Data Management and Analytics for Smart Water Systems

Data | Analytics | Insightful Decisions

IOSight Proprietary Data

Overview

- **What we do** – a leading provider of **data management and analytics** solutions for the utilities sector
- **Who we are** – a quality group of engineers, software & algorithm experts with vast water and energy experience
- **Our track record** – more than **100 installations**, world-wide

Our objective: continue our international growth through strategic partnerships with utilities and service providers

IOSight Proprietary Data

The Challenge – Turning Data into Actionable Insights

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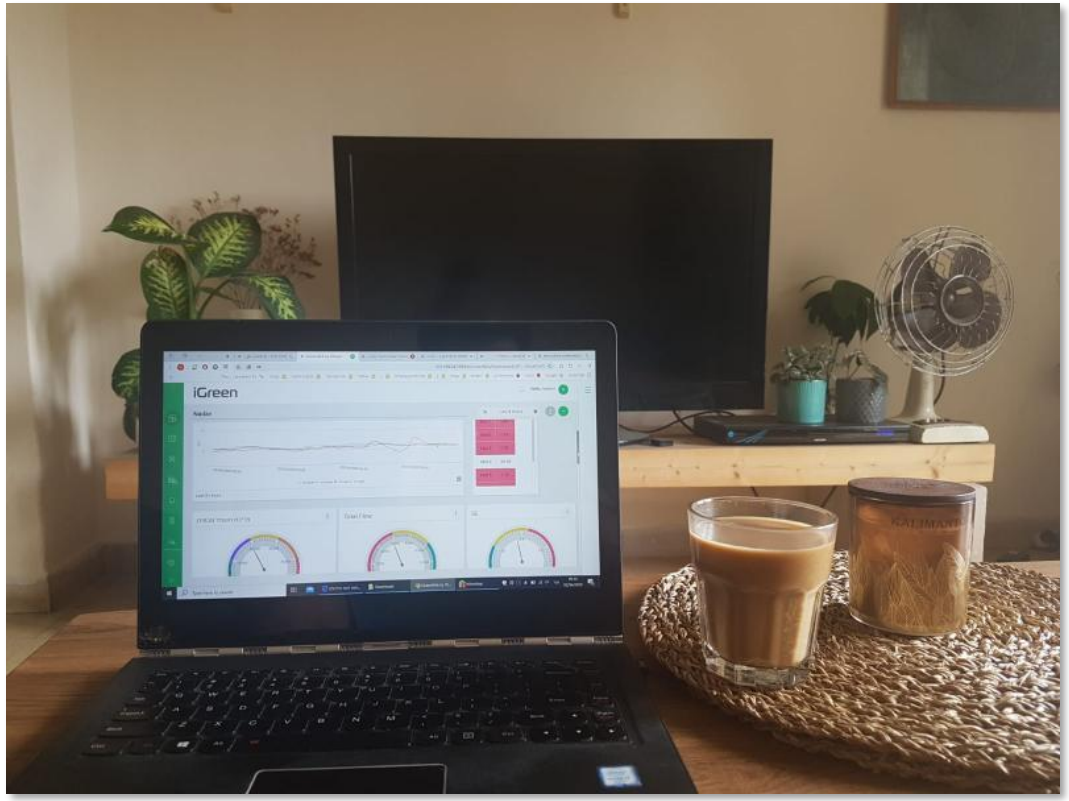
Anywhere Anytime

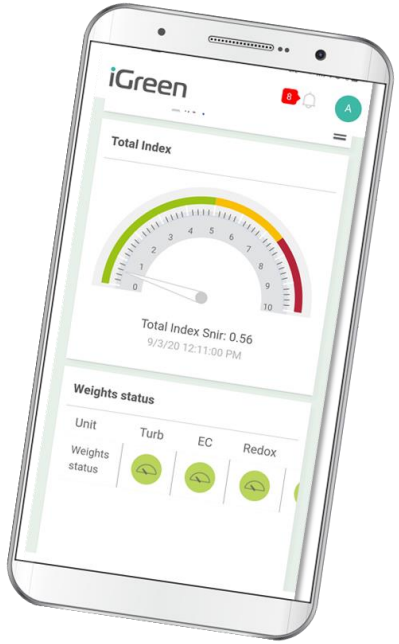
Continuity

Comprehensiveness

Convenience

Collaboration





The New Normal – Post COVID-19

IOSight Responds to the Utility Data Challenge

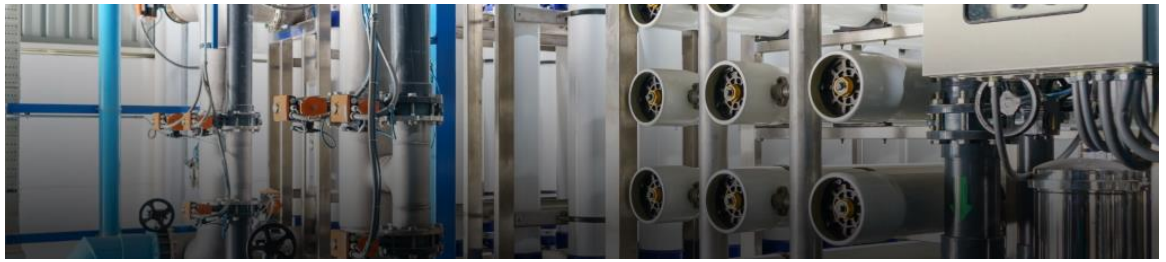
iGreen

IOSight's Integrated Smart Water Suite

Our Clients – Examples

Water and Wastewater Facilities and Utilities

Desalination



Watersheds and Environment

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Installations – Water Treatment, Wastewater Treatment and Desalination Plants

Facility	Location	Capacity
Shafdan WWTP	Israel	397,000 m^3/day
Jerusalem WWTP	Israel	150,000 m^3/day
Everbright Incineration Leachate WWTP	China	2,500 m^3/day
Herzliya WWTP	Israel	20,000 m^3/d
Jardine WPP	Chicago, US	5,300,000 m^3/day
Sawyer WPP	Chicago, US	2,726,000 m^3/day
Westlake Filtration Plant	California, US	68,000 m^3/day
Lahat BWRO Plant	Israel	20,000 m^3/d
Granot BWRO Plant	Israel	20,000 m^3/d
Sorek SWRO Plant	Israel	624,000 m^3/day
Hadera SWRO Plant	Israel	525,000 m^3/day
Ashkelon SWRO Plant	Israel	396,000 m^3/day
Ashdod SWRO Plant	Israel	384,000 m^3/day
Palmachim (ViaMaris) SWRO Plant	Israel	246,000 m^3/day
Carlsbad SWRO Plant	California, US	204,000 m^3/day
Santa Barbara SWRO Plant	California, US	11,000 m^3/day
Larnaca SWRO Plant	Cyprus	54,000 m^3/day
Limassol SWRO Plant	Cyprus	40,000 m^3/day

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Installations – Water Utilities, Watersheds & Environment

Water Utilities, Watersheds & Environment	Location
The Chicago Department of Water Management	US
Current – Chicago River	US
Mekorot – The Jordan River Watershed	Israel
The Jerusalem Water Utility	Israel
The Ramat Gan Water Utility	Israel
The Haifa Water Utility	Israel
Las Virgenes Municipal Water District	US
The Jordan Valley Water Association	Israel
The Beer Sheva Water Utility	Israel
Igudan – Dan Regional Association for Environmental infrastructure	Israel
The Herzliya Water Utility	Israel
The Kfar Sava Water Utility	Israel
The Rishon Lezion Water Utility	Israel

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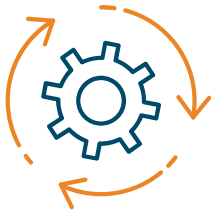
Value Creation for Clients – Use Cases



Operations and Performance

- **Water quality** monitoring
- **Energy** cost reduction
- **Chemical** consumption reduction
- **Machine performance** monitoring
- Minimization of down time
- Network **optimization**
- **Water loss** detection
- **Data integrity** assurance
- Process optimization
- **Knowledge management**

Administration and Finance

- Billing & metering
- Chemical inventory management
- Chemicals and energy balances
- Planning vs. execution comparison

Regulatory Compliance

- Comprehensive regulatory reporting
- Contractual compliance
- Adherence with environmental and public health standards

