



# Hong Kong's Energy Future

A Cleaner Energy Future is  
Hong Kong's Responsibility

Paper I:

Commentary on the

Memorandum of Understanding

between the National Energy Administration and

the Hong Kong Special Administrative Region Government on

Supply of Natural Gas and Electricity to Hong Kong

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#### I: Commentary on the Memorandum of Understanding

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Supply of Natural Gas and Electricity to Hong Kong

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To what extent has China's energy policy towards Hong Kong changed with the Memorandum of Understanding (MoU) signed on 28 August 2008 between the National Energy Administration and the HKSAR Government?

It seems China's policy has changed only slightly from the Mainland's perspective but the dynamics of energy supply for the HKSAR may be much greater – indeed, a potential 'game changer'.

The HKSAR Government's main pitch about the benefits of the MoU is that it "will help ease the pressure for tariff increases" as a result of reduction in capital investment. The Government stresses that with an estimated cost of HK\$10 billion, to build an LNG terminal in Hong Kong would "invariably boost CLP Power's net fixed assets, thus entailing a return to be borne by its customers in electricity tariffs".<sup>1</sup> This way of framing the argument gives an impression that the cost of bringing the natural gas from Central Asia to Hong Kong or for an LNG terminal located across the border under the MoU would be 'cheaper'. The fact is at present no one can say how much the gas supply will be. All that can be said at this point in time is that the price will not be calculated in the way it would have been calculated under the Scheme of Control for electricity supply in Hong Kong.<sup>2</sup>

The other benefit of natural gas is lower pollution and lower carbon emission, wherever it comes from and the important point is for Hong Kong to secure sufficient gas so that it can

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<sup>1</sup> Edward Yau, Secretary for the Environment, "A cleaner, cheaper energy future for Hong Kong", *South China Morning Post*, 23 September 2008. See also HKSAR Government Press Release: "The resulting reduction in capital investment by the power company concerned will relieve the pressure for electricity tariff increases", 28 August 2008.

<sup>2</sup> See the Scheme of Control Agreement between the HKSAR Government and CLP Power Hong Kong Ltd, ExxonMobil Energy Ltd, and Castle Peak Power Co Ltd, signed on 7 January 2008, [http://www.enb.gov.hk/en/resources\\_publications/agreement/files/SCA\\_of\\_CLP\\_Eng.pdf](http://www.enb.gov.hk/en/resources_publications/agreement/files/SCA_of_CLP_Eng.pdf). The Scheme of Control Agreement provides fuel costs are passed through directly with no profit to the utility, investment cost is visible and return on investment is regulated.

reduce the burning of coal from the overall fuel mix. Natural gas emits much less carbon dioxide than coal, and also a fraction of other polluting emissions (see chart below).

This paper will first discuss China's energy policy vis-à-vis Hong Kong up until August this year and then analyse how the MoU may impact on energy decision-making in Hong Kong going forward. It is unclear at this time what implementation and oversight mechanisms there will be to ensure performance, and what it takes for Hong Kong to secure sufficient quantities of natural gas and LNG.

This paper also argues that Hong Kong has responsibilities to become much more energy efficient as well as conserve energy so that it can be an early mover in realizing the national policy to become a low-carbon, circular economy practising sustainable development.<sup>3</sup>

### **I: China's previous energy policy**

Up until this year, China's energy policy relating to Hong Kong made practical sense for the Mainland. In light of China's enormous energy needs, Hong Kong – an economically developed society – was expected to secure its own supplies at market prices. As far as Mainland policymakers were concerned, the city's privately-owned utilities had reliable records in electricity generation, so Hong Kong could be left to 'do its own thing'.

Moreover, Hong Kong had also played an important role in developing the Mainland's energy infrastructure in nuclear and natural gas.

Notably, in 1985, one of the electric utilities, CLP Holdings, helped to build and finance China's first nuclear power plant at Daya Bay in Guangdong, not far from Hong Kong. With CLP's equity participation and long-term purchase of nuclear power with hard currency, it made it possible for China to pay for the project using French technology. Today, the Guangdong Daya Bay Nuclear Power Station is the largest commercial nuclear installation in China. Its first unit began operation in 1993 and its second unit in 1994. CLP Holdings owns 25% of the plant and buys 70% of its output under a 20-year contract (from 1994 to 2014) to supply Hong Kong's needs. The nuclear portion of the supply makes up about a third of CLP's total fuel needs, translating into approximately 25% of Hong Kong's total electricity need.

