



Potential market of hydrogen and fuel cells in Spain

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Hydrogen and fuel cells are growing markets world wide, and Spain is not an exception. It exists a strong interest from the administration and the companies in developing these technologies because of both environmental and economical expected benefits.

Spain is affected by a strong dependence of external energy sources, and hydrogen and fuel cells are understood as two key technologies that could help in diminishing that dependence because two main reasons: on the one hand, their higher efficiency, compared with conventional systems, could contribute to make a more rational use of the fossil fuels, and on the other hand, they are expected to be complementary technologies that could allow to increase the share of renewable energies.

Regarding the energy use, a 40% of the primary energy is used in Spain for the transportation sector (mostly in road transport with almost a total dependence from oil). The substitution of the low efficient internal combustion engines by fuel cells, together with the use of hydrogen (by reforming natural gas, much cleaner than petrol. Or even by electrolysis of hydropower, wind or solar electricity) will help to decrease both the energy imports and the environmental impact (specially in urban centres).

Spain is geographically well positioned for a wide use of the renewable energies. Its orography presents a potential for hydropower energy (in fact, little less than the 20% of the electricity consumed in Spain is produced from it). The situation, face to the Atlantic Ocean, gives a wind potential in areas like Canary Islands, Galicia, Gibraltar area, and others like Aragon or Castilla (during year 2001, about the 3% of the electricity was wind generated, and this percentage is increasing strongly, in fact in some areas the installed wind peak power is close to the limit allowable for grid connection). The solar radiation received (specially in the southern half of the country and the eastern coasts) presents a potential for solar electricity not well used yet. Renewable production of hydrogen (by means of electrolysis) will allow to increase the share of non pollutant sources, and it use even for transport.

The good natural gas distribution network will allow also a wide use of domestic cogenerators based on fuel cells consuming natural gas.

There are three clues that indicate that Spain is moving to some position in favour to the new technologies of hydrogen and fuel cells:

1. The Spanish administration is giving support for developing and demonstrating hydrogen and fuel cells (the R&D National Planning oriented to long term activities developed by Research Centres includes hydrogen and fuel cells as topics in both Energy and Material Areas, and the Innovation and Applied R&D Programme oriented to companies have included the hydrogen and fuel cell technologies as a strategic line)
2. Spanish centres and companies are working in several demonstration projects using fuel cells for different applications (transport, distributed generation, remote generation, generation of hydrogen from renewable sources, etc.). Given the strong social impact, it can be highlighted the demonstration of urban buses with hydrogen and fuel cells. Spain is in a unique position in this race because of some reasons: a) is (together with Germany) the only country that will have in brief hydrogen-fuel cells buses in normal operation in two cities (Madrid and Barcelona), b) will have buses from different manufacturers (in fact, in Madrid, the buses of both manufacturers will share the same filling station) and c) in both projects (CUTE and CITYCELL) the first buses of the European demonstration were given to the city of Madrid.
3. The creation of the Spanish Hydrogen Association (AeH) last year is a good indication of the strong interest in these technologies for both Spanish companies and administration. The fact that more than 40 institutions (companies of different sectors, research centres and energy agencies) and over 60 people (researchers mainly) had joined together with the common objective of developing hydrogen and fuel cells and helping them to be introduced in the market, is a very positive starting point.



Spanish Hydrogen Association
picture: AeH



Fuel cell buses and hydrogen
filling station of Madrid
pictures: ARIEMA