

2013

China Airlines

Corporate Environmental Sustainability Report 2013

China Airlines invites everyone to treasure our planet
Let the journey begin with a big hug



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2013 Corporate Environmental Sustainability Report

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Reporting Scope and Abstract

This report covers the achievements of China Airlines ("CAL") in sustainable environment management in Taiwan and is published in the interests of disclosure and transparent management. The identification of material issues related to the sustainable development of CAL will enable our continued improvement. The reporting period is the 2013 financial year running from January 1, 2013, through to December 31, 2013.

The structure of this corporate environmental sustainability report is based on the GRI G4 guidelines issued by the Global Reporting Initiative (GRI). A comparison table of the content and GRI G4 is provided in the appendix. The scope of this report encompasses environmental governance, environmental management performance of air and ground operations, environmental protection services, employees and investment of social resources. Data was collected in accordance with GRI G4. Stakeholder identification and assessment were carried out by inter-department working groups before undergoing review, while the work process was continuously refined in order to more accurately report on material issues and management performance of CAL relating to sustainable environment management.

China Airlines CSR website

<http://www.china-airlines.com/ch/csr/index.html>

China Airlines environmental protection website

<http://www.china-airlines.com/ch/about/earthsitedata/index.html>



Chairman

From the Management

Continual Innovation, Sustainable Flying

In recent years, scientific research has shown a clear link between anthropogenic greenhouse gases and global warming as well as climate change. This not only affects our lives, but also negatively impacts the aviation industry, including China Airlines. Therefore, the International Air Transport Association (IATA) has defined targets in three stages, including carbon-neutral growth by from 2020 (CNG2020). The International Civil Aviation Organization (ICAO) has also developed a global market-based measure (GMBM) for the international aviation industry. Reduction of greenhouse gas emissions along with increased fuel efficiency have become the focal point of the aviation industry.

China Airlines embraces sustainable development and corporate social responsibility. Thus, we have proactively built an environmental management mechanism with systematic risk controls via the introduction of international standards. We have been granted ISO 14001 Environmental Management System and ISO 50001 Energy Management System certification, becoming the second airline in the world with certification in both environmental and energy management systems. Both of these certifications in conjunction with the ISO 14064-1 Greenhouse Gases Verification have helped China Airlines achieve comprehensive, effective corporate environmental and energy management.

We oriented our action plans towards energy conservation and pollution prevention. In 2013, we established 57 environmental key performance indicators (KPIs) and programs,



President

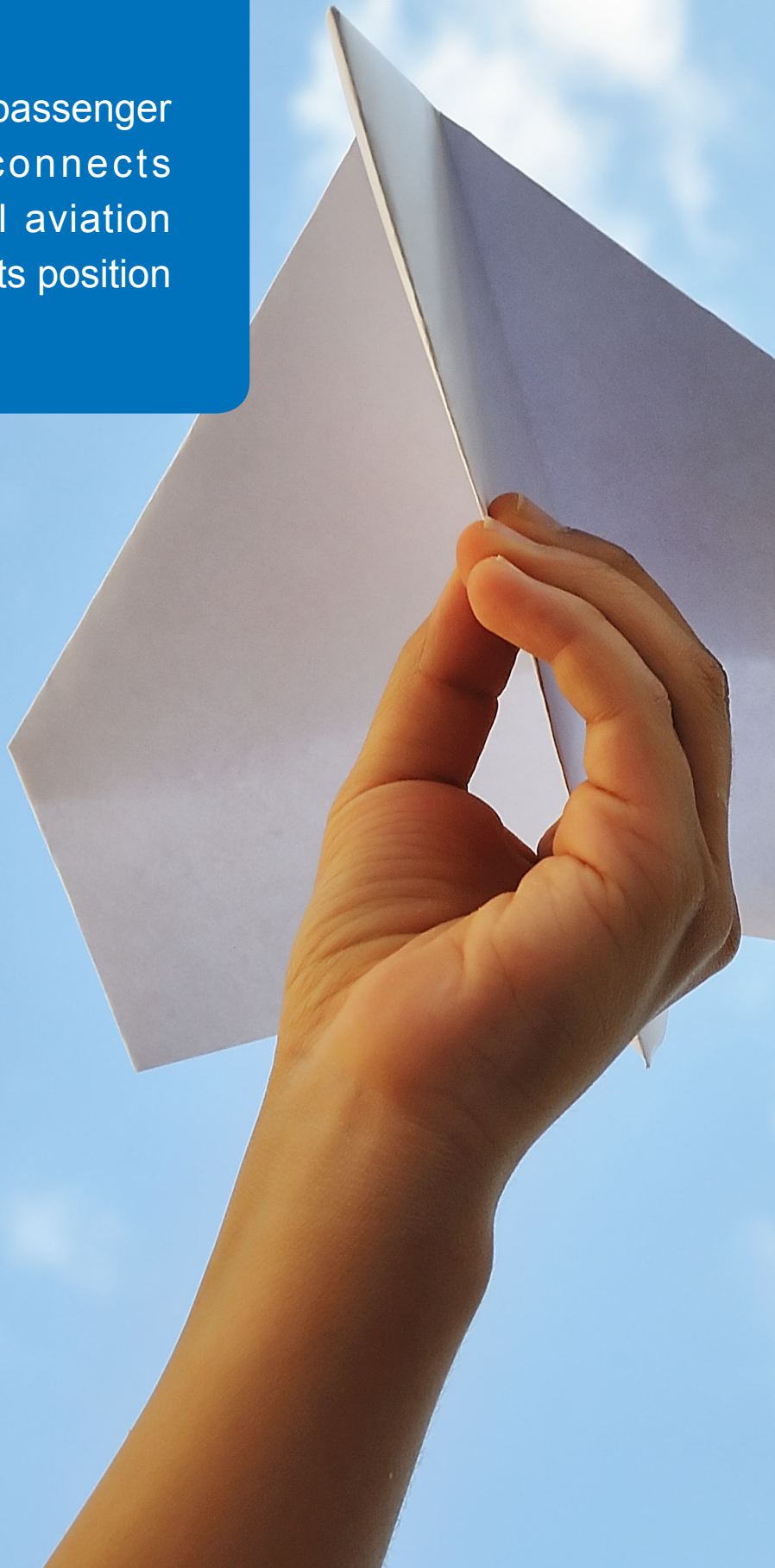
with excellent results that reduced costs by NT\$280,000,000. In particular, we reduced greenhouse gas emissions from aviation fuel by 230,136 tons CO₂e as compared to 2008. We also planned ahead for our fleet. Starting in 2014, our Next Generation fleet such as 10 of B777-300ER and 14 of A350-900 aircrafts will help to further enhance our fuel efficiency. We are the first airline in the industry to propose the “ECO service” concept, listing “environmental protection” and “cultural creativity, technology, emotional connection, trust” as core elements of next generation services. At least 21 specific programs are conducted to ensure our passengers receive the best services while promoting a harmonious relationship with our environment.

We are pleased that our commitment to the environment is not only enthusiastically supported by our entire staff but also widely recognized by customers and external stakeholders. In 2013, China Airlines received the “Enterprise Environmental Protection Award” from the Taiwan Environmental

Protection Administration and the “Green Classics Award” from Taiwan’s Ministry of Economic Affairs. These awards and various other honors have strengthened our resolve to protect the environment. Looking to the future, as China Airlines faces intense competition as well as climate change challenges, we know the key to maintaining sustainable growth is aligning our corporate strategy with environmental protection. We will continue to implement environmental protection measures, creating competitive advantage and corporate values based on eco-friendliness, innovation, and humanitarian concerns. By upholding our commitment, “Striving for Trustworthiness and Excellence,” and with a practical and realistic spirit, we continue to pursue growth and uphold the interests of our stakeholders. Then, and only then, we will achieve our three-win sustainable development goals: customer satisfaction, eco-friendliness, and a thriving economy, leaving a sustainable environment for future generations.

Company Profile

China Airlines' fleet of 76 passenger and cargo airplanes connects Taiwan with international aviation alliances and strengthens its position in the Global market.



Our Business

Founded on December 16, 1959, China Airlines has grown for more than 54 years in tandem with Taiwan's economy. From day one, China Airlines commits to provide the best flight service quality for every passenger. As of December 31, 2013, China Airlines employed 11,141 people including 9,260 employees in Taiwan and 1,881 employees overseas. Its fleet consisted of 76 aircraft – 55 passenger aircraft and 21 freighters – with an average fleet age of 10.1 years. In 2013, three 738 and one A330 were introduced. At that time, China Airlines' flight network covered 113 destinations in 29 countries.

The headquarters of China Airlines, an attractive green building, is located near Taoyuan International Airport on No.1, Hangzhan S. Rd., Dayuan Township, Taoyuan County 33758, Taiwan.

On September 28, 2011, China Airlines became the 15th member of SkyTeam, providing passengers with more convenient services. Subsequently, on October 3, 2012, China Airlines became the 10th member of SkyTeam Cargo – the first airline in Taiwan to join an international aviation cargo alliance. These events not only expand the coverage of SkyTeam Cargo in Asia, but also enhance Taiwan's position as an air transport center in Asia.

In 2014, China Airlines initiated a fleet update program. B777-300ER and A350-900 aircraft will be introduced to further enhance fuel efficiency, service quality, operational efficiency, and environmental protection.

To meet market demand, the carrying capacity of its passenger fleet will be continuously increased in 2014. By June 2014, we will introduce three B737-800 and one A330-300 aircraft, and by the end of 2014, we are expecting three more B777-300ER. We will achieve enhanced fuel efficiency and customer comfort through our Next Generation fleet.

Fleet: 76 aircraft

(as of December 31, 2013)



13 ea

..... Boeing 747-400 passenger jets



23 ea

..... Airbus 330-300 passenger jets



6 ea

..... Airbus 340-300 passenger jets



13 ea

..... Boeing 737-800 passenger jets



21 ea

..... Boeing 747-400 freighters

China Airlines Global Network



Destinations:

113 destinations in 29 countries and regions, as of December 31, 2013

* Cargo service only @ Code-sharing services ☆ Mandarin Airlines flight



Europe

Amsterdam, Frankfurt, Rome, London@, Vienna, Luxembourg*, Manchester@, Prague*@, Moscow@



China

Hong Kong, Macao☆, Beijing, Shanghai Pudong, Shanghai Hongqiao, Guangzhou, Nanjing☆, Hangzhou☆, Shenzhen, Chengdu, Xian, Zhengzhou*☆, Xiamen☆, Ningbo☆, Shenyang☆, Changsha☆, Qingdao, Wuhan, Wuxi@, Sanya, Yancheng, Haikou, Chongqing, Nanchang, Dalian, Wenzhou☆, Urumqi, Lijiang☆, Weihai

Northeast Asia

Tokyo Narita, Tokyo Haneda, Fukuoka, Nagoya, Hiroshima, Ryukyu, Seoul Incheon, Seoul Gimpo, Busan, Osaka, Sapporo, Miyazaki, Kagoshima, Shizuoka, Toyama, Takamatsu, Ishigaki☆

Southeast Asia

Bangkok, Jakarta, Bali, Surabaya, Hanoi, Ho Chi Minh City, Kuala Lumpur, Penang, Singapore, Phnom Penh, Manila, Boracay☆, Yonkon

Middle East /India

Delhi, Abu Dhabi*



America

Anchorage*, Honolulu, Los Angeles, New York, San Francisco, Vancouver, Chicago*, Dallas*, Miami*, Seattle@*, Houston@*, Atlanta@*, Cincinnati@, Salt Lake City@, Orlando@, Tampa@, Columbus@, Raleigh/Durham@, Guatemala City@, Minneapolis@, Detroit@, Las Vegas@, San Diego@, Phoenix@, Sacramento@, New Orleans@, Hilo@, Kona@, Lihue@, Kahului@, San Jose@, Portland@, Sacramento@



Oceania

Sydney, Brisbane, Auckland, Guam, Palau



Taiwan

Taipei Sung Shan, Taipei Taoyuan, Taichung☆, Tainan, Kaohsiung



Environmental and Energy Management Milestones

2011

- + “Environmental Management Department” was established under the “Corporate Safety Division” in August, environmental management was incorporated into corporate risk management.
- + The “All-Employee Environmental Protection” campaign was rolled out in September and October to raise employee awareness of environmental protection.
- + The “Environment Policy” was first published in November.

