System



Requested Funding

- Total Estimated Cost for Meter and Reading System Replacement = \$12,500,000
-

- Estimate for Meter Replacement (including Engineering and Contingency) = \$8,262,529
- Estimate for Reading System Replacement (including Engineering and Contingency) = \$4,237,471

Requested Funding Homeowner Impact

- Year One Annual Impact on Household Using 100 Hundred Cubic Feet (HCF) Based on FY08 Rates = **\$55.04**
- Average Monthly Impact on Household Using 100 Hundred Cubic Feet (HCF) Based on FY08 Rates = **\$4.59**

Summary - Why Meter Replacement

1. Technological Obsolescence

- Meter age & accuracy (@low flow is ↓ 80%)
- 25% of current reads are missed or failed reads
- Vendor support unavailable

2. Customer Service – Enhanced and Proactive

- Improved tools will allow Customer Service staff to investigate high reads (i.e. leaks)
- Potential to transition to monthly billing
- Automated - Doesn't require access to property

3 Equity

- Accurate Usage information for billing
- Reduced number of abatements

Proposed Project Schedule

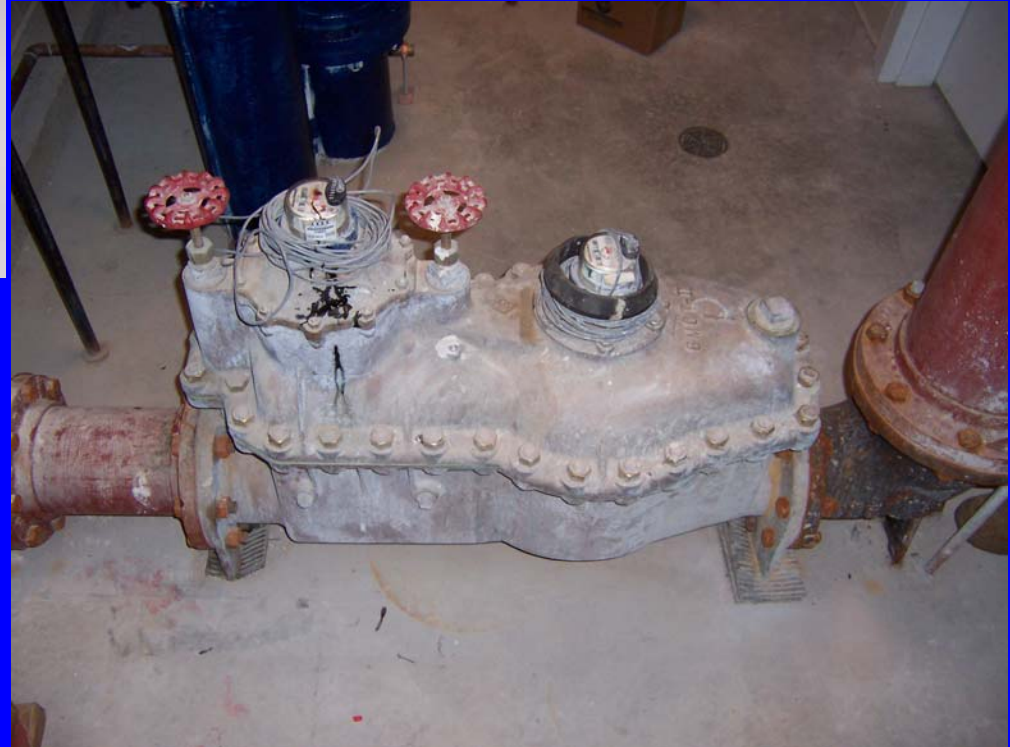
- ✓ April 2008: Request borrowing from the Board of Aldermen
- ✓ July 2008: Issue Request for Proposal (RFP) for automated reading system (AMR)
- ✓ October 2008: Award contract
- ✓ December 2008: Issue Invitation to Bid for installation
- ✓ February 2009: Select installation contractor
- ✓ April 2009: Installation begins
- ✓ April 2011: Project completion

IN OTHER WORDS.....



The horse left the barn a long time ago.....

