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Keep CALM and carry on
Connected Asset Lifecyle
Management

Contents

Introduction

Connected Asset Lifecycle Management is the second in our series looking at how connected technology is beginning to transform the power and utilities sector.

Across all asset-intensive industries, companies are under increasing pressure – pressure to do more with less, to enhance customer service, to improve the uptime of assets, and to increase predictability of performance.

Critical to performing well in this environment is access to the right information at the right time, but power and utilities companies have historically been frustrated by limited knowledge of the all-important component of their business: their assets.

On the back foot

The absence of a detailed, end-to-end view of an asset portfolio makes it hard to achieve value for money across the asset lifecycle.

Indeed, this lack of information also prevents power and utilities companies from establishing a forward-looking view, making it hard to predict when assets may fail and adopt a risk-based approached to investment. This in turn creates an environment where reactive maintenance – which affects customers more and is costly and disruptive – is the norm, and scheduled work cannot be completed as planned.

Today, companies are increasingly realising that a co-ordinated approach is needed to deliver the required change in asset performance and efficiency. Improved strategic planning should enable them to extract maximum value from their assets, and build up their resilience to the potential impact of issues such as climate change or demographic change on their business.

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Making the connection

At the heart of that co-ordinated approach is the concept of 'Connected Assets'.

Connected Assets means having operational technology integrated with information technology; a deep understanding of the physical assets entrenched within your business; and high-quality, reliable data you can use to produce the insights needed to generate incremental, long-lasting business improvements. In addition, the Internet of Things (IoT) creates new streams of data that can help decision making and connect assets with other sources of live intelligence.

The tools available to achieve this are novel and compelling – enabling scenario planning and predictive asset performance – but deployed in isolation they will fail to deliver the required commercial benefits.

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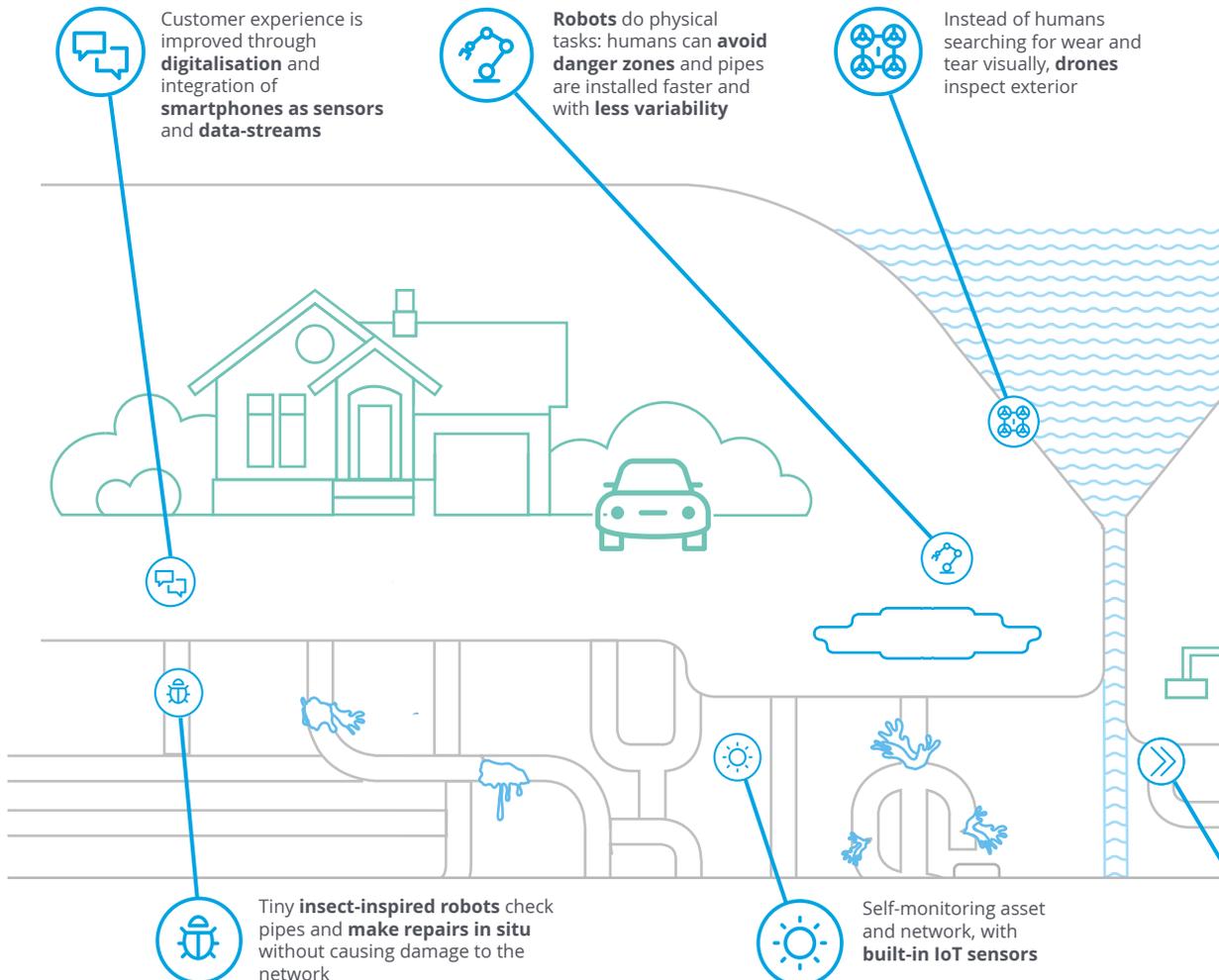
Culture shock

