Care for the Environment

The Group works hard towards a better environment through its various contributions to environmental preservation.

ENVIRONMENTAL POLICY

KMB is committed to building a better environment through environmental conservation and protection.

KMB recognises the potential environmental impact associated with its services and is dedicated to mitigating and minimising these impacts by implementing the following measures:

- Preventing pollution and continuously improving our environmental performance through the establishment and achievement of objectives and targets;
- Conserving resources by reducing waste at source and recycling and reusing resources;
- Minimising and controlling emissions from our buses by implementing control measures and by providing professional bus repair and maintenance engineering services;
- Enhancing staff environmental awareness by providing training in relation to our environmental policy and our environmental objectives and targets, as well as in relation to the potential environmental impact arising from our operations;
- Communicating our environmental policy and relevant environmental requirements to our contractors and suppliers, and making the policy available to the public;
- Responding to environmental inquiries from external parties promptly and ensuring effective communication on environmental issues internally; and
- Ensuring compliance with all applicable local environmental legislation and other relevant requirements.

EXCELLENCE IN ENVIRONMENTAL MANAGEMENT

ISO 14001, the internationally recognised standard for environmental management systems, provides a framework for managing aspects of our operations which affect the environment. Our Sha Tin and Lai Chi Kok Depots were awarded ISO 14001 certification from the Hong Kong Quality Assurance Agency.

Green and comfortable journeys

Having become the first listed public transport organisation in Hong Kong to receive Green Mark Certification, we were recertified in 2013 by the Q-Mark Council of the Federation of Hong Kong Industries for the period from May 2013 to April 2016. The accreditation recognises that our four main depots at Kowloon Bay, Lai Chi Kok, Sha Tin and Tuen Mun meet the prescribed standards in respect of the delivery of franchised bus services and the repair and maintenance of buses under the Hong Kong Green Mark Certification Scheme. KMB undergoes quarterly surveillance audits to ensure that the strict environmental management standards are maintained for the duration of each certification period.

We address and seek to reduce the potential environmental impact associated with our services in the following areas: environment-friendly buses, green use of consumables, environmental waste treatment and green workplace.

ENVIRONMENT-FRIENDLY BUSES

KMB and LWB are committed to building a better environment through continuous investment in the most modern environmental technology and equipment. Our new buses generally have environmental performances that far exceed the legal requirements in Hong Kong.

This is in line with the commitment the Group holds as an industry leader towards introducing innovative technologies and equipment that improve environmental performance while contributing to sustainable environmental development in Hong Kong.

Euro IV and Euro V Engines

KMB introduced Euro IV and Euro V double-deck buses in May 2006 and February 2009 respectively and presently operates the largest fleet of Euro IV and Euro V buses in Hong Kong.

At 31 December 2014, 56 urea solution dispensing units were in place at KMB depots to improve the environmental performance of Euro IV and Euro V buses. In addition, 978 KMB Euro IV, Euro V and hybrid Euro VI buses have been equipped with Selective Catalytic Reduction ("SCR") catalytic converters, which when used with urea solution reduce the emission of nitrogen oxides, as the ammonia formed from the solution converts nitrogen oxides into nitrogen gas and water vapour. To service the growing number of environment-friendly buses operated by KMB, a total of 17 urea solution dispensing units were installed in the depots at Tin Shui Wai, Kowloon Bay, Tseung Kwan O, Yuen Long and Tsing Yi Depots in 2014, and more such units will be installed in the depots at Lai Chi Kok, Kowloon Bay, Sheung Shui and Tai Po in 2015.

A total of 196 buses in the Group's Non-franchised Transport Operations Division (comprising the SBH Group and New Hong Kong Bus Company Limited) are equipped with Euro IV and V engines.

Green Fleet

At the end of 2014, KMB and LWB owned a total of 3,855 and 179 buses respectively, all of which met the stringent exhaust emission standards of the European Council of Environmental Ministers. To bring exhaust emissions to higher Euro standards in terms of particulate matter, 2,641 buses have been equipped with either Diesel Oxidation Catalysts ("DOC") or Diesel Particulate Filters ("DPF"). Compared with emission levels in 1992, the year of the introduction of Euro I emission standards in the European Union, the average particulate emission level of the KMB bus fleet has been reduced by about 95%, while emissions of nitrogen oxides have been reduced by about 64%.

