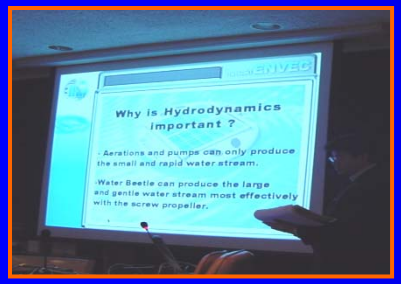
NEW ENERGY AWARD

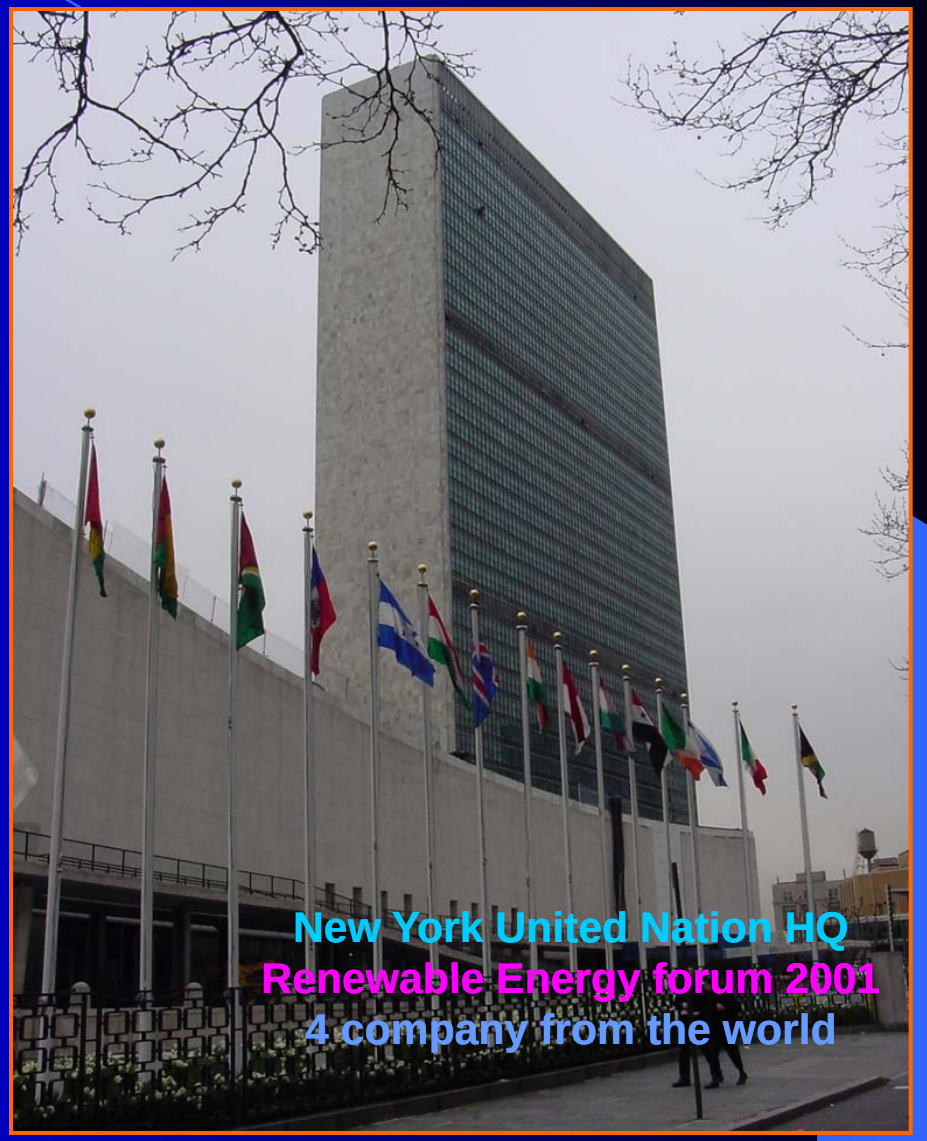
Floating Water Purifying System

mini WATER BEETLE

ENVEC

United Nations Headquarters-New York





New York United Nation HQ
Renewable Energy forum 2001
4 company from the world

New Energy Award

（新工ネ財団会長賞）

表彰状

水質改善装置
「水すまし」

株式会社 眞崎商店 殿

貴社の開発に係る標記新エネルギー機器については当財団主催第四回二十一世紀型新エネルギー機器等表彰（新エネ大賞）において特に優れていると認められるのでこれを表彰します

平成十二年二月十六日

財団法人 新エネルギー財団
会長 棚橋祐治

財団会長賞受賞

The Water Beetle – using the sun to purify water

Introduced in Overseas Magazines

by the CADDET Japanese National Team

A new floating water purification unit (called the Water Beetle) powered by a solar panel has been developed in Japan to purify water in land-locked areas. Water has been demonstrated successfully at numerous sites.

The Water Beetle.

radially on the water through a bell-mouthed duct structure (see Figure 1). The screw propeller also moves the unit around a mooring buoy, producing convection currents over a wide area. The currents destroy putrid layers and temperature gradients in the deeper water, and provide warm water and oxygen. These activate aerobic microbes that decompose the substances causing pollution. These microbes are on the first level of the food chain for fish and aquatic insects; therefore, the Water Beetle stimulates the entire ecosystem. In addition, the water lifted to the surface is exposed to the sun's ultraviolet rays and is sterilised. An extension nozzle can be fitted to the base of the unit for use in deep water.

Figure 1: Dimensions of a Water Beetle.

Capability

There are three sizes of the Water Beetle, designated according to the output of the motor used (25 W, 40 W and 90 W) as shown in Table 1. The 25 W and 40 W models can be powered either by a solar panel or from a public grid.