2012

- + In accordance with corporate organizational reform, “Corporate Safety Division” was Upgraded as “Corporate Safety Office (CSO)”. “Environmental Management Department” was renamed “Environment Department”
- + The “Environmental Management Committee” was established in May. Additionally, Executive Secretary (CSO) and five major sub-committees were formed by representatives from different departments. Furthermore, the European Union Emissions Trading Scheme (EU ETS) response team (subsequently renamed Carbon Management Working Group) was established.
- + Induction of ISO 14001 Environmental Management System was initiated in May. In December of the same year, Engineering & Maintenance Organization (EMO) had been the first to receive ISO14001 third-party certification.
- + The flights for “Pacific Greenhouse Gases Measurement Project” (PGGM) jointly run by Taiwan’s Environmental Protection Administration (EPA), the National Science Council, the National Central University and Europe-based In-service Aircraft for a Global Observing System-European Research Infrastructure (IAGOS-ERI) started in June.





2013

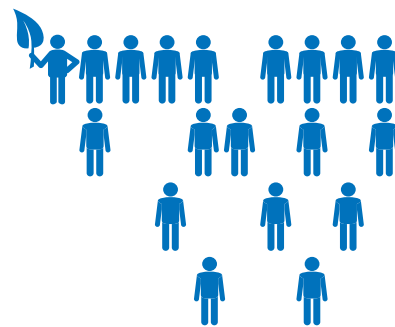
- + China Airlines continued the implementation of the ISO 14001 Environmental Management System, by expanding to the headquarters in Taoyuan County, Taipei Songshan Training Park, cargo service, and Kaohsiung branch. All of the above received third-party certification.
- + China Airlines participated in the “2013 Energy Management System Promotion Program for the Facilitation of Service Sector” held by Bureau of Energy, Ministry of Economic Affairs. This drives the implementation of the ISO 50001 Energy Management System in the headquarters’ main building and the EMO in Taoyuan County. Both received third-party certifications in December.
- + China Airlines was invited to participate in “Air Cargo Carbon Footprint (ACCF) Workshop” held by the International Air Transportation Association (IATA) in February, and China Airlines was one of only two airlines invited from the Asian region.
- + China Airlines published its first Corporate Sustainable Environment Report in March along with update of the corporate environmental website for environmental performance disclosure.

Awards and Honors

- + 2011 and 2012: Outstanding Achievement Award of 2012 “Energy Conservation and Carbon Reduction Action Mark” from the Taiwan Environmental Protection Administration.
- + 2012 and 2013: awarded Business Next Magazine’s Grand Jury Prize of “Super Green” as well as First Prize for Transportation in the “Grand Survey of Green Brands”.
- + 2013: “Green & Sustainability Award” from the Himalaya Foundation
- + 2013: the Hong Kong Enterprise Leading Brand, Excellent Airlines Brand of Low Carbon Environment.
- + 2013: Corporate Standardization Award in the National Standardization Awards organized by Taiwan’s Ministry of Economic Affairs
- + 2013: Enterprise Environmental Protection Award from the Taiwan Environmental Protection Administration (EPA).

Stakeholder Engagement

China Airlines values any communication on environmental issues with employees, shareholders and stakeholders. A five-step approach was established for environmental materiality issues identification and communication. For a description of each step, please see below.



Step 1 Identification of Stakeholders

In order to identify and appropriately respond to various stakeholder needs, the “CESR Working Group - consisting of staff from various departments - was set up to identify who the stakeholders might be and how they might be contacted (and how their business might be affected). Stakeholders are classified into nine groups: employees, customers, suppliers/contractors, shareholders/investors, government/elected representatives, communities, non-governmental/non-profit organizations, external rating institutions, media etc.

Step 2 Summary (and Record) of Stakeholder Issues and Concerns

For the stakeholders listed, China Airlines incorporates both external feedback as well as internal experience to collect and summarize stakeholder issues and concerns. External feedback should include both the feedback itself and where it originated (i.e. whether from external parties, GRI or disclosed information of other airlines). Internal considerations should include both the corporate environmental management vision and blueprint, as well as opinion from staff.

Step 3 Identification of Stakeholders

The priority of a given stakeholder issue is ordered according to the degree of “Internal Organization Impact” and “External Concern”. After internal review and evaluation, 29 environmental issues are classified into 11 material issues, 6 secondary issues, and 12 general issues. The responding conditions of material issues are then stated in this report. Details on the secondary and general issues can be found on the China Airlines website.

Step 4 Response to Significant Environmental Issues

All the environmental material issues identified in the previous year have been practically analyzed, addressed and could further be incorporated into our annual improvement programs and routine practices

Step 5 Response to Information Disclosure Requests

For the best understanding of China Airlines’ improvement measures and results, related information is disclosed via the publication of the Corporate Environmental Sustainability Report, as well as mechanisms established for the best engagement and communication.

China Airlines' Materiality Analysis of Stakeholder Issues and Concerns

High

Internal Impact

<p>12.CSR for environmental protection</p> <p>13.Key green policy, actions and performance</p>	<p>3.Environmental Educational Trainings</p> <p>4.Green Products and Services</p> <p>5.Disclosure of Environmental Information</p> <p>6.Interests and Expectation for Green Products and Services</p> <p>7.Management for Environmental Protection Issues of Supply Chain</p> <p>8.Energy and Resource Management</p> <p>9.Community management</p>	<p>1.Green fleet</p> <p>2.Green measures (e-commerce, eco-services)</p>
<p>18.Service Participation of Environmental Volunteers</p> <p>19.Positive Media Image for Corporation from Environmental Protection</p> <p>20.Prevention of Pollution</p> <p>21.Volunteer Services</p>	<p>14.Green Procurement</p> <p>15.Plan of Vision for Sustainable Development</p> <p>16.Green Buildings and Green Offices</p> <p>17.Environmental Pollution Events</p>	<p>10.Reduction of Greenhouse Gases</p> <p>11.Aviation fuel</p>
<p>23.Comfort Level of Working Environments</p> <p>24.Rewords of Environmental Protection Proposal</p> <p>25.Reduction of Raw Materials</p> <p>26.Transport of Products</p> <p>27.Utilization Rate of Recycled Materials</p> <p>28.Regulations of Environmental ProEcological Conservation, Biological Diversity</p>	<p>22.Safety of Working Environments</p>	

Low

External Concern

High



Stakeholder	Issues	Communication Channels	Section of Report
Employees	<ul style="list-style-type: none"> • Environmental Educational Trainings • Green fleet 	<ol style="list-style-type: none"> 1. Corporate website, Announcements 2. Electronic video files 3. Human resource representatives 4. Employee Communication meetings 5. Email\Employee hotline 	<ul style="list-style-type: none"> • Saving fuel • Education, Training, and Personal Development
Investors	<ul style="list-style-type: none"> • Green fleet 	<ol style="list-style-type: none"> 1. Annual shareholder meeting 2. Operational performance conferences 3. Annual report 	<ul style="list-style-type: none"> • ECO Fly

Stakeholder Issues and Concerns; Communication Channels and Report Outlines (in regards to China Airlines)

Stakeholder	Issues	Communication Channels	Section of Report
Customers	<ul style="list-style-type: none"> Green Products and Services Disclosure of Environmental Information Green measures (e-commerce, eco-services) Interests and Expectation for Green Products and Services 	<ol style="list-style-type: none"> 1.Customer satisfaction survey 2.Customer telephone survey system 3.Corporate website,Email 4.External audits 5.Customer service hotline 	<ul style="list-style-type: none"> Company Profile Structure of Environmental and Energy Management Greenhouse Gases Reduction Ground Operation ECO Services
Suppliers/ Contractors	<ul style="list-style-type: none"> Management for Environmental Protection Issues of Supply Chain Green Procurement 	<ol style="list-style-type: none"> 1.Supplier business review meeting 2.Supplier questionnaire 3.Supplier on-site audit 	<ul style="list-style-type: none"> Structure of Environmental and Energy Management Ground Operation Investing in People & Communities
Governments/ Elected representatives	<ul style="list-style-type: none"> Reduction of Greenhouse Gases Regulations of Environmental Protection Laws 	<ol style="list-style-type: none"> 1.Official documents 2.Public hearings on regulations 	<ul style="list-style-type: none"> Greenhouse Gases Reduction Ground Operation
Communities	<ul style="list-style-type: none"> Community management 	<ol style="list-style-type: none"> 1.Volunteer activities 2.Corporate website,Email 	<ul style="list-style-type: none"> Investing in People & Communities
Non-Governmental/ Non-Profit Organizations	<ul style="list-style-type: none"> CSR for environmental protection 	<ol style="list-style-type: none"> 1.Volunteer activities 2.Corporate website,Email 	<ul style="list-style-type: none"> Investing in People & Communities
External Rating Institutions	<ul style="list-style-type: none"> Energy and Resource Management Aviation fuel 	<ol style="list-style-type: none"> 1.Corporate website,Email 2.Awards and competitions 	<ul style="list-style-type: none"> ECO Fly Ground Operation
Media	<ul style="list-style-type: none"> Key green policy, actions and performance 	<ol style="list-style-type: none"> 1.Press conferences 2.Press releases 	<ul style="list-style-type: none"> Company Profile Greenhouse Gases Reduction ECO Services Investing in People & Communities



Structure of Environmental and Energy Management

To protect the environment and fulfill its social responsibilities, China Airlines makes "environmental protection" a core part of its business operations and "environmental management" a key business focus.

Management Structure

For implementation of Corporate Social Responsibility and Environmental Protection, China Airlines has incorporated “environmental protection” as a core operational element, as well as “environmental management” as an operational focus since 2007. The following Environmental and Energy Management principles were announced:

Complying with Environmental Laws and Regulations

China Airlines, as the largest airline in Taiwan, follows the local environmental protection laws and regulations wherever our flight destinations and operation are located.

Conserving the Earth's Resources

China Airlines actively promotes the 3R principal: Reduce, Reuse and Recycle in terms of fuel saving, energy and water conservation, paperless service development, reducing waste of resources and greenhouse gas emissions, etc.

Improving Eco-Efficiency


China Airlines continually improves its operational flow to ensure the maximum efficiency and protection of resources, reducing its negative impact on the environment and the ecology.

Fulfilling Social Responsibility

Environmental protection is an essential governing principle of China Airlines, as we implement an environmental management system according to international standards, support related research and ensure the flow of communication in order to be an environmentally sustainable enterprise.

Environmental and Energy Policy

China Airlines published the first “Corporate Environmental Policy” in 2011 and updated to the “Corporate Environmental and Energy Policy” in 2013 along with the induction of the ISO50001 Energy Management System



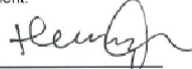

Environmental and Energy Policy Statement

China Airlines has long embraced the corporate vision of “Commitment to Trustworthiness and Excellence” in connecting Taiwan with the rest of the world. While pursuing corporate growth, we have become acutely aware of the responsibility for protecting the environment, the scarcity of the Earth's resources, and the responsibility we bear for conserving these resources. With this understanding, we have established four principles for environmental and energy management, to ensure the company's sustainable development. These principles are:

1. Complying with environmental laws and regulations.
2. Conserving the Earth's resources.
3. Improving eco-efficiency.
4. Fulfilling Social Responsibility.

For the implementation of these principles and to achieve sustainable development, China Airlines set forth and will allocate sufficient resources to the ongoing improvement of the following environmental and energy policies. We are committed to:

1. Complying with laws and regulations, to fulfill the company's responsibilities in environmental protection and energy conservation.
2. Establishing environmental and energy management systems, that include performance indicators, to verify compliance with established policies.
3. Promoting environmental and energy conservation education, to foster employees' eco-awareness.
4. Implementing green supply chain management, to raise overall eco-efficiency.
5. Creating a low-carbon operating environment, to establish continued improvement of environmental protection and energy efficiency.
6. Supporting green design and procurement, to promote sustainable development.

