A Utility Manager’s Dream: Intelligent Dashboards with Data Visualization to Drive O&M and Management Decisions

Wayne Miles, PE
Bryan Cully, PE
Clint Carter
Presentation Overview

- Past, Present, & Future
- Data – What is it Good For? Absolutely Everything!
- Data Visualization and Business Intelligence Tools
- Dashboard Example
- Lessons Learned
- Next Steps
- Questions
Past, Present, & Future
Past

- Information/data was often not collected

- Systems were ‘input’ heavy, with little useful ‘output’

- IMS tools played very little role in daily decision making, troubleshooting, or long range planning
Present

- Utility systems utilize tools, to varying degrees, for GIS, CMMS, Asset Management, CIP budgeting, financial & project tracking, compliance, etc...

- Barriers to effectively using these tools:
  - Info spread across multiple platforms
  - Not everyone has the same access to information
  - Output is not user-friendly
Future

- Use IMS tools to guide better decision making
  - O&M and Management level
- Provide a single location for viewing most data
- Better use of Best Management Practices (BMP)
  - Collect more data since it is now useful
- A New Normal for Data Digestion and Data Driven Decisions
Data – What is it Good For? Absolutely Everything!
Data – What is it Good For? Absolutely Everything!

- Utilities Create and Possess Massive Amounts of Data
  - Data lives in a box – need to free and consume it
  - Data governance
- The Goal – Put All Needed Data in One Location
  - Financial
  - Project
  - O&M
    - Key Performance Indicators (KPIs) – Verification
Data Visualization and Business Intelligence Tools
Data Visualization and Business Intelligence Tools

- Provide great graphics to convey complex information
- Can provide ‘overview’ as well as ‘drilled-down’ information
- Provide single platform for looking at multiple information sources
- Bring tools from the financial industry to the water/sewer world
- Flexible based on specific utility needs

Deciding which Software to Use

Major Considerations include: Cost, Analytics and Content, Ease of Use and Visual Appeal, Overall Capabilities
Dashboard Examples
Dashboard Examples

- Financial
- Projects
- O&M
  - KPIs
### Project Summary

<table>
<thead>
<tr>
<th>Award Amount Requested ($M)</th>
<th>2014</th>
<th>2015</th>
<th>2016</th>
<th>2017</th>
</tr>
</thead>
<tbody>
<tr>
<td>WWTP</td>
<td>67.74</td>
<td>30.56</td>
<td>44.74</td>
<td>48.15</td>
</tr>
<tr>
<td>Capacity</td>
<td>1.07</td>
<td>1.26</td>
<td>1.10</td>
<td>1.25</td>
</tr>
<tr>
<td>Other</td>
<td>0.46</td>
<td>0.28</td>
<td>0.46</td>
<td>0.17</td>
</tr>
<tr>
<td>Rehab</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>WWTP</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
</tbody>
</table>