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<sup>3</sup> The concept of a 'circular economy' is a recycling economy and as a part of China's sustainable development drive, the Standing Committee of the 11<sup>th</sup> National People's Congress passed the *Circular Economy Law* in August 2008 with the law coming into force on 1 January 2009. The law requires the government to monitor energy consumption and pollution emissions in industry, promote recycling and improve energy saving, adopt renewable products etc.

As for natural gas, CLP was also the first to bring it from China to Hong Kong in 1996. With a long-term purchase contract in hard currency up until 2015, China was able to finance exploiting the South China Sea gas field with foreign partners. The state-owned National Offshore Oil Corporation (CNOOC) operates the Yacheng 13-1 gas field located off Hainan Island, which currently has about 11 operating gas wells. This is China's largest offshore gas field with about 2.5 billion cubic metres of annual production of which 1.7 billion cubic metres is currently being sent to the Black Point Power Station via a 780-kilometre long subsea pipeline.<sup>4</sup> Some gas also goes to Hainan via a smaller pipeline. Currently, Yacheng gas constitutes about a third of CLP's energy supply, fuelling approximately 25% of Hong Kong's total electricity requirements.

Both the nuclear power and natural gas supply contracts have renewal clauses.

## **II: What the MoU provides**

The MoU came about because Hong Kong's Chief Executive raised the issue of supply of natural gas by the Mainland to Hong Kong in November 2007.<sup>5</sup> While the MoU includes nuclear power supply, the Hong Kong administration was unlikely to have been concerned about it beyond 2014. After all, CLP Holding is an equity owner of the Guangdong Daya Bay Nuclear Power Station. Thus, the Chief Executive was essentially focussing on natural gas. The impetus had probably come from public concern about the building of an LNG terminal at South Soko Island, as well as concern about the insufficiency of gas from the Yacheng field.

The MoU signed on 28 August is unremarkable in parts and remarkable in other parts.

Firstly, it states the known national policy: the maintenance of "the prosperity and stability of Hong Kong" is in China's "fundamental interest" and that the Central People's Government "will continue to support energy cooperation between the Mainland and Hong Kong on the long term and stable supply of nuclear electricity and natural gas to Hong Kong".

Specifically, and unremarkably, the MoU goes on to say that both the CPG and HKSAR Government "support China Guangdong Nuclear Power Holding Co Ltd to renew its supply agreement to Hong Kong for a further term of 20 years" and that the "supply quantity will not be less than the current level in principle while pricing will be agreed on commercial principles between the relevant enterprises". This means the Chinese Government indicates its general support for the existing contract being extended to sell nuclear power to Hong Kong beyond 2014 for another 20 years.

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<sup>4</sup> These are the latest numbers provided by CLP reflecting reduced quantity in order to preserve the remaining gas reserve until another source is secured.

<sup>5</sup> HKSAR Government Press Release, 28 August 2008.

A nuclear plant has a life of about 40 to 50 years assuming essential production elements, such as uranium and plenty of water for cooling, remain available. Thus, the Daya Bay units should be able to continue to function for the next two decades.

More interestingly, the “CPG supports the China National Offshore Oil Corporation to renew its supply agreement to Hong Kong for a further term of 20 years, the pricing of which will be determined on commercial principles”. This means the Chinese Government expresses a general desire to see CNOOC supply gas to Hong Kong beyond 2015 and up until 2035.

A gas field’s life is finite and depends on how fast the gas is piped out for use. As for the Yacheng facilities, they were originally built to last about 30 years from 1996 but existing wells are now expected to be much depleted by 2013 to 2014, which raises the issue of whether it can supply Hong Kong at current levels for another 20 years.

