# NEW ENERGY AND DIVERSIFIED BUSINESSES

## CREATING OPPORTUNITIES FOR GROWTH

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Falling crude oil and natural gas prices present an unprecedented challenge to our new energy projects that output substitute fuels for crude. Yet our research and development initiatives in technologies that transform industrial and agricultural waste into cleaner fuels and valuable chemicals and materials are bound to bring the Group to another stage of business development. Moreover, the advent of the Big Data Era is setting the scene for the rapid expansion of our telecommunications business, positioning us to flourish in a changing economic and technological landscape.

## New ECO Energy

ECO Environmental Investments Limited (ECO) is the Group's new energy platform and a world-class pioneer in alternative energy. With a strong focus on innovation, ECO has been successful in introducing clean and renewable fuels and their application through a number of projects in mainland China and overseas, bringing the Group closer to its new energy vision and commitment to environmental protection.

In 2015, the mainland government continued to progress towards energy diversification and the reduction of carbon emissions. As such, we expect to see a growing demand for clean automobile and marine vessel fuels, and a strong potential for recycling industrial and agricultural waste. As a leader in clean energy, we have strategically invested in exploring commercially viable ways to turn low value feedstock into high value energy, allowing us to address environmental concerns as well as to meet the energy needs of the country.

To secure our supply of liquefied natural gas (LNG), we are building a diverse energy portfolio using different types of feedstock. One of these is coalbed methane, which we have been converting to LNG at our coalbed methane liquefaction facility in Jincheng, Shanxi province. Commissioned in late 2008, the facility has a production capacity exceeding 250 million cubic metres per annum.

Our coke oven gas plant in Xuzhou, Jiangsu province is expected to undergo operational trials in mid-2016, with an annual output capacity of 110 million cubic metres of LNG.

Another resource for the production of LNG is coke oven gas, which is a by-product of the coke-making process. We are currently constructing a plant in Xuzhou, Jiangsu province to convert coke oven gas into methane, then LNG. Trial operation is expected to commence in the second quarter of 2016, further enhancing ECO's LNG production capability.

ECO has also placed significant effort in converting biomass into clean energy and chemical products. A plant to upgrade low-quality inedible bio-oil is now under construction in Zhangjiagang, Jiangsu province. Upon completion, the facility will process approximately 220,000 tonnes of palm acid oil per year for conversion into high-quality chemical products and low-sulphur fuels. The construction work is expected to complete in early 2017 for trial production.

Agricultural waste, which is abundantly available on the mainland, also provides raw material for biomass conversion – an area showing high potential for development. Agricultural waste was traditionally burned on-site to make way for the next crop, forming a major cause of the severe smog pollution during harvest seasons. Through our research and development efforts, we have succeeded in developing new technology to convert agricultural and forestry waste into natural gas through thermal gasification and methanation, and to produce levulinic acid through hydrolysis, which can be used as a raw material for producing clean fuel additives. We are planning to commence a pilot project in Hebei province, which is expected to generate natural gas output by early 2017. This project will be the first large-scale operation of its kind and will have important implications for the future development of renewable energy.

ECO has developed innovative technologies to convert agricultural waste into multi-purpose energy.

Our coal-based methanol plant in Inner Mongolia employs clean coal technology to generate syngas, which is then synthesised into methanol. In mid-2015, we completed the construction work to enhance its daily production capacity to over 1,100 tonnes. The yield for the whole year rose to over 300,000 tonnes, representing an increase of 26 per cent compared to 2014. Moreover, we have developed technology to upgrade methanol into natural gasoline, a gasoline substitute chemical product. The upgraded facility is now at the pilot production stage.

On the demand side of our LNG value chain, our network of refilling stations on the mainland is growing apace with this prospering market. As part of its green policies, the mainland government is promoting more stringent emissions standards and providing incentives for natural gas vehicles. Moreover, natural gas prices have dropped at the wholesale level, making it a competitive fuel alternative, even at a time of low oil prices.

