

# This presentation premiered at WaterSmart Innovations

[watersmartinnovations.com](http://watersmartinnovations.com)





# The 4 As of Water Accountability

Mission-Critical Water Intelligence



# Water Management | Challenges



Financial Constraints

Expensive Solutions to Big Problems/Silo'ed

Evolving Compliance and Quality Mandates

Leak Detection and Water Loss Management

Scaling Expertise - doing more with less

System Integration/ Interoperability

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# Water Quality Testing & Monitoring | Traditional Methods



**Onsite / Offsite Labs**



**Portable Meters**



**Online Analyzers**



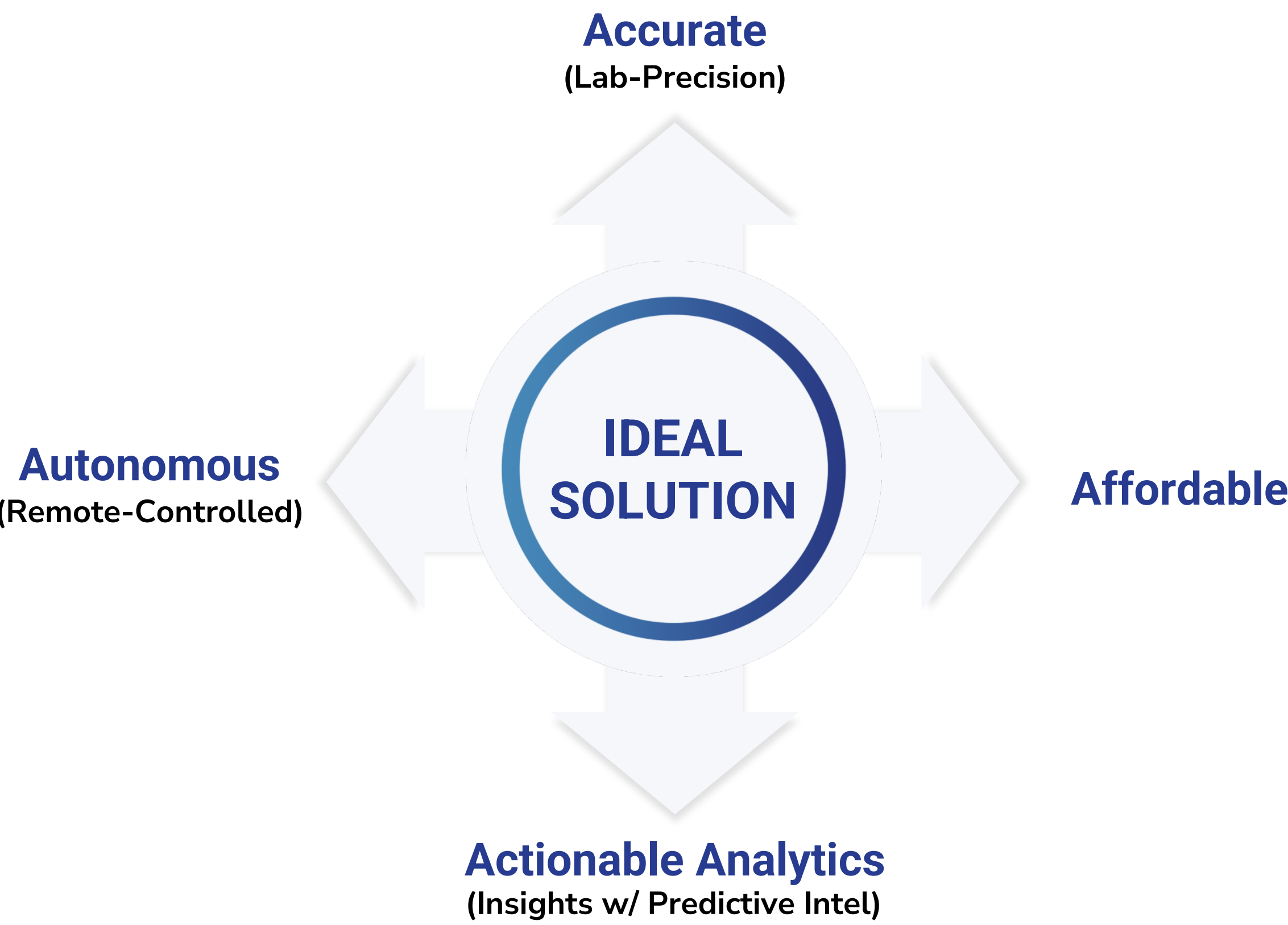
**Manual Reporting  
Delayed Data**

- ✓ High Total Cost of Ownership / Management
- ✓ Decentralized Data
- ✓ Limited Real-Time Data

- ✓ Manual & Labor Intensive
- ✓ CapEx & Service Intensive
- ✓ Reactive vs Proactive



# Monitoring | Water Accountability



## ACCURATE

Deliver timely and accurate feedback across numerous parameters — within +/-10% accuracy of certified lab results, every time.

