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METHODS OF REDUCING SULFUR OXIDE FROM POWER PLANT - 1

Increase in electricity demand increases the emission of greenhouse gases and other pollutants. Emissions of carbon dioxide, sulfur oxide, nitric oxide are the result of combustion of coal in thermal power plants. Coal-based thermal power plants are considered as larger emitters of SO_x, which causes acid rain and destruct the ecosystem. A number of techniques are used to reduce the emission of sulfur oxides (SO_x).

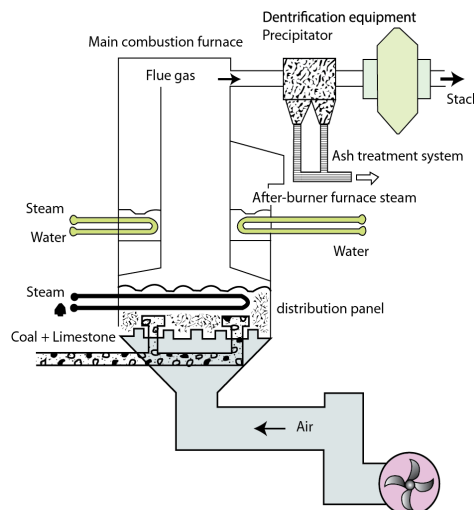
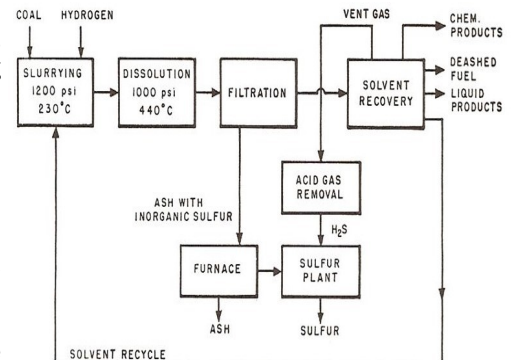
Removal of sulfur from coal before it enters the stack can help in reduction of sulfur oxide.

Techniques used are

- Solvent refining of coal
- Fluidized bed combustion

Solvent refining of coal is a low-ash, low-sulfur product. It is produced by coal-oil slurry-phase hydrogenation. This method is developed by Pittsburg and Midway Coal Mining Company. In this process, solvent oil which has 200-500°F boiling point is fed into the stack with preheated hydrogen. Coal is then de-polymerized or liquefied and partially dissolved in the solvent. The sulphur then becomes a separate entity and reacts with the hydrogen to produce hydrogen sulfide.

Using filters, not only hydrogen and other gases are separated from the slurry (produced out of the solvent and coal) but also the physical coal. The remaining by-product will be a slurry containing ash and inorganic sulfur of coal, plus 40-60% of the organic sulfur and carbon, are known as solvent refined coal.



Fluidized bed combustion (FBC) is widely used for reduction of SO₂, among industrial boilers. The method is very simple and effective as there is no need for additional equipments. The existing boiler for burning of coal will suffice. FBC is composed of bed material (sorbent) and fuel (coal) contained within a pressurized vessel. Limestone along with crushed coal is fed into the boiler which is equipped with an upward hot air stream at the bottom, which will fluidize it. Coal is burned in the fluidized mixture. Sulfur from combustion gases combines with the limestone to produce a solid compound with the ash.

This process eliminates the need for an external desulfurization. FBC can remove 95% of sulfur present in coal. The resultant waste from this process is dry and easy to handle.

The above methods reduces the sulfur emission per unit of power generated while increasing the efficiency of coal to produce electricity.

ENVIRONMENT MINISTRY MAY EMPOWER SEIAA TO GRANT EC

The union environment ministry has proposed to transfer some of its powers to state-level bodies while deciding on green clearances to projects related to non-coal mining, irrigation and townships.

The draft notification proposes that in the case of non-coal mines, the environmental clearance will need to be taken from the environment ministry for mining lease of an area spread over more than 100 hectare. But cases involving area less than 100 hectare in non-coal mines will be appraised by SEIAAs.

At present, all cases of mining lease for areas more than 50 hectare have to seek environment clearance (EC) from the union environment ministry.

As far as irrigation projects are concerned, the notification proposes that irrigation projects involving culturable command

area (CCA) of more than 50,000 hectare will need EC from the environment ministry compared to the existing provision where irrigation projects of CCA more than 10,000 hectares require clearance from the ministry. Under the existing requirements, irrigation projects having CCA of less than 10,000 hectare requires permission from SEIAA. But it is proposed to be changed under the draft notification which said that irrigation projects that have CCA between 5000-50,000 hectares will now need permission from SEIAA.

Interestingly, irrigation projects of less than 5,000 hectare CCA will not require EC even from the state level authorities. At present, the limit for such projects 2,000 hectare. The ministry has invited objections and suggestions from all stakeholders within 60 days.

Environmentalists are concerned that project developers could break big projects in phases to

avoid scrutiny at central level.

