Management Structure & Action Programs

1. Organization and Management Structure

(1) JAL Group Environmental Committee

In order to coexist with the environment, make social contributions, and achieve a recycling-oriented society, Japan Airlines System Corp. has formed the JAL Group Environmental Committee in October 2002 at the time of the integration of JAL and JAS. The committee has set up JAL Group’s Basic Environmental Policy and launched its Action Guidelines to promote environmental preservation and awareness. The committee meets at least twice a year.

A. Members of JAL Group Environmental Committee

- Chairman and Vice-Chairman: Executives appointed by President
- Members: Executives marked with asterisks (*) in the organization chart shown at the bottom of this page, pertinent executives of JAL and JAS Environmental Affairs, representative of JAL Sales Co., managing director of JAL Foundation, and other executives of group companies appointed by the chairman.

(2) Environment-related Directors’ Committee under the JAL Group Environmental Committee

To support the JAL Group Environmental Committee and promote efficient activities, Directors Committee meetings are held at least twice a year. The environmental activity plans and policies are examined and improved during these meetings.

(3) Environmental Affairs

On the integration of JAL and JAS in October 2002, JAL, JAS and Japan Airlines System Corp. have set up environmental divisions in their respective companies. Together, the three bodies work to set up environmental policies and activity plans, make adjustments, liaise with outside bodies, grasp and present group activities, gather and investigate information outside the group, and administer the JAL Group Environmental Committee, Directors’ Meetings, and Environment-related Directors’ Committee of JAL and JAS.

(4) Group Companies and Departments

Environmental activities are promoted and adopted by setting up environmental committees, departments, and managers, especially in those companies and departments closely related to environmental problems and deterioration.

(5) Group Company Environmental Liaison Committee

To promote environmental activities throughout the JAL group coherently, the Group Company Environmental Liaison Committee was founded at JAS in December FY2002 (JAL’s committee had already been set up in July FY1999). Both companies’ liaison committees consist of group companies related to air transport, aircraft maintenance and airport businesses, and discuss and exchange information on environmental matters.
2. ISO 14001 Certification

The JAL Group supports and promotes the acquisition of ISO14001 Certificate related to environmental management systems, especially in the frontline business departments with relatively high risks of creating environmental loads.

JAL Regional Office Cargo and Mail Narita
Acquired the Certificate in Nov. 2002

JAL Group Status of ISO14001 Certification

<table>
<thead>
<tr>
<th>Site and Location</th>
<th>Major Scope of Business</th>
<th>No. of Staff</th>
<th>Status of Certification</th>
</tr>
</thead>
<tbody>
<tr>
<td>JAL Component Services</td>
<td>Maintenance of aircraft landing gear, control surface, brake, electronic device, hydraulic device, and pneumatic device</td>
<td>Approx. 630</td>
<td>Haneda area acquired in Jan. 1999, and expanded to Narita area in Nov. 2001</td>
</tr>
<tr>
<td>AGP Corporation</td>
<td>Power supply to aircraft at Haneda airport, and design, installation, and maintenance of airport facilities and equipments</td>
<td>Approx. 140</td>
<td>Acquired in Sep. 2002</td>
</tr>
<tr>
<td>JAL Regional Office</td>
<td>Air cargo and mail transport business at Narita airport</td>
<td>Approx. 2,220</td>
<td>Acquired in Nov. 2002</td>
</tr>
<tr>
<td>JAL Maintenance Business Division Narita</td>
<td>Aircraft line and check maintenance</td>
<td>Approx. 1,400</td>
<td>Acquired in Feb. 2003</td>
</tr>
<tr>
<td>JAL Dock Maintenance Division</td>
<td>Aircraft scheduled maintenance, change of engine, APU, and landing gear, etc.</td>
<td>Approx. 430</td>
<td>Acquisition declared in May 2003, and planned to be acquired in Feb. 2004</td>
</tr>
<tr>
<td>JAL Repair and Overhaul Division</td>
<td>Aircraft engine repair and overhaul</td>
<td>Approx. 700</td>
<td>Acquisition declared in May 2003, and planned to be acquired in Mar. 2004</td>
</tr>
</tbody>
</table>

3. Introduction of Environmental Audit System

In an aim to achieve the goals listed below, the JAL Group has introduced the Environmental Audit System within the group in FY2002.