As indicated in Table 2, comparing the capabilities of the Water Beetle with those of an airlifter and a pump, the output of the motor required by the former is very small.

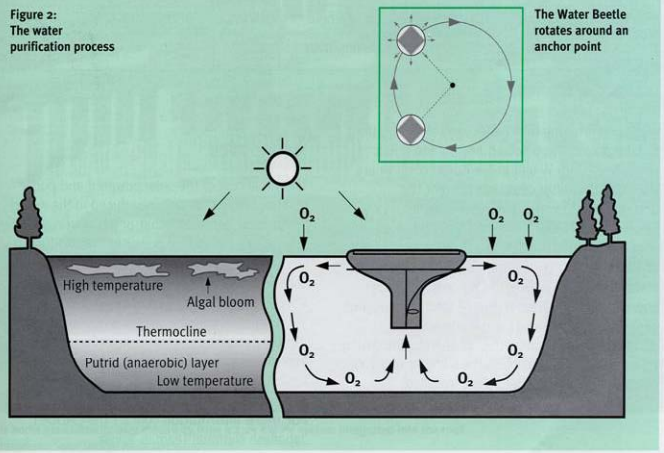
Because the Water Beetle floats on the surface of the water, the need for underwater work is eliminated. This, in combination with its simple structure, considerably reduces maintenance costs. The equipment can also be moved easily from one place to another.

Performance

The first solar-powered Water Beetle was installed in the Nishiyama dam in March 1998. To make a comparison in performance, a pump-type aeration system with a compressor of 7.5 kW output was also installed. Investigations showed that both had almost the same effects on the flow of water, and the preservation and improvement of water quality. However, significantly better chlorophyll values (an indicator of algae – the lower the value, the better) were recorded for the Water Beetle, demonstrating its higher efficiency.

The second Water Beetle, a solar-powered 25 W unit installed in a pond in the Kumamoto Zoological and Botanical Gardens, has improved the water quality by decreasing the propagation of

Figure 2: The water purification process



Before & After

Key features of the Water Beetle

Energy-saving

Low carbon

Economical

1 . Uses a screw propeller

Uses the most efficient hydrodynamic technology

2 . Uses solar energy

Operates on a solar batter = 0 Yen electricity bill! CO2 emissions is also zero!

3 . Installed on the water

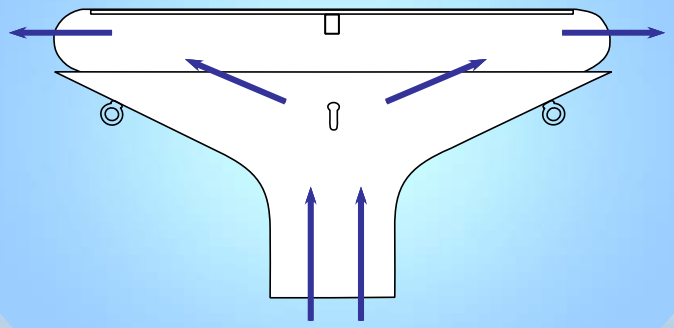
Installed for floating on water: transport and maintenance are simple.

4 . Compact and lightweight (mini)

