

Integrated Asset Management using GIS for Water & Sanitation Utilities

– An effective way of increasing service reliability
and overall business performance

Presenter: Dr. Dinos Constantinides

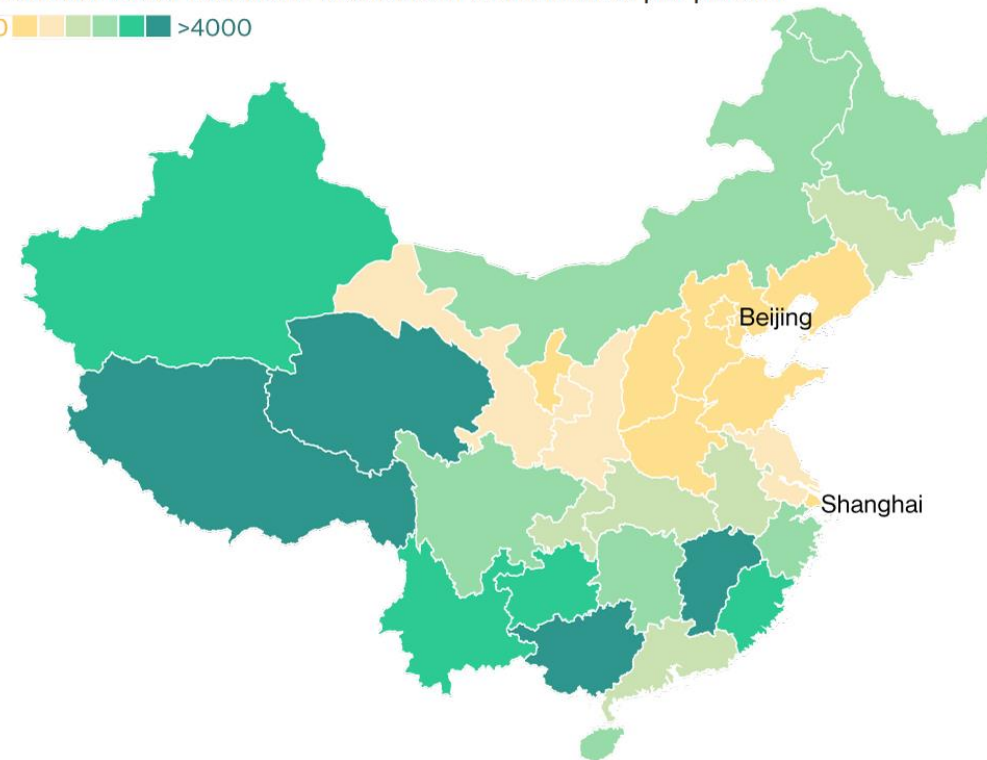
Introduction

- ❑ Annual investments in Water & Sanitation infrastructure in China amounted to over CNY 500 billion over the last few years. They are expected to increase due to China's plans to address water pollution, secure its water supply and reduce degradation of its infrastructure.
- ❑ As a result, Chinese Utilities are starting to realize the importance of improving their asset management and operation management practices.
- ❑ The best way to face this challenge is the introduction of best practices in integrated asset management (IAM).
- ❑ Hydro-Comp has joined hands with Supermap to provide innovative, GIS-based IAM solutions specifically designed for water service providers.
- ❑ The presentation looks at available technology, best-practices and a practical approach, towards building capacity for AM. All aspects of AM are dealt with.

Drying Out






Total annual water resources available in cubic metres per person

<500    >4000 

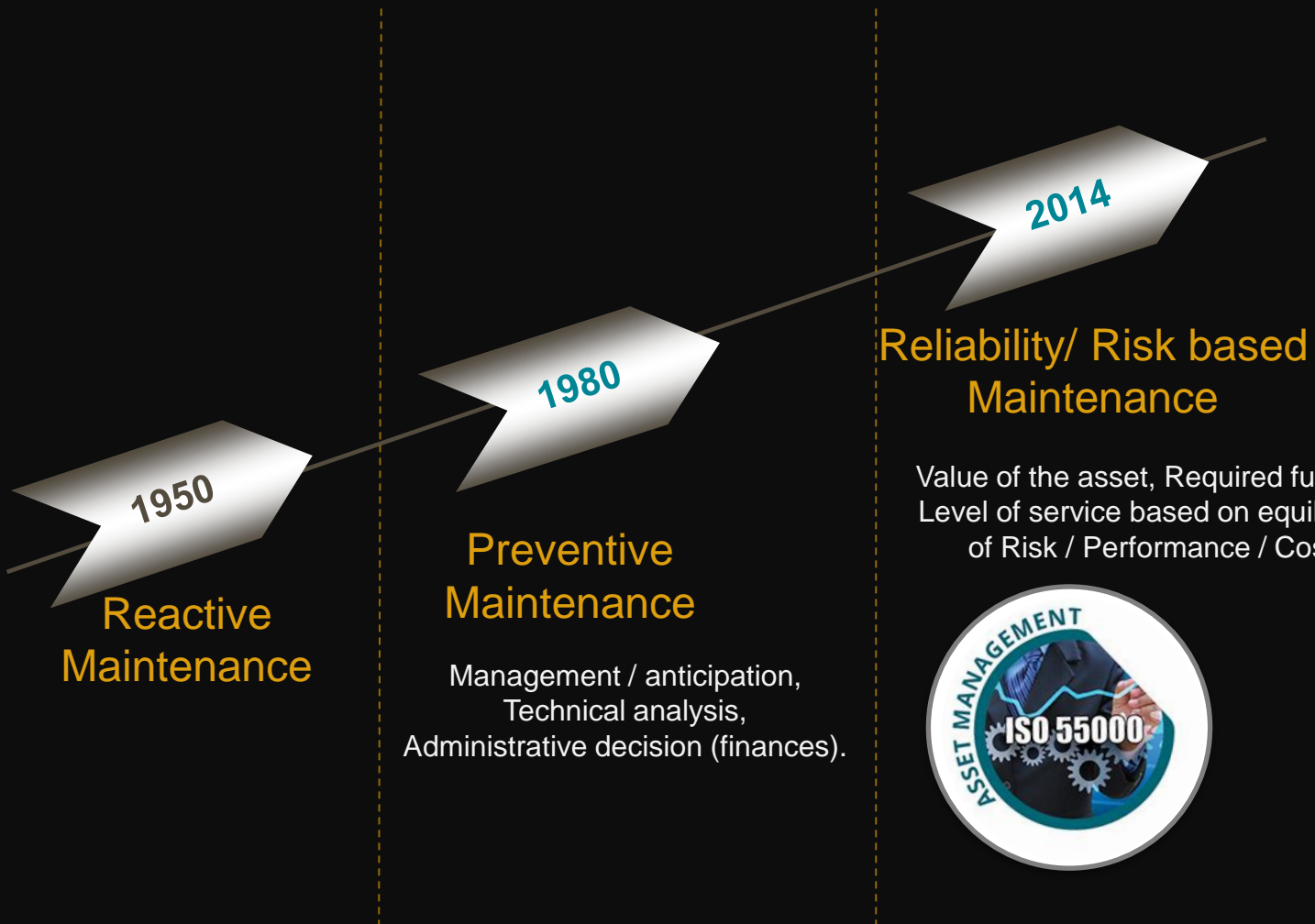


Note: Global average is 5,922 cubic meters. UN defines anything below 500 cubic meters as "absolute scarcity."

Source: National Bureau of Statistics of China, United Nations, World Bank

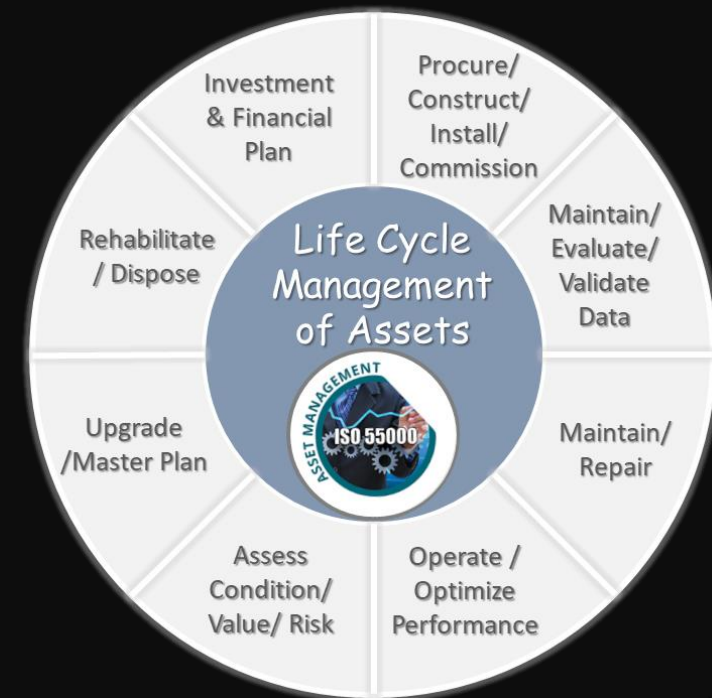
-  What is Asset Management ?
-  AM Methodology Overview
-  AM Practices & EDAMS AM Systems
-  Experience in AM – Case Studies
-  Benefits of AM

What is Asset Management ?