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Unique Value Proposition

- **Engineering-driven** development and implementation
- **Vertically integrated – an off-the-shelf end-to-end solution** for data management and analytics
- **Based on vast experience** (over 100 installations)
- **Seasoned team** – engineers, data scientists, software
- **Water-specific software assets (reports, formulas, analytics)**

Delivering proven solutions and outcomes

iGreen

IOSight Proprietary Data

iGreen is a Best-in-Class Water-Specific Data Management and Analytics Solution

iGreen

Embedded **Water Domain** Know-how and Assets

8	Ease of Use and Scalability	Easy configuration of dashboards and reports by water professionals; Seamless adding of new equipment and tags
7	Algorithm Development Functionality	Embedded functionality allowing easy algorithm formulation for anomaly detection, data-driven optimization etc.
6	Quality Outputs and Displays	Web and mobile dashboards, event management system, robust reporting functionality
5	Cost of Setup and Deployment	Rapid setup and deployment based on proven methodology and vast water project experience
4	Central Secure Database	MS SQL Database in the cloud or on premise
3	Data Modelling and Normalization	Best in class data normalization and modeling functionality and methodology
2	Multi Layer Data Integration and Synchronization	Integration and synchronization of data from diverse data sources; Aggregation of data from various levels (equipment / site / region / corporate) while maintaining data coherency and consistency per level
1	Connectivity	APIs and connectors to SCADA, LIMS, GIS and other data sources

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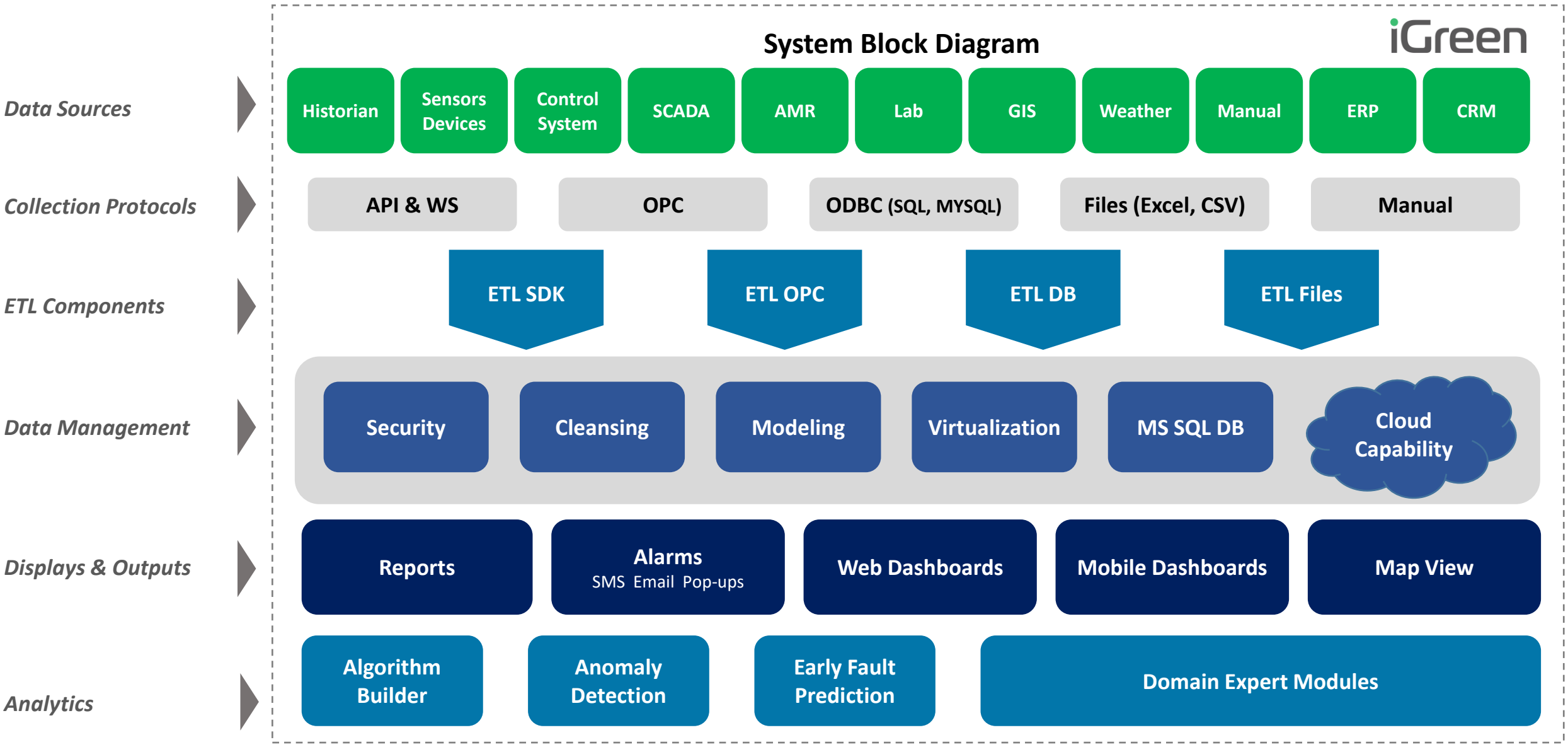
iGreen – System Architecture



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iGreen – Data Foundation

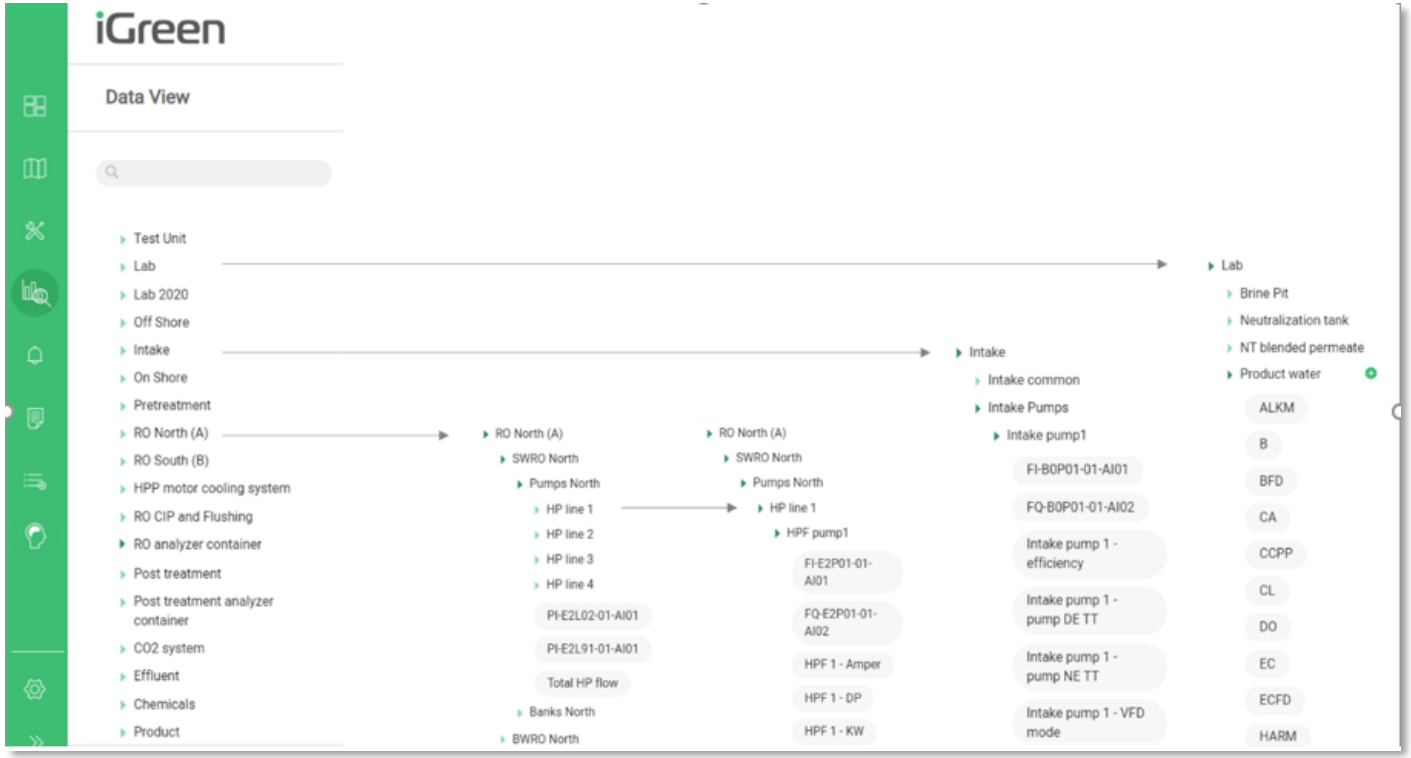
Data Cleansing and Validation

- Pre-processing using data quality concepts and logic rules
- Pre-processing using time series data analysis
- Adding data logic rules – factoring, deadband, limits, etc.

