

OPERATIONS

PIGS, PLANES AND PIPES:

CKHH'S
VEHICLES

Forget what you think you know about vehicles and business. CKHH companies are stretching the definitions to deliver world-class operations.

You probably think you have a pretty good idea of what vehicles are and what they do. They have wings, wheels, or rudders, are made of steel, plastic and glass, and burn fossil fuels to carry people and things from here to there. You may think vehicles are incidental to most of our businesses. And you may very well think that is all there is to it.

You would be entirely wrong.

CK Hutchison vehicles play crucial roles in all our businesses. Some are made of ice, some hum along silently, some watch from the skies, and some plumb watery depths. A new world of vehicles is upon us, made possible by massive computing power, AI, and the creativity and adaptability of CKHH staff.

PIGGIES IN THE PIPES

Ice pigs, smart pigs, pig traps – the Group has more than one firm that is big on pigs. These pigs don't make for good ham however, but they do help Northumbrian Water Limited in the UK and Husky Energy Inc in Canada to bring home the bacon.

Pigging is the term that applies to the technology of Pipe Inspection Gauges – PIGs. In the old days, water, oil and gas pipes had to be dug up to be inspected, cleaned and, if needed, replaced: a costly, time-consuming methodology.

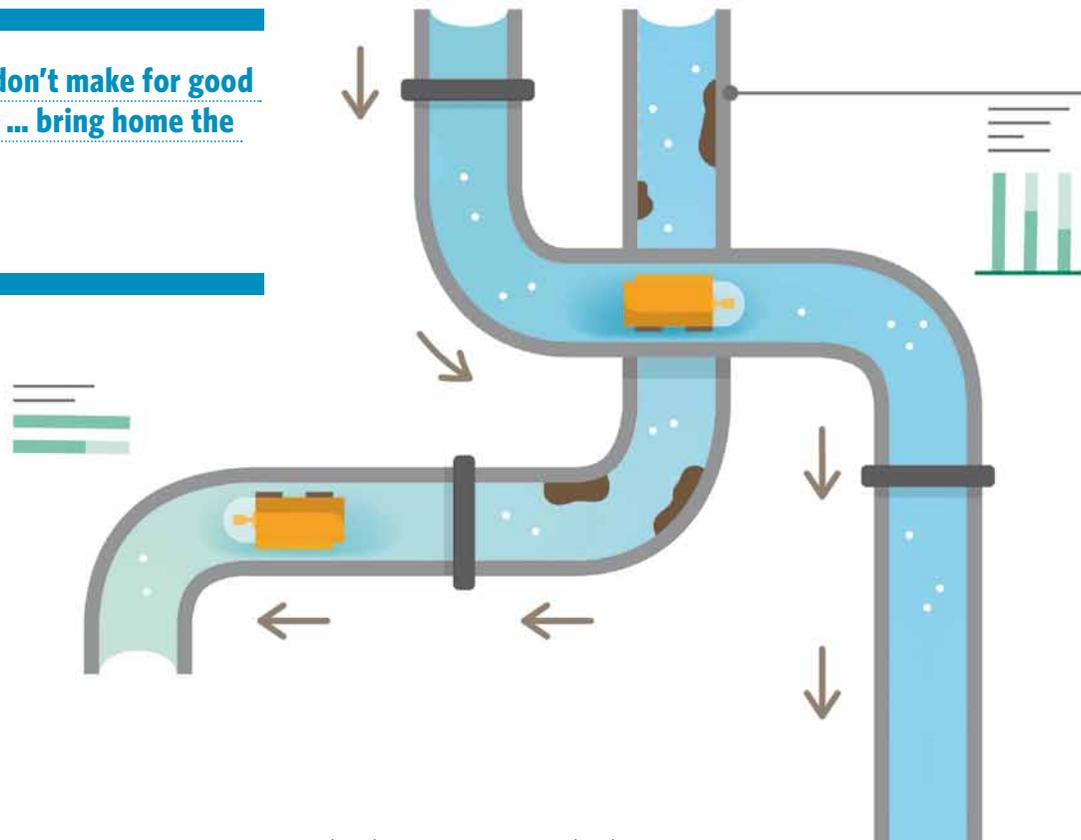
Later, simple PIGs made their way into the pipes, allowing firms to clean them through abrasion. But now Northumbrian Water and Husky Energy have taken pigs – so often used that the acronym has become a standard word – into the 21st century.