While the opportunities for companies are clear, the challenges are significant.

Success requires changes not just to operations, but also to culture – as well as the adoption of new ways of working across the whole organisation. Field workers and operators must embrace registering data as a fundam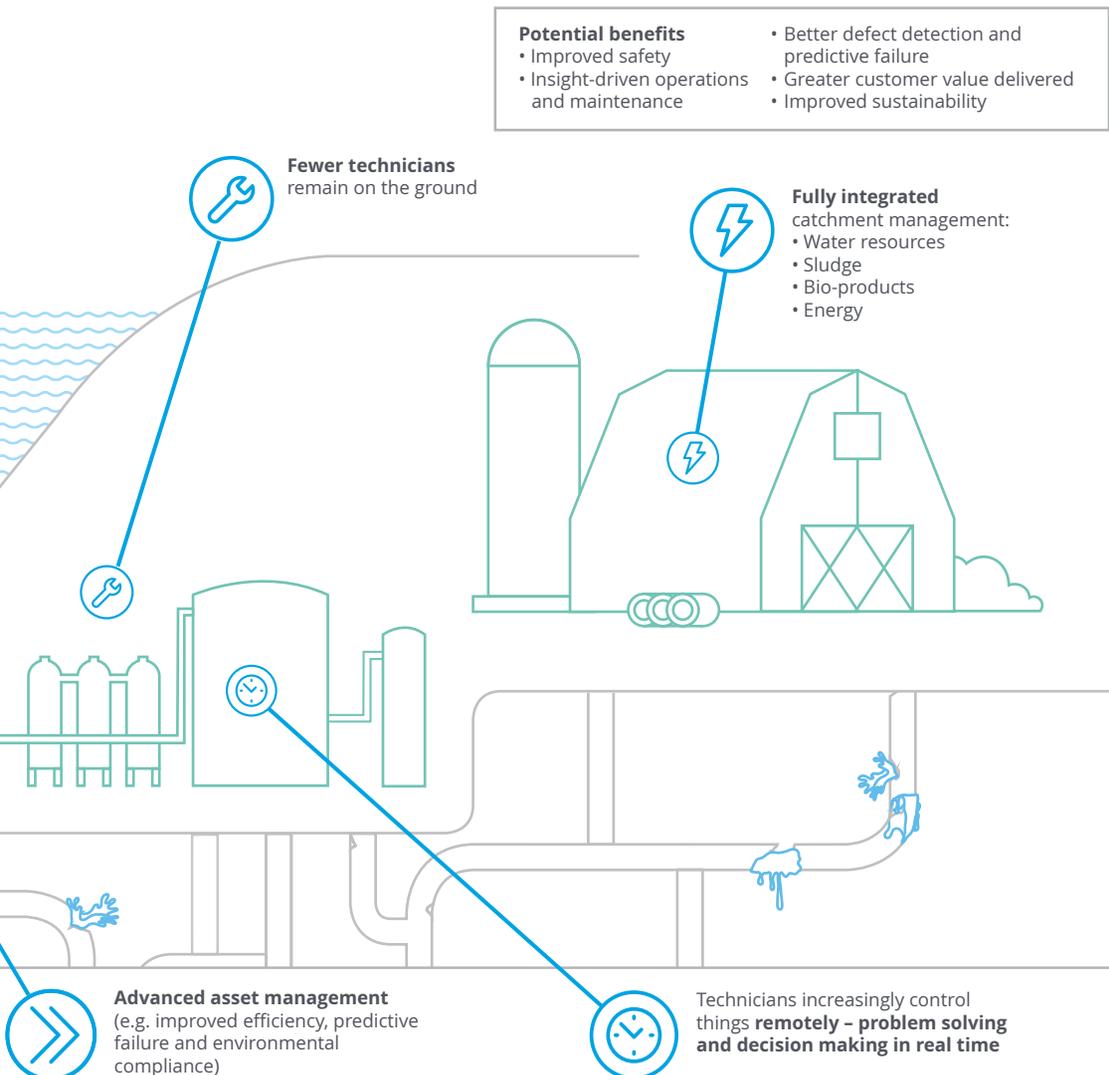ental part of their job. Engineers and asset managers must learn to integrate results from advanced analytics into their decision making. And asset information managers must be (recruited and) entrusted with data ownership and interrogation.

