


G L O B A L

ENVIRONMENT

C E N T R E

FOUNDATION

A n n u a l R e p o r t 2 0 0 0



Contents

- 1 Foreword
- 2 Overview of the Global Environment Centre Foundation
- 4 Activities in Fiscal Year 2000
  - Projects Supporting UNEP-IETC
  - Projects for Providing a Platform for Supporting UNEP and Promoting International Cooperation
  - Official Visits and Publications List
- 16 Project Programs for Fiscal Year 2001
  - Projects Supporting UNEP-IETC
  - Projects for Providing a Platform for Supporting UNEP and Promoting International Cooperation
- 18 References
  - Overview of the UNEP International Environmental Technology Centre
  - Board Members of the Global Environment Centre Foundation



Foreword

The 21st century has arrived. The "Century of the Environment" has begun, in which the world's people must rise and work together to ensure our survival on this planet by solving the global-scale environmental problems that we face. The challenge of global warming is a particularly significant problem in terms of its potential impact on the continuation of humanity and our present global ecosystem. It is a problem that demands the swift implementation of effective attempts at solution. In March 2001, the United States shocked the world by announcing its withdrawal from the Kyoto Protocol, but leaders around the world, including the Prime Minister of Japan, have continued and deepened discussions aimed at finding solutions to this problem.

With the world expected to move yet further in the direction of a borderless society in the 21st Century, NGOs and NPOs of the world, along with numerous other international organizations, will no doubt be needed to align diverse national interests and attitudes and promote a global approach to dealing with such issues. Therefore, the role of the Global Environment Centre Foundation (GEC) and the UNEP International Environmental Technology Center (IETC) is certain to assume even greater importance in coming years.

In order to realize a Century of the Environment, social and economic models in the 20th century based on mass production, mass consumption and mass disposal must be revised in favor of a society enjoying a new type of abundance born of recycling and sustainability. To achieve this, GEC intends to deepen its links with UNEP-IETC, making ever-greater contributions to environmental preservation, with a special focus on developing countries. With this Annual Report, it is our hope that a greater understanding and appreciation of GEC activities will be fostered.

November 2001

KUMAGAI, Nobuaki

President

Global Environment Centre Foundation

### Background of the Establishment

#### Establishment of the UNEP International Environmental Technology Centre

In the 1960s, in conjunction with rapid industrialization, the city of Osaka suffered from several unprecedented environmental problems. Enormous infrastructure improvements and development of environmental technologies were subsequently achieved through cooperation between municipal government and industry. In hopes of extending these benefits beyond its borders, the Osaka City Government has been working to help alleviate environmental problems in developing countries.

With this background, in August 1989, Mr. Masaya Nishio, Mayor of Osaka, announced a plan to attract an international environmental organization to the city in order to disseminate and apply Osaka's successful experience with urban environmental management. This plan was announced in accordance with the spirit of the International Garden and Greenery Exposition held in Osaka in 1990. Following the mayor's announcement and with the support of the national Japanese government, the Osaka Prefectural Government, and business organizations in the region, Osaka Mayor Nishio officially handed a request to Dr. Mostafa K. Tolba, then Executive Director of the United Nations Environment Programme (UNEP), while he was visiting Japan.

The result was that, in July 1990, at a summit of developed nations in Houston, USA, Prime Minister Toshiki Kaifu announced the plan of setting the UNEP facilities up in Japan. In August of the same year, Mr. Naohiro Kumagai, then Japan's ambassador to Kenya, proposed to the 2nd Special Meeting of the UNEP Governing Council that a center be set up in Japan in view of the increasing importance of environmental technology transfer to achievement of sustainable development. In May of the following year, a resolution to establish the UNEP International Environmental Technology Centre (IETC) whose mandate is the adoption, application and operation of Environmentally Sound Technologies (ESTs) in developing countries and countries with economies in transition, was unanimously approved at the 16th Session of the UNEP Governing Council. Official establishment of IETC was completed in October 1992 in Osaka when UNEP Executive Director Tolba and Parliamentary Vice-Minister for Foreign Affairs Kakizawa signed an official agreement marking the founding of IETC. - Note: all titles are effective as of the years mentioned here.

#### Establishment of the Global Environment Centre Foundation

After official approval in 1991 by the UNEP Governing Council to set up the IETC in Japan, the Osaka City Government formed an IETC Osaka Planning Office on July 3, 1991. The purpose of the office was to carry out planning and create a network of support for the proposed center. Following initial preparation by the Planning Office, capital endowment was received from the Osaka prefectural and city governments. The establishment of the Global Environment Centre Foundation (GEC) was carried out on January 28, 1992 with the expressed purpose of supporting IETC. GEC, a nonprofit organization, obtains support from the local business sector.

GEC provides staff and logistical support to IETC Osaka and collaborates with IETC on joint projects. It also acts as a liaison between environmental organizations in Japan and the IETC. In this way, it helps to ensure the IETC's smooth and efficient operation. In addition, GEC promotes environmental conservation through original projects such as the collection and dissemination of environmental technological information, training programs, seminars and symposia, as well as research.

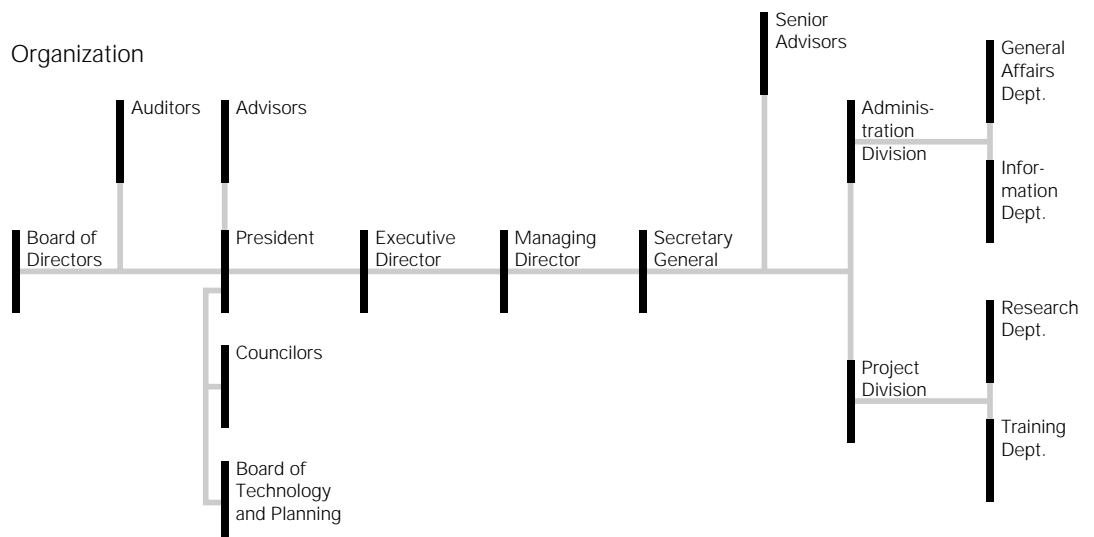
Thus, in all of these ways, GEC's activities make a significant international contribution by Japan in the environmental field.