The original pigs were mini-vehicles, and the smart pigs that Husky Energy uses still are. Northumbrian Water, however, has deployed a new, carefully created post-vehicle "ice pig" to clean pipes. A special freezing point suppressant is introduced into water, allowing it to freeze to just the right consistency to flow down the pipes. It has enough abrasiveness to clean the walls of the pipe, but doesn't damage the lining of the pipe wall.

Trials in 2010 led to widespread adoption in 2012 with comparable results to traditional cleaning methods. Ice pigging has since cleaned over 50km of pipe in the Northumbrian Water network.



These pigs don't make for good ham, but do ... bring home the bacon.



SMART PIGS

Husky Energy has over 30,000km of small-to-medium diameter pipelines spread across the vastness of Western Canada. These pipes must be regularly maintained and monitored - and smart pigs are part of the solution. Smart pigs are wee vehicles that travel the pipes using an on-board computer. Old pigs would scrape the pipe to remove contamination, but newer smart pigs also collect information on minute pipe fractures, wear and tear and other vital data that helps engineers decide whether they need to make repairs, or can leave a pipe be and focus elsewhere.

Pig traps are set into a pipe where it pops above ground and these provide an access point for catching or deploying pigs. The strategic pipeline integrity management programme is aided by engineers learning from the pigs where efforts should be focused to get ahead of potential problems, and what can be left in the ground, making the whole operation more efficient. Pigs may be used to clean a given pipe once a month or more, while smart pigs may inspect pipes every two to five years.

As pigs become even smarter, engineers anticipate that high-definition 3D cameras

and real-time inspection technology may allow technicians to piggyback on smart pigs to inspect pipes in situ, making operations even more efficient.

IN A YELLOW SUBMARINE

Moving from pipes to tanks, Northumbrian Water has partnered with tech provider, UK-based Panton McLeod Ltd, to bring a little of The Beatles to water management.

Yellow submarines, individually bearing staff-given names like Ringo (Starr) and Macca (Paul McCartney), are Remote Operated Vehicles (ROVs), controlled by expert engineers who send them into the massive water storage tanks of Northumbrian Water.

About the size of a football, they can access places staff otherwise can't, and can take water samples in real time. Old inspection protocols required tanks to be drained, a costly and expensive procedure that put additional strain on the rest of the system. Now the feisty little ROVs can save time and improve information about water quality in the tanks and about which parts of the tanks need to be prioritised for cleaning and maintenance.



Ringo (Starr) and Macca (Paul McCartney), are Remote Operated Vehicles, controlled by expert engineers.



CLEANING WITH WALL-E

They aren't the only ROVs in the Northumbrian Water underwater in-tank fleet. The company also works with Panton McLeod to deploy the VR480, VR600 and VR700 WALL-E-like robots underwater to clean and inspect the tanks.

The number in the model type refers to its size: the VR480 moves on tracks 480mm wide; the VR600 on 600mm tracks and so on. The height of each model is about 600mm - a little more than half a metre.

