This presentation premiered at WaterSmart Innovations

watersmartinnovations.com

watersmart
INNOVATIONS

NYC's Large Meter Replacement Program

Improving Revenues and Lowering Costs

Kenneth Molli, Veolia North America
Warren C. Liebold, New York City DEP

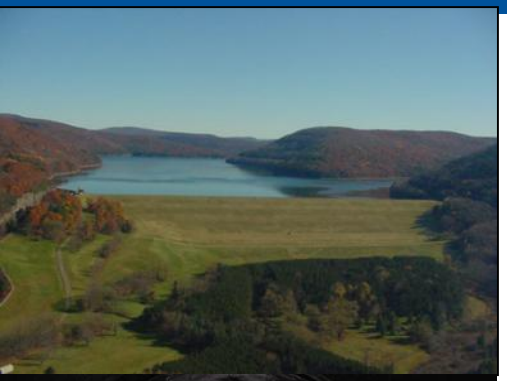
New York City Department of Environmental Protection

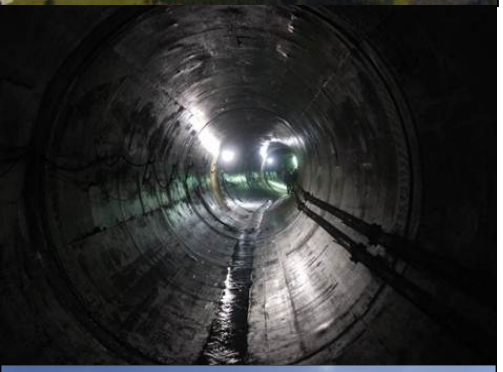
- ***Serves 9 million people***
- *Annual revenue: ~$3.7 billion*
- *Annual operational expense: ~$1.35 billion*

- ***Supplies 1 billion gallons of water per day***
- *19 storage reservoirs, 3 controlled lakes*
- *295 miles of aqueduct and tunnels, 7,000 miles of water mains, 109,000 hydrants*

- ***Treats 1.3 billion gallons of wastewater per day***
- *14 In-city treatment plants; 8 upstate plants*
- *7,500 miles of sewers*
- *96 pump stations*
- *148,000 catch basins*

OpX program in New York City DEP – The Best Always Do Better





Innovative contract to blend the talents of public & private sectors to improve quality, reduce costs and stabilize rates. Incorporate best practices without outsourcing or privatization.

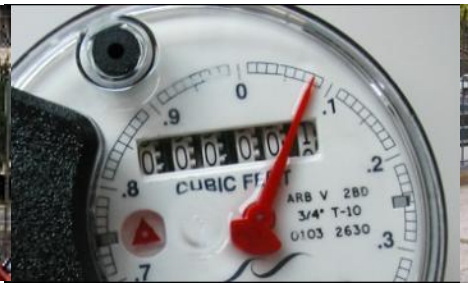
Phase 1 (6 months)
Nov 2011 – May 2012

- **Operational diagnostic** across DEP's facilities and back-office
- Identification of >100 potential savings initiative
- Implementation of **quick-wins**

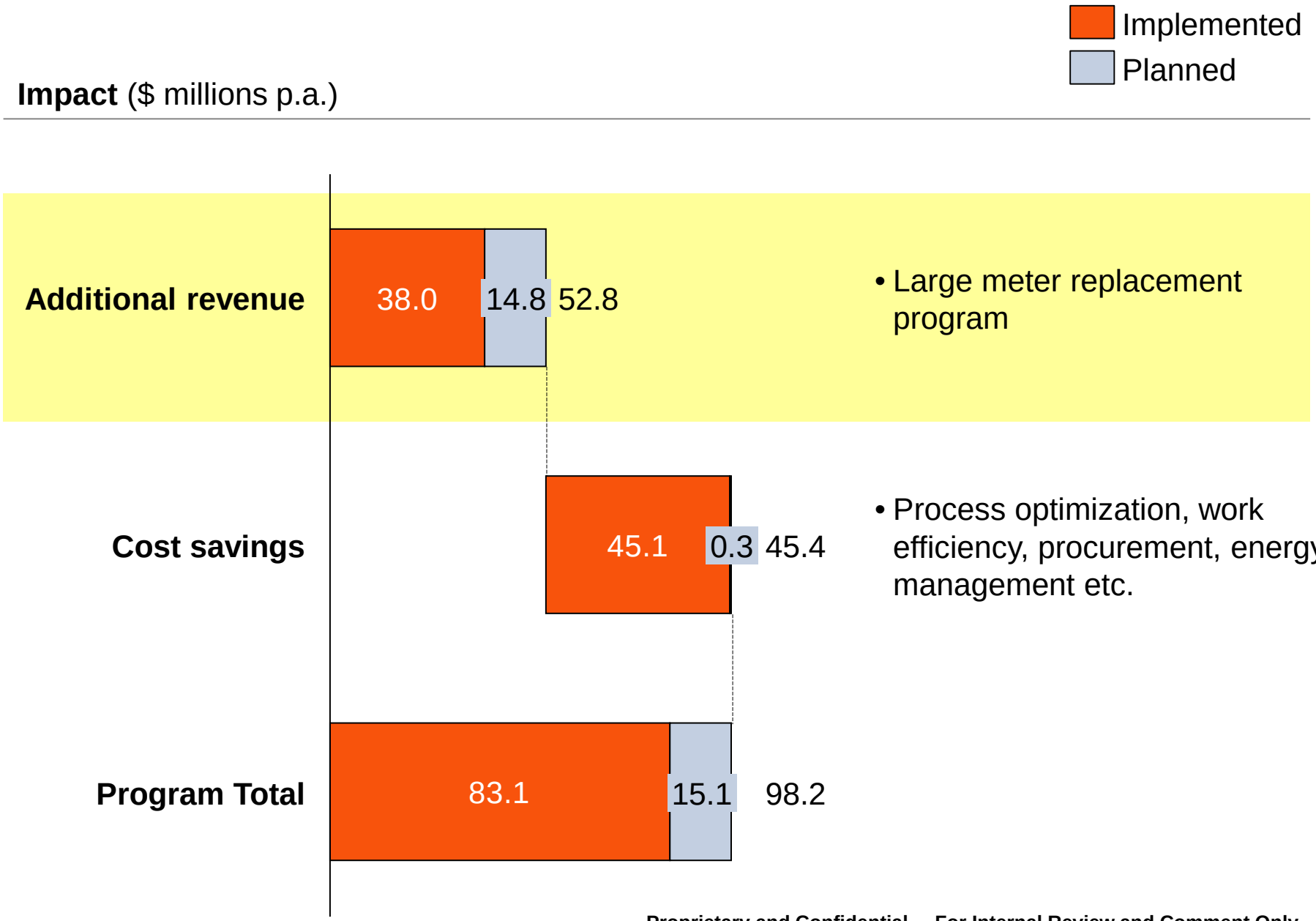
Phase 2 (4 years)
Jul 2012 – Jun 2016

- **Implementation** of ~80 initiatives across the entire agency
- Efficiency savings and revenue generation
- **Performance-based contract** between DEP and Veolia – stake in outcomes

10/8/2015



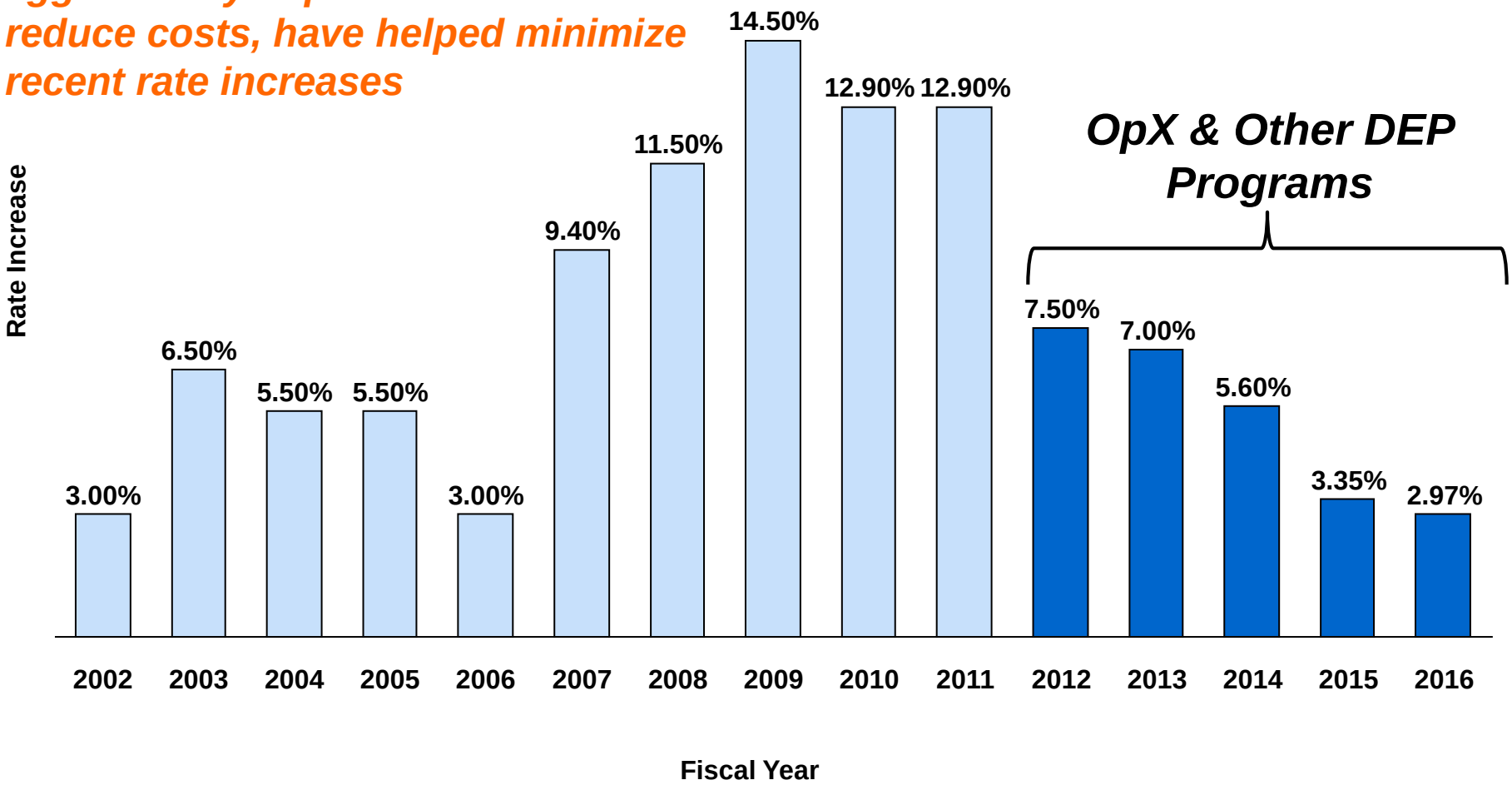
The OpX program has achieved annual savings and additional revenue worth $83.1 million per year