## AFFORDABLE

Financial models are flexible, scalable, and customizable to meet specific needs.

## ACTIONABLE

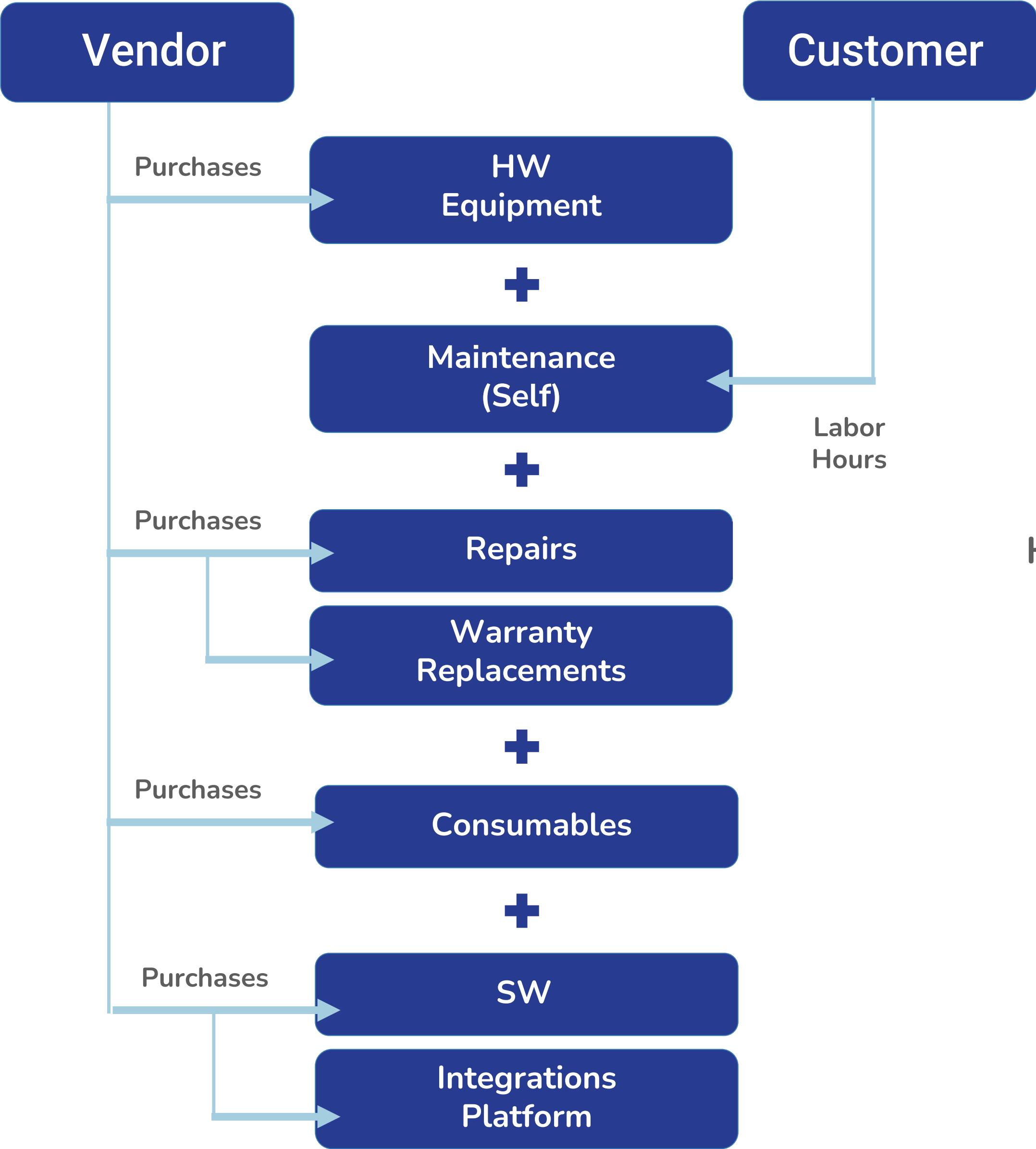
Leveraging a centralized data warehouse and machine learning algorithms to enable automated reports, alerts, forecasting, and predictive analytics. Ideally integrated with other systems.

## AUTONOMOUS

Labor-free. No need for regular cleaning, calibration, collecting samples, testing, and analyzing results.