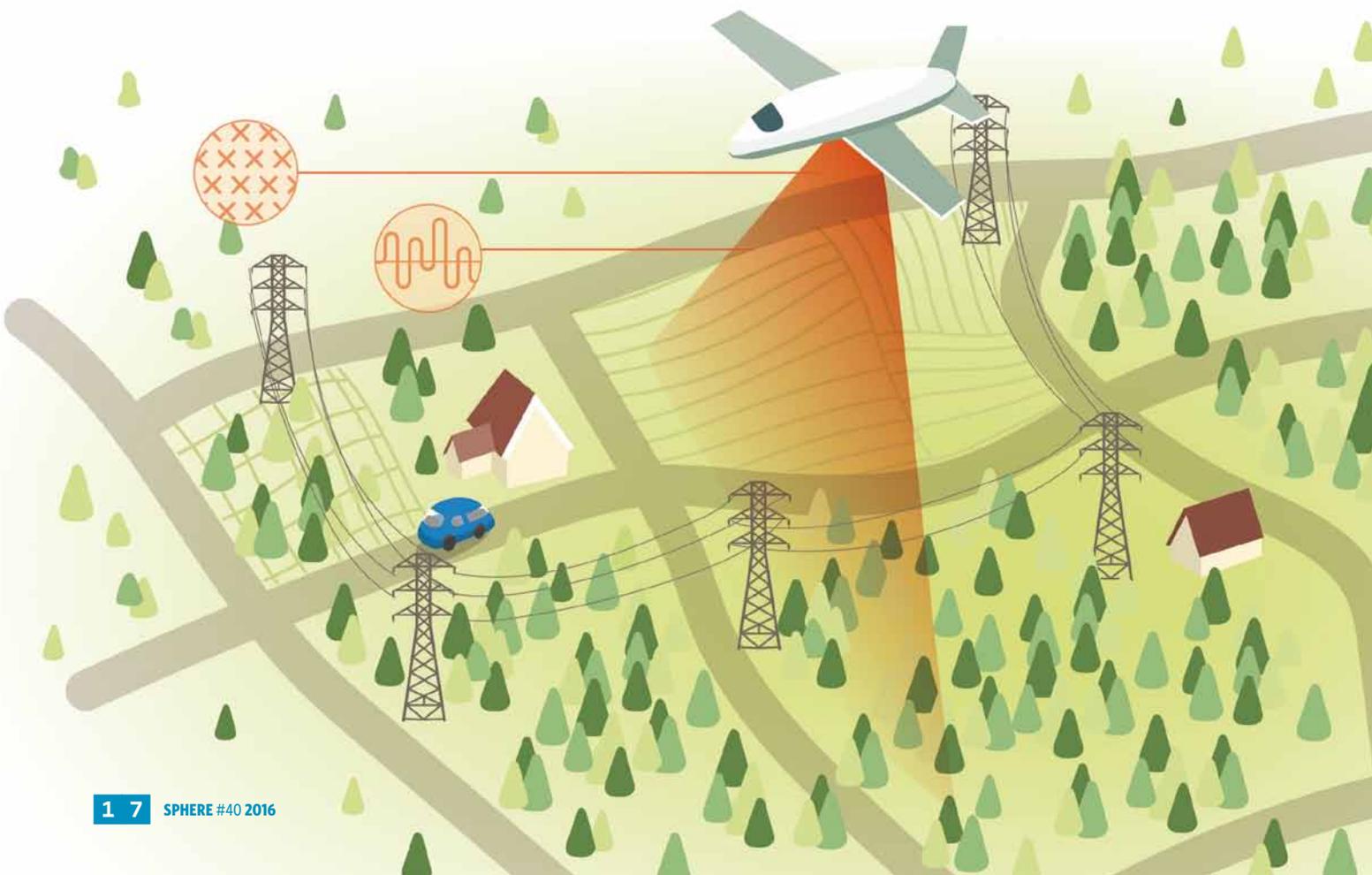
The robots travel in tanks, vacuuming up sediment when cleaning, and inspecting for faults and cracks. Northumbrian Water first adopted the technology in 2003, becoming an industry leader. The Horsley Project saw Northumbrian Water recognise Panton McLeod for their contribution in helping the company "achieve its goal to be the national leader in sustainable water and waste water services." Using the high-tech service, an extremely difficult-to-access 34-megalitre tank was cleaned, inspected and structurally modified without disrupting regular service to customers.