Small and lightweight (~20kg), so installation and transport are easy

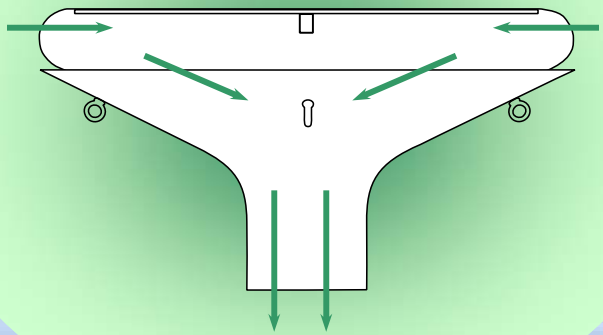
Key features of the Water Beetle

Water quality improvement



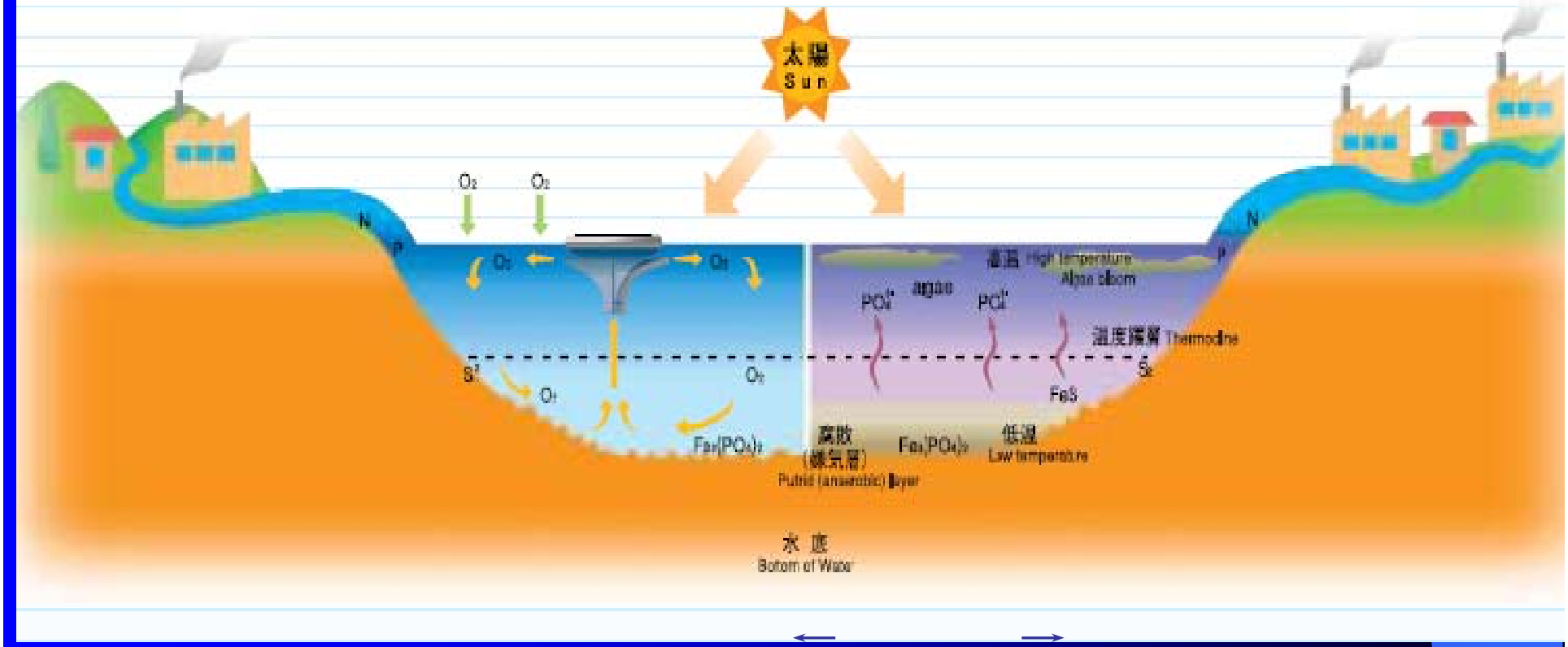
UPWARD

Algae control



DOWNWARD

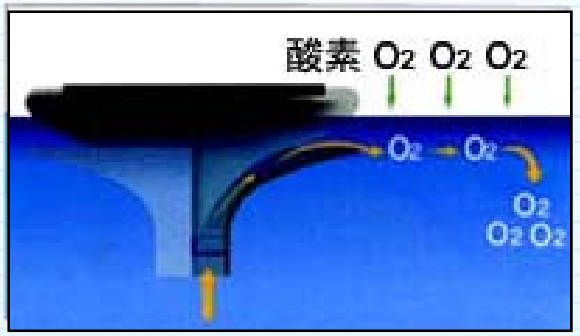
Purification mechanism



Purification mechanism

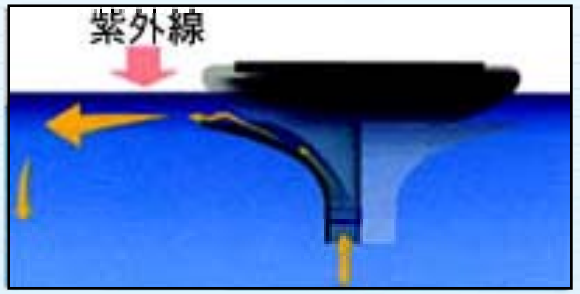
① Revitalization of aerobic microbes by Oxygen

The lower layer water with poor oxygen content is ascended by the stirring system of "Mini W.Beetle", absorbs oxygen by exposure of air near the water surface. This stimulates the growth of aerobic microbes and results in cleaning of water by decomposing polluting substance. These aerobic microbes are on the first level of the food chain for fish and aquatic insects; therefore stimulating and improving the entire eco-system.



② Prevention of Water Putrefaction by Ultraviolet Rays

The lower layer water is lifted to the surface due to the water stream made by Mini W.Beetle, and the sun's ultraviolet rays prevent the growth of bad microbes and keep the water clean.



③ Prevention of Phosphorus by Oxygen

Reduction in amount of Oxygen dissolved in the water leads to the elution of Phosphoric ions from phosphate already present in water and results in the growth of algae and moss. The elution of Phosphoric ions can be controlled by the use of Mini W.Beetle as it circulates even the water present at the bottom layer of pond and thus hinder the growth of algae and pond scum.

Mini-Beetle installation process at a golf course

1、Identification of test site
Nagasaki Prefecture, X Golf course, Hole 9 pond
(Water volume is approx. １５００t)

※Silver point at photo center is the Mini-Beetle。
Pond surface area is approx.
3,000 ㎡。

2、Preparation of equipment
①Water Beetle ② Anchor ③ Tether

※In deeper water, an extension duct can be attached

※Anchor uses a one-point moor, so the beetle can revolve

3、Installation
Anchor fixes to two points, stabilizing the Beetle

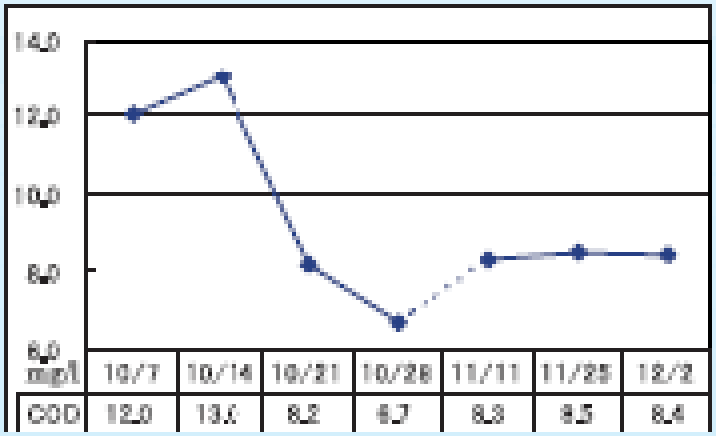
※In deep water, a rubber raft can be used for installation; fixing the Beetle to 2 points on land is also possible

4、Monitoring of operations
After installation, the beetle uses the solar battery to operate

Water from the pond's bottom is emitted in radial directions at the water's surface.