Modeling and Virtualizing

- Creating tags based on engineering expressions
- Adding sanity tests to the incoming values
- Structuring the data to an engineering product tree
- Algorithm builder and rule-based engine per tag

Plant Structure Tree Example



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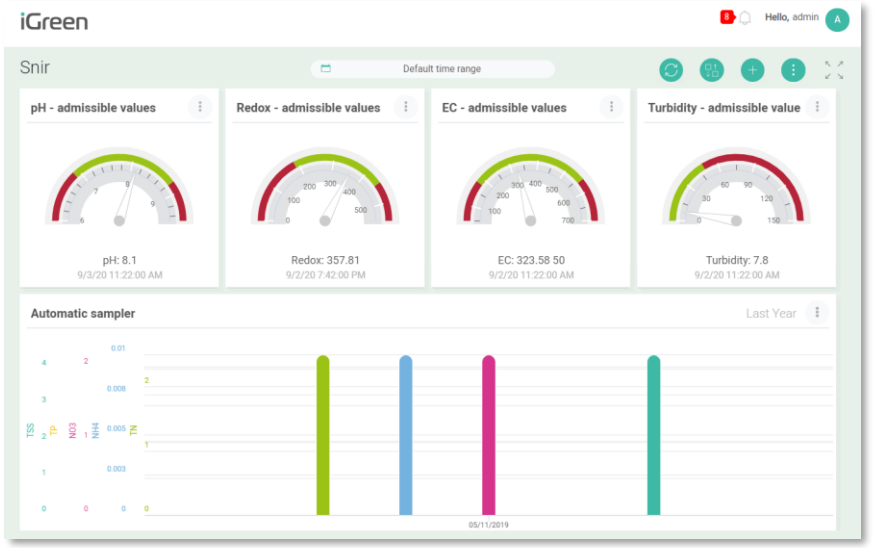
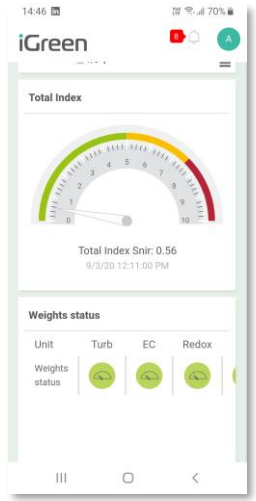
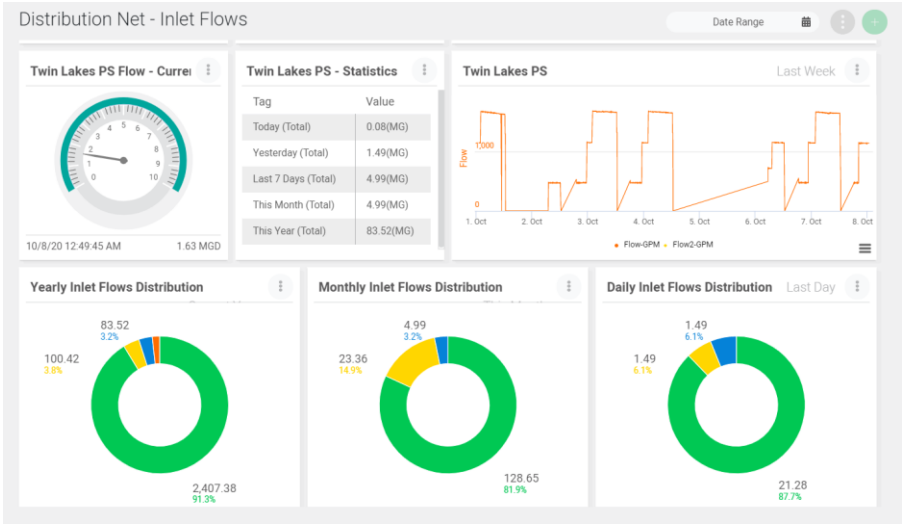
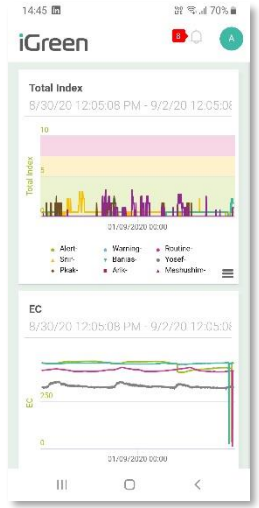
Web and Mobile Dashboards

- Mobile and web Interfaces
- Variety of visual widgets
- User-friendly dashboard creation









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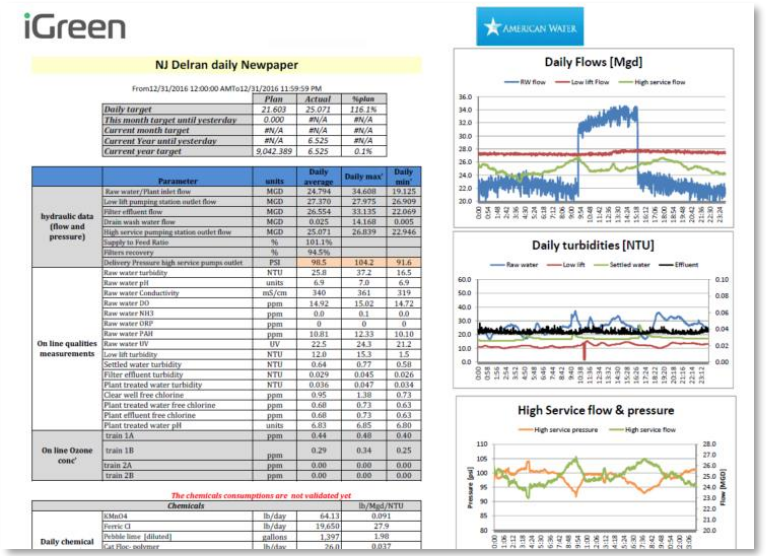
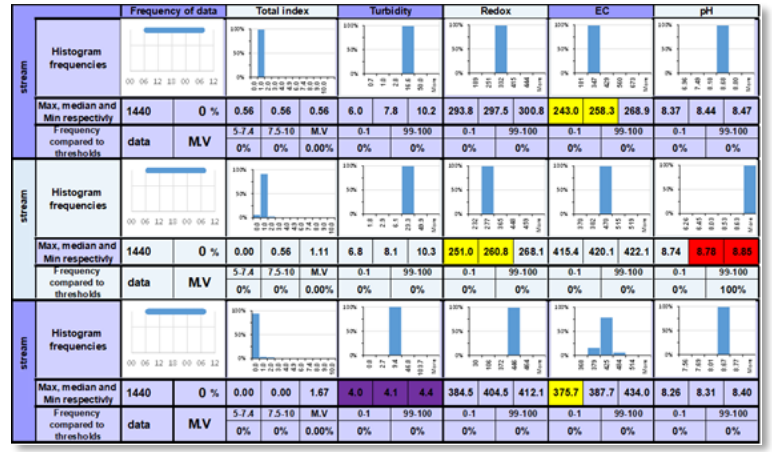
Reporting Engine

- Management and regulatory reports
- Export in multiple formats (Excel, Word, PDF etc.)
- Flexible report creation and distribution (recurrence, trigger-based, on-demand)