# Legacy

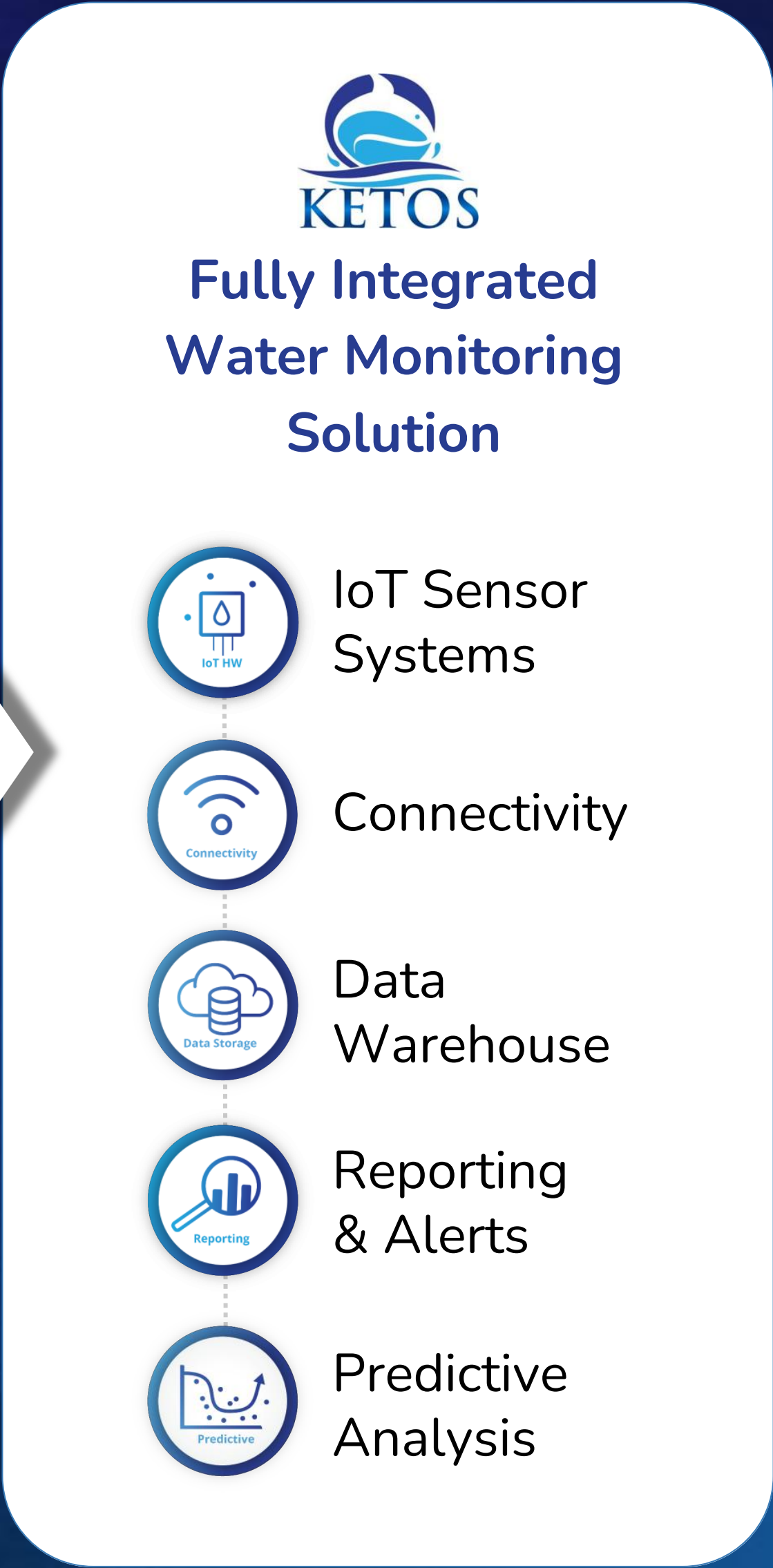
Complex and Costly R&M



\$0 CAPEX  
HARDWARE

# Future with KETOS

Leased Analytics Subscription



0 Labor  
Hours

\$0  
Consumable  
Purchase

\$0  
Integration  
Cost

\$0  
Replacement  
Parts



# Digitizing The Water Industry | Real-Time Autonomous Water Intelligence

## KETOS Shield

- ✓ **26 Parameters**  
Tested and Monitored in Real-Time including Environmental, Heavy Metals, Nutrients, Organics & Inorganics
- ✓ **Autonomous Operation**  
Robotic Automation with Proprietary Patented Hardware & Software Intelligence Self Cleaning & Self Calibration Zero Data Drift
- ✓ **Communications Infrastructure**  
Bidirectional, Smart Networked Communication (IoT) Cellular or Ethernet LAN



## KETOS Platform

- ✓ **Enterprise Grade Software**  
Alerts & Notifications Actionable  
Insights Operational Analytics  
Process Optimization
- ✓ **Data Integration**  
3rd Party Data Integration with Bi-Directional Data Sharing

**Fully integrated water testing & monitoring solution**

# Digitizing The Water Industry | Real-Time Autonomous Water Intelligence

## KETOS Wave

- ✓ **Intelligent Meter**  
Onboard Power Generator  
Remote Shutoff Water Rate,  
Volume & Pressure Metrics
- ✓ **Integrated Hardware & Predictive Analytics**  
Leak Detection Monitoring  
Consumption Management
- ✓ **Communications Infrastructure**  
Non-Cellular Communication  
Network (LoRaWAN)



## KETOS Platform

- ✓ **Enterprise Grade Software**  
Alerts & Notifications Actionable  
Insights Operational Analytics  
Process Optimization
- ✓ **Data Integration**  
3rd Party Data Integration  
with Bi-Directional Data  
Sharing

**Fully integrated water testing & monitoring solution**





KETOS

Thank you!





