Chapter 9
Environmental Protection and Ecology

In light of the gradually exacerbating climate change and global warming, the Taipei City Government approved the "Taipei City Energy Conservation Promotion and CO2 Emissions Reduction Initiative" in 2010, targeting to "lower greenhouse gas emissions generated between 2016 and 2020 down to the 2008 level," so as to shoulder its part for preserving the wellness of the planet. In the areas of ecological conservation, the Taipei City Government pioneered the country by establishing the Taipei City Animal Protection Office on the principles of "professionalism, efficiency, service, and harmony" to support a robust animal-management program.

Chapter 9

Environmental Protection and Ecology

Environmental protection measures have evolved from conventional public hazards and pollution prevention to sustainable development and utilization of resources. Conserving natural resources in pursuit of sustainable development has become an entrenched element in the universal value system, and also a global trend. Through pollution control, ecological protection and other diverse environmentally-driven measures, the Taipei City Government vows to take concrete actions to create a clean, healthy and sustainably developing Taipei.

Part 1 Pollution Control

1. Air Quality

According to statistics released by the Environmental Protection Administration's automatic monitoring stations, there was a total of 10 station-days throughout year 2010 in which Taipei's air quality was unhealthful (PSI, pollutant standards index higher than 100), that is 22 fewer station-days compared to 32 station-days in 2009. This is the best record in years since the establishment of the air-quality monitoring network in 1994.

"Citizens on One Front to Enforce and Protect Clean Air": certification conferral ceremony for environmentally-certified clean vehicles.

In 2010, 188 motorcycle exhaust inspection stations were set up to offer convenient exhaust inspection services to motorcyclists, and motivate the public to report to authorities on vehicles that emit too much exhaust, while providing two subsidy incentive policies to replace the two-stroke engine bikes for electronic bikes and to purchase electronic bikes to quickly minimize exhaust-caused pollution. Roadside inspections include motorcycle emission checks, diesel vehicle emission tests,"environmentally-certified clean vehicle"labels, visual inspections of exhaust emissions and spot checks targeting substandard gases. The raising of public awareness and inspections were given equally important focus.

Continual follow-up inspections on stationary pollutant sources, including construction sites, factories and various public and private venues were conducted. Efforts were underway to reinforce operation permission management of watch-listed pollution sources; follow-up checks and monitoring are administered on these resources. Campaigns are launched to promote improvement and assistance measures on cutting back greasy fumes emitted by restaurateurs, and inspections on dioxin emissions by incinerators and spot checks on recycling facilities of gas station nozzles in designated jurisdictions. The moves aim at prompting these establishments to honor air-pollution control regulations.

2. A Green, Tranquil Living Space

Twenty-four monitoring stations in charge of watching environmental and traffic noise (including one continuous, automatic monitoring station) are set up within the four noise-control areas under the Taipei City jurisdiction. Every monitoring station conducts inspections more than twice, for 24 hours straight, every season. Monitoring results over the course of 2010 were well within the environment noise volume standard.

The Department of Environmental Protection continues to address residents' complaints of undesirable

noise, environmental and transportation noise monitoring surveillance reports. Assistance is provided to the Civil Aeronautics Administration of the Ministry of Transportation and Communications to subsidize aircraft noise prevention reinforcement measures, and promotional campaigns of related laws and regulations. Noise control and monitoring were reinforced for factories, business establishments, entertainment venues, construction projects, amplifier equipment and public venues, construction facilities and other stationary noise-making sources.

Measuring noise volume of a cooling standpipe.

3. Radioactive Waste-free Homestead

Originally, 850 units of radioactive contaminated buildings were watch-listed. According to statistics from the Atomic Energy Council, there were 413 radioactive contaminated buildings in Taipei as of 2010; 410 are no longer radioactive. The remaining 27 units have been demolished and removed from the watch list.

The Taipei City Government specifically formulated and promulgated the "Taipei Municipal Radioactive Contaminated Building Aftermath Handling and Autonomy Statute" on August 1st, 2005 to address aftermath issues involving radioactive-contaminated structures. For residents who are concerned about possible radioactive contamination in specific buildings, free radioactive detection services are available to Taipei residents by the City Government to minimize the threat of such contamination to the public.

4. Safeguarding Water Quality

(1) Conserving Water Resources for Sustainable Management

The Feitsui Reservoir is the main water source for the 5 million people in the Greater Taipei Metropolitan Area. Northern Taiwan suffered a dire shortage of rain in the first half of 2010, yet thanks to the precise prediction and evaluation of water reserves, citizens' water demand was met in full. Water from the Feitsui Reservoir was also used to support water demands in the Banqiao and Xindian areas. Furthermore, due to the appropriate floodwater storage space management, flood waters brought about by typhoons Namtheun, Fanapi, and Megi were successfully retained. The measures have reduced flood peaks and minimized damages to the downstream area.

