

Safe Smart Systems



Water Breakthrough Challenge

What is the Ofwat Innovation Fund?

- Ofwat is the UK's water industry regulator
- £200m Innovation Fund launched in January 2021
- Aim: deliver transformational benefits for consumers, society and the environment



Delivering public value



Operational resilience



Unlocking the power of open data



Climate change



Impact of extreme weather & pollution

Safe Smart Systems



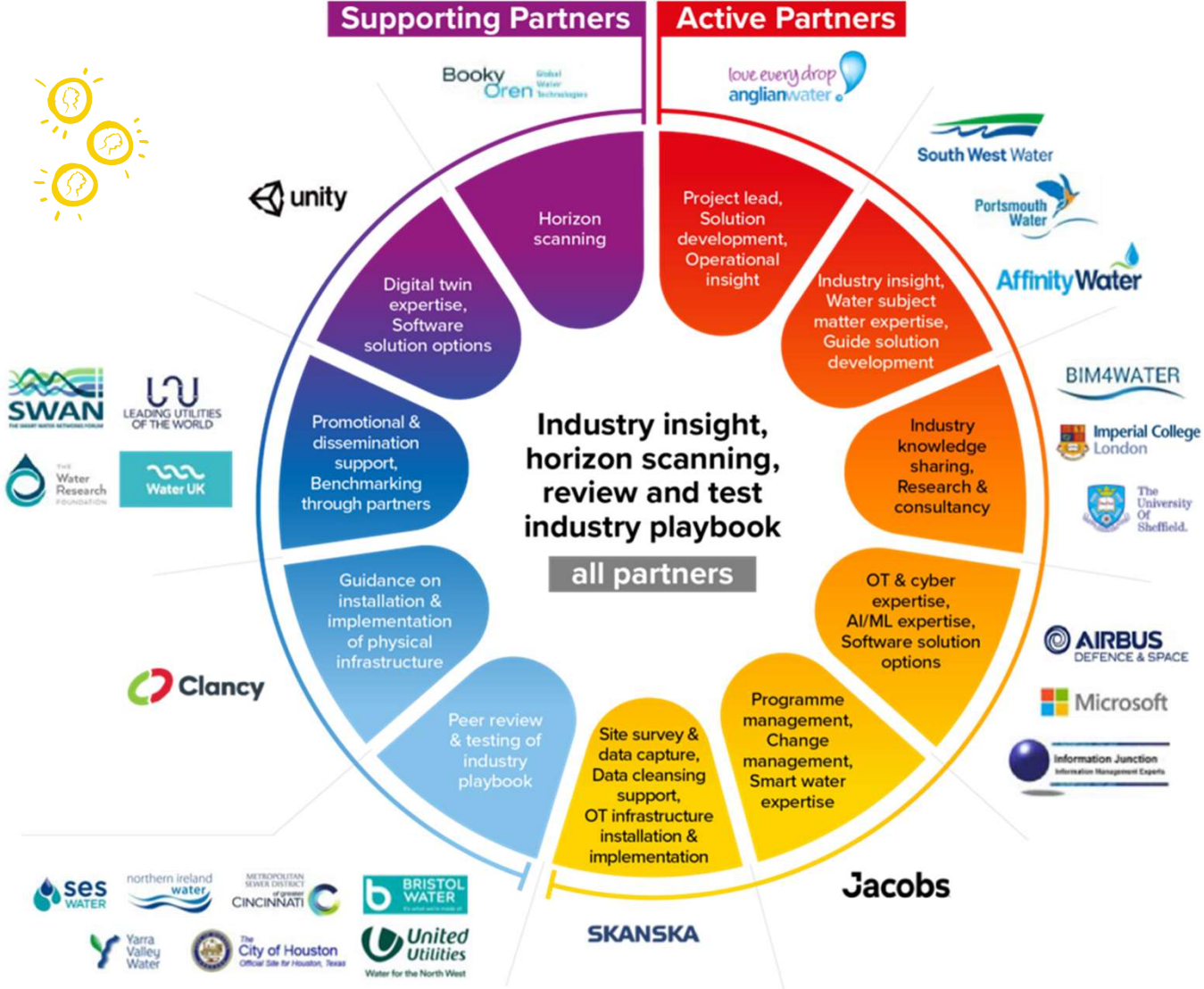
Active Partners



Supporting Partners



Our Partners





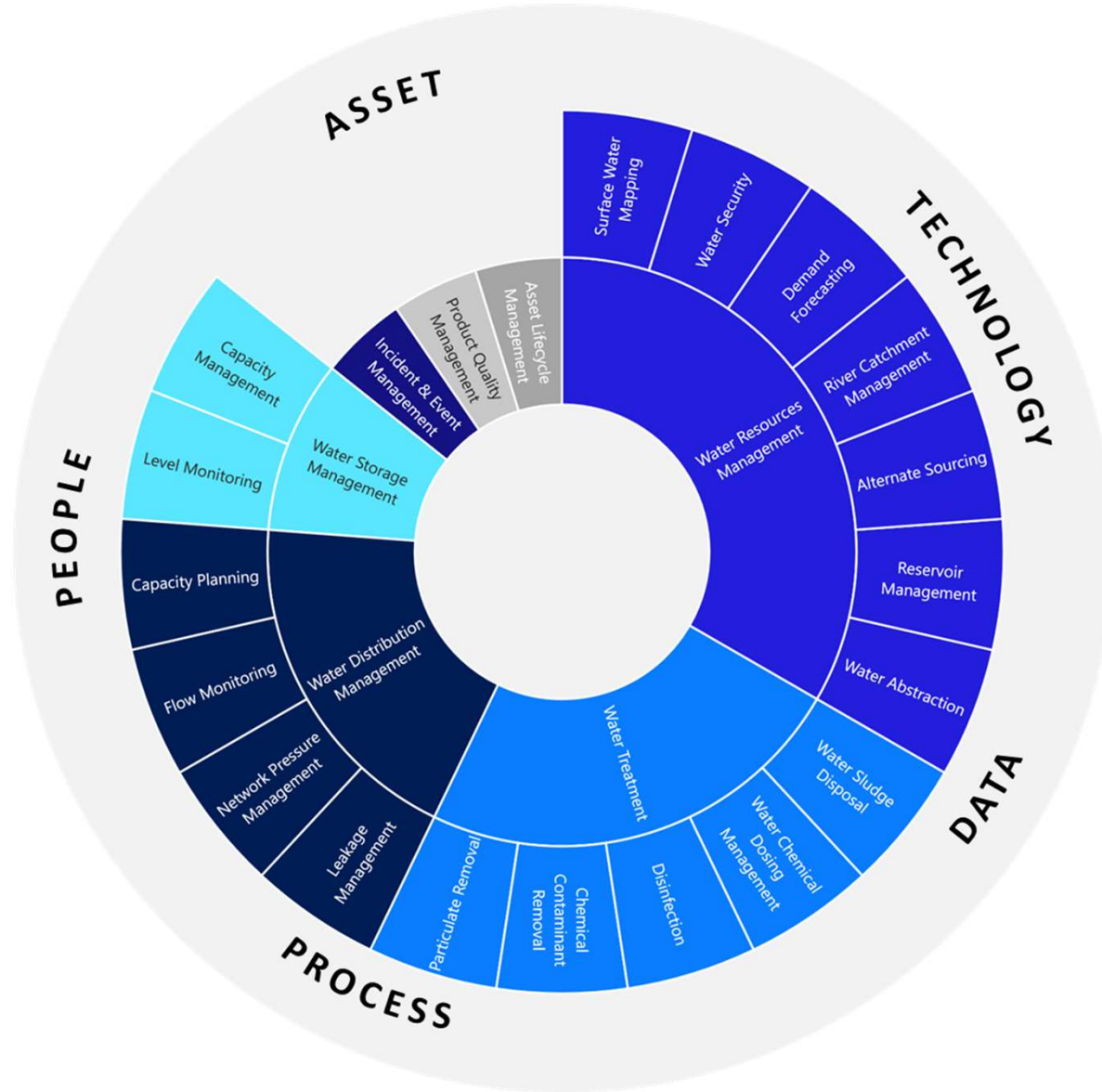
System [*sis-tuhm*]

A connected collection of interrelated and interdependent parts; a complex whole that may be more than the sum of its parts.

