



THE FLOWER OF JAPAN  
**KANSAI**



## Technologies and Products in the Environmental and Energy Sector

<http://www.kankeiren.or.jp/kankyou/>



Contributing to the Solution of Global Environmental Issues with Superior Technology  
[Kansai – an Environmentally-Advanced Region]

# Overview of "Kansai"

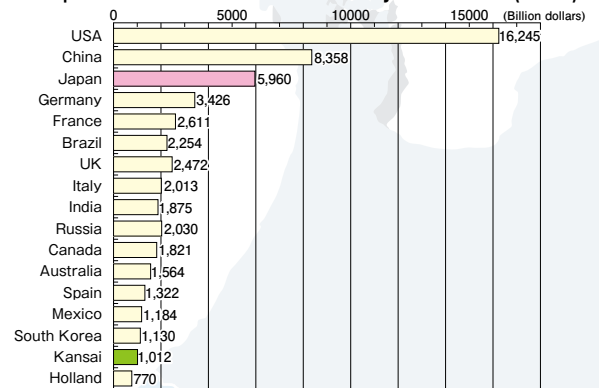
● Kansai is located almost in the center of the Japanese archipelago, and is comprised of six prefectures.

※ The map below shows the member prefectures of the Kansai Economic Federation, and four adjacent prefectures associated with the federation's activities are shown in a lighter color.

- The gross product of the region is 80.8 billion JPY (approximately 16 % of the gross national product).
- The population is approximately 21.6 million (approximately 17% of the total population of Japan).



## Comparison of the GDP with other major countries (2012)



(Note) Nominal GDP. The figure for the GDP of Kansai is obtained from the (nominal) gross product in the Kansai region in 2011. The exchange rate of yen against US dollar in 2012 was 79.82 yen. (Source: APIR 'Kansai in the Asia Pacific 2014')

Large-scale synchrotron radiation facility 'SPRING-8'



Umekita (Osaka Station North District) Knowledge Capital



K computer

## Introduction

After being faced with water pollution in Lake Biwa and other water environments, air pollution caused by industrial plants and industrial waste from those plants during the rapid economic growth era, Kansai has tackled the critical issue of assuring both economic growth and environmental protection through continuous efforts by the government and private sector and by utilizing technologies developed by companies.

In the process, excellent environment- and energy-related technologies and products were developed in Kansai. We believe that 'Kansai, an environmentally-advanced region,' assists counties in Asia and elsewhere trying to promote both economic growth and environmental efforts.

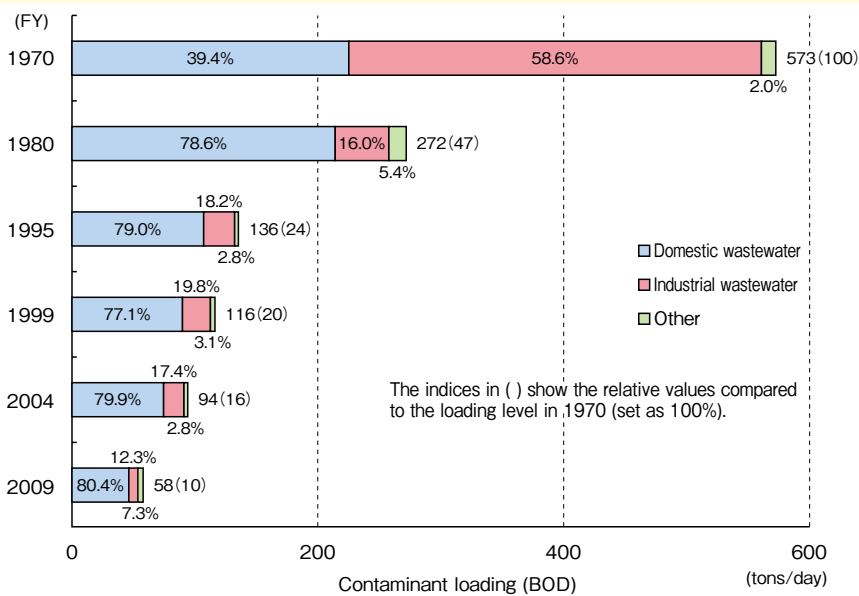
Aiming at widely publicizing superb environmental and energy technologies in Kansai and promoting the businesses related to environmental and technologies, Kankeiren first published the case-example leaflets in 2008. Since then, they have been read by many people.