THANK YOU





“Comprehensive” Energy Efficiency for Newton’s Public Buildings

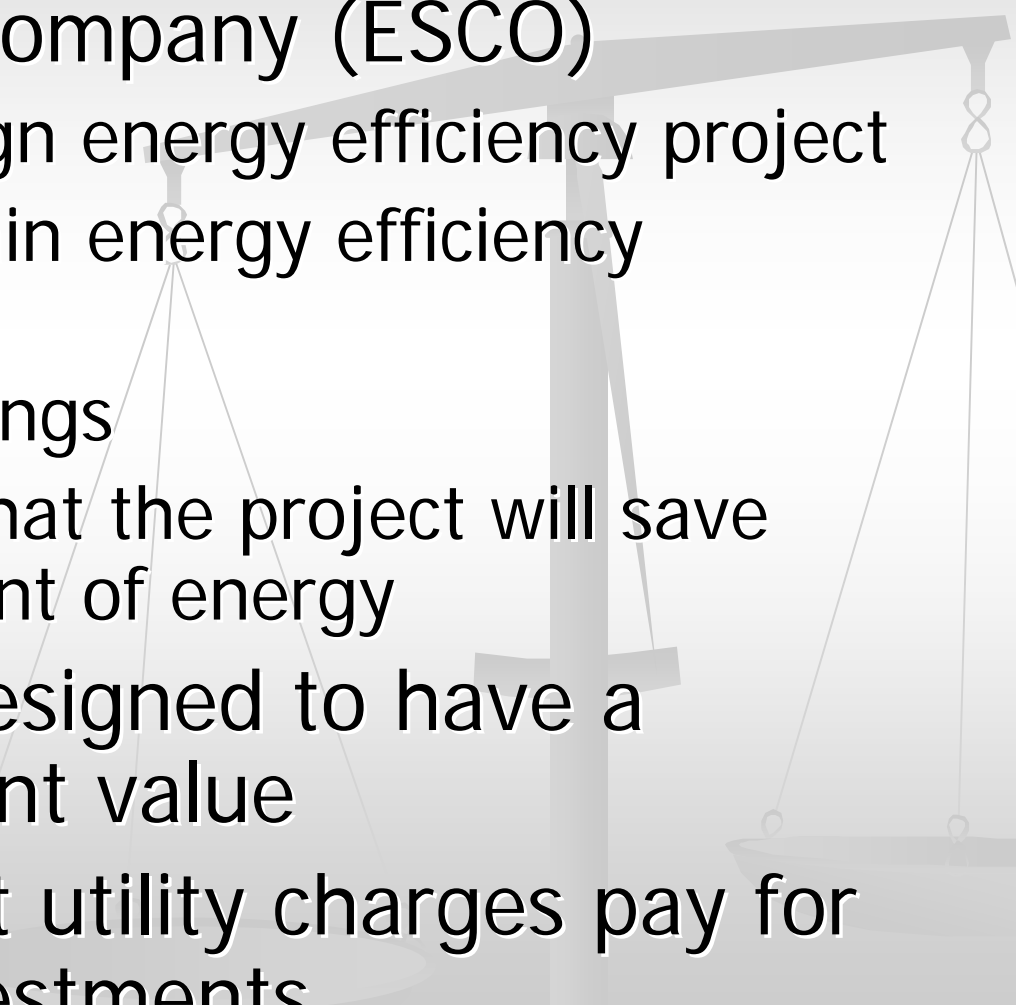
Prepared for Public Facilities Committee
Newton, Board of Aldermen
April 9, 2008 Docket item #144-08
Newton Public Buildings Dept.

History



- **BOA Docket #160-06 – Municipal Energy Conservation/Performance Contracting** (an EAP action item)
- 4 responses evaluated from 6/29/07 RFQ.
www.ci.newton.ma.us/building/default.htm
- Day investment grade audit part of RFQ.
- Energy Services Committee recommended Noresco for negotiations for a Comprehensive Energy Services Agreement

What is an ESCO?

