Cost effective high-impact emissions and cost of operation reduction from coal fired power plants

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Coal power will remain in service for decades to come, although in reduced numbers in Western countries and for fewer years. Extended service is expected in China, India and other Asian countries and Africa. As of 2019 there are 1,600 generating units under construction in 62 countries , and by 2035 there will be 2MMW coal power installed globally. Even if and when the USA and EU depart from coal power, it will have only marginal effect globally. Hence, emissions from coal fired power plants remain a global problem, in particular CO2, SO2 and NOx emissions. To address this problem measures have been undertaken, which demand significant capital investment, which frequently exceed plant's financial capabilities. A large potential exists in tuning of plant's key components to result in reduced emissions, cost of operation and a mitigation of country's communal waste problem. The potential can be tapped immediately with comparably moderate capital outlay. Appropriate tuning of plant's key components, boiler and cooling tower lead to a noticeable coal usage and by that emissions and cost of operation reduction. The resulting economic gain can then become a source for investing into desulfurization and deNOx equipment. Results from case studies are shown involving following measures: a) innovative combustion tuning of the boiler of 600MW unit at 4025MW plant in Indonesia, UNIDO (www.unido.org) sponsored project displaying potential for the plant to reduce its coal usage by half a million ton a year, consequently by $34.5M/year cost reduction, and CO2 emissions by nearly million tons; b) advanced cooling towers performance evaluation resulting in 0.3-1% system efficiency increase; c) cost effective afterburning of unburned in boiler bottom ash resulting in 2-4% boiler efficiency increase; d) cost effective cofiring of fuel manufactured from communal waste, RDF in a coal fired boiler resulting in 5-7% coal usage reduction; e) user friendly boiler thermodynamics online software for engineers and plant operators allowing for an accurate simulation of boiler internal geometry and operating parameters impact on boiler performance, a first time such an application is publicly available. A boiler from case study that underwent combustion tuning was well maintained with combustion values maintained since commissioning in 1997, which tends to be an exception rather a common occurrence indicating existence of a significantly larger boiler tuning potential at other locations

throughout Asia. Cooling towers that were evaluated were also properly maintained and regularly inspected. Yet, the advanced cooling tower performance evaluation procedure showed further potential that eluded conventional procedures, all of which mostly rely on observations and statistical evaluation. These boiler and cooling tower tuning measures require minimum capital outlay and can be carried out by properly trained plant's staff. Bottom ash afterburning and alternative fuel cofiring technology features advanced proprietary technical solutions, fits any pulverized coal boiler in existence, is comparably simpler to install, operate and maintain, is proven in a multi-year uninterrupted operation and requires comparably significantly less capital investment. More details on www.thermalpower.info.