

Environment Committee

Wednesday, September 9, 2015; 2:00 – 3:30 p.m.
Charlotte-Mecklenburg Government Center
Room 280

Committee Members: John Autry, Chair
Ed Driggs, Vice Chair
David Howard
Claire Fallon
Kenny Smith

Staff Resource: Hyong Yi, City Manager's Office

AGENDA

I. Water Meters Upgrade Project

Staff Resource: Regina Cousar, Charlotte Water

In July 2014, Charlotte Water issued a request for proposals (RFP) for a water meter upgrade and management program. As our current metering infrastructure begins to reach the end of its expected service life, Charlotte Water wants to leverage new technologies to improve the efficiency of its metering operations. Staff will review the history of the current drive-by smart meters, and how new Charlotte Water intends to use new technology to be “smarter”, more efficient, and resilient.

Action: For information only.

Attachment: 1. From Smart Meters to a Smarter System.ppt

II. Drought Status

Staff Resource: Barry Gullet, Charlotte Water

Staff will provide an update and discuss the drought this summer; the drought forecast looking forward and the various drought stages and requirements for each stage.

Action: For information only

III. Water Quality Update

Staff Resource: Barry Gullet, Charlotte Water

Staff will provide an update on the recent concerns of the Disinfection By-Products levels in the water system as well as discuss the history of the rule, historical and current trends in water testing results and strategies moving forward to improve the treatment process and water quality in the system.

Action: For information only

Next Meeting

Wednesday, October 14, 2015; 2:00 – 3:30 p.m., Room 280

Distribution:	City Council	Ron Carlee, City Manager	Executive Team
	Bob Hagemann	Stephanie Kelly	Environmental Cabinet



CHARLOTTE WATER

What we do at Charlotte Water

Quantity	FY14 Monthly Activities on Average
3 Billion	Gallons of drinking water produced
2.3 Billion	Gallons of wastewater treated
\$1.7 Million	Power + Chemical cost
270,000+	Meters read
40,000	Water/sewer calls received by 311
10,350	Water services turned on/off
450	Water leaks repaired (total)
150	Water leaks repaired within 24 hours
23	Sewer spills stopped & remediated
32 Minutes	Average time to respond to sewer spill

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How do we collect “smart” meter data currently

- Monthly mobile Collection
 - Residential with multi-family: 241,000+
 - Commercial with institutional: 13,000+
 - Irrigation: 10,000
 - Misc.: 4,700
- High/Low exception - review
- Check read
- Bill






1. Transmitter
2. Register
3. Meter



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Why Upgrade?

- 2002 to 2005 - Implemented smart drive-by; more updates to 2008
- 2009 to 2010 - Drought ends & watering allowed; High bills - Customers complained. Leads to 40 Point Improvement Plan
- 2010 to 2012 – 3rd Party Meter Audit of 9000+; Resolved complaints; Stabilize drive-by and identify new technology
- 2013 – Former contract ended; now replacement only contract; ***Meter assets reaching expected life***



Rate Increase	Evaluation and 40 Point Plan	Customer Input	Meter Audit and Pilot Studies	Maintenance and Improvement	RFI	Research	RFP
2009	2010	2011	2012	2013	2013 to Present		



Trends that are shaping future metering

- Industry-wide trend: *declining consumption* (efficient plumbing/new habits), but the need for *more service* still exists
- *Number of customers is growing* – more people in cities; *denser, difficult driving areas*
- More customers who want *discrete usage information*
- New systems available – more complete but more complex

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More Bytes to Chew On

- Current systems are often **silos**; cannot talk to each other easily - single deployments such as process control at one plant
 - We need whole system health info to optimize
 - We need open, flexible, but secure, structures
- There is a great time disparity of milliseconds to years (**when?**) and a lack of system wide geospatial integration (**where?**).
 - Customers expect us to know more
 - We need to know more about underground assets
- There are few previously installed systems that use highly **granular** data.
 - e.g., Systems that were designed to operate with data points per month simply are not architected to handle hourly data

