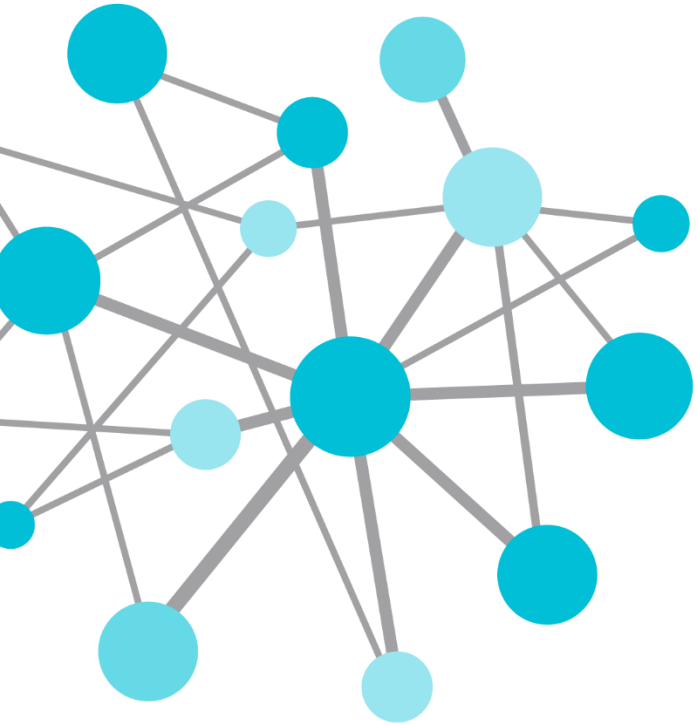


United Utilities- Enabling a Resilient Water Supply System with the PI System Infrastructure

Presented by **Simon Kirkham– CTO**

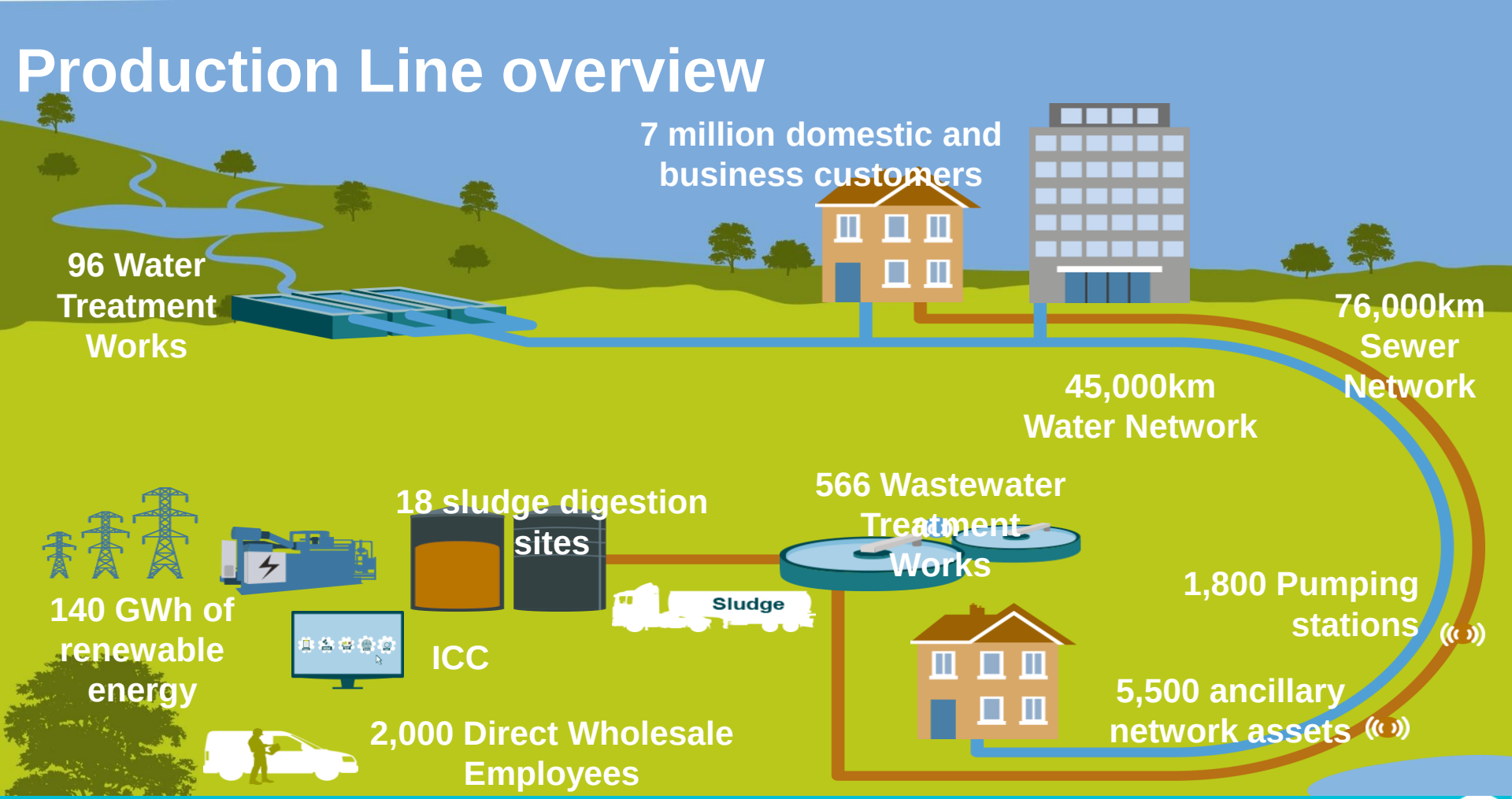
Paul Verdon – Production Planning Manager

