



Smarter Cities Challenge



City of Tucson

March 15, 2013



Introduction and Approach



Executive Summary



Recommendations



Summary / Next Steps



- Launched in 2010
- An IBM grant initiative designed to enable 100 cities around the world to use the time and expertise of top –performing IBMers to become Smarter Cities
- Team of 5 to 6 IBM experts
- Three-week engagement on a focused topic



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The City of Tucson and Tucson Water challenged the IBM SCC team to provide recommendations on:

Improve Customer Service

Capture failures, water usage and leaks in real time

Continue to conserve and save water

Reduce cost of energy to deliver water

Apply best practices such as data driven management across other city departments

Discovery:
Interviews, Meetings,
Issues Tour, Documentation

Visioning:
Recommendations
and
Roadmap



Scope:
Water Service Delivery
leveraging Data Driven
Management

Final Report

Analysis:
Observations and Hypothesis
Formulation

Automotive Product and Service Innovation – A look back



1977

**Oldsmobile
Toronado had a
single computer unit
for spark-plug timing**

Today

**A modern car is more like 30 computers on wheels
with over 15,000,000 lines of code to improve fuel
efficiency, reduce emissions etc.**

**More software and more complex control units than
the NASA Space Shuttle**



Fact : Integrated Software, Data, and Systems is becoming the lifeblood of an Optimized Water Delivery System that delights customers



Energy/Revenue Optimization

Operations Portal

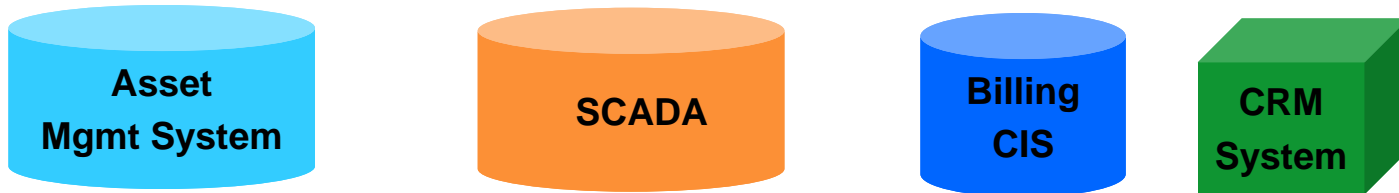
Customer & CSR Portal

Dashboards used by Customers, CSRs, Operations Management

Optimize systems & deliver real time data to empower stakeholders



Integrate data and applications of core control and business systems



Break the application & data silos to enable Data Driven Management



These recommendations are needed to satisfy the request from the Mayor and City Manager.



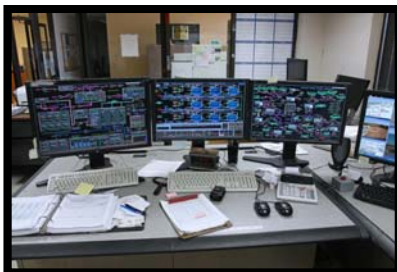
Empower Customers and **Customer Service Representatives** with real-time information



Implement AMI Pilot and accelerate AMI **Metering Management** and system deployment



Lower energy costs and reduce Non-Revenue Water with a refreshed and integrated SCADA **Operations Management** system



Implement an **Information Technology** plan to support the application and data needs of Tucson Water

Customer Service

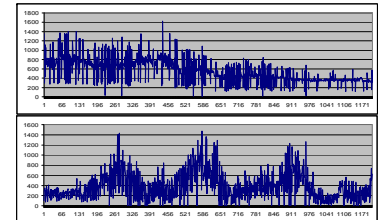


- **Great conservation programs and ethics**
- Customers not fully aware of some conservation programs
- Customer call volumes remain high at over 80,000 per month
- 30% calls due to lack of access to information
- CRM systems need enhancement



Provide real-time data to Customers and Customer Service Representatives (CSR)

- Begin customer pilot to display hourly usage and potential leak events using real time metering data
 - Start Automated Metering Infrastructure (AMI) Data Collection pilot and Customer Portal pilot
 - Assess technical, operational and financial feasibility of AMI implementation alternatives
 - Rollout Portal to Customers and CSRs
- Redesign and consolidate customer-facing processes such as the “Move Request” process.
- Digitize paper documents such as the Landlord Tenant Agreement (LTA) and make them available online to the CSRs.
- Actively communicate the current Tucson Water conservation programs (e.g. rainwater harvesting).



