Green Enterprise

Green procurement

NT$ 2 billion

HCMI certificated

Green Environmental Hostel

Received Taiwan

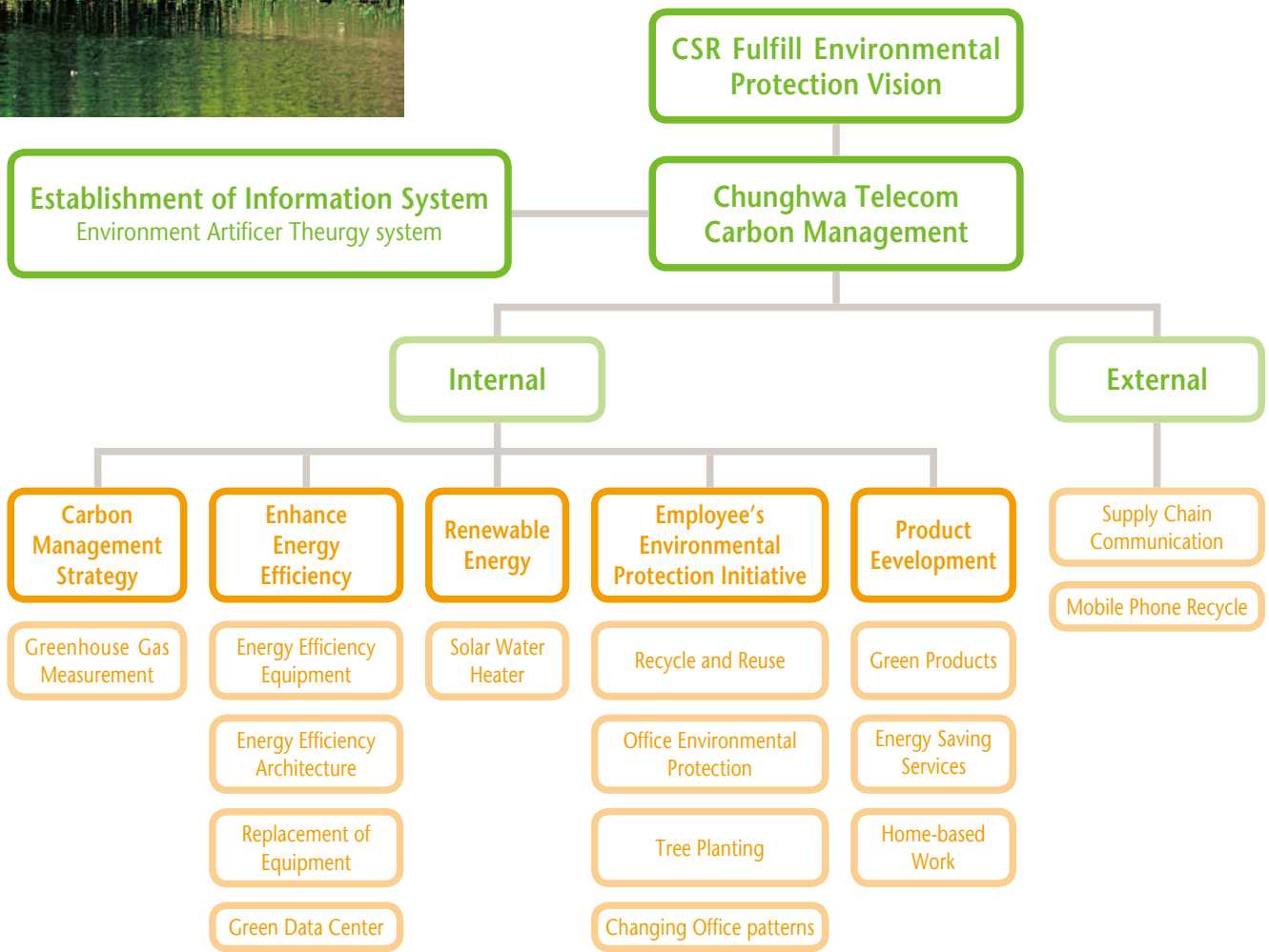
Green Classic Award

S Green Enterprise

As a leading telecom carrier in Taiwan and the Big neighbor" of the society, Chunghwa Telecom aims growth and sustainable development while incorporating environmental issues into business operation and management. As a devoting member of the society, we strive to offer environmental friendly and energy efficient product and service, in hope to make positive contribution on energy and climate change issues, thereby leading the development of the next generation low carbon industry.

Floods, storms, earthquakes and droughts caused by climate change have endangered people's wellbeing and sustainable business operation. Chunghwa Telecom is committed to alleviating global climate change issues, providing low carbon services by lowering environmental footprint of its operations and helping society and industry to achieve energy conservation and carbon reduction. Furthermore, facilitating the greenness of ICT industry (Green of ICT) and greenness of the society overall through ICT (Green by ICT) is regarded as an important strategy when implementing environmental sustainability initiative.

Chunghwa Telecom's Carbon Strategy

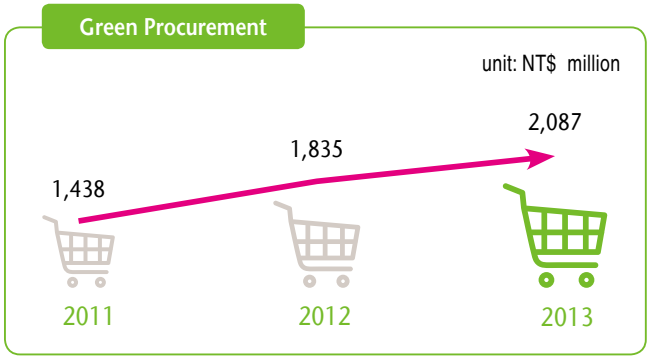


Green Initiative in Full Swing

As an ICT service provider instead of a manufacturer, Chunghwa Telecom stresses how its product and service affect the environment, while developing and offering environmental friendly products and services. Its effort has won a number of environmental certification and awards for its products and services.

- "Environment Artificer Theurgy (EARTH)" won 3rd Taiwan Green Classics Award.
- "iEN Intelligent Energy Network Service" received best company award in 1st Energy Service Company (ESCO).
- Chunghwa Telecom hostels received Eco-Hotel certification and Green Life Achievements certification.
- Chunghwa Telecom's "LED light bulb" received BSMI certification from Bureau of Standards, Metrology & Inspection.