Simon Kirkham

CTO

United Utilities Business Plan

Production Line overview



UU IT strategy

Proactive insight

Workforce enablement

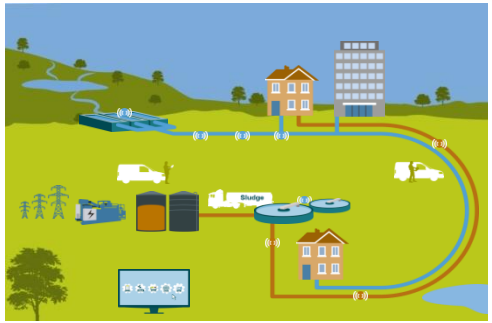
“Silent service”

End-to-end visibility

Analytics

Modelling capability

Mapping OSIsoft PI System with UU'S Users



OSIsoft PI System

Data Mart

Data Warehouse

Data Marts / Data Warehouses

Ad-hoc Analysis

Query & Reporting

Data Mining

Business Intelligence Tools

Internet / Intranet

Mobile Device (PDA / Phone)

Reporting

Outputs

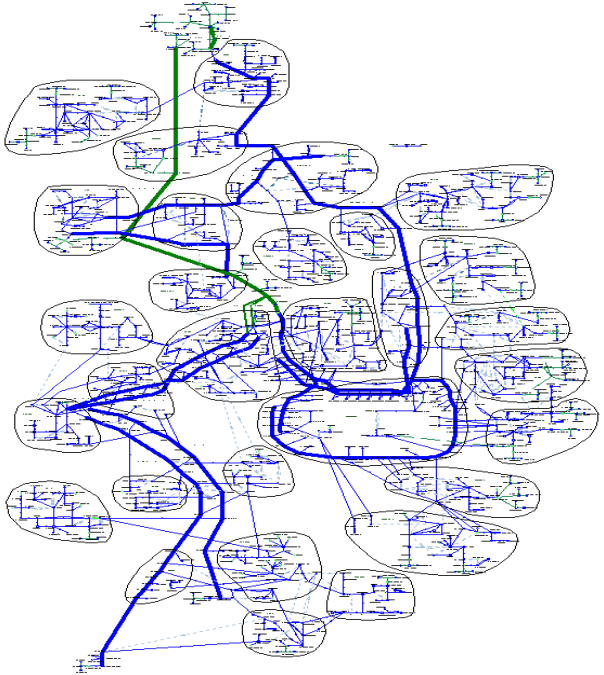
Paul Verdon

Regional Water Production

Planning Manager

What is Production Planning?