CNOOC had already announced in 2006 that it needed to invest more money in drilling new wells at Yacheng to continue to supply Hong Kong after 2015.<sup>6</sup> Thus, the picture is less clear here as to exactly how much gas the South China Sea can supply beyond 2015. Perhaps the situation will become clearer when negotiations for the supply contract are finalised. It was because of the imminent depletion of Yacheng that CLP wanted to build an LNG terminal in Hong Kong to receive imported fuel under long-term contract, most likely from Australia. In light of China’s enormous need for fuel, it is reasonable to assume CNOOC will try to squeeze as much as it can from Yacheng and other gas fields in the South China Sea. In other words, whatever can be produced, Hong Kong is allowed to be first in line to buy it as a matter of policy.

What is remarkable is that in the same section of the MoU where the CPG expresses support that CNOOC would renew its gas supply agreement to Hong Kong for a further term of 20 years, the CPG also says that: “It is agreed in principle that the feasibility of supplying natural gas to Hong Kong via the Second West-East Natural Gas Pipeline will be studied, and an LNG terminal will be jointly built in the Mainland for supply to Hong Kong”. This means the national government is going to consider the viability of piping gas from further afield to not only Guangdong, which has already been planned, but also Hong Kong.

The HKSAR Government says Hong Kong “will see a net increase of at least 1 billion cubic metres” of gas supply for power generation.<sup>7</sup> The MoU is actually silent on quantity relating to the Second West-East pipeline supply. Perhaps the “at least 1 billion cubic metres” statement from the HKSAR Government is based on in principle verbal communication with

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<sup>6</sup> “CNOOC invests to keep SAR contract”, People’s Daily, 15 December 2006, [http://english.peopledaily.com.cn/200612/15/eng20061215\\_332818.htm](http://english.peopledaily.com.cn/200612/15/eng20061215_332818.htm).

<sup>7</sup> Edward Yau, Secretary for the Environment, “A cleaner, cheaper energy future for Hong Kong”, *South China Morning Post*, 23 September 2008.

the Mainland authorities. This is a modest quantity, which from looking at the overall picture (below) should be achievable.

In 2006, China and Turkmenistan signed a general intent agreement to construct a pipeline to supply 30 billion cubic metres of natural gas a year to China for 30 years from 2009.<sup>8</sup> At first, there was much international scepticism about whether details could be worked out for a complex deal that involved gas field development at the Amu-darya River region, pipe construction, and the long 10,000 km transit with parts going through Uzbekistan and Kazakhstan before ending in the Xinjiang terminals. Joint feasibility studies were in fact carried out quickly, and in July 2007, the pipeline construction agreement was signed. China has also set-up joint ventures in Turkmenistan, Uzbekistan, and Kazakhstan to build the route, and Russian companies have won tenders to provide pipes and also build sections of the pipeline. Uzbekistan and Kazakhstan also have abundant natural gas supplies and have expressed interest to supply to China as well once the pipeline is constructed.<sup>9</sup>

What is clear is the priority China gives to the China-Turkmen contract. Indeed, it is part of the nation's energy security policy. China has to stay on good terms with the Central Asian states as well as Russia – another important gas seller to China – to ensure smooth long-term energy supplies.<sup>10</sup> It may well be that Russia did not stand in the way of the China-Turkmen deal because China was willing to give pipes and pipeline contracts to Russian companies.

Good relations have resulted in Turkmenistan now agreeing to sell 40 billion cubic metres a year to China through the planned pipeline instead of the previously agreed 30 billion cubic metres. The President of China emphasized work on the pipeline would be speeded up. This agreement was announced on 29 August 2008, a day after the signing of the MoU with Hong Kong.<sup>11</sup>

Once the Turkmen gas arrives in the Xinjiang terminals, pipelines can transport it to East and South China. China has already completed at the end of 2004 a 4,000 km gas pipeline

<sup>8</sup> "The Turkmen government claims the pipeline will go into operation on schedule", [www.chinaview.com](http://www.chinaview.com), 20 September 2008, [http://news.xinhuanet.com/english/2008-09/20/content\\_10083012.htm](http://news.xinhuanet.com/english/2008-09/20/content_10083012.htm).

<sup>9</sup> Wang Qian, "China Maps Out Natural Gas Pipelines", [China.org.cn](http://en.chinagate.com.cn/english/48013.htm), 23 June 2006, <http://en.chinagate.com.cn/english/48013.htm>.

