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| **Key points**   * A transformation is underway in coal fired power generation in Asia * There are 670 new generation high efficiency, low emissions (HELE) coal-fired power generation units in operation in 10 Asian economies – Bangladesh, China, India, Japan, Malaysia, Philippines, South Korea, Taiwan, Thailand and Vietnam * These units, which represent 37 per cent of electricity capacity, are producing affordable energy with sharp reductions in CO2 and other emissions   + The units emit 20-25 per cent less CO2 than the average of existing power stations and up to 40 per cent less than the oldest technology in place   + For each unit of electricity generated, they consume less fuel and emit fewer local pollutants and   + They typically incorporate modern SO2, NOX and particulate control systems * New HELE coal technology in the 10 countries is already reducing CO2 emissions – by an estimated 479 million tonnes a year * This low emissions coal revolution is accelerating with an additional 1,066 HELE units under construction or planned in these 10 economies alone (representing 672 gigawatts of capacity) * This represents over 24 times Australia’s installed coal-fired fleet capacity as at 31 August 2015 * In the 10 Asian countries studied an estimated 1.1 billion tonnes of CO2 abatement annually will result from the planned deployment of HELE rather than subcritical technology in electricity generation * Were all new power units (under construction or planned) ultrasupercritical, then the estimated annual emissions reduction would increase to 2 billion tonnes – equivalent to India’s current annual emissions.   **The International Energy Agency’s Clean Coal Centre**   * The IEA Clean Coal Centrewas set up in 1975 under the auspices of the International Energy Agency, which was founded in 1974 by member countries of the OECD. |

A new report by the IEA Clean Coal Centre profiles the current and planned coal-fired electric power fleet for 10 Asian countries: Bangladesh, China, India, Japan, Malaysia, Philippines, South Korea, Taiwan, Thailand and Vietnam. They are all increasing their investment in coal-fired power. Most importantly, they are also all increasing investments in supercritical (SC) and ultrasupercritical (USC) technology in preference to subcritical technology.

SC and USC generation units are called ‘High Efficiency, Low Emissions’ (or HELE) technologies. They are preferred over subcritical units because:

* They produce electricity more efficiently by operating at higher temperatures and pressures
* While the initial capital cost is higher, less coal is required per unit of electricity produced – providing significant operating cost savings over the life of the asset
* When a SC or USC unit replaces an old, subcritical unit, CO2 emissions are up to 40 per cent lower
* If a power producer decides to build a new SC or USC unit, it involves 13 and 19 per cent fewer CO2 emissions than a brand new subcritical unit respectively.

The study reports that 672 gigawatts of SC and USC coal-fired capacity is currently under construction or planned in the 10 Asian economies as at June 2015. This represents over 24 times Australia’s installed coal-fired fleet capacity as at 31 August 2015.

***The rapid rise in investment in HELE technology in Asia***

The report profiles each country’s coal-fired generation units from the Platts UDI World Electric Power Plants Database as at mid 2015. For each country the generation units are grouped by age and steam cycle condition (i.e. by subcritical, SC or USC).

**Chart 1** contrasts the *currently installed* mix of coal-fired power capacity in the 10 countries with the mix that includes new capacity *currently under construction or planned*. The mix for the two countries with the largest generation investment pipeline, China and India, is shown separately.

***How HELE coal-fired technology is reducing emissions***

The report estimates the reduction in CO2 emissions already achieved due to building HELE rather than subcritical units. The annual reduction for units built in 2005-09 is estimated as 172 Mt CO2 and the reduction for units built in 2010-14 as 307 Mt CO2. In total, this means the estimated reduction achieved by 2015 and each year after that is 479 Mt CO2.

In addition to looking at CO2 reductions in existing plant, the report also estimates the annual CO2 emission reduction resulting from planned increased investment in HELE in preference to subcritical units (the ‘base case’). It does this by assessing the emissions from new generation units (currently under construction or planned) under three scenarios:

1. all new units are assumed to be subcritical
2. all new units apply the technology as reported publically by investors (i.e. ‘as planned’) or
3. all new units are assumed ultrasupercritical.

In total, as illustrated in **Chart 2** below, it is estimated that for all 10 countries:

* 1.1 billion tonnes of CO2 abatement annually will be achieved due to deploying HELE units in the mix rather than subcritical ones – that represents a 17 per cent reduction over the base case
* A further 915 million tonnes of CO2 abatement annually – or an additional 16 per cent reduction each year – could be achieved if all coal-fired power generation under construction or currently planned is ultrasupercritical
* This totals to 2 billion tonnes of CO2 abatement, which is equivalent to India’s annual CO2 emissions.

The report shows that by investing in some HELE units rather than subcritical generation, there will be a reduction in gross CO2 emissions in all countries except the Philippines, which is still mainly investing in subcritical technology.

Were the countries to invest in USC for all new capacity rather than a mix of technologies, then all countries would reduce emissions annually:

* China is leading the way in the use of HELE technologies
* Given its stage of industrialisation and investment, the most significant savings are in India, where the adoption of a fully ultrasupercritical coal fleet over the planned ‘as reported’ build profile (a mix of all three technologies) could achieve savings of 509 million tonnes of CO2 annually (over 20 per cent)
* Even the Philippines’ relatively modest coal fleet could achieve absolute savings of almost 30 per cent by adopting the most efficient USC units.