



HELE PERSPECTIVES FOR SELECTED ASIAN COUNTRIES

HELE TECHNOLOGIES

This report is one of a series by the IEA CCC which examines the role of HELE (high efficiency, low emissions) coal-fired power plant in reducing emissions by setting out an overview of the prospects for HELE technologies in various coal-using countries. This study focuses on the smaller but populous economies of southeast Asia: Bangladesh, Indonesia, Malaysia, Philippines, Thailand and Viet Nam. In each country, coal is envisaged to remain an important contributor in the energy mix contributing to the supply of each country's growing electricity needs at an affordable price; hence this study has been undertaken to illustrate how HELE plants can help reduce world emissions without compromising growth objectives.

HELE technologies include supercritical (SC), ultrasupercritical (USC) and advanced ultrasupercritical (AUSC) 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;
- if a power producer decides to build a new SC or USC unit, it involves 13% and 19% fewer CO₂ emissions than a brand new subcritical unit respectively; and up to 40% CO₂ emissions if the HELE unit is replacing an older plant.

HELE plants are most efficient at larger unit size, such as 800 MWe and more.

KEY MESSAGES

The key messages from this study are as follows:

A priority in Bangladesh is to accelerate access to affordable power. The government has committed to a massive increase in coal-fired power plant. All new and planned future coal units are largely based on ultrasupercritical (USC) technology which will give Bangladesh a largely HELE fleet for many years to come.

The Indonesian coal fleet is heavily biased towards subcritical and supercritical units and would benefit from a transition to a stronger HELE basis. However, the complicated geography of the country may limit power plant unit size which makes HELE plant less suitable.

In Malaysia, coal use is set to triple, and the coal fleet is relatively mature. Malaysia is committed to the use of the most efficient technologies including USC for newly planned units.

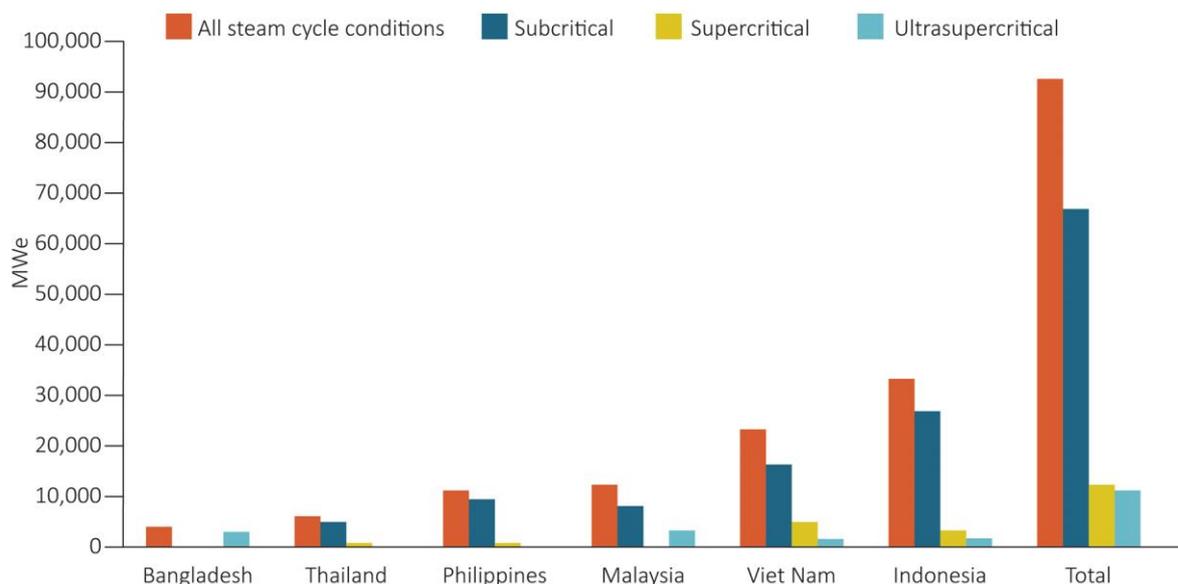
The economy of the Philippines is growing rapidly. The consequential increased demand for power is forecast to be met by natural gas initially but could be overtaken by coal around 2030. However, local resistance to new coal plant is strong. The retirement and replacement of older units with HELE plant

would enable projected power needs to be met with lower CO₂ emissions. However, the Philippines has a complicated geography so grid limitations may impose a limit to the unit size of coal plant.

In Thailand, coal is foreseen to be an important part of the future generating capacity and although the government has a strong renewables commitment coal is seen as vital to meeting future demand for electricity that is expected to displace coal capacity if successfully implemented. Recently added capacity has been limited to supercritical technology.

Currently, coal is important in Viet Nam, but a recent resurgence of interest in nuclear power, may be at coal's expense in the medium term. The availability of sufficient capacity from coal plants now being built means that it is only when plants are retired and additional power is needed from 2035 onwards, that AUSC units may be introduced and emissions of CO₂ will fall.

Not all countries have opted to use the best available HELE technology for new and planned capacity and if significant tranches of the less efficient technologies are installed now and in the near future, they become 'locked in' to the coal fleet for decades. Given the importance of using HELE technologies for continuing coal use it is vital to continue to press the case for their uptake to ensure that such outcomes are minimised.



Coal-fired power plant capacity by steam cycle conditions for the countries studied (data from WEPP)

The IEA Clean Coal Centre is a technology collaboration programme of the International Energy Agency (IEA). The objective of the IEA Clean Coal Centre is to provide definitive and impartial information on how coal can continue to be part of a sustainable energy mix worldwide.

Each executive summary is based on a detailed study which is available separately from www.iea-coal.org. This is a summary of the report: HELE perspectives for selected Asian countries by Dr Ian Barnes, CCC/287, ISBN 978-92-9029-610-2, 75 pp, June 2018.