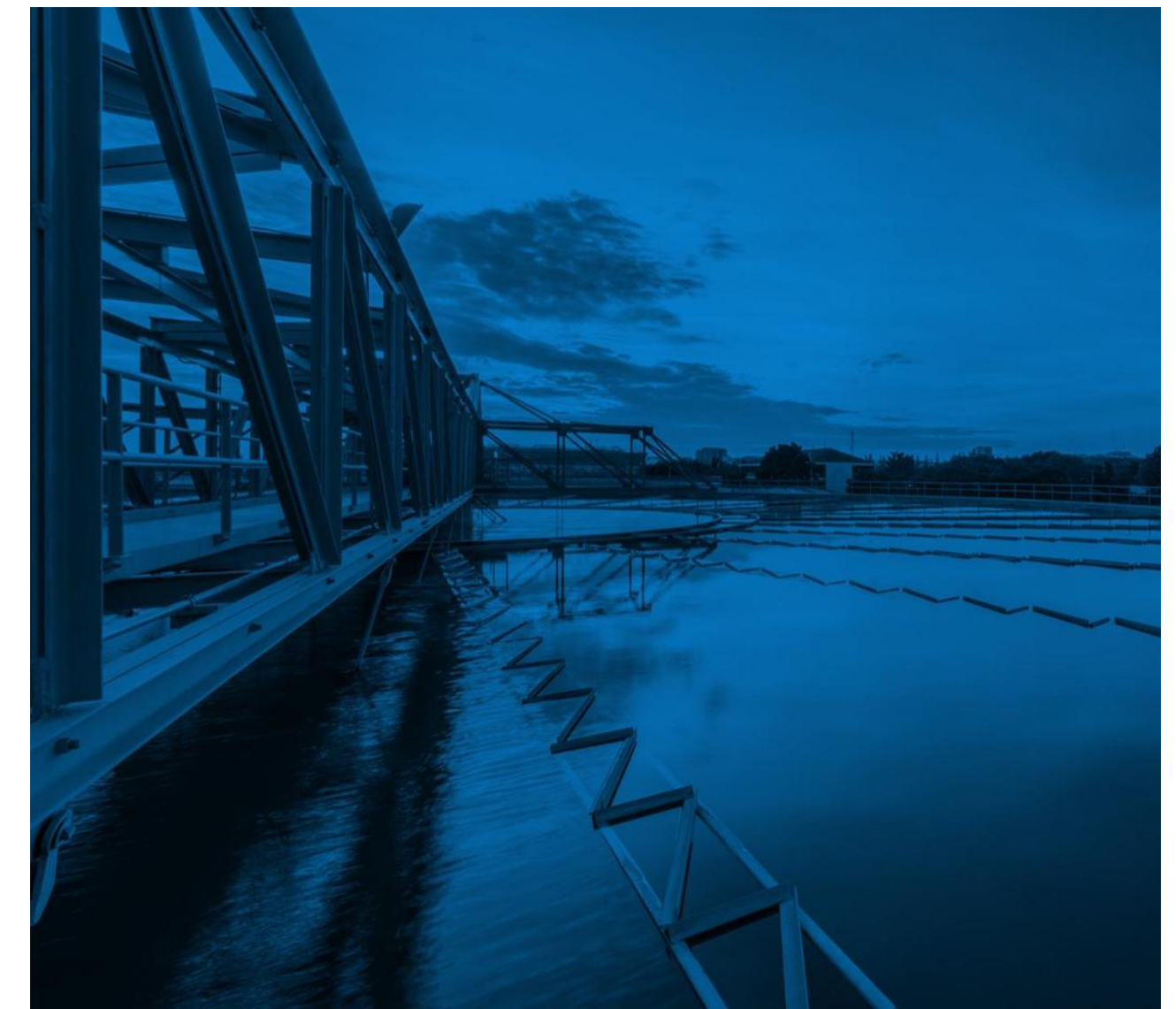