<sup>10</sup> Turkmenistan currently sells most of its gas, about 50 billion cubic metres a year, to Russia's Gazprom. Russia, keen to maintain control over Central Asian gas flows, has offered to buy Turkmen gas at the European price next year and build a new pipeline along the Caspian to take in more Turkmen gas; see "China, Turkmenistan agree to boost planned gas sales", Reuters, 29 August 2008, <http://www.reuters.com/article/rbssEnergyNews/idUSLT34844920080809>. Moreover, Russia is also supplying gas to China. Russia signed a Memorandum of Understanding for the transport of natural gas from Russia to China. From 2011, Russia, the world's No.1 natural gas exporter, will supply 60 to 80 billion cubic metres annually to China.

<sup>11</sup> "China, Turkmenistan agree to boost planned gas sales", Reuters, 29 August 2008, <http://www.reuters.com/article/rbssEnergyNews/idUSLT34844920080809>.

from Xinjiang to Shanghai, and is set to complete by the end of 2010 a 6,500 km pipeline from Xinjiang to Guangzhou. It is part of the national plan to bring the Turkmen gas to South China. With additional up to 10 billion cubic metres of Turkmen gas, the Central People's Government should be able to carve out 10% for Hong Kong. Had it not been for a larger quantity than originally planned, it may be harder for Beijing to divert some of it from Mainland users to Hong Kong.

There is one more part of the MoU that is remarkable. It is agreed that an "LNG terminal will be jointly built in the Mainland for supply to Hong Kong. Support will be given to the relevant enterprises which will coordinate and consider the supply of offshore gas, piped gas and liquefied natural gas and agree on the supply quantity, pricing and implementation plan as soon as possible".

This provision indicates Beijing will allow a Hong Kong-Mainland joint venture for the LNG terminal to be built in Guangdong (where two terminals are already planned and one already receiving gas for Hongkong Electric and Towngas), where imported LNG can be stored and then sent to Hong Kong. This appears to be a replacement terminal for the one originally planned for South Soko Island. Despite the fact that CLP had withdrawn its LNG terminal plan, the MoU seems to open another investment opportunity although the bidding for the development right may be open to any competent Hong Kong party.<sup>12</sup> Thus, those in the energy business in Hong Kong should be getting ready to investigate what the MoU could mean for their business. The reality is that China needs more gas and if a joint venture can secure more gas there will be no shortage of uses for it.

The HKSAR Government should also inform the community how the MoU will be implemented and what monitoring mechanism is being put in place since its success involves the proper alignment of at least several parties' efforts in Hong Kong and the Mainland in order for Hong Kong (and therefore China as a whole) to capture the opportunity to secure natural gas and LNG in the years to come.

### **III: Hong Kong's responsibilities**

As the most economically advanced city in China and much of Asia, Hong Kong has special responsibility to be a high environmental and climate-friendly performer. In exchange for getting some of the natural gas that the Mainland desperately needs, Hong Kong should commit itself to an aggressive programme to become a low-carbon, circular economy – which is also a national policy. So far, the Hong Kong administration has only focussed on the MoU's benefits to Hong Kong of lower tariffs and better air quality without

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<sup>12</sup> Mainland policy favours state-owned enterprises and restrict foreign investments. As to the form and extent Hong Kong companies can participate in the mainland-based LNG terminal it will ultimately be decided upon by regulators on the mainland.

considering its responsibility to become environmentally sustainable and reduce carbon emissions substantially.

Hong Kong should appreciate the reality is that despite all the efforts China is making to secure energy supplies there will still be a shortage of cleaner fuels to power the nation's development. Right now, natural gas plays a relatively minor role accounting for only about 3% of the energy mix.<sup>13</sup> Yet, demand is growing very fast, driven by an urbanisation-led need for clean household cooking and heating fuel, and also for China's petrochemicals industry.