**Mission and Objectives**

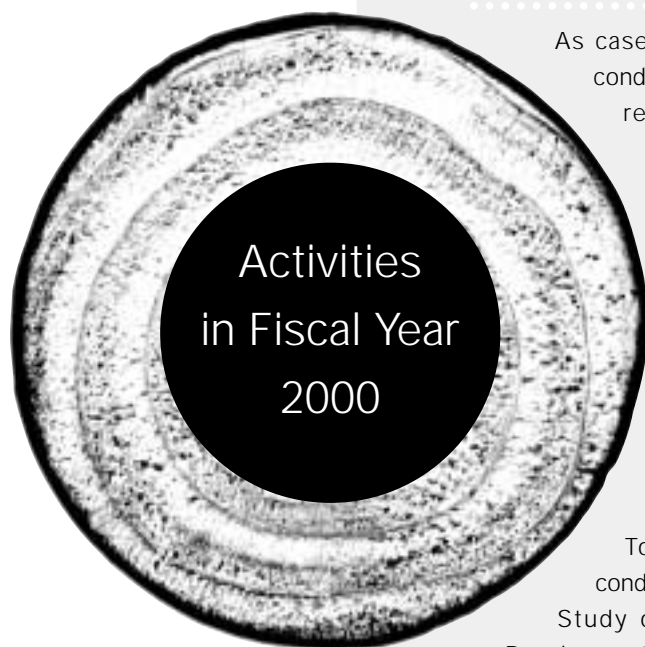
The Global Environment Centre Foundation (GEC) was established to make use of the abundant accumulation of knowledge and experience in Japan in the field of environmental conservation. In particular, it makes use of knowledgeable groups and individuals in the Kansai region in order to support contributions of UNEP in the field of urban environmental management in developing countries. Thus, GEC promotes international cooperation around environmental conservation, and aims to make meaningful, practical contributions to the protection of the global environment.

Name	Global Environment Centre Foundation (GEC)
Date of Establishment	January 28, 1992
Relevant Authorities	The Ministry of Foreign Affairs of Japan The Ministry of the Environment of Japan
Office Location	2-110 Ryokuchi-koen, Tsurumi-ku, Osaka 538-0036 Japan Telephone: +81-6-6915-4121 Facsimile: +81-6-6915-0181
Endowments	1,708,110,000 yen (as of March 31, 2001)
Activities	(1) Providing general support for activities of UNEP relating to urban environmental conservation in developing countries (2) Undertaking research which contributes to the conservation of the global environment, with particular focus upon urban environmental management in developing countries (3) Collection and dissemination of information which contributes to the conservation of the global environment, with particular focus upon urban environmental management in developing countries (4) Holding of training programs, seminars, and symposia which contribute to conservation of the global environment, with particular focus upon urban environmental management in developing countries (5) Facilitating communications with international organizations, governmental organizations, and research organizations in various countries, in order to contribute to conservation of the global environment (6) Any other activities necessary to achieve the mission of GEC.
Number of Staff	20 (as of July 1, 2001)



Note: Please see page 19 for the list of Board members.

With a view to supporting activities of the UNEP International Environmental Technology Centre (IETC), GEC dispatched staff who undertook cooperative management of several IETC projects. In addition, GEC offered support through the dispatch of cooperating staff to the "Seminar for Aseismic Reinforcing Technologies for Existing Housing" in Turkey, as well as the "International Roundtable on Air Quality Management in Cities," and "Pilot Training Seminar on Trenchless Technologies for the Repair and Rehabilitation of Water and Sewage Pipelines in Urban Areas," both held in Cairo, Egypt. Furthermore, in conjunction with the development of a database for cleaner production technology, to organize information collected in 1998 and 1999, GEC also co-organized with IETC an international seminar in Bangkok, Thailand to disseminate information systems about environmentally sound technologies (ESTs) and promote associated technology transfer. GEC also assisted with networking improvements, to facilitate information sharing with the Osaka and Shiga offices of IETC.



Activities  
in Fiscal Year  
2000

As case studies in environmental technology transfer, GEC conducted feasibility studies on measures to deal with both residential wastewater and composting in Lamphun, Thailand. Similarly, in Vietnam, environmental monitoring technology training was conducted with a view to fostering transfer of such technology to that nation.

Formal training for Environmental Auditors of Environmental Management Systems (EMS) is part of GEC's fundamental support for UNEP in promoting international cooperation. In order to more broadly promote EMS, support and cooperation is also provided to other organizations for EMS-related projects.

To contribute to measures to counter global warming, GEC conducted for the second consecutive fiscal year a "Feasibility Study on Climate Change Mitigation Projects for Clean Development Mechanism (CDM) and Joint Implementation (JI)" aimed at reducing global warming. In addition, GEC promoted an environmental cooperation project related to energy utilization in Chongqing, China, and it began to conduct new experimental verification of total greenhouse gas emissions for Japanese municipalities. In order to facilitate the transfer of Japan's expertise in educational activities related to environmental preservation, GEC conducted studies aimed at evaluating the relevant needs of developing countries.

As in the previous year, GEC also organized four training courses commissioned by the Japan International Cooperation Agency (JICA), and promoted networking among former participants in earlier JICA training courses held by GEC. As part of this networking initiative, GEC held One-Day Seminars in Indonesia, and published "GEC PLAZA," a network newsletter. Additionally, a new GEC Networking Project for former training participants, called the "GEC Information Board" was established, to strengthen the network of past training program participants.

### Dispatch of Cooperation Staff

GEC dispatched cooperation staff (both specialists and general support staff) to the UNEP International Environmental Technology Center (IETC). These staff engaged in information gathering, planning and conducting of seminars on "Environmentally Sound Technologies for Construction," planning and participation in the "International Roundtable on Air Quality Management in Cities," and planning and conducting of the "Pilot Training Seminar on Trenchless Technologies for the Repair and Rehabilitation of Water and Sewage Pipelines in Urban Areas."

### Information Gathering and Dissemination / Educational and Promotional Activities

#### Promotion of Environmentally Sound Technology (EST) Information Dissemination and Technology Transfer

GEC continued its project to collect information and develop a systematic database on "Cleaner Production (CP) Technologies," which are designed to reduce environmental impacts and energy consumption within entire production processes. It has also continued to develop its database on end-of-pipe technologies, which treat pollution at discharge stages— this database has been launched on the Internet. In March 2001 in conjunction with the IETC, GEC served as secretariat for the "International Seminar on Information Systems of Environmentally Sound Technologies (EST-ISs)," held chiefly for the benefit of Southeast Asian developing countries in Bangkok, Thailand. This international seminar hosted about 120 participants from 13 countries, including officials responsible for EST-ISs, researchers and academic experts, and observers, and made possible a lively and fruitful exchange of views on the direction of future activities.

- **The International Seminar on the Information Systems of Environmentally Sound Technologies (EST-ISs)**

Dates: March 7-9, 2001

Venue: The Dusit Thani Hotel, Bangkok

Co-Organizers: UNEP-IETC, GEC

Cooperating Organizations: Thailand's Ministry of Science, Technology, and Environment (MOSTE) and Ministry of Industry (MOI), Asian Institute of Technology (AIT), UNEP Regional Office for Asia and the Pacific (ROAP), Japan's Ministry of the Environment

Number of Participants: approximately 120

#### Japan Environmental Technology Information Database Updated and Expanded

GEC's "NETT21: Database on New Environmental Technology Transfer for the 21st Century" was updated and expanded during fiscal year 2000.

- **Technology Database Construction**

Database on Energy-Saving Technologies in Business-Related Buildings (Japanese and English): This database was developed from a report released in March 2000 by the Technical Study Group on Energy Saving in Business-related Buildings.

