

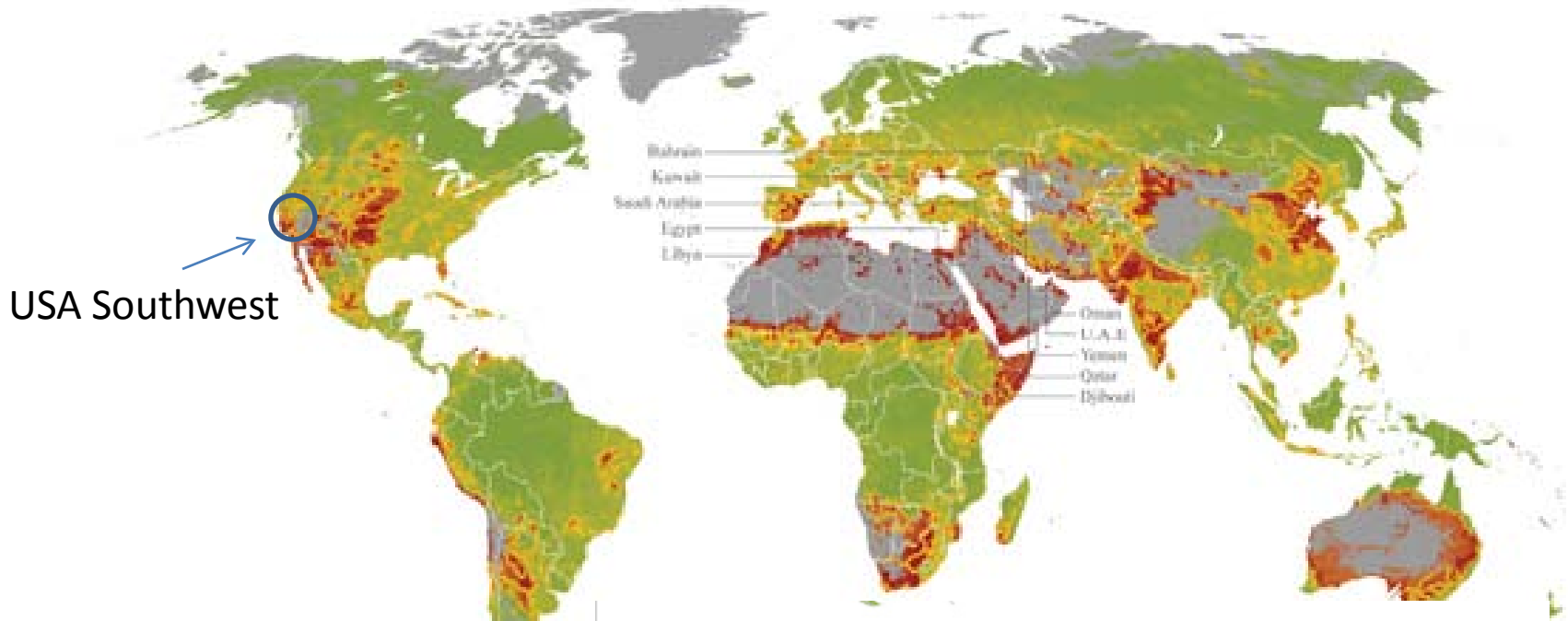
Urban Water Management: Lessons from the American Southwest

WSTA 11th Gulf Water Conference
“Water in the GCC: Towards Efficient Management”
20-22 October 2014
Muscat, Sultanate of Oman

Alexander McPhail, PhD
The World Bank Group
Washington, DC



World's Water Stressed Areas



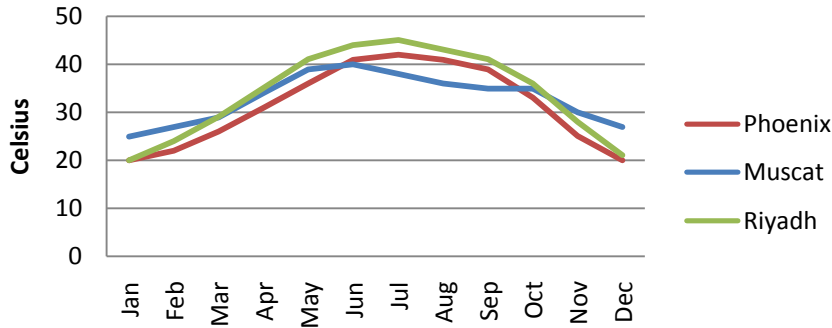
Legend
Extreme risk
High risk
Medium risk
Low risk
No Data