Signed:  
Chairman President
November 18, 2013

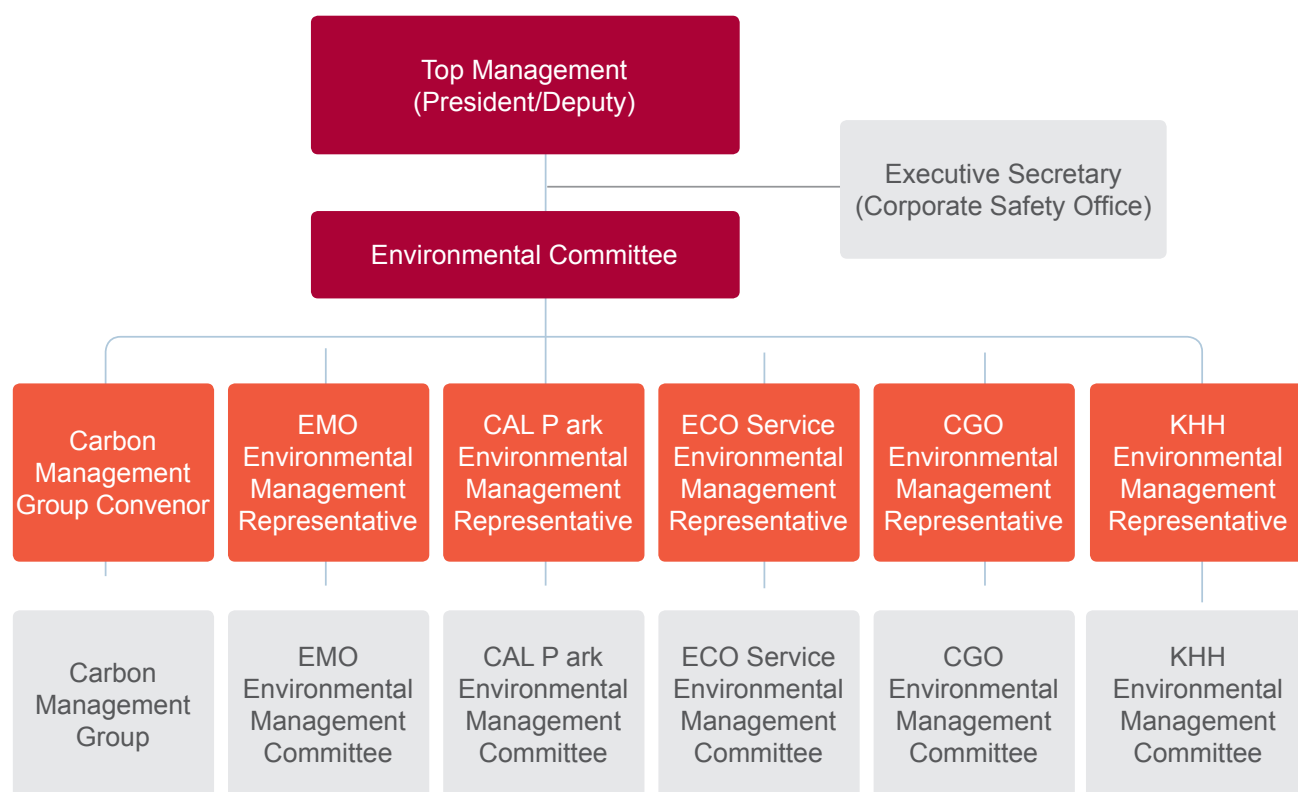
Complying with
Environmental
Laws and
Regulations

Conserving
the Earth's
Resources

Improving
Eco-Efficiency

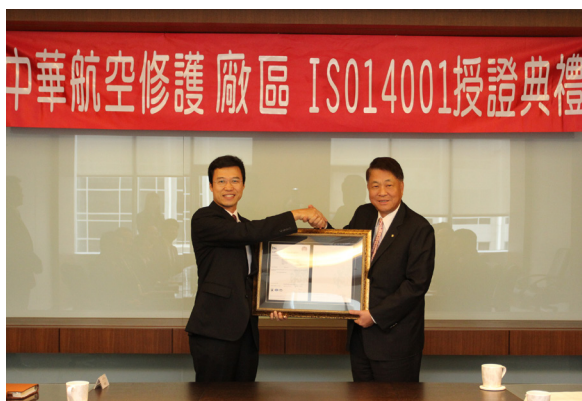
Fulfilling Social
Responsibility

Organizational Structure of China Airlines Environmental Management Committees



Management Organization

For effective management, the Environment Department and Environmental Committee were set up in 2011. The Environmental Committee is formed by five Environmental Management Committees and one Carbon Management Working Group. The environmental and energy performance is reviewed by the president or his representative on a quarterly basis. China Airlines is the first airline in Taiwan to have a designated environmental management department.



Performance

The 57 programs enacted in 2013, including aviation and vehicle fuel efficiency improvement, air conditioning optimization and saving of resources (water, paper), resulted in an operating cost reduction of NT\$280 million and greenhouse gas emissions reduction by 8,000 tons CO₂e.

Fuel saving and carbon reduction:

Since 2007 China Airlines has focused on aviation fuel management. Compared to 2012, fuel consumption in 2013 was lower by 2,081 tons while CO₂ emissions were reduced by 6,584 tons.

Ground operations:

Energy conservation and waste reduction were managed in terms of KPIs in 2012 and 2013. CO₂e emissions were reduced by a total of 1,363 tons in 2013.



China Airlines Certified with ISO 14001 and ISO 50001



The first in Taiwan and the second in the world with dual certification of ISO 14001 and ISO 50001

Establishment of Management System

China Airlines was the first airline in Taiwan, and second worldwide, to simultaneously receive the ISO 14001 (Environmental Management Standards) and ISO 50001 (Energy Management Standards) certifications. This underscores China Airlines' commitment to promoting environmental sustainability and adhering to international standards of environmental management.



57 programs in 2013 reduced emission by 7,947 tons CO₂e

ISO 14001 Environmental Management System

In 2012, in response to the international trend in environmental protection, China Airlines led the domestic aviation industry in its establishment of the Environmental Management System. Achieving certification in ISO 14001, the Engineering & Maintenance Organization (EMO) is a model for the entire industry. In 2013, the Environmental Management System for China Airlines headquarters, as well as the Taipei branch, Kaohsiung branch, and cargo service departments were set up. All of the above have been certified by a third party.



Reduced operating cost by NT\$ 280 million in 2013

ISO 50001 Energy Management System

In 2013, to further ensure effective energy consumption, while at the meeting the goals of energy efficiency, China Airlines led the industry in its implementation of the ISO 50001 Energy Management System at both the headquarters' operation building and EMO. Once again, these were certified by a third party.

ISO 14064-1 GHG Inventory

As a member of the aviation industry, China Airlines actively manages greenhouse gas emissions and drives carbon reduction efforts. An inventory of greenhouse gas emissions from aviation fuel and ground operations has been established and updated since 2009 in accordance with the ISO 14064-1 standards and received a third-party verification statement.

Greenhouse Gases Reduction

Between 2009 and 2013, China Airlines reduced fuel consumption by 48,387 tonnes and CO₂ emissions by 152,419 tonnes.





Greenhouse Gases

One of the biggest environmental challenges facing the aviation industry is mitigating the impact of climate change. Although the air transport sector accounts for 2%¹ of global anthropogenic emissions, international aviation organizations are still dedicated to driving reform to fulfill their social responsibility and ensure the sustainable development of the industry. IATA has issued “Four Pillar Strategies²” and three sequential targets including “Carbon Neutral Growth” from 2020 (CNG2020³). Additionally, ICAO has also decided to develop a global market-based measure (GMBM) scheme for international aviation in its 38th assembly in 2013.

Managing carbon emissions and staying abreast of international regulations are at the core of China Airlines’ risk management efforts. Not only is the senior management team overseeing the execution of the carbon management strategy, the global cooperation network is also actively involved to ensure more frequent and comprehensive cooperation and communication with the international community with global collaboration, China Airlines is building the carbon management roadmap for the future.


152,419
tCO₂

Between 2009 and 2013, China Airlines reduced fuel consumption by 48,387 tonnes and CO₂ emissions by 152,419 tonnes.

1: According to the 4th evaluation report issued by United Nations Intergovernmental Panel on Climate Change (IPCC) in 2007, total carbon dioxide emissions of the aviation industry in 2011 was 676 million tons, representing 2% of total anthropogenic emissions, which was 34 billion tons.

2: The Four Pillar Strategy includes: Technology, Operation, Infrastructure and Economic Measures.

3: The three-stage goals include: (1) An average improvement in fuel efficiency of 1.5% per year from 2009 to 2020. (2) A cap on net aviation CO₂ emissions from 2020 (carbon-neutral growth). (3) A reduction in net aviation CO₂ emissions of 50% by 2050, relative to 2005 levels.



Greenhouse Gas Emissions Reduction Program

To control and reduce greenhouse gas emissions, China Airlines has implemented multi-dimensional energy-saving and carbon-reducing measures and management with reduction in KPIs ranging from aviation fuel usage to various ground operations. Details are further illustrated in this report.

Greenhouse Gases inventory

China Airlines conducts greenhouse gases verification in accordance with ISO 14064-1 annually. According to 2013 data, the major source of greenhouse gas emissions from China Airlines was combustion of aviation fuel, which accounts for 99.65% of total emissions.

China Airlines Greenhouse Gases Inventory

Year	2009	2010	2011	2012	2013
Total Amount of Greenhouse Gases (million tons of CO ₂ e)	6.137	6.948	6.536	6.250	6.484
Percentage of Aviation Fuel contribution(%)	99.41	99.46	99.52	99.53	99.65

Boundary including: China Airlines head quarter, aircraft/engine maintenance facilities, Taipei branch, Kaohsiung branch, and air fuel.



International Cooperation and Communication



Air Cargo Carbon Footprint, ACCF

ACCF is a technical working group composed of member airlines in the IATA Cargo Committee. Its major mission is to develop the calculation method of aviation transport carbon footprint as well as the principle of information disclosure. In 2013, China Airlines was invited to join the ACCF group, as one of the only two participating Asian airlines. By contributing the expertise and experiences of Taiwan, China Airlines is playing an integral part in developing an accurate calculation tool for tracking global cargo carbon footprint.



Association of Asia Pacific Airlines, AAPA

The AAPA is the most influential aviation organization in the Asia Pacific region. Its purpose is to provide members with a communication platform for information sharing as they monitor aviation rules and industrial development in their respective countries. In 2013, China Airlines was elected as a member in the Executive Committee, giving it a seat at the table of discussions on the Asian aviation industry's development - adding its input to environmental issues such as improved aviation fuel efficiency and the development of biomass fuel.



Carbon Disclosure Project, CDP

In 2012, China Airlines accepted CDP's invitation to disclose its annual enterprise carbon risk management strategy, greenhouse gas emissions amount, as well as the management and effectiveness of its reduction efforts. China Airlines also disclosed its carbon management to international investment institutions.

ECO Fly

Saved a total of 2,081 tonnes in aviation fuel in 2013 while also reducing carbon emissions by 6,584 tonnes.



ECO Fly

China Airlines is committed to reducing greenhouse gas emissions as well as ensuring flight safety in accordance with the Four Pillar Strategy of IATA. In 2013, China Airlines developed 30 initiatives, including optimization of aviation plan, operation, aircraft maintenance, and aircraft weight reduction.

Pillar 1 Technology

Manufacturers of aircraft and other related industrial and academic parties must invest in new technology (more efficient airframe, engines and equipment, sustainable biofuels, new energy sources)

- + New aircraft models should achieve improved fuel efficiency and reduced carbon emissions targets primarily through the improvement of materials of wings, engines and fuselage.
- + In regards to alternative fuels, the direction of international research is the development and application of biomass fuel, and feasibility study of other renewable energies.

Pillar 2 Operation

Efficient operations (drive for maximum efficiency and minimum weight).

