FROM WASTE INTO TREASURE

NEW ENERGY AND DIVERSIFIED BUSINESSES

ECO is refining its technology to produce cellulosic ethanol, an advanced biofuel, from agricultural waste. When this process is proven successful at a pilot plant now under construction, ECO will become a world leading producer of advanced biofuels, including hydro-treated vegetable oil and cellulosic ethanol.

NEW ENERGY AND DIVERSIFIED BUSINESSES

The demand for sustainable energy as a means of combatting climate change is growing across the world. ECO's business is helping to meet this demand by turning low-value waste-based feedstock from renewable sources into high-value products. Through our proprietary technologies, we are providing sustainable solutions that will help to decarbonise our world and make it a better place for future generations.

ECO: A Leader in Green Energy

ECO Environmental Investments Limited (ECO) was established in Hong Kong in 2000 under the concept of "turning waste into treasure". Starting with early initiatives to produce clean energy from waste sources, ECO has extended its range of clean products to cover fuels, chemicals and other renewable materials.

Guided by the vision of a carbon neutral world, our business development is powered by the innovative endeavours at our research and development bases in Shanghai and Suzhou. As several of our key research projects come into fruition, ECO is emerging as a global forerunner in the green industry, with solutions that address the environmental challenges associated with climate change.

ECO is focusing on businesses related to the development of clean, renewable energy from biomass, including inedible bio-grease and agricultural waste. At present, these businesses comprise a bio-grease utilisation project in Jiangsu province and two biomass utilisation projects in Hebei province.

In the third quarter of 2020, our hydro-treated vegetable oil (HVO) project went into full production. This project has been performing well despite the challenges of COVID-19.

Using patented technologies developed in-house, ECO produces HVO accredited under the International Sustainability and Carbon Certification Scheme that is capable of reducing carbon emissions by 90 per cent. The product is exported to EU markets, where it helps to meet the EU's latest targets under Renewable Energy Directive (RED) II and its commitment to reduce emissions under the Paris Agreement.

ECO established research and development bases in Shanghai and Suzhou to develop products related to advanced biofuels and eco-friendly materials.

The second phase of the HVO project in Zhangjiagang, Jiangsu province was fully commissioned, expanding its annual production capacity to 250,000 tonnes of HVO.

After only a few months in operation, the HVO facility produced around 88,000 tonnes of HVO, of which 90 per cent was sold to customers in Europe in 2020. With the proven success of our processes and technologies, we are now planning to further increase our HVO production capacity.

Additionally, we plan to upgrade the processes at our HVO facility to enable the production of sustainable aviation fuel (SAF). We believe that SAF will become one of the key pillars for achieving carbon neutrality in a global context and thus has huge market potential.

Also during the year, two new plants were under construction in Hebei province. Both facilities will make use of our patented hydrolysis and saccharisation technologies to convert locally collected agricultural waste, such as corn cobs and straw, into a wide variety of useful bio-chemical products.

The first plant will commence trial production in the second quarter of 2021, when it will begin producing furfural and paper pulp. This will create a solid foundation for a whole new range of bio-products.

The second plant, also in Hebei, is expected to commence trial production of furfural and cellulosic ethanol in the fourth quarter of 2021. Cellulosic ethanol is yet another advanced biofuel, as defined under the EU RED II framework, which can be added to gasoline to reduce its carbon emissions. With the successful completion of this facility, ECO will emerge as a forerunner in the economical production of cellulosic ethanol on a commercial scale and will likely be the only company worldwide capable of producing both HVO and cellulosic ethanol.

Recognising that the world is looking for a viable supply of green hydrogen, we are now exploring the possibility of adapting our patented biomass gasification technology to produce hydrogen-rich gas from agricultural waste. The success of this technology will have profound implications for a hydrogen-based economy, as green hydrogen will then become readily available wherever agricultural waste can be conveniently collected in fields surrounding urban areas.

Going forward, ECO will continue to pursue the expansion of its low-carbon business, powered by its ground-breaking technological innovations.

Telecommunications

We operate telecommunications businesses in both Hong Kong and mainland China through Towngas Telecommunications Company Limited, a wholly-owned subsidiary of the Group, and its subsidiaries (collectively known as "TGT"). With solid infrastructure and resources, TGT provides services for Hong Kong, mainland China and international telecommunications service providers, operators, and corporations.

Today, TGT has grown into a company with seven world-class data centres across Hong Kong and mainland China, offering

Together with Henderson Land Development, TGT launched the Smart Mall service to provide customers with a stable, high speed 5G mobile communication experience at a shopping mall in Ma On Shan.

strong connectivity and advanced data services such as fog and cloud computing.

