Smart Water – Simplified

Biosolids & Renewable Energy Seminars
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From a leading European water utility operator...

- +130 Years of experience
- 100% Family owned
- +3,000 Employees
- 400 Cities managed
- 30 Water treatment plants
- 300 Wastewater treatment plants

...to a holistic Transformation started in 2005...

- Water scarcity and increasing cost of water treatment
- Information siloes between areas and technologies (SCADAs, GIS, CMMS, ERP)
- Generational gap – senior operators with know-how, and younger digital-natives

...to becoming one of the leading smart water companies, providing software & analytics to hundreds of utilities globally

Smart Water – Simplified.
10+ bn data points / year connected
400+ clients worldwide
TODAY GOAIGUA IS HELPING KEY WATER UTILITIES GLOBALLY

Smart Water – Simplified.
GoAigua is helping hundreds of water utilities maximize the value of their infrastructure with its innovative software solutions, analytics and digital consulting services

Office locations:
- New York
- Colorado
- Mexico City
- Spain (HQ)
- Colombia
- Peru
- Ecuador
- Angola
- Romania
- Qatar
- Saudi Arabia

INTRODUCTION: GOAIGUA

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INTRODUCTION: GOAIGUA

CONNECTING SYSTEMS PROVIDES INSIGHT ACROSS THE UTILITY TO IMPROVE DECISION-MAKING & RISK MANAGEMENT

GoAigua Modular Implementation

Unified Platform

Any Technology

SINGLE DATA MODEL

ANALYTICS PLATFORM

SSO PREDICTIVE MODELING

PEAK-FLOW MGMT. & I/I MITIGATION

WATER QUALITY MONITORING

SMART METER ANALYTICS

NON-REVENUE WATER OPTIMIZATION

ASSET INVEST-MENT PLANNING

ENERGY OPTIMIZATION

DIGITAL TWIN, ...

AMI

ERP, CIS

SCADA, PLCs & IoT sensors

Distributed DBs

GIS, CMMS
The Journey in First Person: City of Valencia (Spain)
VALENCIA WATER DISTRIBUTION SYSTEM AT A GLANCE

**WATER PRODUCTION & DISTRIBUTION**

- Sources: Turia and Júcar rivers
- 2 Carbon Filtration Plants
- 1,500 miles of lines & 700,000 smart meters

**DEMAND**

- Valencia and surrounding 51 districts
- 1.7 million inhabitants

**WW COLLECTION & TREATMENT**

- 2 WWTP (150 MGD combined capacity)
- 2,000 miles of lines
- 50/50 combined/separated system
THE CITY OF VALENCIA (SPAIN)

1st European City with 100% AMI, with 700K smart meters by 2009

10 bn data points managed every year through GoAigua

First Operating Digital Twin

First water organization certified in ISO 55001
THE JOURNEY

Step 1
- People & processes
- Centralized Asset Inventory
- Common IT Framework

Step 2
- Increased sensing at production & large facilities
- Operational data integration (OT/IT), GIS, CMMS

EXAMPLE IN ACTION: VALENCIA
INTEGRATED PLATFORM FOR 300+ FACILITIES

**Main challenges faced at the time**

- Information was captive in each technology – WinCC, Wonderware, data loggers, ...
- We were dependent on expert resources to do anything (integrate new components, extracting information …)
- Historical information was hard to access – only for a few months
- Crossing information between different technologies took us a lot
- Generating reports, KPIs, and insights was very hard

**28+ drinking water treatment plants**

**300+ wastewater treatment plants**

**2,000+ DMAs monitored hourly**

**10,000+ miles of pipes monitored constantly**

**10,000+ electro-mechanical assets**

**20 different SCADA technologies**

**EXAMPLE IN ACTION: VALENCIA**
INTEGRATED OPERATIONAL PLATFORM: SCADAs + SENSING + GIS

EXAMPLE IN ACTION: VALENCIA
THE JOURNEY

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- People & processes
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- Common IT Framework