- Ability to effectively plan (model) & deliver water to the customer at least cost.
- Collection of data, modelling of scenarios, produce, deliver and monitor plans.
- Data is currently available in multiple systems
- Information & Data collected in one place from:
    - Reservoirs, rivers, boreholes (ground water)
    - Flows from all water sites both Treated and Raw Water
    - Storage levels in service reservoirs
- Data is automatically collected then fed into modelling systems
- Plans are produced, Communicated to Field Staff and Automatically Monitored

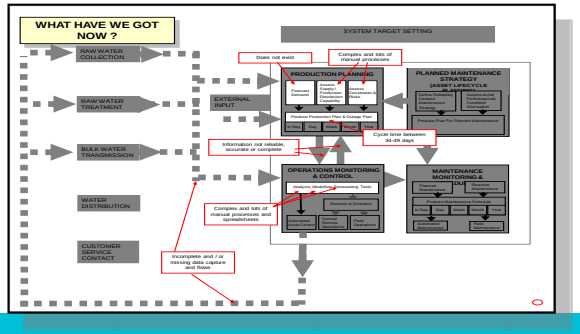


Production Planning ‘Then and Now’

The previous approach to Water System Optimisation and Production Planning had limited capability due to:-

- **Absence of a ‘systems’ view** of the “regional supply system from source to customers tap
- An **outdated business model** with processes across a number of teams
- **Reliance on scarce specialist knowledge**
- **Fragmented business systems** with lack of “real time” information (lagging not leading information)
- **Insufficient financial metrics** of unit and marginal cost

“two men and a spreadsheet”



- **Minimal system modelling capability** to enable intelligent analysis & informed decision making
- **New requirements for proactive production planning and operator intervention**
- **Inability to make proactive operator interventions and system changes** due to the lack of remote monitoring and control functionality from the Intelligent centre