To ensure the safety of Feitsui's water quality, the Taipei Feitsui Reservoir Administration conducts water-quality inspections and evaluations monthly on 19 water-quality monitoring facilities installed around the reservoir's catchment region and along the Nanshi River; also, the city honored the OECD Trophication Classification of Lake and Reservoir Water Quality and Carlson's Trophic State Index (CTSI) to conduct water-quality evaluations. Improvements were made in the

Joint patrols from Taipei City and New Taipei City around the campsite in the reservoir's upstream area.

Seminars on the ecology of ferns.

water-quality laboratory and the instruments in the lab in 2010. Water-quality inspections were conducted promptly, accurately and effectively to verify water status, so as to ensure maintenance and improvement. Water quality in the reservoir throughout 2010 was normal. The annual average CTSI results showed that water quality was mesotrophic, and rather close to being oligotrophic. For six months straight - from January through June - water quality reached the more desirable oligotrophic level, according to CTSI.

To minimize deposits in the reservoir, the Taipei Feitsui Reservoir Management Administration established a hillside collapse variation GIS device in the Feitsui Reservoir's catchment area to promptly follow data on the variations of hillside collapses in the catchment area to facilitate a response mechanism, in addition to the continuous promotion of water and soil conservation projects, and bolstering protection measures for the hillside areas around the reservoir. Additionally, the Taipei City Government conducts joint patrols with the New Taipei City Government and the Water Resources Agency under the Ministry of Economics along the catchment area, to jointly prevent possible pollution in the upstream areas and crack down on illegalities.

In addition to the current Strong-motion Accelerograph Circuits on the Dam's Foundation, the Taipei Feitsui Reservoir Administration also procured a microseism observations data system to conduct analyses on the activities of the dam's curvy structure, and gathers long-term data on the position shifts of the structure to improve the dam's safety monitoring, and ensure their early-warning capabilities. The systems can quickly evaluate damages done to the dam during strong quakes to ensure the life and property safety of residents in the downstream area.

Ecological protection efforts continue in the reservoir area. In addition to the continual rehabilitation projects for rhododendron kanehirai (Wulai azaleas), pteridophyte surveys also continued in 2010: the Feitsui Reservoir pioneered the country with the establishment of the "Pteridophyte Feitsui" outdoor pteridophyte gardens, where ecological lectures on ferns are held, putting the reservoir's ecological preservation capabilities to good use. In 2010, a variety of municipal works and general visits were arranged for water-resource education campaigns, and the annual visitor turnover to Feitsui Reservoir exceeded 22,000 in number.

(2) Renovating the Danshui River

The Danshui River is the beating heart of Northern Taiwan's political, economic and cultural activities; it also represents many fond memories for a lot of people, and is a symbol of Taipei's cultural heritage. To monitor water-quality variations of the river over an extended course of time, 20 water-quality sample collection stations were set up along key sections of the river to better trace water-quality management policy effectiveness; the data serve as a frame of reference for water-pollution inspection and reporting to authorities. RPI in the Danshui River between 2007 and 2010 declined from 5.47 down to 4.42.

The Department of Environmental Protection, Taipei City Government continues to strengthen cooperation with other counties and cities to jointly dredge the Danshui River system, and has successfully improved water quality by a large margin. The Department assisted the Department of Public Works in conducting optimization on the sewage treatment plant for the Sewage Systems Office to upgrade sewage treatment efficiency, mitigate the processing load on the river, and to continue sewage users' pipe connections. Meanwhile, water-pollution source inspections are implemented to assist business and community sewage systems in meeting the requirements stipulated in the Water Pollution Control Act. By 2010, the number of businesses (including animal husbandry) and community sewage systems on the watch list totaled 1,285; 1,944 establishments were inspected. Operation and maintenance continued in the artificial wetlands by Shuimokeng Brook in the Guandu Nature Park, where natural purification engineering was implemented to improve water quality. The amount of water processed was 2,500CMD. Also, campaigns were in place to encourage residents to participate in river pollution patrols, so as to incorporate the input of residents to keep better watch of the river. Fourteen patrol teams were formed by the end of December, 2010. Also, representatives of 1,051 organizations, schools not yet included in the management, and buildings over 10 stories tall were asked to clean the septic tank at least once a year. Water environment education campaigns were hosted to encourage citizens to enjoy the beauty of a Taipei City River Cruise, and the successes of the Danshui riverbank renovation projects."The Taipei City Danshui River System Lifestyle Network" was established, detailing all the joint achievements of various city departments since Mayor Hau Lung-bin took office. 216,838 visitors had visited the site by 2010.

Domestic wastewater is found to be Danshui River's primary pollution source. The City Government thus actively conducts wastewater sewage connections for households in Taipei City, the rate of users' pipe connections increased to 100% in 2010 (and the rate of door-plated households' pipe connections reached 65.50%). Connections were completed for 77 schools; by 2010, sewage connections were completed for 52 public retail markets. The length of Taipei's riverside bike lanes has reached 109 kilometers. The Rainbow Bike Rental Booth was added in 2010. The number of bike rentals has reached 207,124. Also, in 2010, 6,717.61 tons of drifts on the river surface were cleaned off.