A system is influenced by its environment, defined by its structure and purpose, and expressed through its function.¹



¹ Centre for Digital Built Britain and Centre for Smart Infrastructure & Construction, Cambridge [2020] Flourishing systems. Available at: https://www.cdbb.cam.ac.uk/files/flourishing-systems_revised_200908.pdf

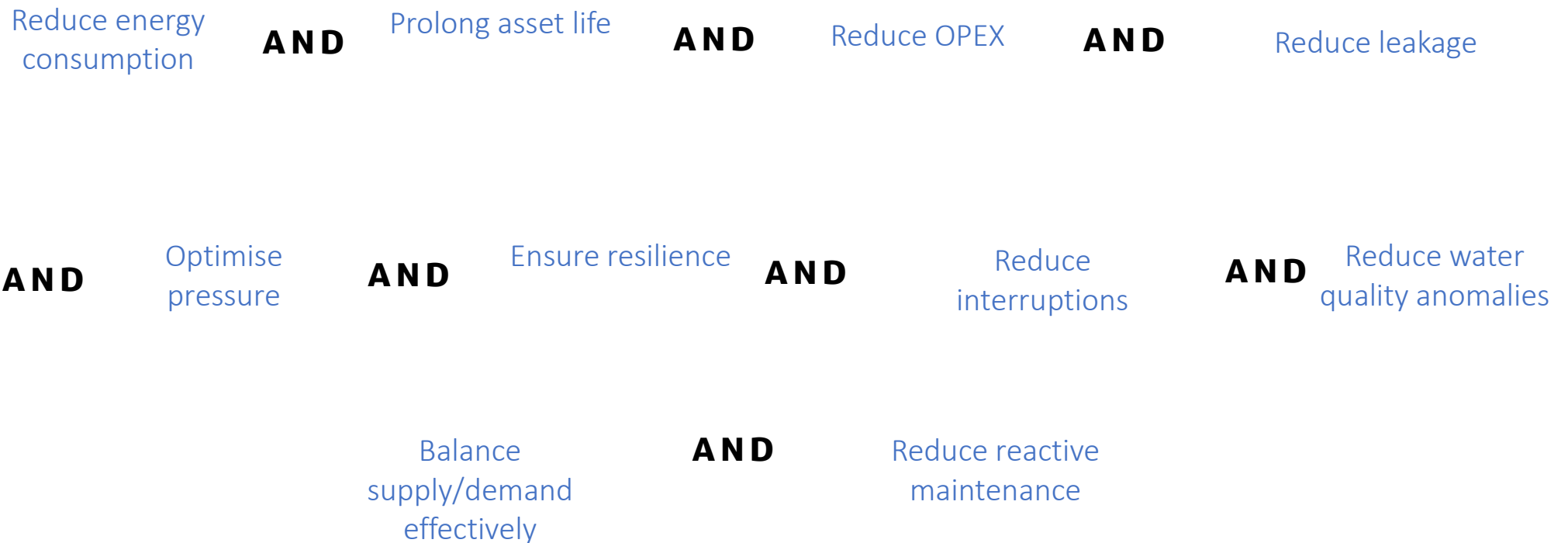


VISION:

An automated, connected system that delivers a clean, sustainable supply of water for future generations.



Increasingly complex and nuanced decision making...



In the face of competing and, at times, opposing priorities a systems-based approach is needed to deliver long-term operational resilience and maximise value for customers, society and the environment.

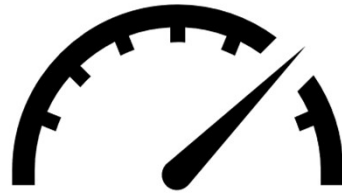
We need to focus on optimal system performance rather than performance of siloed components.



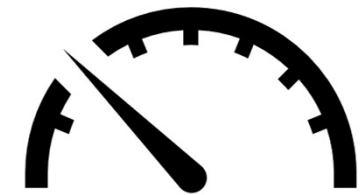
We're asking different questions and needing different answers that optimise multiple outcomes simultaneously. Optimal system performance is dynamic, so how do we operate the dials?