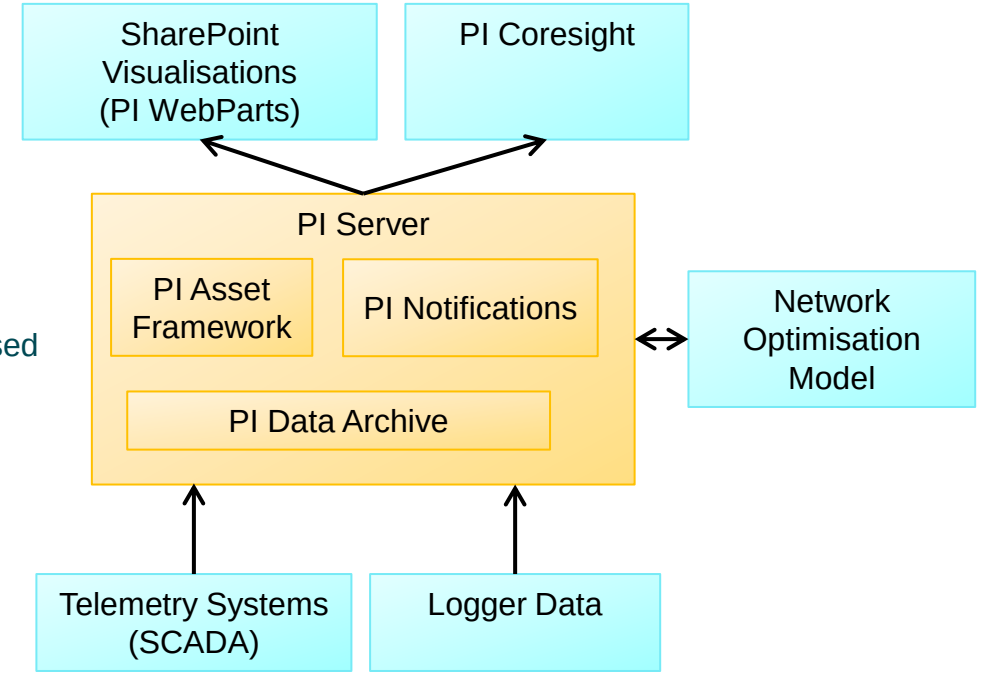
System Overview

Telemetry Systems & Loggers
- Send site asset data into PI System

OSIsoft PI Server
- Captures and analyses data
- Calculates performance & projects forecast LBE data

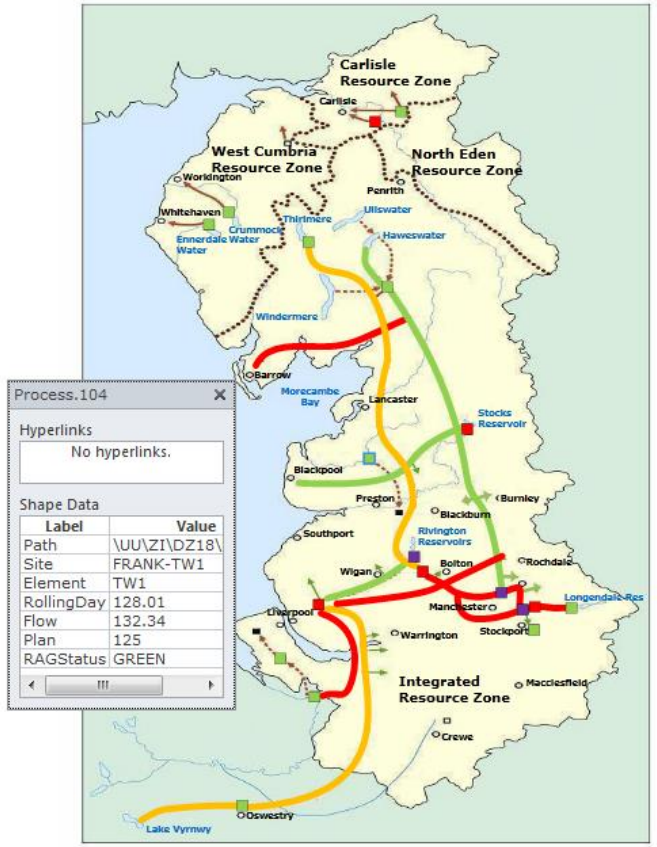
Optimisation Model
- Takes data from PI System to produce weekly optimised Production Plans
- Sends plan data back to PI System for monitoring

SharePoint
- To view / monitor assets using real-time data through visualisations