- Promotion of activities that comply with environmental laws as well as group policies and regulations
- Establishment of precautionary measures in normal situations and preparation for smooth responses in emergency situations
- Disseminating information on the environment and enlightening the group on environmental awareness

The audit will be carried out by Japan Airlines System Corp. Corporate Compliance Department with the support of Environmental Affairs. The contents of the audit are as follows:

- Compliance check: Appropriate understanding of and compliance with related laws and regulations
- System check: Assignment of persons in charge, enforcement of self-audits, implementation of drills and training
- Performance check: Proper management of environmental goals, and promotion of environment-friendly purchases

In FY2002, trial audits were carried out in the JAL Repair and Overhaul Division and the JAL Regional Office Cargo and Mail Narita.
Review of JAL Environmental Action Programs for FY2002

Note: Excludes code-share flights operated by other airlines. Includes JAZ flights in FY2002.

Reduction of JAL Aviation Fuel Consumption

<table>
<thead>
<tr>
<th>Fuel consumption compared to FY1990</th>
<th>Fuel consumption per ATK (liter/ton-kilometer)</th>
<th>ATK (million ton-kilometer)</th>
<th>Fuel consumption (1,000 kiloliter)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fuel consumption &amp; electricity</td>
<td>Thermal energy</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CO₂ emissions</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Environmental activities

- Green purchasing
- Reduction of aviation fuel consumption
- Efficient use of thermal energy
- Introduction of low-pollution and low-emission vehicles
- Promotion of recycling
- Reduction of toxic chemicals
- Compliance with PRTR Law
- Reduction of final waste residue
- Target zero emission of industrial wastes by FY2010

Corporate Action Programs and activity results for FY2002 are as follows.

Starting from FY2000, JAL Environmental Action Programs were established and carried out each year.

Objectives and Targets

<table>
<thead>
<tr>
<th>Objectives</th>
<th>Target</th>
<th>Evaluation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Environmental audit system

- Construction of environmental accounting system
- Introduction of environmental audit
- Study environmental training program for employees
- Promote introduction of low-pollution and low-emission vehicles (Registered in Kanto area) were newly introduced. Countermeasures planned
- Properly comply with PRTR Law and study the report. (Refer to page 25)

Communication

- Constructed environmental communication system
- Includes special posters and other media. (Refer to page 31)
- Study of training program remains unfinished. As for intranet, the number of users increased and the contents were improved including environmental topics

Accounting

- Study of audit system
- Study of accounting system for environmental activities
- Introduction of audit system in terms of law and regulations.
- Supervise the administration of activities according to environmental management regulations, and determine whether adequate measures are taken concerning environmental risks, such as industrial wastes, chemicals, and others. Prepare for the future activities.

Citizens' participation

- Environmental public participation programs
- Tropospheric Observation Project and Marunouchi Environmental Forum, etc. Form plans for environment-related activities, such as the Tropospheric Observation Project and Marunouchi Environmental Forum, etc.

Results

<table>
<thead>
<tr>
<th>Item</th>
<th>FY1990 results</th>
<th>FY2002 results</th>
<th>FY2010 targets</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>


## Reduction of JAL Energy Consumption (Kanto area: the greater Tokyo area)

**FY2002**

<table>
<thead>
<tr>
<th>Results Compared to FY2001</th>
<th>FY2001</th>
<th>FY2002</th>
<th>FY2002 Results vs FY2001</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electricity consumption (1,000 kW h)</td>
<td>173,256</td>
<td>+1.30%</td>
<td>172,275</td>
</tr>
<tr>
<td>Thermal energy consumption (1,000 crude oil liter)</td>
<td>16,492</td>
<td>-4.66%</td>
<td>16,393</td>
</tr>
</tbody>
</table>

## Results

### Review of JAS Environmental Action Programs

JAS has set up action programs and launched its environmental conservation activities since FY2000. The corporate action programs and activity status for FY 2002 are as follows.