**Step 2**
- Increased sensing at production & large facilities
- Operational data integration (OT/IT), GIS, CMMS

**Step 3**
- Increased sensing, AMI, collection system
- Static hydraulic models

**Step 4**
- Data-centric platform / microservices architecture
- Data Science & analytics applied to distribution (I/I, NRW, customer leaks, water quality)

EXAMPLE IN ACTION: VALENCIA
INTEGRATION OF AMI & PREDICTIVE ANALYTICS: NON-REVENUE WATER

EXAMPLE IN ACTION: VALENCIA

Water balance in real time by city district (detection of invisible leaks, fraud, etc.)

GIS representation of water usage, alarms, and other parameters
REAL-TIME CHARACTERIZATION OF FLOW BY SOURCE (INFLOW, INFILTRATION, OTHER SOURCES) FOR ASSET MANAGEMENT & PERFORMANCE FORECASTING

EXAMPLE IN ACTION: VALENCIA
THE JOURNEY

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Step 5
- Automation, AI, and Digital Twin
- Real-time simulations
- Constant forecasting
- Predictive analytics

EXAMPLE IN ACTION: VALENCIA
DIGITAL TWIN: WET WEATHER OPTIMIZATION & PEAK FLOW MGMT.

EXAMPLE IN ACTION: VALENCIA
Integrated Sewer System: City of Houston
39 WWTPs
(564 MGD permit)

3 Wet Weather Facilities

382 Lift Stations
(excluding WWTP Influent LS)

31 million LF Gravity Sewer

1.7 million LF Force Main

127,250 Manholes

590 Sq. Miles
Wastewater Infrastructure (Predictive) Analytics Platform

Infrastructure Performance
- SCADA PS, LS, WPP, WWTP, WWF
- Flow/Level Monitoring
- Water Pressure Monitoring
- Water Billing Wholesale & Retail
- 311 Calls & Works Orders
- Electricity Billing
- Regulatory Reports SSO, WQ

Asset Inventory

Asset Condition

Asset Capacity

Planned Growth & Activities
- Population (HGAC, HGSD, Census)
- Employment (HGAC)
- Land-use (HCAD, HGAC)
- Water Supply (CWA)
- ILMS & WCR (Permitting)
- FOG Program (COH-HHD)
- External Agencies/ Vendors

Infrastructure Improvement (2R)
- CIP Project Information
  - Completed
  - Active
  - Planned

Federal, State, Regional & Regulatory Agencies
- USGS, EPA, NWQMC, NRCS, NOAA, US Census,
- National Water Model | TWDB, TCEQ | HGSD,
- Lone Star | TRA, SJRA, BRA | CWA, HGAC, HCAD

CIPMS

Asset Financial Reporting
- Accounting & Financial Data
APPROXIMATELY 70% OF SSO’s IN THE CITY ARE PREVENTABLE
Risk modelling for SSO occurrence & preventative maintenance

- Profiling system – determining risk level of the system
- Develop preventative maintenance programs (needs-based vs. scheduled)
Optimize sensor location

- Leveraging risk level for available budget in the City
- Next stage: 600 sensors to be deployed in the City
Predictive analytics to detect SSOs: wet level monitors & LS behavior

• Wet vs. Dry weather operations – very different behavior
• Time-to-response & risk to SSO
• Calibration to make sure alerts are coupled with reality
THE RESULTS: 77% SSOs DETECTION
NEXT STEPS: WHAT WE ARE WORKING ON

**FORECAST** system’s real-time response (flooding, overflows...) to storms

**SIMULATE** the network operation any time: **PAST, PRESENT, FUTURE**

**DECISION SUPPORT SYSTEM** for emergency response in real time

**EVALUATE SPECIFIC CONTROL ACTIONS**, by simulating their impact

**PLAN** the best day and hour to perform network operations

**ESTIMATE** values for points without sensing (without field measurements)
Thank you!

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