The number of KMB and LWB buses meeting the respective emission standards at 31 December 2014 is shown below:

	Number of Buses			Emission Level (in terms of particulate matter)			
Engine Type	**KMB**	**LWB**	**Total**	**Euro II**	**Euro III**	**Euro IV/V**	**Euro VI**
Euro I#	162	–	162	162	–	–	–
Euro II	176	–	176	176	–	–	–
Euro II*	1,371	46	1,417	–	–	1,417	–
Euro III	44	10	54	–	54	–	–
Euro III*	1,054	8	1,062	–	–	1,062	–
Euro IV	106	32	138	–	–	138	–
Euro V	939	83	1,022	–	–	1,022	–
Euro VI (hybrid)	3	–	3	–	–	–	3
Total	**3,855**	**179**	**4,034**	**338**	**54**	**3,639**	**3**

Equipped with DOC

* Equipped with DPF

Exploring Zero- and Low-emission Bus Technologies

KMB has always pioneered the introduction of the latest bus technologies. In recent years, much effort has been put into improving its green footprint by exploring and trialling different kinds of zero- and low-emission technologies.

To this end, KMB is working with the HKSAR Government, which, to protect public health and improve roadside air quality, has allocated HK$180 million to Hong Kong's franchised bus companies, including KMB, for the procurement of 36 electric buses to run on trial on different bus routes to evaluate performance in different operating conditions. KMB and LWB are receiving funding assistance to procure 14 single-deck eBuses and 8 single-deck gBuses for trial deployment.

Zero-emission Supercapacitor Bus

Having trialled the first generation zero-emission supercapacitor bus ("gBus") from August 2010 to April 2011 and achieved satisfactory results, KMB introduced the second generation gBus^2 on trial from March to September 2012. With double the electricity storage capacity and twice the driving range (8-10 kilometres when fully charged), gBus^2 requires fewer charging stations en-route, enabling it to operate on some short-distance routes without any en-route charging stations. Other benefits of gBus^2 include rapid charging of the supercapacitors, so that, if required, charging can be conducted at bus stops while passengers board and alight, and no need for an extensive network of continuous overhead cables. In February 2014, KMB received approval from the HKSAR Government for the procurement and proposed trial deployment of eight supercapacitor buses on two routes: Route 284, a circular route in Sha Tin, and new Route 5M, a circular route running between Kai Tak (Tak Long Estate) and Kowloon Bay Station. It is proposed

KMB leads Hong Kong into a new era with hBus

that charging stations be set up at the end points of the routes. The trial is expected to commence by the end of 2015.

Zero-emission Battery-electric Bus

In September 2012, KMB took delivery of its first battery-powered single-deck bus ("eBus"), jointly developed by KMB and an electric bus manufacturer, to assess its suitability for Hong Kong's operating environment.

Powered by lithium iron phosphate batteries and capable of running at speeds of up to 70 km per hour with a maximum of 66 passengers on board, when fully charged, eBus can travel more than 180 km. After seven months of road tests with no passengers on board, eBus was deployed as a staff shuttle bus running between Lai Chi Kok Depot and KMB Headquarters. Based on satisfactory operating results, eBus was then put into passenger service on Route 2, which runs between Tsim Sha Tsui Star Ferry Bus Terminus and So Uk via Nathan Road, for one month from 9 September 2013, becoming Hong Kong's first zero-emission franchised bus providing passenger services. Satisfied with the operational performance of eBus and keen to extend the trial with the intention of introducing more eBuses in the coming years, in the fourth quarter of 2014 KMB commenced the procurement process for the next batch of eBuses for further trial deployment.

In addition to being equipped with the latest design components, eBus is equipped with several enhanced features, including the battery-monitoring system, which allows bus captains to check the voltage, current and temperature of the batteries and turn off the electricity supply if necessary.