10/8/2015

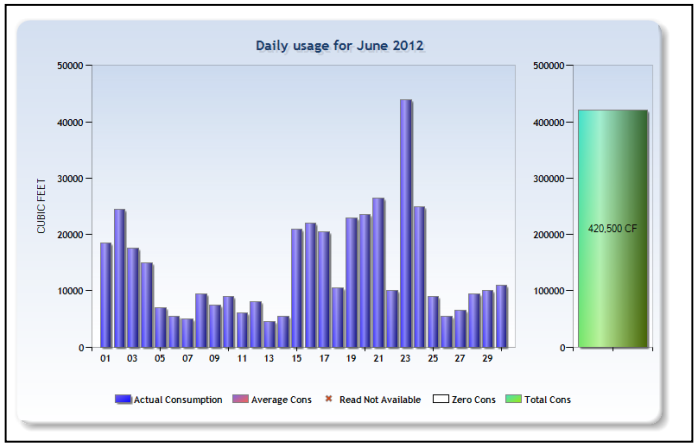
NYC Department of Environmental Protection has enacted the lowest water rate increase in 15 years

The OpX program and other DEP initiatives, which aim to aggressively improve cash flow and reduce costs, have helped minimize recent rate increases



10/8/2015

AMR transmitter



My DEP Account

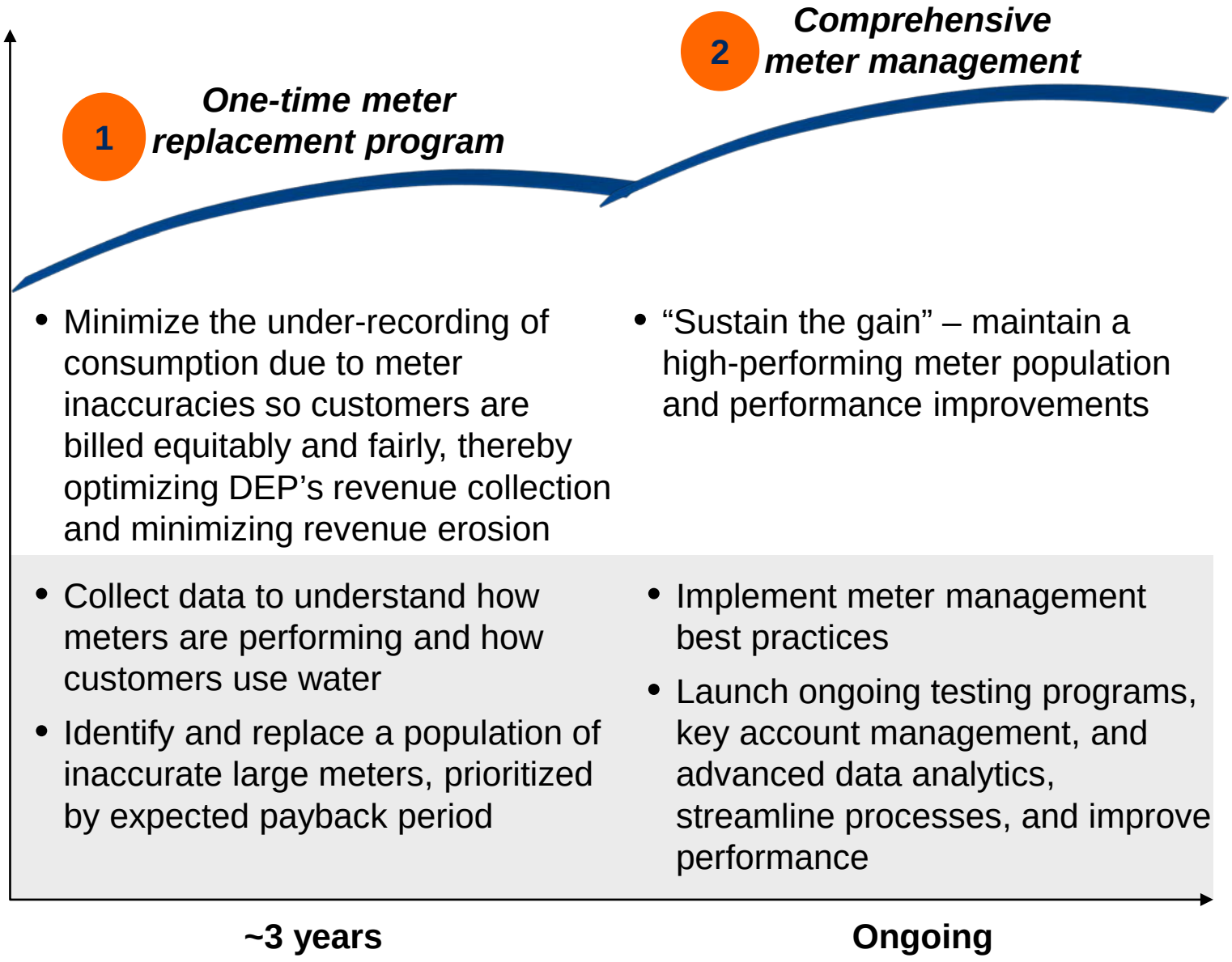
New York City Department of Environmental Protection – Bureau of Customer Services

- ***835,000** customers*
- *Revenue of **~$3.7 billion** per year*
- ***~70,000** "large" meters (2" and larger)*

- ***>97%** of meters connected to AMI*
- *AMI rolled out in NYC since **2009***
- *Number of estimated bills has dropped by over **82%***

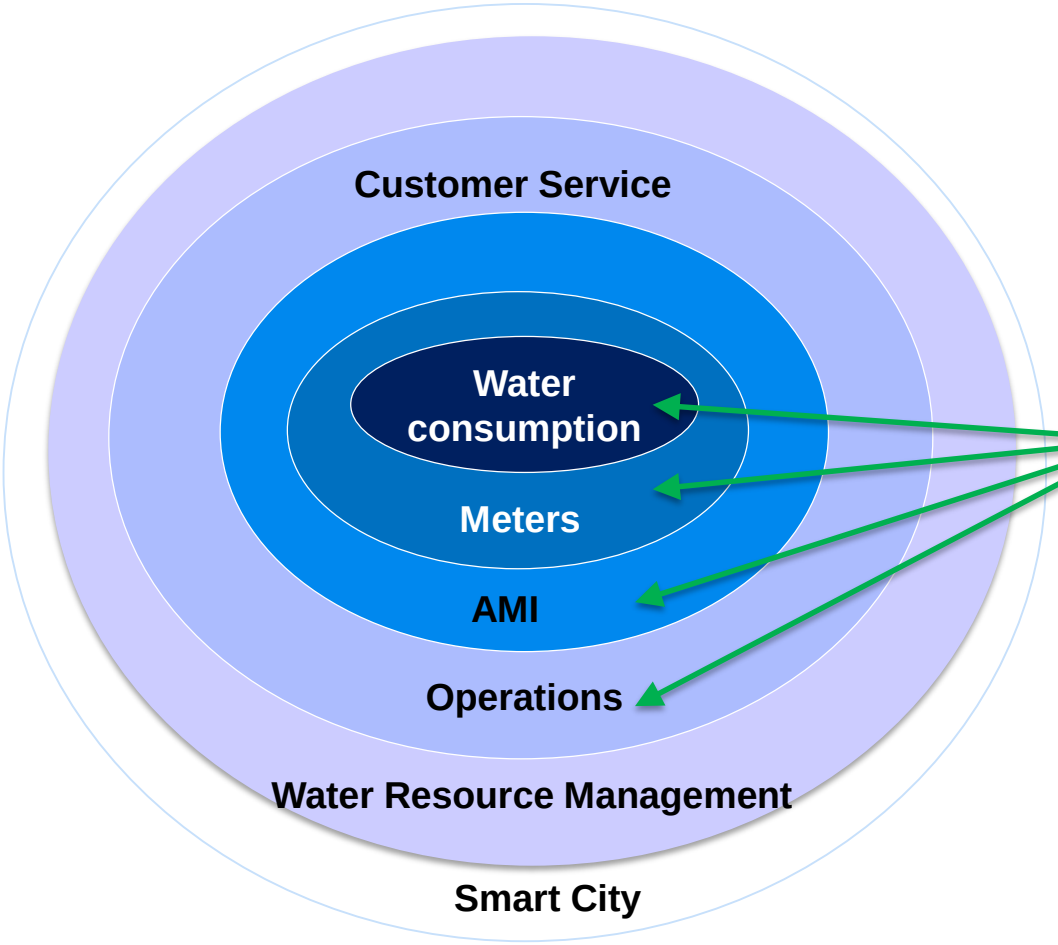
10/8/2015

The objective of the OpX Large Meter Initiative is to sustainably improve DEP's Bureau of Customer Service revenue collection