- Energy Services Company (ESCO)
 - Develop and design energy efficiency project
 - Install and maintain energy efficiency equipment
 - Verify energy savings
 - Assume the risk that the project will save guaranteed amount of energy
 - Projects can be designed to have a positive net present value
 - Operating budget utility charges pay for infrastructure investments
- 

Summary of Energy Conservation Measures: Day Middle School

#	ECM	Payback	Opt 1
8a	Lighting Improvements	short	✓
7	Weatherization		✓
10	Power Management for PC Networks		➔
9	Domestic Water Conservation		✓
4	Energy Management System Upgrades		✓
4a	Variable Frequency Drives on Fans & Pumps		✓
4b	Walk-In Cooler Controls		✓
8c	Lighting Controls in Selected Areas	medium	
8b	Lighting Controls Building-Wide		✓
13	Power Factor Correction		
1	New Rooftop Units with VFDs		✓
11	Premium Efficiency Motors	long	
3a	New Condensing Boilers		➔
3b	New Domestic Hot Water System		➔
2	New Air-Cooled Condensing Units		✓
12	Photovoltaic System		
6	Kitchen Hood Controls		
5	New Gas-Fired Kettle		
4c	Expanded EMS Upgrades: Added Monitoring		✓
14	Energy Education Program		➔
15	Capital Improvements at Other Buildings		



New High-Efficiency Rooftop Units (RTU)

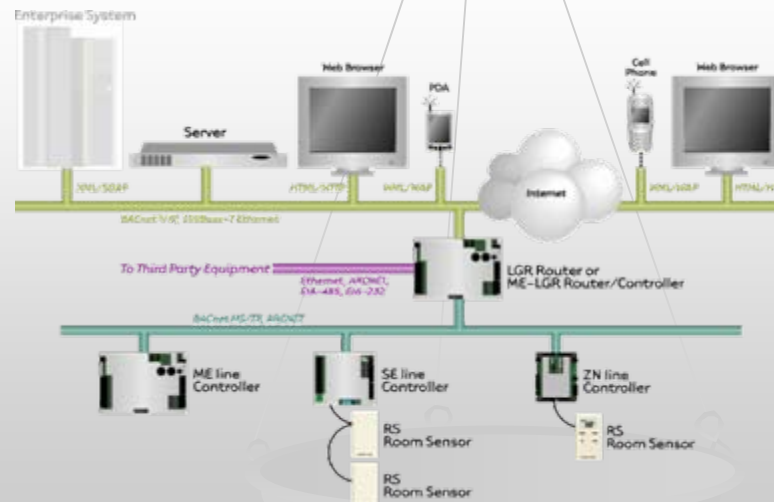
- The existing 25 year old RTU's have major deficiencies due to their age:
 - Outside air damper actuators and linkages are inoperative.
 - Fresh air supply rates and economizer functions are manually adjusted and do not match varying loads.
 - The DX cooling systems have constant refrigerant leakage.
 - Individual unit controls are inadequate, leading to overcooling of the spaces served.
- The new RTU's will incorporate features that will achieve energy efficiency and comfort benefits.
 - Significant fan horsepower savings with variable frequency drives modulating to match actual heating and cooling loads.
 - Comfort will be improved. Current over-cooling of the spaces will be mitigated.
 - The new rooftop units will be connected to the energy management system to provide optimal savings strategies and remote monitoring.



New Roof Top Unit

New Energy Management System (EMS)

- The existing old, complex pneumatic control system is difficult to troubleshoot, and service of these pneumatic control systems are extremely time and labor intensive.
- The existing system does not lend itself to feedback or direct monitoring of performance or functionality, thus a problem with their operation is not typically identified until an occupant calls with a complaint.
- The new EMS will provide advanced control strategies that will provide both energy savings and increased comfort control, with monitoring and control capability via the internet.