Diesel Electric Hybrid Bus ("hBus")

With full funding from the HKSAR Government, KMB introduced three diesel-electric hybrid air-conditioned 12-metre double deck buses (hBuses) in November and December 2014 running on Routes 1A, 104 and 619. The ADL Enviro 500H Euro VI hBus uses the Cummins ISB Euro VI engine in combination with the BAE series hybrid drive system and a fully electric-powered air-conditioning system. Possessing zero-emission capability during boarding and alighting and when stationary, hBus is designed to achieve Euro VI emission standards and fuel savings of up to 30% in urban operations. KMB's hBuses will undergo an operational trial period of two years so that the application of hybrid technology for public bus services can be fully assessed.

Engine Repowering

With funding support from the HKSAR Government, four KMB Euro III buses will be upgraded to Euro V emission standards as part of a feasibility demonstration by means of an Euro V engine conversion and electrification of the engine cooling fan drive. The project aims to achieve fuel savings of 16% in addition to improved emissions performance.

Retrofit of Selective Catalytic Reduction ("SCR") System

With full capital funding from the HKSAR Government, more than 1,000 Euro II and Euro III buses will be retrofitted by early 2017 with a urea-based SCR system aimed at achieving a reduction of 60% in emissions of nitrogen oxides without compromising operating performance. The project will go ahead subject to the outcome of a pre-qualification one-year exercise to be conducted on a small number of buses in 2015, which will assess the technical, environmental and operational feasibility of the SCR technology for retrofit purposes.

Since zero-emission buses are more operationally flexible and require significantly less capital investment than other zero-emission mass transport modes such as rail, we will continue to work with the HKSAR Government to explore the feasibility of deploying such buses on more of Hong Kong's bus corridors. We will continue to track the development of bus technologies and work with our manufacturers and suppliers to further develop zero- and low-emission solutions.

GREEN USE OF CONSUMABLES

Near Zero Sulphur Diesel

The entire KMB and LWB fleet has used Near Zero Sulphur Diesel ("NZSD"), which contains only 0.001% sulphur, since 2009. NZSD significantly reduces the emissions of sulphur oxides and particulates, helping towards a cleaner environment.

Synthetic Transmission Oil

Since its introduction in 2005, synthetic transmission oil has reduced waste oil by 80% and lengthened the oil drain interval from 30,000 to 150,000 kilometres.

Eco-Driveline System

The Eco-Driveline System, a standard feature on new buses since 2003, reduces exhaust emissions by 6% – 10% compared with conventional drivelines by improving fuel economy. The system provides smoother rides by integrating a high-torque engine, a six-speed double-overdrive automatic gearbox controlled by a sophisticated gear-shift programme and an optimised final drive.

Electrostatic Filters

KMB's buses are equipped with electrostatic filters to provide effective filtration of fine particles. The filters capture micron-sized contaminants and particles such as dust and pollen through electrostatic precipitation involving multi-layered collecting plates. Tests demonstrate that electrostatic filters can filter out 80% of fine dust. At the end of 2014, 1,836 KMB buses were equipped with electrostatic filters.

Foam-element Air Filters

KMB and LWB are progressively replacing traditional paper-element air filters with high performance foam-element air filters with an average life span of 12 months, six times longer than that of conventional paper filters, leading to significant reductions in solid waste requiring disposal.

Variable Capacity Air-conditioning Compressor

Power-saving variable capacity air-conditioning compressors, installed on all KMB buses ordered after 2008, provide more flexible and refined thermal control in the bus saloon in the most fuel-efficient manner in all weather conditions.

Tyre Retreading and Recycling

In 2014, 29,500 used tyres were retreaded in KMB's retreading workshop, bringing the number retreaded since 1972 to more than 805,000. More than 17,000 scrapped tyres and 200 tonnes of tyre chips, otherwise destined for disposal at landfills, were collected by an agent for recycling into various rubber products. Through retreading, the life span of a new bus tyre, which can generally be used for seven months, can be extended by around 14 months, as each tyre can normally be retreaded twice.