10/8/2015

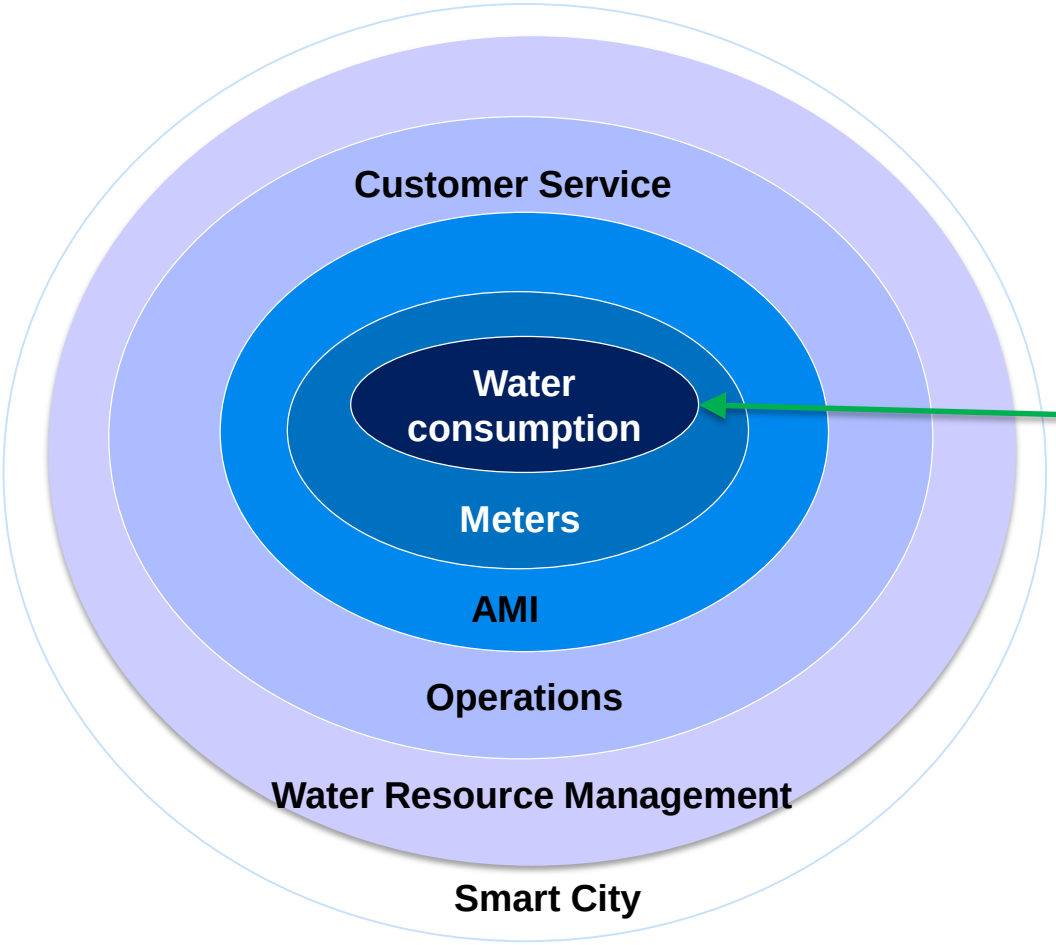
1 To improve revenue collection, data from various elements is required



- The **first step** towards improving revenue management is a **targeted meter replacement** that corrects and prevents revenue erosion, i.e. focus on the middle and expand outwards
- By combining data collected from each element, smart and predictive analytics can be used to execute a comprehensive targeted meter replacement plan and verify impact

10/8/2015

1 Data logging helped quantify how much water loss was occurring due to measured meter inaccuracy



Data logging measures the rates of flow through a particular meter or pipe over a certain time period

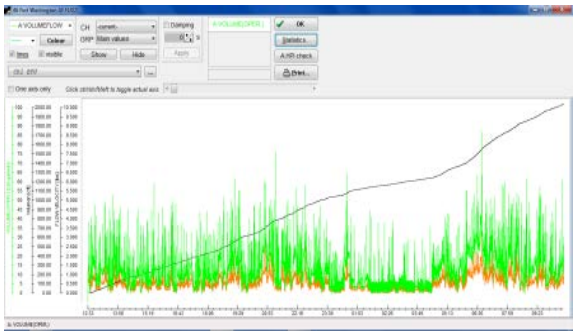
10/8/2015

1 Data logging was performed using three different technologies

Pulse loggers

- In-situ flow rate logging at **10-second intervals**
- Meter accuracy issues
- Electro-mechanical interference

Ultrasonic data loggers



- In-situ flow rate logging at **10-second intervals**
- Results independent of meter performance
- Set before or after meter – sufficient straight pipe & no pipe wrappings

Innov8 register heads

- In-situ flow rate logging at **1-minute intervals**
- Register head with built-in logging capability
- New meters to avoid accuracy issues
- Remote collection of logging data to limit customer disturbance

10/8/2015

159 logging profiles were collected for residential, office, and selected building types – Voluntary program, but good cooperation

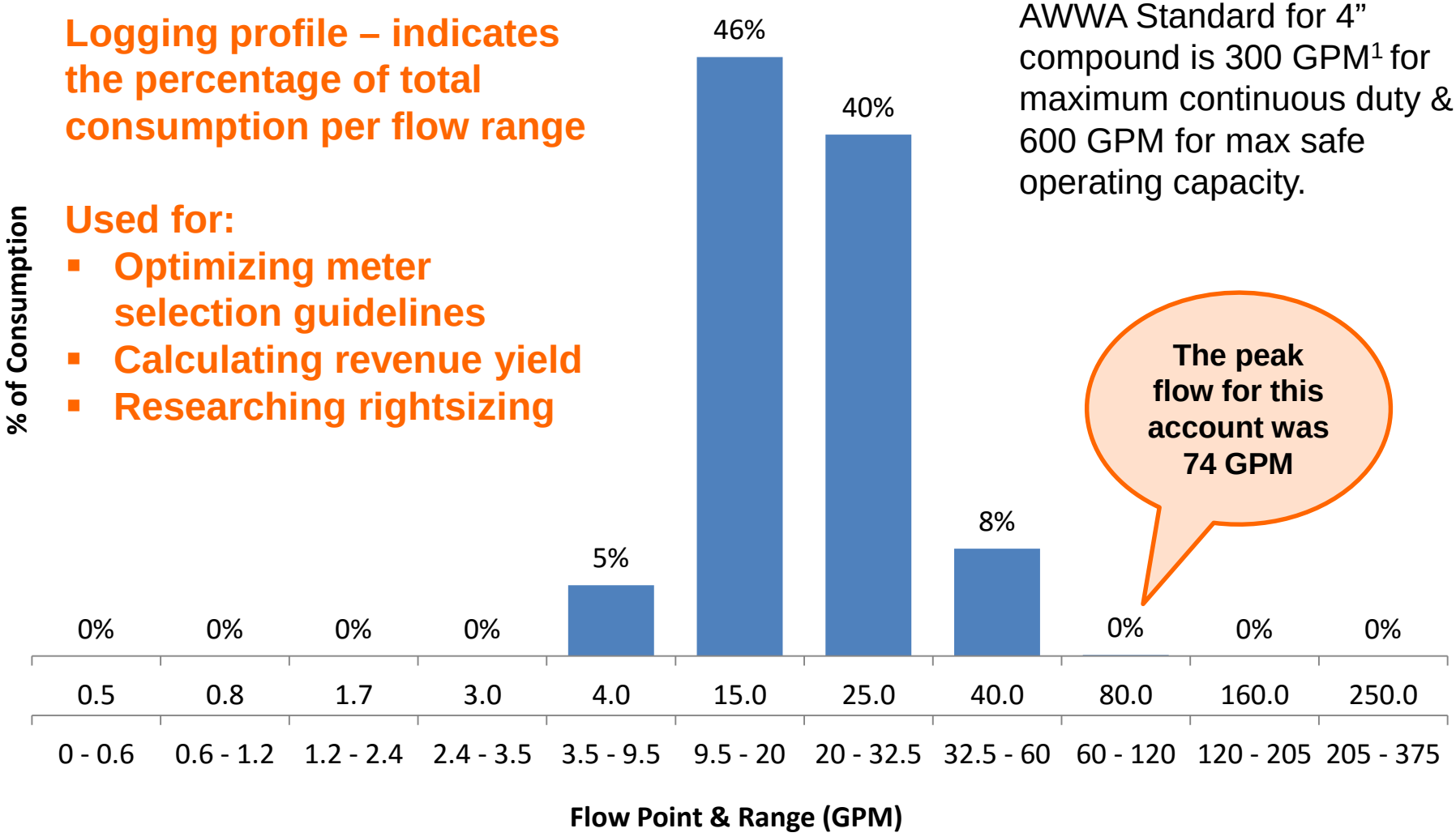
4” Compound Meter Residential Logging Profile Example

Logging profile – indicates the percentage of total consumption per flow range

Used for:

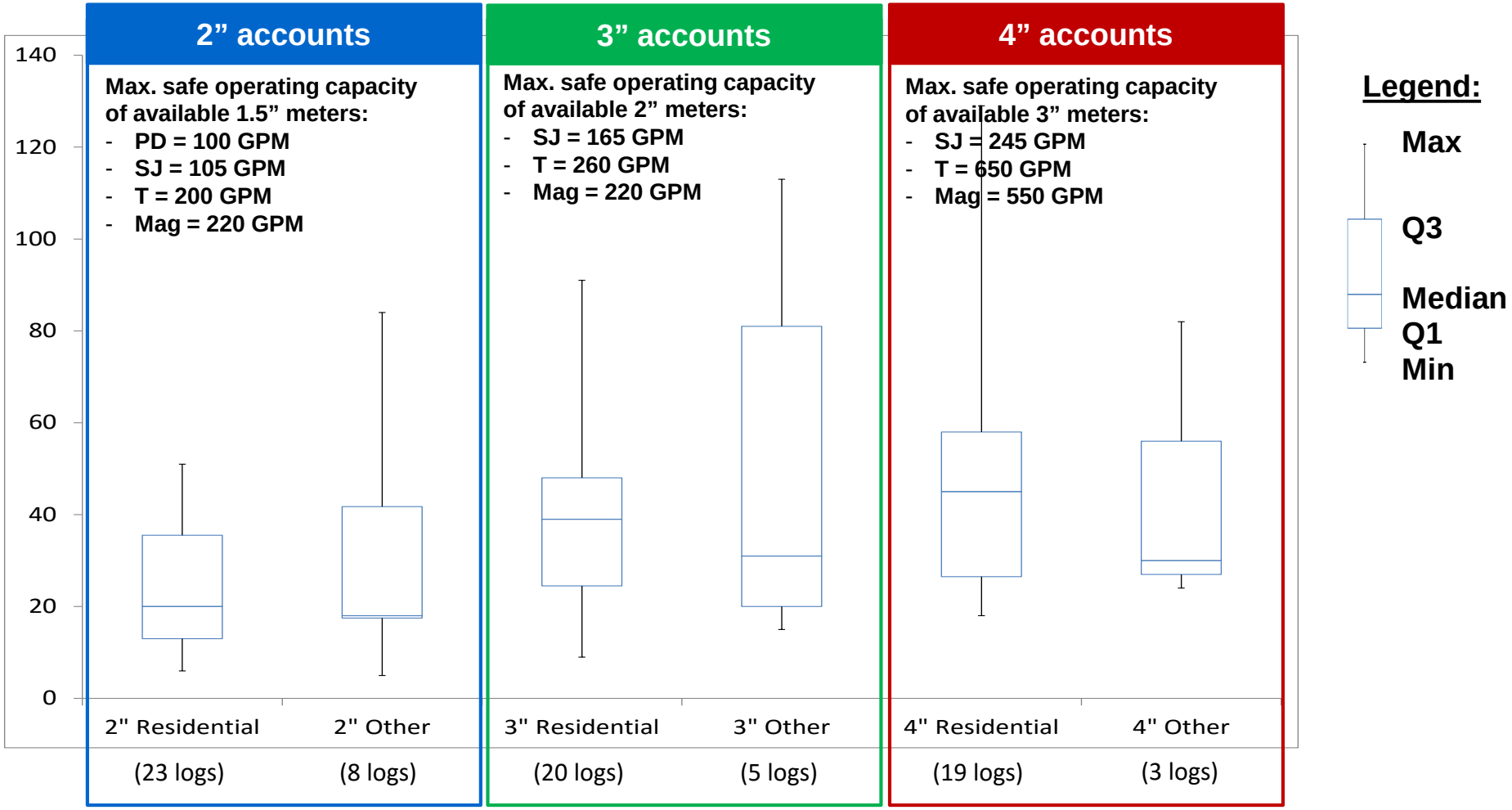
- Optimizing meter selection guidelines
- Calculating revenue yield
- Researching rightsizing

AWWA Standard for 4” compound is 300 GPM[1] for maximum continuous duty & 600 GPM for max safe operating capacity.



[1]*GPM – Gallons per minute*

1 We analyzed results for observed peak flow rates (the worst case for pressure loss)

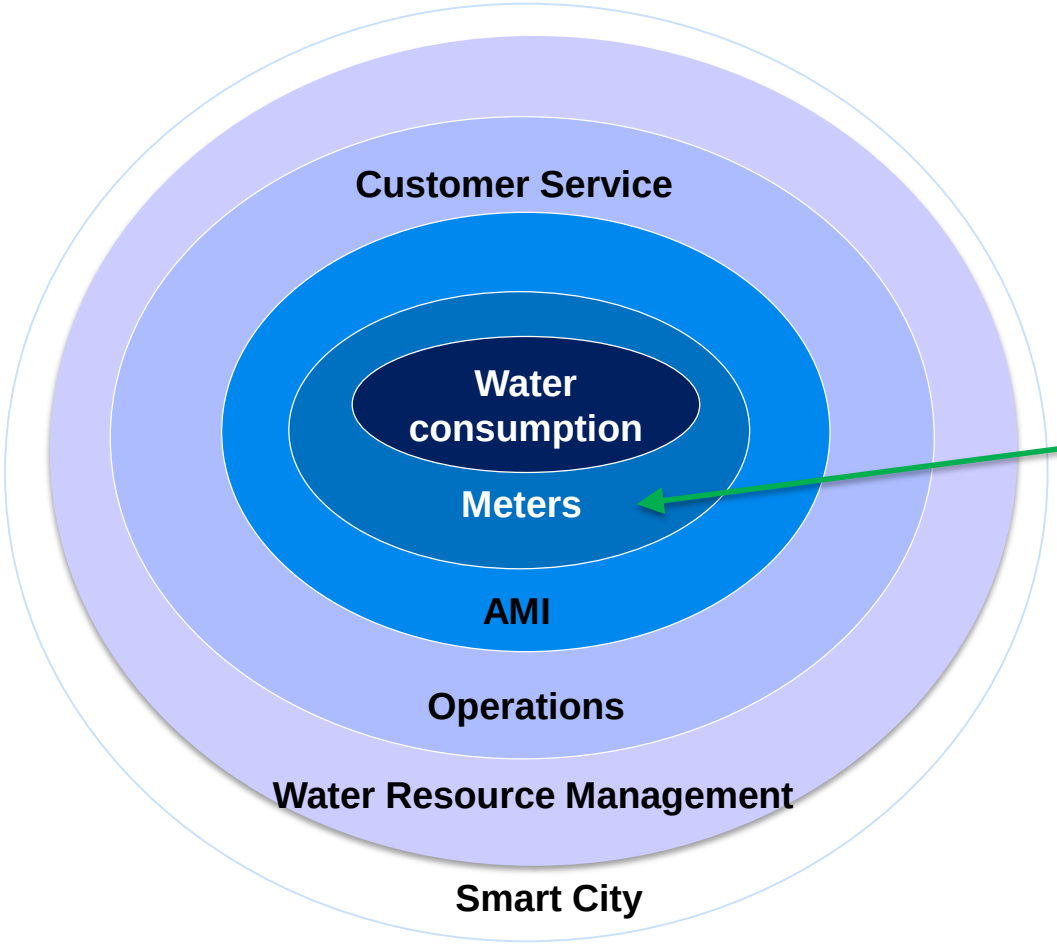


Key findings:

- Many existing meters are oversized for the actual peak flow demands placed on them.
- Average usage rates tend to be at flows much less than the peak flow. Such average flow rates occur at levels that have minimal pressure loss.
- Pressure relationships in real world settings such as buildings with old plumbing can complicate issues further

10/8/2015

1 Meter data is used to identify how meters are performing



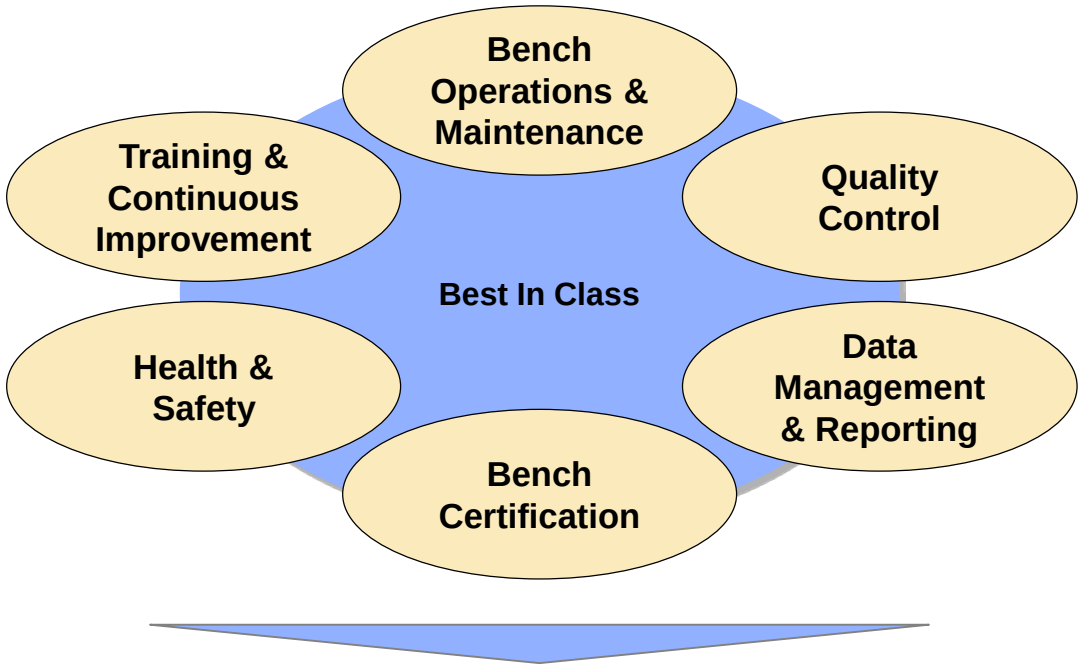
- **Meter accuracy tests** were conducted to determine the performance of various characteristics of meters
- Optimal method for testing meters is to use a **"best in class" meter testing facility**