Figure 1. The digital water utility of the future

Customer experience is improved through **digitalisation** and integration of **smartphones as sensors** and **data-streams**

Robots do physical tasks: humans can **avoid danger zones** and pipes are installed faster and with **less variability**

Instead of humans searching for wear and tear visually, **drones** inspect exterior

Tiny **insect-inspired robots** check pipes and **make repairs in situ** without causing damage to the network

Self-monitoring asset and network, with **built-in IoT sensors**

Company policies must be based on sound data analysis, which is then fed back to the field. Operations, in turn, should provide feedback on policy decisions, creating a virtuous circle of analysis and improvement; a cycle that is becoming ever shorter and ever more intense.

Figure 1 below illustrates some of these changes from the perspective of a water company.

Potential benefits
- Improved safety
- Insight-driven operations and maintenance
- Better defect detection and predictive failure
- Greater customer value delivered
- Improved sustainability

Fewer technicians
remain on the ground

Fully integrated
catchment management:
- Water resources
- Sludge
- Bio-products
- Energy

Advanced asset management
(e.g. improved efficiency, predictive failure and environmental compliance)

Technicians increasingly control things **remotely – problem solving and decision making in real time**

The data challenge

The application of the Connected Asset approach is relatively new in the power and utilities sectors. There are a number of factors at play.

Lack of data

Most power and utilities companies have so many assets under management that it is not uncommon for the condition of some of them to be unknown – particularly when they are below ground. With the sewage infrastructure dating back to the Victorian age, for example, the first time a water company may acquire full information on an asset is when a leak springs up and it has to be repaired. With accurate data on the operational state of assets a prerequisite for effective asset management, many companies are struggling to take a fully integrated approach to managing their asset portfolio.

This affects customers too, who understandably demand to be kept informed of maintenance work (planned or otherwise), as well as the duration and severity of service interruption. Weak asset management increases the likelihood of asset failure, and customer satisfaction scores are more likely to be impaired by a major outage than planned replacement work.

Silo mentality

Until now, many asset managers have been guilty of collecting data in silos. In some cases, the same data set will exist in a variety locations and in formats that are incompatible with each other. Each silo may have a reliance and trust in its own data, but will lack confidence in the quality and suitability of the limited data provided to them by others. This prevents power and utilities companies making effective use of the wide range of data they already collect – a problem compounded when data-governance and field teams fail to update asset data altogether after carrying out an intervention.

Asset strategy

The above factors mean that some companies have never truly understood how their assets are performing, not to mention the criticality of those assets. This can manifest itself in the number of times assets need to be repaired and rebuilt unexpectedly, with the costs, delays and impacts on customer satisfaction this entails. It can also mean that decisions on whether to maintain, repair or replace degrading assets will be taken without an effective asset strategy in place.