Cartridge Recycling Programme

KMB has supported the cartridge recycling programme run by Friends of the Earth (HK) since 2001. By the end of 2014, a total of 6,951 cartridges from printers and fax machines had been collected for recycling.

ENVIRONMENTAL WASTE TREATMENT

KMB's company-wide waste reduction programme aimed at reducing the amount of solid waste requiring disposal was once again recognised in 2014 by the award of the "Class of Excellence" WasteWi$e Label from the Environmental Campaign Committee.

We have programmes for the recycling of commonly used items, such as plastic ink cartridges, rechargeable batteries, fluorescent tubes and waste paper. Since 2009, around 819 kilograms of print circuit boards, which would otherwise have been disposed of at landfills, have been collected by a recycling agent.

Environmental Treatment of Chemical Waste and Waste Oil

In 2014, around 275,600 kilograms of solid chemical waste were treated and stored by type in designated areas at our bus depots before disposal by a registered chemical waste collector at the Government's Chemical Waste Treatment Centre. Around 659,400 litres of waste oil collected from our depots and other bus maintenance sites by a waste oil recycling agent were recycled or disposed of in accordance with the statutory standards.

Waste Water Recycling

11 automatic waste water treatment and recycling systems are installed at our depots with a treatment capacity of 520 cubic metres per day. Chemicals are added to separate solid impurities from the waste water produced during daily depot operations, and then the impurities are disposed of at landfills and the treated water discharged into the public drainage system. 70% of the water that is used each day to clean KMB's buses is treated and recycled, bringing savings in terms of water consumption. We continue to operate a "Save Water" campaign at our depots and headquarters to encourage staff to save water.

Waste Scrap Metal Recycling

To further reduce solid waste disposal, in 2014, more than 960 tonnes of scrap metal from used bus parts replaced at the daily, monthly, half-yearly and annual inspections were collected for recycling. Approximately 94.8% of the metal was scrap iron, which, together with non-ferrous metals, can be recycled repeatedly at low cost and low energy consumption, especially compared to the cost of refining from the original ores. KMB has collection points at its four main depots and its overhaul centre for collection of scrap metal by waste collectors appointed by KMB in line with its annual tendering process for recycling and re-use.

GREEN WORKPLACE

Our depots contain many green facilities including waste water treatment and recycling systems, and environment-friendly fire service systems. The lighting, air-conditioning and ventilation systems are equipped with energy-saving features, and we conduct regular air sampling to make sure that a healthy environment is maintained.

KMB is also progressively installing energy efficient lamps in place of high bay lamps at its depots. In 2014, the use of energy saving induction lamps at Sha Tin Depot, Kowloon Bay Depot and the KMB Overhaul Centre helped the company to reduce its total electricity consumption by 4%.

Since becoming in 2006 the first organisation in Hong Kong to participate in the fluorescent tube recycling campaign, KMB has sent a total of around 703,000 used fluorescent tubes to the Government's Chemical Waste Treatment Centre for recycling. Besides collecting light tubes from the KMB bus fleet, the five collection points at Lai Chi Kok Depot, Kowloon Bay Depot, Sha Tin Depot, Tuen Mun Depot and the KMB Overhaul Centre collect tubes from more than 2,000 bus-shelter light boxes and from the depots themselves. Used fluorescent tubes are stored in a designated area until a licensed contractor collects them for recycling. Once the mercury has been removed from the tubes, they are crushed into glass granules, and the mercury, glass granules and other metal parts are reused.

The Green Office concept drove the design and renovation of the Group's Lai Chi Kok headquarters. Pre-set timers are used to turn lights off when they are not needed or when natural light is sufficient, and air-conditioning thermostats are set to 25.5°C to conserve energy and protect air quality in line with the Government's Action Blue Sky Campaign. LED lighting has also been introduced in common areas of the headquarters building, including the lobby, to reduce electricity consumption and the need for air-conditioning.

Self-developed Filter Compressing Machine

The use of the in-house developed Filter Compressing Machine at KMB's Sha Tin Depot has led to a reduction of 60% in disposed fuel or oil filters. Waste oil removed from the filters during the compressing process is available for recycling.