#### Support Provided in Disseminating IETC's Searchable ESTs Directory/Database: "maESTro"

GEC supported activities to disseminate the environmental technology database and accompanying management software for the searchable EST directory called "maESTro," which was developed by IETC.

- **NETT21 data was entered into IETC's maESTro database**

In order to support the enhancement and dissemination of maESTro, GEC continued the previous fiscal year's efforts to enter examples of Clean Production (CP) technology in the NETT21 database, so that they would be accessible via the maESTro server.

#### GEC and IETC Information Service Maintenance Management and Expansion

GEC conducted to expand the information sharing system with IETC and supported to strengthen the IETC's Internet environment maintenance management.

### Case Study Projects for Environmental Preservation Technology Transfer

Since Fiscal Year 1999, GEC, at the request of the Pollution Control Department (PCD), Ministry of Science, Technology and Environment, Thailand and Lamphun Municipality in the northern part of Thai, has been giving technical advice and guidance to promote a project for improving the water quality of the Kuang River, which flows through the Municipality. In FY 2000, under the guidance of the Committee on Environment Technology (Co-chaired by Mr. Prapat Poocharoen, Mayor of Lamphun, and Dr. Isao Somiya, Professor of Graduate School of Engineering, Kyoto University), which is comprised of administrators and experts from Thailand and Japan, a demonstration project was conducted, which consisted of domestic wastewater treatment with a contact aeration process and a feasibility study of organic waste composting in the Municipality.

GEC achieved its goal of technical cooperation for environmental conservation of Lamphun Municipality and completed this Case Study Project.

#### ● Demonstration Project of Wastewater Treatment

Period: Early December 2000 to early February 2001

Location: Thailand (Lamphun)

Verification Items: Feasibility of the contact aeration wastewater treatment process (BOD, COD, SS)



### Project on Environmental Monitoring Technology Transfer

Under the guidance of the Committee for Studying Transfer of Environmental Monitoring Technology (Chair: Prof. Yasuaki Maeda, Faculty of Engineering, Osaka Prefectural University), GEC is working to promote adoption of environmental monitoring technology in developing countries. As part of this effort, GEC conducted technical training in Hanoi, Vietnam in December 2001 for engineers and members of Vietnam's central and regional governments and research organizations. This training project was designed to meet Vietnam's needs as determined during the Information Exchange Meeting on Environmental Monitoring Technologies held in Hanoi in 1999, and it was conducted with cooperation from the Association for Overseas Technical Scholarship (AOTS).

#### ● Environmental Monitoring Technology Training

Period: December 4-8, 2000

Major Training Items: Environmental Monitoring Planning  
Methods, Monitoring Data Utilization  
Methods, Analysis Equipment Quality  
Assurance (QA) and Quality Control (QC).

Location: Vietnam (Hanoi)

Number of Participants: 25



### Collection and Dissemination of Information on On-Site Green Techniques (OGTs)

GEC disseminates information to developing countries on simple, low-cost on-site green techniques (OGTs), to be developed at manufacturing and other facilities through its NETT21 Internet database. In fiscal year 2000, GEC worked to promote distribution of OGT information, as part of a project to consolidate the OGT data and the database on energy-saving technologies in business-related buildings.

### IETC Publicity Activities Using the GEC Newsletter and Website

In order to inform its wider constituencies of IETC activities, the GEC Newsletter (Japanese and English) contains articles about IETC projects. In another of GEC's efforts to promote understanding of IETC endeavors, details and a report of results from the International Seminar on the Information Systems of Environmentally Sound Technologies (EST-ISs) were made available on the GEC Website.



## Seminars and Symposia

### **Dispatch of Cooperation Staff to the "Seminar for Aseismic Reinforcing Technologies for Existing Housing"**

In fiscal year 2000, the Japan's Ministry of Land, Infrastructure and Transport (MLIT) commissioned the Overseas Construction Association of Japan, Inc. (OCAJI) to undertake a "Project for the Technical Transfer of Reinforcing Devices for Existing Housing in Order to Withstand Earthquakes in the Republic of Turkey," which is a Project for the Promotion of International Cooperation in the construction industry. GEC contributed to this effort by dispatching GEC assigned cooperation staff to take part in the planning and conducting of the "Seminar for Aseismic Reinforcing Technologies for Existing Housing" held in Turkey on November 28-29, 2000.

### **Dispatch of Cooperation Staff and Experts to the "International Roundtable on Air Quality Management in Cities"**

For supporting IETC's activities, GEC sent a delegation of staff and outside experts to take part in the "The International Roundtable on Air Quality Management in Cities" held in Cairo from May 16-18, 2000.

### **Dispatch of Cooperation Staff to the pilot training seminar on "Trenchless Technologies for the Repair and Rehabilitation of Water and Sewage Pipelines in Urban Areas"**

GEC assigned cooperation staff was dispatched to the "18th Trenchless Technology International Convention and Exhibition" held by the International Society for Trenchless Technology (ISTT) in Australia (October 16-18, 2000). The staff also engaged in planning and conducting the pilot training seminar on "Trenchless Technologies for the Repair and Rehabilitation of Water and Sewage Pipelines in Urban Areas" co-organized by IETC and ISTT and held in Cairo, Egypt (February 26-28, 2001). One aim of this seminar was to promote technologies for replacement and repair of water and sewage pipes.

### **Dispatch of Cooperation Staff to Meeting on Urban Waste Management Program**

GEC cooperation staff accompanied IETC staff on a March 19-23, 2001 to visit the Philippine Department of Environment and Natural Resources (DENR), as well as other Philippine government organizations, for the purpose of discussing implementation of the National Integrated Waste Management Program (NIWMP).

## Other Activities

### **Participation in the Hana-Ranman Festival 2000**

GEC and IETC submitted an exhibit for the purpose of environmental promotion at the Hana-Ranman Festival 2000, held April 15-May 7, 2000 at the Tsurumi-ryokuchi Park, Osaka.

### **Participation in the International Cooperation Festival 2000**

GEC, jointly with IETC and ILEC, participated in exhibitions at the International Cooperation Festival 2000 held at Hibiya Park, Tokyo on October 7- 8, 2000.

### **Participation in the One World Festival 2001**

On January 7, 2001, GEC, IETC and ILEC jointly participated in exhibitions at the One World Festival 2001, held at the International House, Osaka.

### **Third IETC's International Advisory Board Support**

IETC held its Third International Advisory Board at the Guest House at Tsurumi-ryokuchi Park, Osaka, on November 29, 2000. GEC provided support and cooperation to IETC in the organizing of this event.

## Survey and Research Projects

### Promotion of Environmental Management Systems and Auditing

GEC was accredited as a training body for environmental auditors in the EMS Registration System for ISO 14001 in October 1997, by the Japan Accreditation Board for Conformity Assessment (JAB). Since then, GEC has organized a full range of training courses aimed at promoting and furthering EMS projects in Japan.

#### ● Environmental Auditor Formal Training Courses and Internal Environmental Auditor Training Courses

Completion of a formal training course accredited by JAB is one of the requirements to become an official environment auditor. The course has also been accredited by the Institute of Environmental Management and Assessment (IEMA; formerly the Environmental Auditors Registration Association, or EARA) in the U.K. In fiscal year 2000, GEC organized a number of courses.