“This is bad news for the environment and a community since there is always more pressure on SEIAAs to clear projects than even MoEFCC. Many SEIAAs also do not have the required capacities to appraise projects, this could lead more arbitrary decision making,” said Nandikesh Sivalingam, senior campaigner with Greenpeace India.

“It is a huge step and the environment ministry is doing nothing but abdicating its responsibilities and that is going to hamper environment regulation in long run. With this notification, the ministry is shifting its powers to state level bodies where they will be weakened to a great extent, if track record of state level bodies are anything to go by,” said environmental lawyer Ritwick Dutta. [Live mint](#) December 22, 2017

In the year 2016-17, production of raw coal in India was 662.792 MT against 639.230 MT in 2015-16, showing an increase of 3.69% over the previous year

COAL POWER GENERATION IN INDIA LIKELY TO RISE: IEA REPORT

Coal-fired power generation in India may increase at nearly 4 percent per year through 2022, the Paris based Agency said adding that import of thermal coal is likely to reduce in the light of the various initiatives being taken by the government to reduce coal imports.

“However, import of coking coal is projected to increase over five percent per year through 2022,” the report said on account of rising steel consumption in industries such as ship building, defense and vehicle manufacturing as well in housing and railways.

The report also noted that global demand for coal should remain nearly flat between 2017 and 2022, resulting in a decade of

stagnation for coal consumption.

Keisuke Sadamori, the International Energy Agency's director for energy markets and security pointed out that for India they expect a strong growth in the deployment of renewable energy but that will not meet the expanding appetite for energy in a strongly growing economy and the gap will be filled by coal.

Coal based thermal power plants constitute 67 percent of India's power generation capacity, further more coal based electricity forms 80 percent of power on the electrical grid. Coal is expected to remain the mainstay of India's power generation for next two to three decades.

“Our total energy supply currently is heavily dependent on coal and lignite. While I am confident that India will be able to meet its renewable energy target of 175 GW by 2022, given our requirement for base load and psychology of people and challenges of storage and transmission of renewable power, coal and coal-based power will continue to grow at the same pace and will remain our energy mainstay till 2030,” Susheel Kumar, Secretary, Ministry of Coal said while expressing his views on the report.

[The New Indian Express](#) December 19, 2017

2017, AN INDICATOR FOR THINGS TO COME FOR THE COAL INDUSTRY ?

In October, a new International Energy Agency (IEA) report detailed the significant role that coal has played in improving energy access around the world.

According to the report, in the last 16 years, nearly all of those who gained access to electricity worldwide did so through new grid connections, mostly from fossil fuels – 45% of which came from coal.

Countries in developing Asia and Africa have identified a role for low emissions coal technology to meet their integrated energy access and climate objectives.

In their Paris Agreement pledges, 24 countries including major economies such as India, Nigeria and Southeast Asia identified low emissions coal technologies as critical to powering their economic development while reducing emissions.

India and Southeast Asia will account for most of the increased coal use in the decades ahead. That is why the World Coal Association (WCA) continues to call for international support from development banks and other institutions for low emissions coal technologies to be deployed where they are needed.

We have made great strides with the transition toward low emissions technologies in 2017. That is particularly true for the recent developments in Asia.

The ASEAN Energy Ministers have pledged their commitment to switch from inefficient coal plants to ones that operate with low emission technologies.

In September, a joint ministerial statement from the 35th ASEAN Ministers on Energy Meeting (AMEM) in Manila, Philippines, acknowledged the role of cleaner coal technologies in advancing sustainable energy for ASEAN member countries. At that same meeting, the WCA and the ASEAN Centre for Energy (ACE) signed a

Memorandum of Understanding to formalize their partnership.

With these events the ASEAN region recognizes the importance of all fuel sources in order to advance their economic growth agenda.

Projections forecast coal to increase its share in power generation from 32% in 2014 to 50% in 2040.

The International Energy Agency (IEA) reckons that some 100 GW of new coal-fired capacity will be built in Southeast Asia by 2040, boosting the total installed capacity to 160 GW, the agency said.

Forty percent of this new capacity will be in Indonesia. According to the IEA, around half of the power plants in 2040 will use either supercritical or ultra-supercritical technology, raising efficiency to 38% from 33% now.

Coal is imperative for the ASEAN countries in order to balance energy security, economic development and environmental sustainability.

As the recently published research by WCA and ACE shows, by upgrading planned coal plants to the latest technologies, ASEAN countries can reduce their cumulative emissions by 1.3 billion t in the next 20 years, a reduction equivalent to taking 157 million cars off the road.

China has since also announced that it is aiming to build the world's largest clean coal power system with the highest efficiency by 2020. Japan also continues to develop its low emissions coal fleet.

At the beginning of 2017, I expressed my hope to see broader governmental support for carbon capture and storage (CCS) technologies. Since then, many countries have begun to

see the need for up scaling the technology.