Pillar 3 Infrastructure

Effective infrastructure (improve air routes, air traffic management and airport procedures) by the integration of airport infrastructure, airspace, and ATM (Air Transport Management) of government authorities, airspace and airport managers

Pillar 4 Economic measures

Governments of various countries should adopt incentive schemes or positive economic measures (carbon offsets, global emissions trading) to encourage the reduction of carbon emissions, thereby compensating for other 3 strategies.

Saving fuel

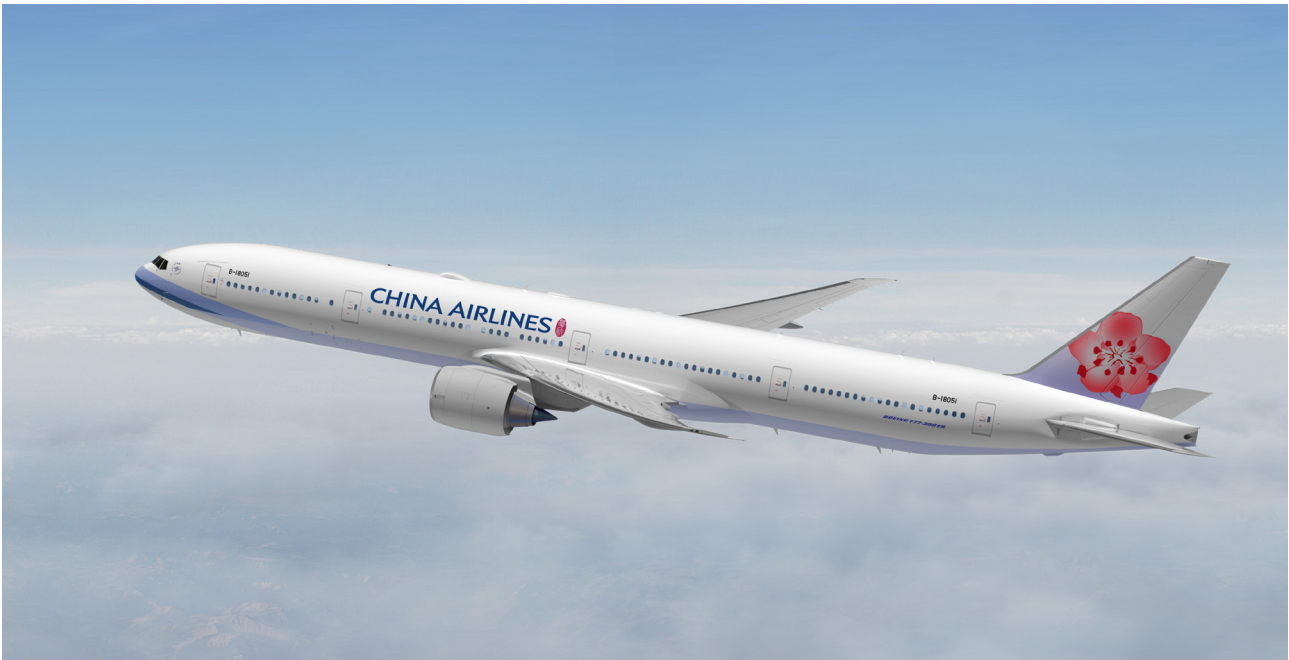
Between 2009 and 2013, China Airlines saved about 48,387 tons of fuel and reduced carbon dioxide by 230,136 tons, saving more than NT\$270 million in fuel costs in comparison to 2012. According to statistics provided by AAPA, China Airlines is the Asia Pacific leader in fuel saving efficiency.

 **6,584**
tCO₂e

Saved a total of 2,081 tonnes in aviation fuel in 2013 while also reducing greenhouse gas emissions by 6,584 tonnes.

 **270**million

In 2013, saving more than NT\$270 million in fuel costs in comparison to 2012



Pillar 1

Technology

Manufacturers of aircraft and other related industrial and academic parties must invest in new technology (more efficient airframe, engines and equipment, sustainable biofuels, new energy sources)

- + New aircraft models should achieve improved fuel efficiency and reduced carbon emissions targets primarily through the improvement of materials of wings, engines and fuselage.
- + In regards to alternative fuels, the direction of international research is the development and application of biomass fuel, and feasibility study of other renewable energies.

Technology

1. Research of Alternative Fuels

The research of alternative fuels is tied with national energy policy that needs cooperation from industrial, governmental and academic parties. China Airlines uses the opportunity to participate in international meetings such as: Association of Asia Pacific Airlines (AAPA), Environment Committee of ,International Air Transport Association (IATA ENCOM) etc. and provides international information and trends to government, thereby communicating the industry's needs to governmental decision makers.

2. Green Design Concept and Elements of New Fleet.

- + Cabin space configuration optimization: seats, lockers and restrooms meets passageway space requirements for both passenger and cabin crew activity.
- + Cabin windows have a filtering, thereby reducing light pollution and temperature.
- + Light-weight materials are used for cabin equipment, thereby reducing weight and fuel consumption.
- + LED lights are used in the passenger cabin, thereby reducing electricity consumption.



- + New-generation electricity saving equipment - with interchangeable device specifications - are used in the kitchen, thereby decreasing the quantity of spare materials and improving the turnover of devices.
- + Weight reduced materials are used for appliances, cabinets, and dining carts.

3. Introduction of next generation, energy saving fleet to improve fuel efficiency.

China Airlines introduced an energy saving fleet with excellent fuel efficiency. In combination with its green design concept, the new fleet has a completely redesigned passenger cabin. Our new fleet looks nice and meets energy efficiency targets at the same time - we're doing our part to keep the sky beautiful. Important features of the two aircraft models are stated below:



+ 777-300ER

Fuel efficiency of the new B777 fleet is better than the 744 by about 20%. B777, powered by two highly efficient engines, further reduces fuel consumption and greenhouse gas emissions through ultra HBPR (high bypass ratio) and new material technologies. The innovative design of Raked Wing-Tips improves aerodynamic efficiency, shortens taxing distance, and enhances climbing performance - further reducing fuel consumption and greenhouse gas emissions.

+ A350-900

The A350's Rising-Level Wing-Tips reduce aviation resistance and noise. The fuselage is composed of ultra light carbon fabric materials, which reduce fuel consumption and greenhouse gas emissions.





Pillar 2

Operation

Efficient operations (drive for maximum efficiency and minimum weight).



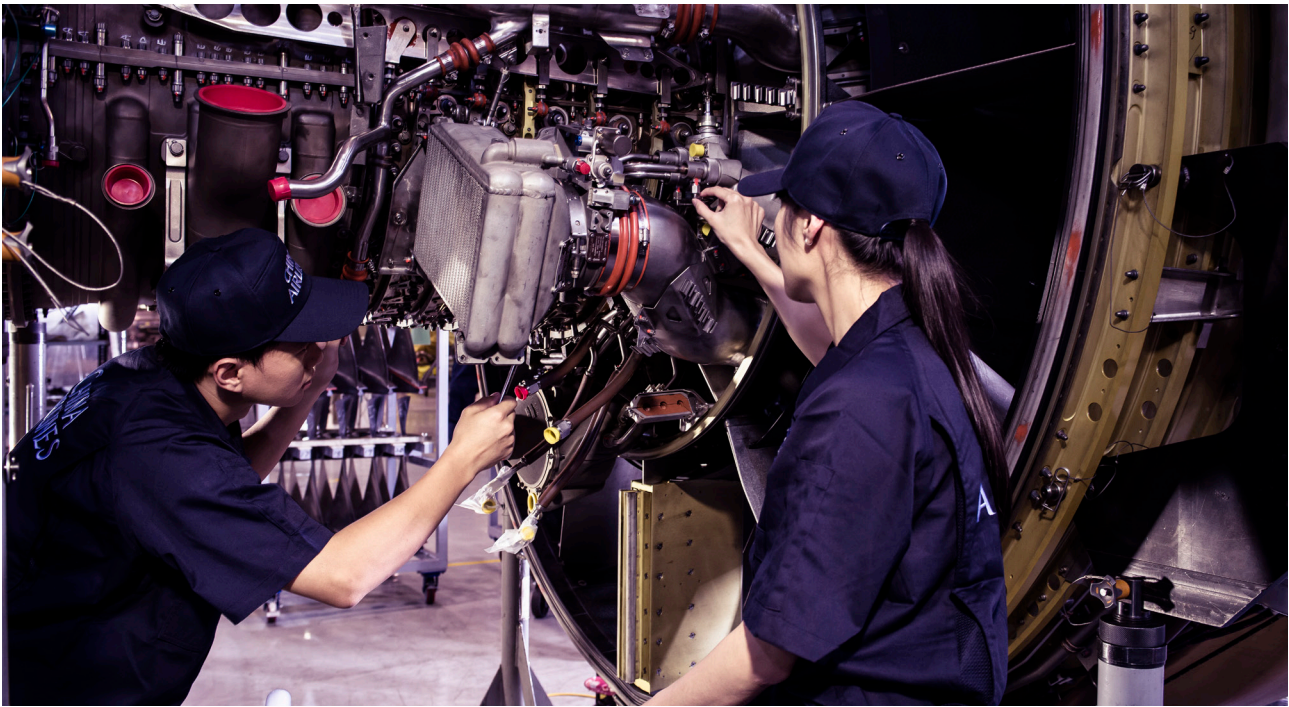
Operation

1. Create low carbon aviation in partnership with GE Aviation.

China Airlines is the leader in the Asia Pacific region in terms of fuel efficiency. In November 2012, China Airlines cooperated with GE Aviation, signing an agreement for a fuel saving and carbon reduction program. The GE team assisted China Airlines in measures that improve aviation operations, and helped the further reduction of fuel consumption and carbon dioxide emissions by providing professional consultation with their international experience and perspective.

2. Optimization of Takeoff and Landing

- + Optimization of aviation planning with respect to takeoff and landing, reviewing flight taxing and cruise performance.
- + Trailer power supply replaces APU (Auxiliary Power Unit) after landing. Alternatively, ground power and air conditioning system are used as efficiently as possible to reduce aircraft fuel consumption.



3.Optimized Routes

Review flight path regularly, choosing the optimal flight path, thereby improving flight efficiency.

4.Optimized operations

Flight crew optimizes flight operations in each stage: acceleration, low flap landing, using idling counter thrust after landing, turning off one or two engines while taxiing.

5.Optimized altitude

Flight crew took the initiative in asking permission to fly at the optimal altitude within regulations, thereby improving performance of aircraft.

6.Optimized Gravity Center of Aircraft

Fuel efficiency can be improved by planning the optimal gravity-center position and weight balance of the aircraft.

7.Optimized cost index

Airway and height most compliant with safety and fuel saving are carefully estimated.