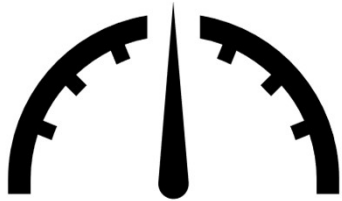
Energy



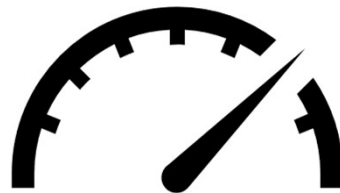
Pressure



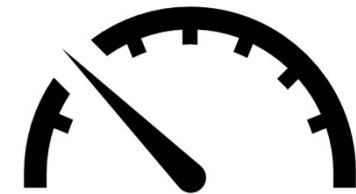
Demand/Supply
Balance



Risk & Criticality



Resilience



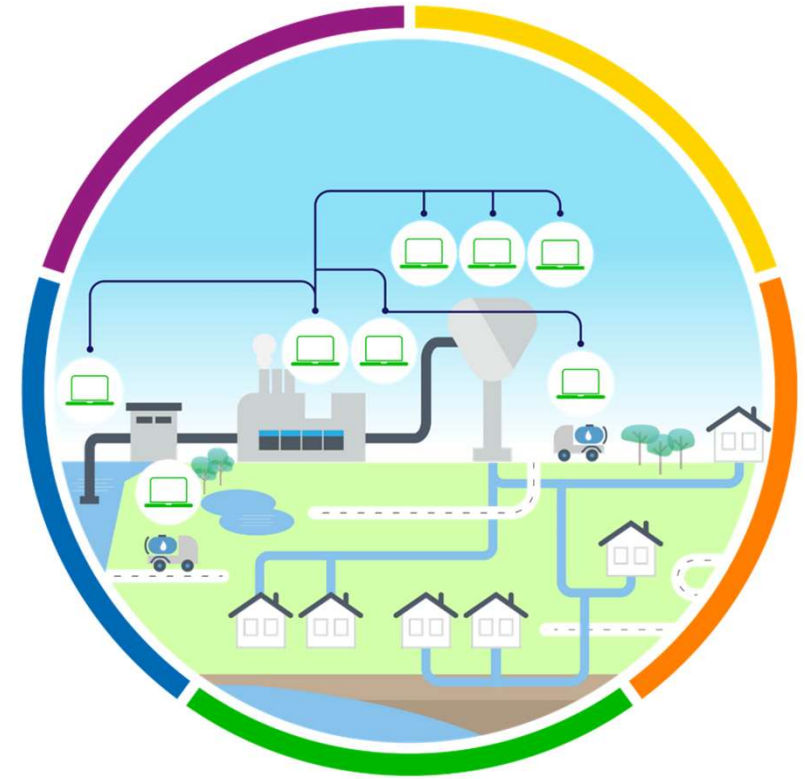
Failure response



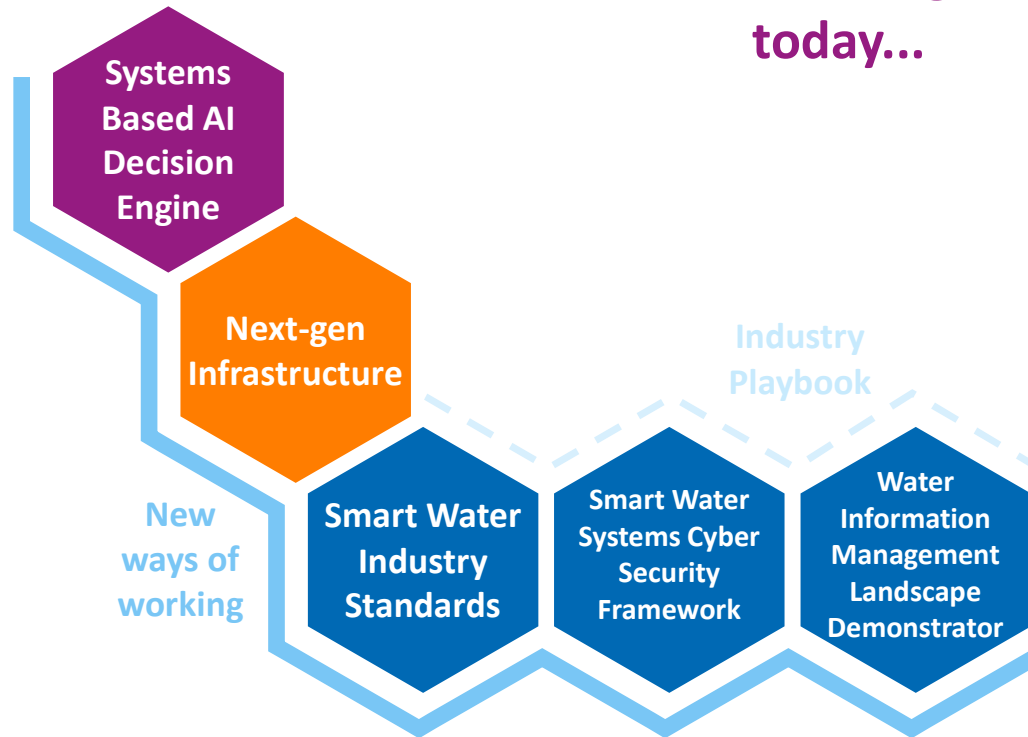
What is it about?

Solving tomorrow's problems and developing the capability to manage emerging change in our world

A safe, smart system embeds resilience from source to tap through optimising and automatically re-configuring based on predicted or detected faults and real-time risk profiles. It is secure by design and can respond to emerging needs as well as those of today.



Enabling the future but applicable today...



We believe that a systems-based approach will deliver long-term operational resilience and maximise value for customers, society and the environment

Our Vision and Mission



VISION

We have built and are operating an automated, connected system that delivers a clean, sustainable supply of water for future generations

MISSION

To develop and evidence a **scalable and adoptable safe smart system** within Ely (Anglian Water Region); with the **capability and culture to operate; that is validated by the industry** and provides the path which can be followed by others to embed resilience and benefits for customers, society and the environment.



Environment

- Reduce leakage and water losses
- Improve management and planning of water resources including sustainable abstraction
- Expedite the industry-wide net zero carbon goal by reducing our carbon footprint

Operations

- Increase proactive maintenance
- Improve operational resilience, response and recovery to short term system shocks and future stresses
- Inform targeted asset planning — focus investment in the most beneficial areas

Wider Industry

- Develop an industry 'how-to' playbook
- Develop of a Water Information Management Landscape (IML) which will enable sharing of interoperable data between water and other infrastructure companies



Customers

- Reduce bursts and service-related issues including water supply interruptions and low pressure
- Protect public health by reducing water quality anomalies

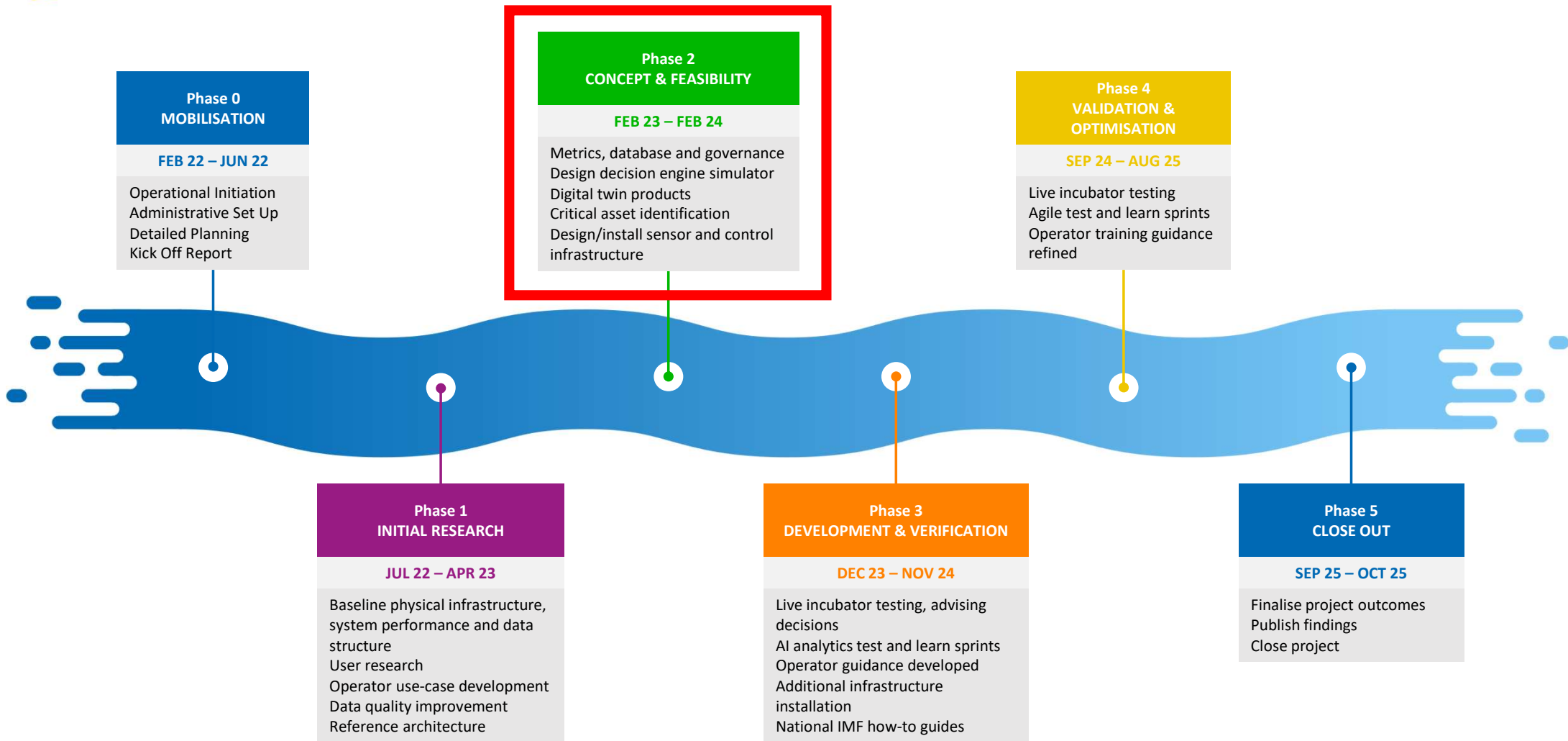
Our ways of working

- Understand the value of our virtual assets and have confidence in the data
- Work more efficiently, making informed, complex decisions based on data and insight

