

Clean Coal - There is no such thing!

By Eng. Parakrama Jayasinghe

The Ministry of Power and Renewable Energy gave an undertaking to the Supreme Court recently that the proposed coal power plant at Sampur will not be built, a decision prompted by the concerted efforts by several concerned organisations and individuals to create general awareness of the immense environmental, and health damage that would have resulted, if the project was implemented.

The many issues that came to light in a closer examination of the project details including the totally flawed efforts to whitewash the project, requires continuous vigilance of the civil society in respect of any similar future projects as well. The responsibility of the various state institutions and officials acting wisely with the wellbeing of the people and the country as the prime objective, in formulating and evaluating any proposed project were found wanting in the case of the Sampur Coal power project, which resulted in the matter being brought to the Supreme Court for a fair dispensation of justice. The country should be grateful for both the opportunity to do so and the outcome.

However, judging from the recent articles and news items appearing in the public media, the problem is far from over. There are attempts to pretend that the court decision is only pertaining to Sampur as a site for implementation of coal power in Sri Lanka. This is a deception aimed at continued efforts for new coal plants, completely ignoring the reality of the disastrous consequences. This is clearly seen in the recent criticism of the Ministry decision and a continued effort to retain coal as a major component of the energy mix in the future.

While comments and opinions expressed by individuals are their right, the relevance of such proposals to the national policy, needs careful consideration by the officials in authority not to be misled and swayed by these opinions. With scant regard to the reality of time scales involved pronouncements of impending power shortages and accusations are made, that the cancellation of the Sampur Power plant as the cause.

The Sampur Plant would have come on line only in about five years, long after the predicted power shortages in 2018/19.



Paris Accord on Climate Change

After years of fruitless deliberations the world came together in December 2015 at the COP 21 of the UNFCCC in Paris and succeeded in agreeing on a common programme to try and limit the global warming, causing the now globally accepted Climate Change events, to a maximum of 20C by year 2050.

Sri Lanka can be proud of being an active participant in this accord.

The realisation of the gravity of the consequences of untrammelled emission of carbon has prompted the majority of the 196 signatories, to ratify the Accord in record time. Accordingly the Paris Accord became law on November 4, 2016.

However, the agreement does not impose specific quantity or time targets country by country for the reduction of emissions or legal binding. This means that the signatory countries can renege upon them. However the ultimate global target of 20C by year 2050 is considered the collective responsibility of all.

Sri Lanka, early signatory of Paris Accord

The Sri Lankan President Maithripala Sirisena was one of the first heads of state to sign the accord in April 2016 signifying Sri Lanka's commitment to achieve the much desired limit of 20C in global warming. The "Common but Differentiated Responsibility" requires each signatory to contribute to the reduction of the carbon emissions from the current levels. However the operative words are "Reflecting their highest possible ambition in reduction of emissions in respect of capabilities in the light of national circumstances".

The President may not be aware that Sri Lanka has submitted its "Intended Nationally Determined Contribution (INDC)" to the UNFCCC (http://www.unfccc.int/paris_agreement/items/9485.php) proposing to not reduce but increase the emissions 3.5 times from current levels up to 2030, and pro-

posing to reduce by 4 per cent from that ridiculously enhanced level after 2030. This INDC was issued by the Ministry of Environment under the purview of the President as the Minister in charge. (<http://www4.unfccc.int/ndcregistry/PublishedDocuments/Sri%20Lanka%20First/Sri%20Lanka.pdf>)

It is our understanding that the energy officials were instrumental in misleading the Ministry officials to cause this national disgrace. It appears that Sri Lanka is already getting ready to renege on the Paris Agreement goals.

It is the very same officials and their supporters in Sri Lanka and outside who are now spreading the myth of Clean Coal to keep Sri Lanka forever dependent on imported dirty coal in gross violation of the spirit of the Paris Accord. The claims are made to hoodwink the public and win their support by creating fears of dire consequences by offering what is euphemistically termed "Clean Coal Power". The promise of cheap power from coal appears to have been ignored with these proposals.