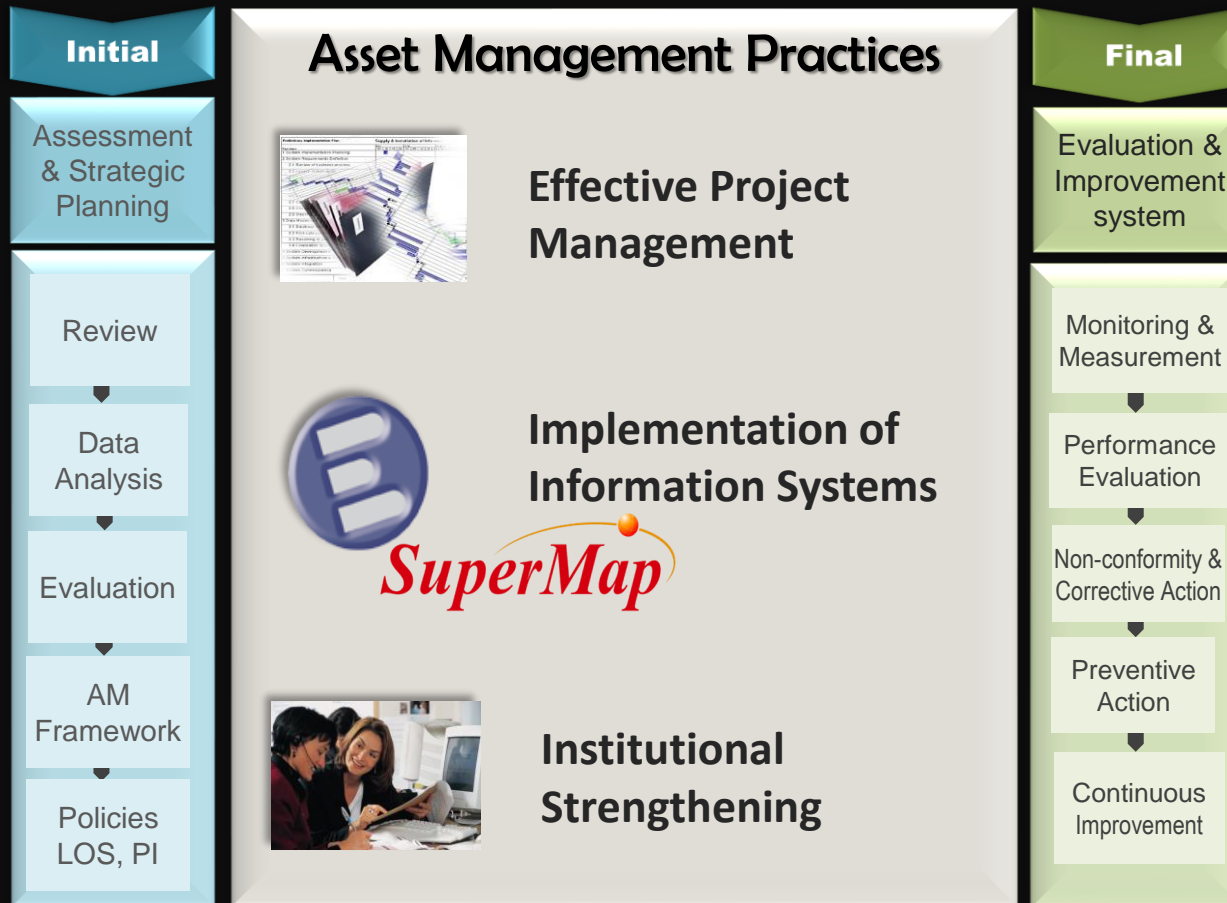
Adopted International Definition by Hydro-Comp:

”An integrated approach to monitoring, operating, maintaining, upgrading, and disposing of assets cost-effectively, while maintaining a desired level of service and improving overall business performance.”



AM Methodology Overview

Integrated Approach



Hydro-Comp has developed a PROCEDURE for transforming the Utility, an AM Framework for Utility AM practices and the TOOLS the Utility needs to carry out effective and sustainable AM within the framework of the Standards.

Includes 3 stages

- Initial: Assessment & Strategic Planning
- Implementation of Asset Management Practices
- Final: Implementation of an Evaluation Improvement system

AM Methodology Overview

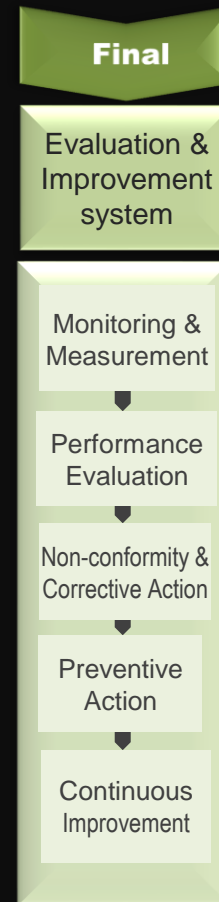
Initial Stage - Assessment & Strategic Planning



- The **AM Framework** results from findings of the Review, Data Analysis & Evaluation activities. It defines the actions to be taken.
- An **AM policy** must be formulated outlining the objectives, expectations, activities and behaviors that will be used to guide the application of AM across the organisation.
- **Level of Service Goals** must be defined in line with what the stakeholders, customers and employees can expect.
- **Standards & Procedures and Data Requirements** have to be defined and implemented in the AM systems deployed under each AM Business Function

AM Methodology Overview

Final Stage - Implementation of an Evaluation Improvement system

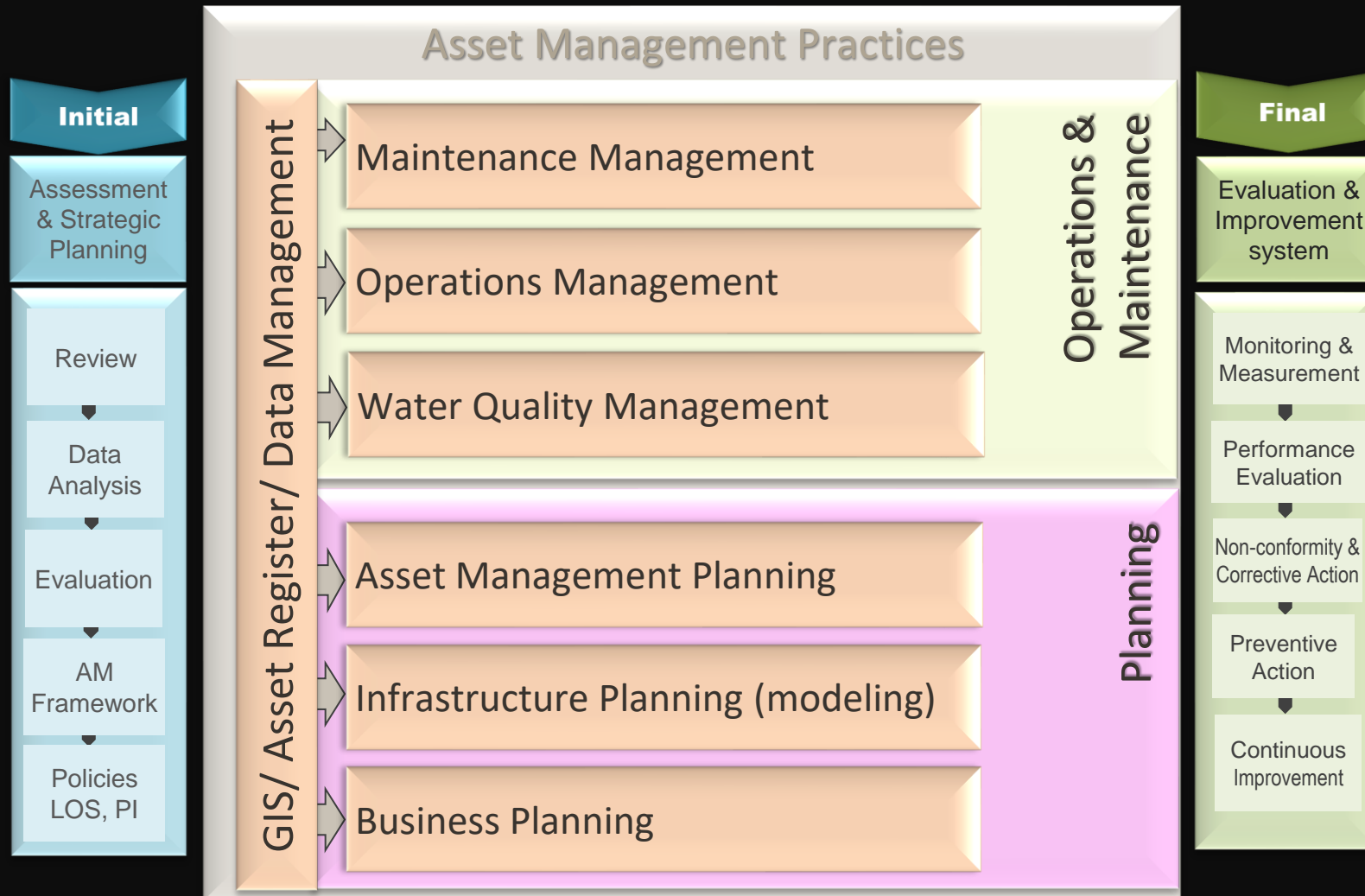


An **Evaluation & Improvement System** is important to enable sustainability and further improvement of the undertaking.

It must be applied to continuously monitor and evaluate performance of both the Utility and the AM project itself.

AM Methodology Overview

Implementation of Asset Management Practices



The EDAMS-Asset Management Software address all AM Practices relating to the different Utility departments.