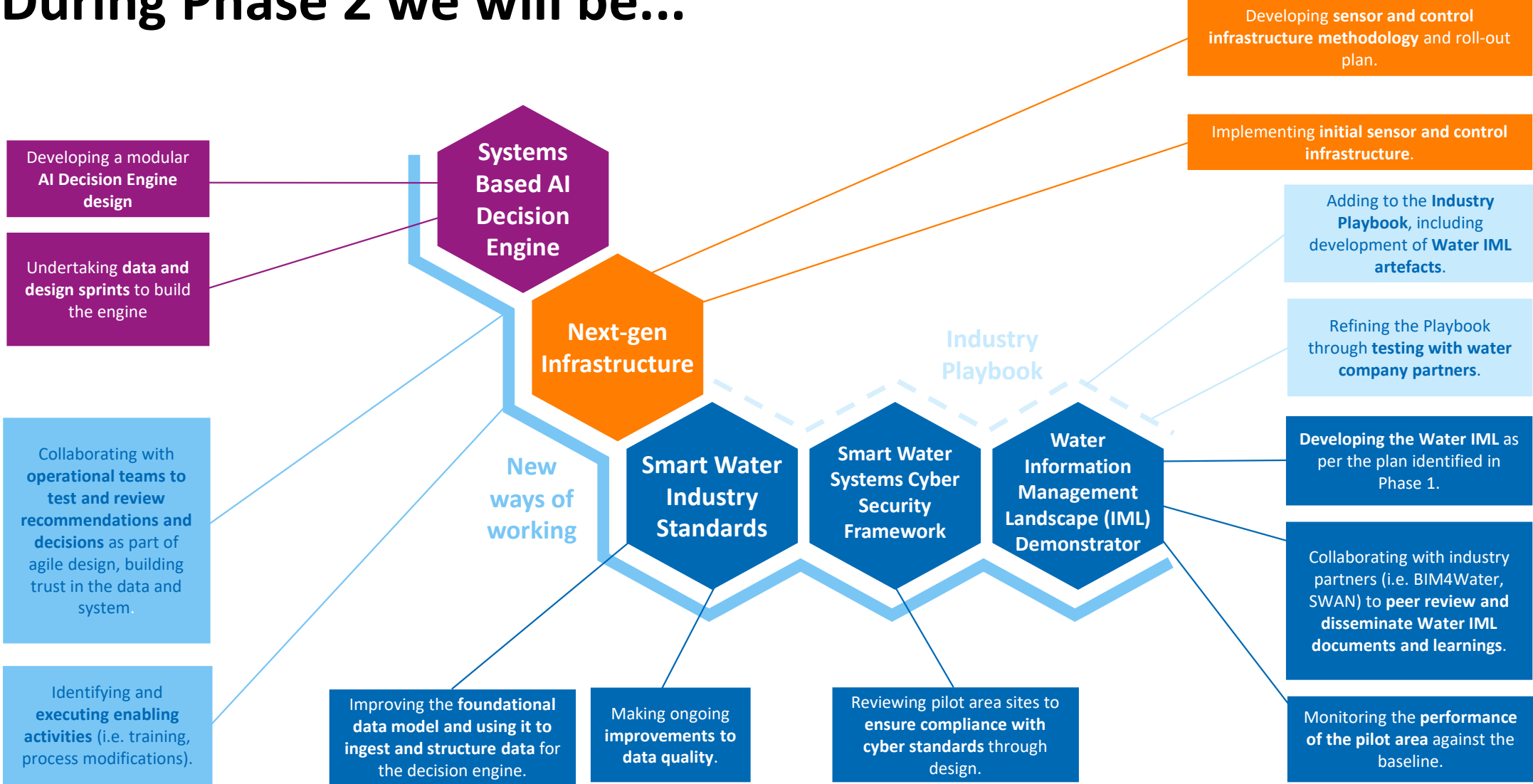
Our people

- Have greater visibility of system performance
- Have time to focus on how to further optimise the system and enhance customer service
- Have less surprises and can focus on prediction and prevention rather than reactive firefighting

Project Timeline



During Phase 2 we will be...



It's about the journey AND the destination...

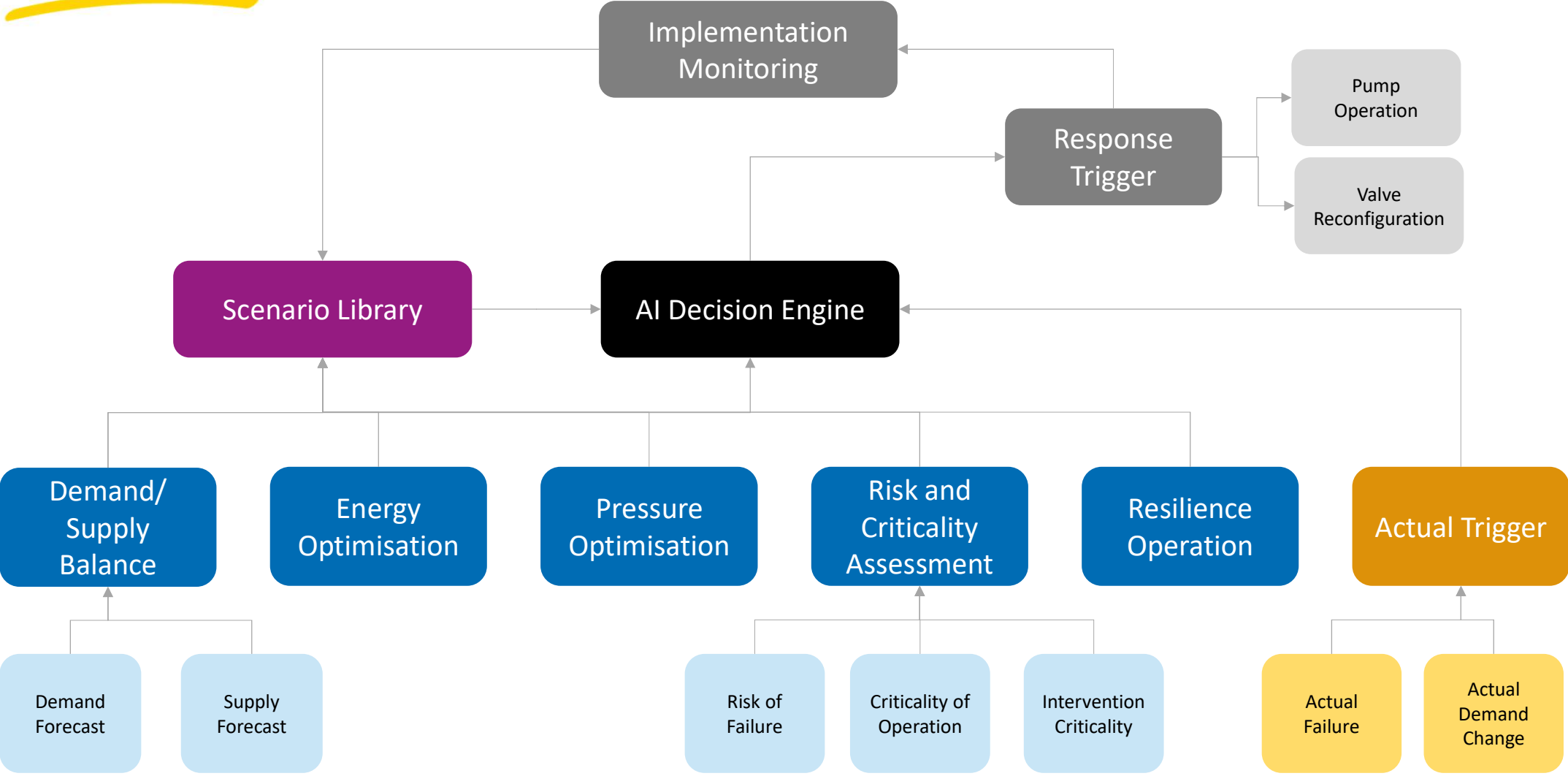
Situational Awareness → Advisory → Supervisory → Autonomous

Trust in data and automated decisions

Iterative change – process, data, technology, assets and people

Learning and adapting with a future vision in mind

High Level System Requirements



An MVP that leads to system-based decision making

What is the minimum required at a system level to be successful?