Rank	Country	Rating
1	Bahrain	Extreme
2	Qatar	Extreme
3	Kuwait	Extreme
4	Libya	Extreme
5	Djibouti	Extreme

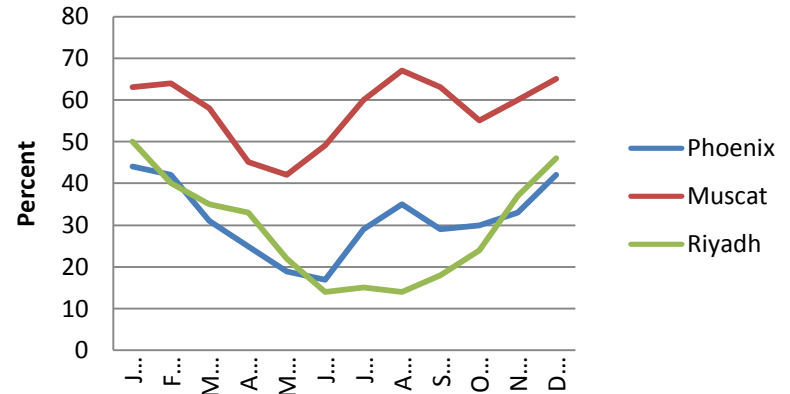
Rank	Country	Rating
6	U.A.E.	Extreme
7	Yemen	Extreme
8	Saudi Arabia	Extreme
9	Oman	Extreme
10	Egypt	Extreme