Chunghwa Telecom was among the 9 institutions and 1 green shop received award from Environmental Protection Administration for "Green procurement and green shop promoting green consumption" in 2013. In addition, Chunghwa Telecom also participated in "The green procurement of the Enterprise and public" that initiated by Taipei City. Of the six institutions received awards, Chunghwa Telecom's north district branch received first place in "Excellent Green Procurement Company".



A Green building is academically part of the earth sustainable development policy, which is mean to build with fewer resources and simply put, generate minimum amount of waste with minimum resources. The "Green Building Promotion Program" promulgated by Executive Yuan defines seven environmental assessment indexes regarding buildings, which includes greenness, water conservation, energy saving, the reduction of CO_2 emission, the reduction of waste disposal, indoor environment, water resources, and improvement of sewage and garbage disposal. Therefore, here we declare that with a fifty million or above construction budget, we will apply for environmentally-friendly and energy-saving green building labels for new buildings and datacenters.

Implement Environmental Education

To promote environmental education and achieve environmental sustainable development, Chunghwa Telecom has been offering environmental education program at Telecommunication Training Institute to facilitate employees' understanding of interdependence between individual and society & environment, while improving employees' environmental ethics and responsibility, thereby maintain the balance of ecological environment, respect life, improve social justice, nurture environmental citizen and learning community.

Participation in GreenTouch

In 2011, We joined formal membership in GreenTouch Consortium, we continued supporting technology document formulation and case study; besides, to contribute toward ICT field, we continued sharing our energy saving findings in GreenTouch conference, IEEE ICCC12 conference, etc.

In 2013, we conducted energy efficiency analysis for mobile network together with French Telecom and Bell Laboratories. The results were published at 2013 IEEE Wireless Communications and Networking Conference (WCNC). We cooperated with international telecom carriers such as China mobile and France Telecom to publish research result for 2020 Small Cell Backhaul model and collaborated with National Chiao Tung University to implement GreenTouch Consortium to develop cloud networking architecture and green technologies. The research results were revealed at the 2013 Asia-Pacific Radio Science Conference (APRASC).

intelligent Energy Network Service: http://www.ienet.net.tw/IENet/zh-tw/product.aspx

Environmental Sustainability Management

To achieve green enterprise commitment, respond to energy and climate change and stay on top of green opportunities through product and service development, Chunghwa Telecom planned "Sustainable Environment Development Strategy and Objective, a five-year plan (2011- 2015)"and "five-year energy conservation and carbon reduction plan for telecom data center (2012~2017)" in accordance with issues of "environmental protection, energy conservation and carbon reduction, green product service and green procurement", and budgeted annually to promote the initiatives.

Environmental Sustainability Policy

- Follow environmental regulations and promote self-regulated environmentalism
- Improve energy efficiency to implement energy conservation and carbon reduction
- Use green energy and employ green purchase
- Develop green product and promote green economy
- Enhance ecological environment and green buildings
- Apply recycle and waste reduction to build a sustainable environment

Environment Artificer Theurgy

To manage resources and environmental protection in a more efficient manner, we developed Environment Artificer Theurgy (EARTH) system to manage in-house electricity, water management, water resources, lighting equipment, recycling and tree planting. EARTH system features:

Energy Saving and Innovation	Departmental uploading of energy saving and innovation initiative to encourage employees to learn from each other.
Performance Evaluation	Performance evaluation is conducted systematically to encourage employees to contribute to environmental sustainability actions.
Power Management	• Request centralized payment of electricity bill; currently there are more than 53,858 electricity number and 1.69 • million electricity payment data under management. • Replace TaiPower's paper bill with electronic bill notification to reduce administrative effort. • Provide electricity summary and analysis to enhance power management efficiency.
Water Management	• Request centralized payment of electricity bill; currently there are more than 1,161 electricity number and 50,348 electricity payment data under management. • Document type, method, management department and location of recycling of water resources. • Provide electricity summary and analysis to enhance power management efficiency.
Carbon Management Operation	In response to the material and regulatory risk of carbon emission, EARTH provides carbon verification form to facilitate our carbon measurement and promote carbon reduction measures, thereby reduce operational risk and enhance corporate benchmark image. The results showed that ISO14064-1 carbon verification efficiency is largely enhanced as 300 men-day operation, traveling expense and carbon emission from transportation is saved.
Fuel Management	To reach energy efficiency and carbon reduction, we also increased fuel management in 2013, in which we incorporated the information of daily gasoline and diesel and analyzed the fuel data of hybrid vehicles and ordinary vehicles.
Corporate Tree Planting	Document type, number, management department and location of trees. Manage 248 types of trees planted in Chunghwa Telecom Park, including over 67,371 trees data saved in EARTH data base.
Recycling Management	Document type, number and management department of recycling objects. We have recorded 22 recycling types and 1,458,024 entries.

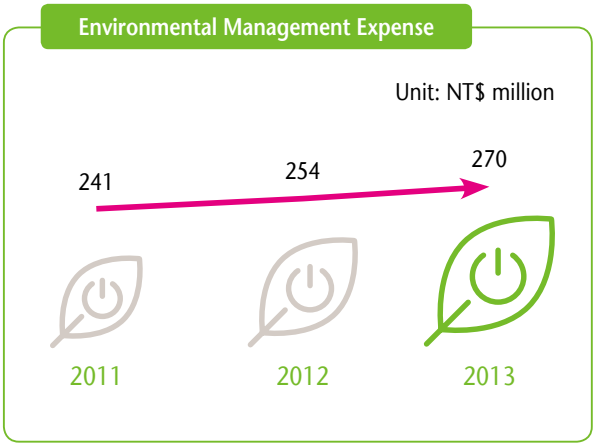
All Branch Offices Have Completed Certification of ISO14001

All the major branch offices including Southern branch, mobile communication branch, northern branch, digital communication branch, international branch, Chunghwa Telecom Laboratories and Telecommunication Training Institute have obtained environmental management system certification. In other words, 100% of Chunghwa Telecom's revenue is derived from offices that have obtained environmental management system certification.

ISO50001 Energy Management System Certification

ISO50001 energy management system certification provides corporations with process and structure to enhance energy efficiency without affecting current operation, while supplementing PDCA (Plan-Do-Check-Action) mechanism to improve energy efficiency and achieve corporate sustainability management.

Chunghwa Telecom is the only Taiwan telecom carrier to implement ISO 50001 energy management system. Digital branch and the research institute have obtained certification in 2011 and 2012 respectively, offices governed by mobile communication branch including operation offices of Taipei, Taichung and Kaohsiung, data center and base station also obtained certification in 2013.