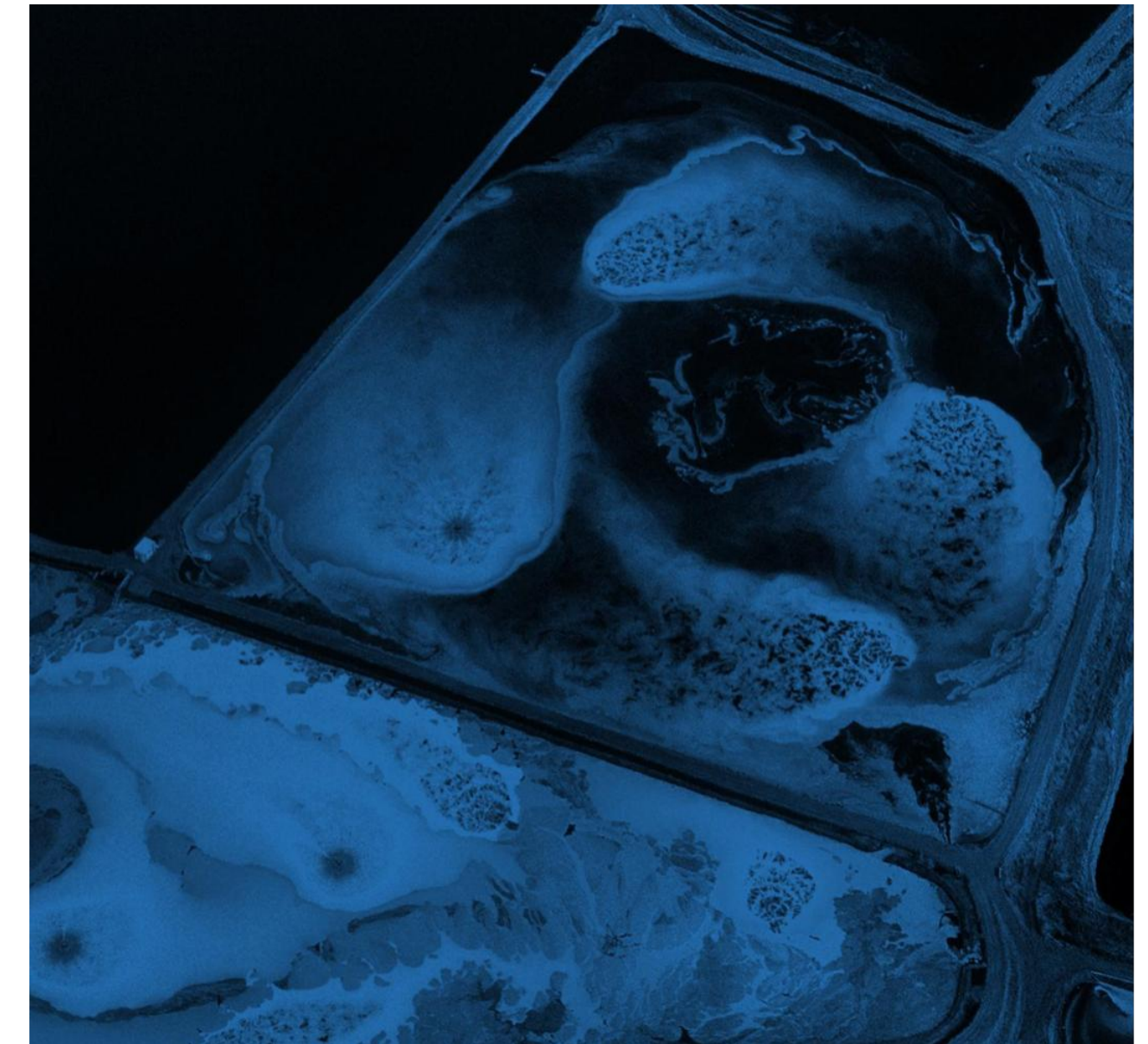
KETOS