### Projects

<table>
<thead>
<tr>
<th>Project Number</th>
<th>FiscalYear</th>
<th>Council Meeting</th>
<th>Type</th>
<th>Project Name</th>
<th>Category</th>
<th>Include For Comparison?</th>
<th>Award Amount Requested $</th>
</tr>
</thead>
<tbody>
<tr>
<td>6G713614</td>
<td>2014</td>
<td>8/13/2013</td>
<td>SS</td>
<td>Agreement for Program Management Services for the implementation of the Clean Water 2020 Program - Amendment #1</td>
<td>Other</td>
<td>Yes</td>
<td>$4,749,800.00</td>
</tr>
<tr>
<td>6G72256</td>
<td>2014</td>
<td>11/12/2013</td>
<td>SS</td>
<td>Regulatory Compliance Consulting for the Metro Wastewater Treatment Plant</td>
<td>WWTP</td>
<td>Yes</td>
<td>$206,000.00</td>
</tr>
<tr>
<td>6G7182</td>
<td>2014</td>
<td>11/18/2013</td>
<td>SS</td>
<td>Construction Improvements for the Metro Wastewater Treatment Plant Aeration System</td>
<td>WWTP</td>
<td>Yes</td>
<td>$3,185,617.75</td>
</tr>
<tr>
<td>6G72514</td>
<td>2014</td>
<td>12/18/2013</td>
<td>SS</td>
<td>Improvements to Four (4) Wastewater Pump Stations</td>
<td>Rehab</td>
<td>Yes</td>
<td>$244,442.00</td>
</tr>
<tr>
<td>6G7253</td>
<td>2014</td>
<td>3/18/2014</td>
<td>SS</td>
<td>An Agreement for Engineering Services for design construction and rehabilitation of the metro/wastewater treatment plant anaerobic digester</td>
<td>WWTP</td>
<td>Yes</td>
<td>$3,248,477.06</td>
</tr>
<tr>
<td>6G7690699</td>
<td>2014</td>
<td>3/18/2014</td>
<td>SS</td>
<td>Permanent Flow Monitoring</td>
<td>Capacity</td>
<td>Yes</td>
<td>$113,300.00</td>
</tr>
<tr>
<td>6G7257</td>
<td>2014</td>
<td>3/18/2014</td>
<td>SS</td>
<td>Rehabilitation/Replacement Hurton #2, Malvern Point and Dog Pound (Humanes Lane) Pump Station</td>
<td>Rehab</td>
<td>Yes</td>
<td>$258,018.00</td>
</tr>
<tr>
<td>6G7256</td>
<td>2014</td>
<td>3/18/2014</td>
<td>SS</td>
<td>Blossom and Huger Streets Sewer Improvements</td>
<td>Capacity</td>
<td>Yes</td>
<td>$1,886,500.00</td>
</tr>
</tbody>
</table>

### Map

The map displays project locations across the city, with markers indicating each project's location.
Project Number: SS7251

Project Name: Blossom and Huger St Improvements and Innovista Infrastructure Improvements

Project Description: Construct new 16" sanitary sewer gravity line to serve future developments around the Blossom @ Huger area.

Council District(s): II

Sewer Basin(s): Crane Creek, Rocky Branch, Smith Branch, Broad River

<table>
<thead>
<tr>
<th>Fiscal Year</th>
<th>Professional Services Encumbrances</th>
<th>Construction Encumbrances</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>$1,463,306.00</td>
<td>$3,853,788.00</td>
</tr>
<tr>
<td>FY13/14</td>
<td>$1,000,500.00</td>
<td>$0.00</td>
</tr>
<tr>
<td>FY14/15</td>
<td>$331,640.00</td>
<td>$1,888,700.00</td>
</tr>
<tr>
<td>FY15/16</td>
<td>$272,740.00</td>
<td>$3,063,050.00</td>
</tr>
<tr>
<td>FY16/17</td>
<td>$0.00</td>
<td>$0.00</td>
</tr>
<tr>
<td>FY17/18</td>
<td>$0.00</td>
<td>$0.00</td>
</tr>
</tbody>
</table>

Encumbrances and Invoices to Date

Related Links:

Interactive Map: SS7251

Business Case: SS7251

SharePoint Project: Blossom and Huger St Improvements...

Public Project Page: Public Project Page

HOME
Lessons Learned & Next Steps
Lessons Learned

- Dashboards can be used for anything that is consistently measured
  - Financial Information
  - Project information
  - Operational Information
  - Maintenance
  - “Ham sandwich” Theory

- Internal or Public Consumption
Lessons Learned

- Start with a Focus on Data Governance
  - Formalize asset management data collection
    - Well-written Standard Operating Procedures
  - Data entry and input consistency
    - Data stewards or custodians

- Identify Output Needs to Shape Data Input Needs
- Must be easy to use!
Deploying Asset Management, Smart Infrastructure & Dashboards

- Dashboards are a key part of Asset Management and Smart Infrastructure
  - Accessible & Actionable
  - Everything in one location

- Challenging to change so much, so fast
  - Business Processes
  - O&M Procedures

- Require close coordination between initiatives
Deploying Asset Management, Smart Infrastructure & Dashboards

- Needs business mindset, NOT engineer mindset
  - Who do you trust?

- Building the Legacy
  - Digital legacy
  - Organizational legacy
Smarter Infrastructure...
Coming to a Utility Near YOU!
Discussion/Questions