With the aim of displacing the heavy reliance on diesel in the commercial and logistics market, we located our compressed natural gas (CNG) and LNG refilling stations along major transportation routes and ports, where they supply clean fuel to heavy commercial trucks as well as marine vessels. We currently possess 60 refilling stations that are in operation, under construction or at the planning stage, covering Shaanxi, Shandong, Shanxi, Henan and Liaoning provinces, among others. Moreover, over 100 new sites have been earmarked for development in the coming years, ensuring that we

do not lose momentum on this important endeavour. By expanding our network of refilling stations, we hope to help drive the uptake of clean fleets across the mainland.

In Hong Kong, ECO continued to perform well in 2015. ECO Aviation Fuel Facility supplies safe and reliable fuel to the Hong Kong International Airport and continues to contribute steadily growing returns on investment. During the year, the total turnover was 6.07 million tonnes.

Our liquefied petroleum gas (LPG) refilling station business, a fixture in Hong Kong since 2000, experienced a growth in sales volume by 3 per cent in 2015. It provides 65,000 tonnes of LPG per annum, accounting for approximately 30 per cent of Hong Kong's auto LPG market.

Despite the impact of falling international crude prices on our upstream oil business, we hit several high-yield wells in 2015 in our onshore oilfield in Thailand, bringing annual production up to 1.86 million barrels, which represents a remarkable 36 per cent increase in yield. This achievement accentuated the value of this asset as well as our ability to deliver on this new frontier through our extensive engineering capabilities, even under harsh market conditions.

## Telecommunications

Currently running two data centres in Hong Kong and three on the mainland with another under construction, having a total capacity of 15,000 server racks, Towngas Telecommunications Company Limited (TGT) demonstrated sustained business growth, with an impressive 39 per cent increase of revenue in 2015. The business provides data transmission and cloud computing services to clients ranging from large corporations to SMEs, as well as telecommunications carriers and international network service providers in the region.


Equipped with TIA-942 Tier 3+ facilities, the TGT Tseung Kwan O Data Centre 2 is fully operational, providing world-class professional services to clients.

At the 10th China Internet Data Centre Conference held in Beijing, TGT was honoured with the 2015 China IDC Industry – Excellent Carrier-Neutral Data Centre Award, which represents the highest accolade in the IDC industry on the mainland, underscoring TGT's position as a trusted data centre services partner.

With a growing presence in the telecommunications market, TGT is well positioned to capitalise on the coming Big Data Era. Massive transmissions of data are expected to mark the coming years, to be used to unlock new value.

It is a market that is expected to grow rapidly in the coming years as China shifts focus from heavy industry to the service sector. With ready access to the Group's resources, TGT is ideally placed to fill this emerging need.

## Information Technology

S-Tech Technology Holding Limited (S-Tech) is a wholly-owned subsidiary of Towngas, responsible for product development, solution implementation and system integration. Since its inception, S-Tech has successfully launched a series of products that have enhanced service quality and efficiency for the Group. We developed three internal mobile applications to facilitate regular safety inspections, meter reading and maintenance appointments for customers on the mainland. We also introduced an advanced customer

service system, enabling our businesses in mainland China to better manage customer data and billing across a cloud computing platform. In addition, S-Tech provides consulting services and other cloud computing applications as well as IT products to companies both inside and outside of the Group.

## Civil and Building Services Engineering

U-Tech Engineering Company Limited (U-Tech) is our wholly-owned subsidiary that provides consultancy and engineering contractor services in Hong Kong and Macau. It specialises in utilities installation, infrastructure construction, and civil and building services engineering for public and private projects.

U-Tech enjoyed an excellent year in 2015 through the acquisition of various new contracts encompassing electrical and air conditioning installation, underground sewer inspection, and the installation of underground water mains and chilled water pipelines. U-Tech is also seeking opportunities in projects such as the construction and installation of a pedestrian lift next to a light rail station.

In recognition of its high standards of quality and safety, U-Tech was awarded the Safety Performance Award – Construction from the Occupational Safety and Health Council, the Outstanding Contractor Award – Electrical Installation from Henderson Land Development Company Limited, as well as the Safety Merit Award from the Hong Kong Construction Association.

## Manufacturing Businesses

To ensure the highest standards of quality across the supply chain, we manufacture critical materials and devices such as polyethylene (PE) piping and jointing parts systems, as well as gas meters. With the steadfast shift to natural gas in mainland China, abundant opportunities are opening up for Towngas to contribute to a safer and more reliable gas infrastructure on the mainland.