Appendix & Use Cases



# Data Driven Water Quality Control | The Ideal Solution

- ✓ 31 Water Quality Parameters
- ✓ Real-Time
- ✓ Fully Autonomous
- ✓ Lab Precision





# SHIELD Water Quality | Detection Parameters

**KETOS Shield®** is currently capable of monitoring over 31 water quality parameters including ENVIRONMENTAL, HEAVY METALS, NUTRIENTS, ORGANICS AND INORGANICS and growing:

## ENVIRONMENTAL (Continuous)

- ✓ Total Dissolved Solids
- ✓ Temperature
- ✓ Conductivity (EC)
- ✓ Salinity
- ✓ pH
- ✓ Oxidation Reduction Potential (ORP)
- ✓ Dissolved Oxygen

## HEAVY METALS (Scheduled)

- ✓ Arsenic (III)
- ✓ Cadmium (II)
- ✓ Calcium
- ✓ Chromium (VI)
- ✓ Copper (II)
- ✓ Iron (II)
- ✓ Lead (II)
- ✓ Manganese (II)
- ✓ Zinc (II)
- ✓ Selenium (IV)
- ✓ Mercury (II)

## NUTRIENTS (Scheduled)

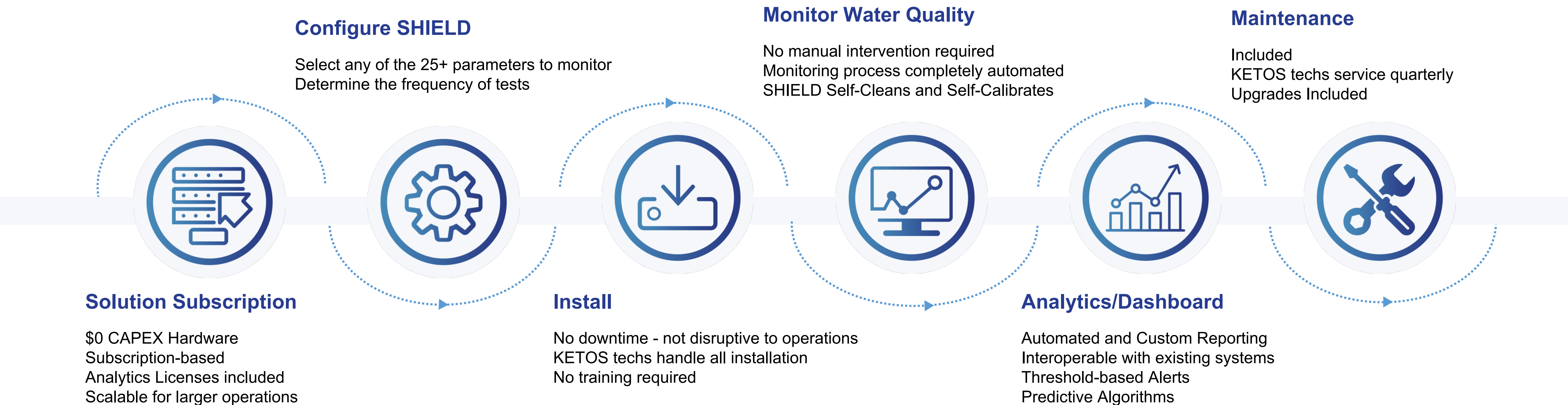
- ✓ Orthophosphates
- ✓ Nitrates (N-N03)

## INORGANICS (Scheduled)

- ✓ Alkalinity
- ✓ Dissolved Boron
- ✓ Dissolved Silica
- ✓ Free Chlorine
- ✓ Residual Chlorine
- ✓ Total Hardness



# KETOS SHIELD | Simple Installation, Configuration, & Operation



# KETOS | Use Cases

**OIL & GAS:** Large midstream oil and gas company (with hundreds of miles of pipeline infrastructure) that develops, produces, treats, and transports water for exploration and production

## Influent & Effluent Testing & Process Controls

### THE CHALLENGE

- Inability to autonomously detect Iron, Selenium and other heavy metals with lab accuracy.
- Failed instruments that could not reliably and repeatably detect heavy metals.
- Uncertainty in use correlations and guess estimations.

### KETOS SOLUTION

- KETOS Shield Sensor System installed outdoors to autonomously test influent & effluent water.
- Data collected from KETOS Shield Sensor System and aggregated in a data warehouse.
- Automated analytics on the KETOS platform.
- Automated reporting and alerts set-up for process controls.
- Outdoor Installation.

### OUTCOME

After installing the KETOS Solution, the client was able to:

- Automatically test and detect Iron, Selenium and other heavy metals in influent & effluent water with lab accuracy.
- Analyze water and capture results in real time.
- Receive real-time, threshold-based alerts.
- Operate consistently without having to calibrate, clean and repair failed instruments.
- Stop relying on correlations and guess estimations and instead make data-driven decisions in real-time.

## Benefits

- ✓ Frequently and Autonomously Test for
- ✓ Heavy Metals
- ✓ Lab Accurate Results in Real-Time
- ✓ Real-Time Reporting
- ✓ Real-Time Threshold based Alerts
- ✓ Data-Driven Decision Making
- ✓ Cost Reduction - Labor and Equipment
  - Instruments
  - Calibration
  - Cleaning
  - Sampling
  - Lab Tests





# KETOS | Use Cases

**MANUFACTURING:** A leading American supplier of carbon and alloy steel bar, rod, and wire

## Real-Time Monitoring of Effluent Discharge

### THE CHALLENGE

- Effluent discharge containing heavy metals from the manufacturing process.
- Need for frequent testing to ensure compliance.
- Issues with sampling and testing were:
  - Time consuming
  - Manual/Labor intensive
  - Expensive
  - Water treatment processes were reactive.

### KETOS SOLUTION

- KETOS Shield Sensor System installed to autonomously sample and analyze water.
- Automated water sample test results and analytics in the KETOS platform.
- Data collected from KETOS Shield Sensor System and aggregated in a data warehouse.

### OUTCOME

After installing the KETOS Solution, the client was able to:

- Proactively monitor and treat all effluent discharge for heavy metals
- Identify testing anomalies and pre-empt potential compliance issues
- Reduce time and expense associated with manual sample collections and lab testing

## Benefits

- ✓ Effluent Water Monitoring
- ✓ Heavy Metals
- ✓ Lab Accurate Results in Real Time
- ✓ Compliance Assurance
- ✓ Real Time Reporting and Threshold based Alerts
- ✓ Cost Reduction - Labor and Equipment
- ✓ Data-Driven Decision Making





# KETOS | Use Cases

**POWER PLANT:** A leading provider of water and wastewater treatment solutions for industrial, municipal, and recreational customers

## Coal Ash Pond Remediation

### THE CHALLENGE

- Safe treatment and disposal of coal ash and residual ash in ponds.
- Frequent testing was needed to ensure water safety and compliance
- Multiple locations.