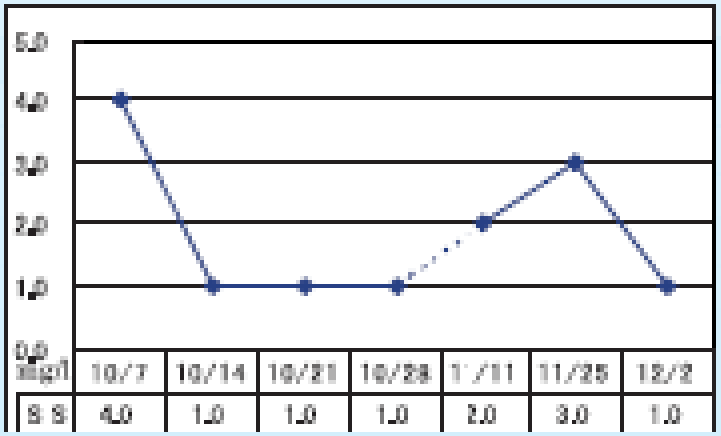
Change in water quality

COD:mg/L



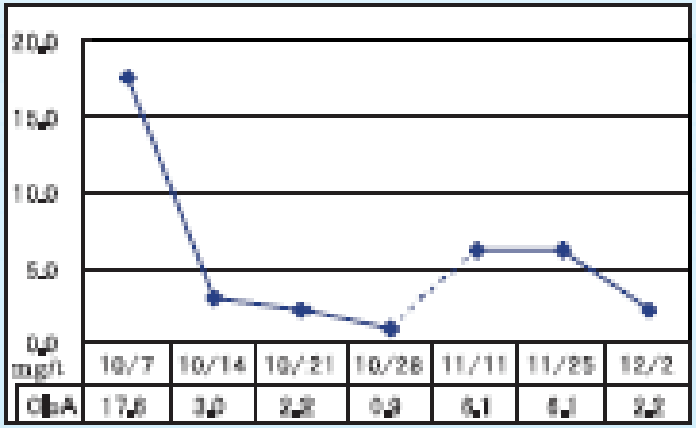
	10/7	10/14	10/21	10/28	11/11	11/25	12/2
COD	12.0	13.6	8.2	6.7	8.3	8.5	8.4

SS:mg/L



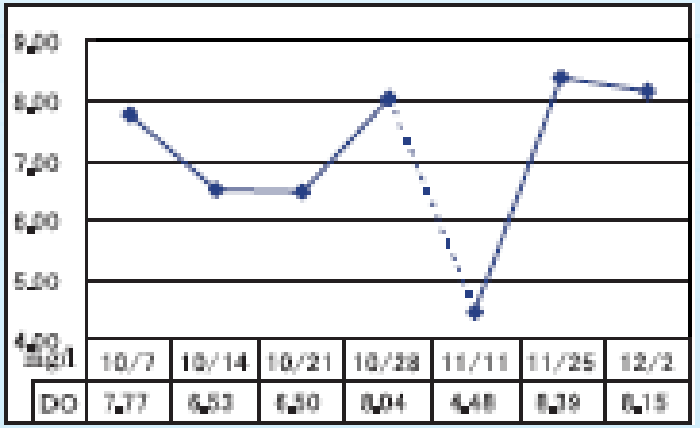
	10/7	10/14	10/21	10/28	11/11	11/25	12/2
SS	4.0	1.0	1.0	1.0	2.0	3.0	1.0

Chlorophyll a mg/t



	10/7	10/14	10/21	10/28	11/11	11/25	12/2
Chl-a	17.6	3.0	2.2	0.2	5.1	5.1	3.2

DO:mg/L



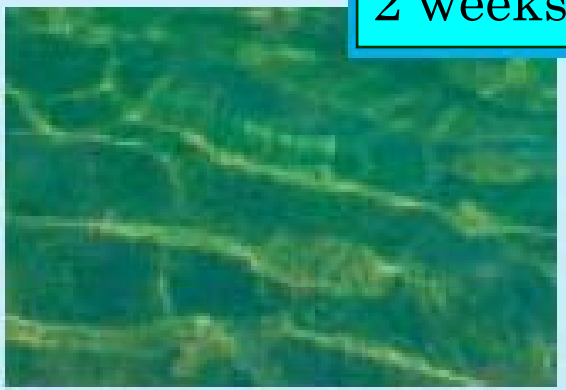
	10/7	10/14	10/21	10/28	11/11	11/25	12/2
DO	7.77	6.53	6.50	8.04	4.48	8.19	8.15

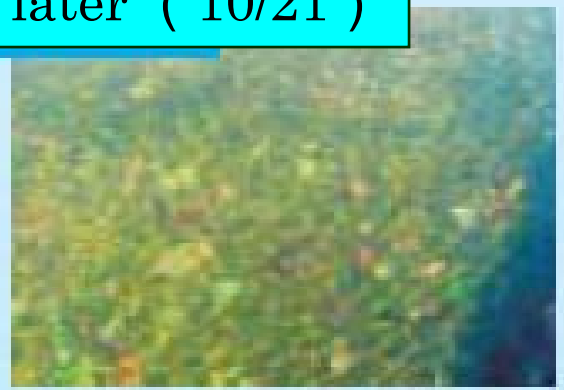
Non-operational period

Change in appearance

Before test (10/7)

2 weeks later (10/21)