BACnet System

LIGHTING IMPROVEMENTS, LIGHTING CONTROLS

Lighting Retrofits

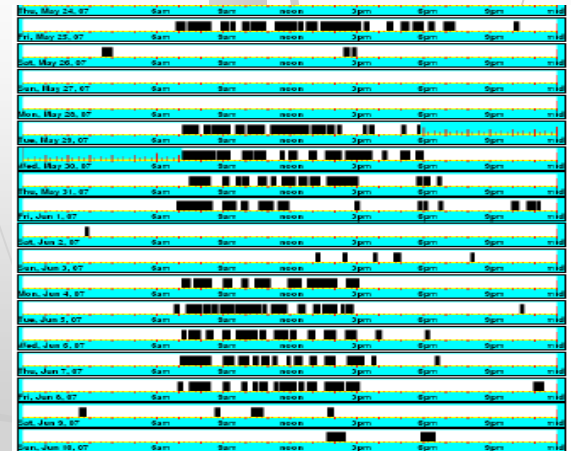
- Existing lighting fixtures in most areas are already energy efficient.
- Retrofit remaining incandescent lamps with compact fluorescent lamps in hallways, the auditorium (excluding dimmable lamps), the library, cafeteria, kitchen, and shower areas.

Occupancy Sensors

- Classrooms, halls, offices, bathrooms, auditorium and the gymnasium are all areas where occupancy patterns change.
- Data loggers determined the occupancy sensor savings opportunity by monitoring the amount of time the lights are left on with the space empty.