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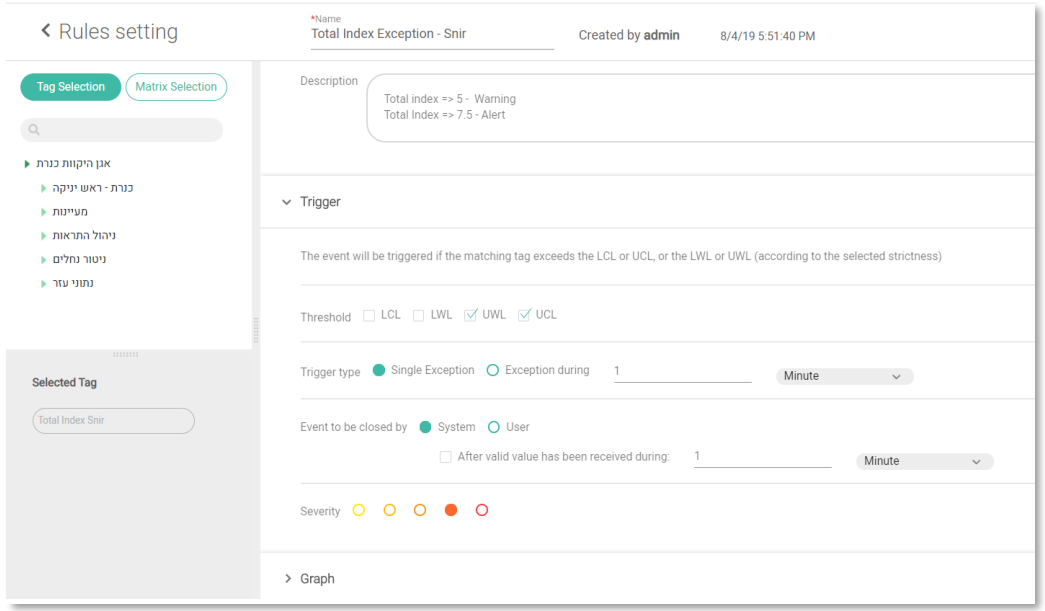
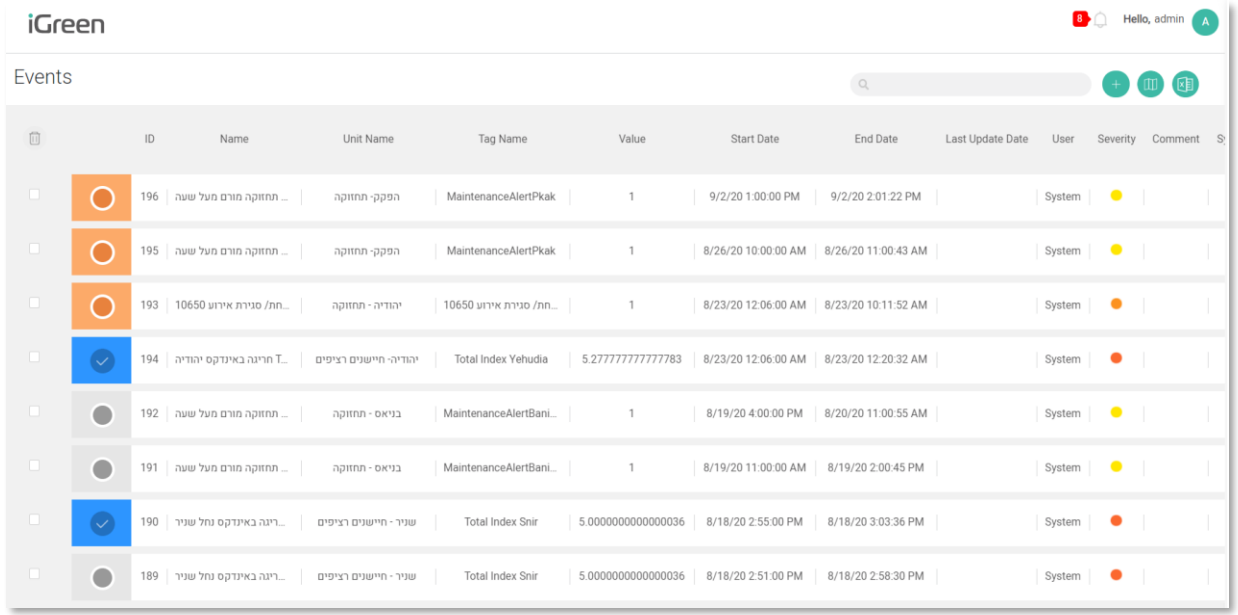
Rules-Based Event Management System

- Rule-based event management
- Alerts can be sent by email or SMS
- GIS interface

Rules Engine



Event Management Screen



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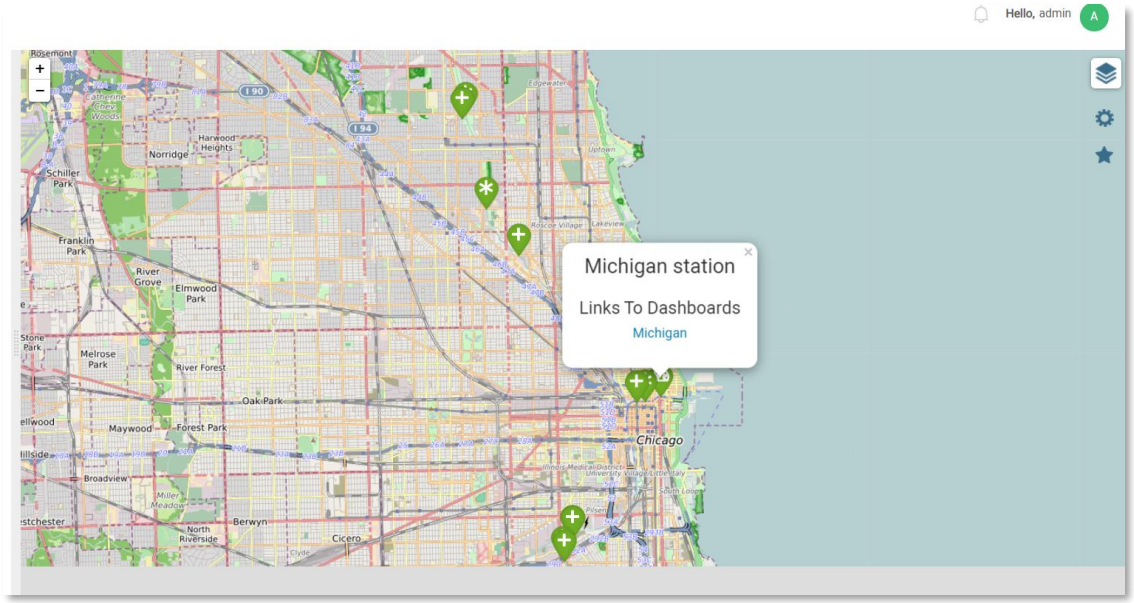
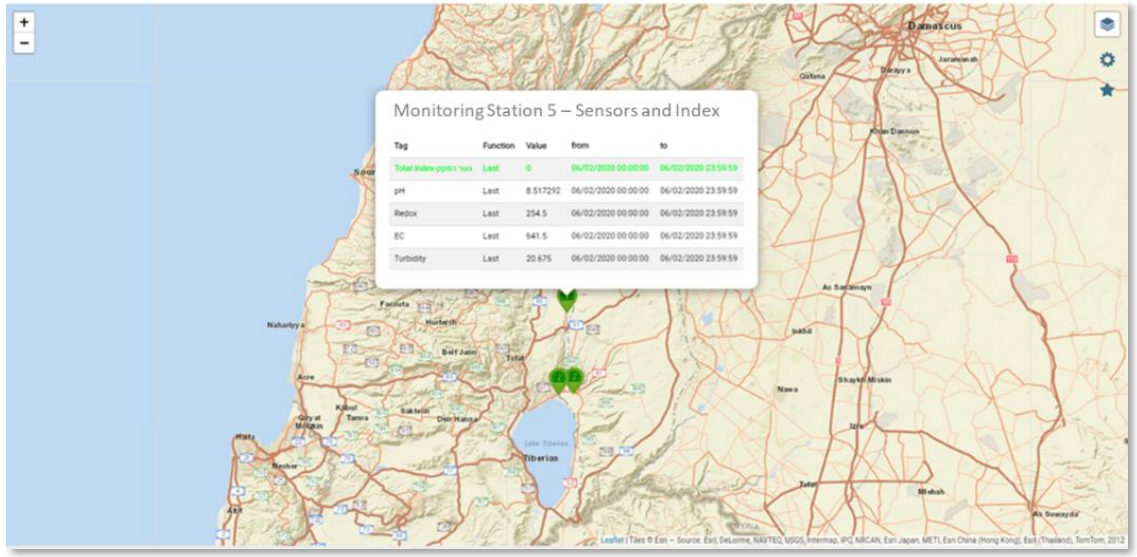
GIS Enabled Map View