We would be glad if the leaflet could be of some help in promoting the businesses related to environmental and energy technologies and products between companies in Asia, elsewhere and Japan (Kansai), as well as in sustaining global growth and solving global environmental issues.

# Solving environmental issues in Kansai by leveraging advanced technologies

## Cases of water quality improvement in Kansai

Transition of the contaminant (BOD) loading levels of the rivers in Osaka prefecture



※BOD: Biochemical oxygen demand. A major index of the contamination level of a river. (Source: White paper on the environment of Osaka Prefecture, 2014)

1960s



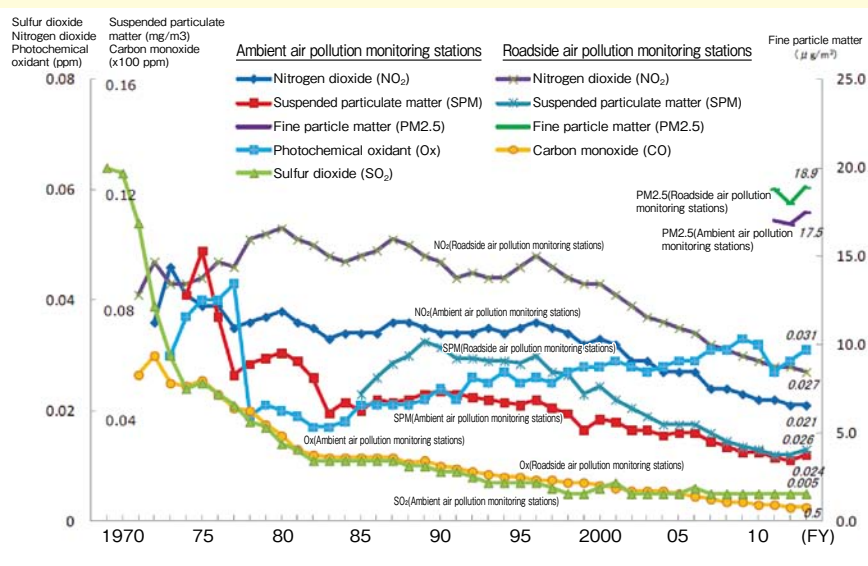
Present



Rivers in Osaka Prefecture

## Cases of air pollution improvement in Kansai

Transition of the levels of major air pollutants in Osaka city



※Average levels measured at 26 monitoring spots in Osaka city (15 ambient air pollution monitoring stations and 11 roadside air pollution monitoring stations) (Source: White paper on the environment of Osaka City 2014)

1960s



Present



Atmosphere around Osaka Castle

(Source: State of Environment, 2013, Osaka Prefectural Government)

# Building advanced water management systems through cooperation between the government and private sector

## 〈Experiences and efforts〉

- Experienced water pollution during the rapid economic growth era in the latter half of the 1950s, and addressed the environmental issues by setting the criteria for industrial wastewater in accordance with the Water Pollution Control Law.
- Secure and safe water supply and sewage systems have been constructed thanks to the highly-effective management of municipal governments and devices such as filtration films, water pipes, valves, pumps, and water-quality measuring instruments developed by companies in the private sector.
- Built efficient water management systems for highly profitable business activities with minimum water intake leveraging water-saving (recycling) technologies incorporating water treatment films and seismic/leak resistant technologies for pipes
- Companies having highly advanced technologies for water supply and sewage systems, such as water-saving technologies, seismic/leak resistant technologies and wastewater treatment technologies, have gathered around the Lake Biwa and Yodo River water systems.