One of TGT's strongest competitive advantages is its Glass-In-Gas technology, which allows optical fibres to be installed within our extensive gas pipe network for a more cost-effective, interference-free alternative to traditional road opening methods. This technology is now also being applied in mainland China, where we obtained approval from the China Gas Association for our Technical Standards for Laying Fibre Casing Pipe in Gas Pipeline.

In April 2020, TGT cooperated with Henderson Land Development Company Limited (Henderson Land Development) to introduce the 5G Sharing System at nine shopping malls of Henderson Land Development. The system offers high speed, low latency and stable 5G mobile services as well as related applications for the convenience of customers. The project earned the Best 5G Connected Arena – Gold Award in the 2020 CAHK STAR Awards. TGT is currently preparing to develop 5G services for use in the public areas of residential premises.

Information Technology

Our wholly-owned subsidiary, S-Tech Technology Holdings Limited (S-Tech), was established to provide our city-gas companies with information technology that supports customer service management. Today, this business is engaged in cloud software development, solutions implementation and systems integration services, which enable our city-gas businesses to manage their advanced customer service and gas piping network systems more efficiently.

The Towngas Customer Information System (TCIS) developed by S-Tech covers 87 per cent of the Group's city-gas companies on the mainland. Of these, 89 per cent are using the latest cloud version of the system, which helps them reduce operational costs, shorten development cycles and provide quality services to more than 17 million customers. The TCIS has now been updated to accommodate data uploads and downloads from millions of smart meters. In 2020, the cloud and non-cloud based versions of TCIS3.0 were implemented in 126 city-gas companies, achieving 100 per cent availability (service-level agreement: 99 per cent).

During the year, S-Tech launched the TCIS3.0 and mobile application project with Changchun Gas Co., Ltd. (Changchun Gas), a major city-gas project of the Group in Jilin province serving more than 1.6 million customers. Changchun Gas plans to adopt S-Tech's mobility application, paperless customer service office and Artificial Intelligence Call Centre system with the TCIS3.0 for their Smart Gas projects and Towngas Total Solution+.

Civil and Building Services Engineering

U-Tech Engineering Company Limited (U-Tech) is a wholly-owned subsidiary of the Group providing consultancy and engineering contractor services

in Hong Kong and Macao. These services include utilities installation, infrastructure construction and civil and building services engineering for public and private projects.

During the year, U-Tech acquired a landfill gas pipe construction contract from Chun Wo Construction and Engineering Company Limited for South East New Territories Landfill Extension in Tseung Kwan O. Other contracts were secured in 2020, including a fire services installation works project for a residential development at Un Chau Street by Henderson Land Development under the Urban Renewal Authority, as well as the supply and installation of electrical works for Henderson Land Development's residential development on Seymour Road.

In addition, U-Tech continued to construct district cooling mains for the Electrical and Mechanical Services Department at Kai Tak Development Area.

Manufacturing

M-Tech Metering Solutions Company Limited (M-Tech) is a wholly-owned subsidiary of the Group that develops and markets smart gas meters. It takes advantage of rapid developments in advanced technology, including Micro-Electro Mechanical Systems (MEMS) and Narrowband Internet of Things (NB-IoT), to provide products with wider measuring ranges and smart features.

In 2020, M-Tech incorporated NB-IoT into its residential and commercial MEMS meters. Connected seamlessly with the TCIS3.0 platform, the NB-IoT meters allow mobile payments, automatic meter readings, remote valve shut-off and other safety monitoring functions. These smart meters have become widely accepted by household users and restaurant clients. During the COVID-19 epidemic, they enabled gas companies to obtain meter readings without accessing customers' premises.

U-Tech's advanced trenchless approach to tunnel boring is being used to install cooling pipes for the District Cooling System at Kai Tak Development Area.

M-Tech is also developing other advanced meters and meter accessories such as filters and connecting pipes, to offer customers a complete solution package.

Another wholly-owned subsidiary of the Group, G-Tech Piping System (Zhongshan) Company Limited (G-Tech), supplies high-quality polyethylene (PE) piping and related ancillary products with the support of GH-Fusion Corporation Limited, a joint venture between Towngas and Fusion Group (United Kingdom) specialising in PE fittings.

G-Tech has a wide range of quality products to meet the different needs of national and international markets. The PE ball valve fittings we launched in 2019 achieved satisfactory sales among our city-gas projects. Although the COVID-19 pandemic in Europe slowed down export sales of PE fittings in 2020, market growth in mainland China made up the shortfall.

G-Tech's production sites are located in Zhongshan, Guangdong province and Maanshan, Anhui province, which had a total production capacity of up to 20,000 tonnes of pipes at the end of 2020. Together with its two logistics centres, G-Tech offers quality products, high distribution efficiency and excellent customer service.