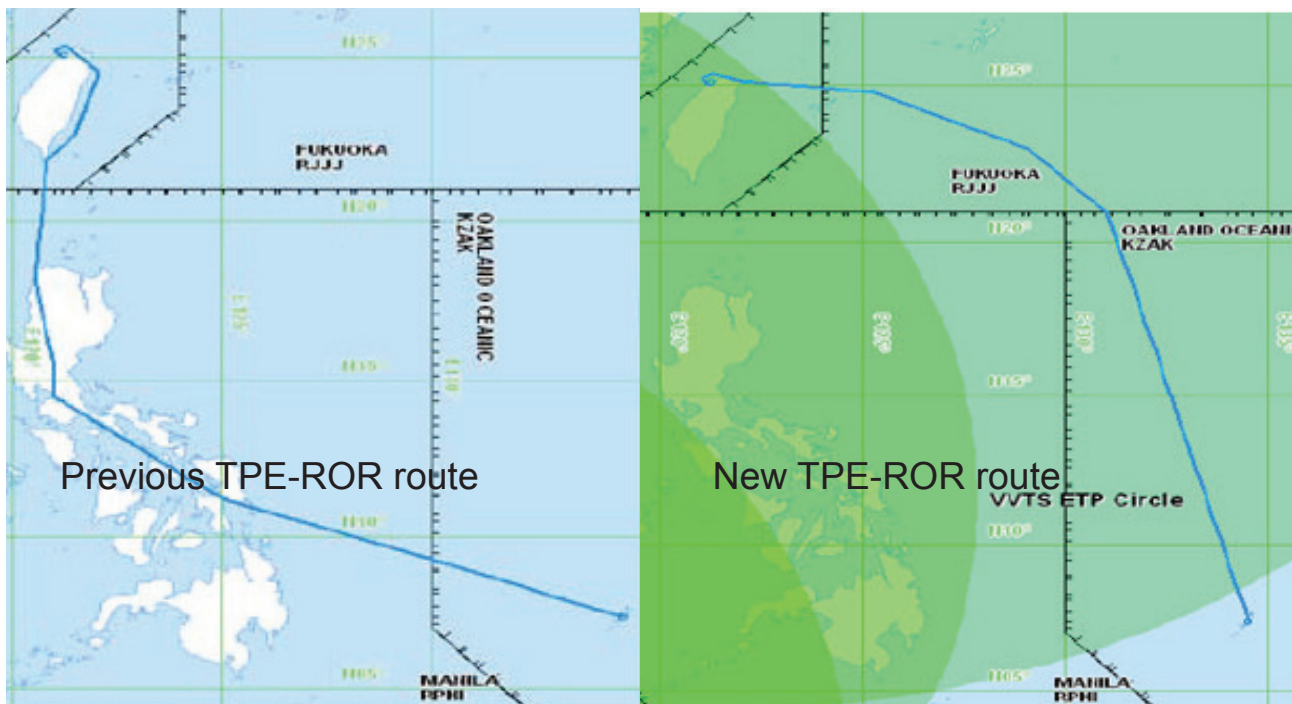
8.Optimized equipment

- + Perform cleaning operation of aircraft engines regularly
- + Wash fuselage regularly to reduce dust and oil spots, thereby optimizing performance.

9.Various Weight Reduction

Perform accurate counts of cabin supplies (e.g. earphones, blankets) according to the number of seat bookings.

- + Replaced traditional AKE aluminum containers with a new light container for cargo, thereby reducing fuel consumption.
- + Introduction of ultra-light meal carts
- + To replace conventional, thick aviation manuals and documents by adopting iPad as the Electronic Flight Bag (EFB) for pilots. Pilots may access the most updated information - such as aviation plan, weather condition, NOTAM notice (Notice to Airmen) etc. - through applications and cloud technology - thus reducing paper usage and the weight on the aircraft and helping reach environmental protection and carbon reduction targets.



Pillar 3

Infrastructure

Effective infrastructure (improve air routes, air traffic management and airport procedures) by the integration of airport infrastructure, airspace, and ATM (Air Transport Management) of government authorities, air-space and airport managers.



Infrastructure

1. China Airlines joined the working group run by Taiwan Civil Aeronautics Administration (CAA). By joining the group, China Airlines contributes industrial expertise and experience in the optimization of takeoff landing procedures that could reduce fuel consumption and noise pollution.

2. After communication and negotiation with air transport management authorities from different countries, China Airlines was granted access to a direct flight path between Taipei and Palau, thereby significantly reducing fuel consumption and saving energy. Not only is faster transport times achieved, but environmental protection is also accomplished.



(Chairman and committee members)

Pillar 4

Economic measures

Governments of various countries should adopt incentive schemes or positive economic measures (carbon offsets, global emissions trading) to encourage the reduction of carbon emissions, thereby compensating for other 3 strategies.



Economic measures

1.As defined in the Kyoto Protocol, to control emissions trading in trans-national greenhouse gases, the EU (European Union) has included the aviation industry in its “EU Emission Trading Scheme (EU ETS)” control. China Airlines has conducted greenhouse gases inventory work in accordance with the guidelines of EU ETS and in March 2013 was certified by an international, judicial third party and approved by the EU.

2.In 2010, China Airlines also established “EU ETS Responding Group”, later named the “Carbon Management Working Group” in 2013 to comprehensively consider fuel efficiency and greenhouse gas emissions, thereby meeting carbon management requirements. In addition, China Airlines monitors international trends in carbon management and engages in information exchange with local authorities.

3.China Airlines became a member of the Clean Carbon Alliance of the Taiwan Environmental Protection Administration in 2013, communicating its experiences and views on carbon management in the aviation sector with industrial, official and academic experts.

In-flight waste disposal

China Airlines has adopted optimal management measures to help classify recyclable waste in compliance with a standard that is higher than local regulations. Leftovers generated during flights are collected and disposed of by a licensed vendor in accordance with national quarantine requirements. For the best use of materials, expired magazines are collected from flights and made available for charity sales among China Airlines staff.

In addition, China Airlines also participates in IATA's International Aviation Waste Research Program, offering further Taiwan waste management experience to the international community. In 2013, China Airlines recycled a total of 4,000 kg of plastic bottles and 1,600 kg of iron and aluminum cans on return flights to Taiwan.

Terminal waste disposal

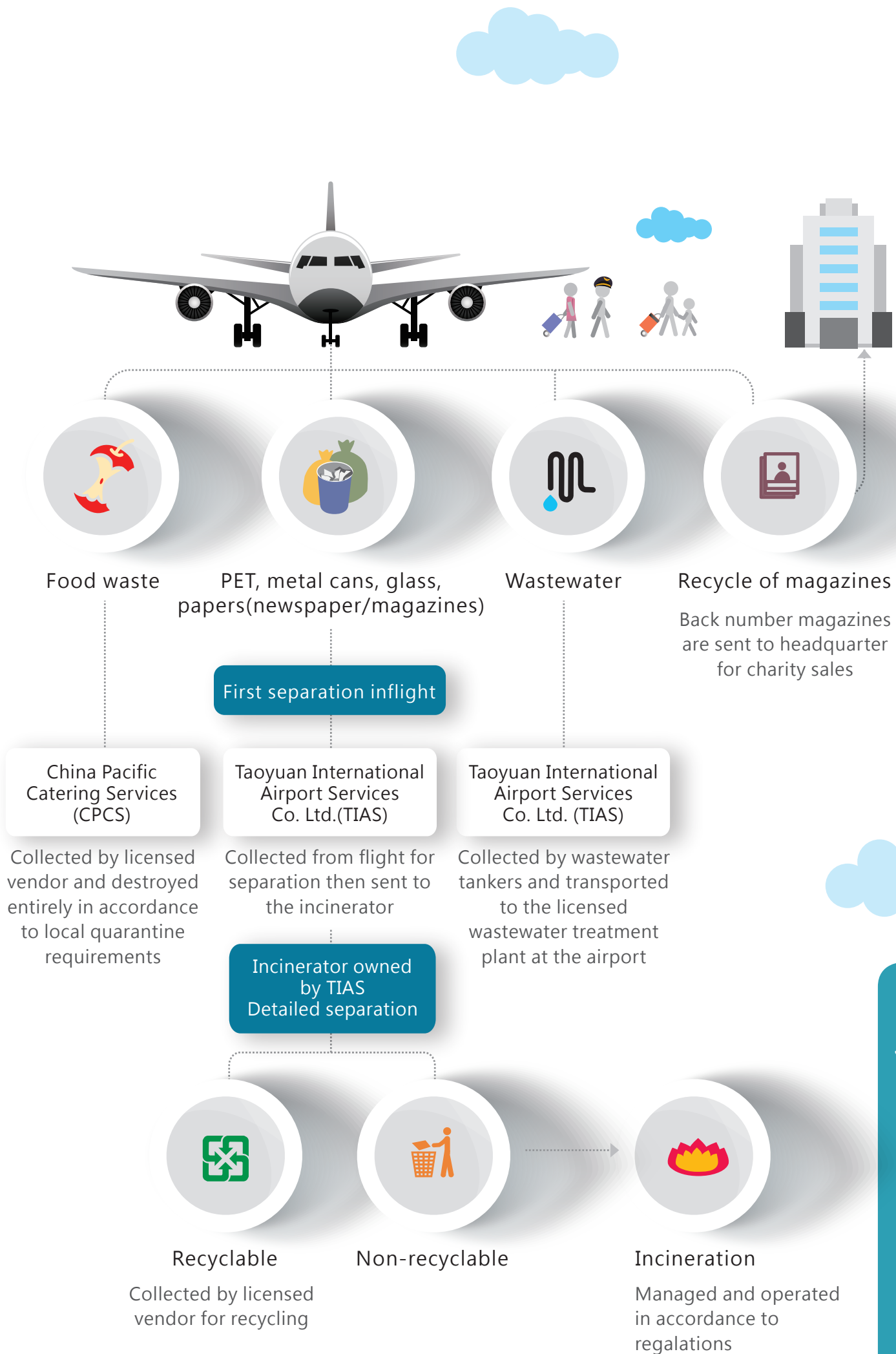
China Airlines' waste management service flow is further extended to include ground operations at aviation stations. In 2013, China Airlines recycled a total of 18,427 kg of plastics and 11,000 kg of iron and aluminum cans at the Taoyuan Aviation Station, thereby reducing waste and effectively recycling resources, ultimately reducing the burden on the environment.

Noise Management

Flight operations and ground operations are the two main sources of noise disturbance in the aviation industry. Noise prevention and control is a concern of China Airlines. All of our aircraft comply with international standards such as ICAO Annex16. Taking full responsibility of environmental protection, China Airlines actively assisted the Environmental Protection Bureau of Taoyuan County in related programs and activities for residents within the aviation noise prevention and control zone of Taoyuan International Airport.

In 2013, China Airlines Resource Recycling in Taoyuan Terminals (Unit: Kg)







Ground Operation

China Airlines actively promotes power, water, fuel and waste reduction green KPI initiatives, demonstrating its commitment to sustainable environment management.

Ground Operation

The headquarters of China Airlines (China Airlines Park) is located at the entry of the Taoyuan International Airport. The cutting-edge, green-building design received the Green Building Candidate Certificate in 2010; the “National Building Gold Award” and First Prize were subsequently awarded. However, China Airlines does not stop its environmental protection, energy saving, and carbon reduction efforts here. We are driving multiple environmental protection KPI control programs - such as electricity, water, fuel saving - to show our commitment to the environment and sustainable operations.

In 2013, to more effectively manage various energy saving measures and optimize environmental protection performance, China Airlines led the domestic industry with its introduction of the ISO 50001 Energy Management System. As a result, China Airlines further reduced ground electricity consumption by nearly 10% as compared to prior energy savings of green buildings in 2011. Other energy and resource saving programs - like optimization of ground fuel utilization, rain water recycling, water resource reuse, paper saving - are continued, thereby meeting China Airlines’ commitment to improving global resource conservation and reducing resource consumption.



7,947 tCO₂e

Total reducing 7,947
Ton CO₂e emissions

Major Resource Savings of China Airlines from 2012 to 2013

	2012			2013			2014 Target		
	Item	Benefit	Reducing the amount of carbon (kg CO ₂ e/year)	Item	Benefit	Reducing the amount of carbon (kg CO ₂ e/year)	Item	Benefit	Reducing the amount of carbon (kg CO ₂ e/year)
Aircraft Fuel efficiency (tons)	30	2,854	8,990,658	30	2,081	6,583,924	30	2,102	6,651,003
Car Fuel efficiency (Gasoline) (Kl)	4	14	32,354	2	11	25,343	3	12	28,921
Car Fuel efficiency (diesel oil) (Kl)	1	194	505,142	1	123	326,004	2	129	342,437
Power saving (degree)	3	2,023,868	1,238,607	2	1,898,116	1,009,798	4	1,159,995	617,117
Water saving (degree)	3	3,672	709	2	8,210	1,346	2	1,860	305
Waste Reduction (sheet)	3	1,915,000	6,488	3	497,174	529	3	458,777	489
Other concerns	20	Promote the environment protection issues into flight service, proceed staff education and set up relating SOPs.		17	Continue 2012 items + less paper consumption.		16	Continue 2013 items + set up “environment information exchange web”, reduce toxic substance amount, and use lighter cargo container.	
Total	64		10,773,958	57		7,947,108	60		8,194,081

Note:

- Statistics of energy and resource saving amount covers China Airlines Park, Engineering & Maintenance Organization, and Kaohsiung branch.
- Since moving to its new site on 1/18/2013, Kaohsiung branch has no independent electricity meter and water meter for recording; thus its 2013 data for electricity and water savings are excluded.
- The calculation of paper saved is based on A4 size.



