Coal Blending in China

Chinese coal trader introduces proven Dutch concept

In China, a copy of the port of Rotterdam’s coal blending facility is taking shape. A Chinese coal trader was so impressed by the original facility that his firm has commissioned the construction of a ‘clone’ by the original facility’s creators, using exactly the same techniques. KEMA is one of the parties involved.

Coal transfer company EMO has a facility at the port of Rotterdam, which blends coals of various qualities, obtained from a variety of countries. On arrival, the coal is placed in silos. Then, coal from the silos is blended in carefully calculated proportions to produce a combustion-ready mix that meets the client’s specifications. ‘The composition of coal from one mine can be quite different from that of the coal you get from another mine,’ explains Geert-Jan Smithuis of KEMA. ‘Coals differ in their sulfur content, calorific value, combustion behavior and ash content, as well as the make-up of the associated emissions. Coals with extreme properties are not so easy to sell. And, because they are in less demand, such coals fetch lower prices. By blending, you can dilute undesirable extreme characteristics, resulting in a relatively cheap and more marketable mix. KEMA has spent years looking at the way the properties of coal influence one another and carrying out combustion tests to support its theoretical work. It is not the case that if you put two coals together in equal proportions you get a blend whose properties are midway between the two constituent coals; some properties are dominant, while others are regressive. We are now familiar with the properties of numerous coal types; we know which types can be combined and what the combustion properties of the resulting blend will be. What’s more, we have special software that we have developed in house, which is capable of predicting the combustion properties of a given blend.’

Impressed
Fifteen years ago, KEMA’s knowledge and experience were utilized in the design of EMO’s coal blending facility at the port of Rotterdam. At the facility there are six silos, each measuring twenty meters across, standing sixty meters high and capable of storing 6000-8000 tons of coal per silo. ‘This facility has been in constant use since without a problem,’ says Smithuis. ‘It is a unique installation, supplying the power plant on the Maasvlakte in the Netherlands and various clients in Germany’s Ruhr valley. It is a concept that has proved to be of great financial benefit for all concerned.’

Chinese coal trader Mr. Howard Au, director of Petrocom (PE), has previously supplied large quantities of coal to Europe via EMO throughout the 1990s. He was therefore aware of the impact the facility had when it was built and just how valuable it has proved. Consequently, he was quick to see that, following deregulation of China’s domestic coal market, the coal industry in his home country could benefit greatly from blending coal using the EMO method.

High sulfur content
China has enormous reserves of coal, which is the country’s main fuel. The calorific value of Chinese coal is high, but so too is its sulfur content. What is more, China’s power plants do not have desulfurization systems. So Mr. Au got in touch with the parties who were responsible for creating the Netherlands’ CBF: facility owner EMO, technical consultant KEMA, Dutch construction firm IV-Bouw and German firm Beste-Erko, which provided the distribution system. ‘From my own experience and a detailed study, we
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knew that EMO’s CBF method and the parties involved were reliable and had proven track records. PE wants long-term partners that it can work with to develop and expand its CBF network and its position in the Chinese coal industry. By working with us to achieve this aim, our partners will gain extensive access to all sectors of China’s coal industry,’ Mr. Au comments.

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KEMA was commissioned to join the project in November 2006. ‘Petrocom announced its plans in the autumn at a gathering for the media and dignitaries,’ recounts Smithuis. ‘There was a sizeable turnout, underlining the level of interest in the project.’ In the final phase, Unit Director Gerd Enoch traveled out to China to finalize the contract. ‘We were confident about the outcome, and we decided to back that confidence,’ observes Enoch.

Controlled blending process
‘The CBF is central to our business model and strategy,’ comments Mr. Au. ‘We are blending high sulfur/high ash/high energy domestic Chinese coals with low sulfur/low ash/low energy coals, primarily from China and Indonesia. So we require a scientifically controlled blending process capable of producing customized coal blends for specific power plants and providing a consistent quality over a long period. Our Integrated Coal Platform and planned CBF network have been recognized by central government departments, local provincial governments, major power plants and major coal companies as valuable in helping China to make better use of its energy reserves by matching coal resources to power plant requirements, thus improving the efficiency of the power plants and drastically reducing emissions during combustion.’

Optimization
KEMA will determine what blend of the coals available from sources in China, Indonesia and elsewhere is best for the individual power plants to be supplied. The object is to reduce the sulfur content without compromising the positive combustion properties. ‘It is a very attractive role for us,’ confirms KEMA’s Cees Gast. ‘We will have the opportunity to add considerable expertise.’ As the project’s coal combustion expert, KEMA will perform a thorough analysis for each client. This is important because every power plant is different and each of them wants to be sure of the implications of burning a given coal blend. ‘The analysis path starts with a desk study, the product of which is a proposal,’ explains Smithuis. ‘We then travel to the power plant and conduct practical full-load trials using the proposed blend. From the findings, we can see whether the blend meets the requirements and indicate what needs to be done to optimize performance.’ Cees Gast adds: ‘As well as fine-tuning the composition of the blend, that may mean suggesting adjustments to the boiler and the rest of the power plant.’ ‘We have found KEMA to be highly professional with extensive knowledge and experience of coal blending, which will be important to our future development of the CBF network,’ says Mr. Au. ‘Detailed feasibility studies have been conducted for the first five sites. In November 2006, construction commenced at the Lianyungang CBF, which is scheduled to enter service in September 2007. PE has identified twenty sites across China with the potential to host CBFs producing ten million tons of blended coal each.’