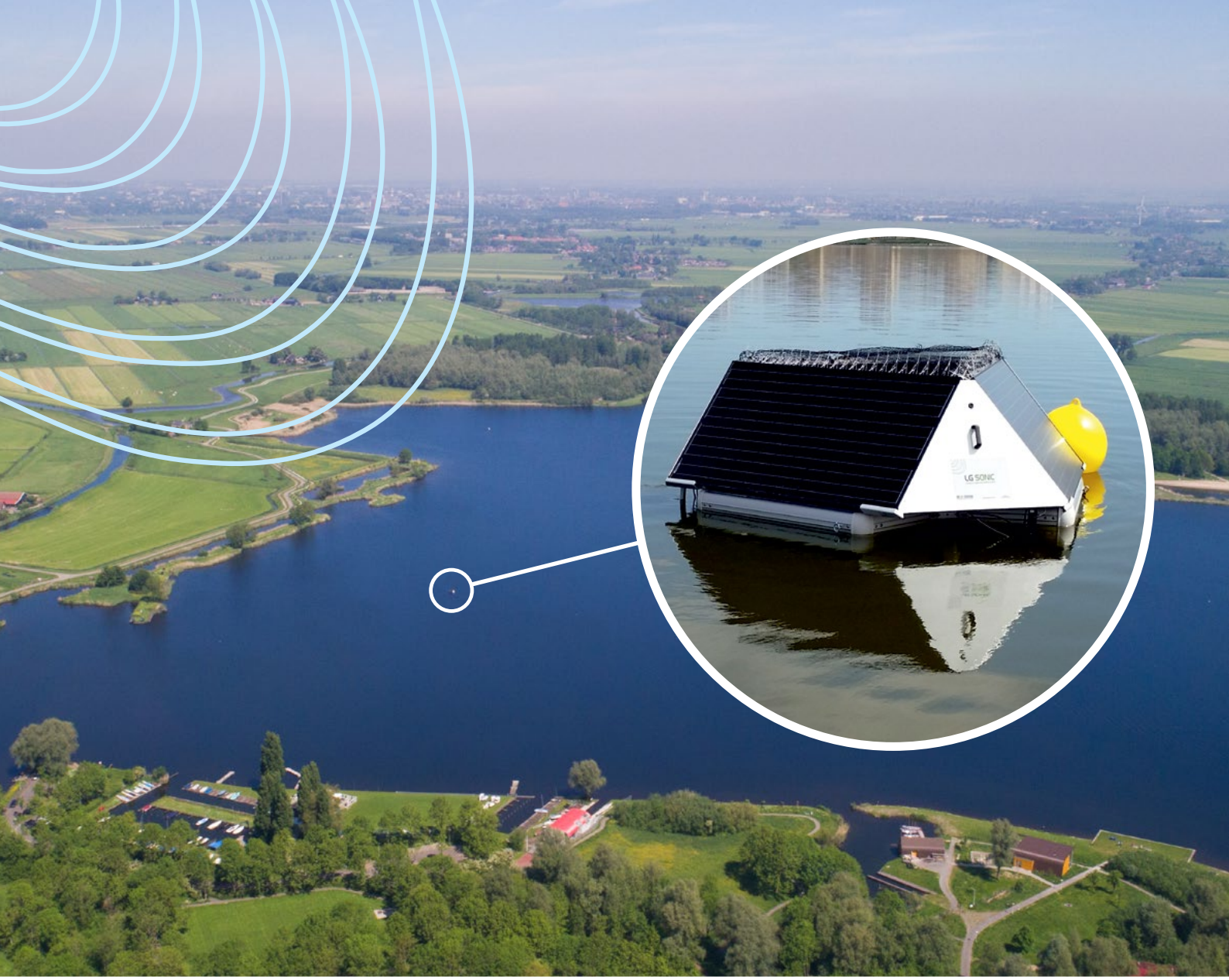


Control and Monitor Algae with the MPC-Buoy

- Eliminate up to 90% of the algae
- Reduce TSS, BOD and chemical usage
- Safe for fish, plants and other aquatic life

LG SONIC
Leading in ultrasonic algae control

Complete Algae Control Solution

A combination of high temperatures, stagnant water, and nutrient overload can result in excessive algae growth. This causes a depletion of oxygen in the water and the release of toxins, as well as taste/odor problems.





