

T.A. COOK IN THE PRESS

China Chemical Reporter | November 2014

Operational efficiency in the chemical industry: A mindset for improvement

When the US Embassy began publishing the exact level of PM2.5 – particles smaller than 2.5micrometres in diameter – in Beijing’s air in 2009, it provoked a wave of public concern. While the air quality of many cities across China is less than healthy, the particularly high levels in Beijing have resulted in a number of government initiatives aimed at tackling the problem. However, as the capital is essentially surrounded by Hebei province – home to a large number of chemical processors and manufacturers – collaboration between the government and industry must be achieved if a practical, sustainable solution is to be found which allows for production to continue without health being adversely affected.

In this article, we briefly examine some of the steps companies can take to ensure that they continue to produce efficiently without negatively contributing towards public health. Indeed, the recent tightening of environmental regulations could mean that the resulting closer inspection of internal processes can in turn lead to greater operational efficiency and long-term improvement.

The recent \$280bn government plan limiting coal use and requiring concentrations of PM2.5 in the Beijing-Tianjan-Hebei region to be reduced by 25% by 2017 is necessary for both public health and private businesses. Tearing down old coal-fired boilers and refitting plants to use replacement energy sources is positive for the environment and balance sheets: natural gas for example, has higher conversion efficiency than traditional fossil fuels and requires between 40 and 60% less water when used to produce electricity. The Intergovernmental Panel on Climate Change notes in its recently published Synthesis Report that replacing coal-fired power plants with natural-gas powered combined cycle power plants could reduce greenhouse gases “significantly.”

For those companies without the capacity to invest in cleaner energy sources, the use of better technologies in coal-fired plants – to improve thermal efficiency for

example – could also have a positive effect. According to the Energy Information Administration, if those plants were to increase their efficiency by 10%, it could represent a decrease in annual carbon dioxide emissions of 2 billion tons. Upgrades and technological changes do require high capital investment, but they also contribute to large cost savings. Furthermore, by committing to conducting appropriate and timely maintenance on their equipment, companies can ensure that its efficiency will increase while the energy used to operate it decreases, again positively impacting the bottom line.

Second, the government’s requirement to collect and disclose pollution data does provide some opportunity for improvement. The old adage that you can only improve what you can measure applies here: as companies are forced to examine processes to find out where waste occurs, they can also use that data for positive change.

Looking closely at how things are done and finding ways to address problems is a key step towards achieving operational excellence (OE). As part of the OE course, robust processes – meaning the way in which physical assets and resources are optimized to create value and minimize losses – must be in place. This demands an in-depth evaluation of the processes spanning Production, Maintenance, TA/Shutdown Management, Contractor Management and Supply Chain and involves the mapping of each to gain an accurate overview and to highlight the difficulties that are being faced.

As part of the implementation of an OE program, businesses must ensure that their equipment and processes are run according to their Standard Operating Procedure (SOP). In parallel, defining maintenance strategies and implementing reliability management will mean clarifying which actions need to be done and what the appropriate frequency is. This will help reduce operating costs and also contribute to a small but nevertheless important decrease in carbon dioxide production. Typically, companies implementing an OE program can



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reduce their energy spending by 3 to 5%, saving costs at the same time as they are reducing their carbon footprint.

Finally, creating an environment which fosters collaboration is vital to the success of any improvement. Operational excellence programs are typically structured with a top down/bottom up approach, which helps to develop a continuous improvement mindset and guide the behaviors of the whole organization. Managers must ensure that targets are aligned and communicated to their teams so that they understand what needs to be done for goals to be achieved. As some of those targets might require significant change, getting buy-in from teams on the ground is critical.

The above tips only touch upon what companies can do to increase their operational efficiency. However, if management is willing to commit to supporting long-term change, the improvements gained as a result of greater transparency of processes and responsibilities will contribute to reduced waste and resource utilization. These will have a strong impact not only on the balance sheet of the companies concerned, but also on the environment and the people in it.