

Test plant for R&D activities on hydrogen and clean fuels from Sulcis coal

Carlo Amorino⁽¹⁾, Enrico Maggio⁽¹⁾, Federica Pratola⁽²⁾,
Francesco Repetto⁽²⁾, Giuseppe Girardi⁽³⁾, Giorgio Cau⁽⁴⁾

⁽¹⁾ Sotacarbo S.p.A. – Centro Servizi consorzio NISI, Portoscuso, ITALY

⁽²⁾ Ansaldo ricerche – Corso Perrone 25, Genova, ITALY

⁽³⁾ ENEA – Via Anguillarese 301, 00123 S. Maria di Galeria (Roma), ITALY

⁽⁴⁾ Università di Cagliari – Piazza d'Armi, Cagliari, ITALY

Abstract

The research project involves the design, construction and testing of a pilot plant for the production of high environmental value fuel gas such as hydrogen, from Sulcis coal, a well known problematic solid fuel. The test facility will be located in the Sotacarbo Research Centre, which is under construction in Carbonia, South East Sardinia.

The construction of the test facility will be carried out by Sotacarbo with the collaboration of Ansaldo Ricerche, ENEA and the University of Cagliari - Department of Mechanical Engineering. It will include the following sections: coal gasification, gas cleaning, CO-shift conversion, CO₂ and hydrogen separation, and energy production. In the first phase of the R&D program, the system will be integrated with a 200 kW internal combustion engine for electrical production. In the next phases the system will be also integrated with small size turbines and fuel cells.

The main purpose of the research project is to test and tune the processes of all pilot plant sections. These processes are aimed at producing clean fuel gas and/or hydrogen from Sulcis coal. These processes are already well known in the petrochemical industrial sector but they are not tested enough with coal.