

## Contributing to Society through Environmental Measurement Technology



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It is said that the earth was born 4.6 billion years ago. The modern-day earth was formed by deformations in its crust and climate changes, and the water and air cycles that are the source of life exist in an exquisite balance that has given rise to the diverse life thriving on this planet. In the long history of the earth, it has only been in the past 200 years since the industrial revolution that there has been a focus on environmental pollution problems. If we calculate the length of time since the birth of the earth as 1 day, these 200 years would be equivalent to only 0.004 seconds out of that day. While the lives of humans have become more abundant as scientific technology has developed, those activities have begun to destroy the exquisite balance of nature and are affecting the global environment. Initially, these problems were handled as being localized issues in specific regions, but currently, environmental problems are considered to be problems on a global scale, such as climate change effects like global warming, destruction of the ozone layer, the sudden, localized summer downpours known as guerrilla rainstorms, and super typhoons, the radioactive pollution caused by accidents at nuclear power plants, water pollution, air pollution such as PM2.5, effects on food safety and ecosystems caused by chemical substances, depletion of the world's water resources, food supply problems, and energy problems. It can be said that the economic activities of developed countries has significantly affected the environmental pollution problems, but developing countries also have environmental problems such as waterborne diseases and infectious diseases caused by insufficient infrastructure for the human living environment. Furthermore, if we take a global look at the water on the earth, 98% of the water is sea water, and about 2% is fresh water, with the majority of the fresh water in the form of glaciers, snow that never melts on high mountaintops, ground water,

or permafrost. The water that humans can drink is less than 0.01% of the whole, and a precious resource. It is said that when the demand for water increases rapidly along with growth in developing countries, 2/3 of the world's population will be experiencing water stress by 2050.

Many of the pollution problems with our precious air and water resources cannot be directly seen with the eye, so the first step needed to correctly assess the current situation is to take measurements. Furthermore, the measurement results must be standardized so that they can be properly evaluated and compared as if in the same sumo ring, so to speak. The HORIBA Group has developed its business with the aim of protecting and improving the global environment and improving the health, safety, and peace of mind of the humans who live on it, by providing measurement devices for analyzing solids, liquids, and gases, and standardizing measurement methods. The countermeasures for environmental problems start with running the PDCA cycle, with first correctly assessing the current situation by taking measurements, setting targets for improvement, checking the effectiveness by measuring the results, and setting the next targets. Originally, the result that the land/water/air had become polluted was mainly handled through passive measuring devices for taking measurements, but nowadays the processes that were the sources that generated the pollution are being optimally controlled and the need for active measuring equipment for controlling the pollutants from these sources has been added to the mix, which has led to the evolution of measuring devices combined with various applications.

In Japan, the Basic Act on the Water Cycle was established in March 2014, and a closer look has been taken on activities for maintaining a healthy water cycle. The smart town concept has been proposed worldwide, for activities for handling energy and the water cycle as a community. The information and communication technology that has been rapidly developing in recent years utilizes ICT and cloud systems to make use of big data and create new added value from the measurements to this point, which is expected to aid in building a sustainable, cyclical society in terms of both resources and the environment. To make this cyclical society into a reality, we have to go from taking measurements to taking control. In order to take control, the measuring devices will be required to be fast, simple, accurate, remote, and operate with real-time information capabilities. It will be important to understand the respective needs required for each of these to happen, and commercialize products that meet them. The HORIBA Group has 60 years of history and a wide range of core technologies, which we have used to develop applications for core technologies. Furthermore, the HORIBA Group has a wide range of experience cultivated in many fields, such as automotive and environmental technologies, medicine, semiconductors, and scientific fields. We can use these technologies and experiences to commercialize products to meet the needs.

There is no change in the fact that the biggest objective of taking environmental measurements is to comply with laws and regulations, but in recent times things have changed so that environmental measurements are dealt with as part of management strategies to take social responsibilities such as Corporate Social Responsibility (CSR) and Creating Shared Value (CSV) and to improve brand value. The HORIBA Group will continue to contribute to society as a reliable partner for innovations by providing solutions for conserving and improving the global environment using the technologies and various types of know-how we have accumulated in the fields of measurement and analysis technologies.