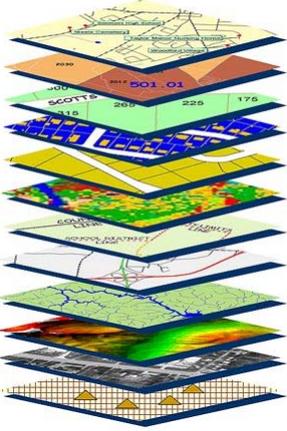


Summary of Observations – Our Reasons to Upgrade Now

- Meter assets are reaching **end of useful life**
- Trends show the need for **discrete data and the skillset to apply it**
- Information to **refine operations** - exceed expectations when possible
- Need “Big Data” processes and policies; **pilot test in the field**; institute security protocols; and refine planning for new infrastructure
- Many technologies available but need to recover invested cost also – **MIGRATION PATH** has to fit business case

Data Fusion – The Future

Near Real Time Assessment of **When** and **Where**



- Aerial Photographs
- Infrastructure Data
- Asset Data
- Customer Engagement
- GIS Data (Location)
- Meter Data (Work Orders)
- CIS Data (Billing)
- SCADA (Plants)
- LIMS (Lab)

Unifying our data structure for holistic water management

- Time Synchronized
- Geospatially referenced (location)

Image from Graham Symmonds, Author of Smart Grid for Water

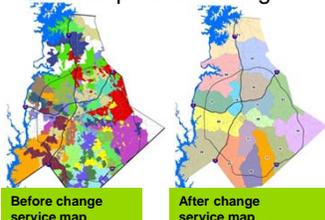
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How we research, innovate, optimize

Visit suppliers, Issue RFI Pilot plant testing, research Internal – ISO certified processes



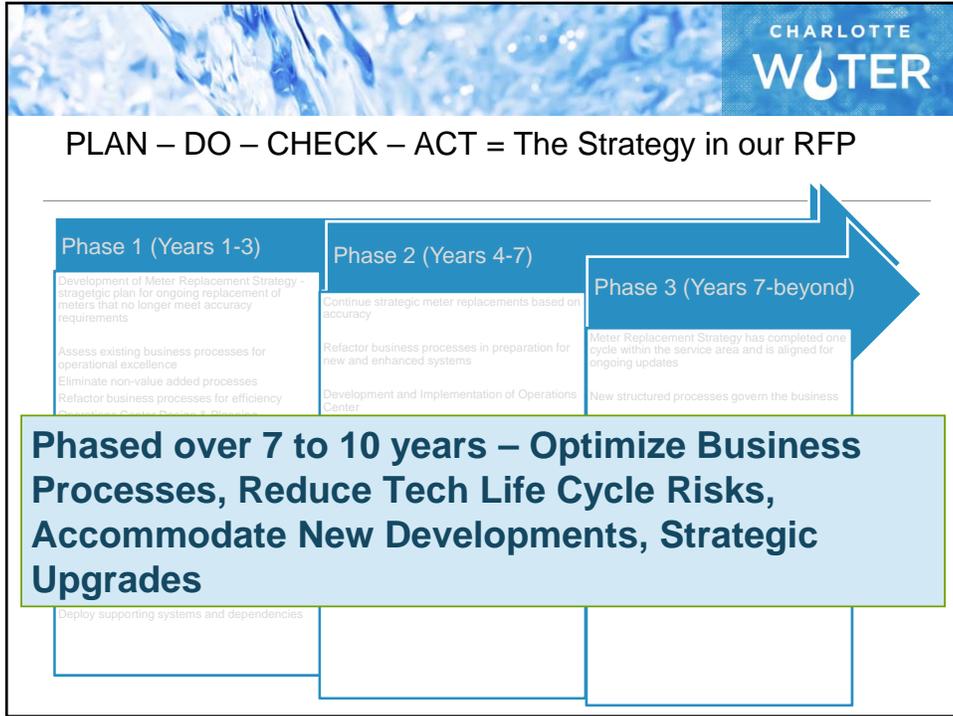
Comparison visits to other Utilities External process changes



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Actions we have already taken

- 2010: Explored new technology – supplier visits, research
- 2011: Conducted different low cost pilot tests; Visited utilities
- 2012: RFI - Developed knowledge base
- 2014: Developed long term strategy and issued RFP
- 2015: Response review; Demo Days including Stakeholder observation; Evaluation is ongoing



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OPTIMIZATION –
What does “smarter” mean?