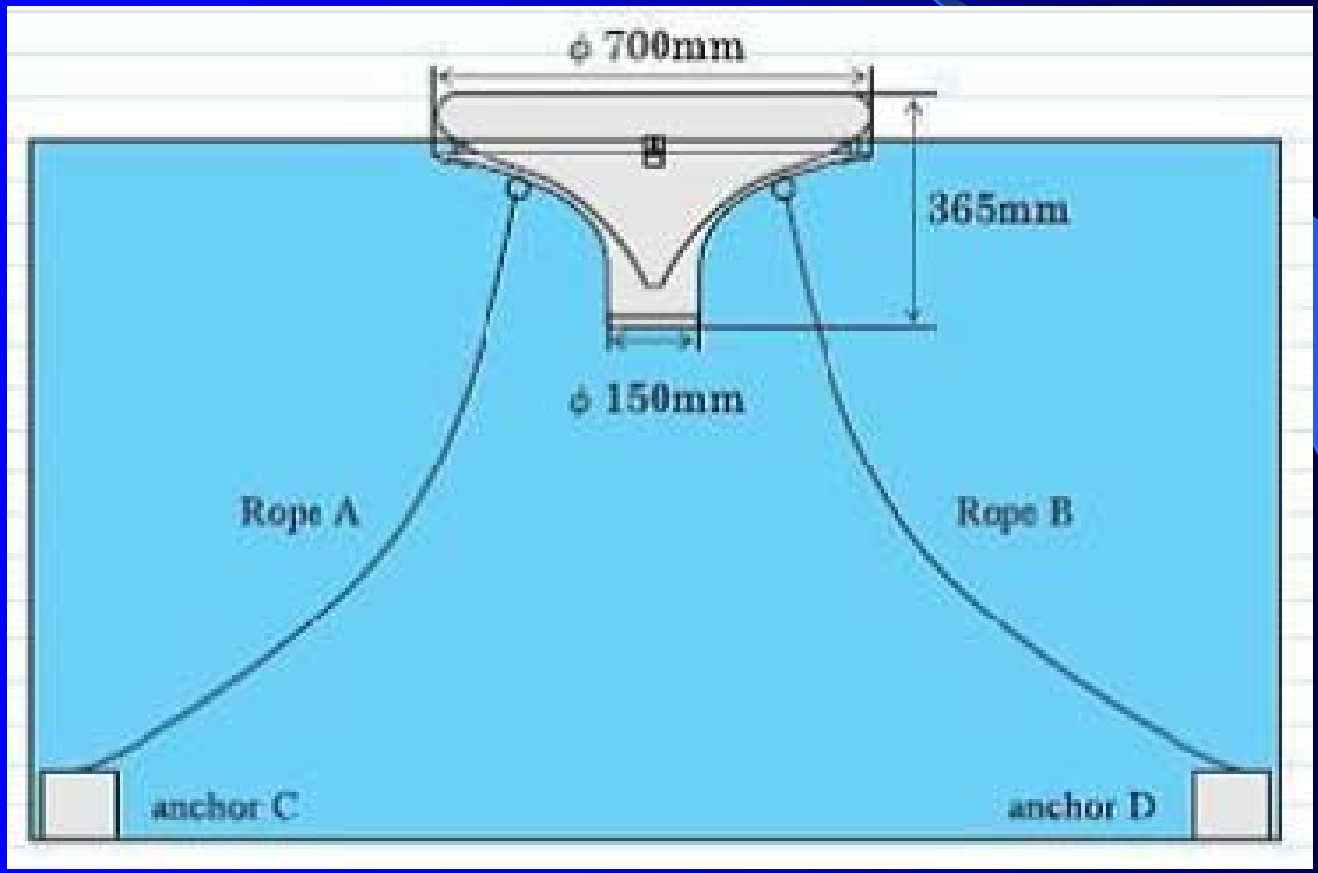


Result:

1) 1-2 weeks after installation, the water quality achieved a remarkable improvement and a clear purification could be seen

2) When the equipment was removed, the water returned to the original state, and re-installation again improved the water quality

Installation method



Name	Specifications
Unit casing	φ700×365 mm
Duct length	φ150 mm
Weight	Approx. 20 kg
Power supply	Solar panel
Motor	DC20W Brushless motor
Water flow	32 t / h (Water passing through duct)
Appropriate water body	1500t 、0.5～3 m

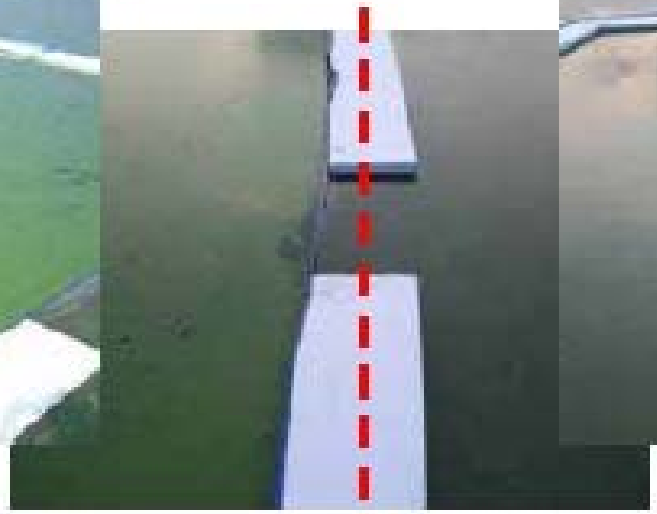
China, Lake Tai

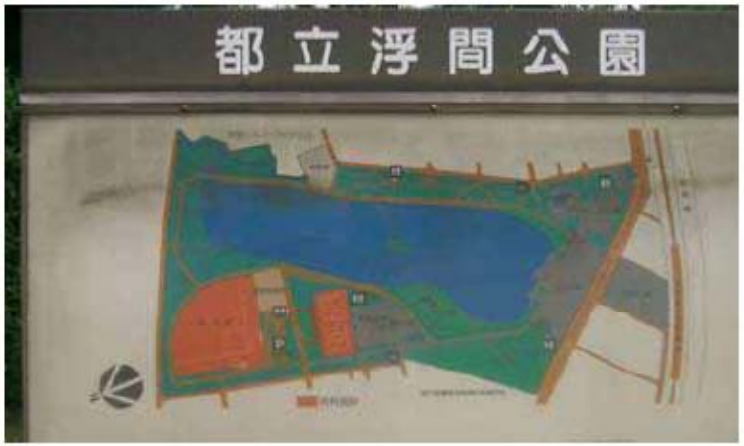
Water condition：Massive amounts of algae
Volume： Approx. 200 t
Depth：2～3m
Operation method：Downward（Reverse revolution）
Other：Used experimental control zone (without Beetle installation)