- Visually display real-time situation (e.g., water quality) across locations
- Link to dashboards and event management





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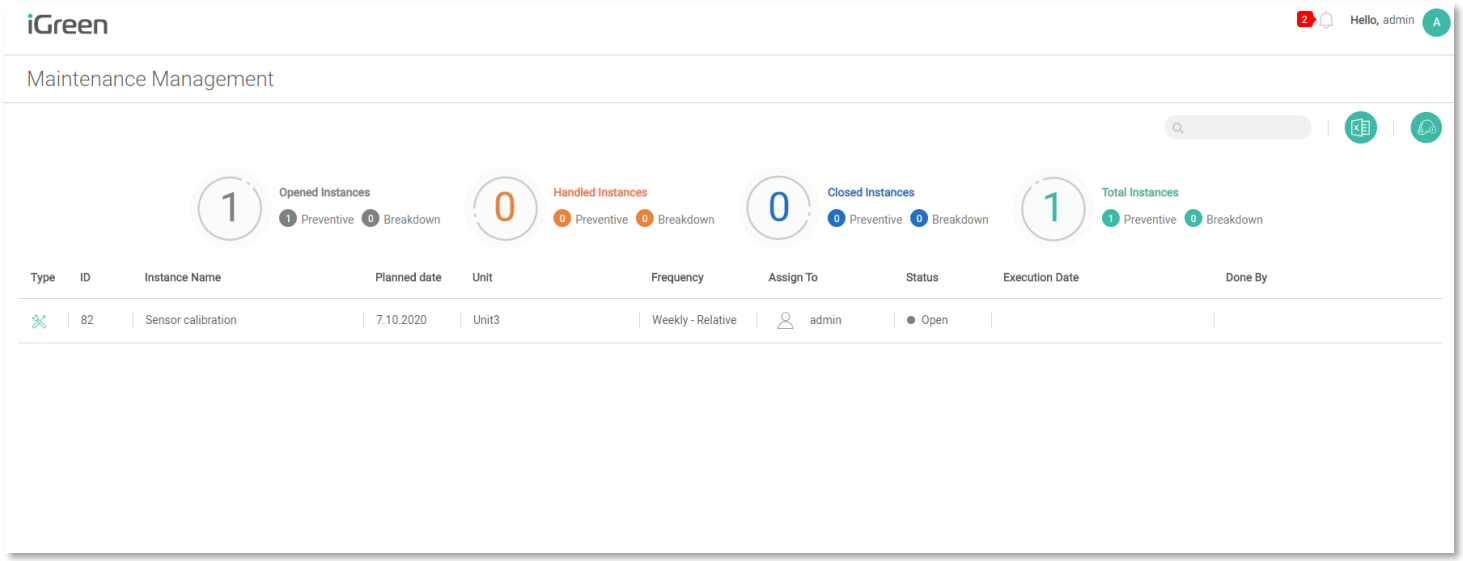
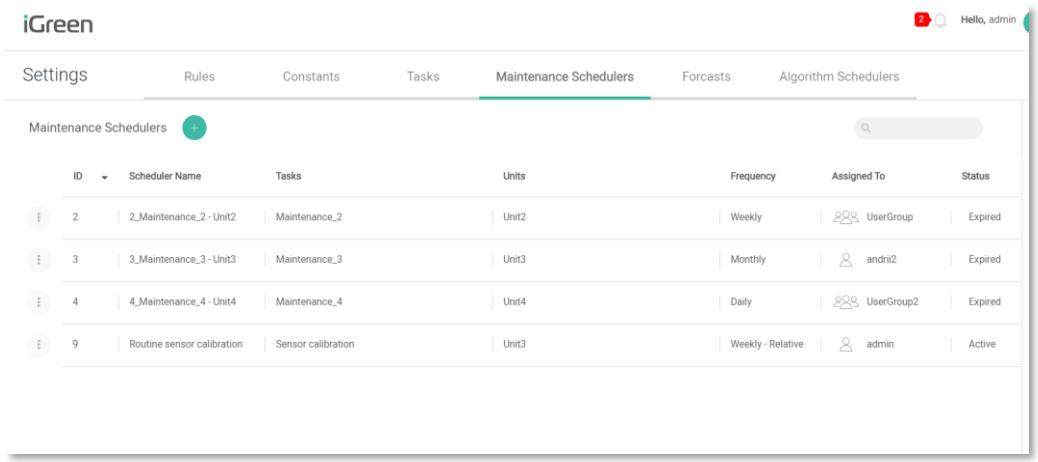
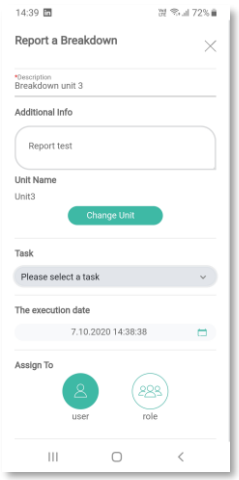
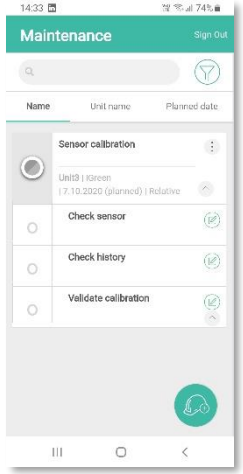
Maintenance management

- Web and mobile interfaces for tracking and managing preventative and corrective maintenance tasks
- Easy, efficient and effective evaluation of asset condition
- Equipment maintenance scheduling processes









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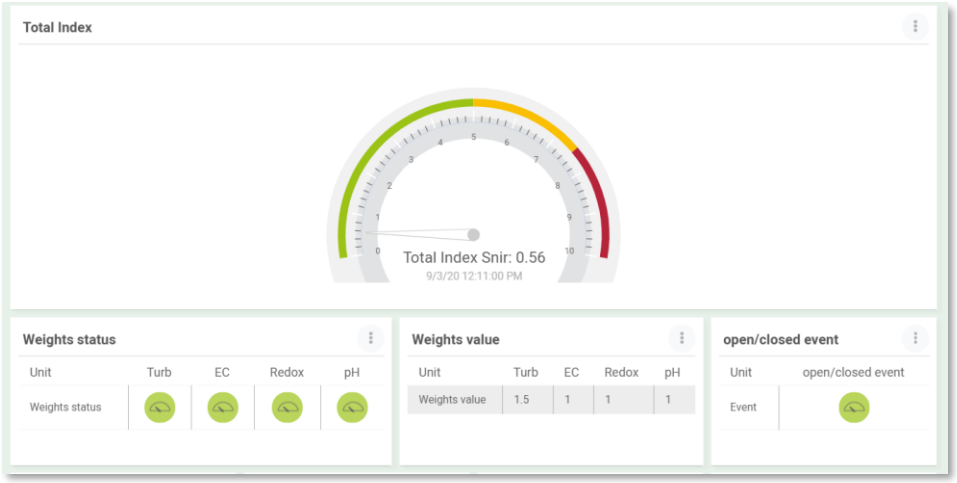
Anomaly Detection and Early Fault Prediction