#### Contents

1. **Compliance to laws and appropriate countermeasures**
   - Compliance with PRTR Law, Waste Management and Public Cleansing Law, and other related laws, and seeking appropriate countermeasures against environmental problems.
   - The released and transferred amount of PRTR Law-regulated substances was analyzed. Installation of PRTR database taken into consideration. To continuously meet environmental problems and compliance with laws and regulations, introduction of ISO 14001 system was studied. (Refer to pages 10 & 26)

2. **Proper countermeasures to environmental matters inside and outside the country for global warming prevention such as Kyoto Protocol.**
   - Regarding CO2 emission from aircrafts, the renewal of aircrafts and various fuel-saving measures contributed to the reduction of aircraft fuel emissions per ATK by 72.8% in FY2002, compared to FY1990. (Refer to chart below)

3. **Promotion of green purchasing.**
   - Established purchasing system and started green purchasing of office supplies, copying paper, etc., in February 2003. (Refer to page 26)

4. **Management of environmental data collection such as waste disposal amount, energy consumption, and operation of vehicles.**
   - Most environmental data was collected in Tokyo Area, but improvement of data management system was partially recognized to be necessary in other domestic airports, thus the data collection and management system for the entire company was examined. (Refer to pages 20 & 21)

5. **Further promotion of efforts in FY2001 activities in each division.**
   - (Omitted)

### Rational use of energy

Based on the Energy Saving Law, buildings designated as Class II Energy Management Specified Plants will promote rationalized use of energy under the direction of Energy Management Staff. Also strengthened rational use of energy throughout the company.

- Energy-saving promoted at two of Class II Energy Management Specified Plants in Tokyo. Tokyo Area’s total energy consumption in FY2002 decreased by 5.93% compared with the previous fiscal year. (Refer to chart below)

---

## Reduction of JAL Group Aviation Fuel Consumption

### FY1990 Results

- Fuel consumption (1,000 kiloliter): 589
- ATK (million ton-kilometer): 1,542
- Fuel consumption per ATK (liter/ton-kilometer): 0.382

### FY2002 Results

- Fuel consumption (1,000 kiloliter): 1,076
- ATK (million ton-kilometer): 3,869
- Fuel consumption per ATK (liter/ton-kilometer): 0.278

### Fuel consumption compared to FY1990

- 100% (100%)
- 72.8% (100%)
- 90% (100%)

### Reduction of JAS Aviation Fuel Consumption

### FY1990 Results

- Fuel consumption (1,000 kiloliter): 1,076
- ATK (million ton-kilometer): 3,869
- Fuel consumption per ATK (liter/ton-kilometer): 0.278

### FY2002 Results

- Fuel consumption (1,000 kiloliter): 1,076
- ATK (million ton-kilometer): 3,869
- Fuel consumption per ATK (liter/ton-kilometer): 0.278

### Fuel consumption compared to FY1990

- 100% (100%)
- 72.8% (100%)
- 90% (100%)

---

## <3> Reduction of JAS Energy Consumption (Tokyo area)

### FY2002 Results

<table>
<thead>
<tr>
<th>Results</th>
<th>FY2001</th>
<th>FY2002</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electricity consumption (1,000 kW h)</td>
<td>25,941</td>
<td>27,577</td>
</tr>
<tr>
<td>Thermal energy consumption (1,000 crude oil liter)</td>
<td>2,679</td>
<td>2,614</td>
</tr>
</tbody>
</table>

### Fuel consumption compared to FY1990

- 15% (100%)
- 72.8% (100%)
- 90% (100%)
As a measure to evaluate the effectiveness of our environmental activities, JAL has adopted environmental accounting since FY1999. In FY2002 the coverage of accounting is expanded including not only all JAL domestic offices but also JAL’s consolidated airline companies and Japan Airlines System Corporation. Compared with FY2001, some airport offices of JAL became JAS offices as the result of the JAL and JAS integration. However, this accounting covers all JAL airport offices as of March 31, 2003.

(1) Basic Concept

The concept is based on the guideline, "Environmental Accounting Guideline (2002 version)" released by the Japanese Ministry of the Environment with some modifications, and some company guidelines.