5. Pathogen Prevention and Control

91,275 people were mobilized to engage in the elimination of pathogen breeding grounds in 2010. 87,137 households, 4,989 dirty and vacant lots and 12,205 public spaces received service treatment to eliminate pathogen breeding grounds. For education campaigns on pathogen control, 1,993 workshops were held in 2010, with 172,907 in attendance. For outdoor pesticide spraying, the service was administered in 2,920 boroughs and 213 markets, totaling 33,202,030 square meters in service size. Sprayings were also conducted on households adjacent to homes where Dengue Fever was reported (including suspected cases). 122 infectious disease prevention projects were performed. Spraying was conducted in the adjacent areas surrounding 29 households where the infected individuals lived.

Part 2 Environmental Preservation and Protection

1.Energy Efficiency and CO2 Emissions Reduction

(1) Greenhouse Gas Reduction

The City Government revised and passed the Taipei City Energy Conservation Promotion and CO2 Emissions Reduction Initiative on April 13, 2010, and targeted "lowering greenhouse gas emissions between 2016 and 2020 down to the 2008 level." Mayor Hau Lung-bin signed the Climate Protection Agreement launched by United Cities and Local Governments on December 8, 2009, and vowed to target the greenhouse gas production level of 1990 as a benchmark, and drop worldwide greenhouse gas emissions by 60% before 2050. The signing was a gesture manifesting Taipei City's resolution to work with other international cities in slowing down global warming. Greenhouse gas emissions and waste reduction by Taipei City's various departments in the last decade have achieved amazing results.

To rigorously promote greenhouse gas reductions, the public sector led by example as various departments and schools in the Taipei City Government began administering power and gas conservation, and the measures have begun to deliver results. Also, the third Energy Conservation Awards in Taipei City were held to publicly commend agencies that successfully save energy. Energy sweepstakes were also held as an incentive to encourage people to cut back energy consumption.

(2) Promoting Energy Conservation in Commercial and Industrial Establishments; the Installations and Utilization of Renewable Energies

The Taipei City Government conducted energy conservation evaluations and instructions for business and commercial users whose contractually-stipulated electricity capacity reached over 300 kWp, to establish reasonable power consumption and efficiency standards. The City Government also hosted a series of commendation activities for hotels, department stores and shops in commercial districts. Those with impressive energy-saving achievements were publicly commended. The City Government conducted joint promotions with manufacturers and marketers of power-saving products to encourage users to opt for power-saving products. It is estimated that 83.87 million watts of electricity can be cut back annually to save NT$280 million, and reduce 52,000 metric tons of carbon dioxide emissions, equaling the total carbon dioxide emissions absorption capacity of 140 Daan Forest Parks combined. Additionally, "Self-Governance Regulations governing the Counseling and Management of Energy Conservation and CO2 Reduction among Taipei's Commercial and Industrial Sectors" were promulgated and went into effect on August 11, 2010, to expedite power-saving measures among Taipei's industrial and commercial establishments.

To promote the setup and utilization of renewable energies, the Department of Economic Development invited experts to form a review commission, who visited agencies and schools in Taipei City for on-site inspections. Places suitable for photovoltaic power generators installations were chosen during evaluation. Business establishments that set up the photovoltaic power generators were subsidized; these

Mobilization of Community Energy Conservation Housekeepers.

establishments were also given assistance to apply for subsidies from the Bureau of Energy, Ministry of Economic Affairs. It is estimated that by 2010, there would be 1,800 kWp of business establishments in Taipei City on the program. An estimate of 1,770,000 watts of power would be generated, and 1,105 metric tons of carbon dioxide emissions would be reduced.

Manufacturers who market energy-saving products are publicly commended.


Indoor temperature in business establishments is measured to promote air-conditioner temperature settings.


Wanfu Elementary School receives subsidies to design and install a photovoltaic power generation system.

(3) Promoting Pipeline Improvements and Enforcing Water-saving Measures

In honoring its role as a responsible citizen of the corporate world, the Taipei Water Department integrates operation strategies and commits to championing social responsibilities to empower its environmental protection and energy conservation projects. The department works in coordination with the Taipei City Energy Conservation Promotion and CO2 Emissions Reduction Initiative to promote pipeline network improvements and water conservation. 115 districts in Taipei City were included in the zoned metering project. 4,641 leaks were inspected, and 158 kilometers of water pipelines were replaced. Compared with the execution results recorded at yearend 2007, the 2010 Initiative successfully reduced leaks up to 51 million metric tons (equaling the amount of carbon dioxide emissions absorption capacity of 14 Daan Forest Parks combined.)