- Northern Taiwan Business Group
  - New Taipei Branch Office
  - Taipei Branch Office
  - Keelung Branch Office
  - Taoyuan Branch Office
  - Hsinchu Branch Office
  - Miaoli Branch Office
  - Hualien Branch Office
  - Yilan Branch Office
- Southern Taiwan Business Group
  - Taichung Branch Office
  - Changhua Branch Office
  - Nantou Branch Office
  - Yunlin Branch Office
  - Chiayi Branch Office
  - Tainan Branch Office
  - Kaohsiung Branch Office
  - Pingtung Branch Office
  - Taitung Branch Office
- Mobile Business Group
  - Taipei Branch Office
  - Taichung Branch Office
  - Kaohsiung Branch Office
- International Business Group

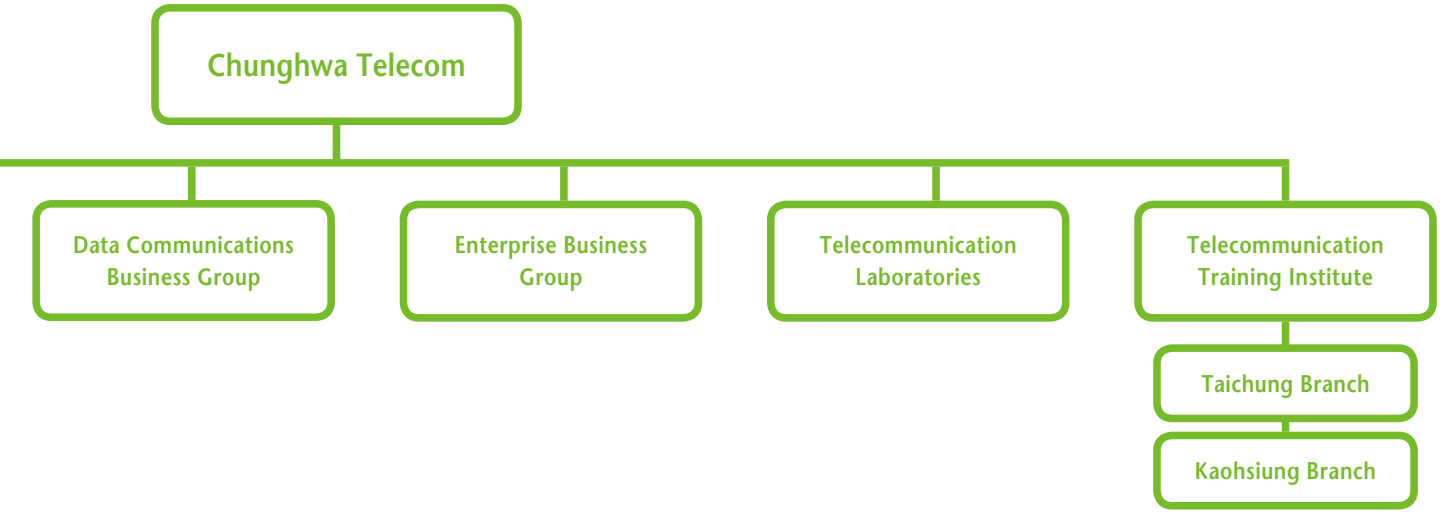
A Environmental Sustainability Action

The responding strategy of climate change issues and a company's long term business positioning are closely related. In order to reduce climate related cost and risk in value chain and evaluate the result of voluntary carbon reduction measures, Chunghwa Telecom initiated "Greenhouse Gas Measurement Project" in 2008 to carry out on-site verification on major emission sources such as telecom equipment, vehicle fuel and motorcycle fuel. A total of 500 manpower efforts were contributed and 2 months were spent to complete the project.

Comprehensive Greenhouse Gas Measurement

With the company overall covered in the scope of measurement control, we are proud to have the most comprehensive Greenhouse Gas Measurement in the industry. Under the guidance of "Greenhouse Gas Measurement Promotion Team, we will conduct group-wide "Greenhouse Gas Measurement and Verification Operation" annually.

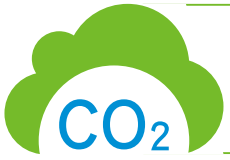
The Executive Vice President convened "Greenhouse Gas Measurement Promotion Team" which covering northern branch (including 8 branch office), southern branch (including 9 branch office), mobile communication branch (including 3 branch office), corporate consumer branch, international telecom branch, digital communication branch, Chunghwa Telecom Laboratories and Telecommunication Training Institute (including 2 branches) to conduct Greenhouse Gas Measurement operation.



Greenhouse Gas Emission

Initially, our carbon management objective was "reducing greenhouse gas emission to the standard that was acceptable in 2007 by 2012", our effort has largely reduced the greenhouse gas emission and the target was met in 2011.

Owing to the requirement of increasing mobile communication facilities to respond to the expected 2% annual growth of 4G and mobile communication business volume, greenhouse gas emission is expected to rise. We proposed a new greenhouse gas management objective in 2013. It is:



Benchmarking 2012 carbon emission standard, control the annual growth of carbon emission to no more than 2%.

The total greenhouse gas emission is 822,791.5 t-CO_2e in 2013, including CO_2, CH4, N_2O, HFCs, PFCs and SF_6. As a comprehensive telecom carrier, the major energy source consumed by Chunghwa Telecom is electricity, which is classified as Scope II (purchased electricity) gas emission and accounted for 97.02% of total gas emission. Scope 1 gas emission is normally sourced from general greenhouse gas emission such offices and accounted for 2.98% of total gas emission.

unit: t-CO_2e

	2011	2012	2013
Direct GHG Emission (Scope 1)	25,322.4	22,489.1	24,519.2
Energy Indirect GHG Emission (Scope 2)	885,556.1	786,472.2	798,272.3
Total GHG Emission (Scope1+Scope 2)	910,878.5	808,961.3	822,791.5
Emission Intensity- Emission/Revenue (t-CO_2e/NT$ million)	4.2	3.7	3.6
Coverage of Revenue	100%	100%	100%

* Carbon accounting, GHG inventories and certification are followed ISO 14064-1 standard, and the value of Global warming potential is referred to IPCC Fourth Assessment Report (2007). All the data are certified by SGS-Taiwan.

