

AQUASENSE AI

Transforming Water Management Through Artificial Intelligence

A Fictional University Case Study

Industry: Water Technology (WaterTech) | AI · IoT · ClimateTech

Business Model: SaaS + Hardware + Enterprise Solutions

Headquarters: London, United Kingdom | Founded: 2026 (Fictional)

Prepared for academic and strategic-analysis purposes.

AquaSense AI is an entirely fictional company created for coursework use.

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1. Executive Summary

Fresh water is one of the world's most valuable yet increasingly scarce resources. According to international environmental reports, billions of litres of treated water are lost every day due to ageing infrastructure, hidden pipe leaks, inefficient monitoring systems, and human error. These losses not only increase operational costs but also contribute to environmental degradation and unnecessary carbon emissions from water treatment and distribution.

AquaSense AI was founded to address this growing global challenge. By integrating Artificial Intelligence (AI), Internet of Things (IoT) sensors, cloud computing, and predictive analytics, the company provides an intelligent water management platform capable of detecting leaks, monitoring consumption, predicting maintenance needs, and helping organisations reduce water waste before significant damage occurs.

The company's ambition is to become the world's leading AI-powered water management platform, serving residential, commercial, industrial, and public-sector customers across multiple international markets.

“Every Drop Matters.” — AquaSense AI mission statement

2. Company Background

In early 2026, three engineers from Imperial College London observed that while businesses invested heavily in cybersecurity, automation, and renewable energy, very few organisations were applying Artificial Intelligence to manage one of their most critical resources: water.

The founders identified that hotels, hospitals, universities, manufacturing plants, and residential buildings typically discovered water leaks only after receiving unusually high utility bills or experiencing structural damage. Existing monitoring systems were largely reactive — they measured water usage but did not predict failures before they occurred.

Recognising this gap between reactive metering and proactive, intelligence-led management, the founders established AquaSense AI with a clear and focused mission: to prevent water loss before it happens, using data rather than guesswork.

3. The Global Problem

Water scarcity has become one of the world's most pressing sustainability challenges. Rising demand, climate variability, and deteriorating infrastructure are combining to place unprecedented strain on water systems worldwide.

Major Causes of Water Loss

- Hidden pipe leaks that go undetected for weeks or months
- Ageing infrastructure in older commercial and residential buildings
- Human error in manual monitoring and reporting processes
- Poor or outdated monitoring systems that lack predictive capability

- Absence of structured predictive maintenance programmes

Consequences for Organisations and Society

- Higher utility costs passed on to tenants, patients, students, and residents
- Property damage from undetected leaks, often requiring costly repairs
- Increased maintenance and emergency call-out expenses
- Environmental pollution linked to water and chemical run-off
- Unnecessary carbon emissions generated by treating and pumping wasted water

Governments worldwide are responding with stricter sustainability regulations and mandatory environmental reporting requirements, creating significant and growing demand for intelligent water management solutions such as those offered by AquaSense AI.

4. The Market Opportunity

Several converging market trends have created a favourable environment for AquaSense AI's growth:

- Smart City investment is increasing across national and municipal governments
- Environmental, Social and Governance (ESG) reporting is becoming a mandatory requirement for large organisations
- Businesses are actively seeking new ways to reduce operating costs amid economic pressure
- Climate change is intensifying pressure on water conservation and resource management
- AI adoption is accelerating across infrastructure and utilities industries more broadly

Together, these trends position water management as a natural and timely extension of the broader AI-driven infrastructure transformation already under way in energy, transport, and security.

5. The Solution

AquaSense AI's platform combines four integrated technology layers to move organisations from reactive metering to predictive, intelligence-led water management.

5.1 Smart IoT Sensors

Compact sensors are installed directly on water pipes to continuously monitor flow rate, pressure, temperature, vibration, and consumption patterns, generating a constant stream of operational data.

5.2 Cloud Platform

Sensor data is transmitted securely to AquaSense's cloud platform every few seconds, enabling near real-time visibility across an organisation's entire water infrastructure, regardless of building count or geographic spread.

5.3 Artificial Intelligence

Machine learning algorithms analyse millions of data points to identify abnormal behaviour. Rather than simply detecting leaks that have already occurred, the AI is designed to predict likely future failures before they happen, giving facilities teams a genuine window for preventive action.

5.4 Mobile Dashboard

Customers receive real-time alerts through a mobile application and web dashboard, translating complex sensor data into clear, actionable recommendations. For example:

Leak detected in Building A. Estimated loss: 45 litres/hour. Recommended action: replace Valve #12 within 48 hours.

5.5 How AquaSense AI Works



6. Product Portfolio

6.1 AquaSense Home

Designed for: Homeowners and residential occupiers

- Real-time leak alerts
- Monthly water usage reports
- Predictive water bill estimates
- Personalised AI conservation recommendations

6.2 AquaSense Business

Designed for: Hotels, hospitals, universities, office buildings, and shopping malls

- Multi-building monitoring from a single dashboard
- Configurable staff and facilities-team alerts
- Automated maintenance scheduling
- Site-level and portfolio-level water analytics

6.3 AquaSense Enterprise

Designed for: Governments, water authorities, and utility companies

- City-wide monitoring and infrastructure mapping
- Predictive maintenance at network scale

- Carbon reporting aligned to sustainability targets
- ESG reporting for regulatory and investor disclosure
- Advanced infrastructure analytics

7. Target Customers

AquaSense AI serves four broad customer segments, spanning individual households through to national infrastructure bodies:

Segment	Representative Customers
Residential	Homeowners; apartment complexes
Commercial	Hotels; hospitals; universities; office buildings
Industrial	Manufacturing plants; food factories; pharmaceutical companies
Government	Water authorities; smart cities; municipal councils

8. Revenue Model

AquaSense AI generates revenue through five complementary streams, combining upfront hardware income with recurring, higher-margin software revenue:

8.1 Hardware Sales

One-off sales of smart sensors installed at customer sites.