To demonstrate that actionable decision making can take place at a system level.

Our first *system level MVP* will include these essential capabilities of a smart network.

MVP = Minimum Viable Product

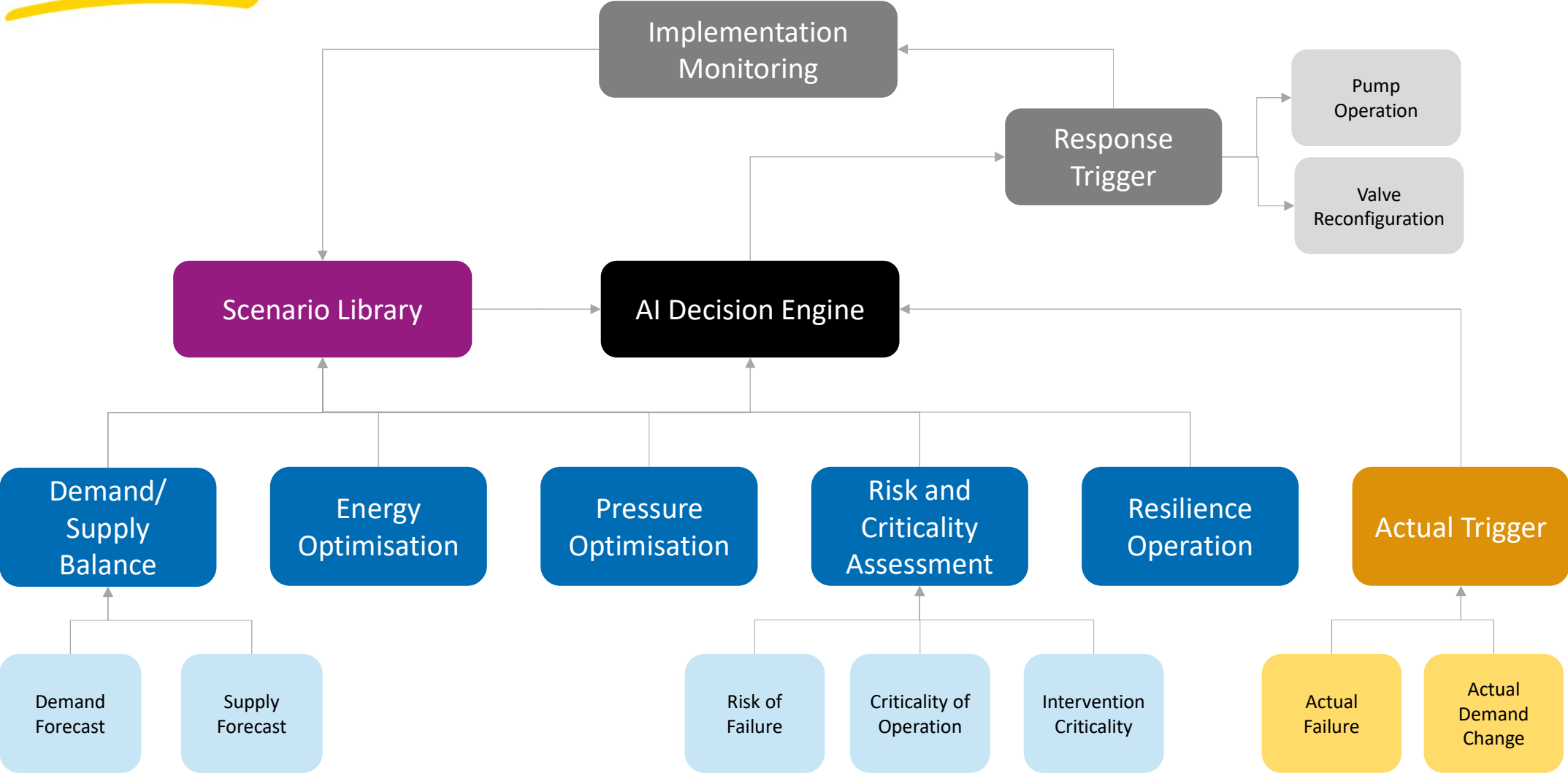
The ability to detect a failure
(sensor or actual)