From the Indian government's declaration that it is ready to fully finance CCS projects, to the UK government looking at reviving its CCS programme, the developments are promising, even though much more work must be done and governments need to step up to the plate to support investment.

On the other side of the Atlantic, in the US, a bipartisan group of senators introduced legislation that would give a financial boost to CCS technology. These are all very bold steps, which I welcome; as the IEA has said, 14% of emissions reductions by 2050 must come from CCS if we are to meet the 2° scenario.

On this front, I would say 2017 has been positive for low emissions technologies. We all want to be a step closer to meeting the world's climate targets, but this can only be achieved if there is policy parity for all low emission technologies, including modern coal technologies.

Indeed, research has indicated that coal is going to continue to be present in the global energy mix for decades to come.

We hope the policy momentum we have seen in 2017 is carried on into the next year and beyond.

It is only by consistent and concerted efforts that we can achieve the climate goals that we all desire.

As an industry we believe that energy security and environmental goals should not be competing priorities, especially in an age where technology makes it possible to achieve both.

[World Coal](#) December 22, 2017

Worldwide coal consumption remains roughly the same between 2015 and 2040 (about 160 quadrillion Btu), with decreasing consumption in China and the United States offsetting growth in India

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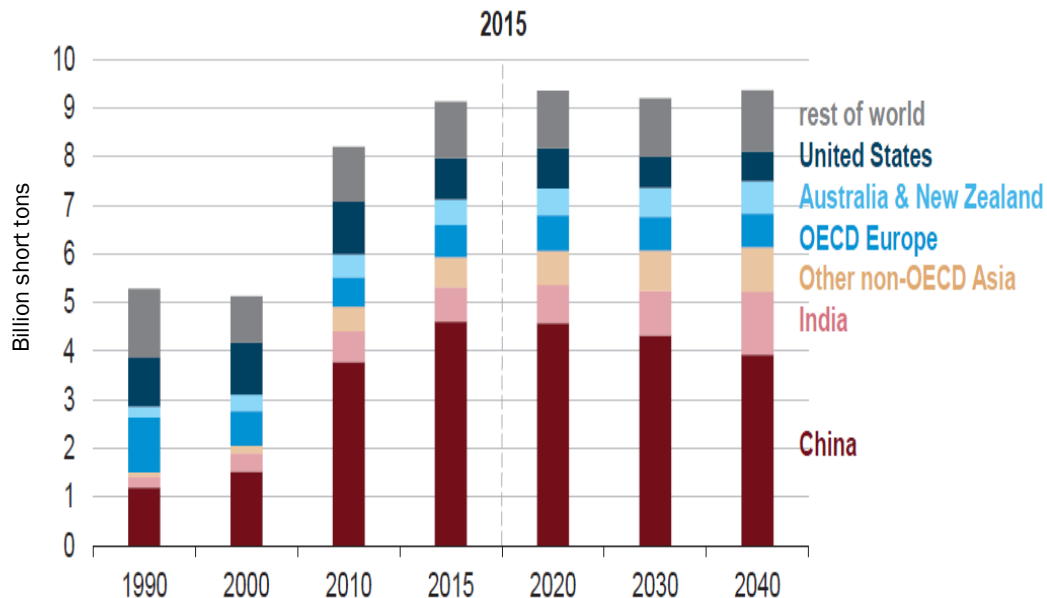
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Citizen consumer and civic Action Group (CAG) is a non-profit, non-political and professional organization that works towards protecting citizens' rights in consumer and environmental issues and promoting good governance processes including transparency, accountability and participatory decision making.

WORLD COAL PRODUCTION WILL REMAIN FLAT THROUGH 2040-EIA



REGULATIONS AND CASES

- Society for protection of environment Vs Union of India & Others “Exemption of environment clearance for buildings and construction”, *Original application no. 677 of 2016*, 08th December 2017, [Click here](#)
- Radhakrishnan K.U Vs Union of India & Others “Violation of CRZ notification”, *Application no. 151 of 2016(SZ)*, 22nd December 2017, [Click here](#)

PUBLICATIONS

- Jafri, M. Rath, R. et al, (2017). Studies on ash reduction of a non-coking coal sample by froth flotation. In: International Seminar on mineral processing technology. [online] Chennai: Indian Institute of Mineral Engineers Available at: [Click here](#) [Accessed 5 Jan 2018]
- Wang, P & Howard, B.H 2017, ‘Impact of thermal pretreatment temperatures on woody biomass chemical composition, physical properties and microstructure’ *Energies-Woody biomass for bio-fuel production* Available at: [Click here](#) [Accessed 8 Jan 2018].

MISCELLANEOUS

- Indian Power Stations, International O & M Conference, Theme: Technological Challenges –Risks & Opportunities in Power Generation on February 13th to 15th, 2018 at New Delhi. [Click here](#)
- Thermal Power Expo, 2nd Next Generation Thermal Power Generation Expo from February 28th to March 2nd, 2018 at Tokyo Big Sight, Japan. [Click here](#)