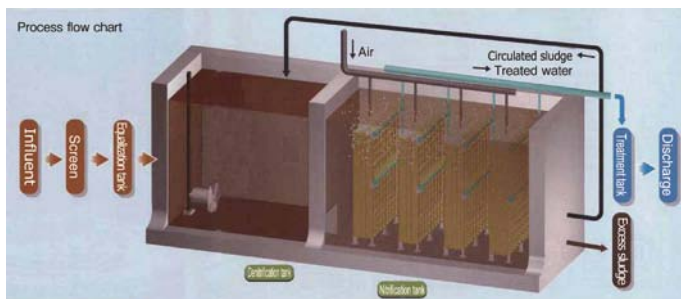
## 〈Major contributions made by Kansai's technologies and products〉

Solved issues such as water pollution caused by domestic and industrial wastewater and shortage of available water resources.

## Major cases of application

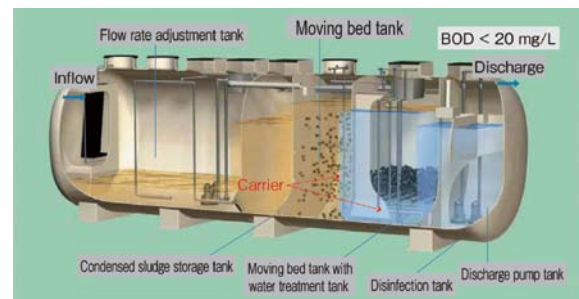
### Water treatment technologies

#### ■ Sewage/industrial wastewater treatment using submerged membranes



Flow of a sewage/industrial wastewater treatment system incorporating submerged membranes

#### ■ Domestic water purification using FRP septic tank



Flow

### Measuring techniques

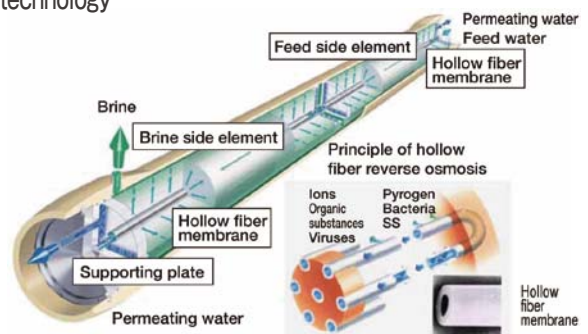
#### ■ Measurement of organic pollutants in wastewater, etc.



Online TOC measurement service

### Seawater desalination technologies

#### ■ Highly efficient and energy-efficient seawater desalination technology



Hollow fiber reverse osmosis membrane for seawater desalination

# Saving energy and coping with global warming through advanced technologies

## 〈Experiences and efforts〉

- Had bitter experiences during the two oil shocks in the 1970s due to the low self-sufficiency ratio of energy and high energy utilization ratio in the industrial sector.
- The Act Concerning the Rational Use of Energy enacted in 1979 encouraged the introduction of energy-efficient equipment to plants and required a mid- to long-term reduction of energy consumption, which led to a substantial reduction of the energy utilization ratio in the industrial sector.
- Introduced the Top Runner Program after the Act Concerning the Rational Use of Energy was revised in 1999, and requested vehicle and appliance manufacturers to ship energy-efficient products that incorporate technological progress.
- Kansai is home to many manufacturers that research and develop a wide variety of products, and boasts accumulated technologies and expertise on energy management.



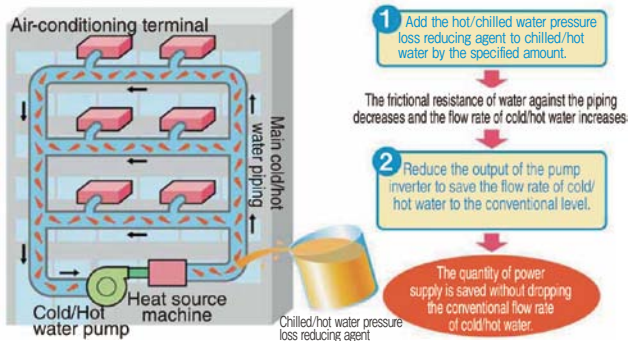
## 〈Major contributions made by Kansai's technologies and products〉

Curbed the increase in energy demand caused by economic growth and urbanization, and mitigated global warming by saving energy.