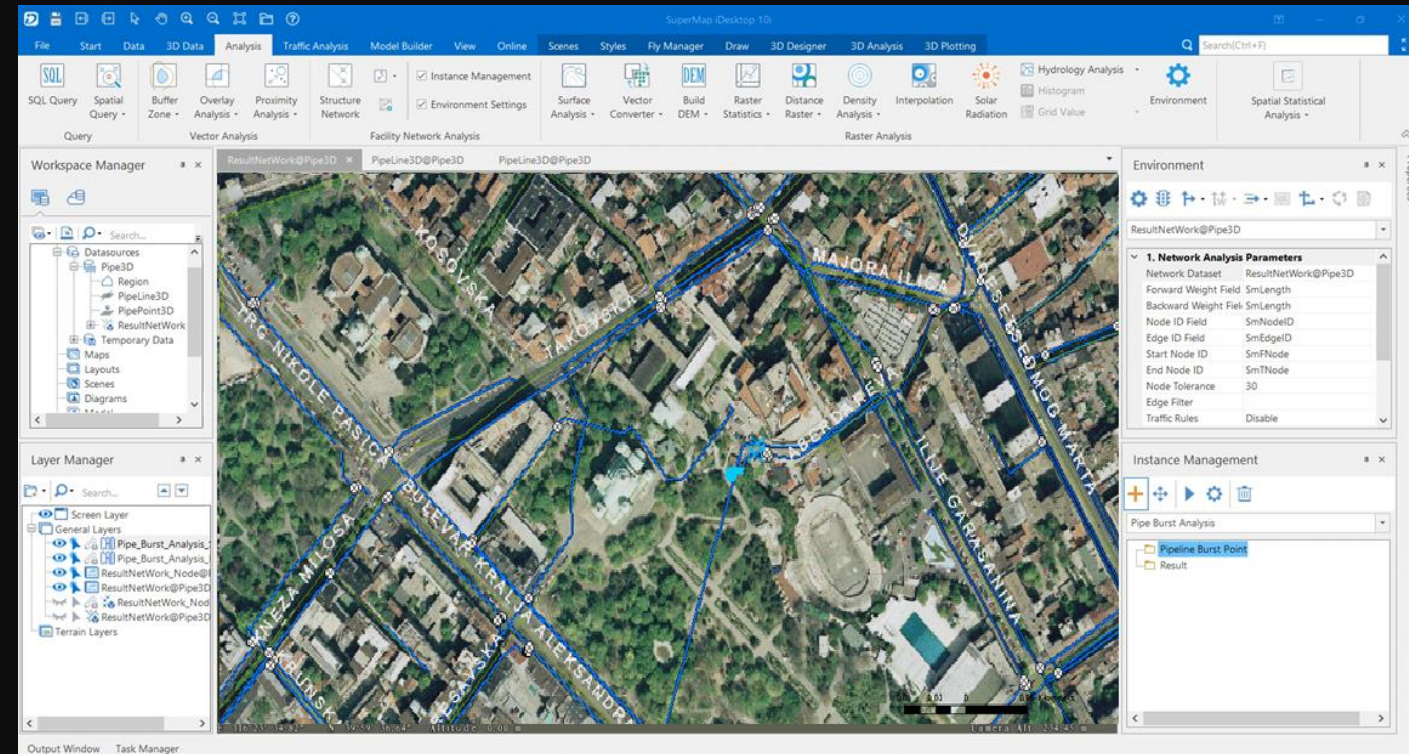
It employs a single data model enabling inter-departmental integration & demand management functionality

It further integrates with the Utility's Financial & Procurement systems to address AM related activities as well as Telemetry systems to receive information

EDAMS Product Overview

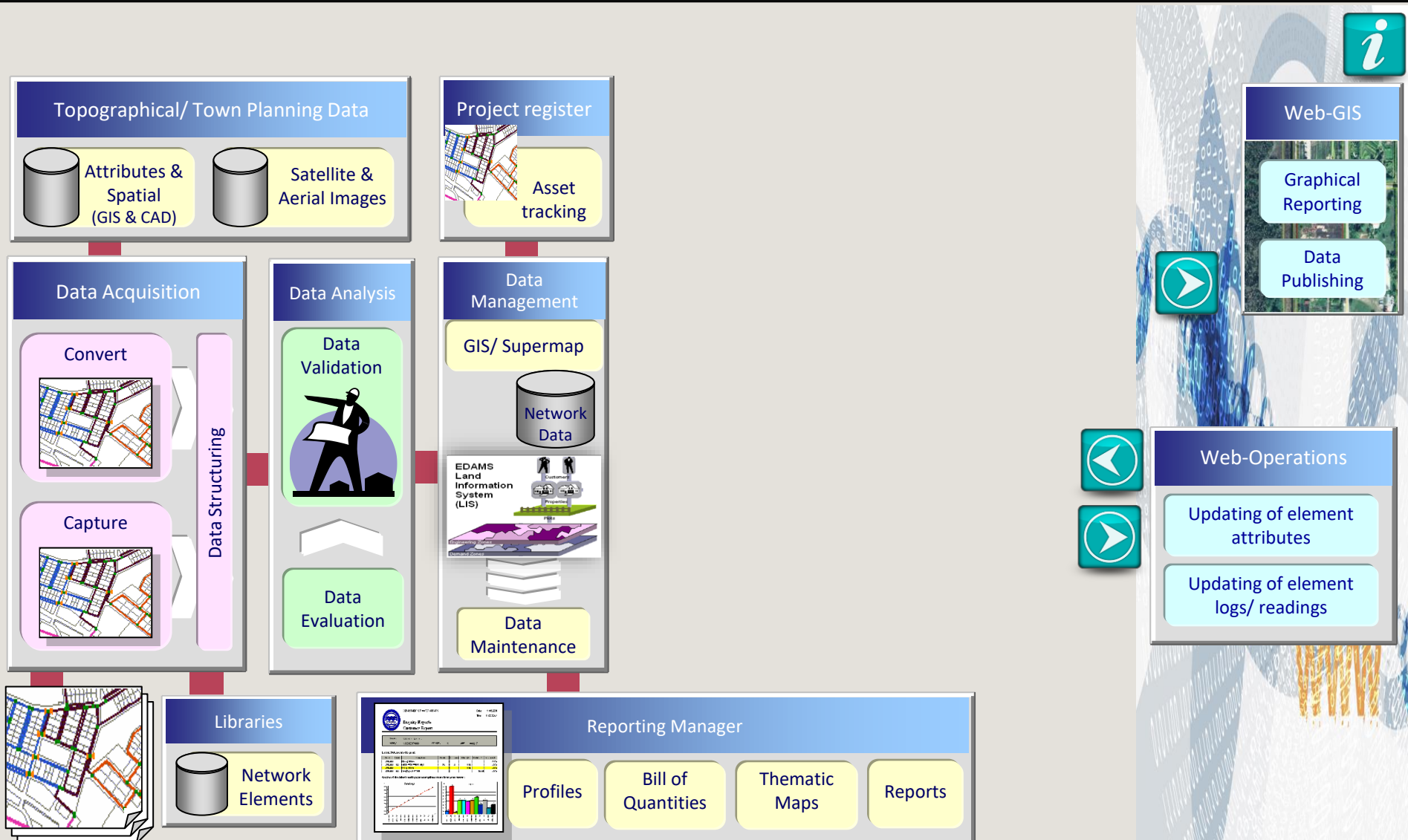
Use of GIS in EDAMS Products

- ❑ Hydro-Comp has recently joined forces with SuperMap to provide integrated GIS-based solutions with future insight and advanced technology for Utility Management
- ❑ SuperMap is a China based, Geographic Information System (GIS) software products and services provider. SuperMap has the 3rd largest share in global GIS market, and the 1st largest share in Asia GIS market
- ❑ All SuperMap products are being fully integrated to the EDAMS suite of products



AM Practices

EDAMS-Data Management System (GIS/ Asset Register)

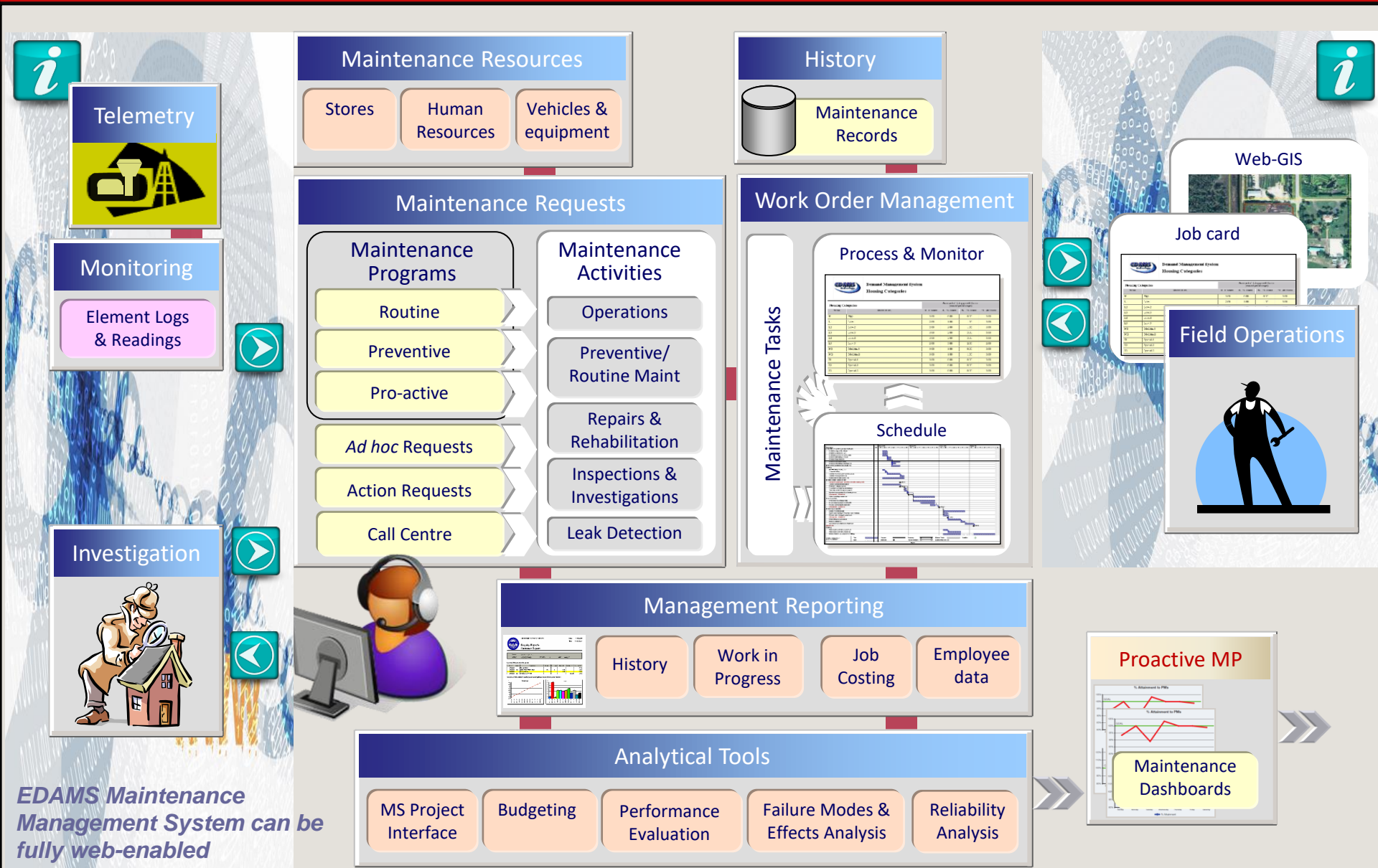


EDAMS Data Management is an industry specific Asset register and network infrastructure management system