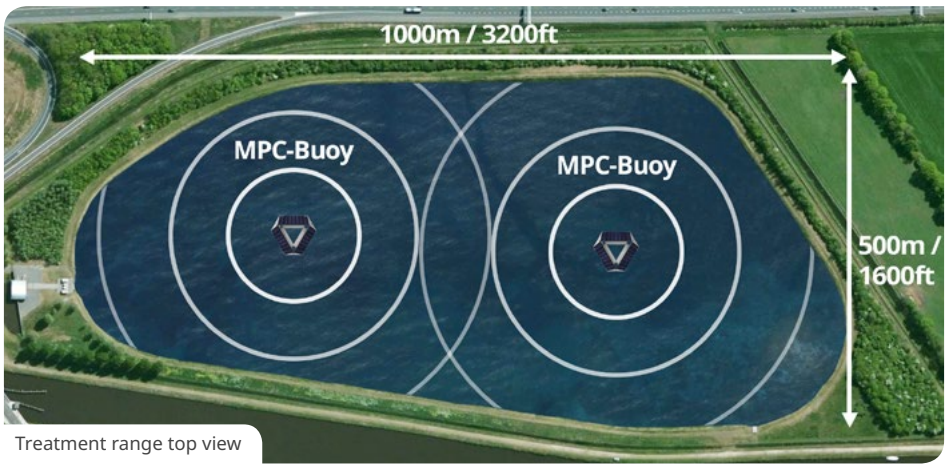
MPC-Buoy

The MPC-Buoy is a floating, solar-powered system that combines real-time water quality monitoring and ultrasonic sound waves to control algae in lakes and reservoirs effectively.

Advantages of LG Sonic ultrasonic technology

- **Eliminate up to 90% of the algae**
- **Prevent the growth of new algae**
- **Reduce TSS, BOD and chemical usage**
- **Safe for fish, plants and other aquatic life**

The solution is to anchor one or multiple systems that transmit specific ultrasonic parameters depending on the type of algae.



Treatment range top view

Each MPC-Buoy device can control algae in areas up to 500m/1600ft in diameter

Control Algae in Large Fresh Water Surfaces

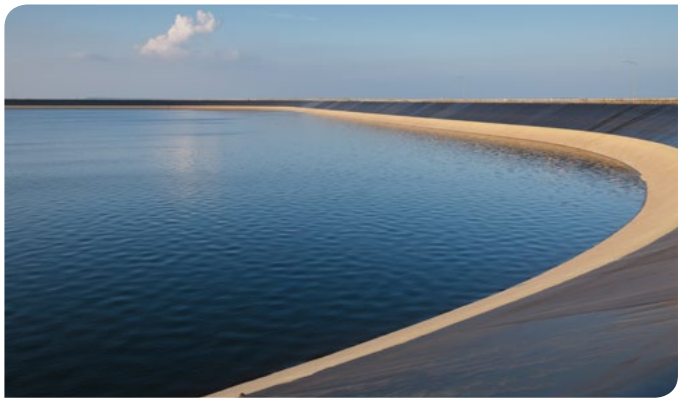
The MPC-Buoy is especially designed to control algae in large water surfaces such as lakes and reservoirs.

