RESULTS OF THE 2.25 t/h POST-COMBUSTION CO_2 CAPTURE PILOT PLANT OF ENEL AT THE BRINDISI COAL POWER PLANT

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CO_2 capture and storage (CCS) applied to fossil fuel fired power plants is a promising technical solution to reduce carbon emissions and mitigate global warming. Post combustion CO_2 capture using amine absorption is considered one of the most mature techniques to achieve the targets of carbon emission reduction .
A fully instrumented post-combustion CO_2-capture pilot plant based on amines has been realized by ENEL in Brindisi, Italy. The goal is to gain experience in CO_2 capture unit design and operation. The capture plant is connected to full scale coal fired power plant, Federico II, as a slip stream system. The capture plant is designed to treat 10 000 Nm3/h flue gas, capturing about 2.25 ton/h of CO_2. The absorber and stripper columns contain Mellapak M250X structured packing of 22 meter and random packing of 11 meter, respectively.
The Enel's Pilot is equipped with a pre-treatment section of flue gas able to meet a large range of compositions in term of SOx, NOx and PM. The impact on the emissions due to the impurities present in the flue gas has been largely evaluated during the last campaigns and in particular the aerosol formation has been investigated.
The conceptual design of the Pilot Unit has allowed to test and evaluate different amine-based technologies, and to investigate deeply many of the aspects concerning the integration of a CO_2 absorption unit with a power plant. As the electricity produced by renewable energy sources is steadily growing, a more flexible operation of fossil fuel fired power stations is required. Consequently the capture process has to be able to follow frequent and fast load changes without drastically reducing the performance of the power station.
The Pilot has been commissioned in May 2010 and up to July 2013 have been performed tests for 8.000 hr of continuous operations and more than 16.000 tons CO_2 has been separated, in this paper a synthesis of the most interesting results obtained will be presented.

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