"Water Conservation with Care, Win NT$1 Million in Cash" incentive package was introduced in coordination with "Subsidizing Buyers of Certification-Labeled Water-Saving Devices Project" by the Central Government and a trial run of water-saving discount measures. Also, the Taipei City Government organized the 2010 International Water Day "321 Great Water and Great Living in Taipei" and the "Water Conservation Carnival 2010" to promote water-saving measures. According to estimates, daily household water use per capita dropped from 263 liters in 2007 down to 225 in 2010. 44 million tons of water was saved compared to the same period in 2007 (equaling the amount of carbon dioxide emissions absorption capacity of 12 Daan Forest Parks combined.)

Water in Taipei City is quality water of plentiful supply, and a type of green energy-generated water. Water-saving measures (zoned metering) by the Taipei Water Department garnered an award at the 2010 IWA East Asia Regional Project Innovation Winner Awards for Planning. The project even made the

covers of international magazines. The award was the only international recognition that Taiwan's water department has ever won in its history. For the future, the Taipei Water Department will continue to promote water pipeline network improvements and execute water-saving measures. From production to services, the Taipei City Government will support all-around environmental protection and energy stewardship projects.

2. Per Bag Trash Collection Fee

On July 1, 2000, Taipei officially launched the imposition of a trash collection fee via "Per Bag Fee Collection Program" to levy garbage collection charges. After the program was implemented, complemented by various recycling strategies, household garbage reduction rate has reached 65.72% in 2010; the total recycling ratio has reached 44.68%. The extraordinary achievements have garnered Taipei a place to participate in the World Expo 2010 Shanghai.

3. The Homeland Cleaning Movement for All

(1) A New Look for a Quality Community

The Department of Environmental Protection, Taipei City Government collaborated with the Nangang District Office and Chengde Elementary School in Nangang to host the "2010 Clean Our Homes and National Cleaning Week, and Nangang Cleaning Day" on January 31 to expand and raise awareness of the three initiatives featured in the 2010 Taipei Beautiful Project. Mayor Hau Lung-bin presided over the pledge ceremony and joined the cleaning crew. 500 people participated in the cleaning rally.

From April to September, 2010, the Department of Environmental Protection rallied volunteers in the private sector and community resources in the neighborhoods to clean up the homes and dirty spaces around offices and workplaces, in hopes of raising awareness of the importance of protecting our environment and improving the cleanliness of our cityscape. 318 tons of wastes were cleaned out.

In addition to environmental protection volunteer crews, support from private businesses and religious groups was included starting in June to clean up our environment. On the World Environment Day on June 5, Taipei Deputy Mayor Lin Chien-yuan led the attending guests to call on green corporations, green stores, environmental protection groups, religious organizations and Taipei citizens to jointly demonstrate "the Strengths of Beauty" in cleanliness, mobilizing everyone to clean up Taipei City.

On September 25, 2010, the Department of Environmental Protection hosted "Honoring Mountains' Majesty and Mountain-cleaning Rally, and Achievements Showcase of the Taipei Beautiful Series" at Dahu Park in Neihu. Over a thousand members of the public, environmental protection volunteers and private organizations participated in the event, and began cleaning debris off the mountain area after a pledge was made by the guests.

Private organizations participate in community cleaning.

Environmental protection volunteer crew removes weeds in Zhuangjing Borough of Songshan District.

(2) Public Toilet Maintenance in Taipei

Creating a quality and pleasant restroom space has always been a priority goal for the City Government. In addition to winning the top prize awarded by the Environmental Protection Administration under the Executive Yuan for "Enhancing Taiwan's Public Toilet Cleanliness and Quality" in team No.1 during early 2009, the city also hosted on-site demonstration annual visits for cleaning crews representing the religious community and schools. In 2010, out of all watch-listed public toilets, 54.13% were rated 'excellent'; 45.30%, 'good'; and 0.57%, 'average.' Public restrooms that were rated 'to be improved' were required to conduct improvements within a deadline. In 2010, the "Taipei Municipal Watch-Listed Public Toilets Evaluation Implementation Project" continued to encourage the public, consumers and experts from outside the city government to participate in restroom ratings, and jointly support public toilet administration units to conduct effective greening, and enhance comfort and user-friendly setups. In 2010, certifications were conferred on the supervising agencies of 45 excellent public toilet facilities. The cleaning crews were awarded gift certificates.

Final annual assessment on excellent public toilets.


Excellent public toilet: MRT Songshan Airport Station.

4. Removing the Garbage Mountain in Neihu

The Mountain is located in Neihu district's Luzhou Borough. It began in 1970, and shut down in 1985. Garbage covered an area of 15.5 hectares. Of these, five hectares were located alongside the Keelung River. To ensure the river's safety, a shutdown improvement project was implemented after it was sealed off. The mountain has weathered many typhoons and other natural disasters. The hillsides have not yet slipped or collapsed.


Sifting is conducted at the construction site designated for removing the Neihu Garbage Mountain.

Though the garbage mountain is rather secure, it has blocked a portion of the Keelung River's course (with about 45 meters of encroachment upon the river course). In light of flood prevention concerns, environmental preservation, and demands by the residents to promote local development, plans were underway to remove the garbage mountain. The overall planning was completed in 2005to clean away all the piles that clutter around the river's passage to stay in line with provisions stated in the Water Act. Approximately 222.8 cubic meters of the mountain were removed.