(2) Coverage

- All JAL domestic operations (Basically items under JAL’s own control)
- JAL’s consolidated airline companies out of JAL group companies (JAA, JTA, J-AIR, JAZ, JEX)
- Japan Airlines System Corporation (Holding company)

(3) Period

April 1, 2002 – March 31, 2003

(4) Basis for Accounting

- Depreciation period 5 years across the board for all investments, and residual value is 10% of book value.
- Period of duration of effects: All investment effects are for 5 years, and spending effects are basically for one year.
- Definition of environmental: Basically, per current guidelines by the Japanese Ministry of the Environment. Sorted collection of cost investment and spending. Spending includes depreciation. 20% of the acquisition and lease costs for aircraft/engine are treated as environmental costs.
- Two standard values are used as personnel costs, that is, specialist personnel and in-charge staff.
- Utility cost (electricity, thermal energy & water): Benefit as a result of environmental activity is counted.
- Benefit of fuel reduction: The improvement in fuel consumption rate is converted to reduction in fuel consumption, and is multiplied by the annual average fuel price to obtain estimated fuel cost reduction (Estimated benefit).
- Other benefits: Basically, effects of green purchasing, PR, and education are not counted.
- Savings generated by replacing APU with GPU are derived by obtaining the difference of maintenance and fuel costs between when using GPU and APU (Estimated benefit).

(5) Typical Environmental Loads (Coverage of JAL, JAA, JTA, J-AIR, JAZ, JEX, and Japan Airlines System Corporation)

<table>
<thead>
<tr>
<th>Category</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aviation fuel (10,000 kl)</td>
<td>593.1</td>
</tr>
<tr>
<td>Electricity (million k'v'ˆ)</td>
<td>205.3</td>
</tr>
<tr>
<td>Water (1,000 m'R)</td>
<td>775.5</td>
</tr>
<tr>
<td>Thermal energy (million 'l'i)</td>
<td>800.8</td>
</tr>
<tr>
<td>CO₂ (10,000 ton)</td>
<td>1,476</td>
</tr>
<tr>
<td>N'n'˜ (1,000 Ton)</td>
<td>6.4</td>
</tr>
<tr>
<td>Industrial wastes (1,000 ton)</td>
<td>5.2</td>
</tr>
<tr>
<td>General wastes (1,000 ton)</td>
<td>28.8</td>
</tr>
</tbody>
</table>

*1: Estimation based on complete combustion
*2: Based on ICAO LTO Cycle (estimated for takeoff, landing, etc. below 915 meter above ground)

Note: Kanto area includes Tokyo and Narita airports

(6) Legend of Categories

Cost Category
- 1) At operation site: Cost spent to control environmental impact of production or service activity at operation site.
- 2) Up or downstream of: Cost spent to control environmental impact generated upstream or downstream by production or service activity.
- 3) Management activity: Cost spent for management activity related to environmental protection.
- 4) Research & development: Cost spent for research & development activity related to environmental protection.
- 5) Social activity: Cost spent for social activity related to environmental protection.
- 6) Environmental damage: Cost imposed due to environmental damage incurred by operation.

Benefit Category
- Real benefit: Economic benefit based on factual grounds (such as increase of profit, reduction, or avoidance of expenditure.)
- Estimated benefit: Estimated economic benefit calculated based on assumption -
## Environmental Accounting (JAL, JAA, JTA, J-AIR, JAZ, JEX, and Japan Airlines System Corporation)

### Classification of Cost

<table>
<thead>
<tr>
<th>Category</th>
<th>Sub Category</th>
<th>Major Activity</th>
<th>Economic Benefit</th>
<th>Environmental Benefit</th>
</tr>
</thead>
<tbody>
<tr>
<td>1)</td>
<td>At operation site</td>
<td>Pollution control</td>
<td>198</td>
<td>440</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Renewal of vehicles to prevent air pollution, introduction of natural gas vehicles, water drainage facilities for maintenance-related factories, construction of new noise reduction hanger for engine test at Narita Airport</td>
<td></td>
<td>2</td>
</tr>
<tr>
<td>2)</td>
<td>Global env. protection</td>
<td>Introduction of fuel efficient aircraft &amp; engines, integration of functions in power conversion facilities &amp; installation of inverters for energy-saving, introduction of halon recycling equipments for ozone layer protection, etc.</td>
<td>88</td>
<td>10,068</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Reduction</td>
<td>317</td>
<td>12,276</td>
</tr>
<tr>
<td>3)</td>
<td>Resources recycling</td>
<td>Proper waste management and reduction, introduction of treated water control devices at power plants for efficient water use, recycling of waste plastic sheets, etc.</td>
<td>0</td>
<td>1,556</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Income</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Reduction</td>
<td>15</td>
<td>21</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Cat. total</td>
<td>198</td>
<td>12,064</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>340</td>
<td>12,276</td>
</tr>
<tr>
<td>2)</td>
<td>Up or downsteam of operation</td>
<td>Green purchasing (mid-pressure gas for boiler), consignment fees for recycling polyethylene bags used in domestic flight cabin sales, etc.</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>3)</td>
<td>Management activity</td>
<td>ISO14001 acquisition/maintenance &amp; management, environmental communication, chemical database management, environmental education, cleanup of office surroundings</td>
<td>265</td>
<td></td>
</tr>
<tr>
<td>4)</td>
<td>Research &amp; development</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5)</td>
<td>Social activity</td>
<td>Marunouchi Citizens’ Environmental forum, contribution to environmental activity organizations, supporting tropospheric observation aimed to analyze global warming mechanism, etc.</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>6)</td>
<td>Environmental damage</td>
<td>CO₂ reduction (10,000 ton)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>A. Reduction through introduction of new energy efficient aircraft. (Estimate) 66</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>B. Reduction through use of GPU instead of APU. (Estimate) 13.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>*1: Coverage: JAL non-consolidated only.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>*2: Coverage: All described above. A little duplication exists with the reduction at shipside.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Item: Major Detail