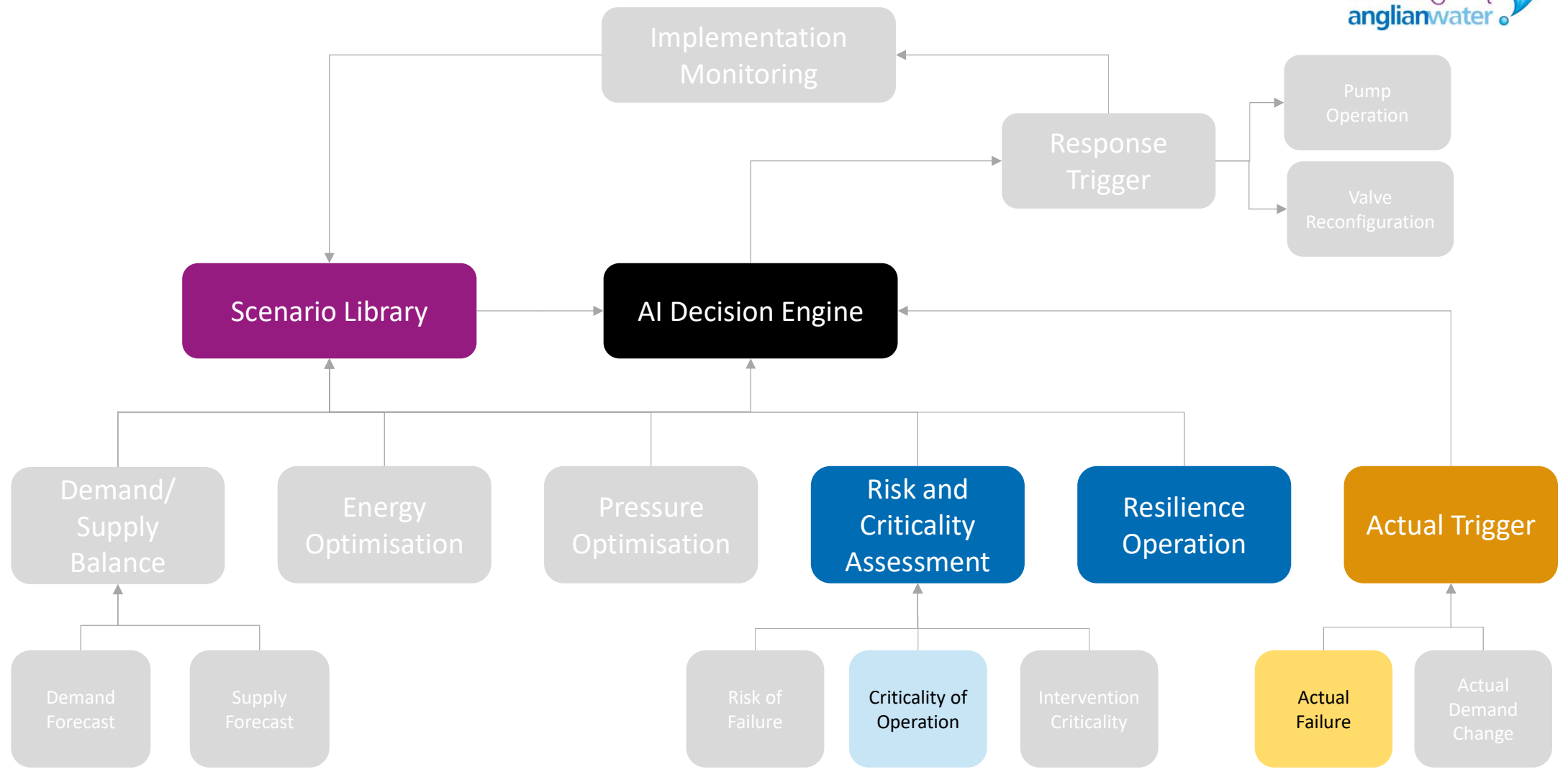
The ability to predict
probable failure

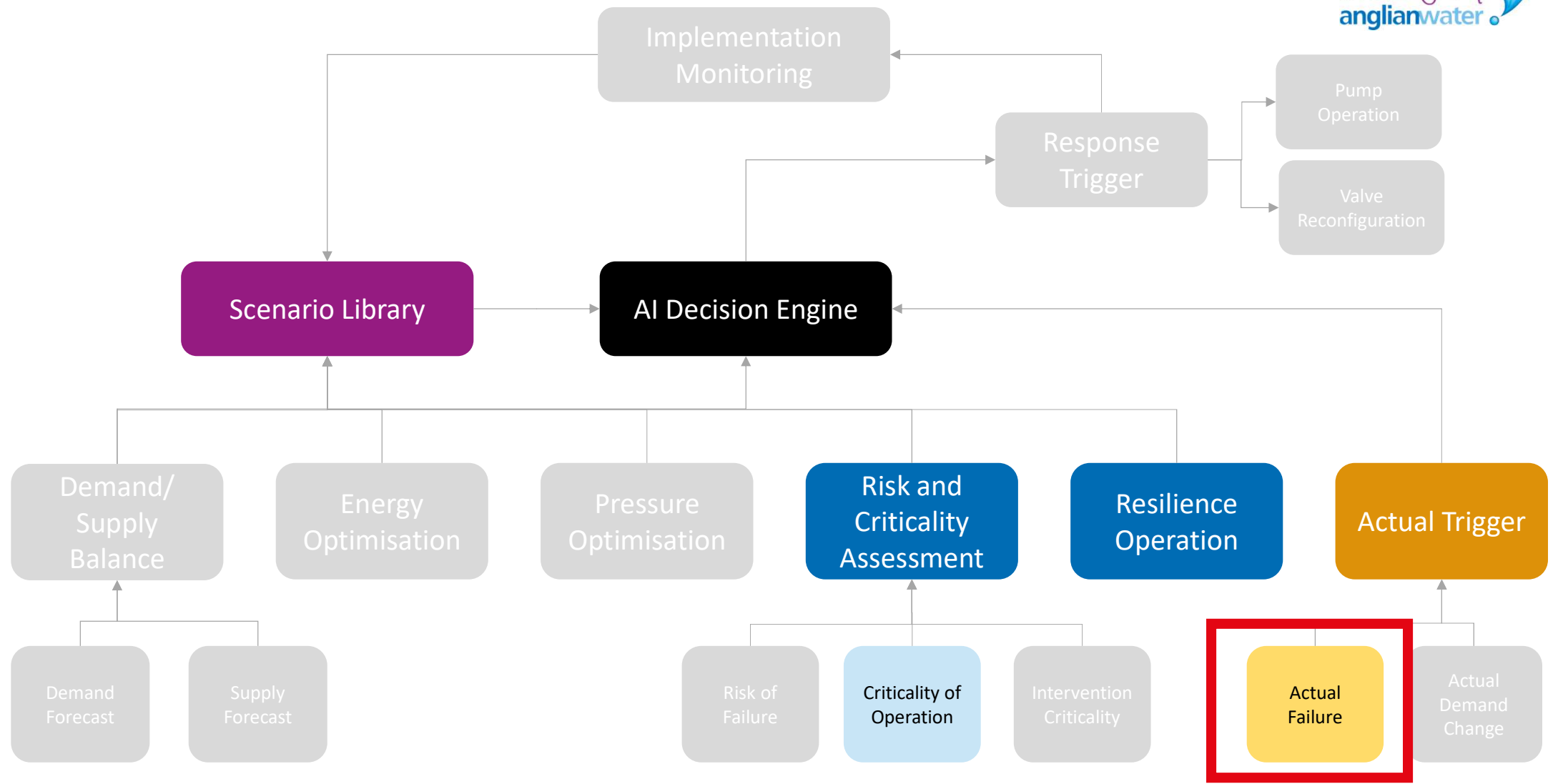
The ability to know the
consequence of failure