BEFORE 2007.7.9

AFTER

2007.7.20





Tokyo Municipal Ukima Park

Water condition：Massive amounts of algae

Volume：Approx. 200 t

Depth：2～3m

Operations：Downward （Reverse rev.）

Other： Used experimental control zone (without Beetle installation)

BEFORE 2007.7.25

AFTER

Yomiuri Country Club

Water condition： Spriogyra presence

Volume：Approx. 1500 t

Depth：1.5m

Operation method：Upward （Std. revolution）

Other：Hole No. 18

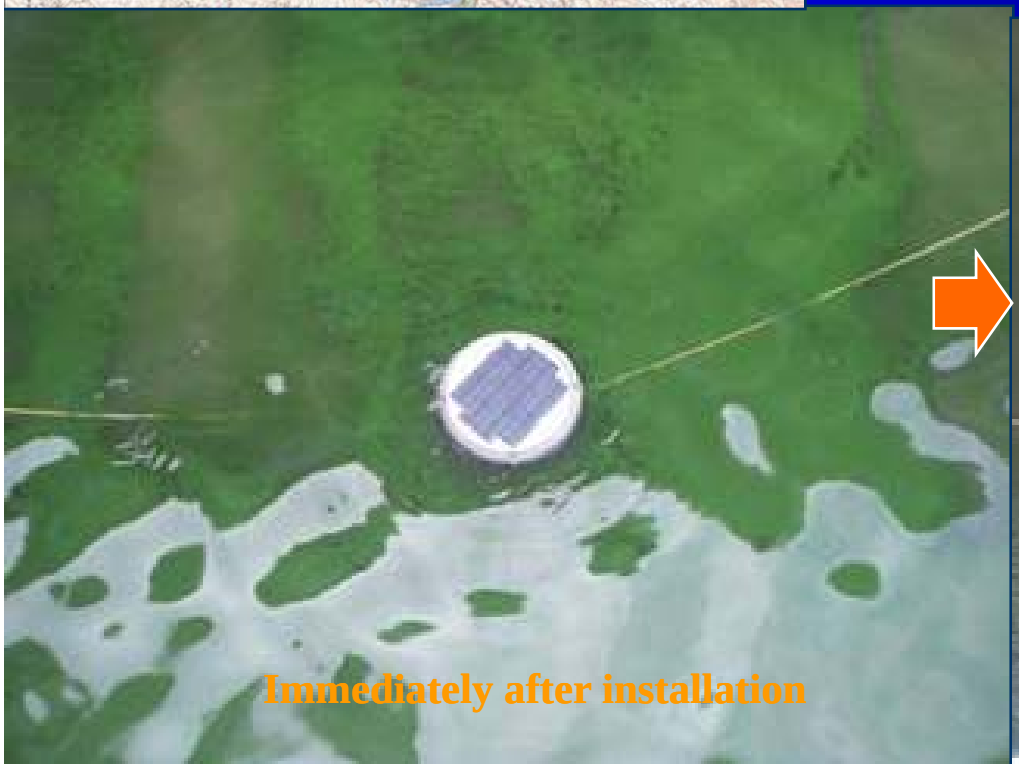
BEFORE 2006.7.15

AFTER 2007.8.17

Before

2 months after installation

Draining Isahaya Bay

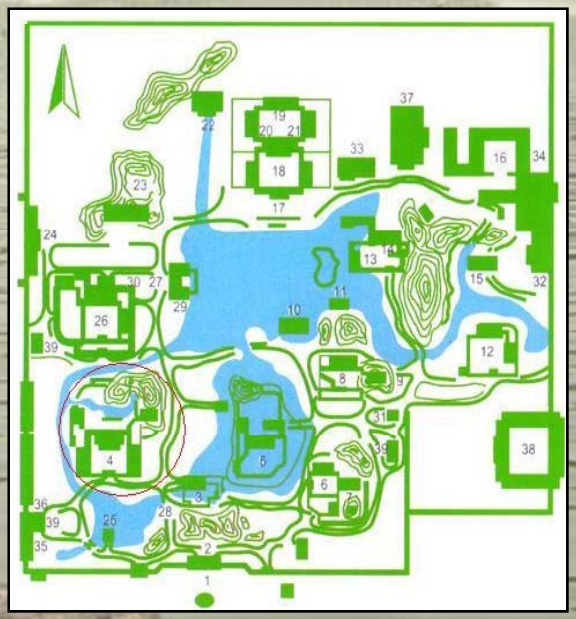


Immediately after installation

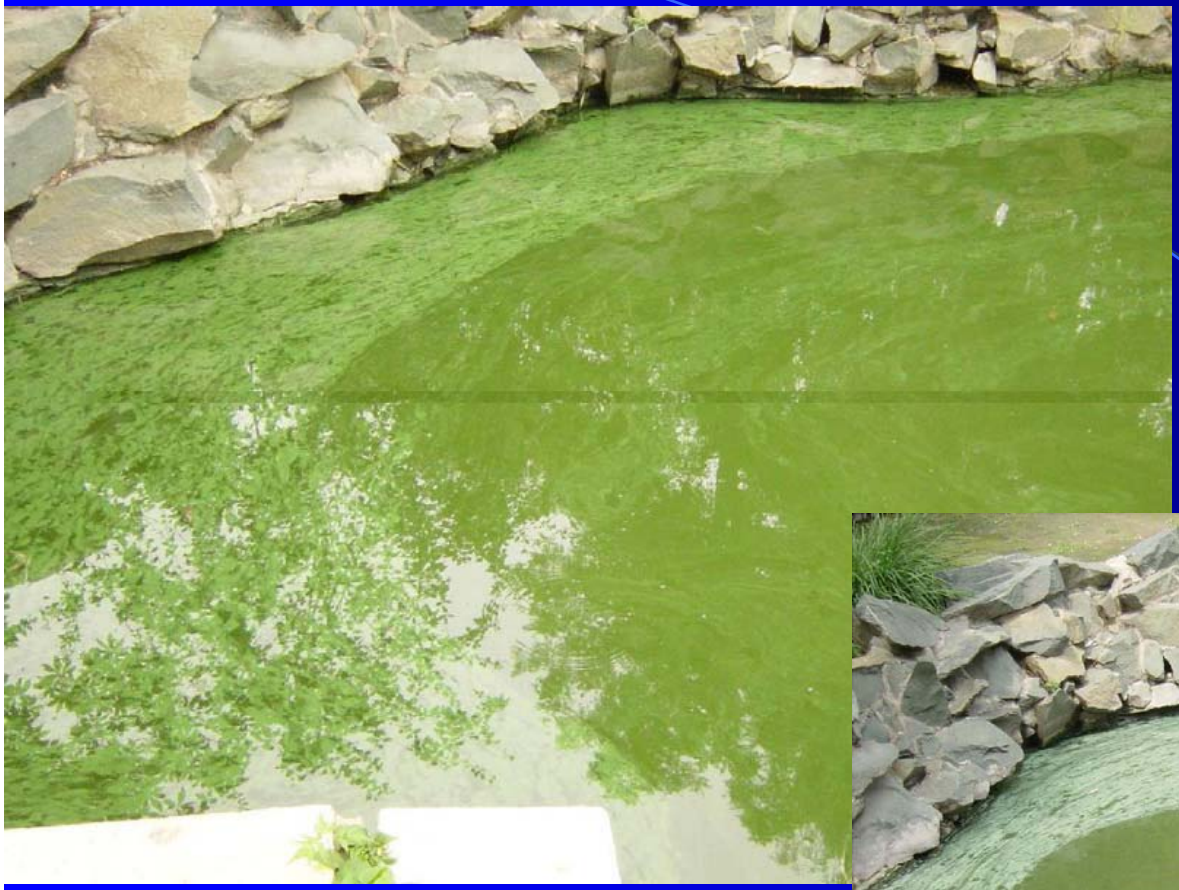
6 hours after installation

北京大观园

Beijing Daguan Park



BEFORE



AFTER

Sites in operation

Reservoir