The removal construction was handled in a turnkey contract, and slated for completion on November 5, 2012. The project was divided into several portions. The different levels of the garbage pile were divided into "combustibles", "recyclables," and "cubic meters of earth and stone" for further processing. The embankment was built into "an ecological dike," and was excavated and sifted in two stages. In stage one, 300,000 cubic meters of construction were excavated by March 19, 2010; stage-two of the project – a removal of 1,928,000 cubic meters of garbage – is underway.

The removal was conducted in the recyclable fashion to reduce waste. This approach ensures that the river can travel unobstructed and helps prevent flooding so as to enhance land-use efficiency and environmental quality to improve the Keelung River's water excellence, and to minimize pollution concerns to safeguard public safety.

5. Environmental Education and Campaigns

(1) Environmental Protection Volunteer Crew

Taipei City's Environmental Protection Volunteer Crew now consists of 13 social eco-protection detachments, 408 squads, and 163 school-based detachments, at 13,344 people in total. The crew has effectively integrated environmental protection volunteers from campuses and communities, social groups and social resources into assisting various environmentally-forward projects. Campaigns are hosted for the volunteers irregularly, allowing volunteers to better understand the City Government's administrative focuses, enhance their professional know-how, and become the cell groups in promoting community environmental protection. Also, in coordination with the annual International Earth Day, Environmental Day and Cleaning Day, the Taipei City Government organizes major environmental protection campaigns and supports public participation to better raise awareness. In 2010, circuit campaigns were conducted on 60 elementary school campuses in Taipei to highlight the importance of energy conservation, cutting down carbon dioxide emissions, resource recycling and rejuvenating the Danshui River. 37,222 school faculties and students participated in the awareness campaign.

Basic training for the Environmental Protection Volunteer Crew.

The water and light corridor in the Gongguan Purification Plant is an excellent place for extracurricular visits to raise awareness on energy conservation and reduction of carbon dioxide emissions.

(2) Water Conservation Education Campaign

The Taipei Water Department promotes visits to the water and light corridor solar power education display modules in the Gongguan Purification Plant. A total of 65 groups and 5,921 tourists visited the facility in 2010. The Taipei Water Department also designed the Taipei Illustration Storybook of Water and e-books and distributed

them to Taipei City's public and private elementary schools and libraries to promote water conservation. Also, the Little Guanyin Mountain in the Taipei Water Park is home to a diversity of flora and fauna, and this has inspired an extensive ecological survey and the establishment of guided tours to ensure sustainable ecological development of the area, and encourage people to better understand the ecosystem of the primeval forest.

(3) School Education Campaigns

A. Creating power-saving and green campuses: T9 and T8 fluorescent lamps in classrooms were replaced with the high-performance T5 lamps at a cost of NT$300 million. Electricity consumption between January and June in 2010 was 5% lower than during the same time period of the previous year. "Beautiful Campus and Ecological Green Fences" were themed for the urban greening ecological campaign. Thirty-nine campuses were targeted in 2010 for the campaign.

Creative photovoltaic lifestyle contests are held in elementary schools.

B. A workshop on "rejuvenating the Danshui River" riverfront lifestyle map drawing was hosted that targeted the eight major river systems in Taipei City. The drawing workshop was attended by more than 100 faculty members and students from eight schools. Schools of various levels were encouraged to support the "2010 Taipei International Flora Expo" guided extracurricular activities. An estimated 360,000 students participated in the tours. Environmental education seminars were organized for the outlining of workshops and improving teachers'eco-conservation know-how. In the past three years, as much as 83% of the participating teachers devoted over five hours to the workshops.

C. Marine conservation education was promoted to encourage students to better understand marine ecology. A variety of teachers' empowerment seminars, students'camp activities and course development programs were formulated to promote marine education in full.

D. Energy conservation is incorporated into lifestyle education. 100 youths as green energy ambassadors were trained and prepared before engaging in an English-language dialog on environmental issues with New York Times columnist Thomas L. Friedman. Ten green energy ambassadors were selected to accompany Mayor Hau Lung-bin to Shanghai for the World Expo 2010 as one-day volunteers.

E. Training sessions were hosted for river protectors; water-quality monitoring patrols were also conducted. A basic and advanced seminar on "the Rejuvenation of the Danshui River – Water Quality Monitoring" was held and attended by 20 teams of 100 youth river protectors.

Part 3 Recycling and Reuse

1. Household Kitchen Waste Recycling

The Taipei City Government categorizes kitchen waste into "Fertilizing Kitchen Waste" and "Feeding Kitchen Waste ." The waste was auctioned off in public bids to agriculture agency-licensed pig farmers for reuse in qualified pig farms. Organic Waste for Compost is stored temporarily in the Kitchen Waste Temporary Deposit Areas located inside the three incinerators in Taipei City to drain off excess water; after simplified compost processing, the waste is thus turned into semi-finished composts. The semi-finished products are then extracted to commissioned private compost plants and voluntary compost-makers for reuse.