Drinking Water Reservoirs



Reduce chemical consumption, odor and taste problems

Irrigation Reservoirs



Prevent the clogging of pumps, filters and sprinklers

Lakes



Reduce odour problems and prevent dangerous toxins

Industrial Reservoirs



Increase water quality and the efficiency of your cooling water

Wastewater Lagoons



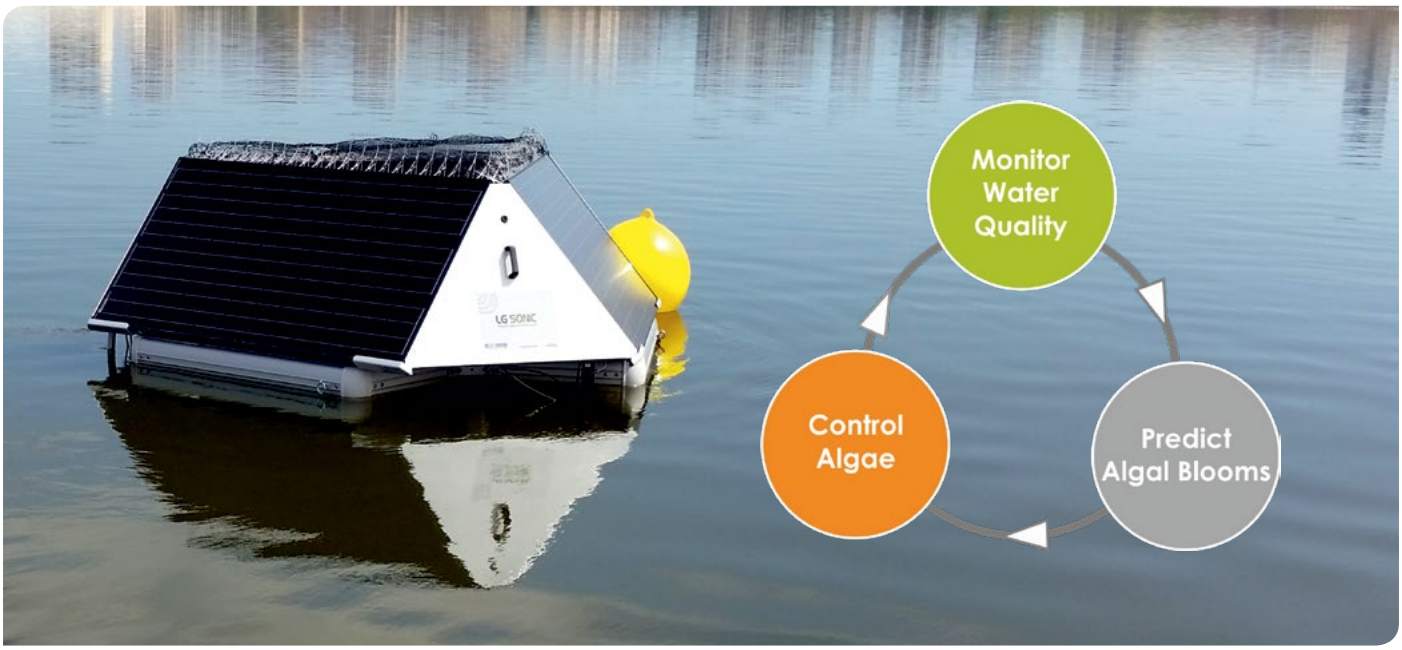
MPC-Grid

For wastewater lagoons, LG Sonic offers an MPC-Buoy solution without solar panels, called the MPC-Grid. The system is powered from the mains (AC, DC optional) to treat smaller water bodies such as wastewater lagoons.

- Improve the water quality
- Reduce TSS and BOD before discharge

Monitor, Predict and Control Algae with the MPC-Buoy

The MPC-Buoy is a floating solar-powered system that combines real-time water quality monitoring and ultrasonic sound waves to control algae effectively.



1. Monitor Water Quality

The MPC-Buoy provides a complete overview of the water quality by collecting the following parameters every 10 minutes:

- Chlorophyll α (green algae),
- Phycocyanin (blue-green algae),
- pH,
- Turbidity,
- Dissolved Oxygen,
- and Temperature.

2. Predict Algal Blooms

The collected data is delivered in real-time via radio, GPRS, or 3G to a web-based software.

The web-based software gives a real-time insight in the water quality.

Based on our developed algorithm we can modify the ultrasonic program to the specific water conditions and predict an algal bloom a few days ahead.

3. Control Algae

Based on the received information, ultrasonic transmitters are activated and/or optimized.