### KETOS SOLUTION

- KETOS Shield Sensor Systems installed to autonomously sample and analyze water.
- Automated water sample test results and analytics in the KETOS platform.
- Real-time reporting and alerts.
- Data collected from KETOS Shield Sensor System and aggregated in a data warehouse.

### OUTCOME

After installing the KETOS Solution, the client was able to:

- Proactively monitor and treat all effluent discharge for relevant contaminants more than once per day.
- Identify testing anomalies and pre-empt potential compliance issues related to heavy metals.
- Reduce time and expenses associated with manual sample collections and lab testing.
- Collect data from multiple locations aggregated in a centralized repository and automatically analyzed in the KETOS platform.

## Benefits

- ✓ Coal Ash Pond Water Monitoring
- ✓ Lab Accurate Results in Real Time
- ✓ Data from Multiple Sites – Aggregated in a Centralized Repository
- ✓ Real Time Reporting and Threshold based Alerts
- ✓ Compliance Assurance
- ✓ Water Safety
- ✓ Cost Reduction - Labor and Equipment
- ✓ Data-Driven Decision Making





# KETOS | Use Cases

**PRIVATE MUNICIPAL WATER PROVIDER:** A diversified water company supplying potable water across central Texas from privately owned and operated groundwater well fields

## Fully Autonomous Groundwater & Well Monitoring

### THE CHALLENGE

The client faced a number of issues before the installation of the KETOS system:

- Full-time employees tasked with taking samples and facilitating the lab testing process.
- Lab tests and environmental monitoring costs were high.
- Data collected was not easily integrated with supervisory control and data acquisition (SCADA) System.

### KETOS SOLUTION

KETOS was able to implement a number of solutions including:

- KETOS Shield Sensor System was installed.
- Frequent and Autonomous water sampling and testing.
- Data collected from KETOS Shield Sensor System and aggregated in a data warehouse with secure access on a cloud-based platform.
- Real-time results, analytics, and alerts via the KETOS platform.

### OUTCOME

After installing the KETOS Solution, the client was able to:

- Replace manual processes associated with water sample collection, testing, and analysis.
- Integrate KETOS with existing SCADA systems.
- Identify testing anomalies and pre-empt potential compliance issues.
- Reduce time and expense associated with manual sample collections and lab testing.

## Benefits

- ✓ Cost Reduction in Labor & Equipment
- ✓ Full SCADA Integration
- ✓ Lab Accurate Test Results in Real-Time
- ✓ Real-Time Anomaly Detection & Alerts
- ✓ Data-Driven Decision Making
- ✓ Cost Per Parameter \$0.01-\$2.14





# KETOS | Use Cases

**SOUTHERN NEVADA WATER AUTHORITY:** Serving more than 2.2 million residents in Southern Nevada, responsible for water treatment & water distribution

## Ensuring Safe Water Treatment & Drinking Water

### THE CHALLENGE

The client faced a number of issues before the installation of the KETOS system:

- Manual testing for Arsenic & Chromium multiple times per day
- Testing recycled & treated water
- Understanding if treated water meets water quality & safety standards
- Labor intensive & expensive sampling & testing processes

### KETOS SOLUTION

KETOS was able to implement a number of solutions including:

- Indoor & outdoor KETOS Shield installations
- Real time data visualization, monitoring & alerts through KETOS Platform
- “Security System” for water quality monitoring & compliance

### OUTCOME

After installing the KETOS Solution, the client was able to:

- SNWA was able to review real-time results on critical contaminants - multiple times a day.
- Maintain control over internal processes on arsenic removal.
- Monitor in real-time both chromium and arsenic with a lower sensitivity level of 2ppb
- SNWA is able to pre-empt potential compliance issues through real-time feedback and alerts.
- Significantly reduce the time and expense associated with manual sample collections and lab testing.

## Benefits

- ✓ Cost Reduction: Transportation, Instruments, Calibration, Cleaning, Sampling & Lab Testing
- ✓ Lab Accurate Results in Real-Time
- ✓ Real-Time Threshold-based Alerts
- ✓ Data-Driven Decision Making
- ✓ Lower Carbon Footprint
- ✓ Safety net for compliance concerns
- ✓ Enhanced consumer confidence





# KETOS | Use Cases

**METROPOLITAN CITY UTILITY:** Major metropolitan suburb serving over 75,000 residents sourcing from surface and responsible for water treatment, water distribution and wastewater

## Real-Time Testing & Monitoring Surface Water & Wastewater Treatment Plants

### THE CHALLENGE

The client faced a number of issues before the installation of the KETOS system:

- Two water plants with different water sources:
  - Surface Water Plant – continuous freshwater stream
  - Water Treatment Plant – treated effluent water
- Understanding if treated water meets water quality and safety standards.
- Loss of revenue by sending high-quality drinking water for non-potable use at recreational facilities such as golf courses.
- Labor intensive and expensive sampling and testing processes.

