

ABSTRACT: Clean Power by implementing Post Combustion Capture Technology

Authors: Vauhini Telikapalli, Gian-Luigi Agostinelli, Alstom Power

Addressing climate change requires nothing short of an energy revolution. Electricity, mostly generated from fossil fuels, is at the core of this challenge. As the combustion of fossil fuels plays a pivotal role in global CO₂ emissions, innovative carbon neutral technologies will be required to enable the power sector to meet the global demand for electricity, while controlling CO₂ emissions and thus reducing the impact on global warming. Although gas-fired power plants contribute ca. 50% by way of mass of the CO₂ produced per MWh compared with coal-fired power plants, they are still projected to contribute about 36% of the total EU Power Generation CO₂ emissions in 2030 under the recent IEA reference baseline, and so are relevant with respect to achieving the goal to decarbonize electricity production and meeting the target fixed by the scientific community.

Carbon Capture and Storage (CCS) to gas-fired power plants will be needed, therefore, to help reaching this target, to avoid leaving CO₂-emitting power plants, and, last but not least, to have a level playing field between fossil fuels and give the flexibility in the choice of decarbonized electricity production source.

The fact that the EU climate package framework included the future obligation to provide assessments on the CCS readiness also for gas-fired power plants above 300 MW, is pointing towards such a direction.

For this reason Alstom is developing commercial scale CO₂ Capture systems for **both** Coal and Gas fossil fuels, currently focusing on Post Combustion Capture and Oxy Combustion principles.

Alstom, with co-funding from various government and private organizations, electric utilities and other industrial partners is developing, operating and testing different technologies at coal and natural gas fired power plants world-wide. The knowledge gained from these projects is very promising; and will position Alstom to support large-scale demonstration projects in development and realize Alstom's goal to supply commercial carbon capture technologies to the market by 2015.

This paper provides an update of Alstom's development program of Post-Combustion Capture Technologies with a special attention to the solution applied to Natural Gas fuelled Power Plants

For natural-gas-fired power plants, post-combustion CO₂ capture is the most mature technology for low emissions power plants.

Details on various field pilot and demonstration projects in operation worldwide are presented, along with key results obtained from various operation and testing programs. These technologies will not only be the most economically viable and sustainable solutions but also can be retrofitted to the installed base- an essential component to meeting future emission targets.

In addition the "Flue Gas Recirculation" (FGR) Technology associated with gas turbine post-combustion capture will be shown. Recirculation of Flue Gas means that flue gas after the HRSG is partially cooled down and then fed back to the Gas Turbine intake. The FGR Technology offers the possibility to double the concentration of CO₂ in the flue

gas so that the volumetric flow to the Post Combustion CO₂ capture unit is reduced, and the overall performance of the CCPP with CO₂ capture is increased.