Analysis of Growth of Greenhouse Gas Emission

The rising of greenhouse gas emission in 2013 was due to the introduction of next-generation communication facilities to meet the growth of telecom demand and resulted higher electricity usage.

The major greenhouse gas emission source, according to our measurement, is purchased electricity. Our strategy in reducing greenhouse gas emission focuses on power management, that is, reduce electricity usage.

Measurement of Emission from Employee Commuting and Travel (Scope 3)

In response to the international trend of measuring employees' commuting carbon footprint, we have initiated the discussion on the subject. Based on Scope 3 of World Business Council for Sustainable Development (WBCSD), we incorporated the measurement into "Employee Business Travel Management System" to calculate the greenhouse gas emission in terms of mileage travelled by employees during business trips. In addition to learning more about Scope 3 greenhouse gas emission, we hope to promote the concept of low carbon commute along with environmental education to facilitate employees' understanding of how business travel may affect environment. In the long term, we hope to include consumer impact into Scope 3 to complete the perspective of greenhouse gas emission measurement.

Annually Report to Carbon Disclosure Project

Carbon Disclosure Project (CDP) was raised by international corporation investors, and they started to invite companies to reply CDP questionnaire since 2003, in order to understand how enterprises face and deal with carbon issue.

In response to international investors' concern, that we began to reply CDP questionnaire since 2010 through world café style that held trans-department meeting for discussion, and Chunghwa Telecom is the only telecom service provider continuously responses to CDP. By reporting to the CDP questionnaire that we not only can review our defects but also can set concrete target of carbon deduction, which is the most important function for us.

Power Management

Chunghwa Telecom has incorporated energy conservation and carbon reduction, environmental protection, ecological concern and green construction into "five-year energy conservation and carbon reduction plan" to ensure development strategy and initiative.

In addition, we evaluate and revise energy saving projects on the annual basis within budget range, and incorporate the energy outcome into the assessment of "Assessment of administrative management" and "Evaluation of maintenance of power and air-conditioning equipment".

After meeting previous power management goal, we revise our power management target to "Benchmarking 2012 electricity usage standard, control the annual growth of electricity usage to no more than 2%, in hope to accumulate 22% energy saving up to 297 million kWh by the end of 2015.Despite the hard time to control the rising of electricity usage due to the increased telecom facilities to meet business growth, we manage to introduce various energy saving measures in our buildings, including:

- Differentiate scope of responsibilities, monitor temperature adjustment in office, conference room and classroom.
- Monitor air-conditioner temperature on 26-28℃, and install automatic temperature control equipment.
- Turn off compressor (replace air-conditioning to air supply) 30 minutes before office is vacated to reduce energy consumption.
- Install inverter to control the air conditioning volume of ice water and air conditioning system to save electricity.
- Install heat sensor switch in the conference room, meeting room, walkways, stairs and washroom…etc., so that the lights switches on automatically when someone enters.
- Replace energy saving tube (bulb) to save 6% energy compare to traditional incandescent lamps.
- Set power saving mode for business machines, so that the machine enters power saving mode automatically when idled for 15 minutes.
- Encourage planting or renting plants to afforest office environment.
- Install energy saving elevator interconnecting inverter when installing or replacing elevator.
- Promote electronic operation (electronic billing, electronic documents, e-procurement and electronic meeting) to reduce resource consumption.

Our energy saving measures and control demonstrated fruitful results; we have saved up to 2.58% or 24.64 million kWh in 2013 compare to 2012 and reduced carbon by 13,158 t-CO_2; from the period of 2007~2013, we have saved up to 232.27 million kWh or 22.92% and reducing carbon by 138,886 t-CO_2.

Power Management Performance

unit: kWh

Year	Total Power Consumption (A)	General Consumption	Business Consumption - Meter Rate Lighting Service (C)	Business Consumption - Flat Rate Lighting Service (D)	Business Consumption Increment (E)	Business Consumption IncrementRate (F)
2007	135,181	(B)	16,559	609	NA	NA
2011	137,567	115,387	16,528	5,652	557	0.40%
2012	139,954	115,835	17,925	6,194	1,940	1.39%
2013	141,773	117,072	17,981	6,721	582	0.41%

* Baseline: 2007

** General consumption mainly includes the power consumption from office building.

*** A=B+C+D , E = Business consumption (C+D) this year - Business consumption last year, F=E/A

In terms of energy saving for data center, in addition to obtaining green building certification, self-developed iEN (Intelligent Energy Network) is installed in the Banqiao IDC data center to meet energy saving, carbon reduction and environmental protection. The measures for ICT data center including:

Air-conditioning Improvement	• Change air speed, remove vent pipe, or disable small air-conditioner to be compatible with new equipment. • Use high sensible heat engine when replacing air-conditioner in annual replacement plan. • Isolate air-conditioning area of air-conditioner placement to avoid unnecessary air-conditioning usage.
Energy Management	• Monitor air-conditioning temperature, designate personnel to maintain adequate temperature in different areas. • Increase data center's temperature by 1℃ after one year monitoring. • Unload cooling water tower in accordance with water outlet temperature. • Use ventilation for low loading mobile base station, telecom office and power distribution equipment. • Introduce renewable energy system such as solar power generation system.
Equipment Consolidation	• Cut off disabled equipment and replace bad energy-consumption equipment after the consolidation of mobile base station, digital switching equipment, transmission equipment, broadband equipment and power supply equipment. • Consolidate equipment and isolate unused space to reduce energy consumption.

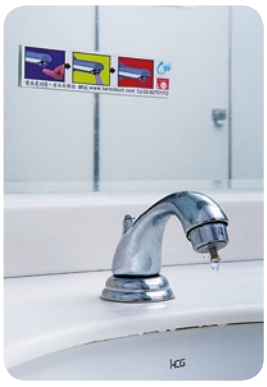
In addition to using energy saving equipment, automatic power off equipment and introduce energy monitoring system, we continue to implement"five-year energy conservation and carbon reduction plan (2012~2017)", including adjust data center temperature, use high efficiency equipment and consolidation of DC load. All the energy data is analyzed and managed through EARTH system.

Water Resources Management

Chunghwa Telecom's water use is sourced from ordinary tap water. In addition to daily use of water, water is utilized to cool air conditioner. Water reduction has become an even harder task with the growth of business and increase of manpower. In this regard, our water control relies heavily on recycling of rainwater and cooling water. For water resources management plan, we have scheduled specific management objective such as promotion of relevant water saving measures supplemented by centralized water management and introduction of water resources, in the hopes of enhancing the efficiency of water usage.

