First results of the 2.25 t/h post-combustion CO₂ capture pilot plant of ENEL at the Brindisi coal power plant with MEA from 20 to 40 %wt and HiCapt+™ process

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ENEL has made the strategic decision to be directly involved in the demonstration of Carbon dioxide Capture and Storage technologies (CCS), as a way to guarantee the future use of coal for power generation in a carbon constrained world. Within this framework the company has committed to build a post-combustion slip-stream pilot plant of 10,000 Nm³/h of flue gas (2,25 ton/h of CO₂), to be installed at Brindisi power station. The flexible unit will allow ENEL to test and evaluate different solvents, starting from MEA (20%wt up to MEA 40%wt).

IFP Energies nouvelles and ENEL have signed an agreement to test the first-generation post-combustion capture process, developed by IFP, on the pilot unit to be built by ENEL at the coal-fired power station in Brindisi (Italy).

IFP Energies nouvelles and ENEL worked together on optimizing the sizing of the unit in 2008 and the partners are now collaborating on monitoring tests and analyzing results. This cooperation with ENEL will enable IFP Energies nouvelles to test and demonstrate performance improvements of the new HiCapt+ process (MEA 40 %wt with degradation inhibitor).

The presentation will first describe the pilot plant. This is today one of the biggest pilot plant in Europe for post combustion capture. The flue gas treated comes from the Brindisi’s power plant and vary from 3,000 up to 12,000 Nm³/h. The pilot plant includes a DeSOx unit with wet electro filters. The absorber column is 46 m tall and 1.5 m diameter with 4 structured packing beds including washing section. A complete description of the unit will be done.

The pilot has started in May 2010 with a first phase of reception with MEA 20%wt solvent. This phase had been concluded in September 2010 by the reception and qualification tests. The second phase is operated from November to January 2011 with MEA at 30%wt. During this second phase many parametric studies will be done (stripper pressure, lean loading, packing height for stripper or absorber, capture rate, …), the main results will be presented.
In a third phase, the new process developed by IFP Energies nouvelles will be tested (February to June 2011), first with a parametric campaign (reference test) with MEA at 40%wt and finally a campaign with MEA 40%wt with degradation inhibitor. The first test is a reference test for the HiCapt+ process in order to be able to evaluate the efficiency of degradation inhibitor. It will also allow to perform the process optimization with MEA 40%wt.

A synthesis of the more interesting results coming from this year of operation (May 2010 to May 2011) will be presented in the IEA meeting for the first time.