Its main purpose is the compilation of a validated asset register with geographical reference, stored in a robust geographical database, important for the purposes of Operations, Maintenance, Asset and Distribution Management



AM Practices: EDAMS-Maintenance Management - Overview



Main purpose is:

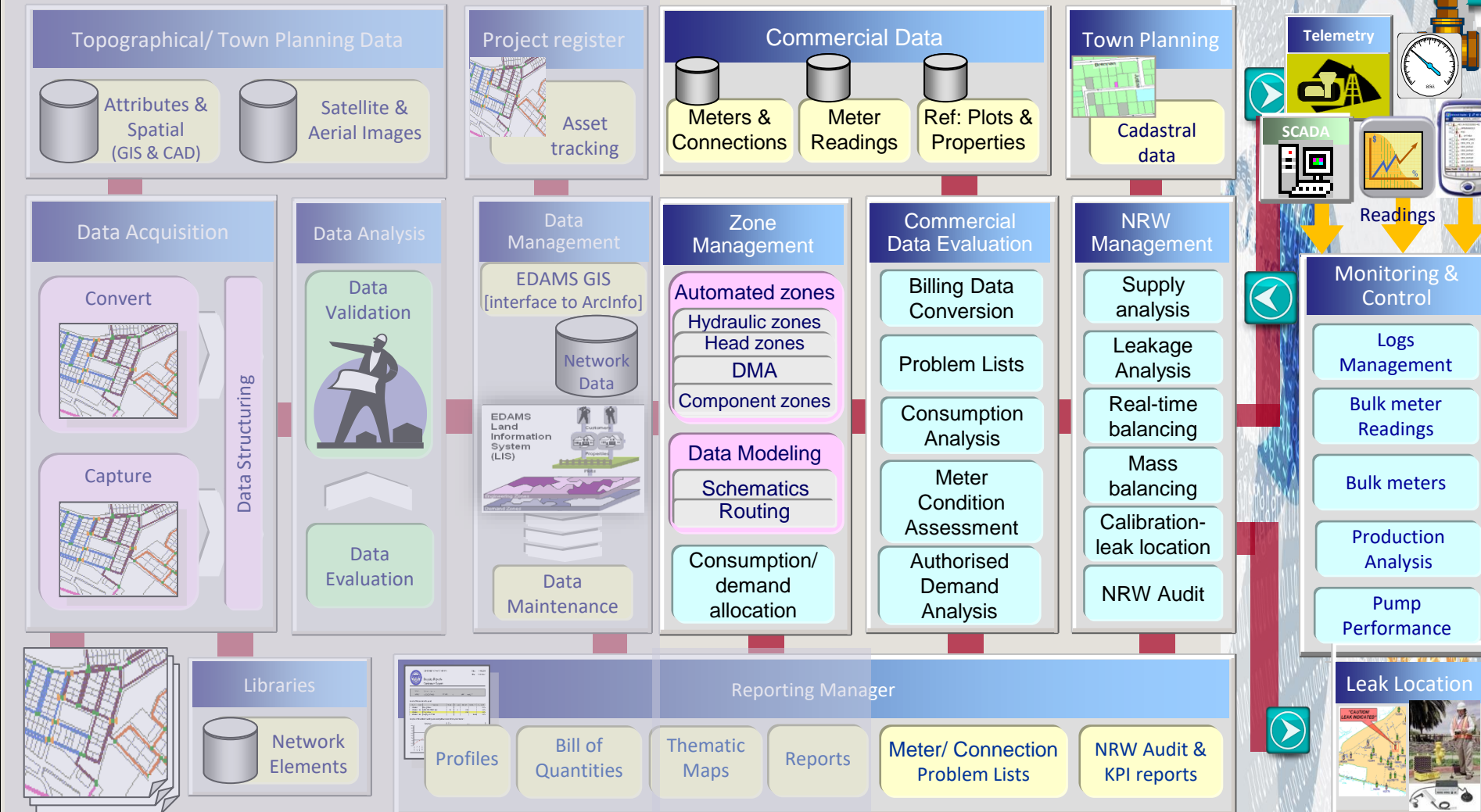
- the improvement of productivity and efficiency of the maintenance function,
- the improvement of service delivery (less breakdown time) and
- the collection of Maintenance records/failure records for condition assessment purposes

Implementation addresses People, Processes and Systems to enable industry specific best practices.

EDAMS Maintenance Management System can be fully web-enabled

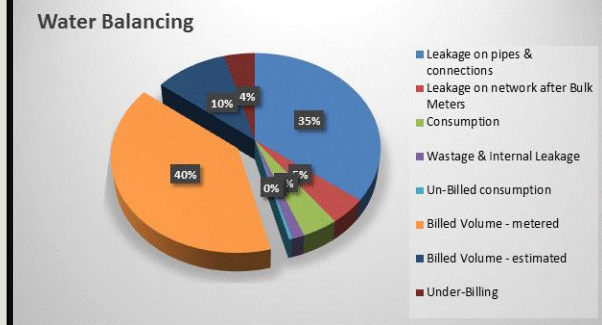
AM Practices: EDAMS-Operational Management - Overview

Uses Network Data Management as base



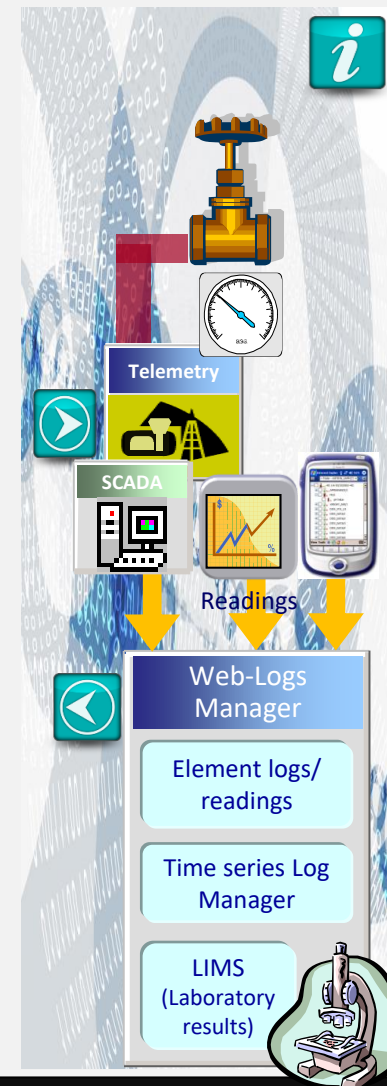
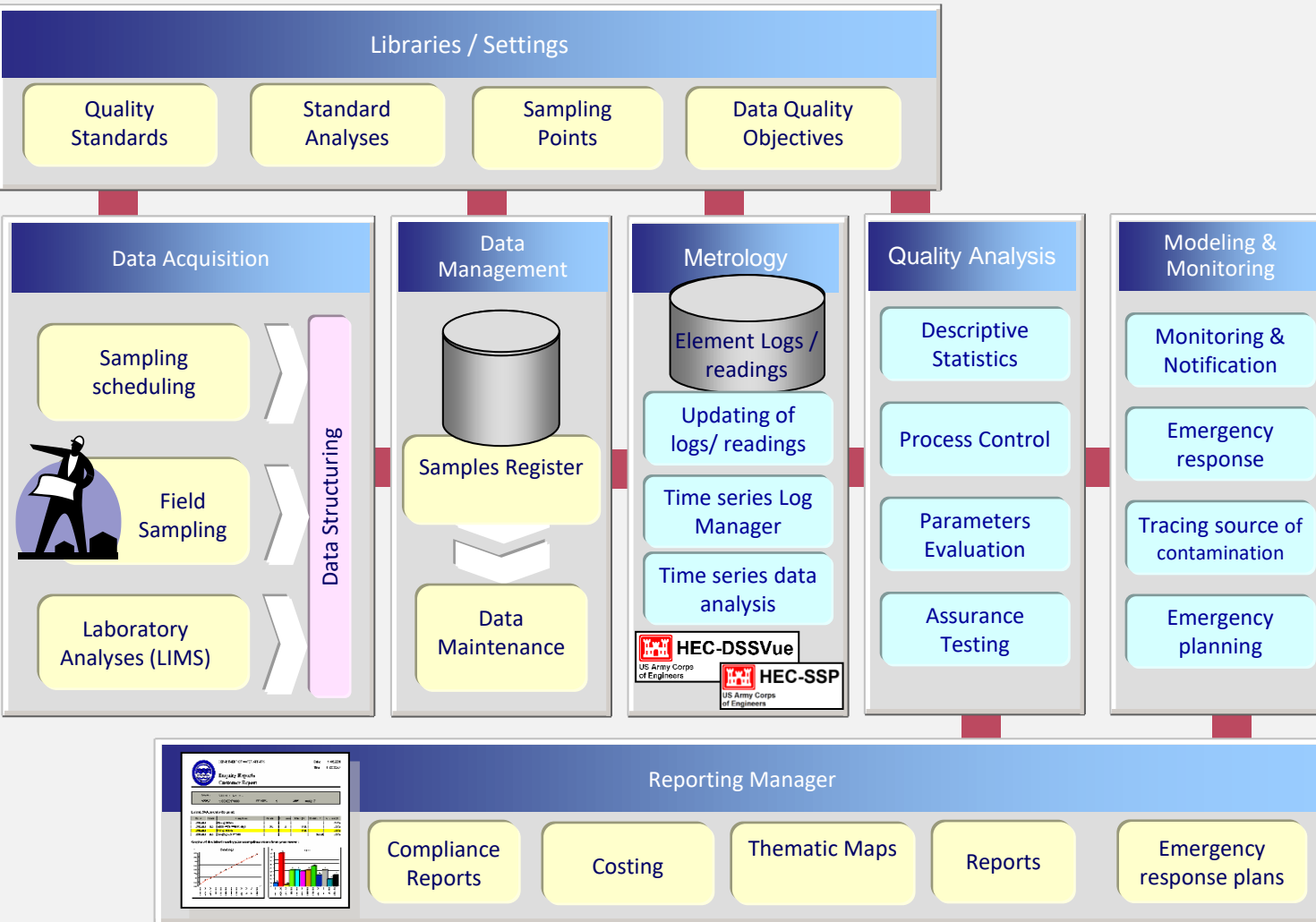
Main purpose is:

- to ensure proper service delivery (quantity and pressure)
- to operate pumps cost effectively
- to identify, localize and quantify system losses (leakage) and
- to ensure compliance with legislation.