<Environmental Auditor Formal Training Courses>

- 17th course to 20th course / total number of participants: 46

<Environmental Auditor Refresh Course>

- 2nd course / number of participants: 22

<Internal Environmental Auditor Training Courses>

- 14th course to 16th course / total number of participants: 57



#### ● Support for EMS-Related Projects

In order to promote dissemination of EMS concepts, as well as capacity building of human resources for EMS projects, GEC organized an EMS training course for the staff of the Environmental Management Bureau, Osaka City Government. GEC also organized a training course on Quality Management Systems (QMS) implementation for Small and Medium-Sized Enterprises (SMEs), and training courses on EMS implementation for SMEs (in conjunction with the Economic Affairs Bureau, Osaka City Government). In addition, GEC dispatched instructors to the "Training Courses for the Development of EMS" held by the Hyogo Environmental Advancement Association (August 29-30, 2000) and an EMS Internal Environmental Auditor Training Course (October 16-17, 2000). Finally, GEC cooperated in conducting ISO 9000-related courses for external training body.

<EMS Training Course for Environmental Management Bureau Staff, Osaka City Government>

- October 11, 30 and 31 / number of participants: 36

<Training Course on QMS Implementation for SMEs>

- 3rd course to 6th course / total number of participants: 88

<Training Course on EMS Implementation for SMEs>

- 5th course to 6th course / total number of participants: 45

### Feasibility Studies on Climate Change Mitigation Projects for Clean Development Mechanisms and Joint Implementation

GEC has served as secretariat for a Feasibility Study on Climate Change Mitigation Projects, Clean Development Mechanism (CDM) and Joint Implementation (JI), which the Ministry of the Environment of Japan has promoted since 1999. As a result, GEC has undertaken the review and screening of applications for the performance of feasibility studies on possible CDM and JI projects such as biomass use and afforestation (as recommended by local governments and NGOs), including evaluation of project feasibility and overall administration. The purpose of the project is to accumulate knowledge necessary to formulate the international/ domestic rules on CDM/ JI frameworks as well as to explore projects that effectively contribute to reduction of GHG emission and enhancement of CO<sub>2</sub> sinks. In FY 2000, under the Promotional Committee for the CDM project, eight feasibility studies were selected including those carried over from previous year. In addition, GEC joined field studies in Myanmar and Vietnam to grasp the progress conditions. GEC also organized a "CDM Forum" incorporating the previous year's studies and reports, thus continuing to take an international approach to climate change mitigation.

#### ● Overview of Feasibility Studies on Climate Change Mitigation Projects for Clean Development Mechanisms in FY 2000

- Study on production of ethanol-containing gasoline, with ethanol made from sugar cane refuse in Vietnam / Japan Energy Research Center, Co., Ltd.
- Feasibility study on afforestation in South Shan State, Myanmar / KARAMOSIA
- Study on sustainable forest management to enhance carbon sinks and stabilize CO<sub>2</sub> by carbonization in Sarawak, Malaysia / Kansai Environmental Engineering Center Co., Ltd.
- Pilot study to establish highly productive and environmentally sound forest management method in West Kalimantan, Indonesia / International Charcoal Cooperative Association
- Study on evaluation of a afforestation project in East Kalimantan, Indonesia / Sumitomo Forestry Co., Ltd.
- Survey for supporting a reforestation project plan in Mongolia / Hyogo Environmental Advancement Association
- Study on afforestation in the Huangtu Plateau, China / Green Earth Network
- Feasibility study of a participatory reforestation project on Lombok Island, Indonesia / Japan International Forestry Promotion & Cooperation Center

### Environmental Cooperation Project on Energy Use with Chongqing, China

Under the guidance of the Study Group on Energy-Related Issues in Developing Countries (Chair: Prof. Dr. Yutaka Suzuki, President of Himeji Institute of Technology), GEC has, since FY 1999, facilitated environmental cooperation— to develop technology for the advanced utilization of natural gas in Chongqing City, China. A visit was made to Chongqing in April 2000, at which time a field study and discussions were conducted. In September, a request from Chongqing resulted in a visit to Japan by a Chinese delegation to develop understanding of Japan's natural gas supply and utilization technology. Following these exchanges, a meeting to exchange opinions was held in Chongqing in February 2001 on the theme of "Securing Safety and Improving Efficiency in the Utilization of Natural Gas," and an agreement was signed declaring the intention of the Japanese and Chinese parties to conduct joint research.

- **Chongqing Delegation Visits Japan**

Period : September 2-9, 2000

Place visited: Osaka Gas Co., Ltd.

Participants: Chongqing Municipal Economic Commission,  
natural gas suppliers, others.

Number of participants: 10

- **Exchange of Views in Chongqing**

Period and venue: February 12-13, 2001 / Chongqing (China)

Theme: Securing Safety and Improving Efficiency in the Utilization of Natural Gas



### Study of Prototype Project: To Assess Total Emission of Greenhouse Gases Verification based on the Law Concerning Promotion of Measures to Cope with Global Warming

Japanese municipalities are obligated to develop concrete plans to control total greenhouse gas emissions and to measure those emissions. The Ministry of the Environment is developing a technical calculation manual to enhance the quality of the data collected. Commissioned by the Ministry, GEC verified the effectiveness of the manual with the cooperation of Suita City and Ikeda City in Osaka Prefecture, and Aioi City in Hyogo Prefecture.

### Study on Energy-Saving Technology for Urban Environmental Conservation

In order to promote and publicize the effectiveness of new energy sources, such as solar generators used in the UNEP-IETC Osaka Office building, fuel cells and electric power generated by refuse incineration, a Research Group on Effective Urban Energy has been active. Beginning in FY 1998, this group's research has been carried out under the auspices of the Technical Study Group on Energy-Saving for Business-related Buildings (Chief: Prof. Minoru Mizuno, Graduate School of Engineering, Osaka University). In FY 2000, the technical information collected in the previous two years was compiled into a database, and made available to the public via the GEC Website.

### Study on New Energy Systems

Since new energy systems created from technologies such as fuel cells and solar generators result in a markedly reduced impact on the environment, GEC undertook a study to verify the effectiveness and sustainability of these systems over long periods of time, through the operation and management of specific facilities. For the first time domestically, a fuel cell that exceeds 50,000 hours of operation has been developed. After 50,000 hours of operation, this project was deemed complete, and operation ceased on October 20, 2000.

### Promotion of Environmental Conservation

With the goal of applying environmental conservation expertise gained in Japan to developing countries in a cooperative framework, GEC conducted a domestic preparatory study in FY 2000 of publicity needs in developing countries, and sought support from experts in realizing this goal.

**Information  
Collection and  
Dissemination /  
Educational and  
Promotional  
Activities**

### **Management of a Library on Environmental Issues**

GEC has opened to the public a library of books on environmental issues, with a special focus on UNEP-related books. Updating the UNEP collection and improving the system of managing the collection have been the main foci of these efforts.

### **Publication of GEC Newsletter and Annual Report**

Issue 18 of the GEC Newsletter was published in April 2000, and Issue 19 was published in November, with the aim of providing more comprehensive content and including special features related to the themes at hand. The English-language GEC Newsletter Issue 9 was published in May 2000, and these reports on GEC activities were distributed widely overseas. In addition, the GEC 1999 Annual Report (Japanese and English) was published, bringing together a summary of all the year's activities and events for the benefit of interested domestic and international organizations. GEC also produced a promotional video for use in facility tours and seminars, aimed at furthering understanding of GEC structure and activities.