## Major cases of application

### Energy efficiency (air conditioning, lighting)

#### Energy efficiency improvement for air conditioner systems using a chilled/hot water pressure loss reducing agent



A chilled/hot water pressure loss reducing agent introduced to a centralized air conditioned building.

#### Self-contained lighting systems operating without commercial power supply



Solar panel/LED lighting

### Energy efficiency (manufacturing process)

#### Use of unused hydraulic energy for power generation



Integrated hydro power equipment



#### Power generation leveraging steam-generating processes



Screw-type compact steam-powered generator

# Creating a society with an environmentally-sound material cycle through good management and the effective use of waste

## 〈Experiences and efforts〉

- Launched full-scale establishment of urban waste disposal systems covering everything from garbage collection to final disposal in municipalities from the perspective of the 'hygiene control of increasing amounts of waste in the urban area' during the rapid economic growth era in the latter half of the 1950s.
- Because it is difficult to reserve sites for landfill disposal and the weather is hot and wet during the summer, refuse incineration became prevalent as intermediate disposal for sanitary reasons.
- After the Basic Law for Environmental Pollution, the Water Pollution Control Law and the Law Concerning Special Measures against Dioxins were enacted in 1967, 1970 and 1999, respectively, established disposal systems that strictly abide by these codes.
- Making an effort to create a society with an environmentally-sound material cycle through the proper disposal and effective use of the waste generated in urban areas by separating waste at the source of generation, collecting/transporting the waste efficiently, establishing and maintaining intermediate disposal systems such as waste incineration power plants, and managing the final disposal properly.



## 〈Major contributions made by Kansai's technologies and products〉

Solved problems such as the rapid increase in waste volumes caused by economic and population growth, and difficulty in reserving final landfill sites.

## Major cases of application

### Waste recycling

#### ■ Introduction of waste power generation systems



Osaka City Environment Bureau Maishima Plant

#### ■ Reduction of sewage sludge and recycling into fuel



Dried product of sewage sludge

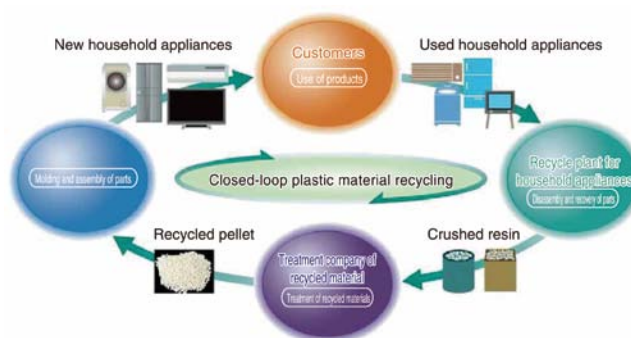
### Recycling technology

#### ■ Steel dust recycling



Steel dust recycling plant

#### ■ Recycling of plastics



General flow of the closed material cycle

# Prevention of air and soil pollution leveraging environmental technologies

## 〈Experiences and efforts〉

- Problems, such as a substantial increase in oxidant smog in industrial town areas, worsened during the rapid economic growth era in the latter half of the 1950s.
- After the regulations on the desulfurization and denitration of exhaust gas were introduced by the Pollution Control Ordinance, the Basic Law for Environmental Pollution, and the Air Pollution Control Law, air pollution caused by the exhaust gas from power plants, factories and vehicles was reduced.
- The Soil Contamination Countermeasures Law was enacted in 2002 to address soil pollution on factory sites caused by heavy metals and volatile organic compounds, and associated groundwater pollution.
- In response to a series of regulations for preventing air/soil pollution, environmental technologies related to measurement and pollution countermeasures were developed.



## 〈Major contributions made by Kansai's technologies and products〉

Prevented air pollution caused by Sox, NOx, VOC and other chemicals, as well as soil pollution caused by heavy metals, and curbed greenhouse gas emissions.