The project began on May 18 2006, and by yearend 2009, a total of 198,946 metric tons of organic waste for compost had been collected; after simplified processing measures, about 5,418 metric tons of waste in the repository area were transformed into semi-finished compost. 18,547 metric tons of the waste were delivered to qualified contractors in the private sector for follow-up processing.


Visitors check out finished products made of kitchen compost.

Improvements were made on existing facilities at the Muzha Incinerator to process semi-finished kitchen compost and turn it into soil ameliorant. In total, about 3,829.97 metric tons of semi-finished compost was processed; 1,030.76 tons of soil ameliorant were made from the compost, and offered to 2,233 people (from the general public or agencies or schools). 947.01 metric tons of ameliorant have been distributed and have worked very successfully.

Also, to process fertilizing kitchen waste, an experimental preprocessing facility was set up in the Beitou Incinerator. High-temperature and high-pressure steaming was utilized to directly manufacture farm-ready fertilizer, so as to resolve issues with fertilization. The facility has processed an accumulated total of 128.05 metric tons of raw organic waste. After secondary fermentation and post-fertilization processing, 10.02 metric tons of finished products were manufactured by December, 2010.

2. Incinerator Bottom Ashes and Fly Ash Recycling

The Taipei City Government began a trial run of reusing and reprocessing incinerator bottom ash in December 2003 in keeping with regulations stipulated in "General Waste –Waste Incinerator Bottom Ash Recycle and Reuse Management Act" promulgated by the Environmental Protection Administration, Executive Yuan, R.O.C. By September 2005, all the bottom ash and residues were reused 100% to meet the zero-landfill target.


Prewash fly ash are bagged and piled neatly in the Muzha Incinerator.

In the past, fly ash piles gathered at incinerators were processed first with a chemical stabilizing process – after the stabilizing fly ash was tested and qualified through a Toxic Characteristic Leaching Procedure (TCLP), it was sent to a designated area at the Shanzhuku Sanitary Landfill Site. In order to attain"total recycling and zero landfill,"actions were taken in succession to reuse incinerator fly ash. On May 16, 2007, a Fly Ash Prewash Processing Plant was built inside the Muzha Incinerator. A cement plant agreed to jointly test and develop technologies in March, 2009, to turn 500 metric tons of prewashed fly ash


On-site construction where bottom ash is processed for reuse.

into a new material to replace cement. The results of the experiment were approved by the Environmental Protection Administration (EPA) under the Executive Yuan. In the future, incinerator bottom fly ash will be prewashed and reused for cement material. In October, 2009, a proposal for the prewashed fly ash reuse project was presented to the EPA for approval to conduct individual reuse. In June, 2010, the EPA approved the proposal to reuse 3,300 metric tons of prewashed fly ash on record. In addition, a fly ash prewash factory that can process two metric tons of fly ash hourly is to be built on the Beitou Incinerator premises. Construction began in September, 2010. Upon completion, all the incinerator fly ash gathered in Taipei City will be entirely reused to attain"Total Recycling and Zero Landfill."

3. Ditch Mud and Ditch Soil Reuse

At present two reuse formulas for ditch mud and soil are in effect. One is by commissioning the Earth and Stone Resource Processing Plant to mix ditch mud and soil with construction admixtures through a physical screener process; after adjusting the aquiferous ratio, the new mixture is processed by a screener to sift out waste in the admixtures; coarse, refined gravels and the remaining earth and stones are sieved out and deposited in the Earth and Stone Resource Processing Plant. These earth and stone resources are further graded and shipped to civil engineering and construction companies for use on construction sites, according to the specification demands of various construction projects.


Sunflowers are planted in soil made of ditch mud on the vacant lot by Nanshen Road.

On the other hand, ditch mud and soil can be used as renewable soil. The ditch mud and soil can be finely screened and sieved for renewable soil materials. These materials can be used to grow plants. The renewable soil is packaged and offered to the public and agencies for growing bonsais and flowers to beautify the cityscape.

I n 2010, Taipei City commissioned the Earth and Stone Resource Processing Plant to process 5,626.81 metric tons of ditch mud and soil. The amount of renewable soil for reuse reached an impressive total of 4,912.9 metric tons. These measures have efficaciously retrenched landfill capacities at the Shanzhuku Sanitary Landfill Site, and prolonged the site's lifespan while cutting back costs for the city to open up new landfill facilities.

4. Refurbished Furniture

Taipei City pioneered the country in setting up the Refurbished Furniture Display Area, displaying and auctioning repaired furniture discarded by people and renovated by the Department of Environmental Protection. In addition to the Neihu and Wanhua Repaired Furniture Display Halls, the Wenshan Refurbished Furniture Auction Hall was established in June, 2010. Since their opening, wood cabinets, tables and chairs, couches and bikes have become the staples and are very popular with buyers. According to statistics, 12,544 items were sold in 2010, totaling NT$10,603,980 in sales.