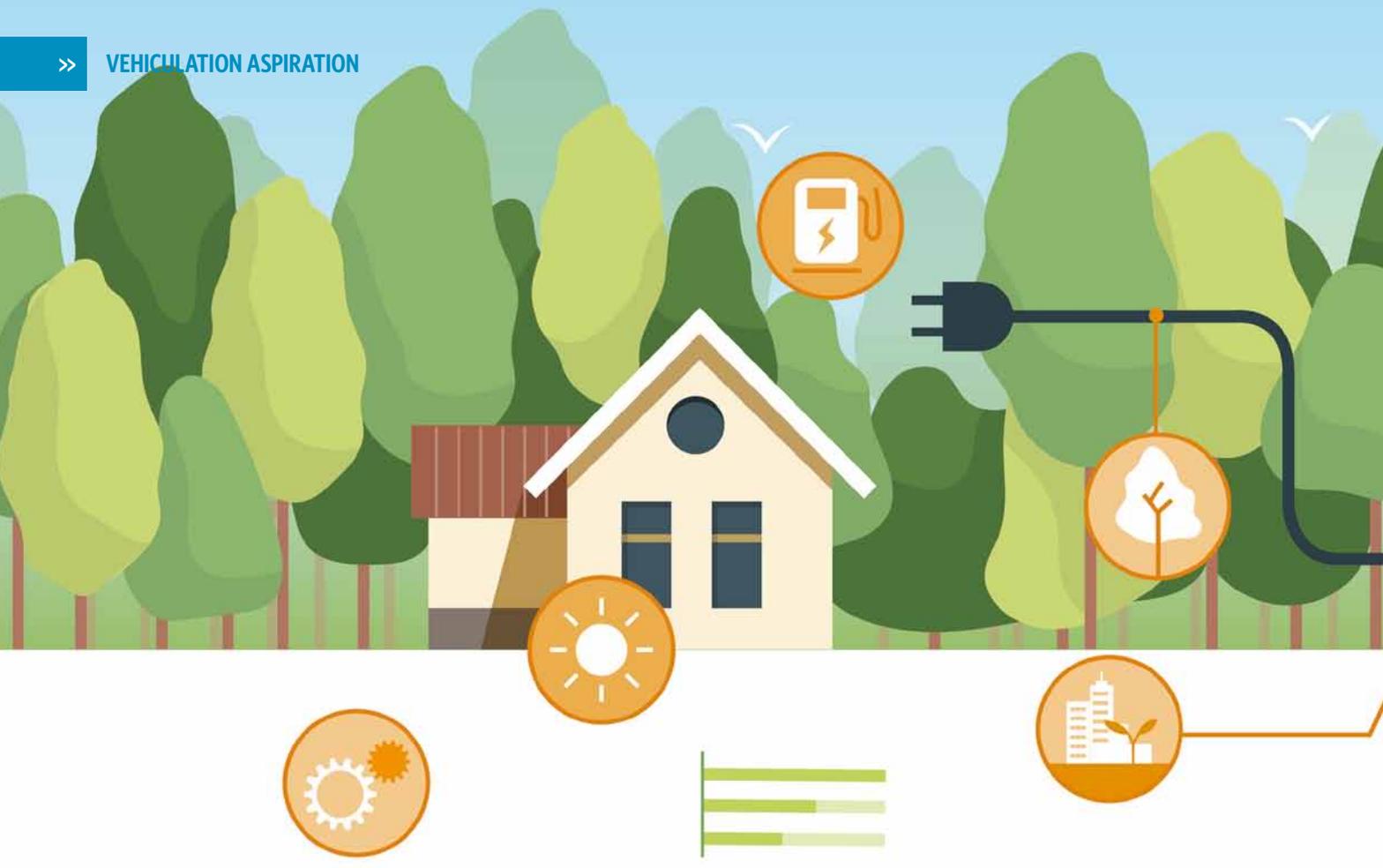
EYE IN THE SKY

High tech can be used in constrained places like pipes and tanks, but has also "slipped the surly bonds of Earth and danced the skies on laughter-silvered wings."

UK Power Networks Holdings Limited has a vast web of powerlines spreading over London, the South East and the East of England, criss-crossing cities, towns, vast tracts of countryside and even forests. Staff have had to pick their way across public and private lands to determine whether those powerlines were at threat of damage from encroaching vegetation growing into the powerlines or being brought into contact from storm or other structural impacts (for example, age or tree trauma).

But now, new technology not only allows the entire surveying process to happen from the sky, but it allows those responsible for surveying the entire network to see a periodically updated image whenever they want. Cutting-edge new technology known as LiDAR makes this possible. A portmanteau of the words





light and radar, LiDAR is a means of using lasers to take images and store them in a massive database. In this case, UK Power Networks makes use of aircraft with the LiDAR technology to fly over the transmission network to create an image of powerlines and anything around them.