**Training  
Projects**

### **JICA Training Course on Heavy Metal Pollution Control**

Commissioned by the Japan International Cooperation Agency (JICA), GEC provided a training course on heavy metal pollution control in cooperation with the Department of Environment, Agriculture, Forestry and Fisheries, Osaka Prefectural Government. GEC received five participants from five countries to develop experts capable of developing preventive measures to deal with heavy metal pollution. The two-month program included lectures, analysis, practical training and facility tours.

- Training period: May 29 - July 21, 2000
- Nationality of participants: China, Indonesia, Sri Lanka, Egypt and Chile
- Main course contents:
  - (1) Lectures:
    - (a) Introduction to heavy metal pollution
    - (b) Air pollution control measures
    - (c) Water pollution control measures
    - (d) Soil Contamination prevention measures and so on
  - (2) Practical training:
    - (a) Sampling and analysis of suspended particles in atmosphere
    - (b) Sampling and analysis of river water
    - (c) Analysis of heavy metals in soil/waste and so on
  - (3) Facility tours:
    - (a) Refuse incineration plant
    - (b) Sewage treatment plant/water purification plant and so on
  - (4) Presentation of country report and action plan

### **JICA Environmental Management Seminar**

Commissioned by JICA, GEC provided an environmental management seminar in cooperation with the Environment and Public Health Bureau, Osaka City Government (Currently the "Environment and Sewerage Bureau"). GEC received eight participants from eight countries who will play major roles in environmental management. The one-month program included seminar-style lectures and discussions, as well as facility tours.

- Training period: June 12- July 14, 2000
- Nationality of participants: Bangladesh, China, Indonesia, Malaysia, Pakistan, the Philippines, Sri Lanka and Thailand
- Main course contents:
  - (1) Lectures/ Discussions/ Tours:
    - (a) Global environmental preservation and sustainable development
    - (b) International initiatives to protect the environment
    - (c) Joint action by governments, industry and citizens
  - (2) Presentation of country report and action plan



### JICA Training Course on Urban Solid Waste Management

Commissioned by JICA, GEC organized a training course on urban solid waste treatment in cooperation with the Environment Management Bureau, Osaka City Government. GEC received five participants from four countries, and provided lectures on collection, as well as interim treatment and final disposal of urban solid waste, during the three-month program.

- Training period: August 14 - November 2, 2000
- Nationality of participants: China, India, the Philippines and Ghana
- Main course contents:
  - (1) Lectures:
    - (a) Pollution control measures
    - (b) Outline of waste management
    - (c) Processing of domestic/ industrial wastes and so on
  - (2) Practical training:
    - (a) Analysis of composition of waste
    - (b) Practice in designing a landfill site
  - (3) Facility tours:
    - (a) Recycling plant
    - (b) Final disposal sites, and so on
  - (4) Presentation of country report and action plan

### JICA Training Course on Air Pollution Control

Commissioned by JICA, GEC provided a training course on air pollution control in cooperation with the Environment and Public Health Bureau, Osaka City Government. GEC received nine participants from nine countries, and provided lectures on air pollution prevention, as well as prediction and management technologies, during the three-month program.

- Training period: September 18 - December 8, 2000
- Nationality of participants: Bangladesh, Indonesia, the Philippines, Thailand, Egypt, Palestinian Authority, Turkey, Chile and Myanmar
- Main course contents:
  - (1) Lectures:
    - (a) Basic knowledge on air pollution
    - (b) Air pollution control technology
    - (c) Air pollution measurement technology
    - (d) Air pollution prediction technology
  - (2) Practical training:
    - (a) Flue gas desulfurization technique
    - (b) Environmental management technology
  - (3) Facility tours:
    - (a) Power plant
    - (b) Refuse incineration plant and so on
  - (4) Presentation of country report and action plan



### GEC Networking Project for Former Training Participants

In order to provide a follow-up framework for former JICA training participants, one that will facilitate a continuing flow of environment-related information with developing countries and enable GEC to continually assess areas of demand for this information, GEC has been offering a network of former JICA training participants since 1998. For FY 2000, a One-Day Seminar was held in February 2001 in Jakarta, Indonesia, and the 5th edition of the network newsletter "GEC PLAZA" was published. To further strengthen the network and enable real-time interactive information exchange, a new Internet-based network message board for overseas former training participants, "GEC Information Board" was established, and trial operation was conducted in January 2001.

- **Third One-Day Seminar**
- Date: February 27, 2001
- Venue: Jakarta (Indonesia)
- Themes: "Environmental Management Systems
  - ISO 14001 and Local Government"
  - "Solid Waste Management
  - Maintenance and Improvement of the Landfill Sites"
- Number of participants: 19



## Seminars and Symposia

### Environment Seminar: "Toward the Realization of a Recycle-Oriented Society"

With Japan's new "Basic Law Concerning the Promotion of a Recycle-Oriented Society" put into effect in May 2000, GEC organized an environmental seminar in cooperation with IETC and Global Environment Forum-Kansai, entitled "Toward the Realization of a Recycle-Oriented Society," on June 20, at the International House, Osaka. This seminar featured Mrs. Beate Weber, Mayor of the city of Heidelberg, Germany, Prof. Kazuhiro Ueta, Graduate School of Economics, Kyoto University, and Dr. Steve Halls, Director of UNEP-IETC. The content of their speeches was summarized and posted on the GEC Website.



Date: June 20, 2000

Venue: International House, Osaka

Organizers: GEC, UNEP-IETC and Environment Forum-Kansai

Supporting organizations: Japan's Environment Agency, Osaka Prefectural Government, Osaka City Government, International House, Osaka, Consulate-General of the Federal Republic of Germany in Osaka-Kobe, Goethe-Institut Kansai, Osaka, Japan-Germany Association of Osaka

Number of participants: approximately 170

### Symposium and Exhibition: "Changing Society Through Green Purchasing"

On June 21, 2000, the Global Environment Forum-Kansai, Osaka Prefecture, Kansai Economic Federation (Kankeiren), and Association of Osaka Constructing an Affluent Society held a jointly-organized symposium and exhibition entitled "Changing Society Through Green Purchasing." The symposium focused on the theme of paper utilization, and provided an opportunity to reconfirm the importance of consumer behavior in a recycle-oriented society. A speech entitled "Considering Environment from the Viewpoint of Food Recycling and Cooking" and an exhibition of "green products" were also featured.



Date: June 21, 2000

Venue: Osaka Science & Technology Center

Organizers: GEC, Osaka Prefectural Government, Kansai Economic Federation, Association of Osaka Constructing an Affluent Society and Global Environment Forum-Kansai

Supporting organizations: Japan's Environment Agency, Green Purchasing Network, Kansai Council, Osaka Industrial Association and Osaka Chamber of Commerce and Industry

Number of participants: approximately 400

### "CDM Forum 2000"

On July 6, 2000, a "CDM Forum 2000" was co-organized by GEC and the former Environment Agency (currently the Ministry of the Environment), as part of the "Feasibility Study on Climate Change Mitigation for Clean Development Mechanism (CDM) and Joint Implementation (JI)." The details of the Forum were posted on the GEC Website.



