



Care for the Environment

The Group is dedicated to working for 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 impacts 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 impacts 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
- Ensuring compliance with all applicable local environmental legislation and other relevant requirements

EXCELLENCE IN ENVIRONMENTAL MANAGEMENT

ISO 14001 is the internationally recognised standard for environmental management systems, providing a framework for organisations to manage aspects of their operations that affect the environment. KMB's Sha Tin and Lai Chi Kok Depots were awarded ISO 14001 certification from the Hong Kong Quality Assurance Agency in 2001 and 2003 respectively.

KMB, the first listed public transport organisation in Hong Kong to receive Green Mark Certification, was recertified in 2013 by the Q-Mark Council of the Federation of Hong Kong Industries for the period from May 2013 to April 2016. This certification recognises that KMB's four main depots at Kowloon Bay, Lai Chi Kok, Sha Tin and Tuen Mun meet the prescribed standards with regard to 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 most rigorous environmental management standards are maintained for the duration of each certification period.

We look to reduce the potential environmental impacts associated with our services in the following four major areas: environment-friendly buses, green use of consumables, environmental waste treatment and a green workplace.

ENVIRONMENT-FRIENDLY BUSES

KMB and LWB are committed to building a better environment through continuous investment in the latest environmental technology and equipment. Our new buses generally have environmental performances far exceeding the legal requirements in Hong Kong. The Group takes very seriously its responsibility as an industry leader to introduce innovative technologies and equipment that both improve our environmental performance and contribute to the development of a sustainable environment in Hong Kong.

Euro IV and Euro V Engines

In order to further enhance emission standards, KMB introduced Euro IV and Euro V double-deck buses in May 2006 and February 2009 respectively. Currently, it operates the largest fleet of Euro IV and V buses in Hong Kong.

At 31 December 2013, 39 urea solution dispensing units had been installed in KMB depots to further improve the environmental performance of Euro IV and Euro V buses. 715 KMB Euro IV and Euro V buses are equipped with a

Selective Catalytic Reduction ("SCR") catalytic converter, which when used with urea solution can reduce the emission of nitrogen oxides, since ammonia formed from the solution can convert nitrogen oxides into nitrogen gas and water vapour. To meet the growing number of environment-friendly buses operated by KMB, the depot at Tin Shui Wai will be equipped with urea solution dispensing units in 2014 and more such units will be installed at the depots at Lai Chi Kok, Kowloon Bay, Tseung Kwan O and Tsing Yi, bringing the total number of urea

solution dispensing units to 65 by the end of the year.

Within the Group's Non-franchised Transport Operations Division (comprising the SBH Group and New Hong Kong Bus Company Limited), a total of 384 buses are equipped with Euro III, Euro IV or Euro V engines.

Green Fleet

At the end of 2013, KMB and LWB had a total of 4,017 buses, all of them meeting the strict exhaust emission standards of the European Council

of Environmental Ministers. To bring their exhaust emissions to higher Euro standards in terms of particulate matter, a total of 2,905 buses have been equipped with either Diesel Oxidation Catalysts ("DOC") or Diesel Particulate Filters ("DPF"). Compared with emission levels in 1992, the year when the Euro I emission standard was first introduced in the European Union, the average particulate emission level of the entire KMB bus fleet has been reduced by about 93.8%, while the level of nitrogen oxide emissions has been reduced by about 61.4%.

The number of KMB and LWB buses meeting the respective emission standards at 31 December 2013 is shown below:

Engine Type	Number of Buses			Emission Level (in terms of particulate matter)		
	KMB	LWB	Total	Euro II	Euro III	Euro IV/V
Euro I [#]	423	0	423	423	0	0
Euro II	200	0	200	200	0	0
Euro II*	1,339	79	1,418	0	0	1,418
Euro III	42	10	52	0	52	0
Euro III*	1,056	8	1,064	0	0	1,064
Euro IV	106	32	138	0	0	138
Euro V	679	43	722	0	0	722
	3,845	172	4,017	623	52	3,342

[#] Equipped with DOC

* Equipped with DPF

Exploring Zero- and Low-emission Bus Technologies

Serving Hong Kong for 80 years in the pursuit of excellence, KMB has always been committed to introducing the latest bus technologies. We have put a great deal of effort into enhancing environmental protection by exploring various kinds of zero- and low-emission technologies in recent years.