In addition to incorporating leaking detection capabilities into products, we also include water use into environmental sustainability management system to manage and analyze using informational interface, while continuously promoting water saving measures such as recycle and reuse of rainwater and wastewater.

The plan and objective of water resource management



Currently, Chunghwa Telecom's annual business growth is 2%, we therefore benchmarking 2012 water usage standard, control the annual growth of water usage to no more than 1% and promote water saving measures accordingly, including:

- Install sink faucet sprayer to reduce water waste.
- Replace toilet with dual-flush toilet to reduce flushing water.
- Limited use of office water supply from 8:00AM to 18:00PM.
- Insist water conservation principle to prevent water waste.
- Recycle rainwater for office plants watering.
- Contact maintenance personnel immediately once water supply equipment is damaged to prevent water waste.
- Encourage the installation of water reclamation equipment in new buildings, so that the treated sewage water can be reused for non-potable and physical separated use after reaching certain water quality standard.

Intelligent Energy Network: http://www.ienet.net.tw/IENet/zh-tw/product.aspx

Recycling of Water Resources

Started from 2007, Chunghwa Telecom initiated water conservation measures by including water resources management into EARTH system, while registering centralized water bill payment through EARTH's "water bill management" function to reduce printing of water bills.

EARTH's information interface allows administrative personnel to inquire, run sequence plot and statistics report, while generating abnormal report to avoid billing or meter reading errors by the water company. By analyzing water use in accordance with sequence plot and statistics report, we are able to reduce water consumption and increase manpower and management efficiency.

We have scheduled a five-year plan to enhance the effectiveness of water recycling and reusing. In the plan, we are expected to establish underground raft foundation water collection system to collect clean rainwater from rooftop and ground. Meanwhile, we also initiated recycle of cool-condensed water project for office air-conditioner. Through the recycle and reuse project, rainwater, bathing water and air conditioning condensation water is given 2nd life on tree planting and cleaning of buildings and sidewalks.

The total of 10842 square meters of ecological pond were established by each governed institution respectively. By beautifying 10000 square meters of abandoned agricultural reservoir and conducting upstream wastewater treatment, Chunghwa Telecom Laboratories has maintained water resources in an effective manner, and created a natural ecological lake.

Water Usage Management Performance

unit: ton

Item	2011	2012	2013
Tap Water	409,500	452,780	462,922
Air-conditioner Water	1,865,500	2,062,663	2,108,866
Recycled Water	7,873	5,587	4,289

Waste Management

Understanding the importance of resources reduction, recycle and reuse, Chunghwa Telecom combined its five-year environmental sustainability development plan and EARTH system to manage the use of resources and control energy efficiency, while conducting systematic management on recycled and waste treatment as well as encouraging cell phone recycling in all branch offices.

Daily Waste Treatment

Chunghwa Telecom designated professional waste treatment company to transport its daily waste to landfills or incinerator for necessary treatment. For recyclable waste, the contracting cleaning company is designated for the classification and disposal treatment.

unit: ton

Item	2011	2012	2013
Weight of Daily Waste	5,033	5,018	6,465

Industrial Waste

The scrapped lead-acid battery is a recyclable industrial waste regulated by the EPA as. To reduce pollution the recycling and disposal operations are outsourced by joint contract based public auction. The contractor must be a qualified service provider listed on the website of the Recycling Fund Management Board of the EPA to ensure legitimate management and disposal.

All the lead-acid batteries scrapped by each business unit are auctioned on site and proper documents for their disposal are filed for audit tracking. There were 30,415 scrapped lead-acid batteries, sold about NT$ 39 million with a total weight of 1,623,556 kg disposed in 2013.

The public and private waste clearance and disposal organizations recognized by environmental institution is designated to handle the treatment of other industrial waste such as cable and hardware miscellaneous.

Type of Waste	Unit	Total Quantity			Treatment Cost (unit: NT$ million)		
		2011	2012	2013	2011	2012	2013
Plastic-filled Cable	Ton	627	462	803	519	368	263
Ordinary Cable	Ton	2,996	2,711	3,917			
Hardware Miscellaneous	Ton	1,393	1,454	3,250			
Battery	PC	17,072	88,395	26,436			

Targeting on Green Enterprise

As a localized telecom carrier, facilitator of community development and important partner of international telecom carrier, we strive to become green enterprise. Following the development of technology, telecom carrier is no longer as traditional as it used to be, while incorporating Corporate Social Responsibility (CSR) into the development and application of product and service, business management strategy is integrated with CSR.

Develop Green Product and Service

Chunghwa Telecom's energy efficiency initiative in 2013 is "extending our technology to the industry", that is, utilize our core technology to enhance energy efficiency for the industry. By joining "Low carbon management cloud association", Chunghwa will be able to install intelligent meters for 500 corporations in New Taipei City, and help corporations in New Taipei City to conduct carbon emission measure through "iEN platform", thereby enhancing corporations' green international competitiveness.

It is expected that this initiative will reduce 280 million kWh for the corporations in New Taipei City every year, which is equivalent to the reduction of 15,000 billion metric tons of carbon dioxide equivalent (CO_2e) (this is approximately the one year's electricity consumption of Luzhou District, New Taipei City).

Video Conferencing

Video conferencing system connects different meeting rooms through telecom network, the participants are able to see and hear each other through TV monitor as if they are seeing each other in the same location. In addition, charts, documents and data can be transmitted to each other at ease. This system saved unnecessary business trips, contributed to environmental protection, and generated NT$ 13 million in 2013.

Ucam

Combining current network bandwidth, business camera and storage and management platform of large cloud images, Ucam provides cloud storage and management services of business images, so that store managers and headquarter administrator is able to monitor instant or historical store images through PC and smart phone; currently there are 3,600 serves and creating NT$ 45 million revenue in 2013.

Iaas Cloud Service

With services covering hicloud CaaS, hicloud Box® and hicloud VPC, Iaas cloud service provides corporate or individual consumers with 24 hours flexible cloud computing resources, storage space and monitoring virtual resources. Iaas made information sharing convenient, stable and safe. In 2013, revenue of NT$ 100 million was generated.