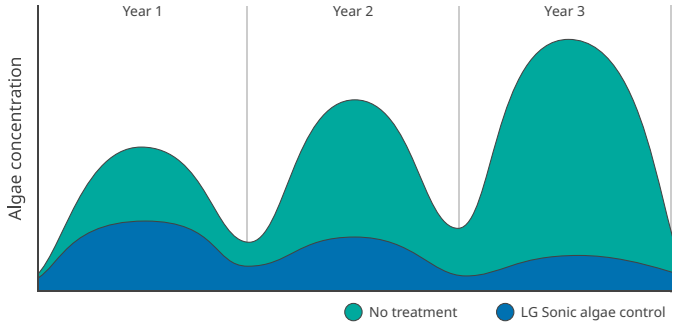
The ultrasound creates a sound layer in the top layer of the water. The sound layer prevents the algae from rising to the surface to get sunlight, the algae will sink to the bottom of a reservoir and are degraded by the bacteria present.

The effects of LG Sonic products have been tested by various universities and are proven to be safe for fish, plants, zooplankton, and insects

LG Sonic Ultrasonic Algae Control Treatment Process

Why it is Important to Control Algae Growth

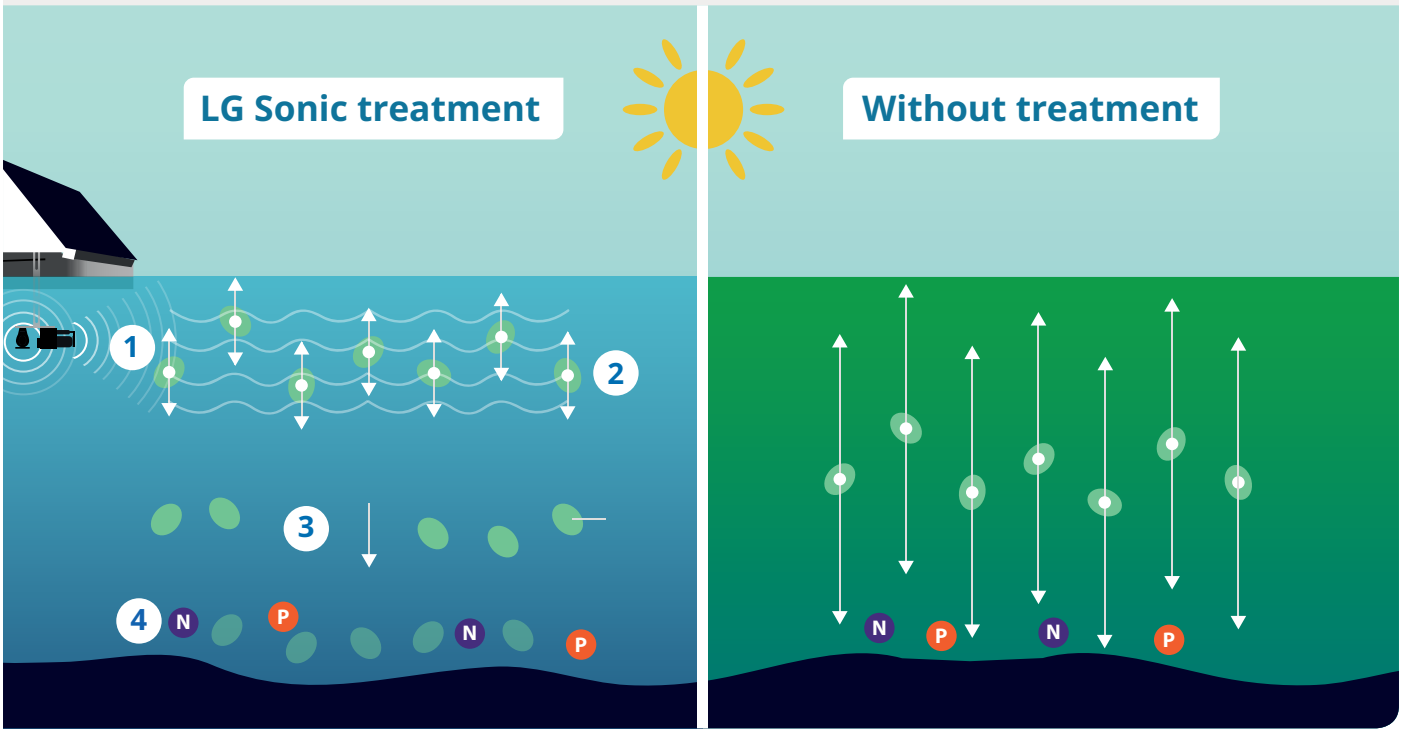
Algal blooms cause a reduced light penetration, depletion of oxygen, and release of toxins from the algae, which are unfavourable conditions for fish and plants. LG Sonic ultrasonic technology contributes to a healthy ecosystem by controlling the algae growth. After one year of treatment, the algal levels will reduce even more as the increased clarity of the water will result in plant growth and increased oxygen levels.