10/8/2015

1 Running a “best in class” meter testing facility requires clearly defined and well documented processes

Vision for DEP’s meter test facility

- Be the best at what we do and **set the standard for meter testing** in the US
- Inspire **trust and confidence** of all customers and other stake-holders
- Produce **accurate and repeatable** test results that stand up to outside scrutiny
- Operate with a **high level of consistency** based on robust processes and bullet-proof SOPs



Immediate Priorities

- Testing protocols and bench setups for all meter types & sizes
- Quality control checklists and processes
- Improved IT setup and better lifting equipment

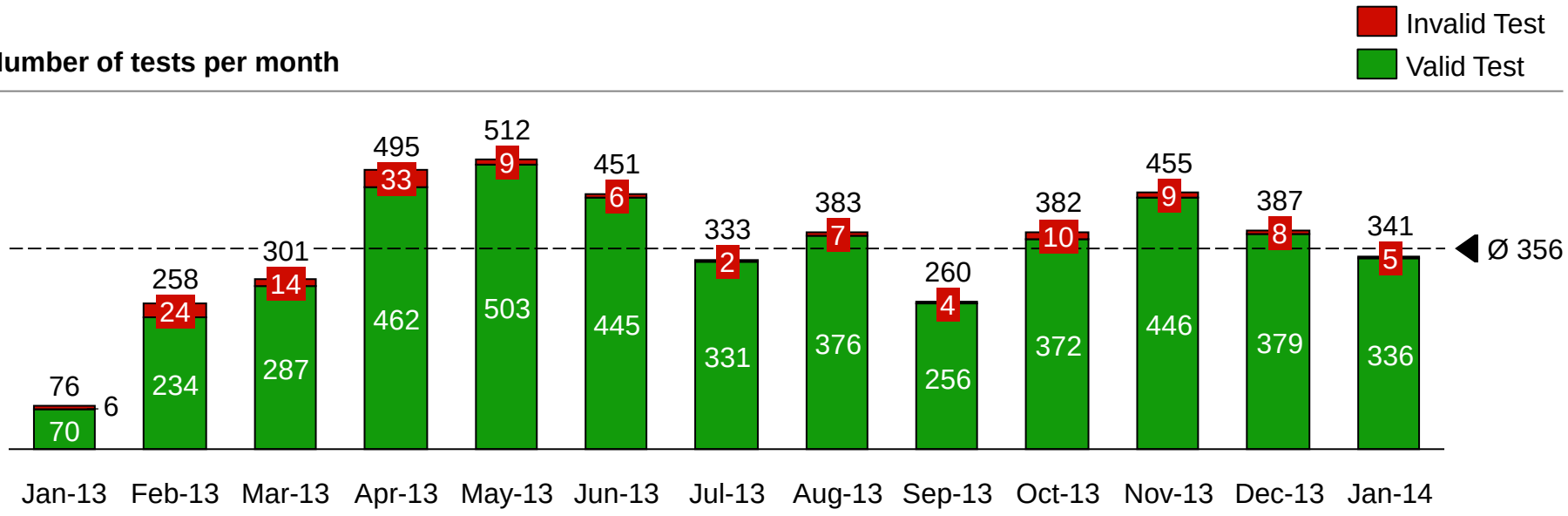
Longer term topics

- Recurring bench calibration and bench validation
- Data management, data storage, and standard data analysis
- Inventory management and optimal test planning

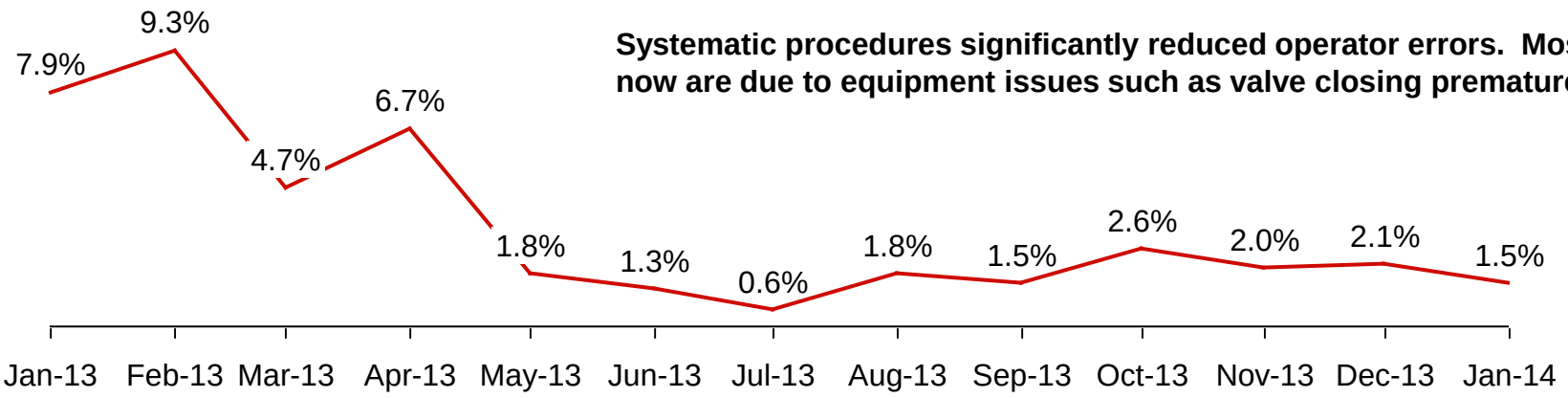
10/8/2015

1 As a result, testing productivity increases and testing quality improves

Number of tests per month



Percentage of invalid tests

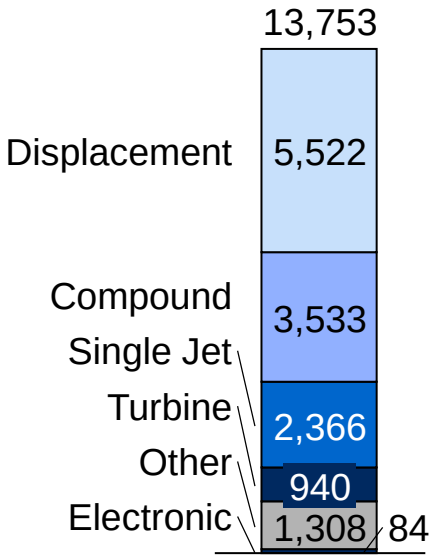


Systematic procedures significantly reduced operator errors. Most errors now are due to equipment issues such as valve closing prematurely.