SaaS Cloud Service

SaaS cloud service covers Consumer Relationship Management (CRM) and Vis-à-vis; the former provides sale, marketing and customer service, while the latter provides management of customer visit report. By facilitating corporations to manage complicated consumer information, sales report and accurate handle of marketing activities, CRM helps corporations to save costs. Vis-à-vis allows employees to record important daily interactions with consumers or colleagues for future reference and tracking. In 2013, revenue of NT$ 30 million was generated.

Intelligent Energy Network (iEN)

With years of experience in monitoring power environment and developing ICT system, we have developed "Intelligent Energy Network (iEN)" to integrate the surveillance equipment in the building, provide consumers with performance computation, equipment operation and immediate reporting through cloud platform, provide corporations with professional energy saving

solution project, and offering three monthly rental services including "power management, environmental management and air-conditioning energy saving".

In addition to providing project establishment, establishment and maintenance services, iEN service provide monthly rental service to help corporations to lower energy saving and carbon reduction standard, which has been applied to hospitals, schools, government institutions, fish farming industry and large stores and won many awards. In 2013, a revenue of NT$ 900 million was generated.

Intelligent Transportation System (ITS)

"Fleet Management Express" combines cloud technologies such as GPS dual communication, personalize door plate positioning technology and fuel management to effectively reduce operational cost of message transmission and enhance business efficiency. One year after importing the service, average vehicle fuel consumption is reduced by 6.6%, average vehicle idle time is reduced by 31%, total fuel saving is amounted to NT$ 4 million, equivalent to 282 metric tons of carbon emission.

"Taxi Dispatching System" adopts Application Service Provider (ASP) model to provide management functions including fleet management, dispatch operation, consumer service, security monitoring, account statement and customer service, as well as information services to facilitate the reduction of cost and increase of average occupancy rate by taxi fleet. As of the end of 2013, we have improved operational efficiency of the system to support daily service of 30,000 calls, meanwhile, by working with 11 fleets, we helped 3500 taxies to reduce dispatching time by 56%, increase daily occupancy rate by 28%, and reduce vacant hours by 48%, which is equivalent to reducing 7.7 kg of carbon emission.

QR Code Reporting System

To improve meeting quality and information transmission efficiency, Ministry of Education has collaborated with Chunghwa Telecom to incorporate ICT technology into National Director of Student Affairs Conference. Our MMS and SMS paging function provide instant SMS for checking-in notice, QRCode, seating, venue maps, emergency notice, caring and gratitude notice, more than 437 users were served and gave positive ratings in 2013.

Our Green Product and Service Are Well Recognized

• "Environment ARtificer THeurgy" won 3rd place at the Taiwan Green Classics Award

Our self-developed "Environment ARtificer THeurgy (EARTH)" won 3rd place in the Taiwan Green Classics Award from Bureau of Foreign Trade in 2013. It is the only telecom carrier to receive this award. EARTH was initially used in-house and later commercialized in 2012 to provide energy saving assessment and expert diagnosis analysis for corporations, thereby lower energy expense and improve environmental management efficiency and eventually demonstrate the result of environmental protection effort without having to install or change existing equipment.

• "Intelligent Energy Network (iEN)" Service received best company award in 1st Energy Service Company (ESCO)

With the government's effort in promoting energy saving policies, Energy Service Company (ESCO) has become an emerging industry that creates integration and high added value; ESCO's professional and order planning, design and technological support facilitates the implementation of sustainable energy policy to meet energy saving and carbon reduction objective.

ESCO is an important green industry that helps enhancing energy efficiency and encouraging energy saving of corporate users, promoting ESCO is, in the developed countries, regarded as an important method to reduce greenhouse gas emission. Chunghwa Telecom's "Intelligent Energy Network Service" received the Best Company Award at the 1st ESCO in 2012.

Importation of Renewable Energy

To reduce the impact of operation on the environment, we imported frequency energy saving, high sensible heat energy saving, ventilation energy saving measures for data center. Starting from 2007 to end of 2013, we had completed energy saving inverter module of 5,515HP, high sensible heat air conditioner of 26,394RT, 5,637 high efficiency air conditioners, 2,098 RT ventilation air conditioner and 366 natural ventilation air conditioners. In addition, to enhance the efficiency of renewable energy, we have established capacity of 26.6kW for wind power generator, 157.16kWp for solar photovoltaic power generation system to reduce power use and impact on the environment.

Promotion of Green Building

Our investment of NT$ 50 million to establish new building and data center is expected to receive Green Building Label, Our data center located in An-Keng, Hsin-Tian also received Green Building Label in 2013. In addition, to provide quality data center service and accelerate the internationalization of Taiwan's cloud service, we have established IDC and cloud data center in Banqiao to cope with the needs and is expected to complete in 2015. IDC is expected to receive LEED gold certification rating from U.S. Green Building Council (USGBC) as well as Green Building Label and Intelligent Building Label in Taiwan. For energy efficiency, we combine Cold-Hot Aisle design with iEN to conduct environmental surveillance, thereby achieving high energy efficiency of below PUE 1.5 based on "The Green Grid "Association's data center measurement standard.

Besides, Chunghwa Telecom works with construction companies on construction projects in an aggressive manner such as green building "Spotlight", in hope, in the future, to apply the energy efficiency service or product to the existing old building, making intelligent life available to everyone, and contributing to green building.

Green Environmental Hostel – Received HCMI Certification

Chunghwa Telecom Hostels provide accommodation for employees business or leisure travel. In response to environmental protection and personal hygiene, the hostels do not provide disposal consumption goods and towel, and implement energy saving measures such as solar water heater, air conditioning heat pump and LED lightings. Environmental friendly and tidiness has made 30 hostels island-wide become the employees' favorite travel accommodation. In 2013, total of 90,000 reservations, received 230,000 residents and created NT$ 160 million revenue. In response to Hotel Carbon Measurement Initiative (HCMI 1.0) formulated by World Travel & Tourism Council (WTTC) and International Tourism Partnership (ITP) in 2013, we introduced "carbon footprint calculator of hotel rooms" in Siziwan hostel, along with the combination of iEN system to manage the use of facilities and electricity in the hostel and construct comprehensive power monitor and room management model, so as to reach maximum energy and water saving efficiency. By reducing electricity by 20.9% and water by 2.0%, our effort has demonstrated impressive results while seeing good revenue result in 2013.