3 Water Stressed Cities

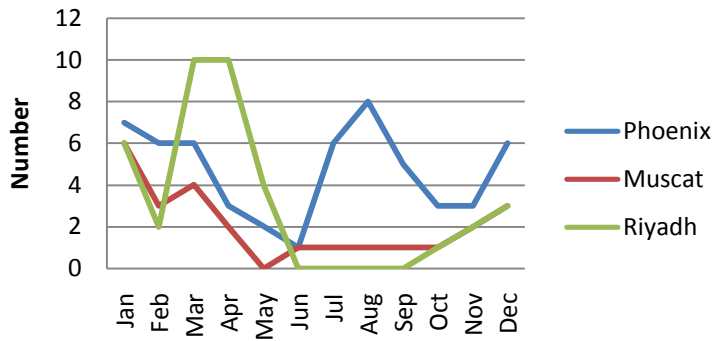
High Temperature



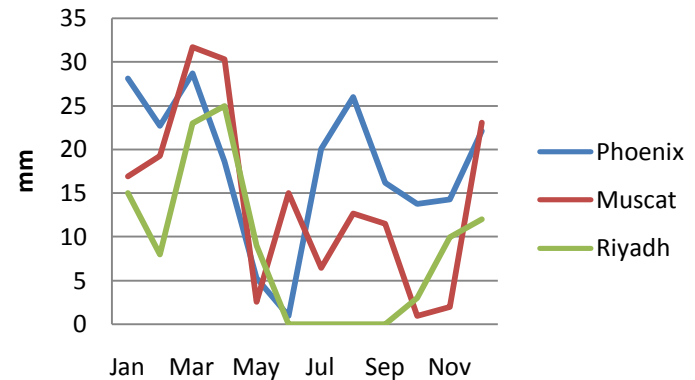
Humidity



Days of Rain



Rainfall



The New Frontier

Data, data and more data



Increased Efficiency



Much better customer service



Sustained Conservation



Lower Investment and Operating Costs

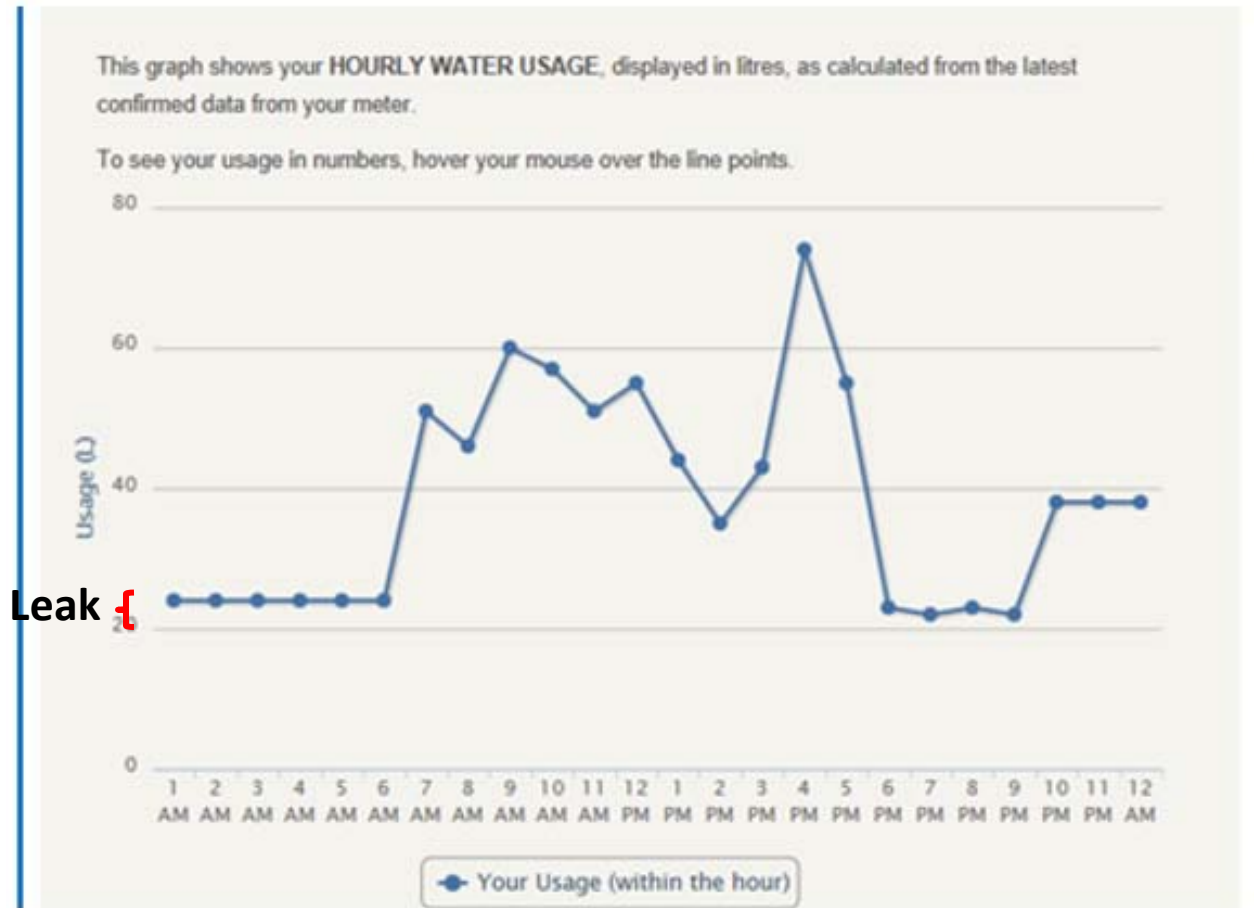
Requirements

- 100% automatic remote read customer and bulk meters
- Comprehensive SCADA for the system
- Customers have internet access
- An integrated IT platform

What the Utility Does

1. Generates a lot of customer data
 - Remotely read every meter every hour
 - 40,000 customers = 350.4 million data points/year
2. Exploits that data to improve efficiency through:
 - Hydraulic model inputs
 - Operating regime
 - Customer behavior

Hourly Meter Readings



Examples of What the Utility Gets*

- In a utility of 35,000 customers:
 - \$16k/month in increased revenues solely through eliminating billing errors
- In another utility:
 - Water loss decreased from 34 to 14%
 - Billed volume up 31.5%
 - Revenue up 40.6%

* Hill, T. and Symonds, G. (2013):
“The Smart Grid for Water”.

Utility Benefits from an Information Based System

- Automatic SMS to customers:
 - Leakage detected
 - Notice of changes in consumption
 - Notice of changes in anticipated bills
 - Payment reminders
- Cohort Management and Relationship Building
 - Compare “like” consumers with each other

Examples of What the Utility Gets*

- Billing Collections:

	Typical	Global Water
30 days	65%	96.5%
60 days	85%	99.5%
Write-off	5% - 15%	0.5%

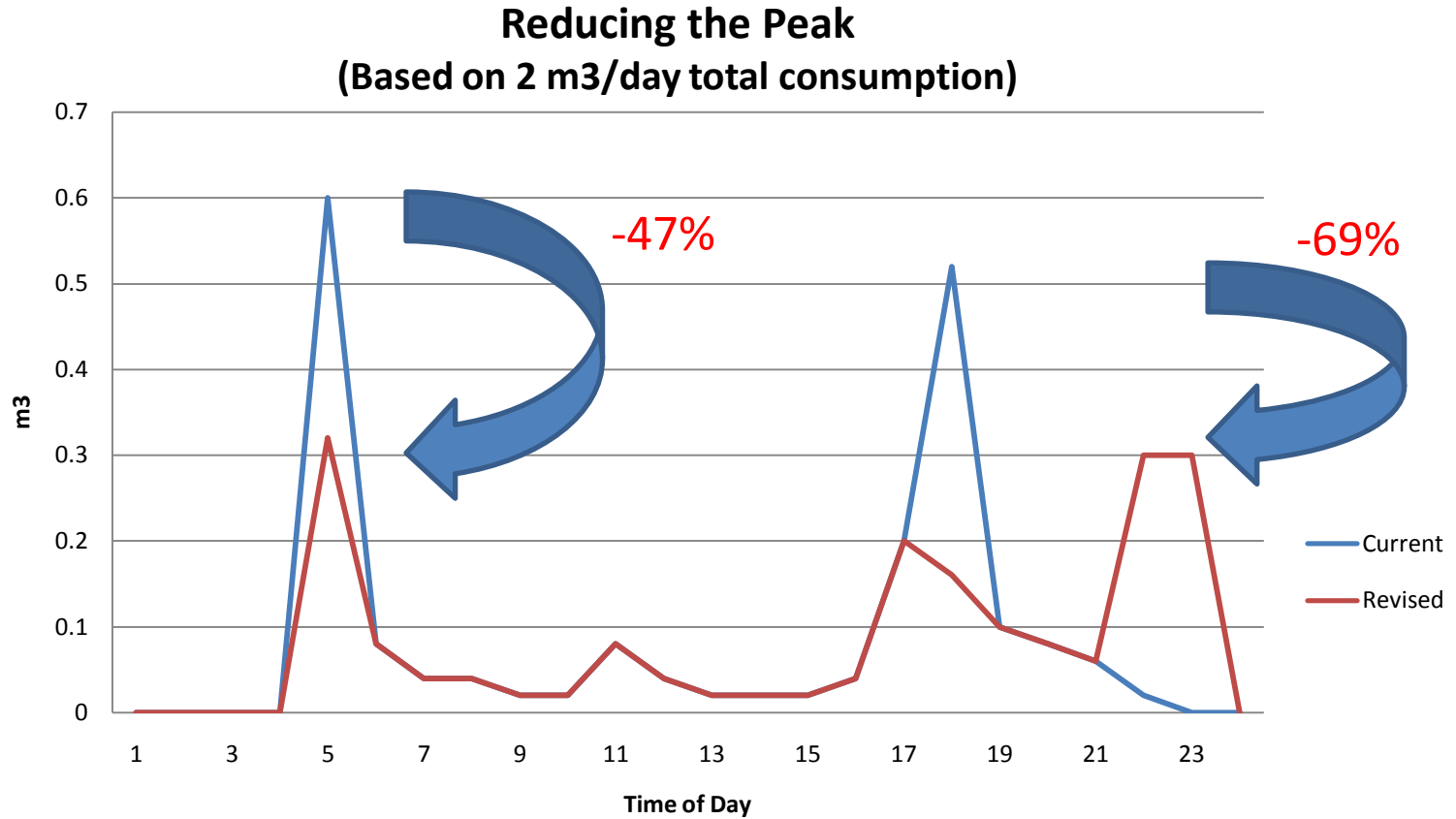
* Hill, T. and Symonds, G. (2013): “The Smart Grid for Water”.

Conservation works via Personalized Information—not a “Campaign”

“Consumers want highly personalized information and they want it at any time on any device—web, TV, print, smart phone.”*

- ✓ Allowing customers to see their water use almost in real time changes behavior
- ✓ Automated messages from the utility on consumption patterns also changes behavior

Possibility to Change Behavior



Benefits from Conservation

- Demand reduction from 9% - 15% is already demonstrated
- Peak Hour Demand Reduction Example

Average Daily Flow (gallons per unit)	250	213	-15%
Max Daily Flow (gallons per unit)	495	421	-15%
Peak Hour (gallons/minute)	0.58	0.49	-15%