iShed

Water Quality Monitoring in Rivers and Watersheds

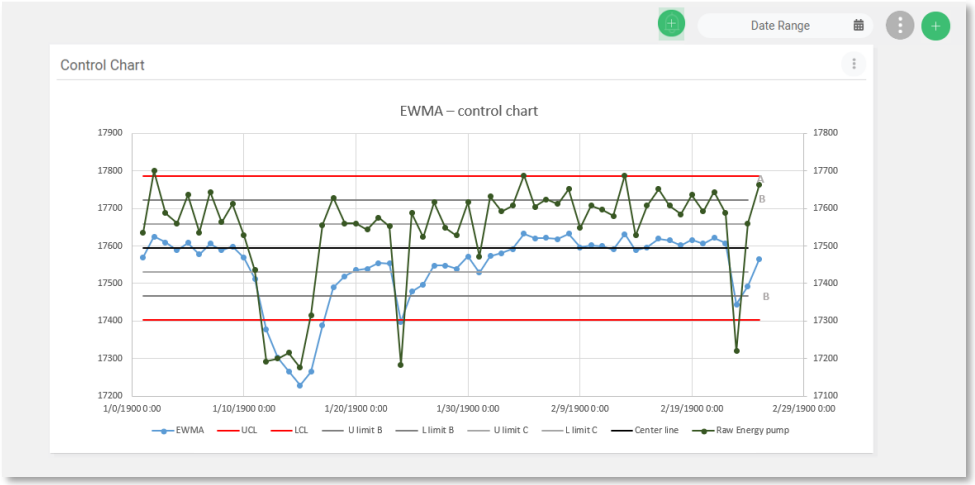
- Contamination / anomaly detection
- Downstream propagation
- Elimination of 95% of false alerts



iDetect

Early Fault Detection Engine

- Machine failure
- Quality exceptions
- Flow and pressure anomalies



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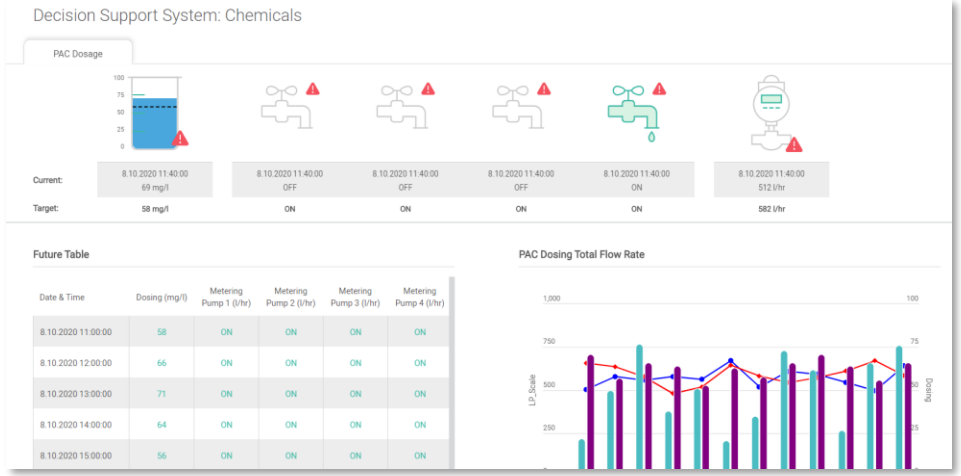
Facility and System Optimization

iWT

iWWT

Optimization for WTPs and WWTPs

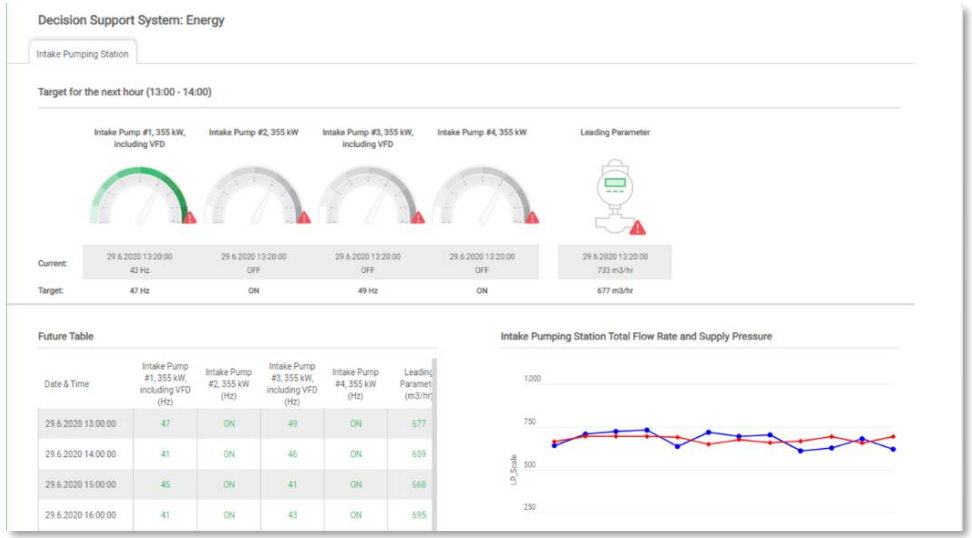
- Energy consumption of pumps/blowers
- Chemical dosing
- Up to 10% cost savings



iOptiNet

Water Supply System Optimization

- Real-time network operations optimization
- Optimization of energy costs



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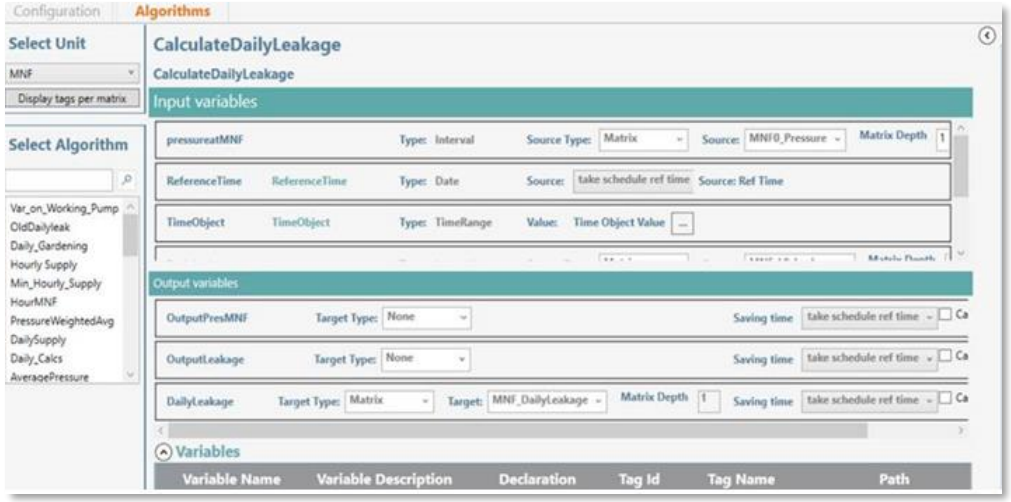
NRW and Leak Detection

iNet

NRW in District Metered Areas (DMAs)

- Online water balances based on MNF
- Water-loss decision-support system
- Detecting anomalies and potential bursts



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Case Studies

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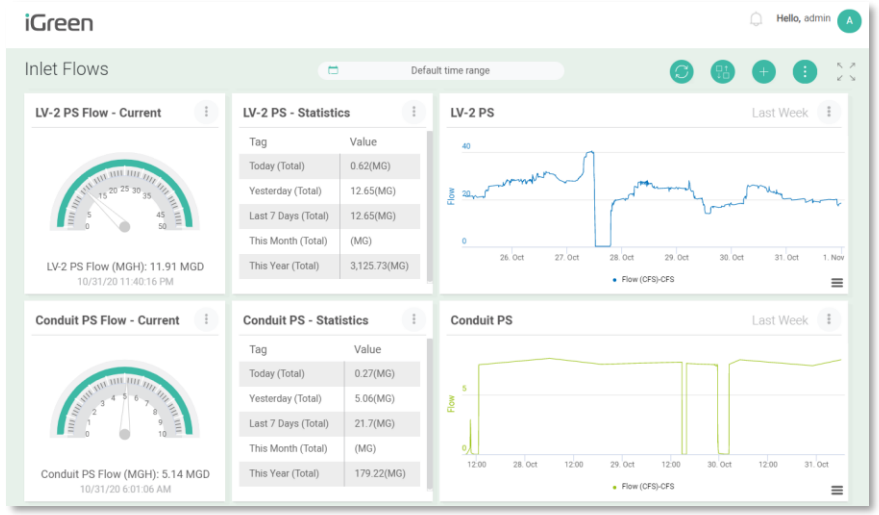
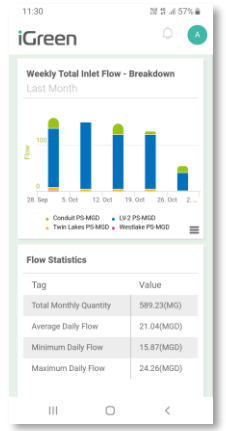
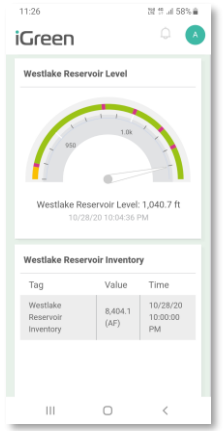
Las Virgenes Municipal Water District, California, US