Golf course

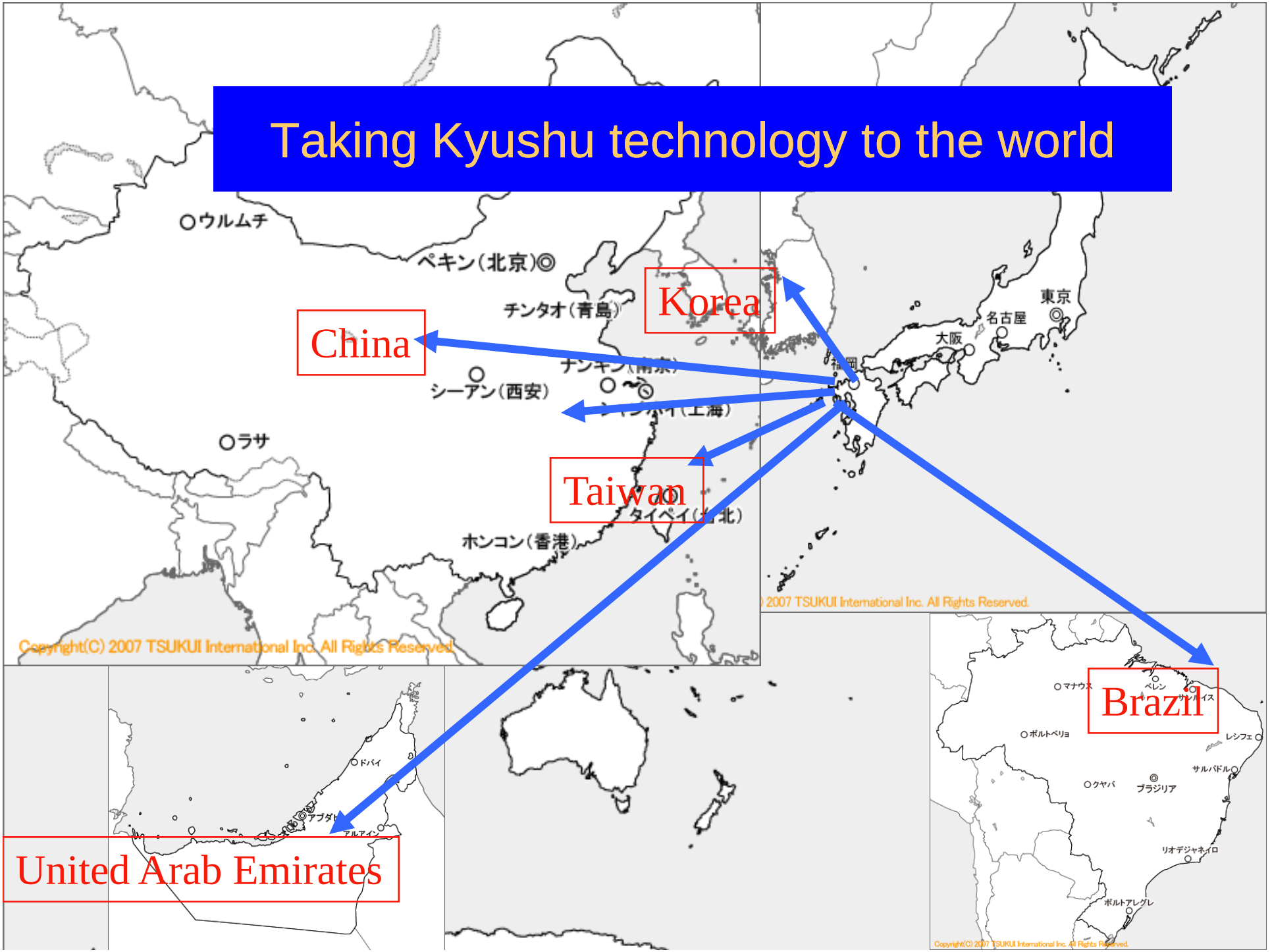
Irrigation pond

Rivers

Fish farm

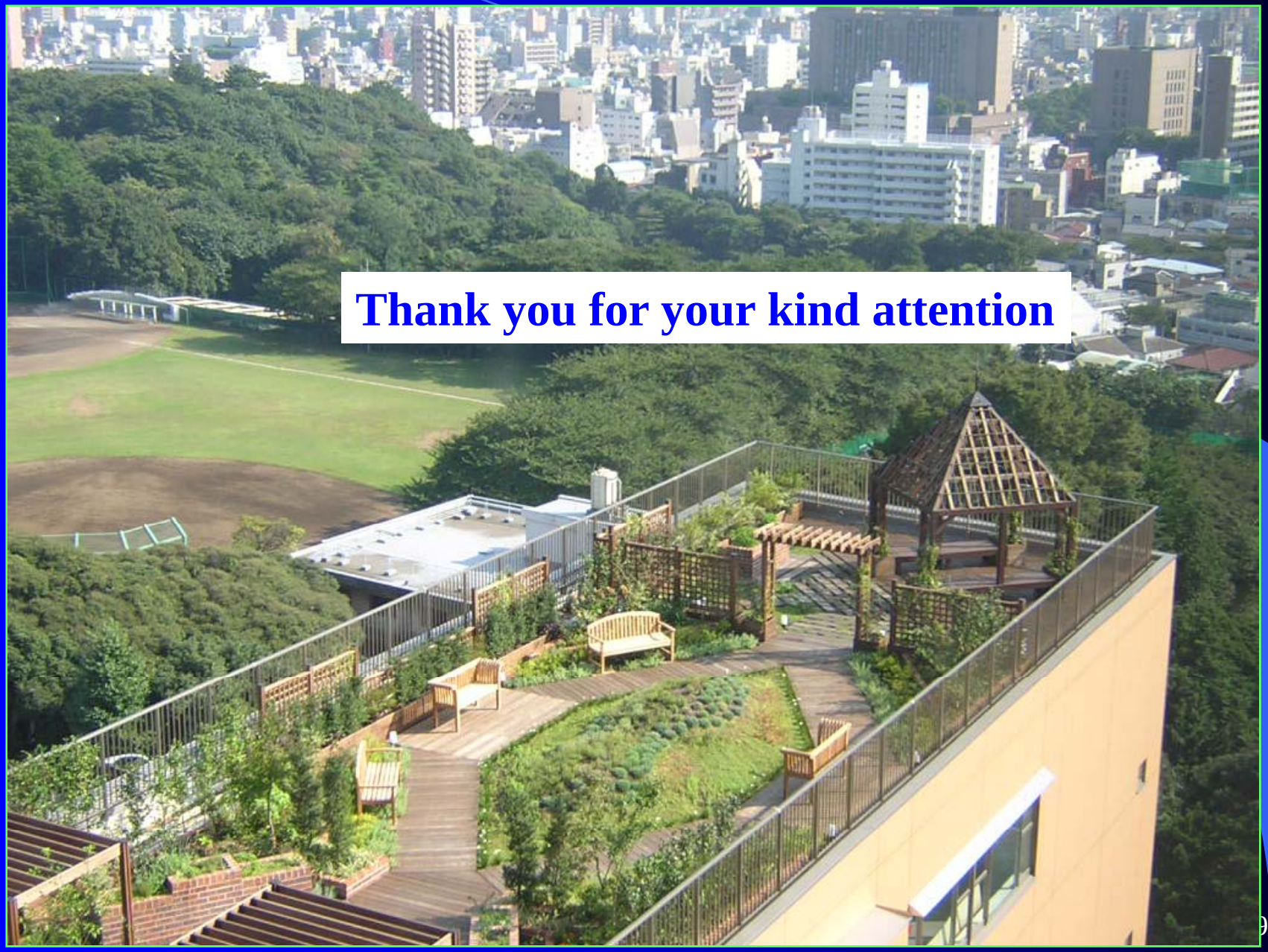
Ohori park (Osaka)

Taking Kyushu technology to the world



Masaki Environmental Engineering & Consulting Co.,Ltd.

1-43 Dejima-machi Nagasaki city
Nagasaki 850-0862 Japan
Tel.++81-95-832-6600 Fax.++81-95-823-1620
eigyou@envec.co.jp


Thank you for your kind attention