

## Mumbai conference - carbon capture making strides in India



Update on CCS in Europe – report from ZEP meeting

With urgent action UK could achieve net zero emissions by 2050

Catalyst opens way to CO<sub>2</sub> capture in conversion of coal to liquid fuels

U.S. carbon capture network could double global CO<sub>2</sub> storage

# MN Dastur – gasification “better pathway to CCS in India”

For India to implement carbon capture and storage, it may be better to look at developing entirely new industries around gasified coal, rather than retrofit CCS on its coal power stations, suggests Atanu Mukherjee, president of Kolkata-based metals & energy consultancy MN Dastur & Co.

For India to develop CCS, it may be easier to look at developing entirely new industries from gasified coal, such as making steel, ammonia (a feedstock for fertiliser urea), methanol and even liquid fuels from coal gas, rather than try to install carbon capture on the existing coal power stations, says Atanu Mukherjee, President of Kolkata-based metals & energy consultancy MN Dastur & Co.

MN Dastur consults to the metals, mining and energy industries in India.

For these gasified coal based businesses to be viable, it would be necessary to source high ash coals with consistent compositions at about \$15/tonne and blend it with sweeteners, rather than the typical price paid for Indian low rank coals at \$30/tonne, he said.

Even in the case of captive coal sourcing, the price of coal sourced through coal block auctions would raise the price of coal much beyond the viable cost for gasification, and one will likely land up in a situation where no coal blocks for gasification get allocated, Mr Mukherjee says.

But if coal were made available for gasification and carbon capture at a lower price, the benefits it would get from these new industries through jobs, tax revenue and economic multiplier effects would far outweigh and offset any losses due to the lower coal price.

Perhaps a financial solution could be devised using investment tax credits and tax credits for gasification and carbon capture, so that the effective cost of coal for gasification is about \$15, but the coal company receives the market price or levelized coal cost after taking auction price into account, he says.

In contrast, retrofitting carbon capture on the country's aging and mostly sub-critical coal power station structure would be very difficult and expensive, especially with so many problems with the power sector as it is, as the power generation and distribution system business

model is broken, Mr Mukherjee believes.

Carbon capture would also increase demands for power from a system already unable to meet demand. And of course it would also increase the power cost to a developing country's population.

## Using gasified coal

Coal gasification is a process where coal is heated to above 700 degree C, causing it to turn into a gas – methane, hydrogen, carbon monoxide, carbon dioxide and water. These gases are then separated, the CO<sub>2</sub> is removed for sequestration, and the CO, hydrogen and CH<sub>4</sub> can be used as a feedstock for other industrial processes.

The gasified coal can be used as a feedstock for many processes, including making steel, liquid fuels and plastics.

In particular, if vehicles could run on more carbon efficient liquid fuels, like methanol, from coal with the CO<sub>2</sub> captured along the way, the country would need to spend less on imported oil, without worrying about the increased CO<sub>2</sub> emissions.

India may face difficulties importing oil from Iran, one of its main suppliers, when US sanctions come into force in November this year. India imports over 30% of its oil, mainly from Iran and Saudi Arabia, every year. India also imports methanol from the Middle East, which the output from these plants could displace.

The coal gas could be used to make steel through the much more carbon efficient direct reduction route. Gasification could also provide gas for standard uses at a much lower cost than importing natural gas through the LNG route at about \$12 per mmbtu for gas delivered to India via LNG shipping. There is limited availability of natural gas in India and access is rationed, Mr Mukherjee says.



*Atanu Mukherjee, president of metals & energy consultancy MN Dastur & Co.*

If designed and implemented right, gasification can work comfortably on high ash low rank coals – which is a large part of the 300bn tonnes of coal India has, Mr Mukherjee says.

## U.S. Department of Energy

Mr Mukherjee's consultancy MN Dastur announced a collaboration with the US Department of Energy, September 2018, to work together in finding ways to advance coal gasification with carbon capture, utilization and storage in India. Dastur will work with the DOE and the Department's National Carbon Capture Center (NCCC) on “technology scaling, economic viability, investment enablement, policy advocacy and strategic and operational designs, both at the government and the enterprise level,” it said.

### More information

[www.dastur.com](http://www.dastur.com)