- COVID-19 “new-born”; Launched in March, go-live in June
- 100% remote project management and execution
- Reservoir, filtration plant, distribution network
- Establishing the data foundation
- Monitoring and management insights
- Web and mobile dashboards
- Management and regulatory reports
- Flows, water levels, quality, energy, chemicals







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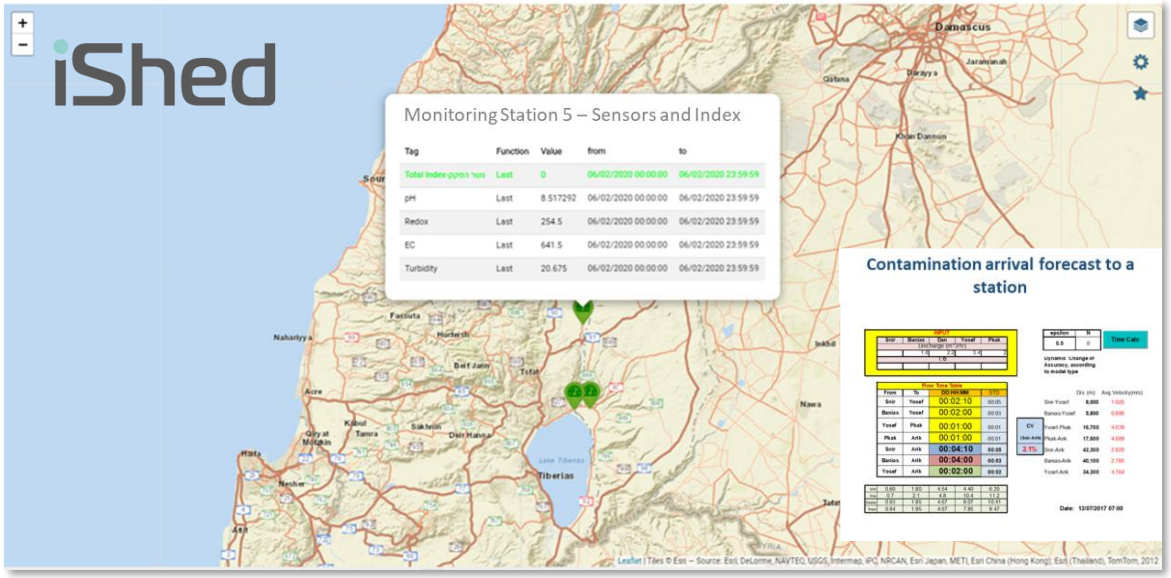
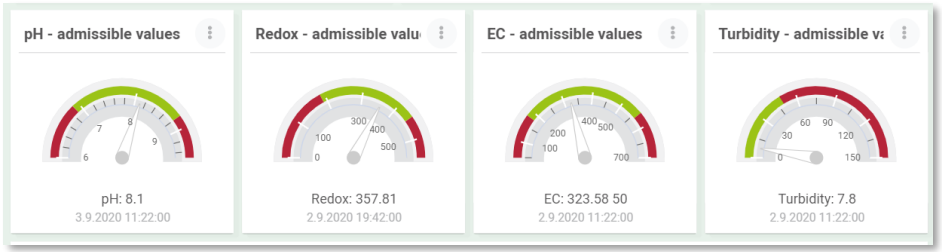
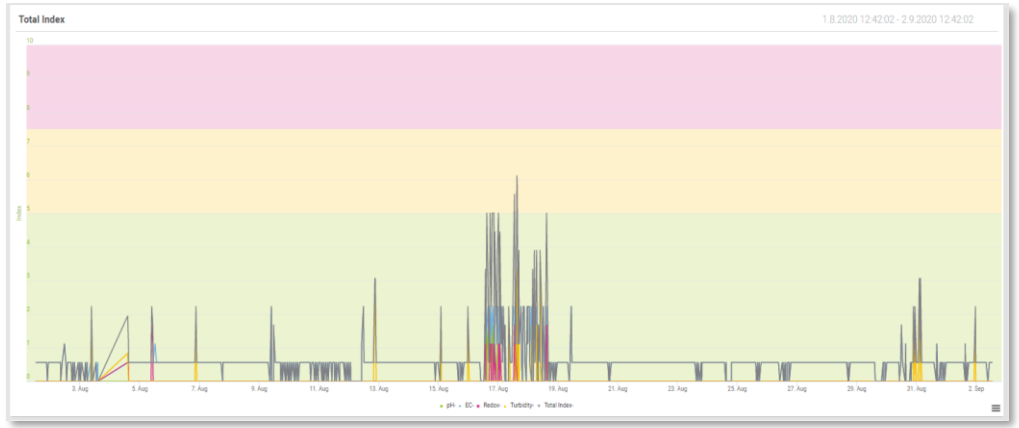
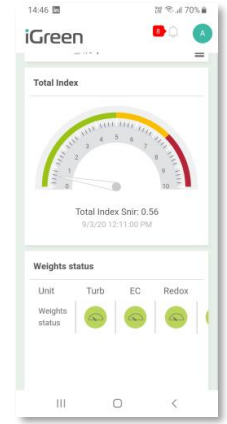
Jordan River / Sea of Galilee Watershed, Israel

- Operational since 2017
- Efficient, comprehensive “Nerve Center”
- 500% productivity improvement
- Algorithm-based anomaly detection
- Elimination of 95% of false alerts
- Propagation calculations
- Event management and alerts
- Web and mobile dashboards









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Chicago Department of Water Management

- Web dashboards and reports for the **Chicago Department of Water Management**
- Integration and management of data collected from 3 SCADA systems
- Jardine and Sawyer Water Purification Plants and the water supply system

City of Chicago

iGreen

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H2Now Chicago – Real-time water quality monitoring

Goals

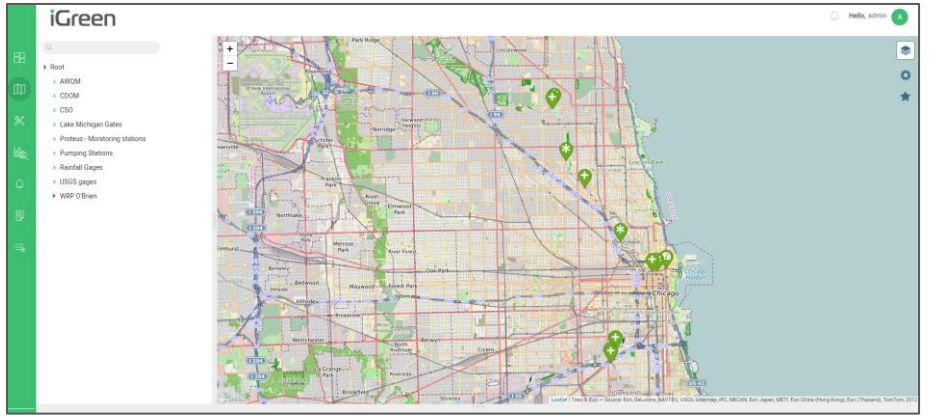
- **Obtain real-time information** about the microbial quality of the Chicago River
- **Communicate** these data to the public
- **Educate** the public
- **Gain insights** into how the river water quality responds to changing conditions and events, such as CSOs