Date: July 6, 2000

Venue: International House, Osaka

Organizer: GEC

Co-organizer: Japan's Environment Agency

Supporting organizations: Osaka Prefectural Government,

Osaka City Government and the International House, Osaka

Number of participants: approximately 190

**Other  
Activities****"G8 Environment Ministers' Meeting"**

A G8 Environment Ministers' Meeting was held in Otsu City, Shiga Prefecture, on April 7-9, 2000. Topics of discussion included climate change, sustainable development in the 21st Century and Rio+10, as well as environmental health issues— in short, some of the most difficult environmental problems the world faces. The question of the nature of support from the developed world to developing countries was also debated. GEC dispatched staff to support in the organization of the meeting and to gather information, as the content of these discussions will be reflected in future projects of the Foundation.

Date: April 4 - 9, 2000

Venue: The BIWAKO Hotel, Otsu City

Participating nations: Canada, France, Germany, Italy, Japan, U.K., the United States, Russia and EC

**Cooperation with the APEC Steering Council of Environmental  
Technology Exchange Promotion**

GEC participated in the discussions of the APEC Technology Exchange Virtual Center (APEC-VC), and offered its cooperation. Links were established between the Website of APEC-VC and the GEC Website, enabling additional search features to be accessed from GEC's NETT21 environmental technology database.

**GEC Participation in the "Ninth International Environmental Cooperation Forum, West Japan"**

On March 9, 2001, the "Ninth International Environmental Cooperation Forum, West Japan " was held in Kita-Kyushu City, Fukuoka Prefecture. The conference was organized by the Kitakyusyu International Techno-cooperative Association (KITA), the KITA Environmental Cooperation Center and GEC participated in the event. The contact group for this conference was comprised of six working member organizations, as well as nine observer member. Each year the Forum meets to exchange information and deepen ties among its affiliated organizations.

**GEC/JCB Card**

GEC made efforts to increase the number of holders of the GEC/JCB credit card, which it developed jointly with JCB Co., Ltd. Under this credit card system, a portion of each purchase is automatically contributed to GEC when the card is used for shopping or traveling. In this way, card users can support global environmental preservation activities without making special donations.

**"Designated Public Benefit Organization" Status Reconfirmed**

GEC has been recognized as a "Designated Public Benefit Organization" since October 1992. This designation ensures that donations to GEC are tax-deductible. The designation is renewed biannually, and GEC received its latest renewal of the status on December 4, 2000 from the Ministry of Foreign Affairs and the former Environment Agency (currently the Ministry of the Environment).

**Official Visits**

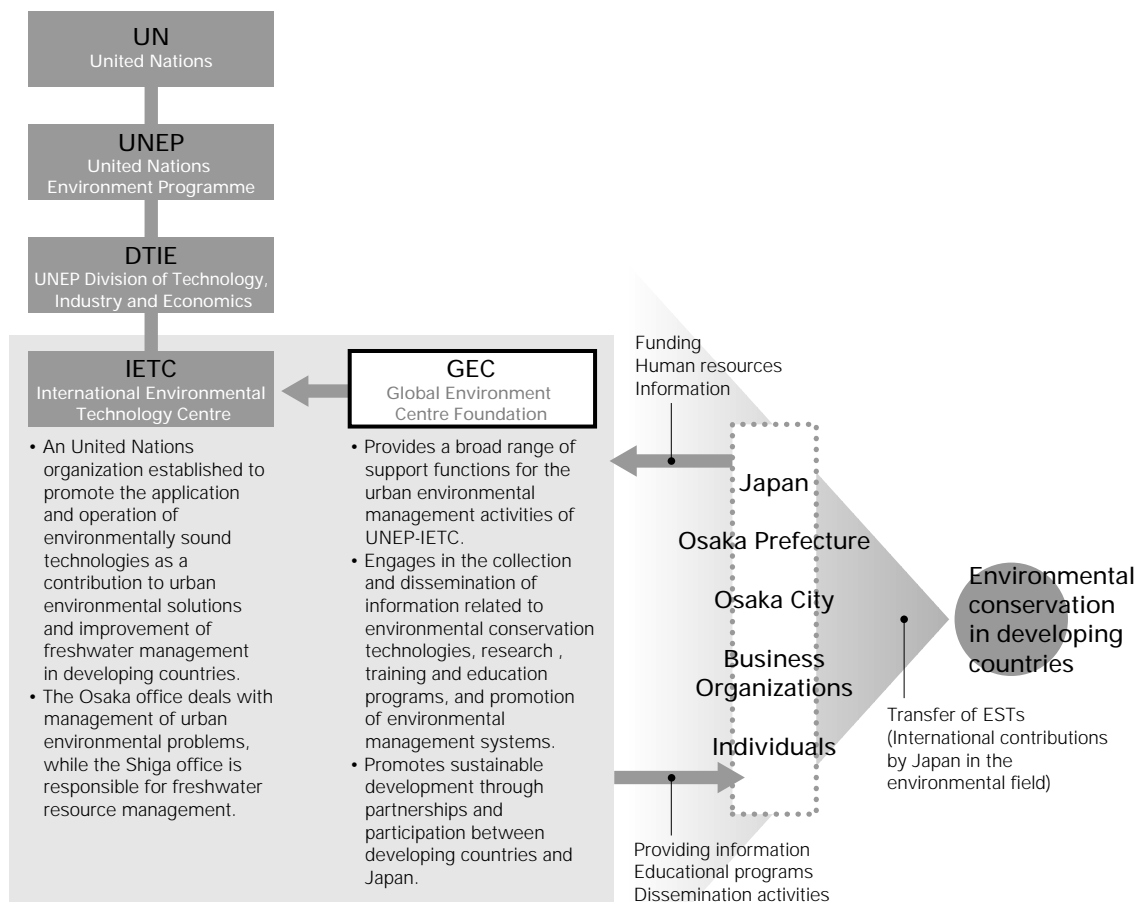
**Official Visit by the Executive Director of the Environment Agency**

On July 19, 2000, Ms. Yoriko Kawaguchi, then Executive Director of the former Environment Agency (now Environment Minister), made an inspection visit to GEC and IETC Osaka offices. GEC provided a tour of the facility, explained activities of the organization, and requested ongoing understanding and assistance.



**UNEP Special Envoy Makes Official Visit**

Ms. Tokiko Kato, designated UNEP Special Envoy on October 30, 2000, made an official visit to GEC and IETC Osaka on December 15 in preparation for fully assuming her new role. During her visit, Ms. Kato was introduced to the activities of the respective organizations.





## Publications

Name of publication	Description	Format/No. of Pages Date of Issue
"UNEP Global Environment Outlook 2000 (GEO-2000)" (Japanese)	GEC, IETC, and ILEC co-published a Japanese version of the UNEP's GEO-2000 overview, translated by the Global Environment Bureau of the Environment Agency.	A4/ 16 pages May 2000
Cleaner Production Technology Case Studies in Japan (Japanese/English)	GEC compiled the results of studies it conducted in 1999, and published them as a Japan cleaner production technology resource volume.	A4/ 321 pages September 2000
The Forgiving Air— Understanding Environmental Change (Japanese translation)	By Dr. Richard C. J. Somerville, Scripps Institution of Oceanography, University of California, San Diego Translated by Dr. Yukimasa Saito/ Dr. Shoichiro Nakamoto	B5/ 326 pages March 2001



## Periodicals

Name of publication	Description	Format/No. of Pages Date of Issue
GEC NEWSLETTER No.18 (Japanese)	An introduction to the activities of GEC	A4/ 8 pages April 2000
GEC NEWSLETTER No.19 (Japanese)	An introduction to the activities of GEC	A4/ 8 pages November 2000
GEC Newsletter No.9 (English)	An introduction to the activities of GEC	A4/ 8 pages May 2000
Global Environment Centre Foundation Annual Report (Japanese)	Report on projects of GEC for fiscal year 1999	A4/ 24 pages September 2000
Global Environment Centre Foundation Annual Report (English)	Report on projects of GEC for fiscal year 1999	A4/ 20 pages November 2000



In order to usher in a true Century of the Environment, in which prosperity can be sustained throughout the century, GEC will continue to provide unqualified support to the UNEP International Environmental Technology Centre (IETC). We will work for international cooperation in the environmental preservation arena, preparing for the World Summit on Sustainable Development (WSSD) in 2002, and promoting IT implementation. In this way, it is our hope to make a continuous and active contribution to environmental preservation in developing countries and around the world.