8.2 Monthly Subscription

Recurring access to the cloud dashboard, forming the core of the company's SaaS revenue.

8.3 Premium Analytics

Advanced AI-generated reports and insights sold as an upsell to standard subscriptions.

8.4 Enterprise Licences

Bespoke licensing agreements for large organisations and government bodies with city-wide or multi-site requirements.

8.5 Annual Maintenance Contracts

Ongoing hardware servicing and software updates, providing a stable, recurring revenue base and reinforcing customer retention.

9. Competitive Advantage

Unlike traditional water meters, which are fundamentally reactive, AquaSense AI is built around predictive intelligence — shifting the value proposition from measurement to prevention.

Traditional Water Metering Systems	AquaSense AI
Measure water usage only	Predicts failures before they occur
Detect leaks only after damage occurs	Prevents damage through early intervention
Largely manual or rules-based monitoring	Powered by machine learning and predictive AI
Limited cost-saving impact	Actively reduces operating and utility costs
No sustainability reporting capability	Generates ESG and carbon reports automatically

10. Business Model Overview

10.1 Value Proposition

Reduce water waste before it happens — converting an unavoidable operating cost into a manageable, data-driven process.

10.2 Customer Relationships

- Subscription-based, ongoing relationship
- Dedicated Customer Success team for onboarding and retention
- Responsive technical support for hardware and software issues

10.3 Channels

- Direct website and self-service sign-up
- Enterprise sales team for large accounts
- Government tenders and public-sector procurement frameworks
- Technology and facilities-management partnerships

10.4 Key Activities

- AI and machine learning model development
- Sensor design and manufacturing oversight
- Software and platform development
- Ongoing customer support and success management

10.5 Key Partners

- Sensor manufacturers
- Cloud infrastructure providers
- Construction and facilities-management companies
- Utility companies
- Universities and research institutions

11. Marketing Strategy

AquaSense AI follows a primarily business-to-business (B2B) marketing approach, reflecting the nature of its core commercial and enterprise customer base. Key channels include:

- Targeted LinkedIn campaigns aimed at facilities managers and sustainability leads
- Presence at sustainability and climate-technology conferences
- Active participation in government tenders and public procurement processes
- Exhibition at engineering and infrastructure trade shows
- Strategic partnerships with facilities management companies

12. Growth Strategy

AquaSense AI plans a staged international expansion, beginning in its home market before progressively entering regions with strong regulatory tailwinds and rising water-scarcity pressures:

Phase	Target Market
Phase 1	United Kingdom
Phase 2	Europe
Phase 3	Middle East
Phase 4	North America
Phase 5	Asia-Pacific

13. Sustainability Impact

AquaSense AI's platform is designed to contribute directly to several interconnected sustainability outcomes:

- Clean water conservation through early leak detection and prevention
- Reduced carbon emissions associated with treating and pumping wasted water
- Support for Smart City infrastructure and planning initiatives
- More resilient and sustainable long-term infrastructure investment

14. Risks and Risk Mitigation

As with any technology company operating in a regulated and infrastructure-adjacent sector, AquaSense AI faces a number of strategic and operational risks. The table below summarises the principal risks alongside the company's planned mitigation approach.

Risk	Mitigation
High sensor manufacturing costs	Invest in R&D to drive component and production cost efficiencies over time

Risk	Mitigation
Cybersecurity threats	Use encrypted cloud infrastructure and pursue ISO security certifications
Competition from established technology firms	Differentiate through predictive AI capability and deep sector partnerships
Customer resistance to new technology	Offer flexible subscription pricing and clear ROI case studies
Government regulatory changes	Partner with global engineering firms and monitor policy developments closely

15. Financial Outlook (Illustrative)

The illustrative three-year financial outlook below reflects an early period of investment-led losses, followed by a transition to sustained profitability as the subscription base scales and unit economics improve.

Year	Customers	Revenue	Profit Margin
Year 1	500	£1.2M	-10%
Year 2	2,000	£5.4M	8%
Year 3	7,500	£18M	22%

Note: figures are illustrative projections for academic case-study purposes and are not based on an actual operating business.

16. Vision

To become the world's most trusted AI-powered water management platform, helping organisations conserve water, reduce costs, and build a more sustainable future.

17. Teaching Note

This fictional case has been developed for university-level strategic analysis and business planning coursework. It is designed to support analysis using a range of established strategic frameworks, including:

- SWOT Analysis
- PESTLE Analysis
- Porter's Five Forces
- Business Model Canvas
- Value Proposition Canvas
- Ansoff Matrix
- BCG Matrix (future product portfolio)
- VRIO Framework

- Financial Forecasting
- Break-even Analysis
- Risk Analysis

These frameworks are intended to support the development of an investor pitch, financial projections, and a broader strategic evaluation as part of the associated assignment brief.