

# **AN OVERVIEW OF FILTRATION AND SEPARATION TECHNOLOGIES FOR CLEAN ENERGY AND AIR**

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Filtration and separation technologies widely used for air emission control resulted from energy and power generation by fuel combustion. Fuel combustion related air emissions include particulate matter, SO<sub>2</sub>, NO<sub>x</sub>, and CO<sub>2</sub>. Cyclones are designed for separating large particles from the flue gas, while electrostatic precipitation (ESP) and filtration are effective for PM<sub>10</sub> and PM<sub>2.5</sub>. ESP is featured with low pressure drop and high through put, and filtration is more effective on fine particles. Wet scrubbing is effective for the separation of particulates and acidic gases including SO<sub>2</sub>, but water consumption is major concern in emerging economy like China. Recent advances in semi-dry and dry wet scrubbing technologies address this concern. The most widely used NO<sub>x</sub> control technology is selective catalytic reduction (SCR). Like carbon capture, the main challenge to SCR is also high cost. The incompatibility between these air separation technologies remains a technical challenge to effective air emission control.