**Fossil Fuel Emission Levels**  
- Pounds per Billion Btu of Energy Input

Pollutant	Natural Gas	Oil	Coal
Carbon Dioxide	117,000	164,000	208,000
Carbon Monoxide	40	33	208
Nitrogen Oxides	92	448	457
Sulfur Dioxide	1	1,122	2,591
Particulates	7	84	2,744
Mercury	0.000	0.007	0.016

Source: EIA - Natural Gas Issues and Trends 1998

Since the late 1990s, China has started to build a network of natural gas arteries including the West-East pipeline. Today, China's natural gas pipelines measure around 24,000 km but by 2010, it should increase to 36,000 km. From now till 2020, we will see the rapid development of China natural gas industry, reaching maturity between 2020 and 2030. Despite this rapid development, China will continue to face the challenges of inadequate natural gas supplies. By 2020, China is estimated to need 200 billion cubic metres of natural gas and there could be shortages of as much as 90 billion cubic meters.<sup>14</sup> The gap will have to be met through imports via land pipeline as well as LNG imports, which is why the Central Asian supplies and LNG imports from elsewhere are so critical to China's development.

On the issue of price, energy prices going forward will not be cheap and the Hong Kong government should be upfront about this. Hong Kong will continue to pay market prices for all its fuels. The Turkmen fuel will also include the total cost of bringing it to Hong Kong.

<sup>13</sup> International Energy Outlook 2008, Chapter 3 – Natural Gas, Energy Information Administration, Official Energy Statistics from the US Government, [http://www.eia.doe.gov/oiaf/ieo/nat\\_gas.html](http://www.eia.doe.gov/oiaf/ieo/nat_gas.html).

<sup>14</sup> On total demand estimates, see Eric S. Downs, "China" in *Energy Security Series*, ed. Brookings Institution, Washington DC, 2006; and on shortage, see Wang Qian, "China Maps Out Natural Gas Pipelines", China.org.cn, 23 June 2006, <http://en.chinagate.com.cn/english/48013.htm>.

Hong Kong needs to view China's willingness to supply gas to Hong Kong in context of the country's overall energy profile. Energy is a finite global commodity, and its supply and demand affect us all. Policymakers in Hong Kong need to do their best not just to secure supplies but also to conserve energy and to use energy efficiently. For example, Hong Kong undoubtedly has the capacity to improve building energy efficiency substantially by reforming its building and energy codes. Hong Kong can also use demand-side management tools to get the electric utilities to innovate on how to work with customers, so that reducing consumption and improving efficiency are rewarded financially. The utilities should be allowed to earn more from energy savings and customers can also benefit by paying less. Currently, the Schemes of Control are still supply-led.

The HKSAR government had already stated that it has "an open market" energy policy, the new Schemes of Control agreements entered in 2008 "would enable early preparation for the introduction of competition into the market when the time is ripe", and "pave the way for possible opening up of the electricity market". Furthermore, the government "would make necessary preparation in the next regulatory period, including studies on open market models and the regulatory framework, as well as enhanced interconnection between the grids of the two power companies".<sup>15</sup> This means the government intends to consider CLP Power and Hongkong Electric interconnecting their respective grids (which are owned by them) as a way to promote competition in the future, as well as possibly opening up the electricity market to others. So far, there has been no discussion about using the concept of 'eminent domain' for the government to buy the grids, as there may well be justification for the power grid to be a public asset, like airwaves.

The government has also showed no interest to explore the future of distributed power, where small power generators can tie-up to the grid. Up until now, the utilities have been unwilling to enable other generators to use the grid. Technological development has the ability to enable clean power generation from small sources (say solar or wind generated power in a district) to use the grid.

A low-carbon circular economy will likely involve all these efforts and more. It is time for Hong Kong to show real appreciation for the Central People's Government's generosity.

#### **IV: Summary**

The signing of the MoU needs to be seen as the first of several steps. It has to be implemented appropriately otherwise Hong Kong will not be able to enjoy the full benefits of an adequate natural gas supply at reasonable price, as well as better air quality and

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<sup>15</sup> Government Press Release, "New Scheme of Control Agreements reached with the two power companies" (with video), 7 January 2008.

therefore improved public health. The HKSAR Government must keep Hong Kong informed on next steps.

Furthermore, the HKSAR Government also has a wider responsibility to conserve energy resources, promote energy efficiency, ensure fair competition and keep an eye on facilitating new technology that will help Hong Kong's transformation to a clean, circular and low-carbon future. The HKSAR Government must make major policy change for this to happen.

2 October 2008