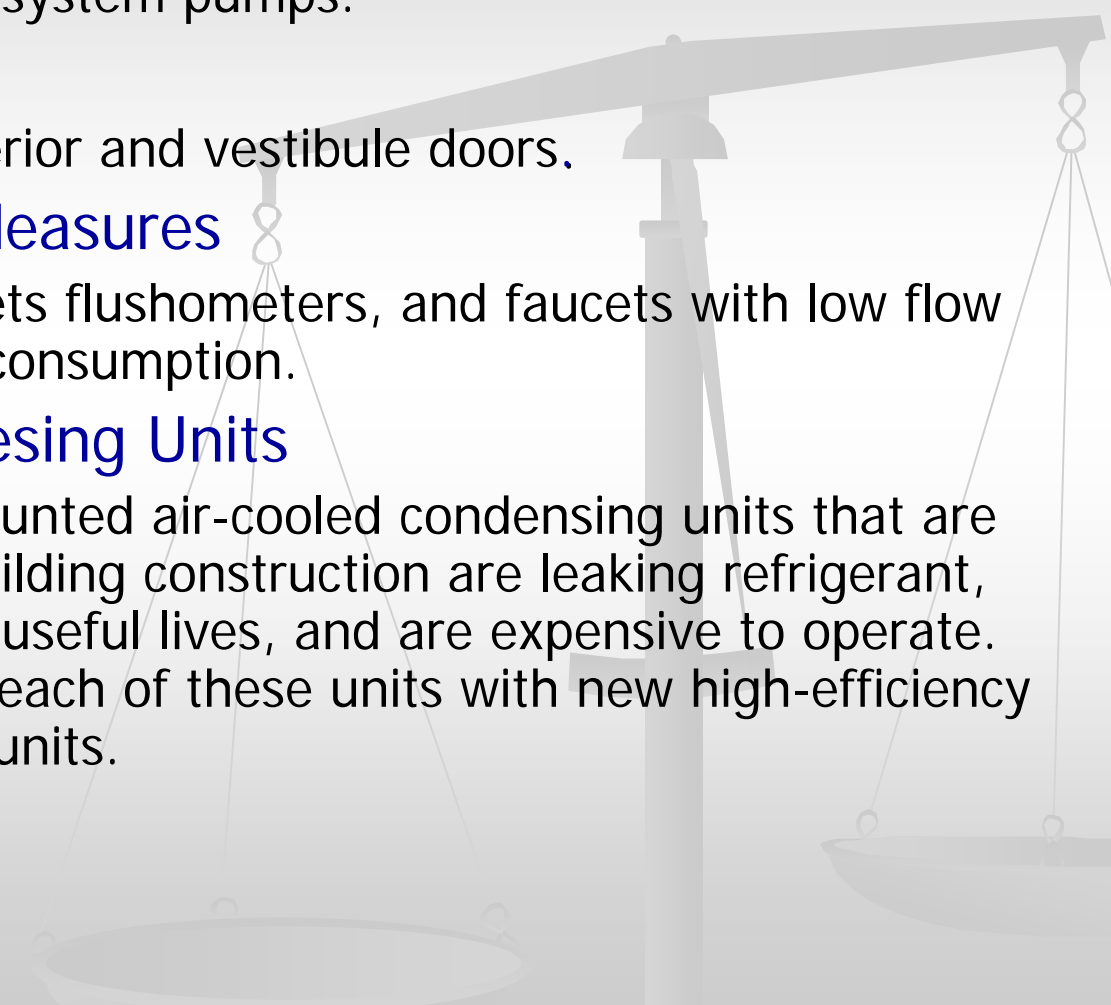


Occupancy Sensors



Lighting metering data

Balance of other Energy Conservation Measures

- **Variable Frequency Drives (VFD's)**
 - New VFDs on a number of supply, return, and exhaust fans, and for two hot water heating system pumps.
 - **Weatherization**
 - Installation on all exterior and vestibule doors.
 - **Water Conservation Measures**
 - Retrofit urinal and toilets flushometers, and faucets with low flow units to reduce water consumption.
 - **New Air-Cooled Condensing Units**
 - Three existing roof-mounted air-cooled condensing units that are original to the 1970 building construction are leaking refrigerant, are at the end of their useful lives, and are expensive to operate. NORESCO will replace each of these units with new high-efficiency air cooled condensing units.
- 

Previous Energy Efficiency Work includes lighting, new construction, and solar energy as incentives were very attractive

Examples:

- Newton since 2000 has “invested” \$945K in public building lighting projects with NSTAR rebating \$700K.
- \$245K final cost returned in two years plus improved customer service and substantial pollution reduction.
- 90% funding of 54 kW Solar Electric power plant at South High School (\$500K grant)
- \$400K grant for North for Green School Certification including 30 kW Solar Electric Power Plant.
- \$300K plus Street Lighting conversion incentive.