Complementary Benefits from Conservation

Less Demand



Less pressure needed



Reduced line breaks



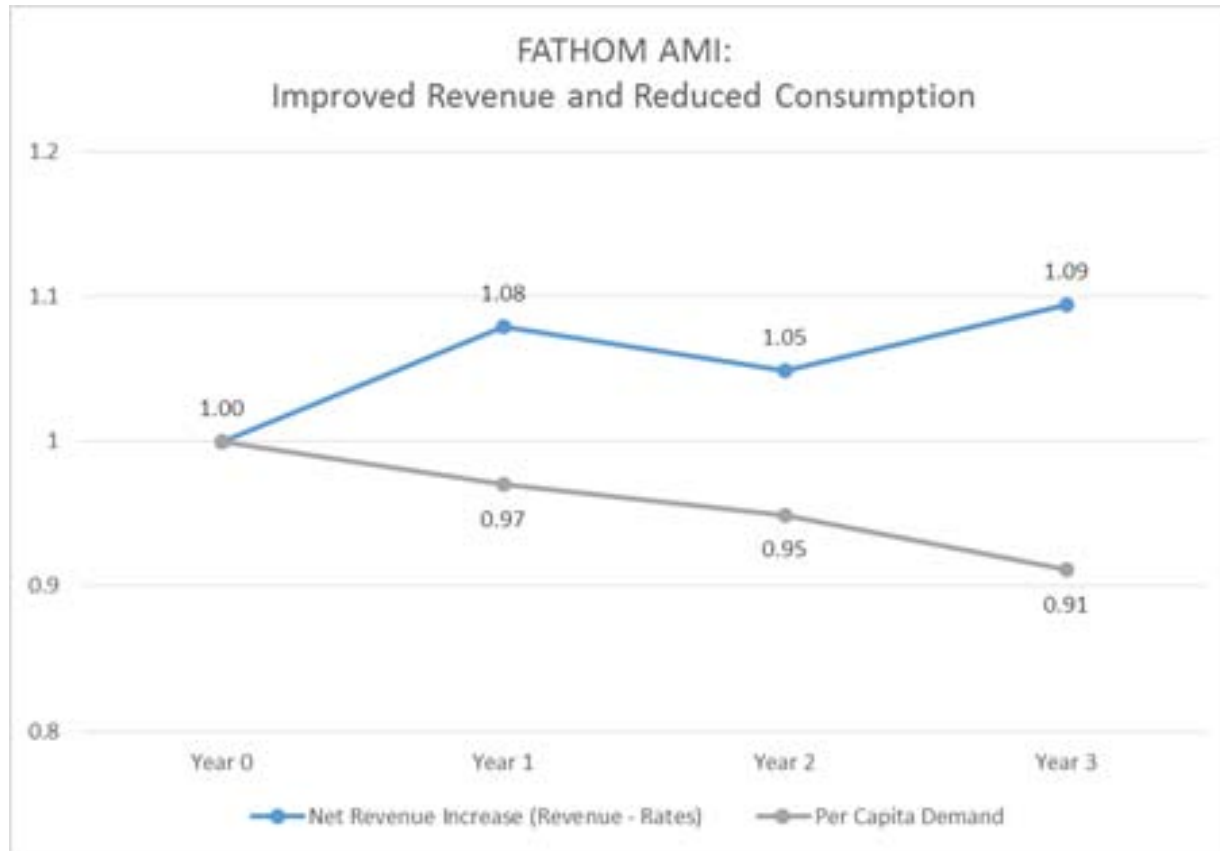
Reduced electricity used

Reduced Electricity Example

- Reduce pressure 10 psi, then
- Electricity decreases by 0.065 kWh/dwelling/day.
- If power costs \$0.09 kWh, this yields \$200,000 per year savings per 100,000 homes
 - Could be more if diurnal power rates exist
 - Could be more through demand charge reductions from less pump starts

Conservation ~~=~~ Reduce Revenues

(11 Utility Sample)



The New Frontier: Summary

	In	Out
Meter Reading	All the time	Monthly
Customer Access to Account Information	Self Serve and Web based	Phone Call & Bill
Utility Management Expertise	Big data	Plant engineering
Conservation Program	Continual SMSs	Big PR Program
Capacity Expansion	Better efficiency using existing infrastructure	New infrastructure

3 Questions for Discussion

1. Are the external conditions present that would permit the new frontier to work in the GCC?
2. Would utilities be willing to finance the changeover to a data rich environment?
3. Is there sufficient political will, especially with regulators/de-facto regulators, to change the status quo?

Thank you!

Alexander McPhail
The World Bank Group
amcphail@worldbank.org
+1 202-458-2125

Hezam Alotaibi
The World Bank Group
halotaibi@worldbank.org
+1 202-473-4147