Expected Outcomes

- Customers:
 - Improved customer satisfaction, fewer 'surprise' bills and with timely alerts (e-mail, text, phone call...)
 - Alerts when customer enters a new rate tier or bill exceeds a threshold.
 - Increase participation in conservation programs and decrease water usage
- Tucson Water Staff:
 - Improved customer satisfaction with timely and satisfactory resolution of queries/issues
 - Significantly reduce 'high water bill inquiries' caused by 'stuck meters' and 'unintended leaks' and save customer service call center costs.
 - Opportunity to increase customer facing activities that promote conservation (water usage audits, conservation related workshops..).
- Tucson Water Organization:
 - Becomes well known for its customer care in addition to reliable water service delivery.

Savings and Investment Impact

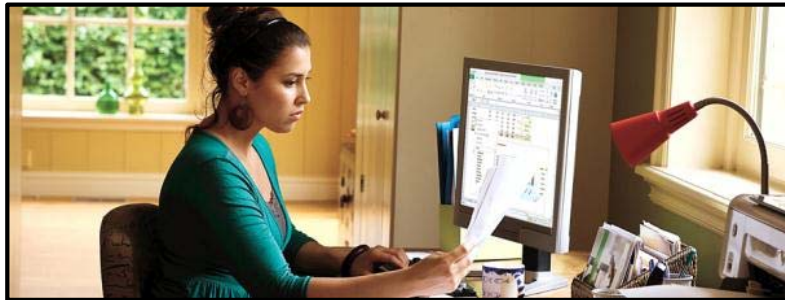
- Successful rollout of AMI and a Customer Portal will improve customer satisfaction and improve staff efficiency
- Earlier detection of leaks and implementation of alerts will improve water balance and help increase revenue or banking of more water

Metering Management



- **Manual Meter upgrade program is underway with \$5M / year available**
- High bill or stuck meter situations
- No water usage / leak info available until monthly bill is received
- \$2M /year write-off for customer bill adjustment

Implement AMI pilot and accelerate AMI system deployment



Monitor your water use in “real time”



- Expedite AMI pilot partnering with Tucson Electric Power (TEP)
- Evaluate Buy vs Build option for the communications network
- Accelerate build-out of AMI system rather than AMR (drive-by read)
- Integrate AMI solution with Billing and other Enterprise Systems
- Leverage usage data for demand forecasting and process optimization



Expected Outcomes

Customers:

- Empower customers with real-time usage and leak data
- Support use of mobile devices
- Promote water conservation

Customer Service:

- Send alerts for leaks, entering a new rate tier or exceeding a usage threshold
- Improvement of customer service issues (ability to respond to calls and complaints)

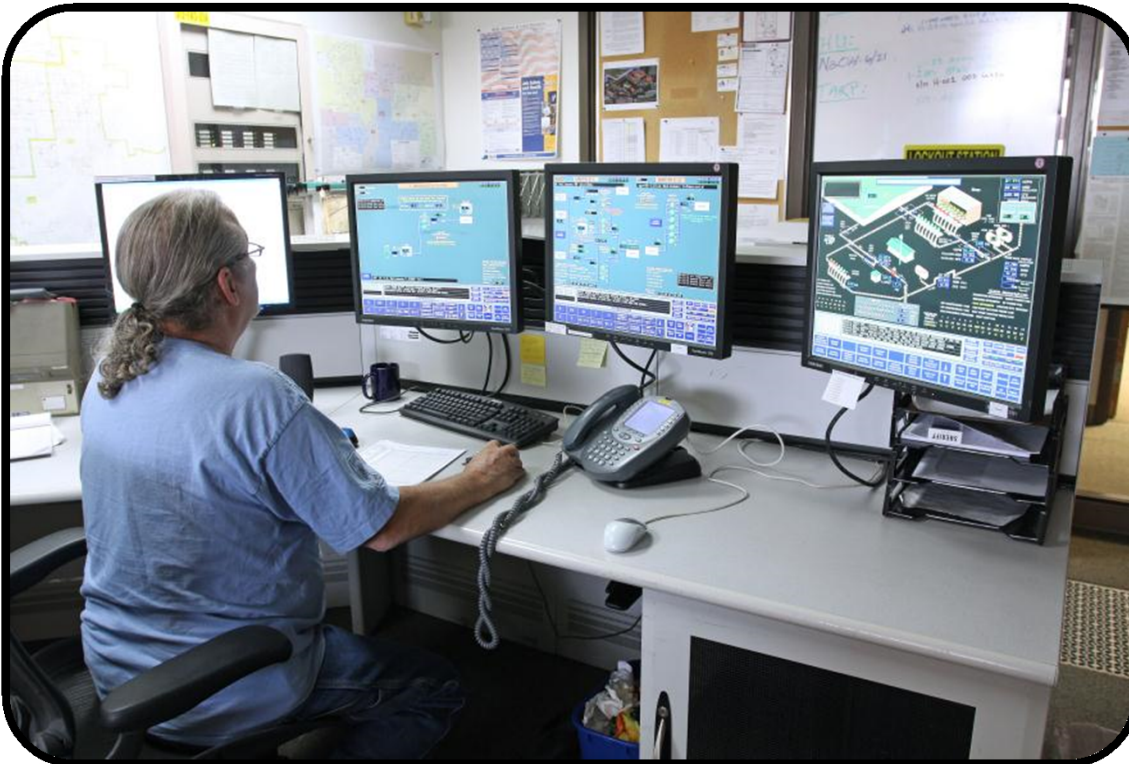
Meter Shop:

- Significantly reduce the manual meter reading effort and increase availability and accuracy of meter readings.

Savings and Investment Impact

- AMI Pilot with TEP (approx \$50,000)
- Deploy 225,000 AMI meters (approx \$50 M)
- Build and roll-out AMI solution and Customer and CSR portal (approx \$4-5 M)
- Data and application integration (approx \$1-2 M)

Operations Management



- **Excellent Supply Planning**
- Non-Revenue Water - 10%
- Annual energy cost is \$15M
- Daily breaks and leaks
- Water System complexity
- Data not integrated with enterprise systems

Lower energy costs and reduce water loss by implementing Water Control optimization best practices

- Apply best practices in Water Operations optimization to the unique and pressing problem of Tucson Water
 - Pilot dynamic pump optimization for reduction in energy costs
 - Pilot advanced pressure management techniques to anticipate, detect and reduce breaks and leaks
- Improve distribution network sensors and metering using optimization techniques to solve complex and high impact problems
- Integrate the data from across Water Operations with other IT systems

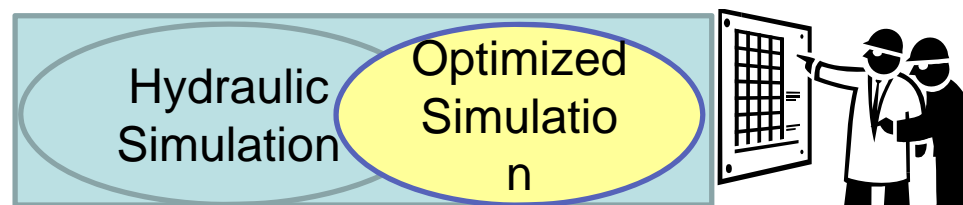
Expected Outcomes

- Reduce Non-Revenue Water (NRW) – predict and reduce water loss
- Reduce the use of electricity to operate the water distribution system
- Optimize pressure measurement to reduce system leaks
- Maximize Water Operations investments for continuous optimization

Savings and Investment Impact

By using data and analytics

- Pressure Management: Economically feasible reductions in NRW, reduce the costs of leaks and extend system life
- Energy Management: Dynamic pump optimization to reduce energy costs by up to 10%. Reduced water latency and costs of quality.



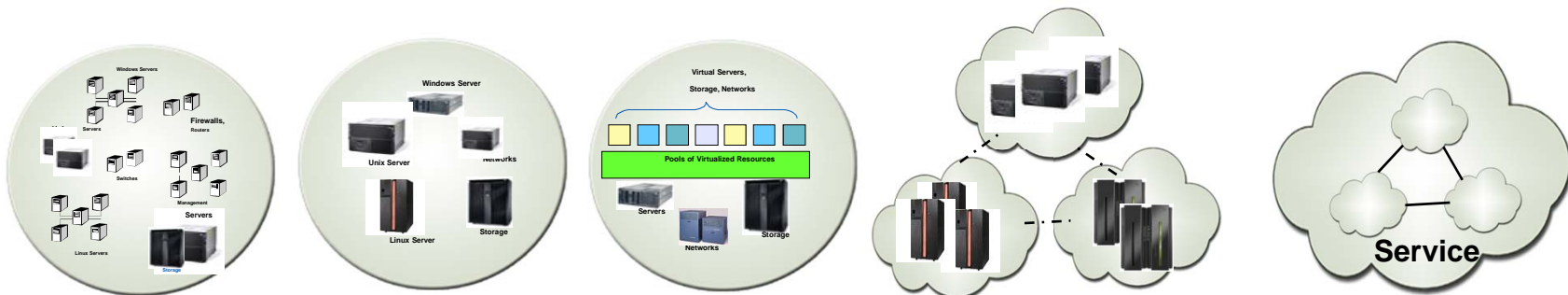
Information Technology



- **New management in place and IT infrastructure refresh is underway**
- **Silo'ed IT and Control Systems**
- **Inadequate system documentation**
- **No data sharing between applications**
- **Potential to use KPIs to drive better performance**