Example Day and Brown Gyms

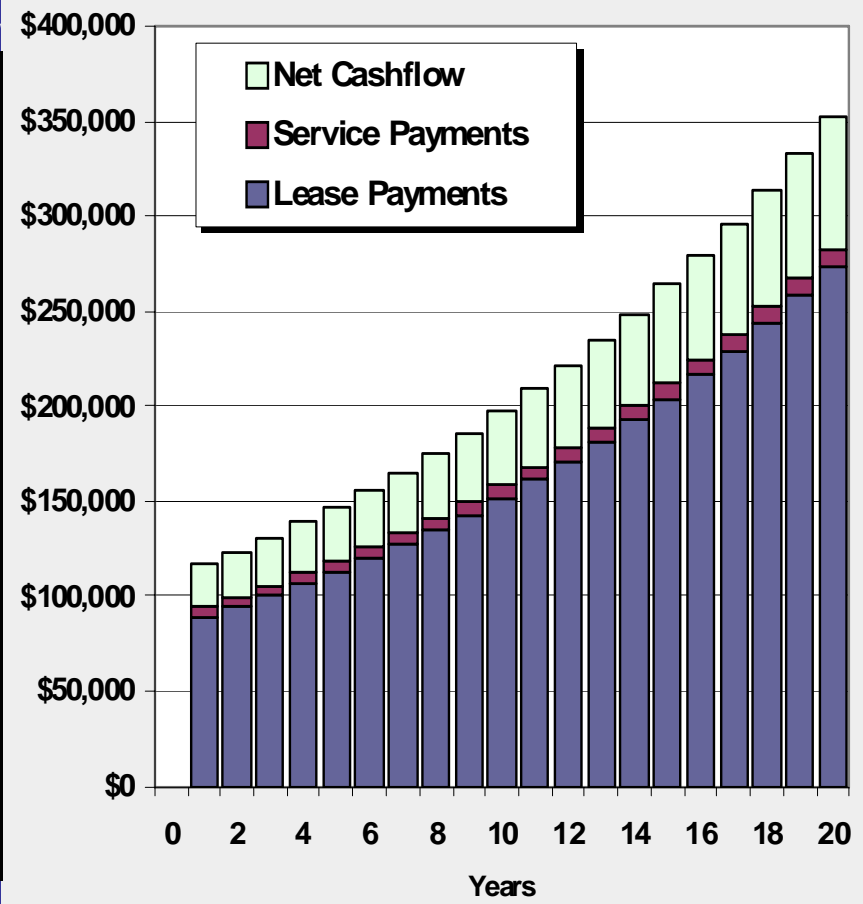
- T5 Fluorescent replaced Mercury Vapor



F.A. Day Middle School

Option 1: \$2.031 Million, 20 Year Term

Year	Lease Payments	Service Payments	Expected Savings	Guaranteed Savings	Net Cashflow
0	\$0	\$0	\$0	\$0	\$0
1	\$88,839	\$5,087	\$116,600	\$116,600	\$22,673
2	\$94,291	\$5,240	\$123,596	\$123,596	\$24,065
3	\$100,074	\$5,397	\$131,012	\$131,012	\$25,541
4	\$106,207	\$5,559	\$138,872	\$138,872	\$27,106
5	\$112,713	\$5,726	\$147,205	\$147,205	\$28,766
6	\$119,612	\$5,897	\$156,037	\$156,037	\$30,527
7	\$126,930	\$6,074	\$165,399	\$165,399	\$32,395
8	\$134,691	\$6,257	\$175,323	\$175,323	\$34,376
9	\$142,922	\$6,444	\$185,843	\$185,843	\$36,476
10	\$151,651	\$6,638	\$196,993	\$196,993	\$38,704
11	\$160,909	\$6,837	\$208,813	\$208,813	\$41,067
12	\$170,727	\$7,042	\$221,342	\$221,342	\$43,573
13	\$181,139	\$7,253	\$234,622	\$234,622	\$46,230
14	\$192,181	\$7,471	\$248,699	\$248,699	\$49,048
15	\$203,890	\$7,695	\$263,621	\$263,621	\$52,037
16	\$216,307	\$7,926	\$279,439	\$279,439	\$55,206
17	\$229,475	\$8,163	\$296,205	\$296,205	\$58,566
18	\$243,439	\$8,408	\$313,977	\$313,977	\$62,130
19	\$258,246	\$8,661	\$332,816	\$332,816	\$65,909
20	\$273,948	\$8,920	\$352,785	\$352,785	\$69,917
	\$3,308,193	\$136,694	\$4,289,200	\$4,289,200	\$844,313