Greenhouse Gas Emission of Siziwan Hostel

Item	2011	2012	2013
Revenue (NT$ million)	6.3	8.4	9.1
Carbon emission (ton)	68,054.4	78,405.2	71,869.0
Electricity usage (kWh)	111,200	128,113	117,433

Merger of Electronic Bills

Chunghwa Telecom has monthly electronic bills available to replace traditional paper bills, consumer may simply go to Chunghwa Telecom's business counter, cloud counter and web counter to make such request. In addition, consolidation and centralization of bill service is also available. That is, bills of different telecom number can be issued on the same bill, or different bills can be sent in one envelope. By the end of 2013, total of 9 million users have requested bill merger, accounted for 87.8% of all users, in addition, more than 4.76 million users have requested e-bills. Both measures save 750 million pieces of paper, equivalent to 3.7 million trees and reduce carbon emission of 13,531 metric tons.

Adopt Electric Vehicle

On October of 2012, we signed a 2-year lease for 20 business use Luxgen Electric Vehicles. For every kilowatt-hour the electric vehicle can travel 6 kilometers and releases 0.536 kg of CO_2e; therefore, 0.089 kg of CO_2e per kilowatt-hour is released every kilometer. Compared to similar vehicles, the average gasoline use is 8 km per liter and releases 2.361 kg of CO_2e per liter; therefore, 0.295 kg of CO_2e per kilowatt-hour is released every kilometer.

After switching over to electric vehicles, we are saving 0.206 kg of CO_2e per kilometer. Estimating that we travel 2,000 km per month, every vehicle is reducing CO_2e emissions by 4,944 kg and a total of 98,880 kg less CO_2e emissions for 20 vehicles. It's a small step but a big change to the earth if every company adopts electric vehicles. Therefore, in order to take responsibility for our earth we plan to increase the use of electric vehicles in our company.

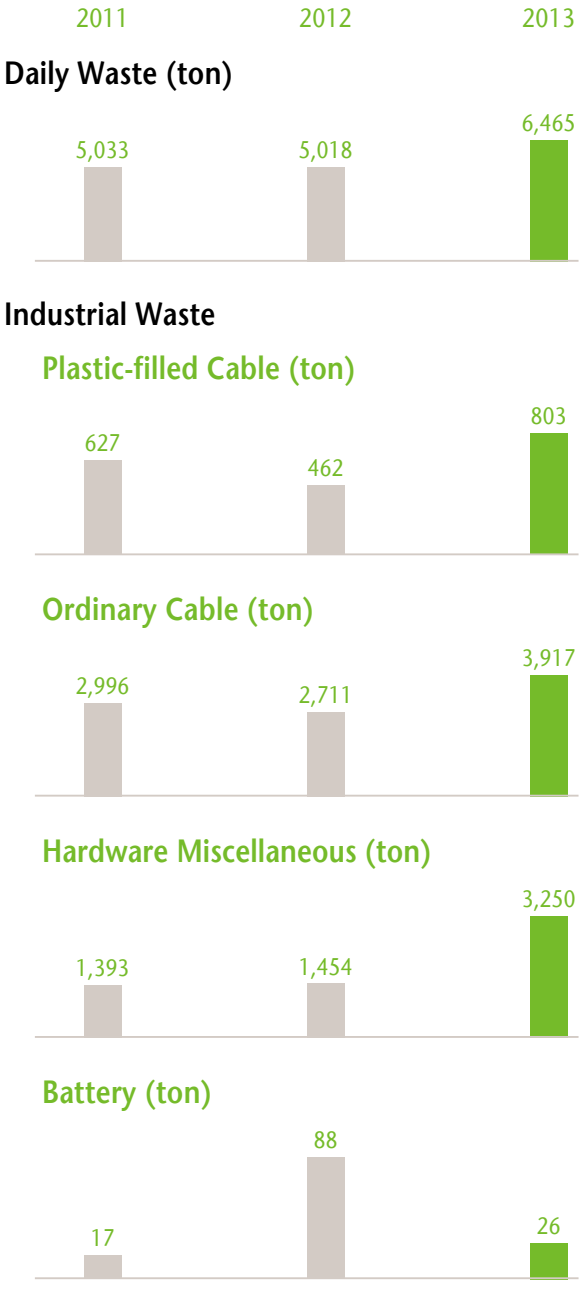
In 2013, total of 20 electric vehicles have travelled 17,361 km with carbon emission of 1,550.92 kg-CO_2e, which generated carbon reduction of 3,572.75 kg-CO_2e comparing to same type of fuel vehicle and same distance of travel.

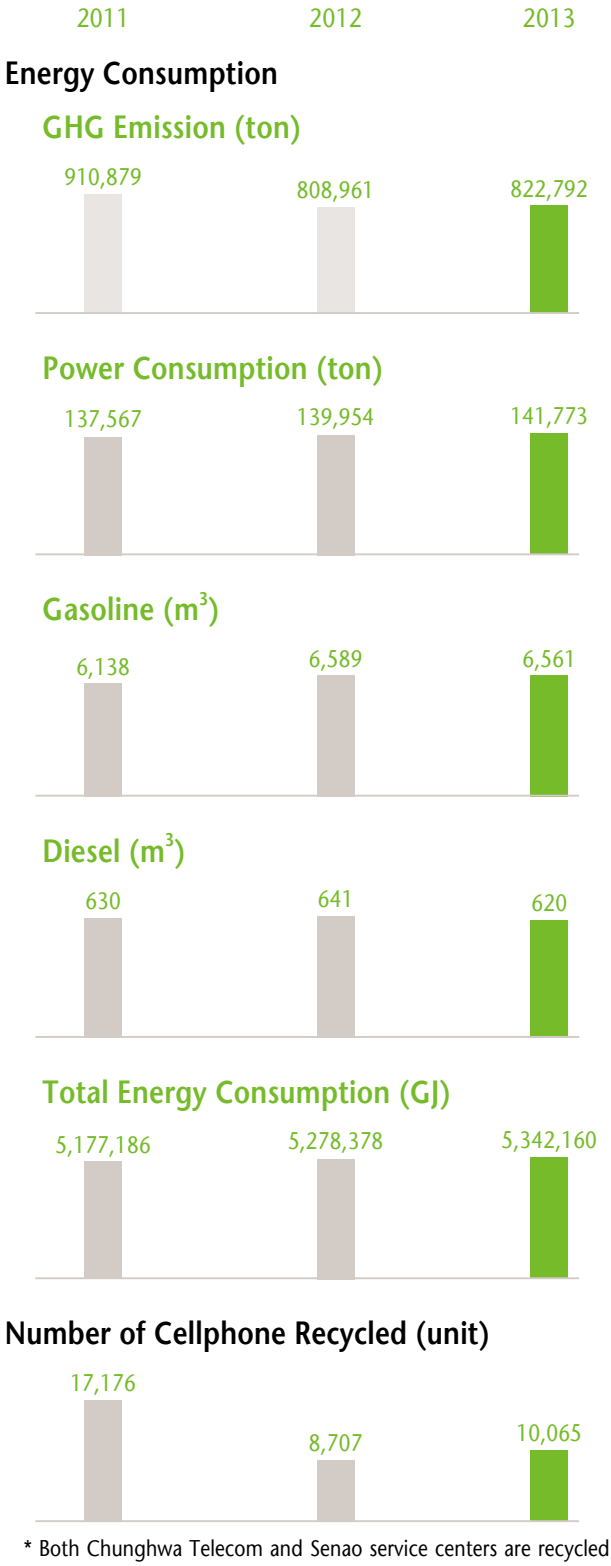
Item	Electric Vehicle	Fuel Vehicle
Fuel Consumption Per Km (liter)	0	0.125
Carbon Emission Per Km (kg-CO_2e)	0.089	0.295
Carbon Emission Reduction Per Km (kg-CO_2e)	0.206	-