Zero-emission Supercapacitor Bus

We conducted trials of the zero-emission supercapacitor bus ("gBus") in Hong Kong from August 2010 to April 2011, during which satisfactory results were achieved. Following the trials of the first generation gBus, KMB introduced the next generation supercapacitor bus ("gBus²"), which has double the electricity storage capacity and hence twice the driving range (8-10 kilometres when fully charged). This means that fewer charging stations need to be installed en-route, allowing

gBus² to operate on some short-distance routes without any en-route charging stations. The performance of gBus² in trials from March to September 2012 was satisfactory.

gBus² does not require an extensive network of continuous overhead cables to operate and because of the rapid charging of supercapacitors, charging can be conducted at bus stops while passengers board and alight. Only around 30 seconds' charging is required to store enough electricity for gBus² to



KMB launched Hong Kong's first electric bus for franchised bus services in September 2013

run each extra kilometre. In line with KMB's commitment to environmental protection, used supercapacitors and batteries will be collected by suppliers for recycling.

In March 2012, KMB submitted a proposal to the HKSAR Government and received approval for the proposed trial deployment of supercapacitor buses on two routes. They are Route 284, a circular route in Sha Tin, and a new route, numbered 5M, a circular route running between Fuk To Street in Ngau Tau Kok and Tak Long Estate in the Kai Tak Development Area, with a total of four bus stops. Charging stations are proposed to be set up at the end points of the routes. The trial is expected to commence in the fourth quarter of 2014.

Zero-emission Battery-electric Bus

At the same time, we continue to explore other zero-emission technologies, including the battery-electric bus, which has made significant

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

eBus, which is 12 metres in length, is powered by lithium iron phosphate batteries and capable of running at a speed of around 70 km per hour with a maximum of 66 passengers on board. Full charging at the bus depot takes only around three hours. When fully charged, eBus can travel distances of more than 180 km. After seven months of road tests with no passengers on board that focused on driving range, reliability, durability, battery performance and motor and mechanical performance, as well as performance in different weather and road conditions, KMB deployed it to provide staff shuttle services, running between Lai Chi Kok Depot and KMB Headquarters, starting from May 2013. To further assess its

performance on one of the busiest roads in Hong Kong, KMB put eBus into service on Route 2, which runs between Tsim Sha Tsui Star Ferry Bus Terminus and So Uk via Nathan Road, in the morning and evening peak hours for one month, starting on 9 September 2013. Thus, eBus became Hong Kong's first zero-emission franchised bus providing passenger services - a milestone both for KMB and the local public bus industry. KMB will review the operational performance of eBus to guide it in the procurement of the next batch of eBuses for further trial deployment in Hong Kong.

To ensure eBus matches KMB's existing bus fleet, the manufacturer has adopted a number of imported components in its design, including front-axle, steering system, air-conditioning system, bus gates, passenger seats, floor, bus body paint and related components. All these components meet European standards as well as KMB's strict standards for its vehicles. eBus is also equipped with several specially designed enhanced features, such as 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.

Procurement of Zero- or Low-emission Buses

To protect public health and improve roadside air quality, the HKSAR Government has allocated HK\$180 million for Hong Kong's franchised bus companies, including KMB, to procure a total of 36 electric buses for trial runs on different bus routes to assess their performance in different operating conditions. KMB and LWB will be receiving funding assistance from the HKSAR Government to procure 14 single-deck eBuses and eight single-

deck gBuses for trial deployment. KMB and LWB have started the tendering and procurement process.

As for low-emission technology, KMB placed an order under the HKSAR Government's subsidy scheme for three hybrid diesel-electric air-conditioned 3-axle 12-metre double-deck buses in the third quarter of 2012. These hybrid buses are expected to be trialled on urban routes in the second half of 2014.

As 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 in areas that are especially suited to their services, in particular, busy corridors. We will continue to follow the development of the latest bus technologies and collaborate with our manufacturers and suppliers to develop zero- and low-emission solutions for Hong Kong.

GREEN USE OF CONSUMABLES

Near Zero Sulphur Diesel

Since 2009, all KMB and LWB buses have been using Near Zero Sulphur Diesel ("NZSD"), which contains only 0.001% sulphur. NZSD significantly reduces the exhaust emission levels of sulphur oxides and particulates, contributing to a cleaner environment.

Synthetic Transmission Oil

Introduced fleet-wide 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, which has been a standard feature on all our new buses since 2003, reduces exhaust emissions by an average of 6%-10% compared with conventional drivelines by improving fuel economy. The system integrates a high-torque engine, a six-speed double-overdrive automatic gearbox controlled by a sophisticated gear-shift programme and an optimised final drive to provide smoother rides.

Electrostatic Filters

KMB's buses are equipped with electrostatic filters, which provide effective filtration of very fine particles. Electrostatic precipitation involving multi-layered collecting plates enables the filters to capture micron-sized contaminants and particles such as dust and pollen more effectively than traditional air filters. Tests demonstrate that electrostatic filters can filter out 80% of fine dust. At the end of 2013, electrostatic filters had been installed on 1,449 KMB buses.