**Total investment for the same period:**

- Power station equipment-related work, lounge construction work, 767 simulator, spare engine, aircraft components, acquiring aircraft on termination of lease (four B747s, two MD-11s *3), airport refurbishment, aircraft modification, etc.
- Excluded four MD-11s which have been leased, and tentatively purchased for sale.
- Calculation using purchase and lease cost of high energy efficient aircraft and engine.
## JAL Group Mid- and Long-term Environmental Action Programs

Environmental Action Programs for FY2003

- **Objectives and Targets**

<table>
<thead>
<tr>
<th>Item</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. <strong>Reduction of CO2</strong></td>
<td>- 10% reduction of fuel consumption per ATK by FY2010 from FY1990. For the attainment of this purpose, 1% reduction of annual thermal and electric energy consumption from previous year.</td>
</tr>
<tr>
<td>B. <strong>Reduction of emissions</strong></td>
<td>- 10% reduction of fuel consumption from the viewpoint of compliance with the law.</td>
</tr>
<tr>
<td>C. <strong>Efficient use of energy</strong></td>
<td>- Promote introduction of low-pollution and low-emission vehicles. Especially take appropriate measures for registered diesel vehicle in Haneda and Narita area to be restricted by government from FY2003.</td>
</tr>
</tbody>
</table>

## Objectives and Plans

<table>
<thead>
<tr>
<th>Item</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. <strong>Reduction of CO2</strong></td>
<td>- Pursue adequate compliance with new chapter 4 requirement, and various regulations of local airports.</td>
</tr>
<tr>
<td>B. <strong>Reduction of emissions</strong></td>
<td>- Promote introduction of low pollution (natural gas, electric, etc.) and low emission vehicle in order to comply with various restrictions by law and ordinance, and to reduce air pollution.</td>
</tr>
<tr>
<td>C. <strong>Efficient use of energy</strong></td>
<td>- Continue to promote the concrete measures to reduce fuel consumption, such as use of GPU, renewal of aircraft, etc.</td>
</tr>
</tbody>
</table>

## Enrichment of Environmental Report to Include Group Companies

- Promote introduction of low-pollution (natural gas, electric, etc.) and low emission vehicle in order to comply with various restrictions by law and ordinance, and to reduce air pollution.

## Environmental Reporting and Disclosure

- Promote unifying PRTR-Law based management system and database inside the group, and consider reducing toxic chemicals.

## Auditing

- Introduce environmental auditing to check the activity based on the environmental management manual and to evaluate improvement opportunities as well as to check the enforcement of preventive measures against environmental risks such as wastes, chemicals, and promotion of other energy.

## Communication

- Marunouchi Citizens’ Environmental Forum, etc. Consider new tropospheric observation project, preparing the information by using internet and intranet. Furthermore, construct environmental education program which includes that of group company employee, and promote education.

## Accounting

- Issue the environmental report as JAL Group. Construct environmental education program for group company employees, and educate them. Educate employees by using intranet, in-house media Sora Weekly, etc.

## Promotion of Social Activity

- Promote social activity related to environment through activities such as tropospheric observation project, education for airport authorities, communication with local residents and promotion of global warming etc. from the viewpoint of compliance with the law.