



# Improving Energy Generation for China's Chemical Industry

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Better protection of the environment is one of the key objectives of China's government policy. This obviously has a big impact on the energy sector in the country. In the 13th Five-Year Energy Development Plan, a number of targets regarding energy generation and energy consumption have been set. In particular, in the period between 2015 and 2020, the share of coal in energy consumption is to be reduced to 58% (from 64% in 2015) and the energy intensity per unit of GDP is to be reduced by 15%.

In 2016, the chemical industry accounted for slightly above 7% of domestic coal consumption – the limitations on coal utilization therefore will certainly also affect the industry. Furthermore, there are several other reasons which will force the chemical industry to pay more attention to the way its energy is generated:

- For the last two years, both environmental regulation and its implementation have been tightened considerably, with a massive government program of inspections. These primarily focus on emission and on safety standards, but of course these issues are also closely related to energy generation. As a consequence, non-compliance with regulation

related to energy generation may even lead to the shutdown of chemical plants;

- In addition, the Chinese government has tightened energy standards for individual processes and products (e.g., upper limits for energy consumption in PX projects), and actively promotes advanced technologies that reduce energy consumption (e.g., in the chlor-alkali industry);

- A reduction in the share of coal as energy source will mean a shift towards more expensive but cleaner sources such as natural gas, providing additional economic incentives for energy savings;

- The newly introduced emission tax provides similar incentives to save energy and to switch to less polluting energy sources;

- Finally, though the idea of sustainable chemical production so far is less advanced than in Western countries, it is likely to gain momentum, and buyers of chemicals may eventually choose their suppliers at least partly on their use of resources such as energy.

Given these trends and driving forces, producers of chemicals are well advised to examine ways to improve their energy generation, both with regard to cost and with regard to environmental impact. However,

individual chemical companies may struggle to achieve this on their own. Typically, energy generation is not the core area of expertise of a chemical producer. At the same time, chemical companies only have limited resources for investment in new energy generation, as they focus on investment in production capacity of their own chemicals. Competition in most chemical markets is intense – management therefore needs to focus on their core chemicals business, leaving limited or no time to focus on utilities management. This lack of management resources is particularly challenging in times such as the current one, when regulations are being tightened and deadlines for these changes are tight.

A solution that is already established in Europe and the US is to outsource the energy supply to a 3rd Party that is an expert in providing this type of service. This approach has a number of advantages:

Technological expertise: as the energy provider strictly focuses on cost efficient energy generation, the company has access and knowledge to all available technology, and is able to benchmark its energy generation with global best practice. The experience in energy generation may also lead to reduced





operating cost and decreases in downtime;

**Regulatory compliance:** as energy generation is the core business of the supplier, compliance with all relevant environmental regulation can be transferred to this outside expert;

**Focus on core business:** outsourcing the energy supply to a 3rd Party allows the chemical company to focus on its core area of chemical research, production and marketing;

**Cost reduction via economies of scale:** if the energy provider serves multiple customers or a whole chemical park, economies of scale can be attained, reducing the overall cost of energy;

**Reduced capital investment:** depending on the individual case, chemical companies may completely or partly avoid investing capital in energy generation, instead just paying for energy when it is being supplied to them. This

allows them to concentrate their own capital investment on their core business;

It is true that engaging a 3rd party energy provider adds a certain amount of complexity, for example with regard to the energy price charged or take-off guarantees. However, as past experience shows, these issues can be managed well via service contracts precisely defining expectations, deliverables, tariffs, penalties, indemnities, service charges, operating performance and procedures. If such service contracts are in place, it can be ensured that the chemical company clients and the third-party energy provider are fully aligned with regard to technical and commercial terms.

In which situations can a switch to an external provider be particularly beneficial? Any major changes in the production setup should be regarded as opportunities to consider outsourcing. This includes a

relocation of production (e.g., to a chemical park), the establishment of new chemical production, and the upgrading of production processes. Tightened government regulation may also favor switching to a 3rd party provider, e.g., if tightened emission regulations require modernization of the current energy supply or a shift of the energy source such as from coal to natural gas. Finally, companies may consider outsourcing their energy supply to meet cost improvement targets or – depending on the contractual scheme agreed on with the energy provider – to reduce their asset base.

An example for an energy provider taking over the energy supply of chemical companies is the CHP (Combined Heat and Power) plant operated by Veolia in Porvoo, Finland. At this site, the finish petrochemical company Neste operates an oil refinery while Austrian







Borealis produces polyolefins. Neste were obliged to comply with new European Union emission limits (IED) and also wanted to improve the energy efficiency of their plant. Veolia's offer to provide energy to the site included financing (via a Special Purpose Vehicle with multiple stakeholders), design, building and operation of the plant for a period of 20 years, with operations starting in 2018. Advantages of this model for Neste and Borealis include the mutualization of assets with the associated improvements in plant utilization, performance guarantee by Veolia, a reduction of the asset base as well as reductions in operating costs and Total Cost of Ownership (TCO) by utilizing the newest process technologies and clever utilization of refinery residuals as heating material. The fact that Neste recently was ranked at No. 2 of the global 100 list of the world's most sustainable

companies emphasizes the importance the company places on environmental issues, which is in line with them asking an expert outside company to provide energy.

In China, an example for this model is the CHP plant operated by Veolia within the Chongqing chemical cluster (Changshou), which supplies more than 80 companies in the same geographic area with steam and electricity. As the preferred energy service company of the local industries, Veolia provides investment, construction and operation services to this CHP plant. The chemical companies located in the cluster benefit from lower steam and electricity costs due to the centralized energy production and the process and automation expertise of Veolia. As the CHP plant is financed by Veolia, there is no investment required from the customers. Veolia guarantees both constant availability of energy and steam and compliance

with all relevant environmental regulation.

Given the increasing importance of efficient and environmentally friendly energy generation for the chemical industry in China, it is reasonable to expect that this task will increasingly be taken over by specialized service providers rather than be done by the chemical companies themselves, which have less expertise and will do better to focus on their core areas. A few very qualified companies already offer such services in and outside China, and particularly those with a good track record in providing these services to Western chemical markets should be well positioned to establish themselves in China. This will require these companies to be able to meet complex technological challenges, to show a strong and diverse set of existing references and to provide customized solutions rather than standard selling products. ■