Foam-element Air Filters

KMB and LWB are replacing traditional paper-element air filters with high performance foam-element air filters with an average life span of about 12 months, six times longer than that of conventional paper filters. The use of foam-element air filters maintains the operational performance of our buses while significantly reducing the amount of solid waste requiring disposal.

Variable Capacity Air-conditioning Compressor

Power-saving variable capacity air-conditioning compressors are installed on all KMB buses ordered after 2008. The compressors provide more adaptive

and refined thermal control in the bus compartment in the most fuel-efficient manner in all weather conditions.

Tyre Retreading and Recycling

In 2013, 28,500 used tyres were retreaded in KMB's retreading workshop, bringing the number retreaded since 1972 to more than 780,000. Additionally, more than 17,000 scrapped tyres and 200 tonnes of tyre chips, which would otherwise have been disposed of 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 typically be used for seven months, can be extended by around 14 months, as each tyre can normally be retreaded twice.

Cartridge Recycling Programme

Since 2001, KMB has supported the cartridge recycling programme run by Friends of the Earth (HK). Up to the end of 2013, KMB had collected a total of 6,436 cartridges from printers and fax machines for recycling.

ENVIRONMENTAL WASTE TREATMENT

KMB implements a company-wide waste reduction programme aimed at reducing the amount of solid waste requiring disposal. Good results were again achieved in 2013 in the recycling of commonly used items, including the plastic cartridges used in fax machines and printers, 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. In 2013, our achievements in



environmental preservation were again recognised by award of the “Class of Excellence” WasteWi\$e Label from the Environmental Campaign Committee.

Environmental Treatment of Chemical Waste and Waste Oil

In 2013, around 315,000 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 715,000 litres of waste oil were collected from our depots and other bus maintenance sites by a registered waste oil recycling agent for recycling or disposal in line with the statutory standards.

Waste Water Recycling

Environmental protection has always been an important consideration in KMB’s operations. Our depots are equipped with 11 automatic waste water treatment and recycling systems with a daily treatment capacity of 520 cubic metres. After chemicals have been added to separate solid impurities from the waste water that is produced during daily depot operations, the impurities are disposed of at landfills and the treated water discharged into public drains. 70% of the water that is used every day to clean our bus fleet is treated and recycled through these systems, helping reduce water consumption. We also operate a “Save Water” campaign at our depots and headquarters to encourage staff to save water.

Waste Scrap Metal Recycling

To further reduce the disposal of solid waste, in 2013, more than 957 tonnes of scrap metal from used bus parts that

were replaced at the daily, monthly, half-yearly and annual inspections were collected from KMB depots for recycling. Approximately 94% of that metal was scrap iron, which, together with non-ferrous metals, can be recycled repeatedly at low cost and low energy consumption, especially in comparison to the cost of refining from the original ores. To enable more effective scrap collection, KMB has collection points at its four main depots and its overhaul centre. The scrap metal is handled by waste collectors appointed by KMB in accordance with its annual tendering process for recycling and re-use.

GREEN WORKPLACE

All our depots feature a range of 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, while we also conduct regular air sampling in depot areas to ensure that a healthy environment is maintained.

As part of its commitment to promoting a low carbon environment, KMB is progressively installing energy efficient lamps in place of high bay lamps at its depots. In 2013, the use of energy saving induction lamps at Sha Tin Depot, Kowloon Bay Depot and KMB Overhaul Centre enabled KMB to reduce its total electricity consumption by 4%.

In 2013, KMB, the first organisation in Hong Kong to participate in the fluorescent tube recycling campaign, sent around 86,000 used fluorescent tubes to the Government’s Chemical Waste Treatment Centre for recycling, bringing the total number recycled to

around 623,000 since 2006. KMB’s five collection points at Lai Chi Kok Depot, Kowloon Bay Depot, Sha Tin Depot, Tuen Mun Depot and the KMB Overhaul Centre collect used fluorescent tubes from around 3,800 buses, more than 2,000 bus-shelter light boxes at bus shelters, and the bus depots themselves. Whenever a fluorescent tube is replaced, the packing material of the new tube is used to wrap the old one. The used fluorescent tubes are stored in a designated area until a licensed contractor collects them for recycling. Having removed the mercury from the used tubes, the contractor crushes them into glass granules, allowing the mercury, glass granules and other metal parts to be reused.

At the Group’s Lai Chi Kok Headquarters, the Green Office concept drove both the design and renovation of the premises. 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 support of the Government’s Action Blue Sky Campaign. Lower-energy LED lighting has also been introduced in common areas of the headquarters building including the main lobby to reduce electricity consumption and the demand 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. The waste oil squeezed from the filters during the compressing process can also be recycled.