Six years ago, the firm first started looking at the technology, but deemed it not quite ready for prime time in terms of costs and proven technology. A second look led to a trial in 2013, scanning two parts of the network. The successful experiment led to the system being implemented across the entire network.

The aircraft does the heavy lifting and provides the overhead vantage point that allows the LiDAR to work. The scanning provides masses of data. Almost too much – the biggest challenge in implementation was updating the asset management database to take on the huge amounts of new, detailed data that is now available.

The impact on business is real. Martin Peters, Tree Manager at UK Power Networks, explains, “From a survey perspective, it would take about three years to foot patrol the network. But

by using the LiDAR technology, all of our network can be covered in three months with much less disturbance to stakeholders. And it’s much safer from an injury perspective for the many staff that had to venture across rough land, rivers and ditches.”

In the future, the technology may allow for identifying specific vegetative species and their current growth rates, making pruning schedules even more cost-effective. Other power providers in the UK have taken note and at least two have followed UK Power Networks in using this technology, according to Mr Peters.

EV-ERYONE IS DRIVING EVS

Operational efficiency has been a boon for The Hongkong Electric Company Limited (HK Electric) as it has become one of the major users of Electric Vehicles (EVs) in Hong Kong. But it has also kept track of market developments, staying ahead of its customers’ demands.

It has a growing fleet of EVs in Hong Kong, with these now making up around 37 per cent of its vehicles. The plan is to replace old combustion engine vehicles as they are retired until the whole fleet consists of

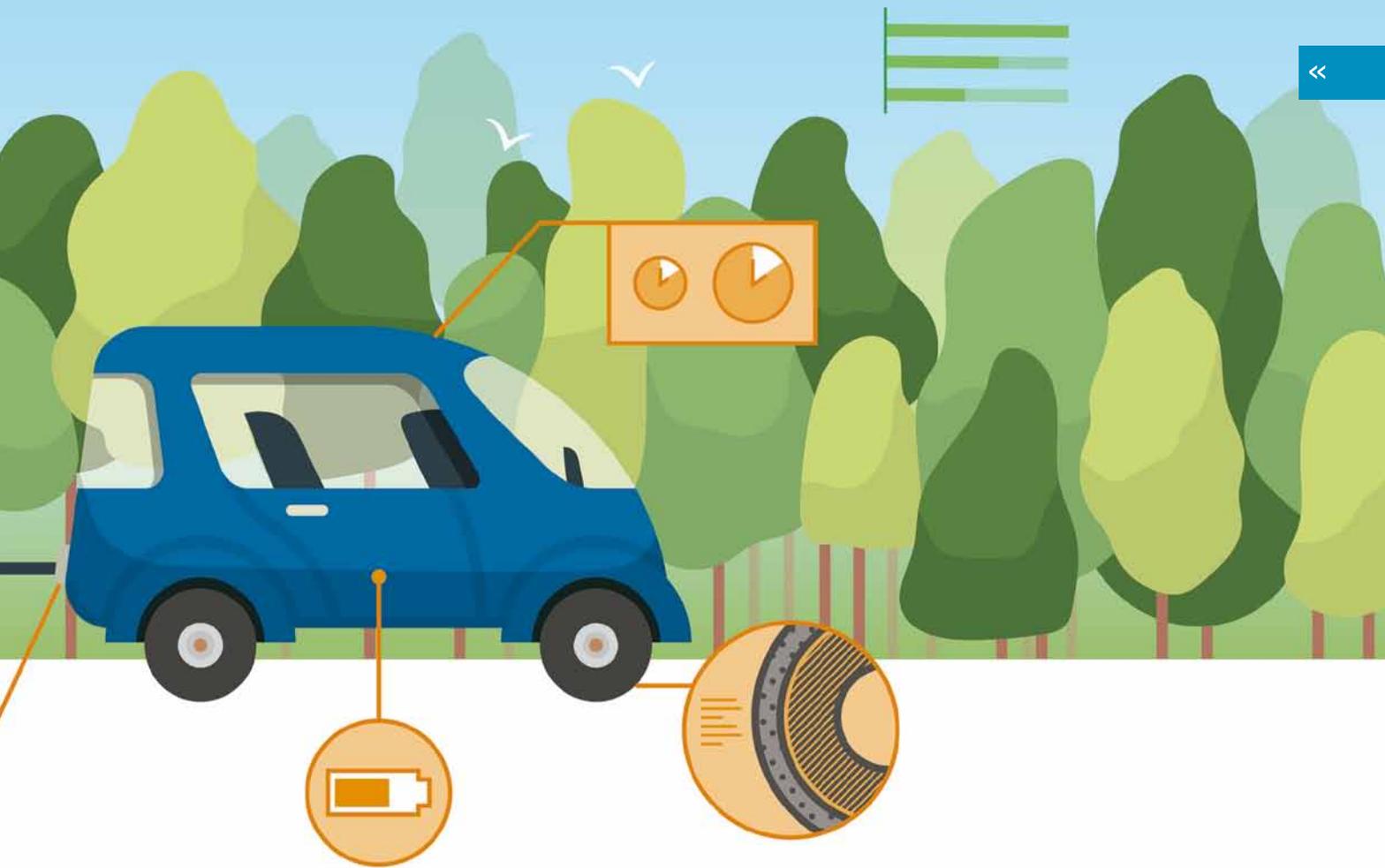
EVs. Various HK Electric offices’ car parks are fitted with chargers and, as vehicles are used in Hong Kong’s small area and spend overnight in a parking bay, charging and range is never a problem. With fewer moving parts, the vehicles have less downtime for repair, meaning they are on the road much more often which lends to greater operational efficiency.