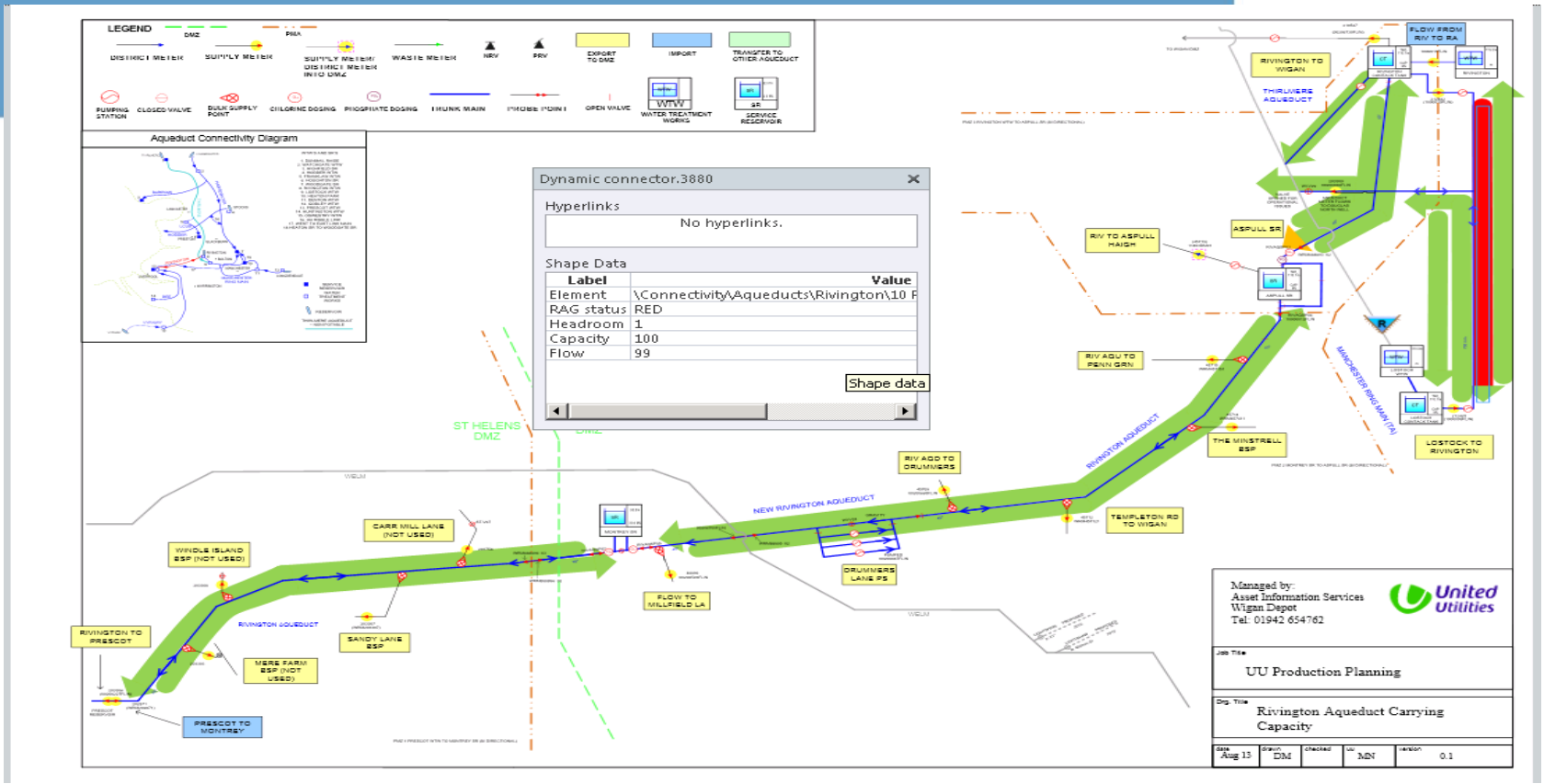


Overview Schematic

- Using PI WebParts to support existing Visio diagrams enabling live animation.
- Red / Amber / Green status to visualise Aqueducts and Key Water Treatment Sites.



PI System Visualisations – Aqueduct Overview

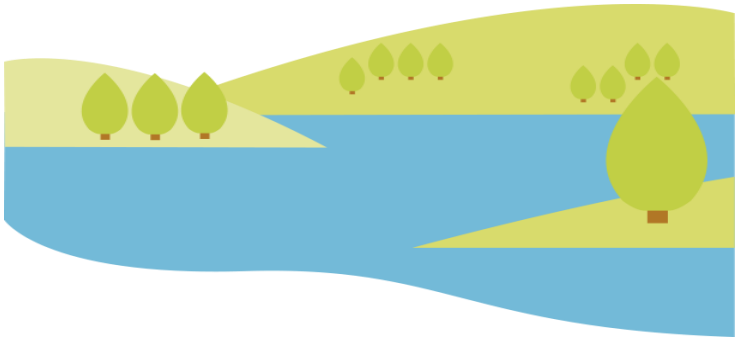


Our New Production Planning System

Improved Inputs:

- Real time data flow feeds to intelligent control centre via OSIsoft PI System
- Feeding into scenario modelling packages
- Feeding into Production Plan process

- **Visualisations with real time data of assets in corporate systems:**
  - Water Treatment Works / Large Diameter Trunk Mains Flow
  - Service Reservoir Levels
  - Treatment Works Capacities which include outage plans.