AM Practices: EDAMS-Water Quality Management Overview

EDAMS Quality Management system can be used by itself or in connection with Data Management system



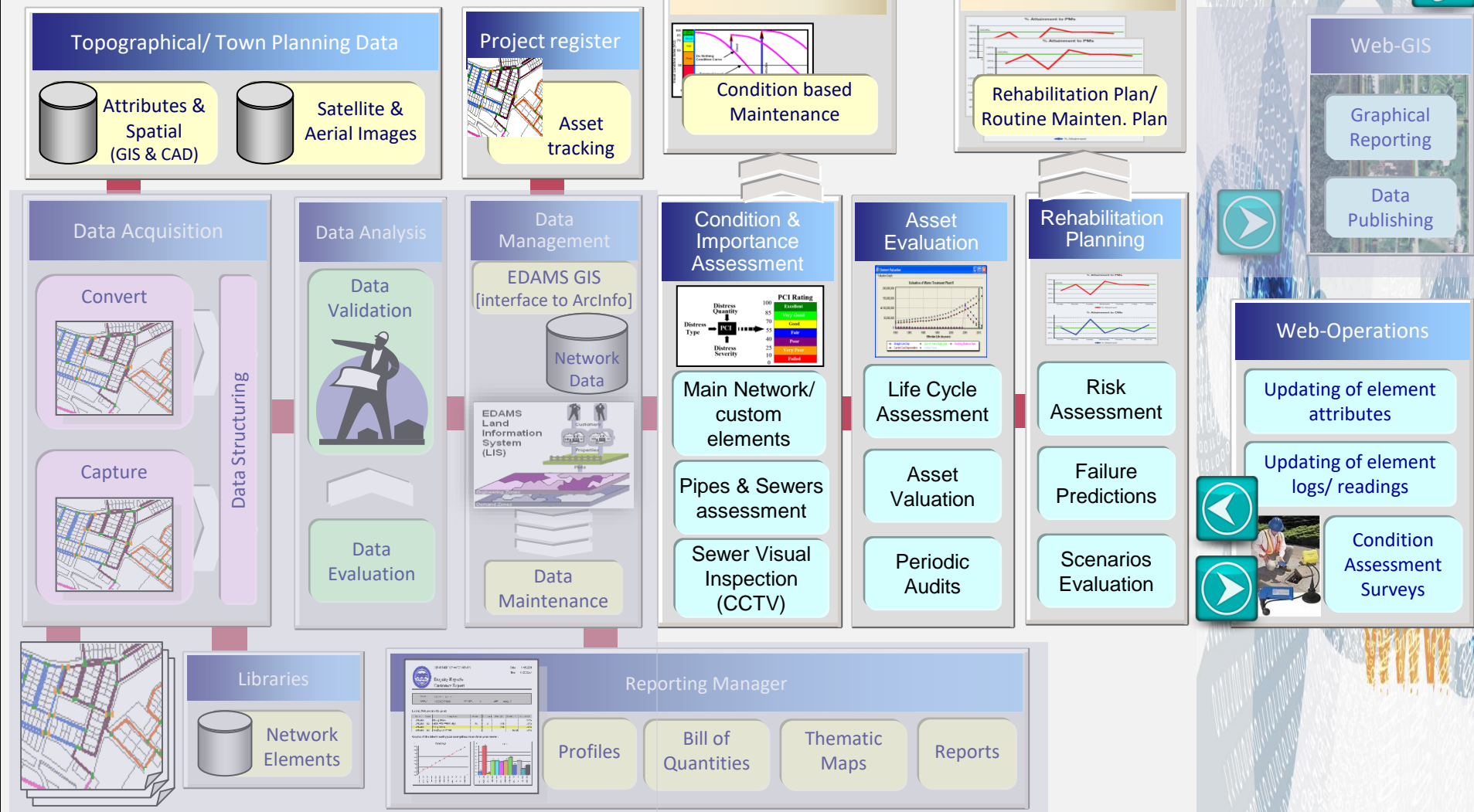
Purpose:

- to improve water service provision (quality)
- to ensure quick emergency action in case of contamination and
- to ensure compliance with legislation.

AM Practices: EDAMS–Asset Management Planning (AMP)

Overview

Uses Network Data Management as base



Purpose: The main purpose of AMP is to:

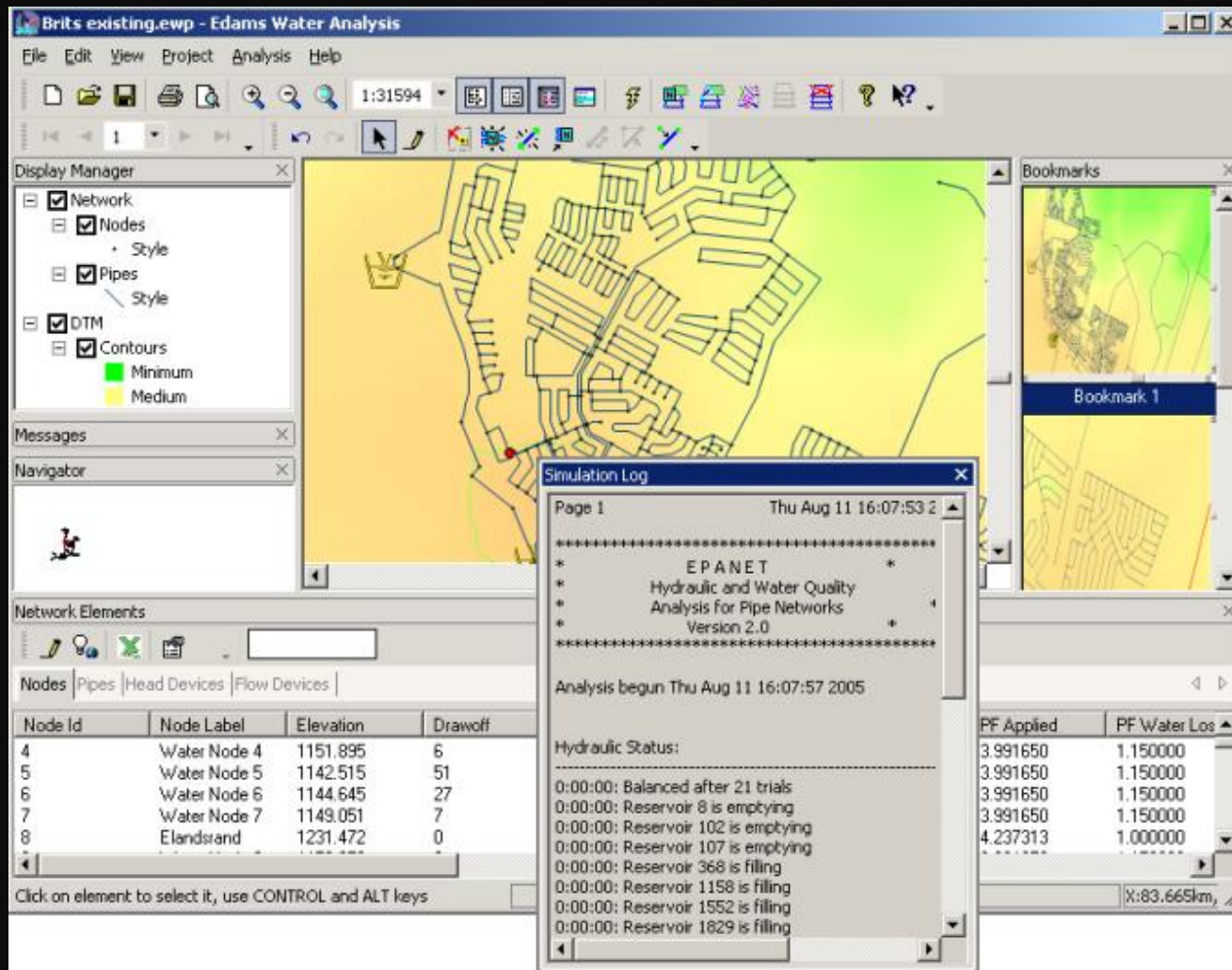
- Minimize the cost of ownership of the existing assets,
- Minimize the risk of failure/ Improve reliability
- Maintain/ Improve required level of service
- Sustain the infrastructure in a proper working condition

Output: The main output is in the form of two plans:

- Rehabilitation Plan (replacement, refurbishing)
- Routine Maintenance plan.

AM Practices: Infrastructure Planning

EDAMS–Hydraulic Modeling - Overview



A fully-functional Hydraulic Modeling system for the accurate evaluation of water & sewage networks offering full analysis functionality with flexible visualisation, GIS and CAD database access, and powerful digital terrain modelling