The ability to know how to
resolve a failure

High Level System Requirements







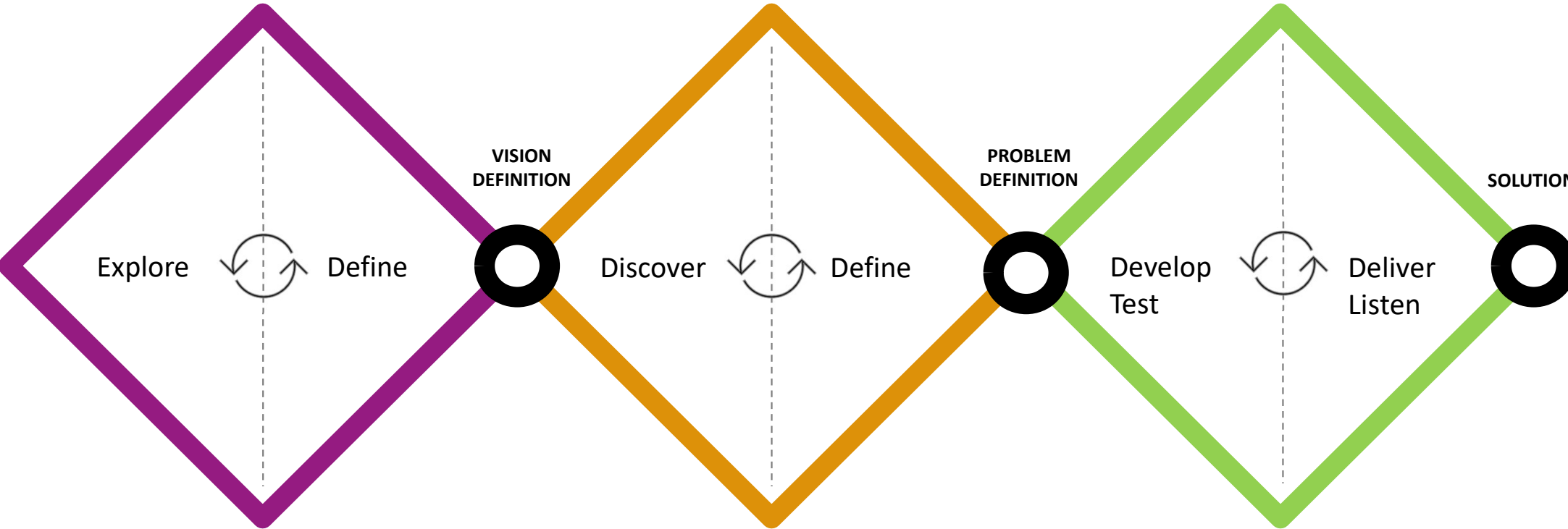
Innovation Methodology



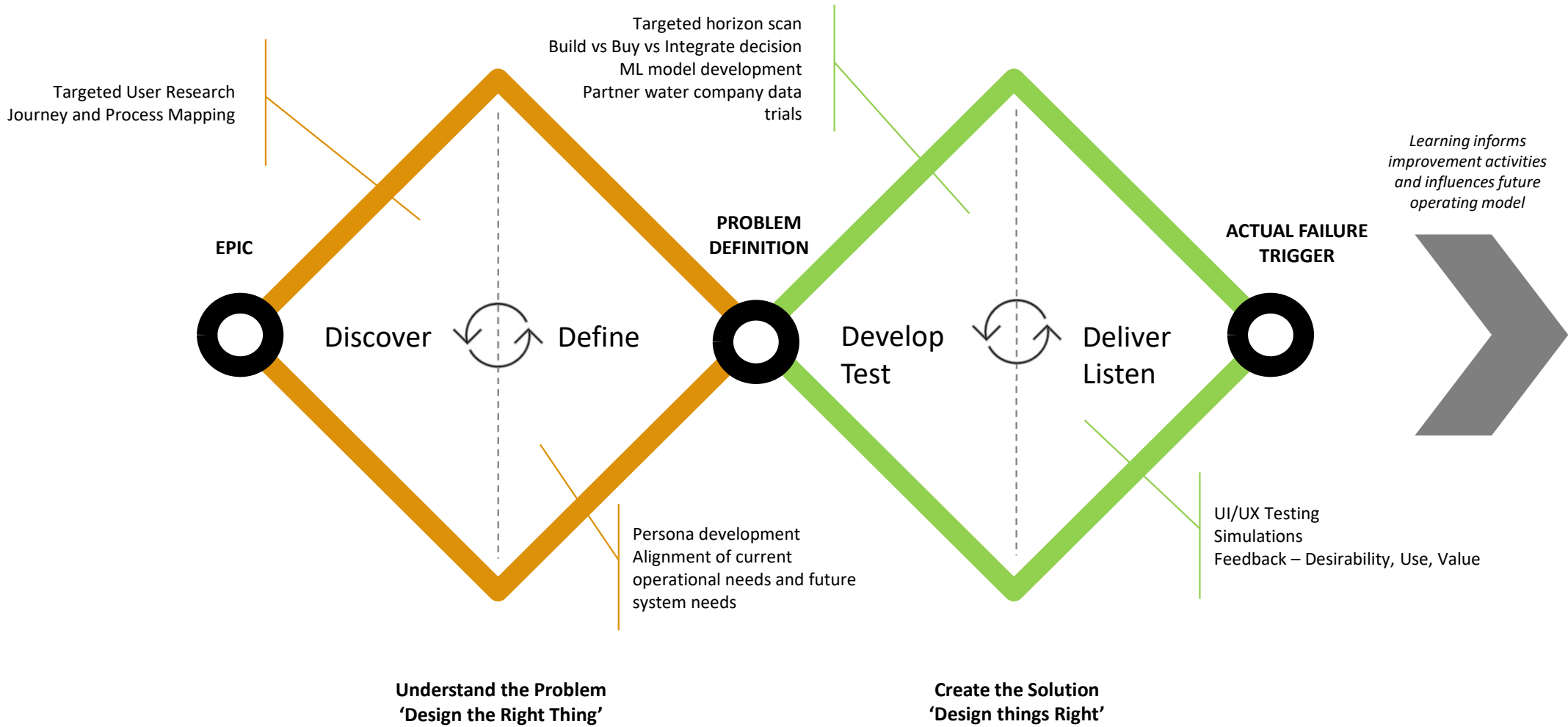
Start with a Vision

Understand the Problem
'Design the Right Thing'

Create the Solution
'Design things Right'



Current Development

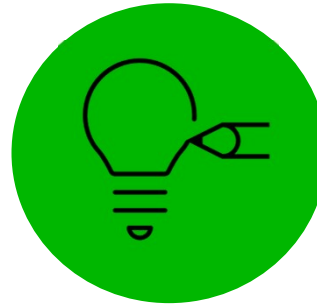


Design Thinking

Empathise



Ideate



Test



Define



Prototype

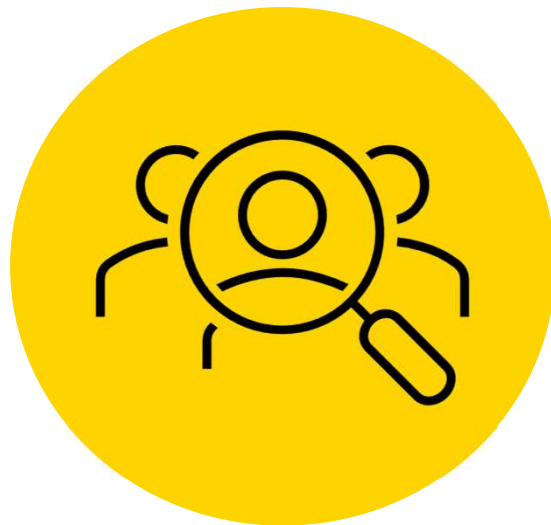


Human
Centred
Design

User Centred
Design

Design
Thinking

User
Experience
Design



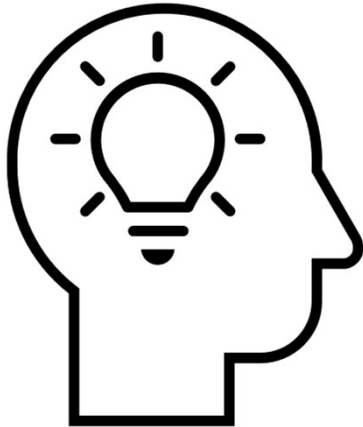
Co-Design

User-Driven
Development

Participatory
Design

Goals of the visit

To understand more about the users



- To **speak to some of the key users** from TacOps and watch them in their normal working environment
 - Alarm Handlers
 - Reactive Operational Restoration Technicians
 - Proactive Operational Restoration Technicians
 - Operational Modellers
- To understand **current processes**
 - How things are done at the moment
 - The systems and screens used
 - The challenges and pain points
- To have a **better understanding of the people** involved in these processes that we can share
 - What are their responsibilities and goals
 - What devices/systems/data do they use
 - Who do they interact with
 - What causes them pain or frustration

Next Steps

1

Validate our learnings
(personas, process maps, etc) with the end users

2

Continue learning
(speaking to more users and different people in the processes) to expand our knowledge