Summary of Environmental Impact

Recycling of Equipment

Chunghwa Telecom's major business facilities covering ATU-R, VTR-R and MOD set-top box, we recycle and reuse all equipment, making recycling rate as high as 100%.





* Both Chunghwa Telecom and Senao service centers are recycled channels

Safeguard Our Beautiful Homeland

With frequency of storm and strength of typhoon increasing, and summer temperature hitting record high, it is obvious that Global climate has significantly changed in recent years. The goal of global initiative on energy saving and carbon reduction is reducing the depletion of earth resources, while allowing the environment to renew and regain strength. Confronted by the deterioration of the ecological environment and energy crisis, all the methods are pointing to one purpose, that is, to create a better homeland for us all.

Environmental Education

Chunghwa Telecom hopes to deliver the concept of "Everyone bears his/her share of responsibility of environmental issues, corporation bears responsibility for the sustainable operation." to its employees, who then shall understand the close correlation between extreme weather and personal environmental gestures, and incorporating product life cycle into product design; in the hopes of marking environmental sustainability as the company's green culture on the basis of energy saving, resources reduction and waste reduction.

We offer each employee with 4 hours of environmental education training each year, covering topics such as promotion of environmental conservation, trend of international environmental act and making of handmade sop; In addition, by hosting ecological tour, we combine teaching with pleasure to bring environmental education into life.

Environmental Education

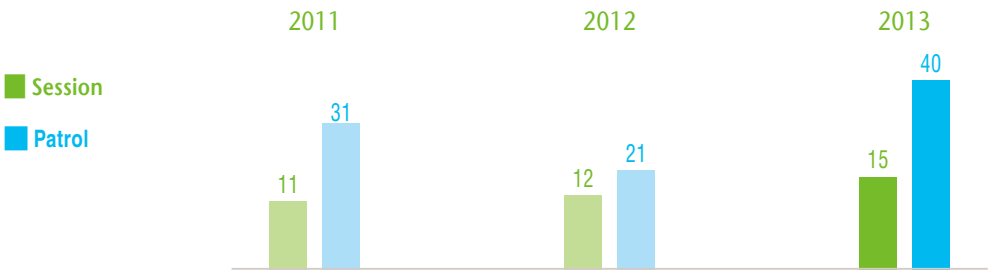
Item	2011	2012	2013
Session	30	5	5
Participant	2,652	1,626	254

Ecological Tour

Item	2011	2012	2013
Session	25	25	38
Participant	5,441	6,067	9,304

Corporate Volunteer Exchange

The Chunghwa Telecom corporate volunteers also participated in the Taiwan Energy Conservation Patrol initiated by Epson Technology and other corporations. This focuses on increasing energy efficiency within corporate operations and production processes to achieve the objectives of carbon reduction and to mitigate global warming. It is hoped that on-site inspections and the provision of energy conservation advice, given to the units inspected, will help us achieve maximum benefit for both environmental protection and corporate profit.35 sessions of training courses were offered and 92 energy saving volunteers participated in the last three years.



Environmental Information Disclosure

- Implement annual greenhouse gas inventory. Obtain ISO14064 verification and certification.
- Respond to the annual Carbon Disclosure Project (CDP) questionnaire.
- Respond to environmentally related issues in the annual Dow Jones Sustainability Indexes (DJSI) questionnaire.
- Respond to the Common Wealth Magazine and Global View Magazine questionnaires.
- Publish the CSR report (environmental protection): Provide data on greenhouse gas inventory, power, water, and fuel consumption, as well as waste recyclables generation.

Improve Energy Use Efficiency

- Integrate datacenters: Merge and exploit datacenter space.
- Add iEN to buildings: Incorporate iEN Intelligent Energy Saving System into new datacenter construction.
- Save cooling energy: Use high-efficient and air- conditioners, and cold/hot channel air-conditioning systems in the datacenters.
- Green building and accommodation: Use green materials for newly constructed datacenters or buildings.
- Solar water heaters: Install solar water heaters in Telecommunications clubs.
- Recycling: Set up rainwater, underground, and condensed cooling water recycling systems.
- Environmentally-friendly LED bulbs: Internal office building trial plan.

Green Energy

- Photovoltaic system: 157.16 kWp capacity System constructed in 2013.
- Wind power: 26.6kWp capacity built in 2013.
- Fuel cell: Pilot program with the Industrial Technology Research Institute, 30kWp capacity system

Autonomous Environmental Protection

- Vehicle energy conservation and carbon reduction: Replace old vehicles with environmentally friendly, and use electric vehicles for trial.
- Clean homes, energy saving office, health management system, car-free days, and paperless ODAS.
- Taiwan Energy Conservation Patrol: Focus on increasing energy efficiency within corporate operations and production processes to achieve the objectives of carbon reduction.
- Industrial waste recycling: Set recycling goals.
- Environmental award summary: Annual enterprise environmental protection award, energy-saving gold award, and Ministry of Economic Affairs energy conservation award.

Value-added Products and Services

- Electronic billing: Features environmental protection, promote with marketing section.
- Promote iEN and other energy-saving categories.
- Mobile device recycling: Recycle bins are available at service centers in line with the promotion of waste recycling.
- Assist suppliers to apply for product eco-labels.