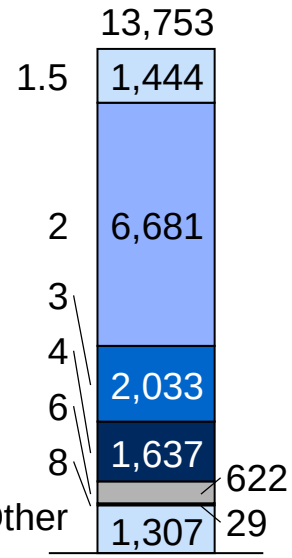
10/8/2015

1 As of 8/3/15, DEP has tested the accuracy of over 11,000 large meters

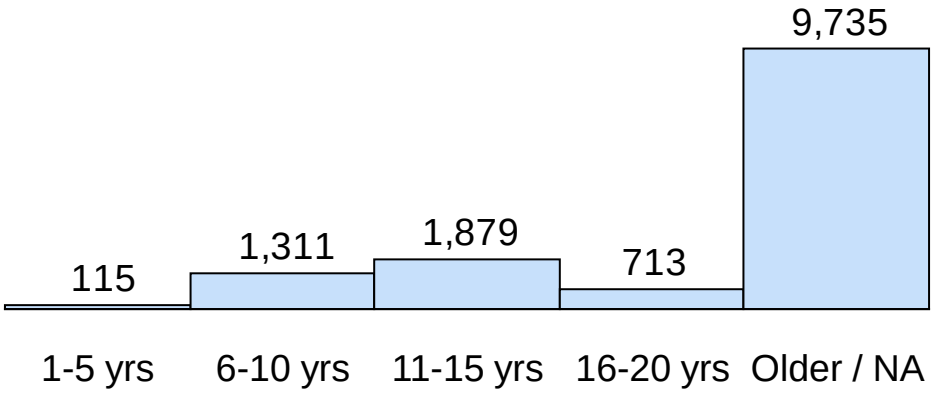
Tests by type



Tests by size

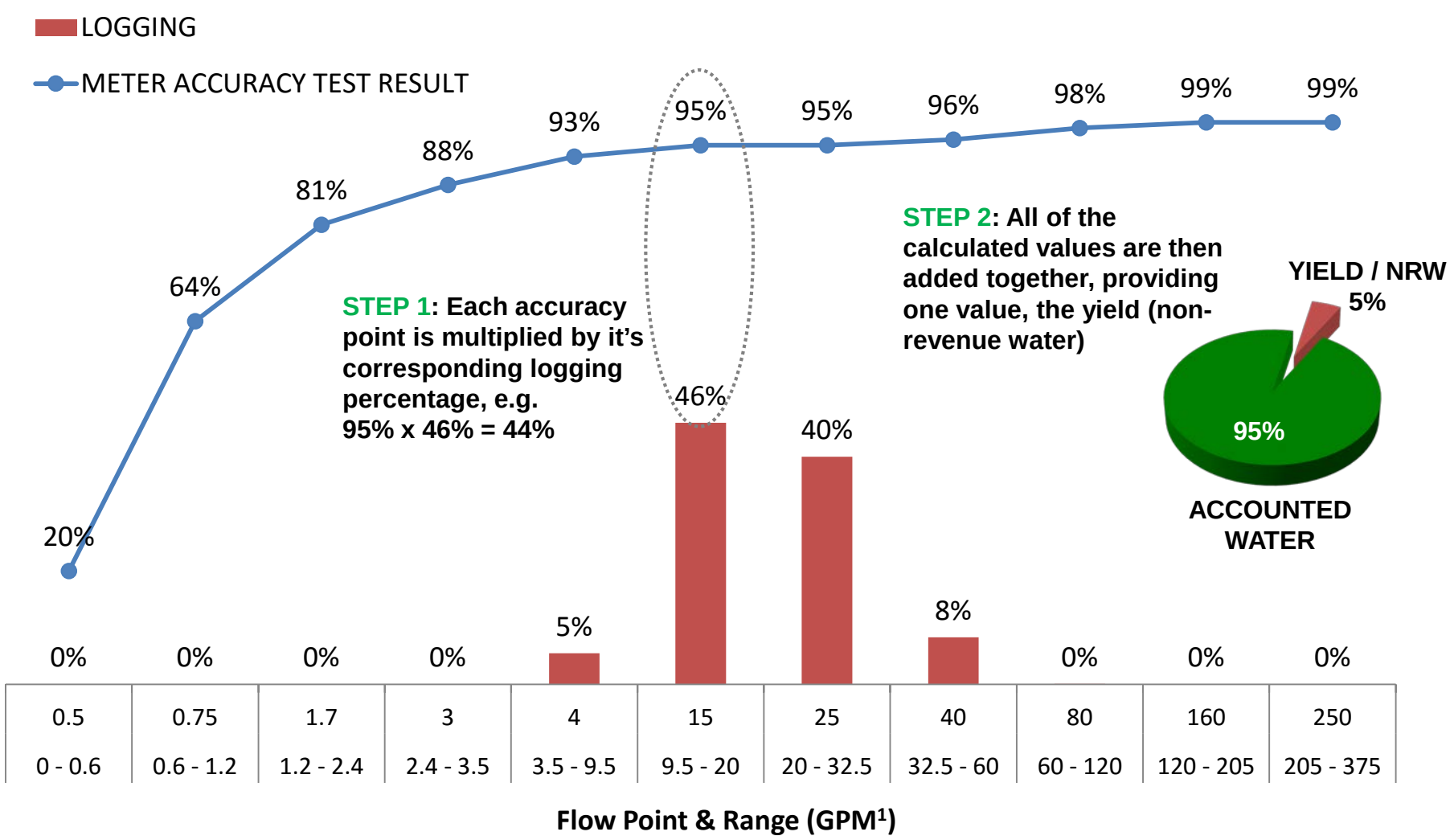


Tests by age



10/8/2015

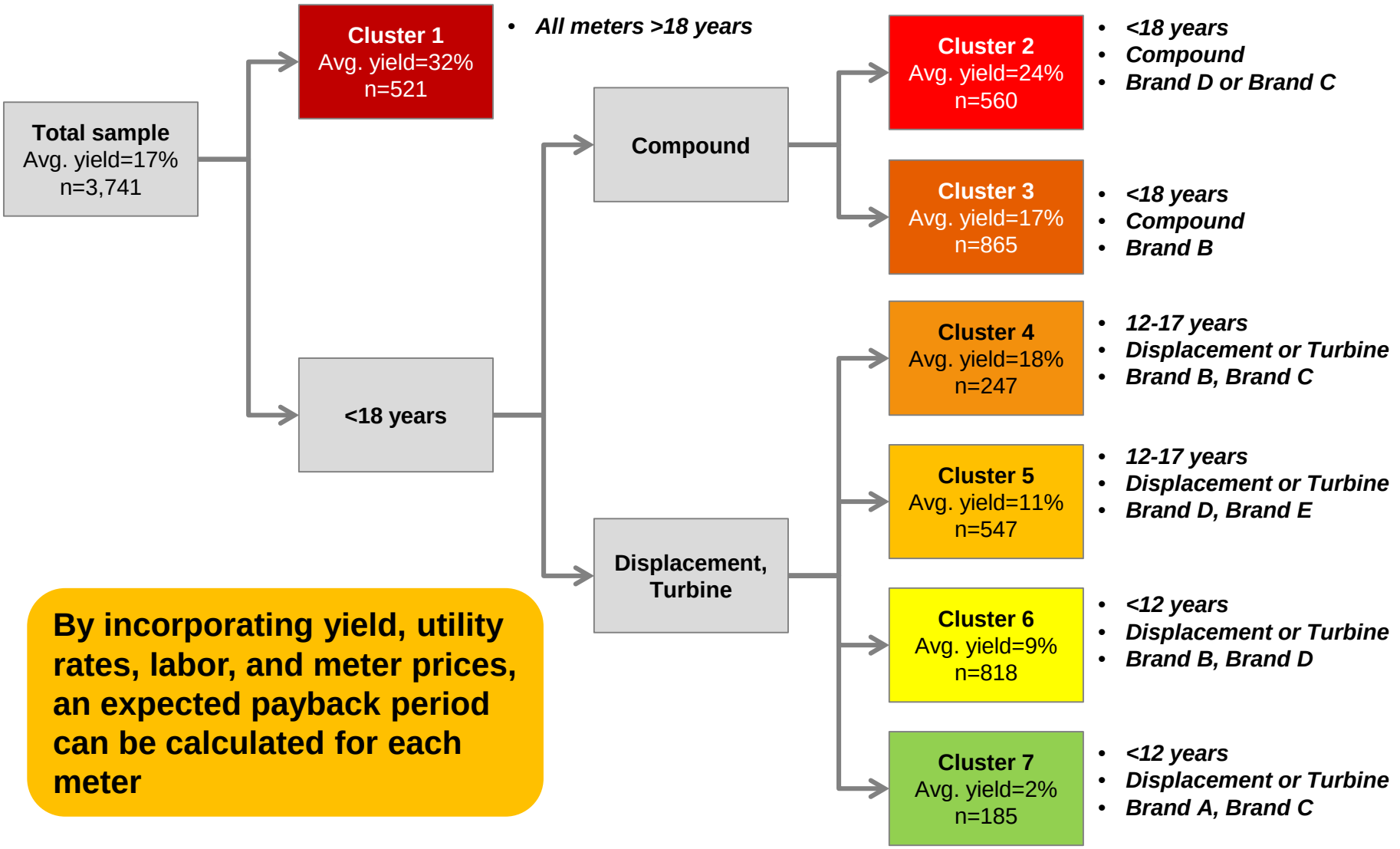
Calculating yield requires two steps



10/8/2015

1 The yield from each meter is analyzed to determine clusters of poor performing meters

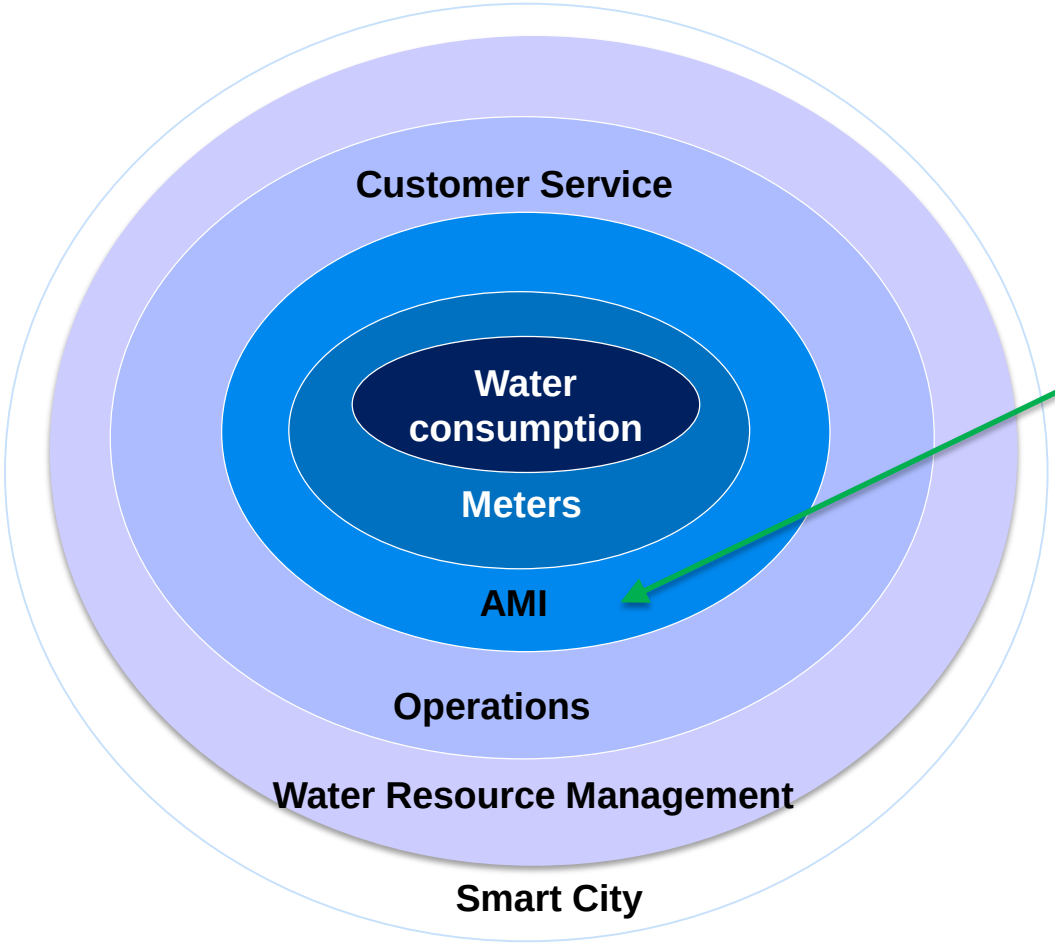
An algorithm is used to develop the most statistically relevant groupings based on various characteristics