Ultrasonic treatment by LG Sonic can reduce algal blooms by 70 – 90% in concentration, compared to no treatment

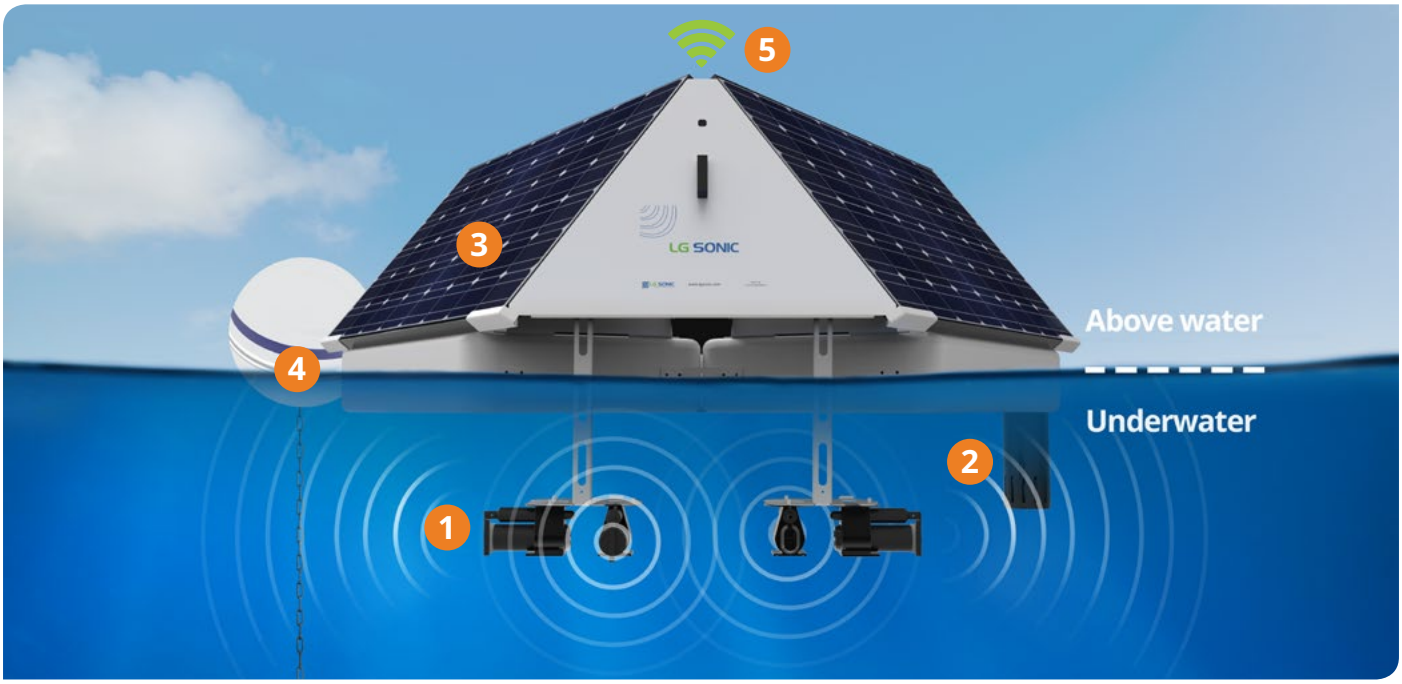
How Ultrasound Targets the Algae

1. The ultrasound creates a sound layer in the top layer of the water.
2. The ultrasound affects the buoyancy of the algae, fixing them in the water column.
3. Due to a lack of sunlight and nutrients, the algae will die and sink to the bottom of the reservoir.
4. The algae are degraded by the bacteria present.