HK Electric’s experience in running its own operations is also enabling it to align itself with government incentives for consumers to use cleaner cars, and with consumer preferences and spending trends.

HK GOING GREEN

Hong Kong has possibly the highest first registration tax on new cars in the world. However, in a bid to reduce roadside pollution, the Hong Kong government has waived the tax on purely electric cars, making them popular in the crowded city. Their widespread adoption is now leading to a demand for more charging stations.

HK Electric has responded to this market demand and is helping to smooth the way for those who would like to help improve Hong Kong’s roadside air quality. It launched 10 of its own free-to-use



charging stations across Hong Kong to get things started. Drivers can get a 50 per cent charge in about four hours on a standard charging station, or an 80 per cent charge in half an hour on a quick charge station.

Just last year, HK Electric started working directly with property owners who are fielding more and more requests from tenants to provide charging stations in the car parks of their apartment buildings. Last autumn, the company hosted a seminar with around 200 building operators, developers and service providers to discuss the installation of EV charging. Peter Leung, Manager, EV Support and Development, explains some of the challenges that needed to be overcome.

“Property owners may be concerned about a number of factors, such as the availability of space for installation of EV chargers and adequacy of power capacity at their premises,” he notes.

“With our ‘Drive EV Charge Easy’ service, we provide customers with an all-round technical advisory and support service that facilitates the installation of EV charging

facilities within their buildings,” Mr Leung adds.

A tripartite range of EV charging support services has seen assessments and complete installations delivered in a timely fashion for building operators. From the first successful building estate, with installation of EV charging facilities for 70 parking spaces (soon to be expanded to 240), the programme has since been delivered to over 30 buildings. Building operators appreciate HK Electric’s two-day service delivery pledges for each stage of installation, and help in achieving a viable solution for installing EV charging infrastructure. More interested parties are sure to follow; Mr Leung’s team has fielded several hundred enquiries from owners and managers of residential buildings last year.

“We’re happy to see that more and more residential buildings are installing chargers,” says Mr Leung, looking forward to cleaner roadside air quality in Hong Kong. He is encouraged by the use of EVs and is confident that the only significant barrier to adoption is a lack of information in the community. He and his team are overcoming that barrier by working closely

with communities to get the message across: “It’s pretty simple – and safe!”

CK Hutchison companies have taken the basic concept of using vehicles in the workplace and stretched the limits of current technologies to improve business processes and make a better world for their customers. Next time you take a look at your part of the CK Hutchison Group, look for opportunities where a yellow submarine, piggies or WALL-E could transform your business. □