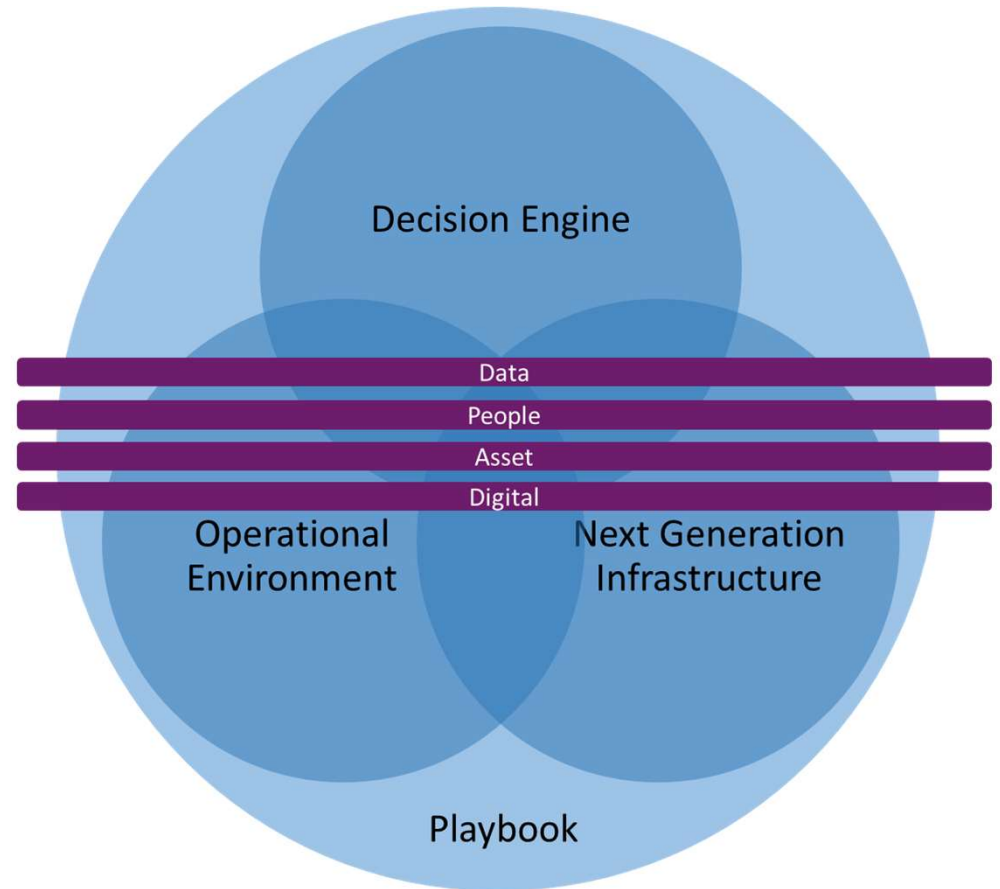
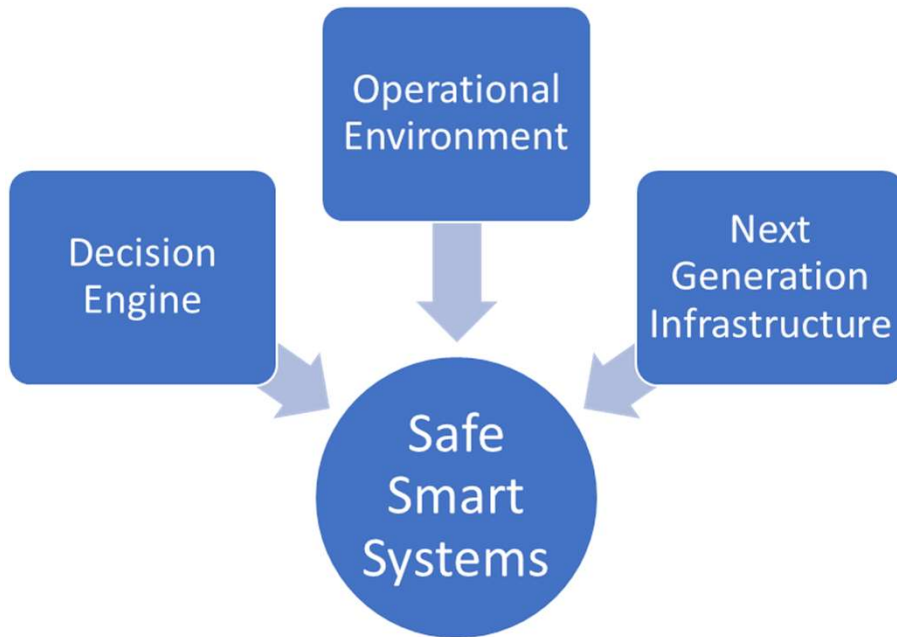
3

Use these learnings to **direct our design decisions** and steer the final solution

Key Learning 2



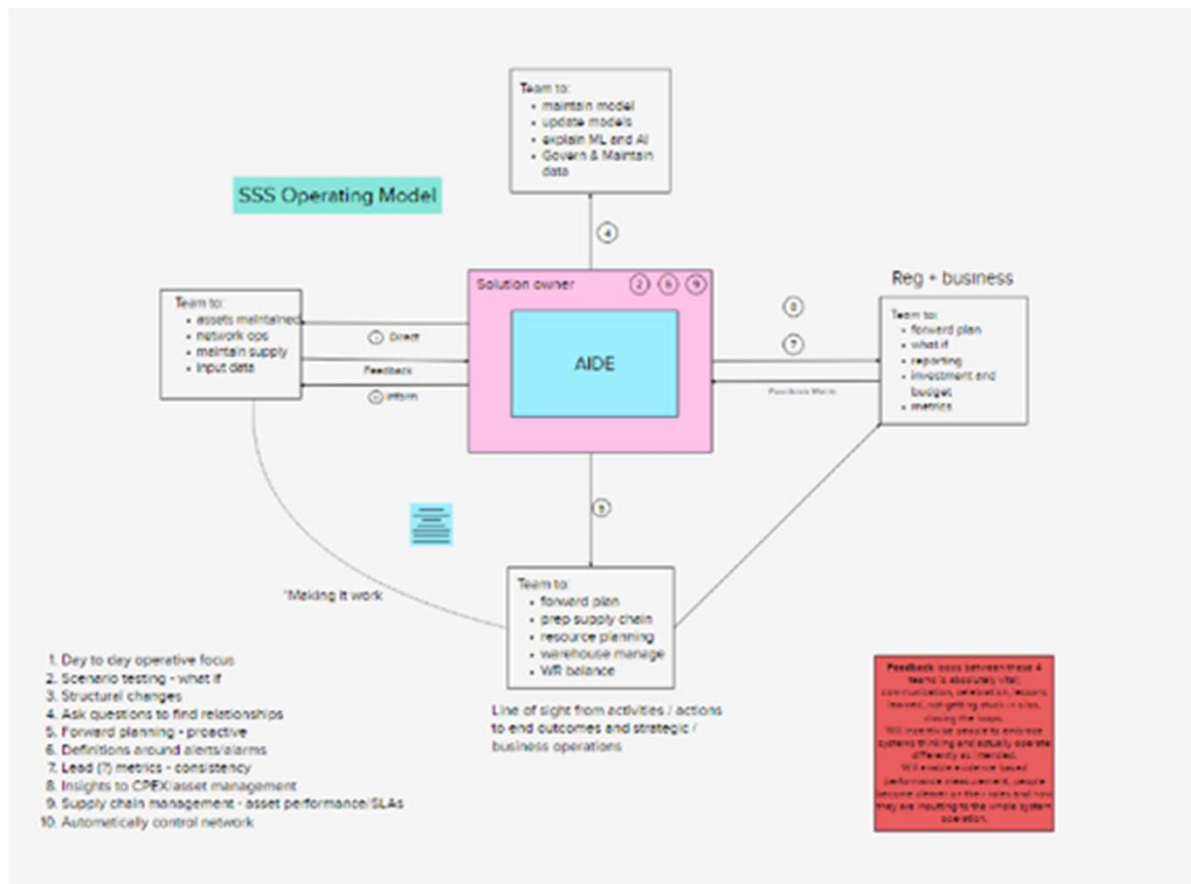
For the solution to be successful and sustainable it needs 3 elements:



Key Learning 4



For the SSS solution to be sustainable and utilised to its intended benefits, we can't be dictated and constrained by current working structures and organisational models.



There is also a need for different and more specialist skills and capabilities to sustain a SSS solution.

Any questions



**Thank you
for listening**

