

Technology Fact Sheet for Mitigation

Technology 3: Pulverized coal combustion with higher efficiency ⁱ

<i>Subsector</i>	Energy supply
<i>Sector GHG emission (tCO₂-eq)</i>	6,399,000 tCO ₂ -eq from the energy supply subsector in 2006
<i>Technology Name</i>	Pulverized coal combustion with higher efficiency
<i>Background/Notes, Short description of the technology option sourced from ClimateTechWiki, Seminars, etc</i>	Pulverized coal power plants account for about 97% of the world's coal-fired capacity. The conventional types of this technology have an efficiency of around 35%. For a higher efficiency of the technology supercritical and ultra-supercritical coal-fired technologies have been developed. These technologies can combust pulverized coal and produce steam at higher temperatures and under a higher pressure, so that an efficiency level of 45% can be achieved (ultra-supercritical plants). Supercritical and ultra-supercritical plants are more expensive (because of the higher requirements to the steel needed to stand the higher pressure and temperature) but the higher efficiency results in cost savings during the technical lifetime of the plants. The emissions of CO₂ per MWh delivered to the grid could be reduced from 830 kg to 730 kg.
<i>Implementation assumptions, How the technology will be implemented and diffused across the subsector?</i>	In coming years several Thermal Electric Power Stations will be built with significant capacity near coal mines in Mongolia. There's a project to build a Pulverized coalthermal supercritical power plant with capacity 600 MW at Tavan Tolgoi coal mine.
<i>Reduction in GHG emissions</i>	An efficiency improvement from 30 to 45% would bring about a 33% decrease in CO₂ emissions. As two-thirds of all coal-fired plants are over 20 years old with an average efficiency rate below 30%, replacing this capacity with supercritical and ultra-supercritical plants could contribute significantly to global GHG emission reductions (IEA 2008, p.259). GHG emissions are expected to be reduced by 1.159 million tCO₂/year.
<i>Impact Statements - How this option impacts the country development priorities</i>	
<i>Social development priorities</i>	There will be a new electricity source for mining and chemical plants
<i>Economic development priorities</i>	Supercritical power plants are highly efficient plants with the best available pollution control technology; they reduce pollution levels by burning less coal per megawatt-hour produced and capturing the vast majority of the pollutants. Introduction of the Pulverized coal power plants has the potential to reduce fuel consumption of existing thermal power plants by 25-30 percent.

<i>Environmental development priorities</i>	Because of the above techno-economic benefits, along with its environmentally-friendly cleaner technology, more and new power plants are being developed with this state-of-the-art technology. As environmental legislation is becoming more stringent, adopting this cleaner technology has lead to benefits in all respect. As LHV (lower heating value) is improved (from 40% to more than 45%); a one percent increase in efficiency reduces specific emissions such as CO₂, NO_x, SO_x and particulate matter by two percent. Reduced air pollution: Concentration of noxious gases in flue gas to be decreased by 30 %.
<i>Other considerations and priorities such as market potential</i>	The market potential is big
Costs	
<i>Capital costs</i>	Investment costs for <u>supercritical</u> pulverized coal (SPF) power plants is 2.5 million USD or 1.75 million EURO per MW. Source: www.energy.siemens.com/.../power-generation/power-plant .
<i>Operational and Maintenance costs</i>	In a typical case, fuel costs account for 60-80% of the total operating cost of a SPF power plant. Annual electricity production of Pulverized coal power plants is to reach 4800.0 million kWh with installed capacity of 600 MW. Annual coal consumption will be 1.33 million tons. Total coal cost per year is expected to be 40 million USD. Where: coal cost is 30 USD /t. Total operational and maintenance costs will be 101.95 million USD/year. Electricity generation cost of Supercritical pulverized coal power plants will be 0.028 USD/kWh
<i>Cost of GHG reduction</i>	GHG emission reduction cost will be 87.95 USD/tCO ₂

ⁱ This fact sheet has been extracted from TNA Report – Technology Needs Assessment For Climate Change Mitigation– Mongolia. You can access the complete report from the TNA project website <http://tech-action.org/>