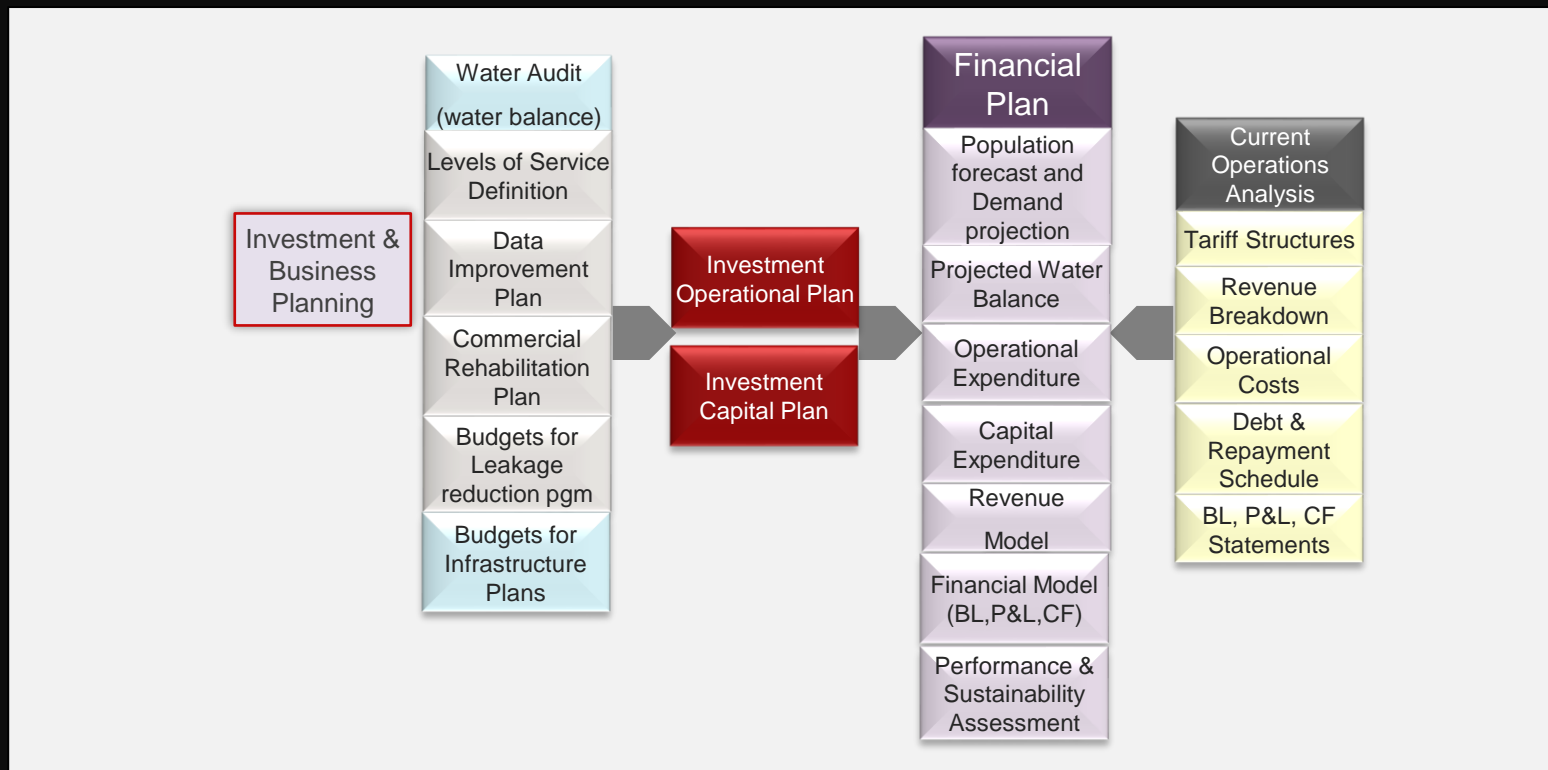
Hydraulic Modeling is needed for comprising :

- ❑ **Upgrading Plan:** Optimising infrastructure performance issues; stabilizing pressures; design of District Management Areas (DMA)
- ❑ **DMA implementation plan and commissioning**
- ❑ **Emergency Response Plan:** contamination, large leaks, breakdowns, etc.
- ❑ **Shutdown & Outage Management Plan:** for maintenance works or intermittent supply for demand conservation purposes.
- ❑ **Master Plan (CAPEX)**

AM Practices

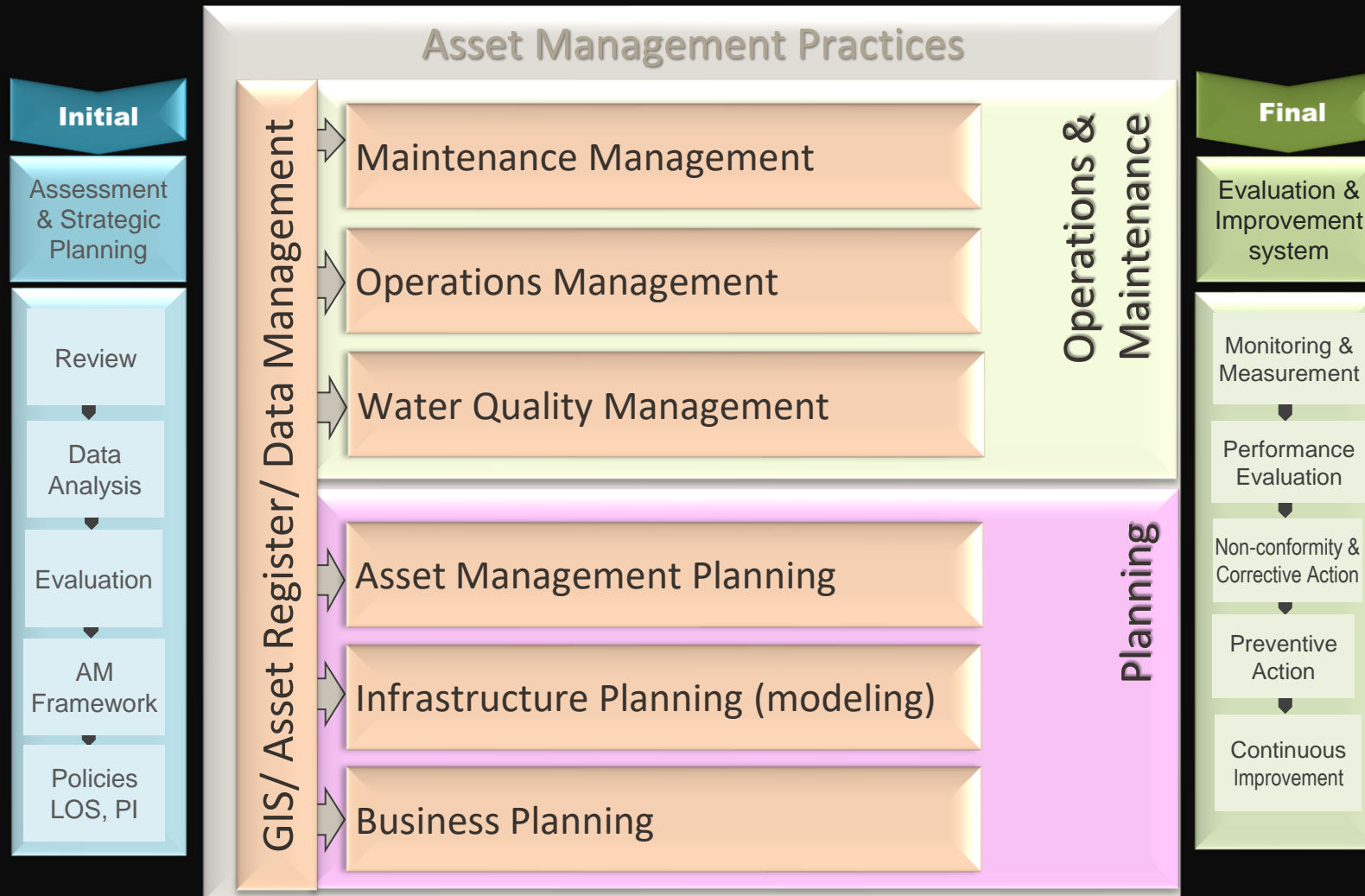
EDAMS-Business Planning

- Various information from all departments/ systems come together to produce the financial plan
- Enables Providers & Funding organisations to assess the performance and sustainability of the Provider's future operation and its ability to repay loans, as a result of implementing an Investment Plan made up of interventions proposed through carrying out effective AM.