Energy Consumption and Efficiency



351,347
tCO₂e

Reduced fuel by 134 kL,
equal to 351 tons of CO₂e
in 2013

Fuel efficiency

China Airlines ground operations execute energy saving and carbon reduction principals:

- + Joint shuttle dispatch for flight crew.
- + Vehicle idling is minimized to save fuel consumption and reduce air pollution.
- + The use of company vehicles is optimized.
- + At the EMO, petrol vehicles are replaced with electric vehicles.

Currently, 100 petrol vehicles have been replaced by electric vehicles at the EMO. In combination with multiple vehicle dispatching optimization measures, 134 kilo-liters of fuel was saved in 2013, and 351 tons CO₂e of greenhouse gas emissions was saved.





Energy Consumption and Efficiency

 **1,010**
tCO₂e

In 2013, a total of 1.9 million kWh of electricity was saved and reduced greenhouse gas emissions by more than 1,010 tons CO₂e.

Power saving

The major energy consumed by China Airlines Ground operations is electricity. As a result, in 2013 China Airlines introduced energy saving programs in response to the government's energy saving and carbon reduction policy. The programs included:

1. Air conditioning

- + Independent air conditioning units for the off-duty periods in China Airlines Park instead of the centralized air conditioning system supporting the entire area.
- + Start and stop times for the air conditioning system is adjusted in compliance with energy saving regulations.
- + Air conditioning temperature in the simulation building (especially for the server room) is optimized.
- + Separate air conditioning units are installed for non-constant usage, thereby reducing electricity consumption of the centralized air conditioning supporting the entire area.

2. Lighting

- + The high energy consumption 300W halogen lamps for the Engineering & Maintenance Organization (EMO) are replaced with energy saving 100W LED lamps.
- + Lighting circuit control and independent switches are added, controlling lighting in terms of area and duration.
- + The 1,000 W mercury maintenance work lamps are replaced with 320W-LED lamps.
- + High efficiency T5 lamps are replaced with T8 lamps.
- + 250W mercury lamps on exterior walls are replaced with 60W LED lamps.
- + High energy saving LED lamps are adopted in newly rented offices.



Resources

 **8,210 tons**

Reduced tap water by
8,210 tons in 2013, equal
to that consumed by
31,700 individuals daily

Water saving

China Airlines conserves water in two ways: by recycling water on one hand and reducing the usage of water on the other hand. In 2013, by means of various water saving measures, a total of 8,210 tons of water were saved. According to the data from the Taiwan Water Corporation, the 2013 daily water consumption of each person was 0.259 tons; given this calculation, the total water saved by China Airlines would support the needs of 31,700 people every day!

1. Recycling Water

- + Rainwater recycling system has been established in the China Airlines Park. The water recycling tank has a 1,050 ton capacity and is used for toilet flushing and irrigation.
- + Wastewater generated from the drinking water system at the China Airlines Park is included in the recycling system.
- + Wastewater generated at the EMO is recycled and reused for the washing of vehicles, irrigation and landscape pools.

2. Reducing the Use of Water

- + China Airlines uses products that are certified to save water and all kinds of water-saving devices, hydrants, toilets, shower devices, as well as automatic flushing systems. Lawns and flower beds have automatic moisture detection and watering mechanisms, which also save water. In this way, compared to standard equipment and products, 15% to 20% of water is saved.
- + Piping for landscape pools at China Airlines Park has adopted the rainwater system.
- + China Airlines Park has reduced the frequency of washing its building exteriors to save water.



Resources



497,174
sheet

Total saving 497,174 sheet
of paper, reducing 529kg
CO₂e emissions.

Waste Reduction

China Airlines recognizes the irrecoverable nature of resources, and incorporates 3R (Reduce, Reuse and Recycle) into our operations:

- + Printing machines on the same floor are shared. The procurement amount, application and use are all controlled to reduce the number of copies.
- + Papers with print on one side are recycled for reuse in offices.
- + Waste cartons at cargo services are reduced. For wastepaper, licensed vendors are employed for recycling.
- + Tie-down and Skid for cargo operations are recycled for use.
- + Waste ULDs (Unit Load Devices) for cargo are recycled.
- + Cloth recycled from the cabin is cut into rags and reused for cleaning, thereby reducing wet tissue consumption.





Environmental investment and procurement

China Airlines follows the principle of green procurement, using green products with environmental protection and/or energy saving labels, including printing machines with electricity saving labels, using electricity saving lamps, selecting consumables with environmental protection labels, etc. In 2013, China Airlines invested over NT\$ 30 million in environmental protection equipment and green procurement.

1 million

Green procurement and investment fee over NTD100 million

Green investment and procurement

Year	Equip-ment ¹	Procure-ment ²	Total
2010	20,839	115	20,954
2011	18,076	4,567	22,643
2012	23,407	9,423	32,830
2013	22,260	14,263	36,523
Total	84,582	28,368	112,950

Note:

- Equipment refers to pollution preventive equipment depreciation, operation and maintenance, hardware investment and environmental testing.
- Procurement refers to Environmental Preferable products of Category 1, 2 and 3 prescribed by the Regulations for Priority Procurement of Eco-Products (Jan. 15, 2011).
- The figures are rounded to the unit of NT\$ 1,000.

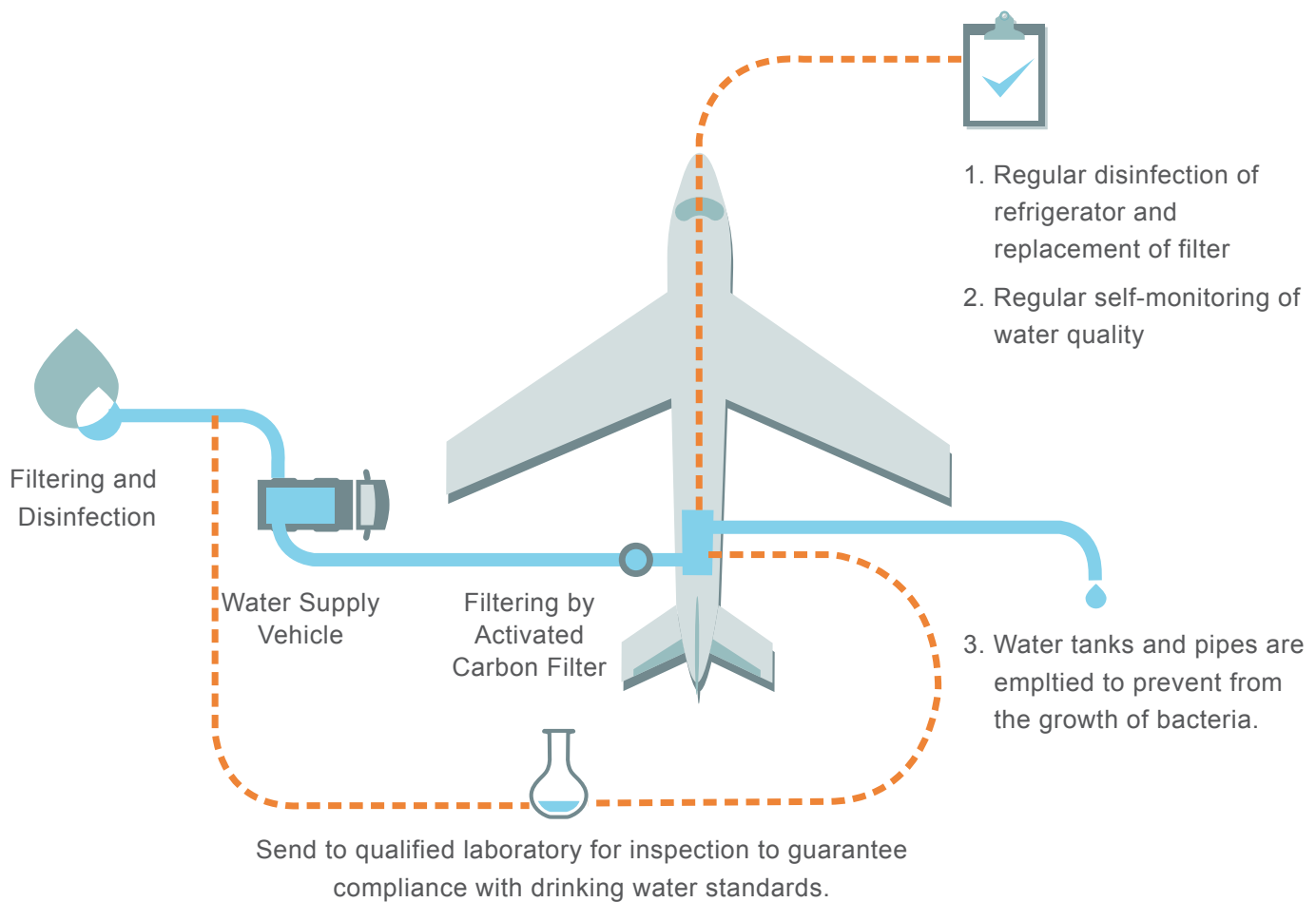
Other concerns

Environmental protection is a main consideration of China Airlines. China Airlines actively drives environmental management, complies with various environmental protection requirements and regulations, and cooperates on environmental auditing by administrative authorities.

Proactive Completion of Soil Remediation and Restoration

Minor soil pollution was found at the underground oil storage tanks located at the decommissioned testing area at the EMO during the soil and groundwater investigation conducted by the Taiwan EPA in 2011, with only one item found to be exceeding the Taiwan Soil Pollution Control Standard. It was concluded that, although the pollution had been detected and treated immediately upon discovery, related monitoring and control technology had not been developed then. Hence, minor soil pollution was then reported in the 2011 investigation.

With its emphasis on pollution control, China Airlines took immediate responsibility and action-investing labor and resources and entrusting a professional team to remediate and restore soil within the area. Shortly after, in 2013, the area passed the examination of the Taoyuan County Environmental Protection Bureau. Not only was it no longer listed as a soil pollution control site, but the observation pursuant to paragraph 5, Article 7 of the Soil and Groundwater Pollution Remediation Act was also removed. In addition, China Airlines was elected as a national distinguished demonstrative restoration site by the Taiwan EPA in 2013. A site visit demonstrating the excellent results of restoration was led by the EPA and participated by EPB supervisors from all cities and counties in Taiwan.



In-flight drinking water

To ensure the quality of drinking water for passengers, China Airlines leads the industry in defining the management procedure, “Standard Operation Procedure of Cabin Drinking Water PZ033”. Strict requirements as compared to the local law and regulations and also the maintenance requirements of equipment vendors are employed at China Airlines.

- + The drinking water safety is listed as a key item in the evaluation of new station openings.
- + The qualification of water supply agents is controlled strictly; outer stations are required to strictly monitor the process water supply operations and conduct audit regularly.

- + The maintenance plan is carried out at a frequency superior to vendor recommendation. To prevent the growth of bacteria, water tanks and pipes are emptied on overnight flights.
- + Active carbon filters are installed in in-flight water dispensers to ensure water quality.
- + Drinking water quality is supervised by the headquarters.

Noise control

Regular noise monitoring is conducted by licensed professional institutions at China Airlines EMO and other working sites. Noise levels are found to be in compliance with the local law and regulations.

ECO Services

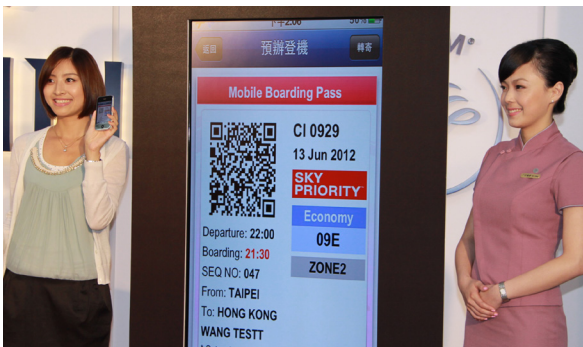
China Airlines incorporates environmental concerns into every service process in the hope of inspiring customers to join us in protecting the environment.