The Wenshan Refurbished Furniture Auction Hall.

5. Promoting A Green Life-style

(1) Developing Diverse Green Businesses

In 2010, the Taipei City Government provided consulting assistance to green businesses 2,915 times, and organized 5,473 sessions of Healthy and Eco-friendly Product Marketing Activities. 1,306 shops have become Taipei's Green Businesses. Additionally, the department assisted green business establishments in the jurisdiction to take part in the Green Marketing Awards held by the Environmental Protection Administration. (B & Q Home Improvement) Test Rite Retail Co., Ltd's branch company in Neihu was recognized with the green business excellence award in the chain store category.

(2) Strengthening Corporate Green Procurement Institutionalization

A total of 204 businesses from the private and organizational sectors applied for green procurement, totaling NT$1,140,842,435 in procurement dollars. Also, the City Government works to enable green products procurement systemization among business corporations. In addition to championing green products procurement, the Taipei City Government also worked to consolidate an environmental-protection consensus among employees, so that eco-friendly projects can be extended from departments, to sections, and to corporations in attaining sustainable consumption.

(3) Enhancing Resource Integration, Promotion and Campaigns

The campaigns include circuit campus awareness promotions, seminars, community campaigns and themed lectures. Booths were set up to support eco-friendly green consumerism. The Taipei City Government also joins hands with boroughs, villages and communities to encourage green shopping. Campaign messages are posted on the Green Living Website, encouraging the public to take action. 132,117 people took part in these green consumption campaigns in 2010.

Experts on collecting eco-friendly labels discuss their experiences in a shared area during the Dharma Drum Mountain event.

Part 4 Conserving the Natural Environment and Protecting the Ecosystems

1.Animal Protection

On January 28, 2010, Taipei City pioneered the country in setting up the Taipei City Animal Protection Office, integrating several animal-related programs, including animal quarantine and inspection, stray animal control, wildlife rescue, animal administration and protection, wildlife conservation and natural ecology conservation, into one robust management mechanism. The office honors"Professionalism, Efficiency, Service, and Harmony"to promote a strong, animal management service.

(1) Stray Animals Protection and Administration

Taipei City's stray dog catching and entrapment tasks evolved to the foundation of its "Animal Rescue Team." In addition to enforcing animal control, the "stray emergency animals rescue project"was added to readily protect stray animals and provide emergency rescue and medical treatment to ownerless animals on the streets. In 2010, 1,651 stray animal rescues (including treatment for injuries), and 4,164 stray animal catching and control assignments were completed in 2010. The stray animals were placed in the Taipei Animal Shelter. To help enforce a greater sense of responsible ownership among pet owners, the Taipei City Government continues to enforce and support "pet registration, rabies vaccination and neutering and spaying dogs and cats" as a three-in-one inspection and awareness project. Joint crackdowns were conducted in parks, big and small. In 2010, the Taipei City Government addressed 689 cases involving animal protection, averaging 57 cases monthly. One hundred and fifty five cases involving the violation of animal protection laws were investigated and prosecuted; 124 tickets involving animal protection exhortation were issued; 23 cases involved administrative disciplinary actions, and eight violations were considered criminal cases.

Taipei City also provides pet registration discounts, increased the quota of subsidies for neutering dogs and cats, and hosts promotional campaigns on responsible ownership. On April 26, 2010, the "446 Days of Loving Animals - a parade of pets, pets adoptions and fair" was organized at the Civic Square in front of Taipei City Hall. Various campaigns were held to raise awareness about protecting pets, so that they will not be cruelly abandoned or suffer excessive breeding.

In 2006, the Taipei City Government began to promote the policy Trap-Neuter-Return to resolve issues with noise, pollution and excessive breeding by street cats. In 2008, promotions, consultations and assessments were conducted instead, combining subsidies and input from private animal protection organizations to jointly enforce Trap-Neuter-Return for cats. After years of promotion, the initiative is now entrenched in various districts and boroughs throughout Taipei City. As many as 118 boroughs participated in the

The Taipei City Government establishes the Animal Rescue Team.

Promoting responsible ownership education-interaction between animals and humans.

446 Day of Loving Animals - a parade of pets.

enforcement in 2010 to complete theTrap-Neuter-Return of 2,090 street cats, tripling the number of cases of 2009.

(2) Wildlife Protection and Administration

The Taipei City Government handles nearly a thousand cases of wildlife injuries annually. In 2010, a total of 1,301 reports of wildlife injuries and placements were received. Among the reported cases, 35 were endangered animal species, such as brown spotted pit-vipers, collared scops owls, and the Formosan gem-faced civet, totaling 466 animals. Sixty-three other species of wild animals, such as red-banded kraits, turtledoves, and Malay Night herons, totaling 835 animals, were rescued. Also, inspections were conducted on private breeding practices among breeders and sellers of aquarium animals and pets. Wildlife protection training sessions, seminars and workshops were also held. On May 9, 2010, the Taipei City Animal Protection Office joined hands with the Taipei Zoo, the Luodong Forest Administration, the Conservation Education Foundation of the Taipei Zoo, and the Qixing Ecological Conservation Foundation to host the "2010 Taipei Natural Conservation Drive," focusing on "Colorful Taiwan – Vivacity and Species Paradise." 23,652 people visited the sites after the themed website was inaugurated. The site aimed at improving conservation know-how and concepts among the general public and enforcers.