### KETOS SOLUTION

KETOS was able to implement a number of solutions including:

- Indoor and Outdoor KETOS Shield Sensor System installations.
- Autonomous water sampling and testing.
- Data collected from KETOS Shield Sensor System and analyzed without any manual intervention.
- Real-time results, analytics, and alerts via the KETOS platform.

### OUTCOME

After installing the KETOS Solution, the client was able to:

- Increased revenue by monetizing high-quality drinking water for its appropriate applications.
- Reduced time and expense associated with manual sample collections and lab testing.
- Leveraged real-time water sample test results in the KETOS platform.
- Automatically detect water quality issues and pre-empt potential compliance issues.

## Benefits

- ✓ Increased Revenue
- ✓ Reduced Labor and Lab Testing Costs
- ✓ Autonomous Water Quality Testing
- ✓ Lab Accurate Results in Real-Time
- ✓ Data-Driven Decision Making & Real-Time Reporting
- ✓ Real-Time Threshold-based Alerts & Trend Analysis
- ✓ Cost Reduction: Transportation, Instruments, Calibration, Cleaning, Sampling & Lab Testing







KETOS

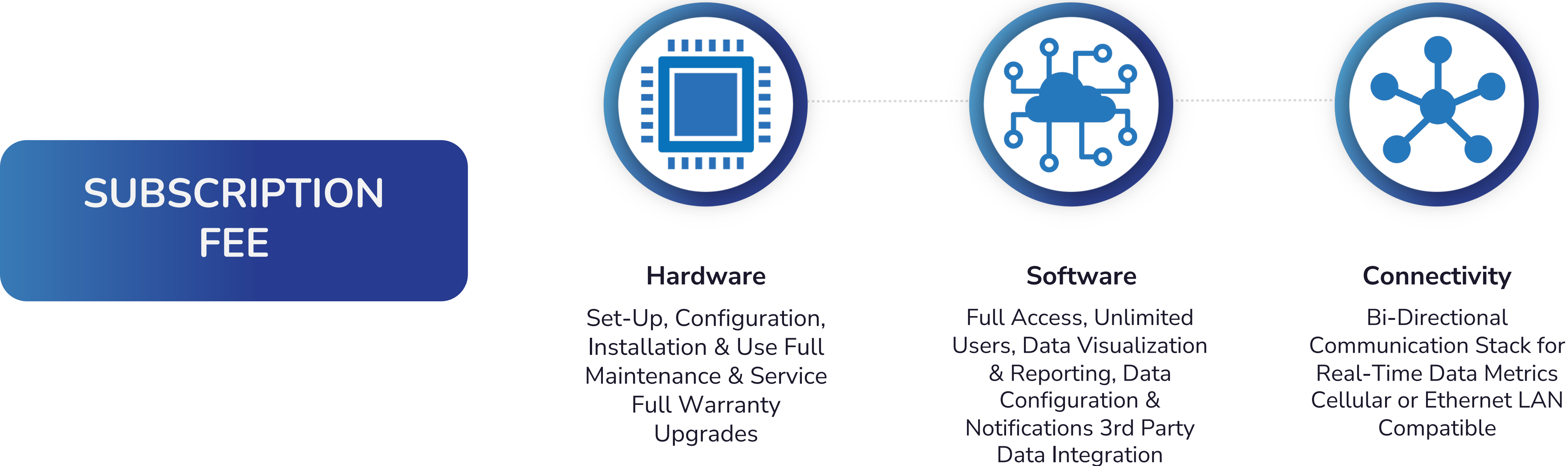
Business Model





# Business Model | Customer Centric

Compelling **\$0 CAPEX** Hardware/Software as a Service Model





# KETOS | Company Overview

**Founded:** 2015  
**Funding:** Venture-backed  
**Employees:** 60  
**Background:** Engineering, Robotics,  
Data Science & Material  
Science  
**Product:** KETOS Data Platform,  
KETOS Shield &  
KETOS Wave  
**Deployments:** US, Canada, Mexico & India



**Meena Sankaran**  
*CEO & Founder*

## Awards



World Open Innovation Conference  
1st Prize Industry Startup Disruptor



Top Global Water  
Technologies



Top 50 Global Technologies for  
Smart Cities in 2020

**BILL & MELINDA**  
*GATES foundation*

Top 10 Agricultural  
Technologies of Food Safety



Innovation in  
Clean-Tech Award



UNITED NATIONS

Presenter: UN SUMMIT Sustainable  
Development Goals



2017 Milestone Maker





**Thank You!**

**REQUEST A DEMO**