## Major cases of application

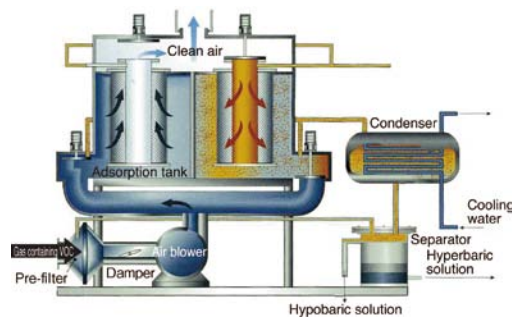
### Environmental pollutant removal technologies

#### ■ Removal of SOx/NOx



Desulfurization plant

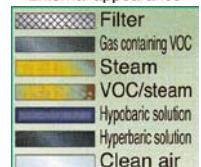
#### ■ VOC recovery and treatment



VOC recovery system



External appearance



### Measures against greenhouse gasses

#### ■ Separation and recovery of CO<sub>2</sub> from combustion exhaust gas



CO<sub>2</sub> recovery plant

### Measuring techniques

#### ■ Measurement of exhaust gas



Exhaust gas measuring system

#### ■ Soil pollutant measurement



Cd level Simple and quick assay kit

In addition to the cases introduced in this leaflet, information on more than 150 cases is available in Japanese, English, and Chinese on the Kansai Economic Federation website.

For more details, visit our website at:  
<http://www.kankeiren.or.jp/kankyoku/>

[English]



[Japanese]



[Chinese]



Title	Corporate Name
Development of Biorefinery Technology	Research Institute of Innovative Technology for the Earth (RIITE)
Bio-fuel Manufacturing System and Related Equipment	Hanada Kagaku Co., Ltd.
Fluidized-bed Biomass Boiler	Korabo Industries Ltd.
Waste-Fuel power generation system	Hitech Zozan Corporation
Sludge collection and recycling as fuel	Kansai Heavy Industries, Ltd.
NEVIONE-o	Ecotop Sanghanka Kankyo Kaisha Kanba
Subcritical Water Processing Technology	REMATEC Corporation
Waste Recycling and RF Fuel Production Technology	REMATEC Corporation
High-speed vertical vibrator	KUBOTA DEVELOPMENTAL SERVICE Co., Ltd.
Steel Mill Slag Recycling Plant	Kobe Steel, Ltd.
Recycled Plastic Molding Material	Carpet EGSSAN, Inc.
Hot Peel System	Hitech Zozan Corporation
Recycling Technology for Waste Plastic Chloride	Ashio Ima Co., Ltd.
Techniques for Recycling Used Plastic Bottle	Shay Corporation
The "ECOSE" series of recyclable / recycled carpet tiles	Sunstone Textile Co., Ltd.
Vertical maize intercropper	PLANTEC Inc.
Vertical-type High-speed Rotary Pulverizer	Kancho Kaisho Kogyo Co., Ltd.
Sludge reduction and recycling as fuel	Shimayama Industries, Ltd.
Wiper Roll Cleaner for Component Mounting Lines	SARA CORPORATION
SD "Karex-Plus" Concrete Form Panel	Karex Corporation Co., Ltd.
Double-coated Adhesive Tape for Ease of Disassembling Household Electrical Appliances	Nitta Denso Corporation
Infectious medical waste sterilizer / shredder system	YAMADA Kogyo Co., Ltd.
Air-cooled blast furnace fine slag aggregates	Nippon Steel & Sumitomo Metal Corporation (Mitsubishi Works)
Energy-saving winduppage shading/insulation sheet "VELEBEX"	Nitta Denso Corporation
Commutated blast furnace slag for Portland blast furnace slag cement	Nippon Steel & Sumitomo Metal Corporation
Mining is unnecessary, contributing to environmental preservation/blast furnace material ("Foster Stone", "Foster Rock")	Nippon Steel & Sumitomo Metal Corporation

For details search

Kankeiren Env

Qcases

※Note

This leaflet is provided for the purpose of introducing cases that may be useful for addressing environmental/energy issues (technologies, products, etc.); it does not guarantee the transfer or sale of such technologies or products. Note that the cases in this leaflet are original and unaltered reports prepared by the contributors, and the Kansai Economic Federation does not guarantee the figures shown as the results or effects of the technologies or products.

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