2. Ecological Sanctuaries

Taipei City is home to four wildlife sanctuaries: the Taipei City Water-bird Refuge, Hua-jiang Wild Duck Nature Park, Guandu Nature Park, and Guandu Nature Reserve, at 398 hectares in total size. Due to silt deposits and vegetation, the wetlands became gradually encroached by land, so in 2010, habitat revitalization was conducted on 15 hectares of land in Guandu Nature Park, the Taipei City Waterbird Refuge, and Hua-jiang Wild Duck Nature Park, based on the conditions of the habitat, ensuring that the waterfront landscape and muddy beaches were properly restored, and providing inhabit for waterfowls, such as plovers, sand pipers, snipes and herons.

To promote natural ecology conservation, the Taipei City Government invites approximately 20 conservation groups to conduct the "Taipei Eco-Festival" and exchange success stories of conservation, while imparting conservation knowledge to the public. During the autumn and winter seasons, bird watchers from overseas and Taiwan are invited to Guandu Nature Park for the Taipei International Birdwatching Fair, welcoming the arrival of winter migratory birds. Also, the "waterfowl season" is hosted in Hua-Jiang Wild Duck Nature Park to welcome the return of migratory birds.

Baby water ducks inhabit the Guandu Nature Park.

An Aboriginal dance during the Taipei International Bird-watching Fair.

A bird's eye view of the Hua-Jiang Water Duck Nature Park.

3. Promoting Ecological Engineering

In October, 2009, Taipei City continued the construction of the Zhongxiao and Guiyang aerated gravel contact oxidation facilities, with a processing capacity estimated at 370,000 CMD. They are expected to eliminate up to 75% of various contaminants (biochemical oxygen demand, ammonia nitrogen, and suspended solids). A trial run was conducted on the primary structure after its completion by yearend 2009. Since then, all the drainage from Zhongxiao, Guiyang and Chengdu is directed into the processing facilities. After absorption and dissolution, the sewage becomes impurity-free water before it is discharged into the Danshui River to improve the river's ecology.

With a view to enriching and revitalize local landscapes and improving the quality of our living space in the city, the Parks and Street Lights Office of the Department of Works actively promotes a re-landscaping project to turn cemeteries into parks. Regional environment renovations are conducted after the existing public cemeteries are relocated so as to give the urban landscape a new facelift. For instance, the Beitou Fourth Public Cemetery, located at Section Three of Zhongyang North Road, was reconstructed to become the new Beitou 241 Park. The construction of the park was defined by several principles: protecting the existing ecology without destroying any original landforms and the ecosystem, and minimizing any artificial facilities, retaining large patches of lawns, while incorporating water and soil conservation designs, such as sand basins, into the landscape. The sand basin addition ensures water storage, minimizes runoffs on the earth's surface, and complements the existing lush forest to create an eco-space inhabitable to indigenous plants, butterflies and frogs, so that visitors can enjoy the intimacy of living close to nature. The park helps fashion a relaxation space that is quiet and serene yet eco-education-worthy.

In light of the increasingly severe environmental destruction inflicted by urban development,

Flood-routing sand basin on Dahu's Shangzhuang Street.

the Hydraulic Engineering Office of the Department of Public Works has adopted several ecological engineering concepts in the construction of the flood-routing sand basin on Dahu's Shanzhuan Street. The planning of the project is characterized by the incorporation of existing ravines, an improvement on the Dagou Brook landscape, and the diversion of water from downstream Dagou Brook to set up a wetland area. The office created a landmass and waterfront ecology gradational area, and built a wildlife habitat with deadwood, rock chunks and aquatic plants. These aquatic plants include emerged, floating and submerged plant species that are both indigenous and diverse. The flood-routing sand basin can ensure the infiltration of surface water to achieve permeability and water retention; whenever a storm hits, the basin helps to reroute floods and temporarily stores floodwater to level down the flood peak. Additionally, it can preserve or create a wildlife habitat for local flora and fauna to ensure biodiversity and ecological rehabilitation in the wetland, allowing visitors to enjoy the ecology of aquatic plants close-up. It serves both relaxation and education purposes.

Conclusion

Improving the quality of the environment is a never-ending mission. By giving equal consideration to protecting the environment and supporting economic development, the Taipei City Government, in honoring its pursuit of excellence, has vowed to transform Taipei City into a hospitable city of "blue skies and green parks," "clear rivers and majestic mountains," "a clean landscape without noise," "resource renewal," "energy conservation, "and"biodiversity."