Eco-Friendly Services

“Environmentally Friendly” has been listed as one of the five corporate core values including “Cultural Creatively, Technology, Emotional Connection and Trust.” In conjunction with the introduction of its new fleet, China Airlines has launched its “Next Generation” Plan by integrating weight reduction, waste reduction, and sustainable utilization together with the fashionable, green design concept into its Next generation services.

China Airlines conveys the natural resources, green products and the environmental protection culture of Taiwan to passengers through its ECO service platform, inviting passengers to care for our global environment together. In 2013, this concept and its results of implementation have been awarded the special honor of Green Classics Services Award from the Bureau of Foreign Trade, Ministry of Economic Affairs, Taiwan.



Interacting With Customers

Eco Film

In 2013, to improve passengers' environmental awareness, China Airlines released an environmental protection film titled, “A Pleasant Ecotravel”, which was later shown on YouTube and the full fleet of China Airlines. The footage depicts cabin crew interacting with passengers, all the while showing the environmentally friendly services provided

to passengers and China Airlines' efforts to protect and preserve the environment.

Besides China Airlines' self-produced environmental protection film, there are many great short films related to environmental protection, such as Green Building Discovery, Pride of Taiwan: Ecological Volunteers who Protect Formosa Ecology, etc. Their contents are regularly updated so passengers can stay informed about the latest measures in environmental protection in the aviation industry.



Saving Energy by Closing Windows

From June to October, China Airlines launched the “Close Cabin Shutter for Energy Conservation” campaign to save energy and reduce carbon emissions together with passengers. Such simple measures could lower the temperature in cabins by about 3-4 °C, thereby lowering air conditioning loading and reducing fuel consumption.





270
million

The number of CUSS and self print baggage tag users in 2013 was more than 2.7 million times



170%

The number of APPs users in 2013 by almost 60,000 times increased by 170% in contrast to that in 2012



50%

The average usage of pre boarding and self-service check-in is up 50%

ECO services

China Airlines Self-Service Check-in Services

Passengers can use smart phones to operate China Airlines CI Mobile or enter China Airlines Official Website to complete online reservation, purchase tickets, and check-in. Additionally, China Airlines is partnering with Taoyuan Airport to establish more Self-Check-In Kiosk space for the common user self-service (CUSS) and self-print baggage tag service. These will replace traditional counters and will reduce boarding procedures, saving passengers time and paper.

According to statistics, around 600,000 passengers used the CI Mobile APP in 2013 to check in online, a 170% increase over 2012. Furthermore, passengers using self-service check-in counter and/or self-print baggage tag service have exceeded 2.7 million people. Around 50% of passengers in Taiwan use online check-in and self-service check-in. It's clear that more and more passengers are enjoying our agile and convenient ECO service.



CI Mobile



KIOSK



Pre-booking
on line



Transport
luggage

Number of People Using e-Commerce and Self-Service Check-in Service of China Airlines

Item	2011	2012	2013	2012-2013
Number of Passengers Using CI Mobile APP e-commerce		21,908	59,148	170.0%
Self-Service Check-in or self-print baggage tag	1,007,468	2,069,600	2,725,897	31.7%

Remark: e-commerce APP be operated from year 2012



6 Carbon Footprints

Carbon footprint

After initially marking carbon footprint of in-flight meals through cooperation with the Taiwan Industrial Technology Research Institute (ITRI) in 2012, China Airlines further promoted carbon footprint awareness by labelling six additional hot meals in VIP lounges. Now, passengers can enjoy fine cuisine while simultaneously gaining a greater understanding of the dishes' environmental impact.





Item	Carbon footprint
Beef Noodles	1.5 KgCO ₂ e
Noodles with Pork Broth	700 gCO ₂ e
Braised Soya Tea Egg	600 gCO ₂ e
Steamed Pork Dumpling	300 gCO ₂ e
Crab Dumpling	220 gCO ₂ e
Baked Sweet Potato	55 gCO ₂ e

20 Freight agents

e-Freight

In 2009, IATA named China Airlines the 22nd "e-Freight" airline in the world for cargo operations. Since then, China Airlines has helped more than 10 cargo agents introduce e-Freight service. China Airlines is committed to further developing paperless service, and plans to move forward wherever possible.

e-Freight of China Airlines (Unit: Counts)

2011		9,891
2012		17,085
2013		28,107
Total Counts		55,083



 **32.3 %**

- The percentage of flights using light-weight dining cars: from 9.4% in 2012 to 32.3% in 2013.

Eco in-flight goods

In consideration of safety, environmental protection, and comfort, in-flight supplies of China Airlines are becoming more environmentally friendly. In 2013, in addition to continued use of environmentally safe products, China Airlines also created new cultural concepts to help convey the rich Taiwanese culture to our global passengers, all the while offering them richer and better flight services.

1. Eco travel kit

Toothbrushes made of biodegradable core starch materials are used for certain cabin classes. Reusable package made of non-woven fabric printed with Taiwan aboriginal design pattern instead of plastic is used for personal sanitary kits.

2. Light Dining carts

To reduce fuel consumption and greenhouse gas emissions, cabin meal carts were improved by reducing their weight from 26 kg to 17 kg. The percentage of flights using light-

weight meal carts has significantly increased from 9.4% in 2012 to 32.3% in 2013.

3. Environmentally Friendly Cloth used for Cabin Headrests and Pillowcases

In some business and first class cabins, headrests and pillowcases made of Eco-labeled fabric (Label No.:7776 & 7777) that were composed of coffee yarns (35%) and recycled plastic bottles (65%) are provided.

4. Utilization of Other Green Goods

In addition to the above mentioned environmental measures, China Airlines provides re-usable, lightweight, environmentally friendly onboard earphones--not only lighter and smaller compared to original earphones (with weight reduction of 42g for each), but also compliant with EU (RoHS) environmental protection regulations for electronic products. China Airlines is committed to the re-use of products wherever possible.

Due to the long period of flying and the spatial limit of the cabin, odor is sometimes unavoidable. To improve in-flight air quality, China Airlines utilizes only natural fragrances not harmful to the human body or environment, requesting that suppliers show certification of their environmentally safe and friendly ingredients. Any items in the products not approved by the Environmental Protection Administration are rejected.

Proportion of Light-weight Dining Carts used in China Airlines Flights

Year		2011		2012		2013	
Weight	Total, Ratio						
26 kg		2,654	41.3%	2,528	36.4%	2,525	27.2%
20 kg		3,769	58.7%	3,768	54.2%	3,762	40.5%
17 kg		1	0.0%	653	9.4%	3,003	32.3%
TOTAL		6,424	100 %	6,949	100 %	9,290	100%



Local Ingredients for In-flight Catering

For environmental protection - reducing carbon emissions from long-distance transport of food - China Airlines follows a "Local Ingredients" policy, using local fruits and vegetables for in-flight catering. Additionally, the renowned baker "Pao-Chun Wu" and famous Hotel "W Taipei" were invited to support our policy by creating new dishes with culinary aesthetics. Not only is China Airlines supporting Taiwan's agricultural industry and reducing carbon footprint, we're making food more delicious! China Airlines promotes local Taiwanese cuisine:

- + Champion Bread of Master Pao-Chun Wu
- + Chinese Creative Cuisine of YEN Chinese Restaurant of W Taipei Hotel
- + "Coffee Chicken" for In-flight Dining
- + Taiwanese beef noodles: local Taiwanese beef is used.
- + Quality Taiwanese Rice: No. 11 SUNSUVI rice is used.
- + Fresh Taiwanese fruits are provided in economy class for aircraft departing from Taipei to Mainland China, Northeast Asia, and destinations across the Americas and Europe.
- + Vegetarian meals from Water Drop Teahouse are provided for vegetarian dining. Local Taiwanese fruits and vegetables are used.





Investing in People & Communities

To uphold our corporate social and environmental responsibilities, China Airlines hosts a number of charity events to give back to society and the planet in a tangible way.



Environmental Management for Supply Chain

China Airlines is committed to protecting the environment and takes a leading role with associated enterprises and supply chain partners, making joint efforts towards sustainable development. In 2013, China Airlines held a series of environmental protection and energy management courses (for example, ISO 14001 Environmental Management System and ISO 50001 Energy Management System), training programs for our partners, inviting a total of 80 people from associated vendors (e.g. Novotel Taipei Taoyuan International Airport, TACT Logistics, China Pacific Catering Services). Our hope is that through the training, green seeds in the supply chain will be planted.

Education, Training, and Personal Development

In 2011, China Airlines led the industry in conducting full-staff education on environmental protection. Through the regular announcements of environmental protection messages, as well as promotional information on environmental protection, China Airlines was able to keep staff up to date. In 2013, all staff in Taiwan took part in the e-learning courses about environmental management - 8,756 employees were trained in total. Additionally, various department managers worked with relevant personnel (for example, ground operations speaking with pilots) to create tailored training materials about environmental management in the aviation industry.



Charity

China Airlines takes its social responsibility seriously, offering various public services and environmental protection events, giving back to the community and the Earth with various public benefit events.



Beach cleaning

To conserve global resources, China Airlines regularly invites retirees and staff from various departments to participate in the beach clean-up at the Chuwei Fishing Harbor. As of the end of 2013, China Airlines has picked up nearly 2,000 kg of waste - including driftwood, fishing nets, tires, plastic bottles, plastic bags - doing its part to keep our community's Chuwei Fishing Harbor beach beautiful.

Equipment donation

In addition to events like beach clean-ups, China Airlines regularly sends its pilots and cabin crew to school districts at local communities (e.g. Chuwei Elementary School) for public education drives. China Airlines donated cabin equipment - such as 140 cabin seats, life jackets, meal carts - for educational use in 16 schools. China Airlines gives back to the community, truly living the reuse and environmental protection principles we espouse.


2,000KG

The waste collected at Chuwei Fish Port in 2011-2013 weighed a total of 2,000 kg.



PGGM Project



984
voyages

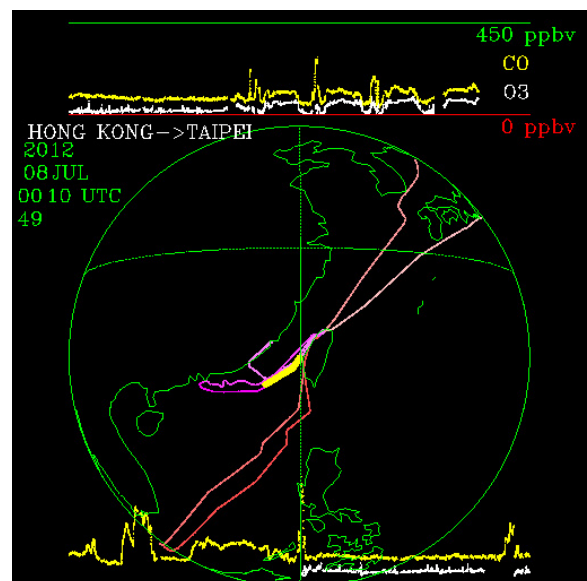
As of the end of 2013, the data of 984 flights was collected for further studies.

Since June 2012, in support of the “Pacific Greenhouse Gases Measurement Project” (PGGM) jointly run by Taiwan’s Environmental Protection Administration (EPA), the Taiwan National Science Council, the National Central University, and Europe-based In-service Aircraft for a Global Observing System-European Research Infrastructure (IAGOS-ERI), CAL’s Airbus 340-300 aircraft with the identity number B-18806 has been installed with the IAGOS Instrument and was officially launched on June 26th, 2012. CAL is therefore the first airline in Asia to participate in the PGGM project to monitor greenhouse gases and the first to operate an IAGOS-equipped flight for taking atmospheric measurements on trans-Pacific routes.

The IAGOS instrument is installed in the avionic compartment underneath the control cabin on CAL A340-300 passenger plane. A sampling port extending from the fuselage collects data on atmospheric gases, water vapor, ozone, carbon dioxide, carbon monoxide, and nitrogen oxide during each flight. The collected data, after the aircraft’s landing, is automatically transmitted by Global System for Mobile Communication (GSM)

to the Centre National de la Recherche Scientifique (CNRS) for data analysis. The data is then provided for the National Central University and the global scientific community in their research on global warming and climate change.