To support UNEP-IETC, GEC promotes projects related to Environmentally Sound Technologies (ESTs) and technology transfer, as well as joint projects with IETC, and the Proof Study on Energy-Saving Technology for Urban Environmental Conservation.

In addition, as part of our projects for providing a platform for supporting UNEP and promoting international cooperation, GEC will work to further the "Demonstration Project of Environmental Preservation Activities with Community Participation in Lamphun Municipality, Thailand." GEC will continue its group training activities that are commissioned by JICA, striving to build a smooth technology transfer process through improved environmental cooperation with developing countries. And by strengthening the GEC Networking Project for the Former Training Participants of JICA seminars, we hope to keep a constant finger on the pulse of environmental technology needs in developing countries.

To contribute to climate change mitigation both domestically and overseas, GEC will continue its support of the "Feasibility Study on Climate Change Mitigation Project for Clean Development Mechanisms (CDM)," the "Study of a Prototype Project to Assess and Verify Total Greenhouse Gas Emissions," and environmental cooperation with Chongqing City, China around energy utilization technology. On the Environmental Management System (EMS) front, GEC will continue to offer training courses including Environmental Auditor Formal Training Course, and incorporate EMS programs into the JICA training programs. JICA training programs, all with a view toward fostering and promoting the education of expert, environment-related human resources for the future.

Finally, GEC will assist in the implementation of the new UNEP Special Envoy Project commissioned by the Ministry of the Environment, and work to promote the broadest and most comprehensive environmental conservation approaches possible.



## IETC support

---

- (1) Providing of Office Space and Equipments
- (2) Promotion and Transfer of Information on Environmentally Sound Technologies (EST-ISS)
- (3) Implementation of joint projects with IETC
  - EST/EVT Project
  - Project for application of environmental management system principles to urban management
  - Air quality management project
  - Trenchless technologies for the repair and rehabilitation of water and sewage pipelines in urban areas
- (4) Proof Study on Energy-Saving Technology within Urban Environmental Conservation
- (5) UNEP Special Envoy Project

GEC will provide support for environment-related activities of the UNEP Special Envoy, both domestically and overseas.\*

\*This support indirectly benefits IETC by raising the profile of UNEP in Japan and the Asia-Pacific region.

## Promotion of technology transfer to Asia

---

- (1) Water quality management support study for Halong Bay in Vietnam:

GEC will apply its experience in monitoring technology transfer projects to support the development of water quality measurement plans, and related activities, in collaboration with the Vietnamese government.
- (2) Public awareness activities for environmental conservation:

GEC will implement a demonstration project in Thailand to transfer expertise in promotion of community awareness of, and participation in, environmental conservation with reference to Japanese experience in the field.
- (3) Training courses commissioned by the Japan International Cooperation Agency (JICA)
  - JICA Training Course on Heavy Metal Pollution Control
  - JICA Environment Management Seminar
  - JICA Training Course on Urban Solid Waste Management
  - JICA Training Course on Air Pollution Control
  - JICA Environmental Management in the Republic of Cuba
- (4) GEC networking project for the former training participants

Through needs assessments, publication of the GEC PLAZA newsletter, holding local seminars, and engaging in information exchange via the Internet-based message board, GEC will follow-up on previous training courses and strengthen its network.

## Contribution to Climate Change Mitigation in Japan and Abroad

---

- (1) Feasibility study on climate change mitigation projects for Clean Development Mechanism (CDM) and Joint Implementation (JI)

GEC will continue to conduct the CDM project study as in fiscal year 2000.
- (2) Study of prototype project to assess and verify total emission of greenhouse gases

GEC will continue with accuracy verification of data collected on greenhouse gases.
- (3) Environmental cooperation project on energy utilization technologies with Chongqing, China

GEC will conduct joint research with natural gas-related companies in Japan and Chongqing to promote technology transfer on advanced utilization of natural gas.
- (4) Proof study on new energy-saving systems

GEC will gather data on operations and maintenance of solar generators, and similar energy-saving systems.

## Promotion of Environmental Management Systems (EMS)

---

- (1) Implementation of training courses for environmental auditors and internal environmental auditors and related activities.
  - GEC will conduct Environmental Auditor Formal Training Courses, Environmental Auditor Refresher Courses and Internal Environmental Auditor Training Courses.
  - GEC will organize EMS-related seminars.
- (2) Environmental Management System (ISO 14001) Design and Operation in GEC

## Information gathering and dissemination

---

- (1) Seminars and Symposia

GEC will organize a wide variety of seminars and symposia in collaboration with industry organizations, NGOs and other entities.
- (2) Public Awareness Activities
  - GEC will provide environmental information via the Internet
  - Publication of the GEC Newsletter and GEC Annual Report (Japanese and English)
- (3) Operation and enhancement of the Library

**Name**

United Nations Environment Programme (UNEP) International Environmental Technology Centre (IETC)

**Date of Conclusion of the Agreement between Japanese Government and UNEP**

October 30, 1992

**Mandate**

The main role of the IETC is to promote the adoption, application, and operation of Environmentally Sound Technologies (ESTs) to address urban environmental problems such as sewage, air pollution, solid waste, and noise, and the management of freshwater to developing countries and countries with economies in transition.

**Approach**

Osaka Office management of urban environmental issues  
Shiga Office management of freshwater resources

**Contacts**

Osaka Office 2-110 Ryokuchi-koen, Tsurumi-ku, Osaka  
538-0036 Japan  
tel: +81-6-6915-4581 fax: +81-6-6915-0304

Shiga Office 1091 Oroshimo-cho, Kusatsu-city, Shiga,  
525-0001 Japan  
tel: +81-77-568-4582 fax: +81-77-568-4587

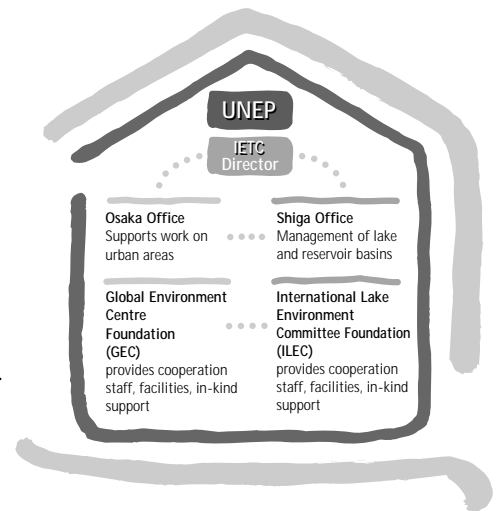
e-mail [ietc@unep.or.jp](mailto:ietc@unep.or.jp)  
IETC homepage <http://www.unep.or.jp/>