In contrast, if companies can predict accurately when to replace an asset, our experience suggests they could save 10 to 15 per cent of operational expenditure (OPEX) and 5 to 8 per cent of capital expenditure (CAPEX). At a time when regulators and shareholders are looking to asset owners to provide better value for money across the asset lifecycle, these efficiencies simply cannot be ignored.

Further still, with regulators now pushing water companies to look at total expenditure (TOTEX), organisations dependent on large-scale infrastructure now have no option but to manage the entirety of their assets over the life of a project more effectively.

Spinning plates

There is more. Power and utilities companies are also being directed to be more customer-focused – with regulators using both carrot and stick to ensure it happens.

This means continuity of supply, affordability and customer satisfaction must all be addressed, at the same time as keeping profits up and investors happy.

To be able to keep the asset portfolio performing as necessary, managers must consider all aspects of the asset management lifecycle, from investment planning and capital project delivery through to operation and maintenance.

The good news is there are tools to help asset managers at each stage:

- virtual models can help anticipate potential issues, reduce costs and improve safety and reliability;

- capturing physical data from the moment assets are installed improves reliability and allows the assets to be monitored in real time to predict maintenance needs;

- predictive analytics can optimise maintenance cycles and prolong asset lifetimes; and

- analysing asset information helps inform future upgrade and planning cycles.

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The digital twin

With data firmly established as central to effective asset management, how best is it to acquire and maintain that data?

Arguably one of the most important solutions today is the digital twin – a virtual representation of a physical asset. Enabled by the IoT, this pairing of the virtual and physical worlds allows data to be analysed and systems to be monitored to head off problems before they even occur. For power and utilities companies, this means preventing downtime, developing new opportunities and even planning for the future by using simulations. By moving to a data-centric approach, significant efficiencies can be realised over time.

The volume of data the water sector collects, for example, has increased dramatically in recent years to include flow, chemical concentration and laboratory data; metering and customer usage data; engineering and construction data; and asset performance and maintenance data. This provides a rich vein of intelligence to monitor and control assets from procurement through to retirement, giving the potential to diagnose and remedy issues before they cause a supply interruption. This ability to take preventative action – and to predict future asset performance and reduce risk – helps optimise investment decisions.

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A business imperative

Now is the time to decide who is responsible for the data analytics agenda within your organisation, and then to align the business and IT around the problem.

It will involve changing the way decisions are made, both centrally and on an operational level. Workers will need to be educated on the value of capturing and providing asset data in a way they have traditionally not been required to. Operational efficiency will need to be viewed as a long-term strategy that uses data-driven insights to inform the analysis, design and roll-out of new business operating models. Personnel with technical and analytical skills will also need to be deployed alongside those with business and commercial skills.

All this can present a significant challenge, as companies need to bring in additional capabilities and establish processes to industrialise analytics and ensure that insights are actionable and sustainable.

Done well, power and utilities companies will have valuable resources they can use for improved asset management and long-term strategic planning. Get it wrong and risk being left behind.

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What does good look like?

The benefits of more effective asset management can be summarised as:

- enhanced customer satisfaction from improved performance and control of product or service delivery;

- controlled and systematic processes that comply with legal, regulatory and statutory standards, aligning to ISO 55001;

- improved safety (e.g. water safety, employee safety, public safety);

- improved risk management and corporate governance, and a clear audit trail for the appropriateness of decisions taken;

- the ability to demonstrate best value for money within a constrained funding regime;

- an optimised return on investment – and growth through effective stewardship of assets;

- an enhanced corporate image, including improved marketability of products and services, greater staff satisfaction and more efficient and effective procurement from the supply chain; and

- the ability to demonstrate that sustainability is actively considered as part of asset utilisation and selection.

Contacts

Deloitte's Energy & Resources team has worked with most of the UK's major energy and water companies. We understand the challenges you face, and can help you address the strategic, operational and cultural changes you may need to make.

We recognise that asset management is not just about fixing an immediate problem, it's about driving longer-term value for customers, shareholders and society. To that end, we also help our clients think about what they are investing in and what their strategic plan is, to ensure consistency of supply to customers.

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