For an effective treatment the ultrasound is adapted to the specific water conditions

MPC-Buoy Features



1 4 ultrasonic transmitters

- Treatment range of 500m/1600ft in diameter
- Integrated Aquawiper™, an automatic cleansing system for the ultrasonic transmitters
- Real-time water quality monitoring to adjust the ultrasonic program to the specific water conditions

2 In-situ water quality sensors

- Monitors chlorophyll α, phycocyanin, DO, turbidity, temperature pH, and redox
- Automatic antifouling wiper ensures optimal readings
- Optional sensors are available according to your needs and preferences

3 Solar panels as power supply

- 3x 195 Wp high-quality solar panels that provide power, all year round in any country
- Switches to energy-saving program during periods of low sun radiation
- 1x 24 Volt, 40 AMP lithium battery

4 Anchored floating construction

- Aluminium powder-coated frame
- UV and corrosion resistant construction
- Unsinkable floats

5 Smart communication system

- GSM/GPRS Telemetry Quadband (CDMA, Radio, GPS and Iridium Satellite optional)
- Real-time water quality data with the MPC-View software
- Integrated alarm functions

MPC-Buoy explainer video

Scan the QR code with your smartphone to learn more about the MPC-Buoy system

Real-time Water Quality Monitoring Software

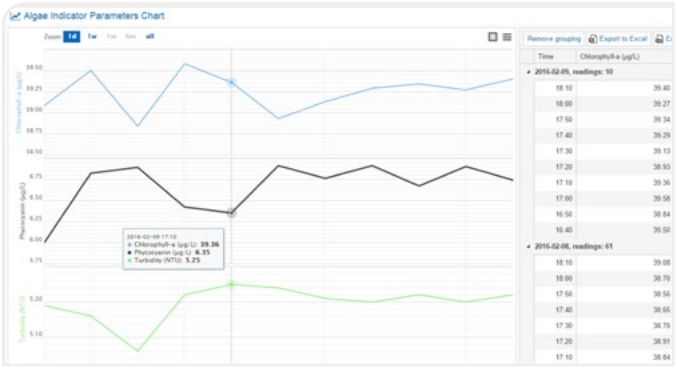
MPC-View is an advanced web-based software. The software allows to generate a complete overview of the water quality of one or multiple water bodies.

- **Real-time insight in the water quality**
- **Data transfer through radio, GPRS, 3G**
- **Ultrasonic program changes based on received water quality data**



Insights into the Water Quality





- The software receives, summarizes, and publishes data into charts, tables, and spreadsheets on your personal webpage
- Allows users to follow the progress of the algae treatment and the status of the units
- Based on the data, ecologists, biologists and technicians from LG Sonic modify the ultrasonic program for effective treatment
- Set alarms for changing water conditions and maintenance activities

