

Future of Coal Power

By Asoka Abeygunawardana

Over half of the world's total fossil oil is exported from the country of origin to the oil importing countries at present. Oil is recognized as a rapidly depleting resource and it is not considered as an energy source for the future. Oil prices will increase at a rapid rate in the near future unless the political powers intervene to control it. The situation with coal was quite different from that of oil. Until recently, coal has been a resource used mostly in the country of origin. Internationally traded coal was a fairly small percentage of the total amount consumed globally. However, there is an increasing trend toward the development of an integrated global coal market as coal is considered an available resource for the next 2-3 centuries.

The global coal market will be predominantly determined by the consumption patterns of China and India. Chinese electricity generation capacity at present is 900 GW; with 7% annual growth, the nation's electricity demand in 2020 will be 1800 GW. China aims to have 100 GW of wind power capacity and 20 GW of solar power capacity by 2020. If China can achieve this target it will become the world's renewable energy leader. The situation with nuclear power is similar: China has 11 atomic power plants now and is in the process of building 20 more, with a target of 60 GW of generating capacity by 2020. But renewables plus nuclear will cater to between 10-12% of total Chinese electricity demand by 2020. As there are no other options China's coal consumption is growing at an alarming rate, and coal has become the basis of the Chinese economy.

China's coal consumption was only marginally higher than that of the U.S. in 2000 but it has grown to be three times greater than U.S. consumption at present. China will import 150 million tons (Mt) of coal this year, representing over 60 percent of the total exports of Australia, the world's top coal exporter. China is now mining and burning over three billion tons of coal per year. Hence by 2020 China will be using approximately six billion tons per annum. According to the World Coal Institute, China has a little over 110 billion tons in coal reserves. It is sufficient for around 37 years at current rates of consumption. Adding ten percent annual consumption growth to the forecast the reserves will last for only 16 years.

India has similarities with China and wants to grow its economy at a rate of 7% annually, and India's economy is just as coal-dependent as China's. As India is facing growing problems with its domestic mining industry it is necessary for them to import more coal. This trend in the developing world is unsustainable for three reasons: The existing coal mining and handling infrastructure cannot cater to the increasing demand for coal; there is not enough coal for continued consumption in the long run and the problems of carbon emissions from coal combustion leading to climate change. Chinese and Indian demand for coal imports will definitely push up the export price for coal and the result will be higher coal prices worldwide. At present coal prices are tagged with oil prices, however in the future coal prices will increase at a greater rate mainly due to lack of infrastructure to cater to the increasing demand of China and India.

The other key factor that determines the future of coal power is the development of Carbon Capture and Sequestration (CCS) process. Carbon capture and sequestration is where carbon dioxide from flue gases is captured and then compressed, transported and stored in underground geological formations such as saline aquifers that are comprised of porous rock filled with brine. This technology aims to reduce greenhouse gas emissions and thus prevent catastrophic climate change, while maintaining growth in energy supplies and associated economic activity. This is one way of allowing the continuation of fossil fuel combustion fuelled by increasing amounts of coal while preventing the resulting CO₂ from going into the atmosphere. This can be done. All of the elements

of the technology are already working in various pilot projects. Oil companies already inject carbon dioxide into oil wells in order to re-pressurise wells and increase production. However there are two major issues that hinder the progress of Carbon Capture and Sequestration. The first issue is the difficulty of scaling up such an enterprise. The second issue is its impact on electricity prices. While it holds the potential to significantly cut heat-trapping emissions, it may be more expensive than most other technologies.

The other alternative for the promotion of coal power is centered on improving efficiency gains, or reducing the amount of coal that is burned so as to limit emission levels. The older and pulverized coal-fired plants are the least efficient units with about 35 percent of the energy input converted to electricity. Ultra-supercritical facilities are said to have efficiency rates of 50 percent or more. However those "ultra-supercritical" generation technologies are expensive and are not financially competitive.

Due to high costs involved with ultra-supercritical technologies, Sri Lanka has opted to go for pulverized coal-fired power plants. However a study conducted recently in Sri Lanka has concluded that the economic costs of pulverized coal-fired power plants are much higher than most other power generating options. Increasing the demand for coal will increase the price of coal further. As a result the imported coal prices will be increasing at a much faster rate than oil, making coal a prohibitively expensive option in the near future.

Considering these developments the government of Sri Lanka has quite correctly taken a decision to limit the construction of coal power plants to the already committed projects in Norochcholai and Sampur. The government is further exploring the possibility of co-firing biomass with coal for the committed coal power plants to reduce the dependence on import coal. This initiative is timely as there is a great uncertainty regarding the price of coal in the years to come.