- **Improved Processes:**
  - Water hydrology management (shared information)
  - Optimised source to tap
  - Incident management support
  - Security and general risk management responses
  - Single source of data (OSIsoft PI System)

- **New organisational structure for production planning in place working to new business processes**

A Step Change in Production Planning

From a Vintage Plane ....

Previous

- Currently takes a week to produce a Water Production plan.
- The cost of water production is not visible, with no ‘baseline plan’ to track against
- No ability to model scenarios for outages
- Using out of date data and information to base future production plans.

....to a Dreamliner

Now

- Water Production plans produced within day
- Automatic integrated real time data collection and processes
- Potential to reduce costs (power, chemicals) by minimum 5% p.a.
- Increased resilience & modelling capabilities

Benefits Overview

The overall aim will reduce business risk and enhance our customer service

1. **Future proofing the UU's production business**.
2. **Better understanding of production changes and interventions** of the Regional Supplies System
3. **Delivery of Cost efficiencies** associated with
    1. Using cheaper unit cost of water sources with existing systems
    2. Optimised energy and chemicals usage across Water Production and Network assets and pumping efficiencies
4. **Risk avoidance and improved customer service**
5. **Retaining business knowledge and continuity through implementing a robust business model**
6. **Operator intervention to minimise customer impact from unplanned events and incidents**

Other benefit items include:

- Risk Management - contribute to security of supply, avoiding compensation payments.
- Asset Management Assessment (AMA) - increased auditable and accurate data to reduces fines.
- Abstraction licence management – improved compliance with regulatory requirements
- Upgraded PI System built in a scalable manner.

What Next For Production Planning

"it's not all blue sky thinking"

- **Development of outage tracker to link directly & upload to PI System**. Will help automate the outage planning process to avoid missing pre-approved planned outages
- **Impounding Reservoir level data to be introduced into PI System**. Bringing a fully connected source to tap data stream into one central repository.
- **PI DataLink to support contingency plan to update automatically**. Will give the ability to react using real time contingency plans in the event of unplanned outages across the water network.

Future Plans - Unit Cost of Treatment (Water & Wastewater)

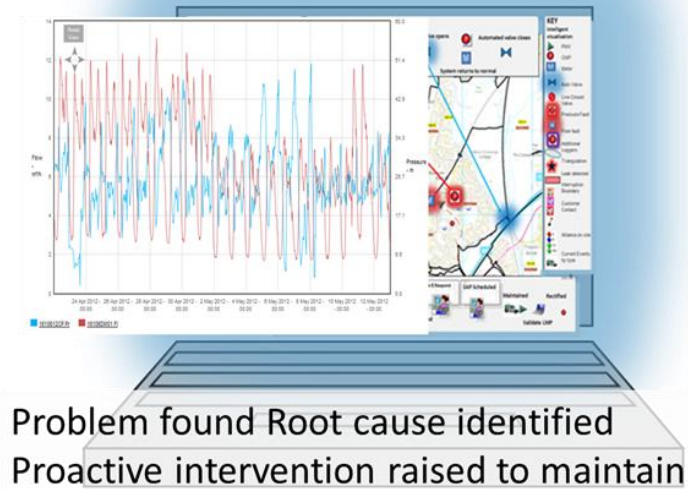
- **Operation costs are increasing with Energy and Chemical prices set to rise.**
- **PI System will interface with SAP and our engineering models**
- **PI System will inform production & investment decisions based on targets set by our engineering models.**

Future Plans - Regional Sludge Operations Management

- **Optimise the movement & management of organic waste for energy generation.**
- **SAP data to provide real-time knowledge on asset availability**
- **Track actuals against targets to inform production & investment decisions**
- **Telemetry and sample data to assess waste quality**

