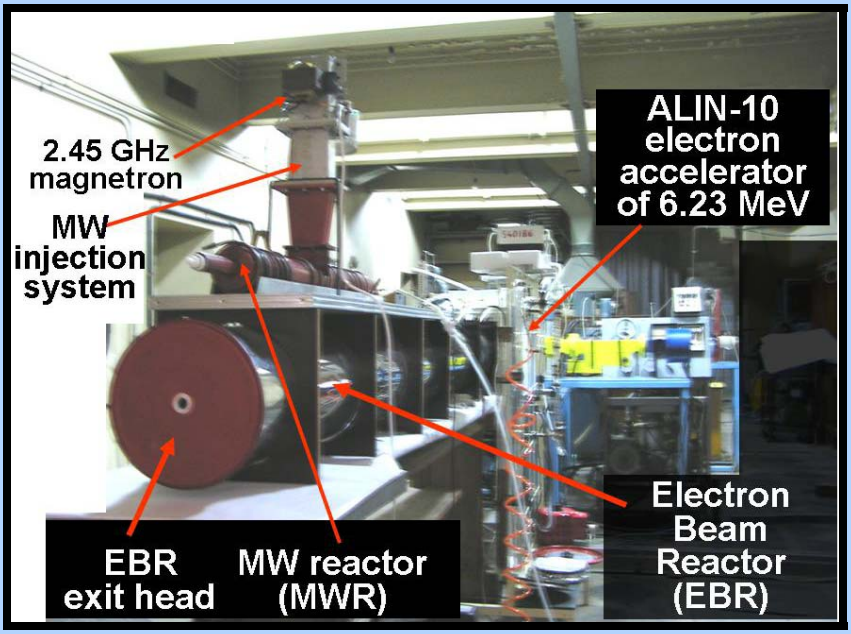
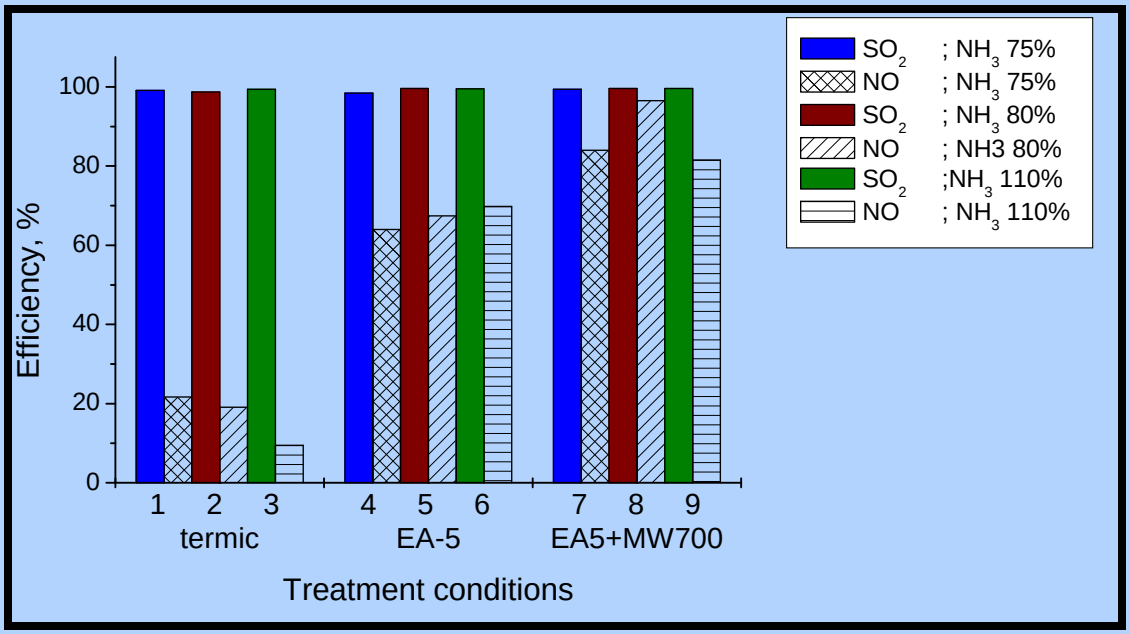
Stage II 15.10.2008

Stage II **Elaboration, designing, realization and testing of the experimental model for flue gases electron beam (EB) and microwave (MW) treatment for the laboratory accelerator ALIN-10**
Activity II.1: *Elaboration of an expertimental model for acid gases conversion with the combined treatment EB+MW, for ALIN-10*
Elaboration of the combined irradiation reactor
Elaboration of the experimental model for gas analyzing and conditioning
Act. II.2: *Design of an expertimental model for acid gases conversion with the combined treatment EB+MW, for ALIN-10*
Design of the combined irradiation reactor
Design of the experimental model for gas analyzing and conditioning
Act. II.3: *Realization of an expertimental model for acid gases conversion with the combined treatment EB+MW, for ALIN-10*
Realization of the combined irradiation reactor
Realization of the experimental model for gas analyzing and conditioning
Act. II.4: *Elaboration, designing and realization of the experimental model for the gases preparation and for the fly ash separation*
Elaboration, designing and realization of the experimental models
Act. II.5: *Development of a method for EB dose determination for continuously gas flow*
Elaboration,of the method
Act. II.6: *Experimentation of the model for acid gases conversion with the combined treatment EB+MW, for ALIN-10*
Experimentation of the combined irradiation reactor
Experimentation of the model for gas analyzing and conditioning
Act. II.7: *Experimentation of the model for the gases preparation and for the fly ash separation*
Experimentation of the model
Act. II.8: *Experimentation of the method for the dose determination*
Experiments
Act. II.9: *Participation to scientific manifestations and dissemination of the results* *All partners participate*

No. 2 phase objective was to develop, design, make and experiment a model for the conversion of acid gas by combined electron beam and microwave treatment for laboratory accelerator ALIN-10.
Comparative analysis of the EB and MW interaction mechanisms with substance made in the Phase 1 and 2 led us to conclude that the experimental treatment of the combustion gases with accelerator laboratory model should allow successive irradiation with EB and MW and should contain the following components (shown in figure): - An electron accelerator as a source of accelerate electrons - A reaction enclosure for accelerate electrons which should have an adapted geometry with electrical and geometrical characteristics of EB - A microwave reaction enclosure which should present a geometry adapted to the electromagnetic characteristics of MW - A system of microwave generation and transmission - An experimental model of conditioning and preparation of a synthetic gas composed of air, SO2, NOx and CO2 and specific additives - An experimental model for the separation of flying gray and the reaction products; - An analysis system of the synthetic gas composition before and after irradiation.
An example of the results obtained is represented in the chart below.



Photograph of the acid gases irradiation installation with ALIN-10 accelerator



Acid gases treatment results

Total dry gas flow rate 1500 l/h, Ammonia 70-110%; Gas temp. 55 – 70^{0}C, Input concentration: [SO_2]=1500-2000 ppmv; [NO]=200 ppmv, [water]=5,3%

		NH_3 %	Doza absorbita KGy
1	Thermal	75	
2	Thermal	80	
3	Thermal	110	
4	EA (Electron beam) 5W	70	6,4
5	EA 5W	76	6,4
6	EA 5W	110	6,4
7	EA 5W + MW (microwave) 700W	65	6,4
8	EA 5W + MW 700W	70	6,4
9	EA 5W + MW 700W	85	6,4