By incorporating yield, utility rates, labor, and meter prices, an expected payback period can be calculated for each meter

10/8/2015

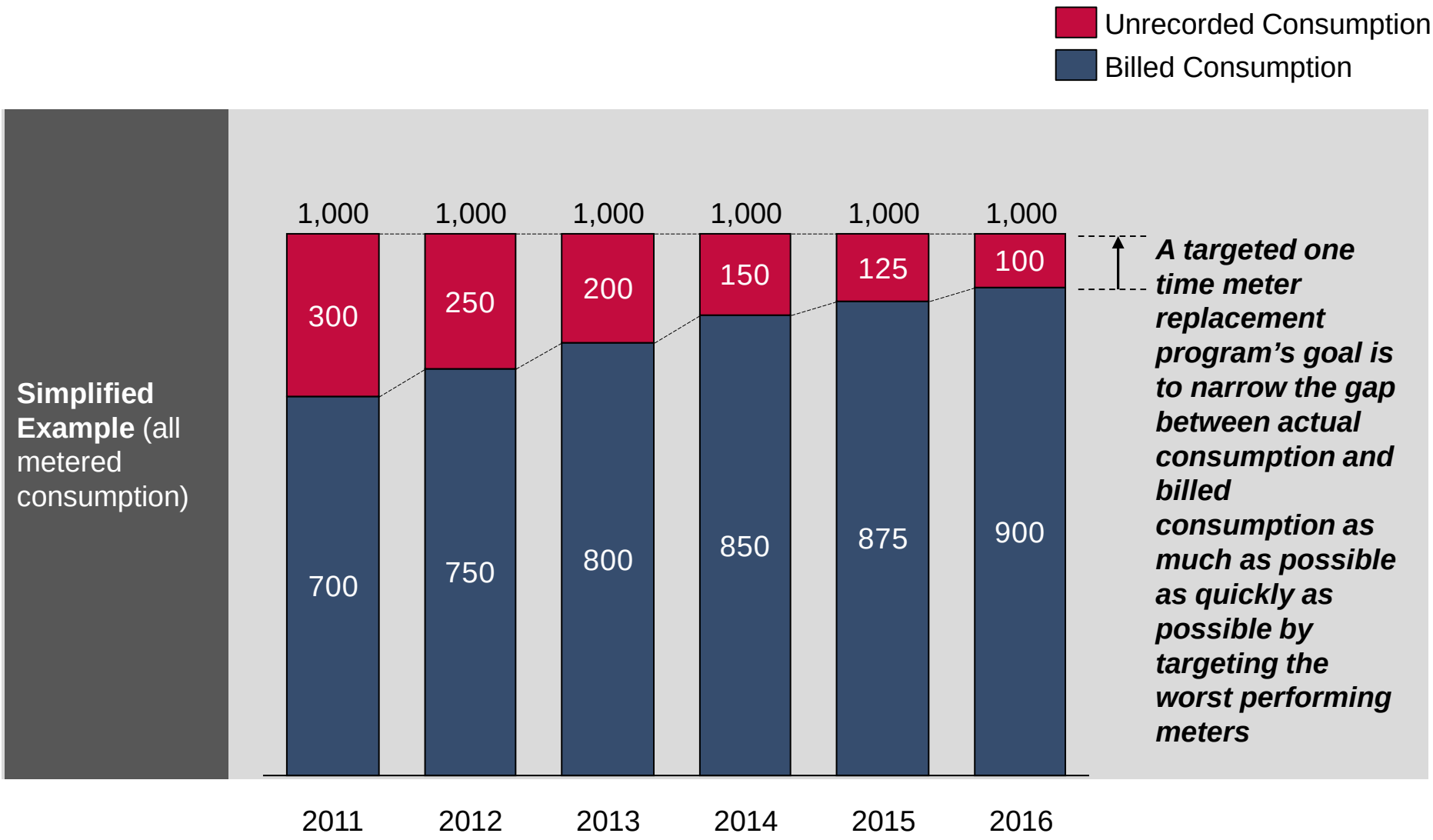
1 Among other things, AMI is used to verify the impact of the Large Meter Initiative



Analyzing **AMI/AMR data** allows us to quantify the impact of program and identify potential issues

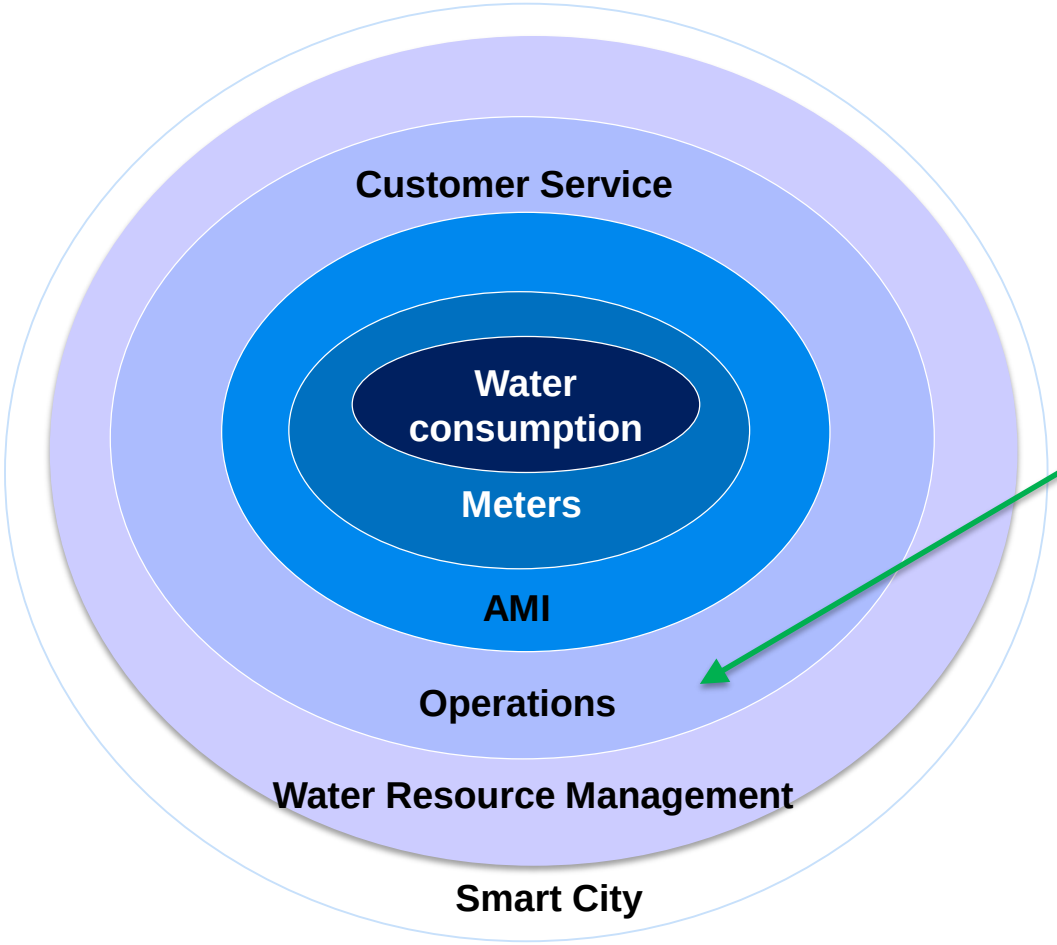
10/8/2015

1 One way AMR/AMI data can be used to measure the progress of the program is to quantify the decrease in non-revenue water



10/8/2015

2 Operation data is used to improve know-how and processes



- **Operations data** was reviewed to identify areas for improvement
- **Operations** includes everything from people to tools

10/8/2015

2 The governing principles for operations and sustaining the gain

People	• Every customer is treated fairly; payment equity is the guiding principle • Clearly defined roles and responsibilities and defined escalation protocols • Transparent flow of information between departments and within departments
Processes	• Clearly defined processes and procedures to optimize deployment of resources • Approach based on continuous improvement cycle (“Plan-Do-Check-Act”) • Processes that optimize effort and reduce redundancies
Tools	• Applications built around intuitive systems and tools • System functionality that optimizes effort • Comprehensive and clear management reports