Future Plans- Intelligent Network Management

- **PI Events Frames used to detect abnormalities in water pressure or leakage**
- **Proactive intervention before the any customer impact.**
- **Situational Awareness - integration with Esri ArcGIS to visually represent and drill down on events on our network.**

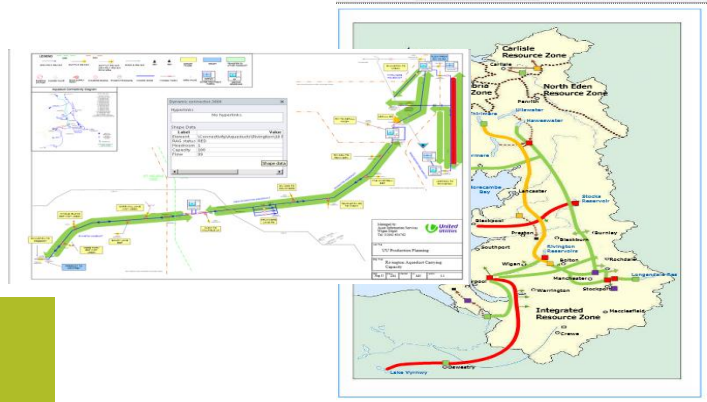


Problem found Root cause identified
Proactive intervention raised to maintain
PMV ref 12986

Enabling a Resilient Water Supply System with the PI System Infrastructure

"It's great for me now to be able to see the heartbeat of our complex transmission system in real-time. There is now no hiding place for inefficient operation."

John Butcher , Regional Water Supplies Manager



United Utilities
helping life flow smoothly

Business Challenge

- **A step change in Water Production Planning**
- **Transformation to proactive production planning and operator intervention**
- **Build a strategic scalable solution based on the OSIsoft PI System infrastructure for managing time series data**

Solution

- **Water Production plans produced within day**
- **Automatic integrated real time data collection and processes**
- **Potential to reduce costs (power, chemicals) by minimum 5% p.a.**
- **Increased resilience & modelling capabilities**

Results and Benefits

1. **Future proofing the UU's production business with OSIsoft PI System**
2. **Better understanding of production changes and interventions**
3. **Delivery of cost efficiencies**
4. **Risk avoidance and improved customer service**
5. **Retaining business knowledge and continuity through implementing a robust solution**

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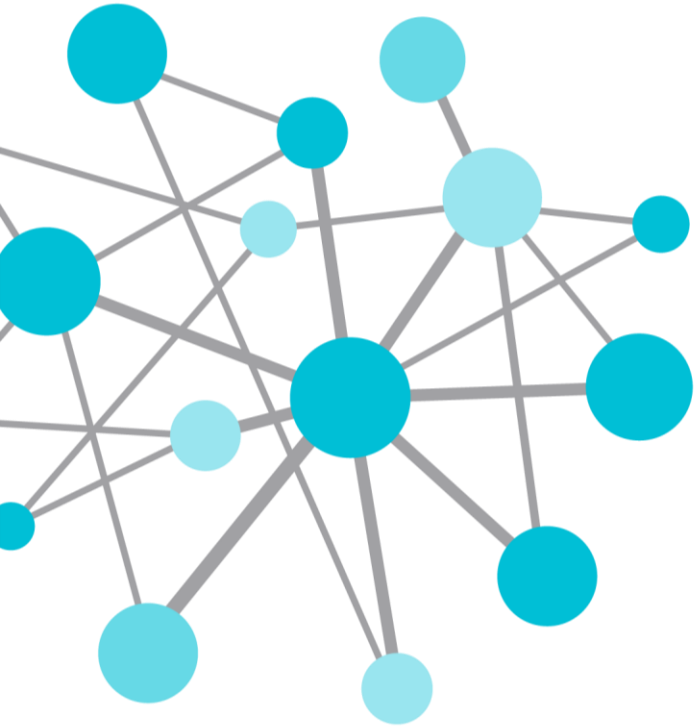
Questions

Please wait for the **microphone** before asking your questions

State your **name & company**



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