User-friendly software to real-time monitor the water quality

Data Driven Water Treatment

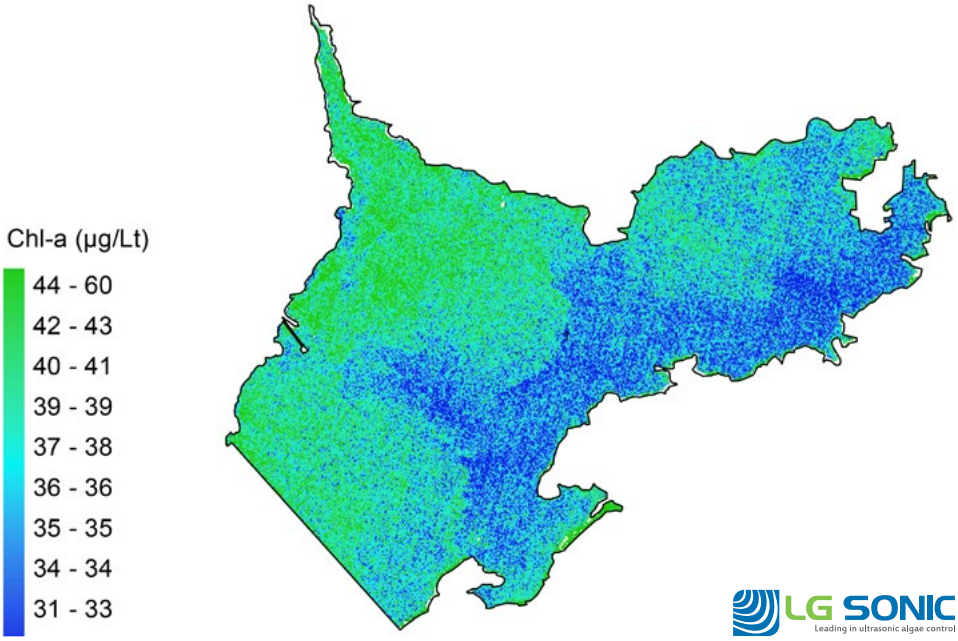


LG Sonic combines water quality data and ultrasound technology to provide a complete algae solution for large water surfaces. LG Sonic has been gathering water quality information for many years in different water bodies all over the world. This has resulted in a database, containing different algal species, water quality characteristics and applications in relation to the most optimal ultrasonic treatment program.

Map Algae Concentrations with Remote Sensing

LG Sonic has integrated a technology based on remote sensing to accurately map the spatial and temporal distribution of the water quality parameters to generate a complete overview of the algae distribution in large water bodies.

- **Generate a complete overview of the water quality of a large water surface**
- **Optimize algae treatment by detecting algal hotspots**



Remote sensing imagery showing the chlorophyll levels of a water body

Combining Remote Sensing with Water Quality Monitoring

Remote sensing in combination with in-situ water quality data allows for the detection and monitoring of the quality of large water surfaces at higher spatial and temporal coverages. LG Sonic can supply monthly, quarterly or yearly remote sensing reports based on our customers' needs.

The maps can be integrated with the in-situ water quality reports to have a complete overview of the water quality. With remote sensing technology LG Sonic offers many parameters such as Chlorophyll-a and BOD (Biological Oxygen Demand).

Parameter	Description
Chlorophyll-a	Indicator for all algae types
Phycocyanin	Indicator for blue-green algae types
Turbidity	Clarity of the water
SPM	Suspended Particulate Matter
CDOM	Coloured Dissolved Organic Matter
BOD	Biological Oxygen Demand
COD	Chemical Oxygen Demand
SST	Sea Surface Temperature

Remote sensing technology allows to accurately map the algae distribution in large water bodies

MPC-Buoy Technical Specifications

Frame 3x aluminum framed polyethylene buoy • Material: Rotationally-moulded UV-stabilized HDPE polyethylene • Filling: Closed-cell polyurethane foam • Buoy frame: Anodized aluminum • Weight: 15 kg • Size: 1200x600x200mm • Buoyancy capacity 95 kg	**Solar panels (3x)** • Solar cell: Monocrystalline cell • Rated Power (Pmax): 195Wp Weight: 16 kg • Connectors IP67 • Size: 1580x808x35mm
Telemetry • GSM/GPRS • CDMA (optional) • Radio (optional) • GPS (optional) • Iridium Satellite (optional)	**Data acquisition system** 4 x analog channel (user-configurable for either 4-20mA) • 1 x RS485 port for instruments • 1 x high frequency pulse counting channel • 1 SDI-12 input • 3X RS232
Battery 1 x 24 volt lithium lifepo4 • Capacity: 40 Ah • Weight: 15kg	**Solar Charge Controller** Overcharge and Deep discharge protection Ip68 Protection

