

***Techno-economic feasibility study and environmental performance analysis
of a power generation plant with CCS system***

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Abstract

In order to increase Italian national energy security (partially releasing energy production from imported primary sources) and to re-launch the economy in the Sulcis area (South-West Sardinia, Italy), the Italian Government and the Sardinian Regional Administration are strongly interested in the development of an industrial project for the construction of a 300-450 MW_e power generation plant, equipped with a demonstration carbon capture and storage (CCS) system. The plant has been conceived to operate in close integration with a sub-bituminous coal mine in the Sulcis area, where the only Italian coal basin is located.

In this context, Sotacarbo is engaged in the development of a detailed study with the end to evaluate the feasibility of this project and to define the best plant configuration and operating parameters.

This paper shortly describes a portion of this study, in which a preliminary comparative analysis (from the technical, economical and environmental points of view) of all the technical alternatives allows to select the best plant configuration: an ultra supercritical pulverized coal combustion (USPCC) plant, equipped with a SNOXTM section for the combined removal of SO_x and NO_x and with a partial capture of CO₂.

Due to the potential unreliability of some assumption and to the impossibility to estimate with accuracy the future trend of some operating parameters, a sensitivity analysis has been assessed in order to evaluate the effects of these assumptions, with a subsequent reduction of the investment risk.