- Business Services Optimized for performance
- Recovery of sunk costs – go to the limits of current drive-by approach
- Exploring new leak detection, sampling, and pressure management technologies
- Understand cost versus technical gain then **strategically deploy**
- Engage with other utilities on potential shared path forward

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What Does Being “Smarter” Look Like to the Customer?

HOURLY WATER USE

- Daily Evidence of Possible Leak – Repair Quickly
 - Events and Alerts on Cost and Issues
- Comparison with Other’s Usage
 - Voluntary Behavior Adjustments

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What Does Being “Smarter” Look Like to Operations?

Data System							Use
CIS	MDM	LIMS	SCADA	Hydraulic Model	GIS	AMS	
*	*						Revenue Assurance
	*		*				Real-time Demand Projection
	*						Pressure Control
*	*	*					Proactive Water Quality
	*						Found Capacity
*	*						Customer Alerts
*	*						Demand Reduction
	*						Conservation
*	*						Real-time Billing
	*						Virtual DMA
	*						Leak Detect
*	*						NRW Reduction
	*						Meter Health Monitoring
*	*						Distribution System Efficiency
	*						Outage Response
	*						Maintenance Efficiency
*	*	*	*				Fate of Contaminant Modelling
*	*					*	Ordinance Enforcement

**Near Real Time
Pressure Management
Leak Detection
Capacity Analysis
Pipe Failure Prediction**

Image from Graham Symmonds, Author of Smart Grid for Water

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Building Our Future – A System of Systems based on metering

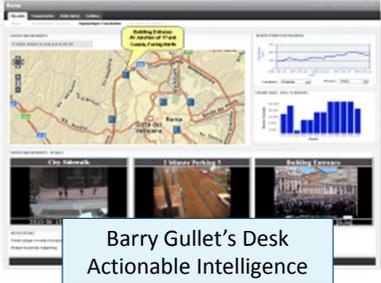
- **Seamless Package of New Meters, Devices, Software, and Optimization Support Services**
 - Customers with more relevant usage data
 - Customers with Early Leak Notifications
 - More Efficient, Secure Remote Operations
 - Sampling Station Data
 - Leak Detection Sensors
 - Pressure Management Sensors
 - Modeling and Simulation of Events
 - Asset Condition Prediction and Notifications

Staff as sensors - "Crowd Sourcing" Real Time Data



Hydraulic Simulation



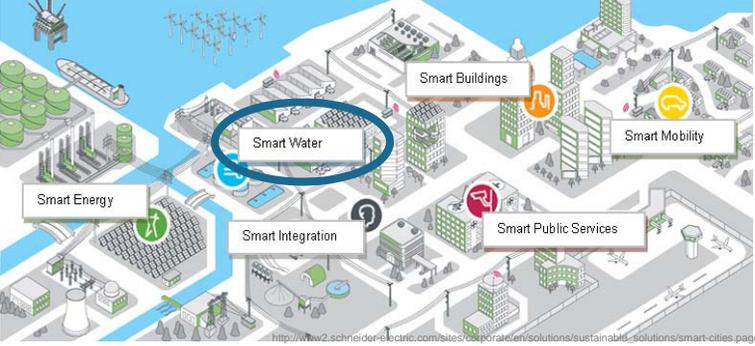


Barry Gullet's Desk
Actionable Intelligence

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Smarter Infrastructure for a Smart City



http://www2.schneider-electric.com/sites/corporate/en/solutions/sustainable_solutions/smart-cities.page

Smarter example: Move Out Service Orders could be completed remotely with no truck roll similar to other utility companies; at 2500 orders per month, the cost of this single service order is nearly \$1 million dollars per year

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Next Steps

- Briefing Council Environment Committee – 9/9/15
- Narrow to Short List of Future Solution Providers
- Negotiate Potential Contracts – Terms and Cost
- Review with City Manager’s Office
- Recommend to full Council

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Contact information:
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