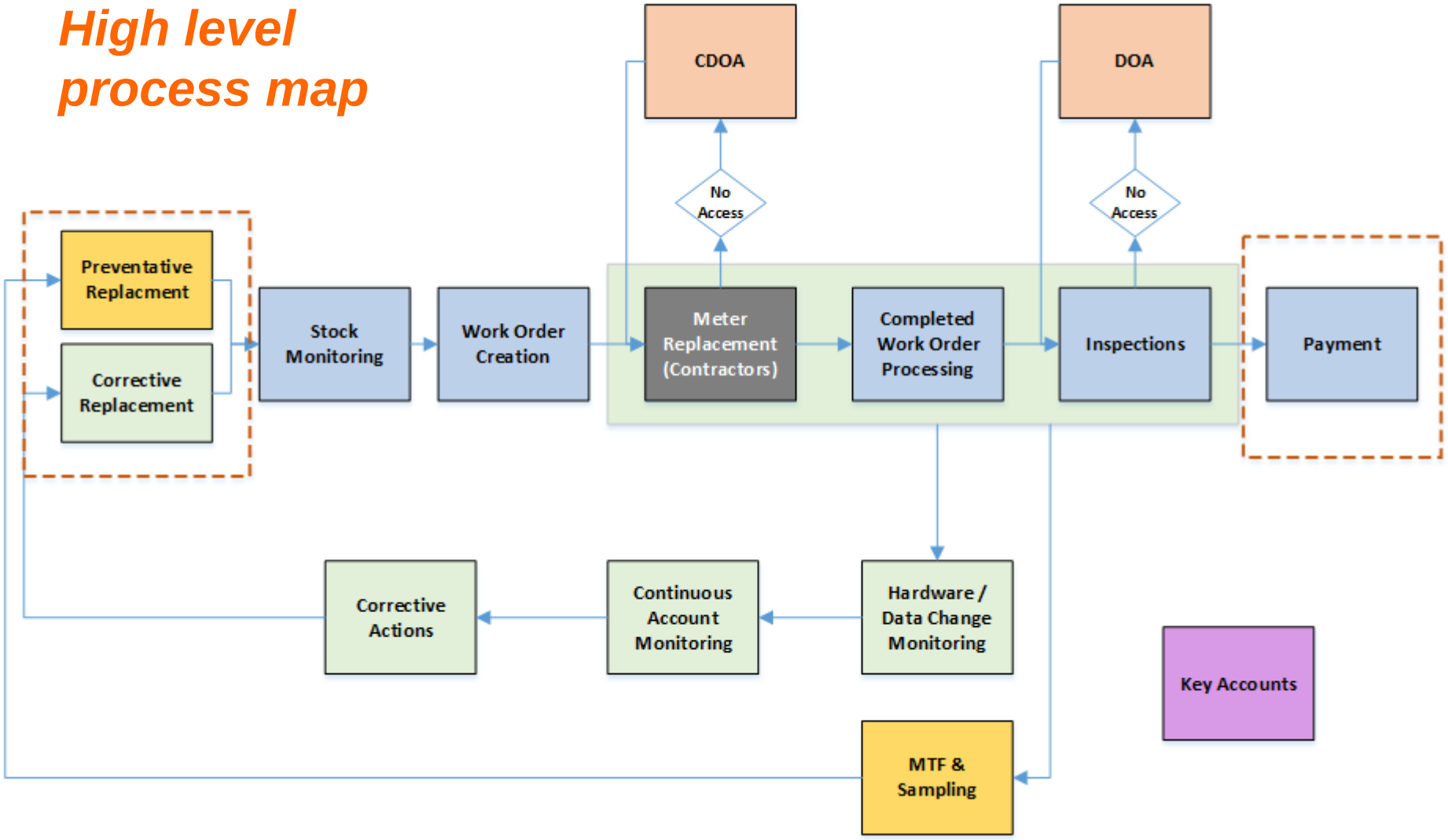
10/8/2015

2 Training utility staff on new processes is critical for transferring know-how and maintaining the course after the program

10/8/2015

2 Streamlined and defined processes increase productivity and reduce bottlenecks

High level process map

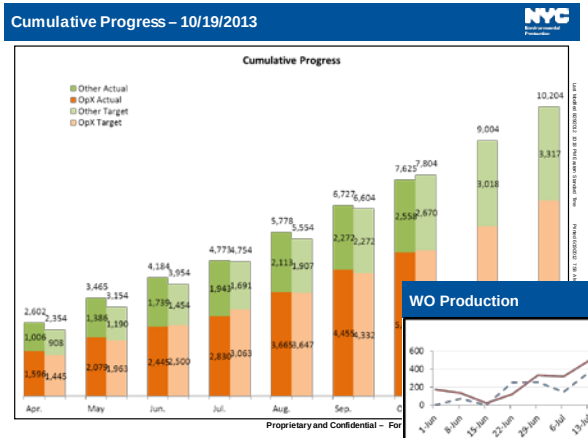


10/8/2015

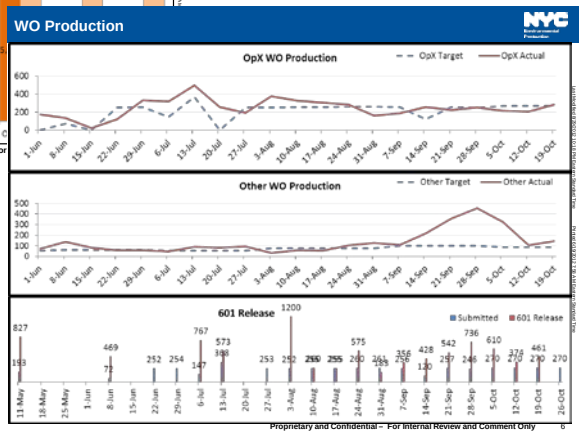
2 Improved tools allowed project team to manage the program & make data driven decision

Tools / Data / Dashboards

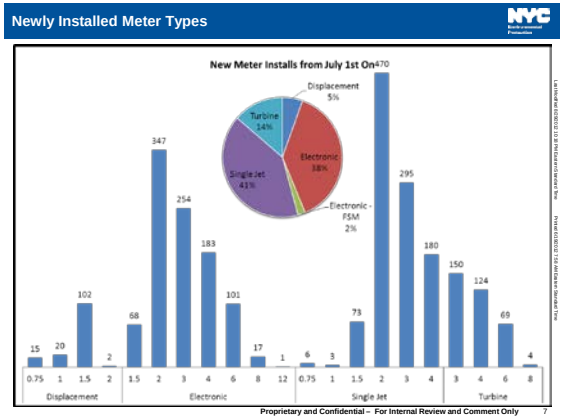
- Ambitious **monthly** ramp-up and production **plan**
- **Weekly tracking** system and management dashboards
- **Production forecasts** for contractor and inventory management and for financial reporting
- **Work order database** management system



Tracking against monthly targets



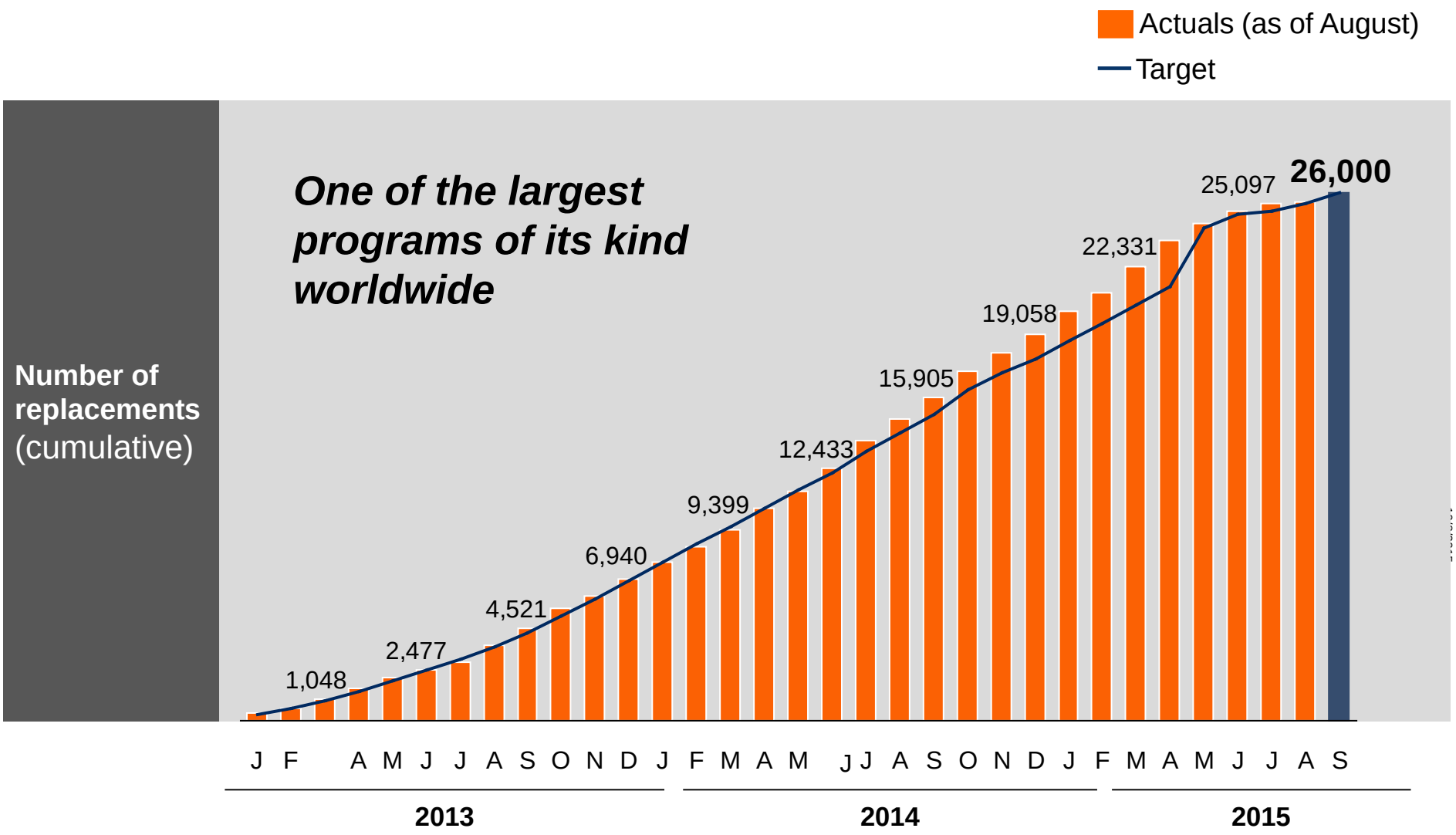
Weekly WO tracking



Tracking contractor compliance with meter selection guidelines

10/8/2015

Putting it all together, the Large Meter replacement program is scheduled to replace 26,000 large meters in under 3 years



NYC's Large Meter Replacement Program

Improving Revenues and Lowering Costs

Contact Information

Kenneth Molli, Veolia North America
Ken.molli@veolia.com
312.316.7020

Warren C. Liebold, New York City DEP
wliebold@dep.nyc.gov