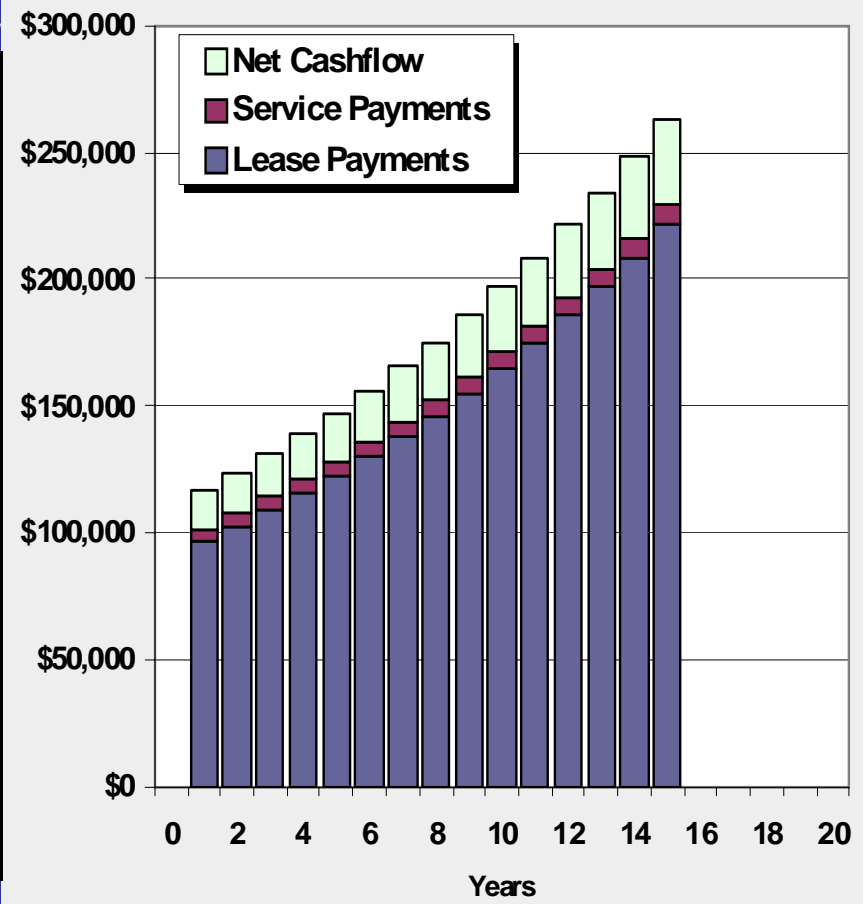


Project Turnkey Price:	<input type="text" value="\$2,031,000"/>	<input type="button" value="Update"/>	Finance Rate:	<input type="text" value="4.50%"/>	Capitalize Construction Interest?	<input type="text" value="Yes"/>
Customer's Capital Contribution:	<input type="text" value="\$0"/>	OK	Utility Escalation Rate:	<input type="text" value="6.00%"/>	Estimated Savings:	<input type="text" value="\$110,000"/>
Estimated Utility Rebates:	\$ (117,850)		Customer Contribution	<input type="text" value="No"/>	Term (Years):	<input type="text" value="20"/>
Customer's Construction Interest:	\$ 82,912		Include Utility Rebates?	<input type="text" value="Yes"/>		
Total Financed Amount	\$ 1,996,062					
Present Value of Cash Flow:	\$ 503,965					

F.A. Day Middle School

Option 2: \$1.6 Million, 15 Year Term

Year	Lease Payments	Service Payments	Expected Savings	Guaranteed Savings	Net Cashflow
0	\$0	\$0	\$0	\$0	\$0
1	\$96,533	\$5,087	\$116,600	\$116,600	\$14,980
2	\$102,457	\$5,240	\$123,596	\$123,596	\$15,899
3	\$108,741	\$5,397	\$131,012	\$131,012	\$16,874
4	\$115,405	\$5,559	\$138,872	\$138,872	\$17,908
5	\$122,474	\$5,726	\$147,205	\$147,205	\$19,005
6	\$129,971	\$5,897	\$156,037	\$156,037	\$20,168
7	\$137,923	\$6,074	\$165,399	\$165,399	\$21,402
8	\$146,356	\$6,257	\$175,323	\$175,323	\$22,711
9	\$155,300	\$6,444	\$185,843	\$185,843	\$24,099
10	\$164,785	\$6,638	\$196,993	\$196,993	\$25,571
11	\$174,844	\$6,837	\$208,813	\$208,813	\$27,132
12	\$185,513	\$7,042	\$221,342	\$221,342	\$28,787
13	\$196,826	\$7,253	\$234,622	\$234,622	\$30,543
14	\$208,824	\$7,471	\$248,699	\$248,699	\$32,405
15	\$221,548	\$7,695	\$263,621	\$263,621	\$34,379
16	\$0	\$0	\$279,439	\$0	\$0
17	\$0	\$0	\$296,205	\$0	\$0
18	\$0	\$0	\$313,977	\$0	\$0
19	\$0	\$0	\$332,816	\$0	\$0
20	\$0	\$0	\$352,785	\$0	\$0
	\$2,267,500	\$94,616	\$4,289,200	\$2,713,978	\$351,862



Project Turnkey Price: <input type="text" value="\$1,620,000"/>	<input type="button" value="Update"/>	Finance Rate: <input type="text" value="4.50%"/>	Capitalize Construction Interest? <input type="text" value="Yes"/>
Customer's Capital Contribution: <input type="text" value="\$0"/>	OK	Utility Escalation Rate: <input type="text" value="6.00%"/>	Estimated Savings: <input type="text" value="\$110,000"/>
Estimated Utility Rebates: \$ (117,850)		Customer Contribution: <input type="text" value="No"/>	Term (Years): <input type="text" value="15"/>
Customer's Construction Interest: \$ 65,100		Include Utility Rebates? <input type="text" value="Yes"/>	
Total Financed Amount \$ 1,567,250			
Present Value of Cash Flow: \$ 240,004			