Develop an information technology plan for Tucson Water

- Develop an enterprise architecture
- Implement a governance model
- Invest in refreshing the infrastructure
- Integrate and consolidate major applications
- Provide a dashboard with key performance indicators (KPIs)



Expected Outcomes

- Shared data will connect the siloes of information
- Improvements in customer satisfaction
- Reduced manual operations and improved productivity
- Enabled data-driven management and Single View of the Citizen

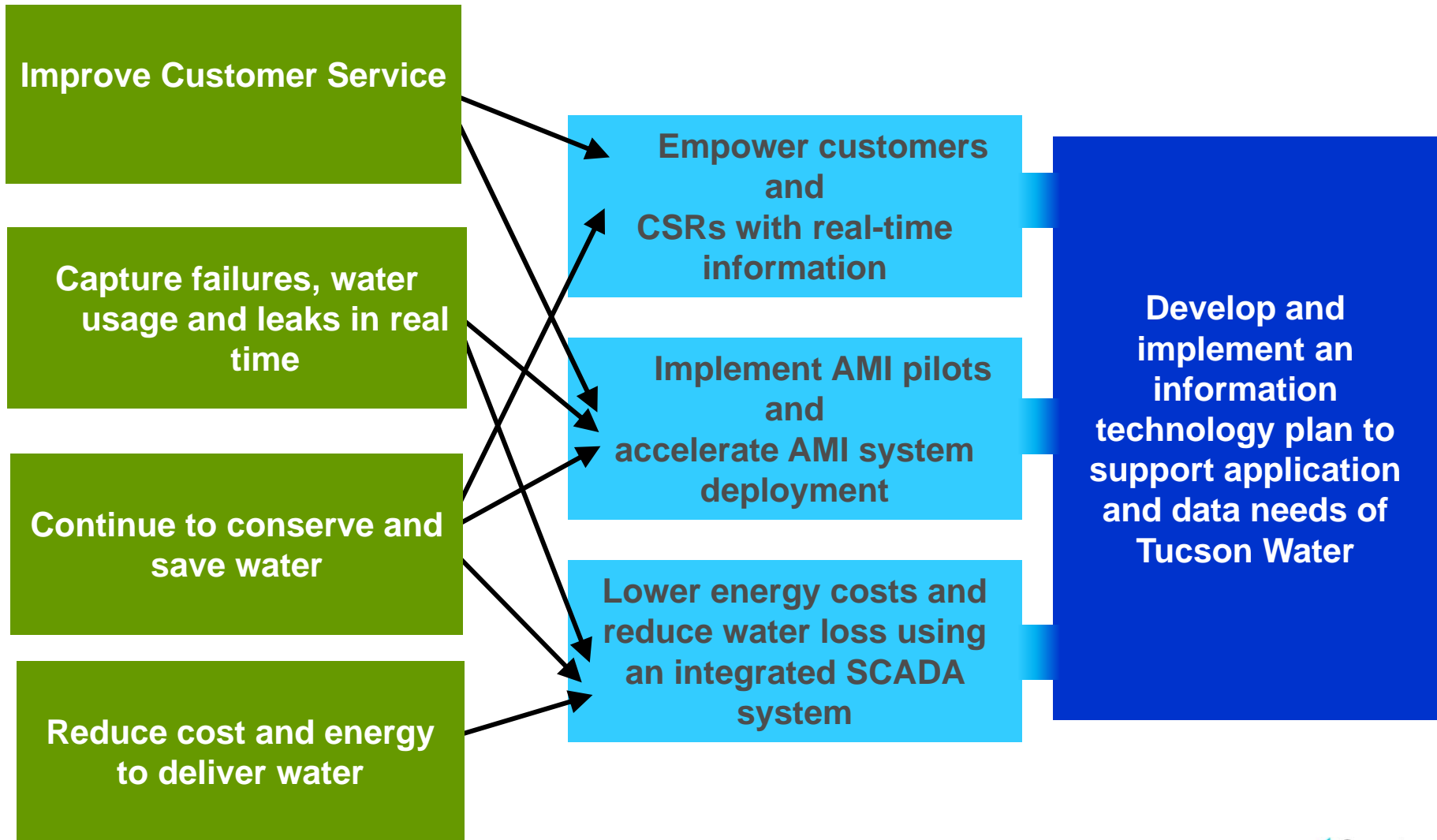
Savings and Investment Impact

- Invest in skills (e.g. Project Managers, Architects, Business Analysts, Integration Specialists, etc.)
- Investigate alternatives for sourcing information technology
 - cloud based services
 - external hosting (i.e. focused on specific functions or applications)