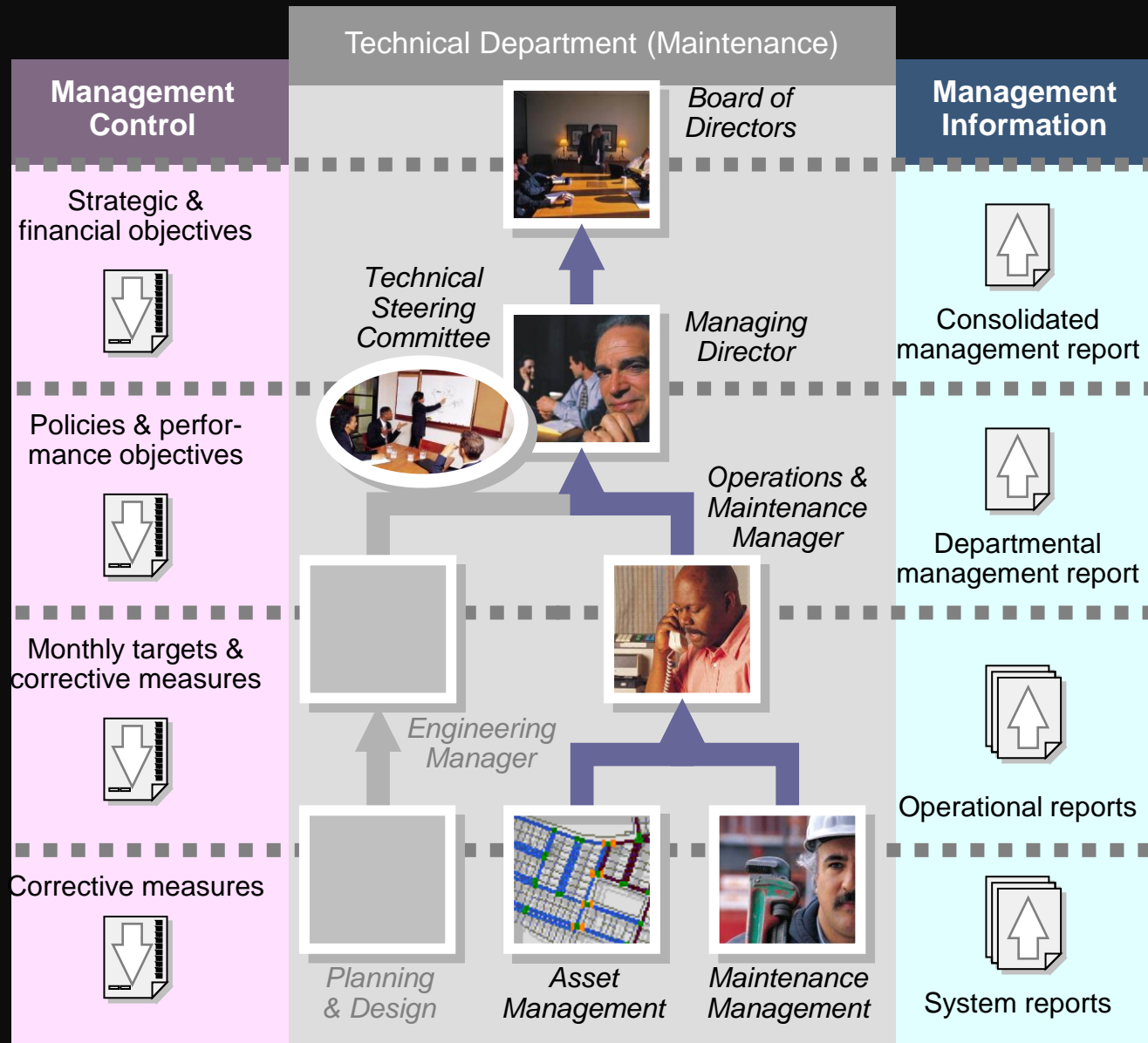


AM Methodology Overview

Summary Overview



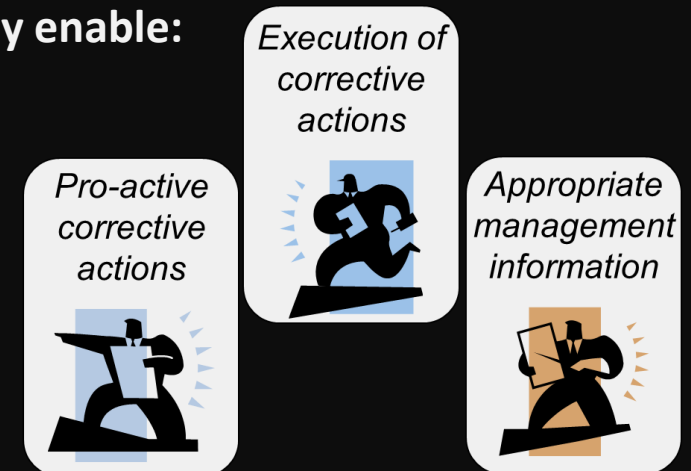
Evaluation & Improvement - EDAMS - Management Reporting



A set of standard Reports are designed for each business function.

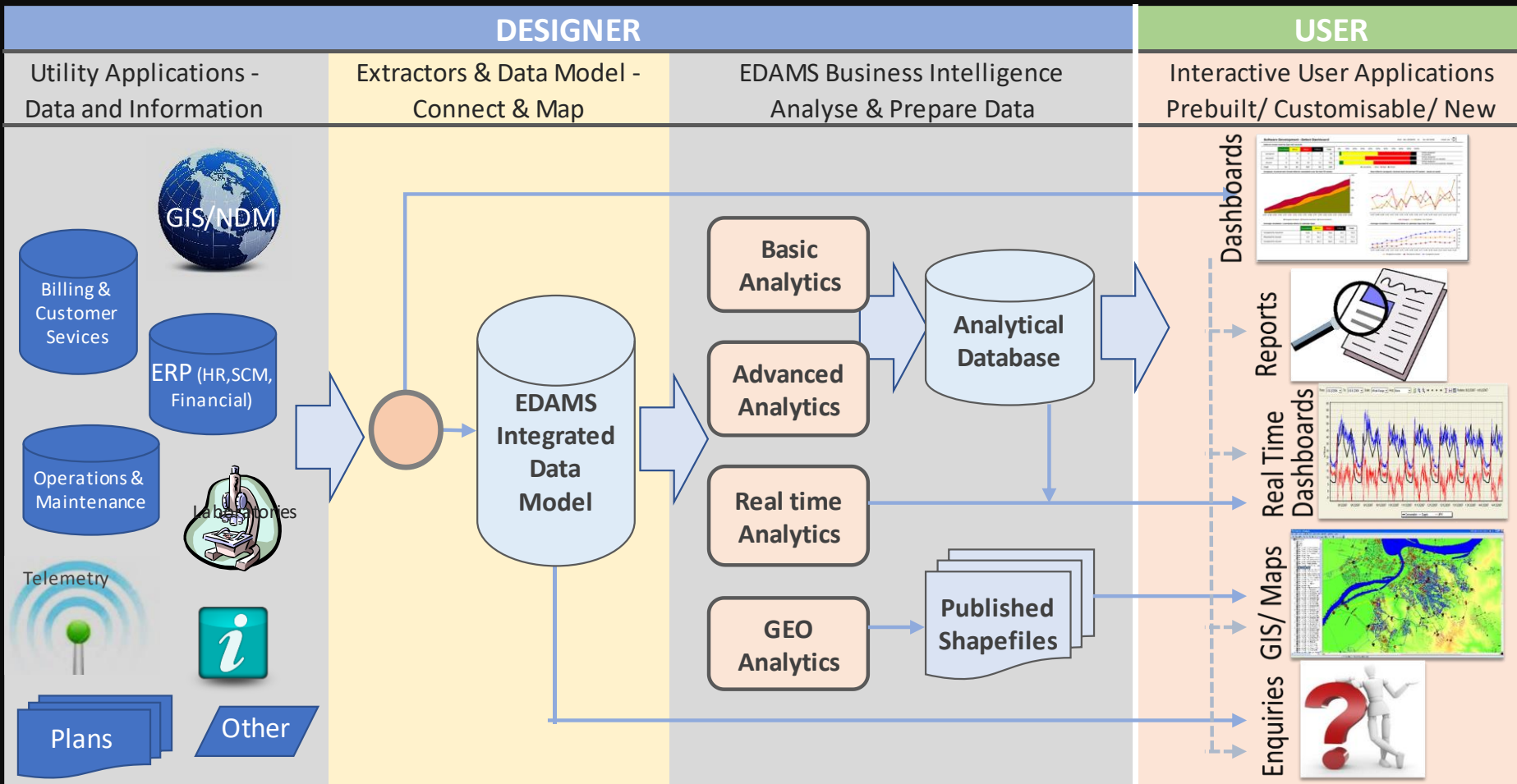
They are structured in such a way so as to satisfy: operational, middle and senior management, Levels of Service and AM Evaluation & Improvement requirements

They enable:



Evaluation & Improvement

EDAMS - Business Intelligence



EDAMS Business Intelligence system analyses and prepares the data utilizing the EDAMS Integrated Data Model.

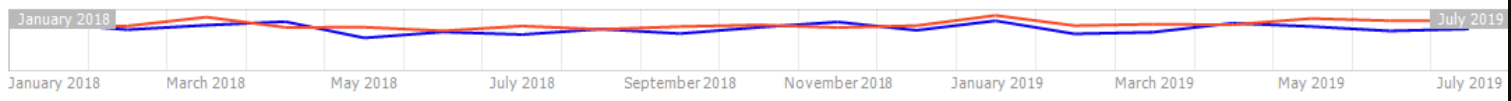
The Management Reporting engine can publish the reports in a number of formats including

- (a) Crystal Reports
- (b) Dashboards
- (c) Ad-hock Queries
- (d) Thematic Mapping

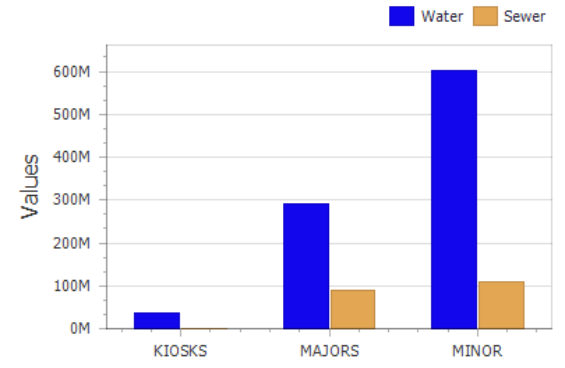
Evaluation & Improvement - EDAMS - Business Intelligence