G-Tech Piping System (Zhongshan) Company Limited (G-Tech), the Group's wholly-owned subsidiary, is a supplier of high-quality PE pipes, supported by GH-Fusion Corporation Limited, our joint venture with the United Kingdom-based Fusion Group, which specialises in PE fittings.

Reinforced by steadily increasing export opportunities despite the relatively weak export climate prevailing in mainland China, the PE piping business expanded rapidly in 2015, supplying about one quarter of the Group's mainland markets. To capture these opportunities, G-Tech commissioned its fourth PE pipe production line in Zhongshan in early 2015 and GH-Fusion also developed a number of new PE fittings to address the needs of the market. A second G-Tech PE pipe factory will come into operation in Maanshan, Anhui province in mid-2016, doubling its total production capacity and enabling its businesses to further broaden its market reach on the mainland.

M-Tech Metering Solutions Company Limited (M-Tech) develops and markets proprietary smart gas meter solutions. Incorporating Micro-Electro-Mechanical Systems technology, the accuracy of these new generations of gas meters

The construction of an underground seawater cooling system and associated works in the Kai Tak Development Area by U-Tech is progressing well.

G-Tech supplies high-quality PE pipes to piped-gas operators.

is not affected by the temperature or pressure of the gas they measure, providing a more accurate measure of gas consumption. We are planning to supply these solutions to all of our city-gas businesses, as well as others in mainland China and overseas.

To meet the requirement for tier tariffs on the mainland, in 2015 M-Tech developed a new generation of Near Field Communication (NFC) residential gas meters, which allow for tariff payment, monthly tier tariff settings and gas consumption records to avoid conflict during tariff adjustment. These meters also contain several gas safety features such as regular safety inspection alerts, excess flow cut-off as well as external interference alarms.

## New Energy and Other Projects in 2015

| | Year of Establishment | Project Investment Rmb M | Registered Capital Rmb M | Equity Share % |
|---|---|---|---|---|
| **NEW ENERGY PROJECTS** | | | | |
| **Coal Mining** | | | | |
| Jiangxi Fengcheng | 2008 | 1,100 | 236 | 25% |
| Inner Mongolia Erdos Kejian | 2011 | 450 | 150 | 100% |
| **Coal-based Chemical** | | | | |
| Jiangxi Fengcheng | 2009 | 1,250 | 350 | 40% |
| Inner Mongolia Erdos | 2009 | 1,170 | 400 | 100% |
| **CNG/LNG Refilling Stations** | | | | |
| Shaanxi Xianyang | 2008 | 12 | 12 | 100% |
| Shaanxi Huitai | 2010 | 54 | 27 | 100% |
| Shaanxi Lueyang | 2014 | 21 | 13 | 100% |
| Shaanxi Fengxiang | 2014 | 30 | 15 | 100% |
| Shaanxi Shenmu | 2015 | 26 | 22 | 90% |
| Shaanxi Baoji | 2015 | 28 | 14 | 100% |
| Shanxi Yuanping | 2008 | 40 | 20 | 42% |
| Shanxi Lingshi | 2013 | 25 | 20 | 75% |
| Shanxi Pinglu | 2014 | 27 | 14 | 100% |
| Shandong Chiping | 2010 | 30 | 15 | 100% |
| Shandong Jining | 2010 | 11 | 8 | 100% |
| Shandong Dongping | 2010 | 43 | 26 | 91% |
| Shandong Jiaxiang | 2012 | 50 | 28 | 70% |
| Shandong Weishan | 2014 | 58 | 29 | 100% |
| Shandong Shanxian | 2014 | 28 | 14 | 100% |
| Shandong Linqing | 2014 | 22 | 13 | 100% |
| Shandong Heze | 2015 | 23 | 13 | 90% |
| Hebei Shijiazhuang | 2014 | 65 | 31 | 80% |