**Posts**

Director  
Deputy Director  
Senior Liaison Officer  
Programme Officers (4)  
Administrative/Fund Management Officer (1) (as of October 2001)

**Programme Activities (for 2001-2002)**

- Information Bulletin, IETC's newsletter INSIGHT, Technical Publications and Report Series
- Development and maintenance of the EST information system, including maESTro
- Preparation of Publications and training materials on:
  - (1) Sustainable management of urban wastewater and stormwater
  - (2) Rainwater harvesting in cities
  - (3) Transport and cities
  - (4) Planning and managing of lakes and reservoirs
  - (5) Energy and cities
  - (6) Environmental Management Systems (EMS) for urban management
  - (7) Municipal solid waste management
  - (8) ESTs in architecture and construction
  - (9) Computer based training for EMS
  - (10) Trenchless technologies
  - (11) ESTs for urban management
  - (12) Phytotechnologies and ecosystem management
  - (13) Urban land use and "Brownfields"
- Workshops and seminars on:
  - (1) Management practices of lakes and reservoirs focusing on eutrophication (in association with UNEP-GPA)
  - (2) Bioclimatic and ecological design in Architecture
  - (3) Adoption, applying and operating ESTs for sewage in the wider Caribbean region
  - (4) Joint training programme of IETC and Environment Canada on environmental management for urban decision-makers
  - (5) Environment citizenship
  - (6) Environmental Verification of Technologies (EVT)



---

**Board Members of the Global Environment Centre Foundation**


---

**President**

KUMAGAI, Nobuaki Professor Emeritus, Osaka University

**Executive Director**

OKUNISHI, Hajimu Director, Environment and Sewerage Bureau, Osaka City Government

**Managing Director**

ONAWA, Tadayoshi Assistant Director, Department of Environment, Agriculture, Forestry and Fisheries, Osaka Prefectural Government

**Directors**

AKIYAMA, Yoshihisa Chairperson, Kansai Economic Federation (Kankeiren)  
 HASHIMOTO, Michio Advisor, Overseas Environmental Cooperation Center  
 ISOMURA, Takafumi Mayor, Osaka City Government  
 MATANO, Kagechika Former Ambassador to Sweden  
 MORISHIMA, Akio President, Central Environment Council  
 RYOKI, Shinichiro Chairperson, Osaka Industrial Association  
 SAITO, Fusae Governor, Osaka Prefectural Government  
 TASHIRO, Wa Chairperson, Osaka Chamber of Commerce and Industry  
 TSUDA, Kazuaki Chairperson, Kansai Association of Cooperate Executive

**Auditors**

KOSAKA, Yujiro Treasurer, Osaka Prefectural Government  
 KUMAGAI, Hideo General manager, International Affairs and Banking Services Study Department, Osaka Bankers Association  
 SASAKURA, Kazutada Treasurer, Osaka City Government

**Councilors**

GOSHI, Yoichiro President, National Institute for Environmental Studies  
 IGOSHI, Masashi Deputy Mayor, Osaka City Government  
 KANEKO, Kumao Professor, Strategic peace and International Affairs Research Institute, Tokai University  
 KIMURA, Yo Director, United Nations Centre for Regional Development  
 KOBAYASHI, Shoichiro Advisor, Kansai Electric Power Co.,Ltd.  
 KOSEKI, Kinichi Vice-Governor, Osaka Prefectural Government  
 MIZUNO, Minoru Professor, Graduate School of Engineering, Osaka University  
 NAKAI, Shinya Managing Director, Osaka International Centre of the Japan International Cooperation Agency  
 NOMURA, Akio President, Osaka Gas Co.,Ltd.  
 SAITO, Yukimasa Director, Kansai Airport Research Institute  
 SUZUKI, Yutaka President, Himeji Institute of Technology  
 YAMAMOTO, Kenjiro Chairperson, Osaka City Environment Council

**Board of Technology and Planning**

AMANO, Akihiro Professor, School of Policy Studies, Kwansai Gakuin University  
 HINO, Yasuo Professor, Graduate School of Engineering, Osaka City University  
 IZUMI, Kazuo Executive Director-Environment Management, Department of Environment, Agriculture, Forestry and Fisheries, Osaka Prefectural Government  
 KISAKA, Hiroyuki Chairperson, Environmental Problem Committee, Osaka Industrial Association  
 MAEDA, Yasuaki Professor, Graduate School of Engineering, Osaka Prefecture University  
 MASUDA, Noboru Professor, Graduate School of Agriculture, Agricultural and Environmental Sciences, Osaka Prefecture University  
 MASUDA, Takafumi Director of Environment, Environment and Sewerage Bureau, Osaka City Government  
 MIWA, Masako Commentator  
 NISHIOKA Shuzo Director, National Institute for Environmental Studies  
 PAK, Pyong Sik Associate Professor, Graduate School of Engineering, Osaka University  
 SASAKI, Nobuaki Professor, Graduate School of Economics, Osaka City University  
 SERITA, Kentaro Professor, Graduate School of International Cooperation Studies, Kobe University  
 SOMIYA, Isao Professor, Graduate School of Engineering, Kyoto University  
 TAKEDA, Nobuo Professor, Graduate School of Engineering, Kyoto University

## INDEX

Series of NETT21: Database on New Environmental Technology Transfer for the 21st Century by GEC, and number of each data listings.

Database on:

- Air Pollution Control Technology in Japan: 128
- Waste Treatment Technology in Japan: 98
- Water Pollution Control Technology in Japan: 109
- On-Site Green Technique (OGT) in Japan: 83
- Air Pollution Continuous Monitoring Technology in Japan: 83
- Water Pollution Continuous Monitoring Technology in Japan: 53
- Cleaner Production Technology in Japan: 189
- Energy-Saving Technology in Business-related Buildings: 47
- Japanese Advanced Environmental Equipment (provided by JSIM): 552

---

Total: 1,342 data listings (complete data available in English via the GEC Website)

Number of user sessions in 2000: 123,201

Number of visitors to UNEP facilities: 537 (April 1, 2000 – March 31, 2001)

Collections in GEC library: 4,643 (including UNEP related publications 182)

### **Global Environment Centre Foundation Annual Report 2000**

Date of issue: November 2001

Issued by Global Environment Centre Foundation (GEC)

2-110 Ryokuchi-koen, Tsurumi-ku, Osaka 538-0036 Japan

Tel: +81-6-6915-4121 Fax: +81-6-6915-0181 E-mail: [gec@unep.or.jp](mailto:gec@unep.or.jp)

Internet Homepage Address (URL): <http://www.unep.or.jp/gec>

Editorial consulting:

Stephen M. Hoffman, Ph.D., PlanetBound Inc.

John A. Munroe, PlanetBound Inc.

© Global Environment Centre Foundation (GEC)

GEC's publications are printed on non-wood pulp paper with soybean ink to minimize impact on environment generated by printing.

<100% non-wood pulp paper (kenaf)>



Global Environment Centre Foundation

2-110 Ryokuchi-koen, Tsurumi-ku,  
Osaka 538-0036 Japan

Tel: +81-6-6915-4121

Fax: +81-6-6915-0181

E-mail: [gec@unep.or.jp](mailto:gec@unep.or.jp)

Internet Homepage Address: <http://www.unep.or.jp/gec>