What is claimed as Clean Coal?

Since there are no sources of coal without the attendant pollutants, the only possibility of cleaning the operation is by

- Reducing the coal consumption using higher efficiency generation
 - Equipment to reduce the quantum of pollutants which is costlier
 - Installing additional emission cleaning systems to trap all pollutants
- The attention seems to focus on the first option, by the use of supercritical boilers operating at very high pressures and temperatures, which lead to higher overall efficiencies in the power generation. Thereby lower specific coal consumption by way of amount of coal consumed to generate each unit of electricity is expected.

A comparison of the impact of this against the known data from the

Year	2012	2013	2014	2015	Super Critical Plant
Plant Capacity MW			900	900	500
Generation GWh	1404	1469	3202	4443	
Coal Consumption M. kg	625	678	1364	1880	
Specific Consumption kg/kWh	0.45	0.46	0.43	0.42*	0.35**
Thermal Efficiency %	30.7	29.7	32%	~ 32%*	42%**
Generation for 500 MW with 80% P F- G WH				3504	3504
Estd Annual Fuel Consumption Tons				1,482,673	1,235,564

Source - CEB Statistics * - This is calculated as the figure quoted in CEB statistics is incorrect
** - Estimated values

Metal Emitted	Emission Standard g/GWh	Emission Rate g/GWh	Total Annual Emissions from 500 MW plant kg	Emissions complying with EPA Stds kg
Lead	9.1	220	770	31.88
Mercury	1.4	117	410	11.2
Chromium	3.2	114	400	11.2
Nickel	1.8	110	385	6.3
Arsenic	1.4	76	266	4.9
Cobalt	0.9	29	101	3.2
Cadmium	0.2	5	17.5	0.7

Source: EPA - USA

Norochcholai power plant is shown in the table below.

Thus by the use of higher pressures and temperatures in a super critical coal power plant of capacity of 500 MW, the coal consumption will reduce only by about 17 per cent or about 250,000 tons annually.

What does this mean in way of pollution?

The estimated amounts of different pollutants in coal are given in the table below assuming the coal consumption uses for a super critical plant.

But what is of relevance to us in Sri Lanka is that even if 100 per cent capture is possible, all what we can do is to transfer the pollutants from the chimney down to the ground and perhaps to the ground water table.

Therefore all that would be achieved by the installation of super critical boilers is to reduce the annual coal consumption and thereby the import and distribution of a variety of highly toxic pollutants to the Sri Lankan environment by a mere 17 per cent from a conventional coal power plant.

In addition, the capital cost of achieving this insignificant reduction would be substantial, and the operation and maintenance costs at supercritical range as well as the additional cost of the more sophisticated emission control

devices and their operation cost.

The Norochcholai coal power plant is reported to have cost US\$1350 million or \$1500 per kW, without any provisions for the equipment and processes required to control the hitherto ignored but most dangerous pollutants like Mercury and other heavy metals, or even the simplest facilities for proper management of the Fly Ash and Bottom Ash. The cost of a Super Critical coal power plant is likely to cost very much more perhaps as high as \$3000 per kW, and there is no way that coal can be claimed as the lowest cost option for electricity, even if the most significant environmental cost is ignored.

Therefore our request to the proponents of "Clean Coal" is to do their sums again as the myth of cheap power from coal cannot be sustained even by the skewed calculations used so far.

The general public is well advised not to be taken in by these offers of clean coal without consideration of the above realities. It is indeed unfortunate that Japan to whom the world looked up to, as champions of the fight against climate change, has contributed to this sad situation by offering to install a super critical power coal power plant in Sri Lanka. This would be in total violation of their message to the world of a low carbon future.

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Table I - Common Pollutants associated with Coal Power Plants

Pollutant	Total Annual Emissions from 500 MW Tons
Sulfur Dioxide	10,000
Oxides of Nitrogen	10,200
Particulates	500
Ash	125,000
Sludge	193,000