Water Quality Sensor Package

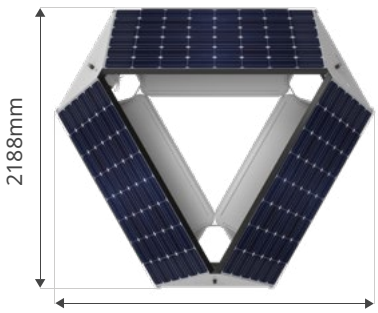
Fluorescence, including anti-fouling wiper: chlorophyll a, phycocyanin, turbidity • 470nm – Chlorophyll a • 610nm – Phycocyanin • 685nm Turbidity	**Redox** • Combined electrode (Redox/reference): • Platinum tip, Ag/AgCI • AgAgCl. • Gelled reference (KCI) • Range - 1000 to + 1000 mV • Resolution 0,1 mV • Accuracy ± 2 mV	**pH** • Combined electrode • (pH/ref): • special glass, Ag/AgCI ref. • Gelled electrolyte (KCI) • Range 0 – 14 pH • Resolution 0,01 pH • Accuracy +/- 0,1 pH
Dissolved Oxygen • Optical measure by luminescence • Measure ranges: • 0.00 to 20.00 mg/L • 0.00 to 20.00 ppm • 0-200%	**Temperature** • Technology CTN • Range 0.00 °C à + 50.00°C • Resolution 0,01 °C • Accuracy ± 0,5 °C • Response time < 5 s	It is possible to add additional sensors to the water quality sensor package.

Side view



Total weight: 200kg (excl. anchor)

Top view



Our Clients

LG Sonic works together with top-level water utilities

AMERICAN WATER

"Extensive testing conducted during 2014 showed that the buoys had a significant impact on the algae, allowing the plant to reduce chemical consumption by more than 20 percent, and reducing the concentration of undesirable taste and odor causing compounds in the treated water delivered to customers".

Orren Schneider, Manager Water Technology

epm®

"The algae and cyanobacteria control has been an excellent investment. We achieved by means of an environmentally friendly technology to improve the water quality and decrease the treatment costs, furthermore we have today a monitoring and control which is more adjusted to the behaviour of our reservoir".

Santiago Barrera, Professional Business Operations

Dŵr Cymru Welsh Water

"This is a new and exciting technology that has the dual advantage of being low capital cost and being solar powered, giving low operational costs. The environmentally friendly technology offers the potential of algae removal using ultrasound, resulting in an improvement in the water quality".

Martin Bradley, Head of Innovation

SOUTH WEST WATER

"We're working closely with the supplier who is able to fine-tune the sound frequencies to deal with specific outbreaks of algae. "It's early days and we haven't hit the peak time for algae but following the first significant outbreak, we've already seen a dramatic reduction which is very encouraging".

Tim Latcham, Head of Water Supply

Company Profile

Mission

We at LG Sonic have the mission to eliminate harmful chemicals in the water treatment industry. Therefore, we developed a chemical-free technology that controls algae without disturbing the natural balance of water ecosystems. We work together with multiple European universities and research institutes, often on European-funded research and development projects.

Since 1999, LG Sonic has been a leading international manufacturer of ultrasonic algae control and biofouling prevention systems



Our Solutions

MPC-Buoy
Control and monitor algae in lakes and reservoirs

LG Sonic e-line
Control algae in ponds

LG Sonic Industrial Line
Biofouling prevention in industrial systems

Ecohull
Prevent biofouling and reduce the use of antifouling paint with the Ecohull

Track Record

Coordinator of several European FP7 projects: ClearWater PMPC and Dronic (€3.2 million)

Official Innovation Partner of American Water, U.S. largest water and waste water utility

Winner of several innovation awards: Aquatech Innovation Award (2015), Global TAG excellence award (2015), WssTP Water Innovation Award (2014)



LG Sonic is running MPC-Buoy projects in more than 20 countries worldwide

Visit LG Sonic online

Scan the QR code with your smartphone
to visit the LG Sonic website

LG SONIC
Leading in ultrasonic algae control

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