

BONG-HY

(parallel application of Blends Of Natural Gas and Hydrogen in internal combustion engines and fuel cells)



Problem/needs addressed by the sub-project

The transition towards an Hydrogen economy needs a lot of intermediate steps for technology development, infrastructure preparation, the creation of both national and international regulations as well as for public acceptance. The use of blends of hydrogen and natural gas in vehicles, in internal combustion engines or in fuel cells, constitutes a possible approach to speed up the process of the diffusion of a "hydrogen culture".

The use of blends of hydrogen and natural gas can lead to a reduction of the emissions of gaseous pollutants in urban areas if they constitute the fuel of important classes of vehicles that contribute most to the atmospheric pollution. BONG-HY focus its attention on the waste-collecting vehicles of the city of Brescia both for their particular low speed driving cycle characterised by a succession of frequent "stop and go" and for their routes that embrace all the streets of the city, so that they constitute a potential environmental threat for the population.



Statements and thoughts

Dr. Ettore Brunelli

Environmental Administrator of the Municipality of Brescia

Foreseeing the long term application of pure hydrogen, in order to reduce the actual emissions these blends constitute a short term "bridge technology" between the use of the least pollutant fuel (natural gas) and the use of pure hydrogen.



The activities that will be carried out concern the use of blends of hydrogen and natural gas in internal combustion engines and in solide oxide fuel cells for applications in industrial vehicles. The main goal is to obtain the largest environmental benefits. Experimental tests and homologation and safety studies will help the creation of a new infrastructure where the synergism between natural gas and hydrogen could accelerate the penetration of low impact vehicles. The results will be widely diffused.

REGINS project partner

REGINS (REGional standardised Interfaces for a better integration of regional SMEs in the European Economy) is an INTERREG IIIC Regional Framework Operation (RFO) that aims to support interregional cooperation projects (Sub-Projects) within the thematic priorities automotive, biotechnology and logistics within the participating partner regions Upper Austria, Stuttgart Region, Lombardy Region and West-Pannon.

Summary/activities of the sub-project

The workpackages foreseen by BONG-HY are the following:

WP1: Simulation of the combustion of H₂/NG blends and validation of the code

WP2: State of the art of the use of H₂/NG blends and analysis of pro and cons of the introduction of an advanced fuel in ASM SPA fleet

WP3: Modification, test and optimisation of an ICE

WP4: Study of the use of H₂/NG blends in SOFCs and related tests

WP5: Analysis of the Regulations for the use of H₂/NG blends and homologation procedures for the waste collecting vehicles

WP6: Interviews to different key players about barriers and constraints

WP7: Lab tests on the components of the Austrian SOFC to study the ageing processes due to the use of the H₂/NG blends

WP8: Diffusion of the results and preparation of new proposals

Contribution to strategic goals of REGINS

BONG-HY is an integrated project since all the partners will conduct parallel studies and experimentations on different but complementary topics in order to reach the final common objective; therefore, common studies and results will be shared with continuity between the partners of the different European regions involved. The results of the developed technologies can be applied to the automotive sector. The study represents the first step for a wider program of utilisation of hydrogen and hydrogen/natural gas blends in industrial vehicles. In the frame of the project an international workshop concerning the studies on these technologies is foreseen, along with the dissemination of the results and the preparation of educational material both for public use and for experts of the same field.

External experts

The Municipality of Brescia, lead partner of BONG-HY, will delegate the technical aspects of the Italian work to the Municipalised Multiutility ASM SPA.

ASM SPA will be supported by the following four operative units :

- 1) Catholic University of the Sacred Heart/Dept. of Mathematics and Physics (Brescia), for the study of the environmental benefits due to the use of H₂/NG blends;
- 2) ENEA (CASACCIA - Rome), for the lab tests regarding the optimisation of the internal combustion engine of the waste collecting vehicle fuelled by the H₂/NG blends;
- 3) University of Tor Vergata – Dept. of Mechanical Engineering (Rome), for the simulation of the combustion of H₂/NG blends in an ICE;
- 4) SINTESE AB s.r.l.(Milan), an engineering consulting company that will study the Regulations and the homologation of the tested vehicles.

Facts and figures

Name of the sub-project	REGINS - Regional standardised interfaces for a better integration of SMEs in the European Economy	
Duration	January 1 st 2006 – November 30 th 2006	
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