The EPA and the National Central University will also use the data collected by China Airlines, together with observations from FORMOSAT-3 satellite, ground weather stations, and sea observations to analyze the sources and pathways of air pollution. The resulting information can be further used as a reference for formulating air pollution control policy. As of the end of 2013, a total of 984 flights have collected atmospheric data during aviation for European scientific research. China Airlines is making a concrete contribution to climate change and atmospheric monitoring.



(B-18806 aircraft flight track, provide by Professor Kuo-Ying Wang, National Central University)



Awareness of Environmental Protection through Painting

Airframe painting is commonly employed by airlines to convey its company image to international travelers. To show our concern and commitment to the land, China Airlines' cooperation with "Jimmy" - a famous Taiwanese illustrator - promoted the "Love & Hug Airplane", the first painting in Taiwan's Cultural Creativity series. In alignment with our promotional "Travel Starts with a Big Hug", this painting depicts protected animals such as the green turtle, the Chinese white dolphin, and owl. Not only environmental issues--such as climate change, global warming - are depicted, but our commitment to environmental preservation is also conveyed. Through these images, customers are invited to participate in a greater awareness and appreciation for Earth.



Participation in International "Earth Hour"

To get people to pay attention to global warming and climate change, China Airlines promotes events that raise awareness about the Earth. Since 2008, it has participated in "Earth Hour" (in 2013, it joined for the sixth consecutive year). During this hour, all unnecessary energy is switched off for one hour (from 8:30 p.m. to 9:30 p.m.). For China Airlines, this means switching off unnecessary lighting in China Airlines' Taoyuan headquarters, its maintenance plant, the China Airlines Building in Taipei as well as the Songshan Training Park. Additionally, electricity is saved by switching off the lamps on the outer walls of China Airlines Park at 12:00 p.m., thereby saving energy and reducing carbon.



Prospects

China Airlines strives to realize a philosophy of "Exceptional Operations, Sustainable Development" to create a happy, green and sustainable development environment for future generations.

Exceptional Operations, Sustainable Development

China Airlines has grown with the people of Taiwan since its founding in 1959. Over the past half century, China Airlines has continuously pushed itself to not only provide passengers with the best and most dependable services but to also protect and look after the environment.

Even though the seeds of environmental protection we planted are now beginning to sprout, we are not resting on our laurels. As the scale of our business operations continues to grow, we will gradually strengthen our environmental protection efforts with supply chain partners through experience sharing, benchmarking and the establishment of more comprehensive and transparent communication models. We will ensure customers understand and approve of our contributions and accomplishments in environmental protection while also continuing to encourage and assist suppliers to fulfill their own environmental protection responsibilities. More importantly, we hope they can expand relevant standards to their own supplier management. This internal and external cooperation will hopefully achieve synergies in environmental protection, not just for China Airlines but the aviation industry as a whole. At the same time, we know that in business you may not always find a win-win outcome that balances environmental sustainability with lower operating costs.

This will not only require 100% concentration from everyone at CAL but also close cooperation with government agencies and international aviation organizations.

At the same time, we know that in business you may not always find a win-win outcome that balances environmental sustainability with lower operating costs. However, this challenge of a win-win strategy will not deter China Airlines in its goal of sustainability; rather strengthen our resolve, requiring 100% concentration from everyone at CAL

and re-doubling our efforts and cooperation with government agencies and international aviation organizations.

For this reason, CAL has not only established a corporate environmental and energy management mechanism to actively implement and refine our various energy and resource performance management operations internally. We are also using cross-industry exchanges, drawing on risk management experience of domestic benchmark enterprises, and actively participating in the environmental protection initiatives from Taiwan's aviation regulators and other international aviation organizations including IATA, ICAO and AAPA. By continuing to raise the environmental management horizons and abilities of our company as a whole and working to realize the corporate philosophy of "exceptional operations, sustainable development", we not only create a corporate organization with sustainable competitiveness for our investors and colleagues, but also create a prosperous and green sustainable development environment for future generations.



Table of Comparison for Global Reporting Initiative (GRI) G4 Environmental Performance Indicators

GRI Indicator		Section of Report	Page
No.	Content		
EN1	MATERIALS USED BY WEIGHT OR VOLUME	5 Ground Operation	31
EN2	PERCENTAGE OF MATERIALS USED THAT ARE RECYCLED INPUT MATERIALS	5 Ground Operation 6 ECO Services	35 39
EN3	ENERGY CONSUMPTION WITHIN THE ORGANIZATION	5 Ground Operation	31
EN4	ENERGY CONSUMPTION OUTSIDE OF THE ORGANIZATION	5 Ground Operation	31
EN5	ENERGY INTENSITY	5 Ground Operation	31
EN6	REDUCTION OF ENERGY CONSUMPTION	5 Ground Operation	31
EN7	REDUCTIONS IN ENERGY REQUIREMENTS OF PRODUCTS AND SERVICES	5 Ground Operation 6 ECO Services	31 42
EN8	TOTAL WATER WITHDRAWAL BY SOURCE	5 Ground Operation	31-32
EN9	WATER SOURCES SIGNIFICANTLY AFFECTED BY WITHDRAWAL OF WATER	CAL did not significantly affect any water sources by the withdrawal of water.	-
EN10	PERCENTAGE AND TOTAL VOLUME OF WATER RECYCLED AND REUSED	5 Ground Operation	31-32
EN11	OPERATIONAL SITES OWNED, LEASED, MANAGED IN, OR ADJACENT TO, PROTECTED AREAS AND AREAS OF HIGH BIODIVERSITY VALUE OUTSIDE PROTECTED AREAS	5 Ground Operation	31
EN12	DESCRIPTION OF SIGNIFICANT IMPACTS OF ACTIVITIES, PRODUCTS, AND SERVICES ON BIODIVERSITY IN PROTECTED AREAS AND AREAS OF HIGH BIODIVERSITY VALUE OUTSIDE	5 Ground Operation	31
EN13	HABITATS PROTECTED OR RESTORED	7. Charity	45
EN14	TOTAL NUMBER OF IUCN RED LIST SPECIES AND NATIONAL CONSERVATION LIST SPECIES WITH HABITATS IN AREAS AFFECTED BY OPERATIONS, BY LEVEL OF EXTINCTION RISK	All effluents and waste discharged by CAL conform to regulatory requirements and had no significant impact on biodiversity.	-
EN15	DIRECT GREENHOUSE GAS (GHG) EMISSIONS (SCOPE 1)	3 Greenhouse Gases Reduction	17
EN16	ENERGY INDIRECT GREENHOUSE GAS (GHG) EMISSIONS (SCOPE 2)	-	17
EN17	OTHER INDIRECT GREENHOUSE GAS (GHG) EMISSIONS (SCOPE 3)	Data collect but not publish	-
EN18	GREENHOUSE GAS (GHG) EMISSIONS INTENSITY	3 Greenhouse Gases Reduction	17
EN19	REDUCTION OF GREENHOUSE GAS (GHG) EMISSIONS	3 Greenhouse Gases Reduction	17

GRI Indicator		Section of Report	Page
No.	Content		
EN20	EMISSIONS OF OZONE-DEPLETING SUBSTANCES (ODS)	3 Greenhouse Gases Reduction	17
EN21	NOX, SOX, AND OTHER SIGNIFICANT AIR EMISSIONS	Data collect but not publish	-
EN22	TOTAL WATER DISCHARGE BY QUALITY AND DESTINATION	5 Resources	35
EN23	TOTAL WEIGHT OF WASTE BY TYPE AND DISPOSAL METHOD	4 Other Impacts of Aviation Work on Environment	29-30
EN24	TOTAL NUMBER AND VOLUME OF SIGNIFICANT SPILLS	5 Other concerns	37
EN25	WEIGHT OF TRANSPORTED, IMPORTED, EXPORTED, OR TREATED WASTE DEEMED HAZARDOUS UNDER THE TERMS OF THE BASEL CONVENTION ² ANNEX I, II, III, AND VIII, AND PERCENTAGE OF TRANSPORTED WASTE SHIPPED INTERNATIONALLY	CAL has no such kind of hazardous transportation or handling	-
EN26	IDENTITY, SIZE, PROTECTED STATUS, AND BIODIVERSITY VALUE OF WATER BODIES AND RELATED HABITATS SIGNIFICANTLY AFFECTED BY THE ORGANIZATION'S DISCHARGES OF WATER AND RUNOFF	CAL complies the regulations for waste / materials handling	-
EN27	EXTENT OF IMPACT MITIGATION OF ENVIRONMENTAL IMPACTS OF PRODUCTS AND SERVICES	6 ECO Services	39
EN28	PERCENTAGE OF PRODUCTS SOLD AND THEIR PACKAGING MATERIALS THAT ARE RECLAIMED BY CATEGORY	4 ECO Fly 5 Ground Operation	21 31-32
EN29	MONETARY VALUE OF SIGNIFICANT FINES AND TOTAL NUMBER OF NON-MONETARY SANCTIONS FOR NON-COMPLIANCE WITH ENVIRONMENTAL LAWS AND REGULATIONS	5 Ground Operation	37
EN30	SIGNIFICANT ENVIRONMENTAL IMPACTS OF TRANSPORTING PRODUCTS AND OTHER GOODS AND MATERIALS FOR THE ORGANIZATION'S OPERATIONS, AND TRANSPORTING MEMBERS OF THE WORKFORCE	4 ECO Fly 5 Ground Operation 6 ECO Services	21 31 42
EN31	TOTAL ENVIRONMENTAL PROTECTION EXPENDITURES AND INVESTMENTS BY TYPE	5 Ground Operation	37
EN32	PERCENTAGE OF NEW SUPPLIERS THAT WERE SCREENED USING ENVIRONMENTAL CRITERIA	7 Investing in People & Community	46
EN33	SIGNIFICANT ACTUAL AND POTENTIAL NEGATIVE ENVIRONMENTAL IMPACTS IN THE SUPPLY CHAIN AND ACTIONS TAKEN	7 Investing in People & Community	46
EN34	NUMBER OF GRIEVANCES ABOUT ENVIRONMENTAL IMPACTS FILED, ADDRESSED, AND RESOLVED THROUGH FORMAL GRIEVANCE MECHANISMS	There is no any violation or major complain from our stakeholders during the report period.	-

Reader Response

Thank you for spending time to read the Environmental Sustainability Report 2013 published by China Airlines. China Airlines takes environmental protective seriously and will continue to assume its corporate social responsibility. Therefore, China Airlines hopes to receive your feedback. Please fill out this questionnaire and fax or mail it to the Environment Department, Corporate Safety Office of China Airlines (No. 1, HangZhan S. Rd., Dayuan Township, Taoyuan County 33758, Taiwan).

FAX:(03)399-3210

E-Mail:Environment@china-airlines.com

01

What is your impression of this report?

- ☐ 1.Excellent ☐ 2.Good ☐ 3.Acceptable ☐ 4.Poor ☐ 5.Very poor

02

Which section(s) in this report impresses you the most?

- ☐ 1. Company Profile ☐ 4. ECO Fly ☐ 7. Investing in People
☐ 2. Structure of Environmental and ☐ 5. Ground Operation & the Community
Energy Management ☐ 6. ECO Services ☐ 8. Prospects
☐ 3. Greenhouse Gases Reduction

03

Which section needs the most improvement? Multiple selections are available so please leave your opinions.

- ☐ 1. Company Profile ☐ 4. ECO Fly ☐ 7. Investing in People
☐ 2. Structure of Environmental and ☐ 5. Ground Operation & the Community
Energy Management ☐ 6. ECO Services ☐ 8. Prospects
☐ 3. Greenhouse Gases Reduction

04

What are your recommendations for China Airlines on its environmental protection initiatives in the future?

05

Any other opinions about this report will be appreciated as a reference for next year's publication.

06

Would you like to receive the next version of China Airlines Environmental Report?

Thank you for filling out this questionnaire. Finally, please leave your data. China Airlines pays much attention to your valuable suggestions!

Name		Gender	
Address		E-mail	
Telephone		Fax	
Occupation		Job Title	