Dashboard

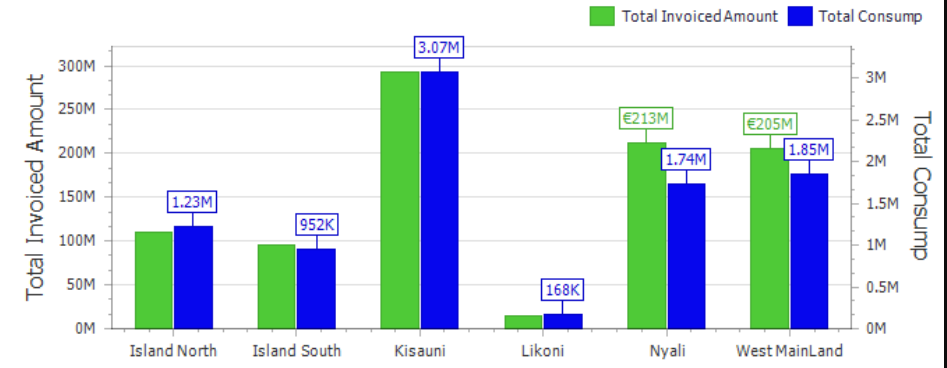
Areas Map - Water



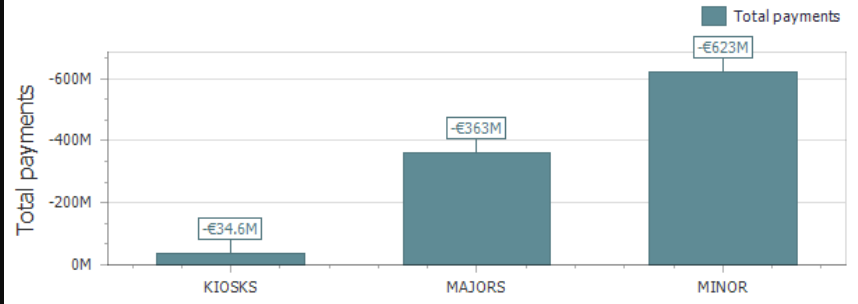
Water & Sewer per Customer Type



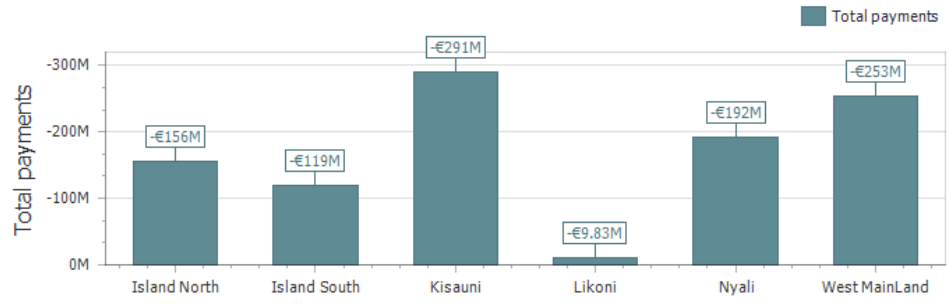
Invoiced Amounts & Consumption per Area



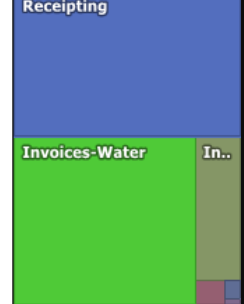
Total payments per Customer Type



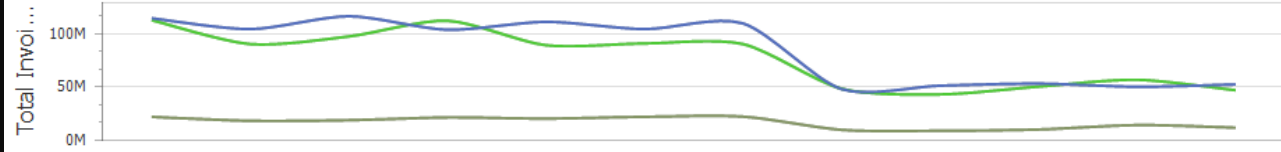
Total payments per Area



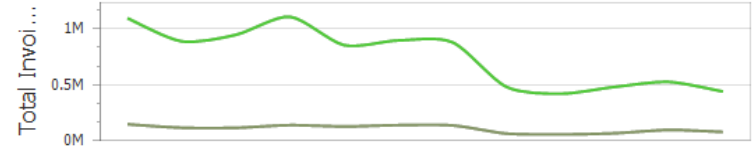
Total Amounts...



Amounts per Transaction type over period



Consumption per Transaction type over period



Case Study - SEEAM Project

Hydro-Comp in a Strategic Partnership Agreement with GIZ (German Government) is currently carrying out a 5-year program offering AM capacity to small and medium sized utilities in South Eastern Europe through the use of EDAMS AM software on the Cloud

This program provides direct technical assistance, a state-of-the-art software solution and extensive capacity building for AM to Water utilities in 6 countries namely Bosnia and Herzegovina, Serbia, Macedonia, Montenegro, Albania and Kosovo.



implemented by **giz**

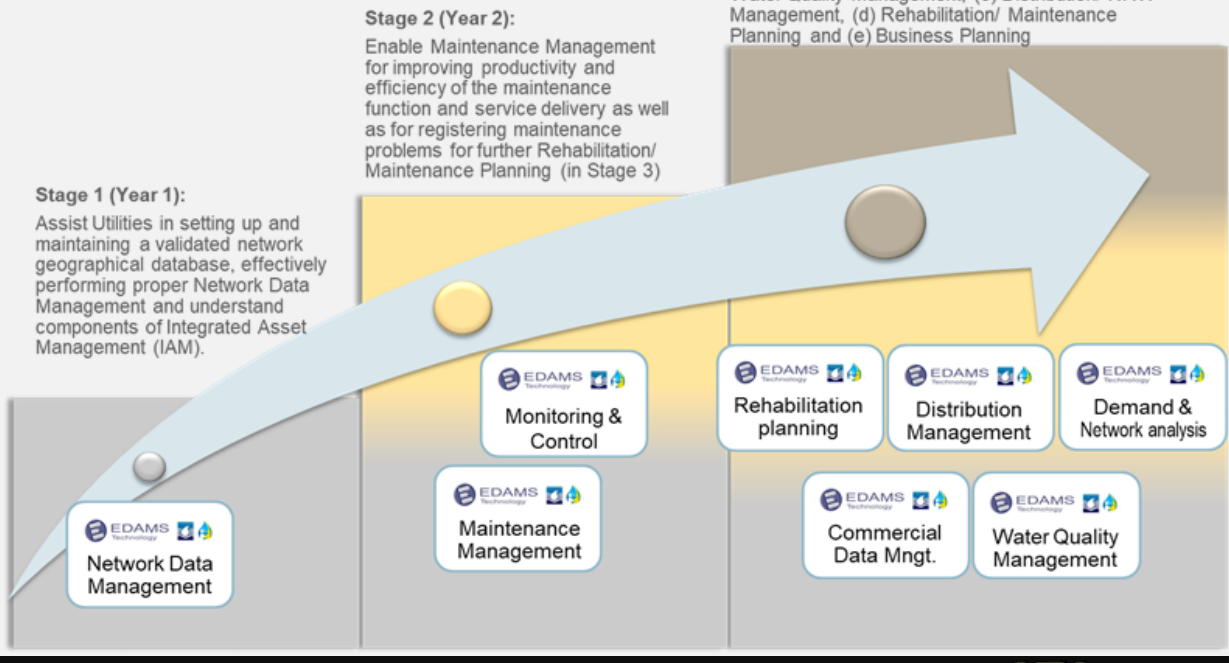
Albania Kosovo

2019 - 2021

Montenegro North Macedonia Serbia Bosnia and Herzegovina

2017 - 2021

SEEAM Project



Case Study - SEEAM Project

AM solutions are systematically introduced to the participating utilities through three stages.

- ❑ Silver Stage: GIS/ Network Data Management (122 Utilities)
- ❑ Gold Stage: Maintenance Management (67 Utilities)
- ❑ Platinum Stage: Asset Management and Distribution, Non-Revenue-Water Management (31 Utilities)

Silver Stage – 2017, 2018, 2019 & 2020



Gold Stage – 2018, 2019 & 2020



Platinum Stage A – 2019 & 2020



Platinum Stage B – 2019 & 2020



Case Study - Lusaka, Zambia

Further to supplying all the EDAMS Management Information Systems, Hydro-Comp completed in a joint venture with Seureca Veolia the contract on AM Technical Assistance to Lusaka Water & Sewerage Company (LWSC) funded the Millennium Challenge Account-Zambia (MCA-Z).

The project provided knowledge transfer and practical support to LWSC and its staff, on the organization's journey towards Asset Management Excellence in line with ISO 5500 standards. In many cases the project entailed capacity building for the proper operation of the EDAMS systems. Project components included:


- 1) Formulating AM Policy
- 2) The building of a solid Technical database and Financial Asset database
- 3) Implementing Maintenance Management
- 4) Implementing AM Planning
- 5) Implementing Investment Planning and Business Planning
- 6) Formulating and monitoring a Strategic Asset Management Plan



Case Study - Implementing & Insourcing of AM systems in Nelson Mandela Bay Municipality, South Africa

The Nelson Mandela Municipality with the assistance of Hydro-Comp implemented an EDAMS - Integrated Asset Management system, encompassing: GIS, Operations & Maintenance, Quality Management, Call Centre, & Network analysis software for the Water supply and Sanitation Divisions

The system with over 100 users, over the last 8 years, is been supported by in-house Hydro-Comp personnel ensuring proper operation and maximum system efficiency.



nelson mandela bay
MUNICIPALITY
PORT ELIZABETH | UITENHAGE | DESPATCH

INFRASTRUCTURE & ENGINEERING

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Our Ref: 18/1/1/R; 2/8/1/1 Fax: +27(0) 506-2180
Date: 21 September 2018 e-Mail: jtsatsire@mandelametro.gov.za
Who deals with this: MR J TSATSIRE/AN

To Whom It May Concern

Dear Sir/Madam

PROJECT: IMPLEMENTATION OF EDAMS-WQMIS/LIMS SYSTEM

Nelson Mandela Municipality (Port Elizabeth) is the fifth largest city in population terms and the second largest in terms of area it covers in South Africa. The Municipality is responsible for water supply and sewerage disposal in the area serving a population of over a million people, through approximately 250,000 connections and 3,500 km of pipelines.

Nelson Mandela Municipality awarded Hydro-Comp Enterprises Ltd. in 2012 and 2015 the Phases I and II of the contract for "Operations (outsourcing) of GIS/ Network Asset management, Demand management, MIS and planning functions Water Supply and Sewer disposal departments for Nelson Mandela Municipality "with overall project value of €3,8 million.










Benefits from AM

Overall

Type	Benefit
Improved management	<ul style="list-style-type: none"> • Accurate Technical Asset Register • Effective proactive and preventive maintenance • Data and evidence-based management decisions (job costs; budgeting, performance indicators) • Risk based Rehabilitation and Maintenance planning • Best Practice standards, procedures and workflows • Integrated processes: Overcoming sectorial divisions and integrated collaboration • Permanent change through use of operational systems • Cost-effective investment and business planning • Informed and strategic decision making through reports and Performance Indicators
Better services	<ul style="list-style-type: none"> • Improved Customer services • Improved Service Delivery (Pressures, Quality, less breakdown time) • Quicker maintenance response & more effective emergency & crisis management • Increase customer satisfaction & Improve perceptions
Financial benefit	<ul style="list-style-type: none"> • Increased Revenues • Reduced wastage and internal leakage • Reduced leakage • Reduced production and pumping costs • Reduced maintenance and rehabilitation costs • Better Planning for future investments • Asset Valuation
Higher creditworthiness	<ul style="list-style-type: none"> • Accurate Balance sheet • Non-Revenue Water Audit reports • Operational Cost budget • Capital Cost requirements • Improved financial performance • Sustainable/ Profitable operations • Attain grants and Loans
Enhanced compliance and transparency	<ul style="list-style-type: none"> • Reporting and Performance Indicators • Easy assessment of regulative requirements

Benefits from AM

Quick Wins

-  Raise Utility profile
-  Demonstrate trust, care and confidence
-  Ease political pressure
-  Increase Revenues (Commercial Rehabilitation)
-  Reduced Customer Complaints
-  Generate customers and stakeholders interest
-  Transparency in Good Governance
-  Demonstrate socially responsible and ethical business practices
-  Change people perception and demonstrate how serious the Utility about its business – people will take interest and support the business of AM



Thank You!

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Online Exhibition Stand