| | Year of Establishment | Project Investment Rmb M | Registered Capital Rmb M | Equity Share % |
|---|---|---|---|---|
| **NEW ENERGY PROJECTS** | | | | |
| **CNG/LNG Refilling Stations** | | | | |
| Xingtai Ningjin | 2014 | 20 | 17 | 80% |
| Henan Xinmi | 2010 | 29 | 15 | 100% |
| Henan Anyang | 2012 | 29 | 14 | 100% |
| Henan Kaifeng | 2013 | 29 | 15 | 100% |
| Henan Linzhou | 2013 | 30 | 20 | 100% |
| Henan Nanyang | 2015 | 14 | 10 | 100% |
| Inner Mongolia Huhhot | 2014 | 28 | 14 | 90% |
| Inner Mongolia Wulatezhong Qi | 2015 | 11 | 8 | 100% |
| Inner Mongolia Xiwuzhumuqin Qi | 2015 | 30 | 15 | 100% |
| Inner Mongolia Chifeng | 2015 | 30 | 15 | 100% |
| Inner Mongolia Chaha'eryouyiqian Qi | 2015 | 30 | 15 | 90% |
| Ningxia Guangwuxian | 2015 | 15 | 11 | 100% |
| Ningxia Qingtongxia | 2015 | 21 | 13 | 100% |
| Ningxia Jinyintan | 2015 | 28 | 14 | 100% |
| Jiangxu Xuzhou | 2015 | 40 | 20 | 80% |
| Anhui Maanshan | 2006 | 15 | 11 | 30% |
| Jiangxi Pengze | 2015 | 45 | 30 | 70% |
| Guangdong Guangzhou | 2013 | 26 | 13 | 100% |
| **Upstream Projects** | | | | |
| Shanxi LCBM | 2006 | 600 | 200 | 70% |
| Jilin Tianyuan | 2007 | 140 | 5 | 50% |
| Xuzhou COG | 2014 | 453 | 151 | 80% |
| Heze COG | 2014 | 450 | 150 | 90% |
| Jiexiu COG | 2014 | 480 | 250 | 60% |
| **Coal Logistic Project** | | | | |
| Shandong Jining Jiaxianggang Logistic Port | 2011 | 540 | 180 | 55% |
| **Oilfield Project** | | | | |
| Phetchabun Province in Thailand | 2012 | USD 181M | USD 12,000 | 100% |
| **TELECOMMUNICATION PROJECTS** | | | | |
| Shandong Jinan | 2008 | 80 | 40 | 90.1% |
| Shandong Jinan (Chibo) | 2009 | 170 | 68 | 65.5% |
| Shandong Laiyang | 2011 | 14 | 10 | 90% |
| Suzhou Fengxian | 2011 | 11 | 8 | 100% |
| Suzhou Peixian | 2012 | 13 | 9 | 100% |
| Liaoning Dalian (DETA) | 2010 | 14 | 10 | 49% |
| Liaoning Dalian (Yida) | 2011 | 190 | 76 | 90% |
| Heilongjiang Harbin | 2013 | 158 | 63 | 80% |
| Beijing (Zhongjing) | 2014 | 14 | 10 | 49% |
| Beijing (Chibo) | 2014 | 14 | 10 | 97% |
| Guangdong Dongguan | 2013 | 240 | 80 | 60% |
| Guangdong Shenzhen (Qianhai) | 2014 | 59 | 29.5 | 100% |
| Guangdong Shenzhen | 2015 | 99 | 40 | 30% |
| **OTHER PROJECTS** | | | | |
| Shenyang Sanquan Construction Supervisory | 2011 | 4 | 3 | 60% |
| ECO Engineering Management (Xi'an) | 2014 | 13 | 9 | 100% |
| Suzhou Industrial Park Broad Energy Services | 2012 | 170 | 71 | 25% |
| GH Yixing Ecology | 2013 | 184 | 184 | 100% |
| Zhangjiagang (Chemical) | 2014 | 610 | 205 | 100% |
| Dalian (New Energy Technology) | 2015 | USD 4.75M | USD 4.75M | 100% |
| M-Tech | 2011 | 30 | 30 | 100% |
| GH-Fusion | 2001 | 87 | 43 | 50% |
| G-Tech | 2012 | 77.5 | 31 | 100% |
| Towngas Technology | 2011 | 30 | 21 | 100% |
| S-Tech (Zhuhai) | 2014 | 7 | 5 | 100% |
| ECO Engineering Management (Shenzhen) | 2014 | 30 | 15 | 100% |
| Towngas Lifestyle | 2015 | 7 | 5 | 100% |
| Towngas Payment Technology (Shenzhen) | 2015 | 50 | 28 | 100% |