

Industrial smoke levels are rising rapidly. Does India have a combat plan?

This article is the second part of a two part series written by Dr Baldev Raj – a Padma Shri awardee and Dr. R Srikanth – researcher in the field of energy and environment. Read the first part [here](#).

By Dr. R Srikanth and Dr. Baldev Raj

On 7th December 2015, the Ministry of Environment, Forests and Climate Change notified revised air pollution standards for coal-based power plants in India. These are known as the Environment (Protection) Amendment Rules, 2015 and primarily aim at reducing emissions of, Particulate Matter (PM10), Sulphur di Oxide (SO₂) and Oxides of Nitrogen (NO_x).

Combating the impact of coal-based power plants on the environment

These revised standards are critical to bringing about an improvement in the Ambient Air Quality (AAQ) around these plants. The rules are more stringent for power plants constructed post-2003 and most stringent for plants to be commissioned after December 2017. In addition, all existing power plants have to limit their water consumption to 3.5 m³/MWh by December 2017 from the current level of more than 5 m³/MWh. The plants installed after 1st January 2017 have to limit the same to 2.5 m³/MWh.

These revised standards have come not a day too soon since:

- Several coal-fired power plants located in drought-prone areas of India were closed temporarily in 2016 due to the lack of adequate water. Such temporary closures may become the norm since India

has only 4% of the world's fresh water resources while it sustains 17% of the world's population.

- A recent study by NASA indicates that India has now become the second highest emitter of SO₂ in the world. While China still remains the largest SO₂ emitter, the installation and operation of Flue-Gas-De-sulfurizers (FGDs) in most coal-fired plants and the closure of inefficient coal-fired plants, has led to a reduction of about 50% in SO₂ emissions between 2012 and 2014.

Problems in implementation

Many of India's 300 plus power units do not comply with the December 2015 emission standards. They require extensive retrofitting (which may not be possible in many pre-2003 power plants due to their layouts) and major investments to comply with the revised standards. However, India cannot afford to shut down its all more than 25-years old power plants indiscriminately. Some of them (like the Singrauli power plant of NTPC) generate power at the lowest tariff and are used to cross-subsidize solar power by "bundling" costlier solar power with cheaper coal-based electricity for sale to the State Utilities.

India's Central Electricity Authority (CEA) has estimated that the indicative capital required to comply with the revised standards may be as high as Rs. 10–15 Mi per MW of installed capacity. On the other hand, the average under-recovery per unit of power sold by State Utilities in India was about 0.60 Re in FY15. This meant that all the State Utilities incurred combined losses of Rs. 587 billion. Thus, the financial health of these Utilities does not permit them to make the investments required by the revised standards.

The expected losses to comply with the amended pollution rules cannot even be recouped by hiking the tariffs.

An important case study

Therefore, one way of addressing these challenges is for the Central

Government to replace more than 25 years-old, inefficient, and polluting units with more efficient and cleaner super-critical (SC) or ultra-supercritical (USC) power plants. A good role model for such an exercise already exists in the form of a joint venture between the NTPC and the Jharkhand State Electricity Board for replacing seven inefficient/non-performing units in Patratu with 5×800 MW super-critical units. The CEA has also indicated that, about 10,180 MW of super-critical capacity can be installed after replacement of old units with a combined capacity of 5860 MW, at an investment of \$10.5 Bi. This is a more realistic, environment-friendly, and cost-effective path for India.



NTPC and the Jharkhand State Electricity Board are replacing seven inefficient/non-performing units in Patratu. | Photo Courtesy: Livemint

An economically feasible transition plan

From the above facts, it is clear that India's power sector faces a major challenge in its path to comply with the revised emission and water consumption standards. On the other hand,

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(1070 units) is about one-third the world average, and the lowest among BRICS countries. India's power sector needs a transition plan which is not only technically feasible and economically viable, but also people-friendly. Such a transition is possible only if the following steps are carried out by power producers with support from the developed countries, as per the Paris Agreement:

- Power plant-wise study of the techno-economic feasibility of retrofitting suitable pollution control measures in existing coal-based power plants to comply with the revised emission and water-consumption norms. Since the revised standards for coal-fired plants come into force in December 2017, these studies should be commenced without further delay to identify those power plants which cannot comply with the revised standards, without extensive retrofitting requiring substantial expenditure.
- Wherever, the above retrofitting is technically feasible and economically viable, a phased program of implementation of the pollution-control measures has to be developed, with due priority to coal-fired power plants near urban centres and/or in clusters located in the industrial hubs of Chhattisgarh and Odisha, which are already showing SO₂ hot spots in satellite images gathered by NASA and are therefore facing the risk of acid rain.
- A commitment from the GOI to fund the incremental capital and operating costs of these pollution control technologies to avoid any tariff hike by coal-fired power plants to recover the costs of compliance.
- Since GOI is currently using the NCEF to promote renewable energy in order to achieve India's INDCs, the developed countries should commence mobilization of the Green Climate Fund (GCF) as per the Paris Agreement.

As per the Planning Commission, faster adoption of SC and USC technologies would save as much coal as would be saved by installation of ten times the solar power capacity. While GOI has taken a policy

decision to permit only SC/USC technology for coal power plants to be installed after 2017, it is necessary to accelerate the replacement of older and inefficient power plants which cannot comply with the revised standards in a cost-effective manner. Since India has not only ratified the Paris Agreement but has also taken several steps towards the achievement of its INDCs, the developed countries should honour their commitments in relation to the GCF so that India can realise its Sustainable Development Goals (SDGs) without compromising on the achievement of its INDCs.

Dr Baldev Raj, an Padma Sri awardee has provided unique interpretations and solutions to challenges in energy, water, healthcare, manufacturing and national strategic unsolvables in a large measure, with clear impact, distinctions and awards. He has been selected for eminent positions, awards, and fellowships of prestigious academies. Dr. R Srikanth

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