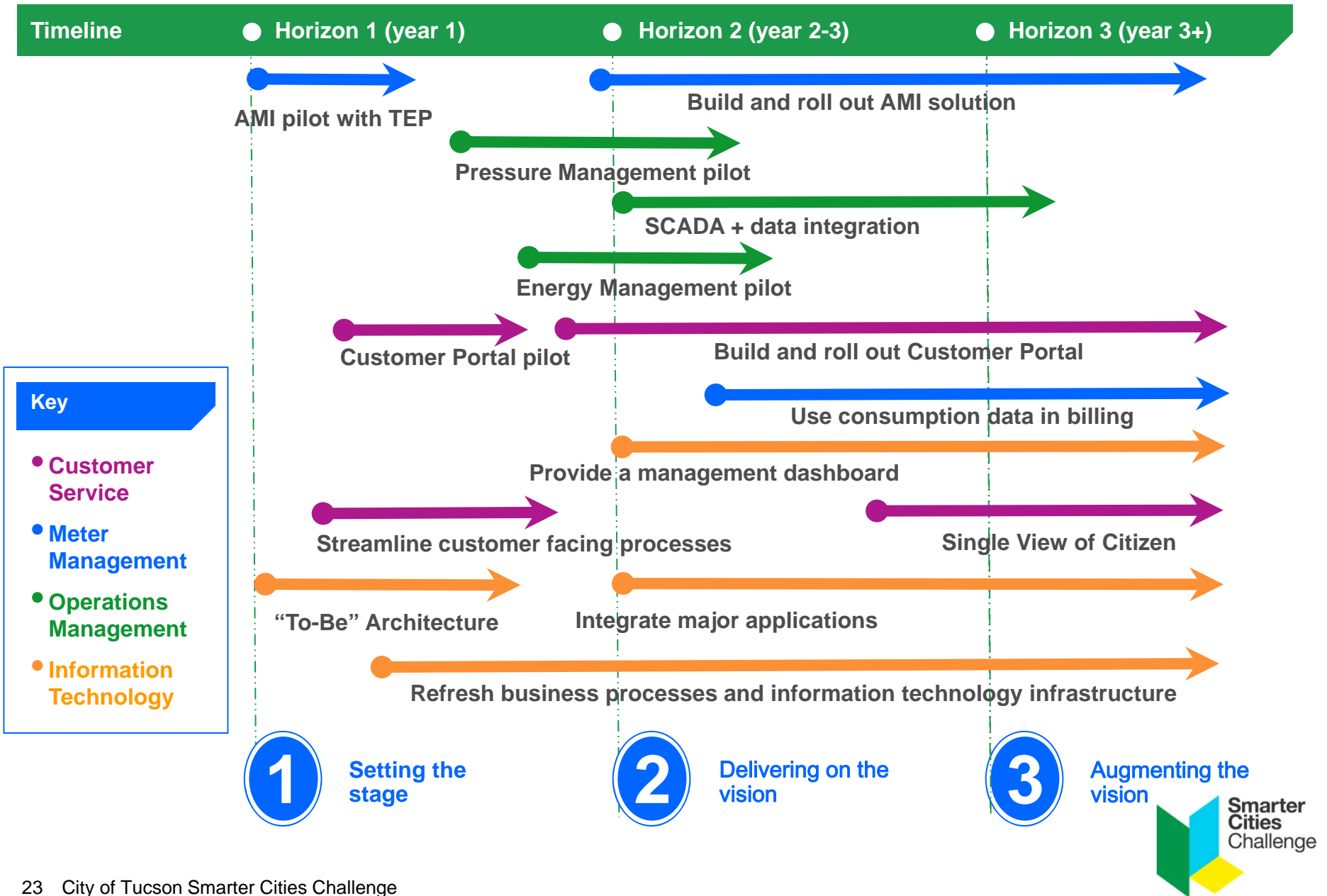
The Challenge!

The Team Response



Roadmap Summary

Note: Horizon 1 begins at Fiscal Year 2014





Thank you!