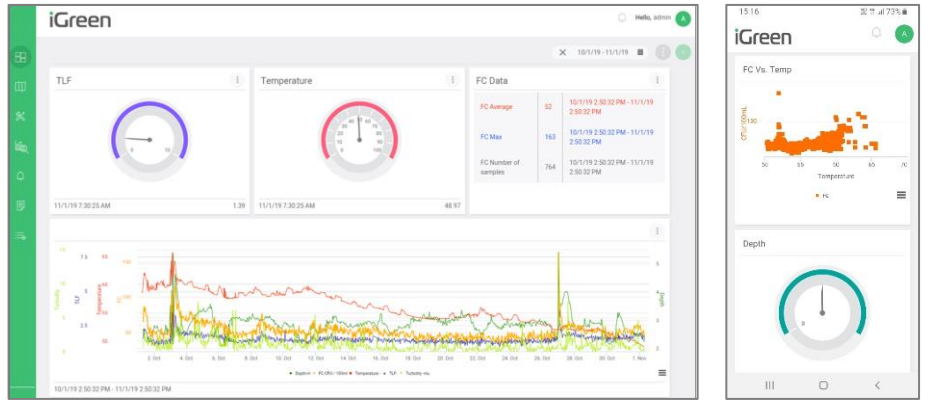
Status

- **iGreen** installed and working
- **iShed** underway

Data Sources

- AWQM
- CDOM
- CSO
- Lake Michigan Gates
- Proteus - Monitoring stations
- Pumping Stations
- Rainfall Gages
- USGS gages
- WRP O'Brien





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Shafdan WWTP

- The **largest wastewater treatment plant in Israel**
- Treats approximately **145 million cubic meters of wastewater per year**
- **iGreen – the center of operations, and the main DSS**
- Data collected from SCADA and Lab (over 4,000 tags)
- **Outputs** – engineering and regulatory reports, online web dashboards
- During **COVID-19**
  - remote access, and ability to monitor the facility's performance
  - numerous daily reports and web dashboards
  - new cyber security component – Waterfall data diode enables **mobile phone access**

MEKOROT
ISRAEL NATIONAL WATER CO.

iGreen

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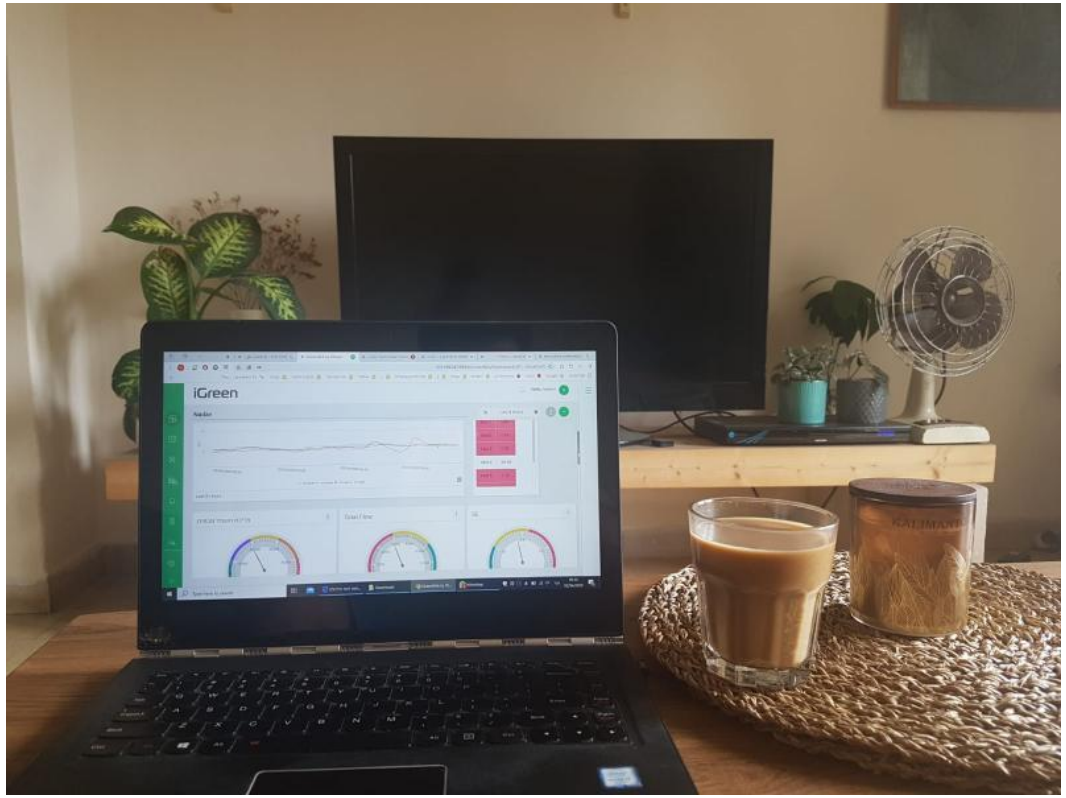
Palmachim Desalination Plant, Israel

- One of the major desalination facilities in Israel
- Produces approximately 90 million cubic meters of water per year
- During COVID-19 period
  - iGreen ensures complete business continuity
  - Remote access by plant engineers and managers
  - More frequent report distribution



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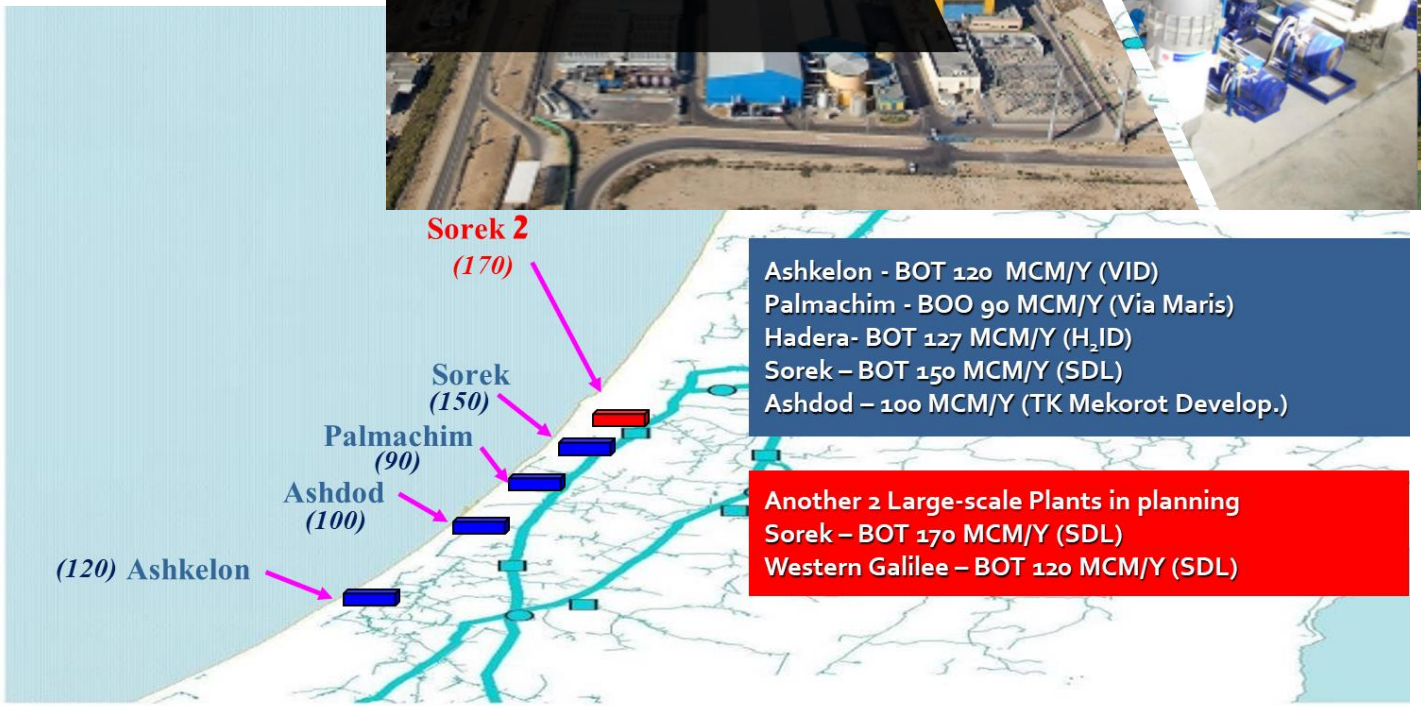
The Israel Water Authority

Control center for monitoring multiple SWRO facilities

- Israel produces 80% of its drinking water from sea water desalination and is considered a world leader in the field.
- With 5 huge facilities built on BOT, the government arm for designing, inspecting and collecting the desalinated water is utilizing iGreen to keep a close watch on plant operations while assuring both water volumes and water quality.



iGreen

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Thank You

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