

# **Fuel Cell and Hydrogen (FCH2) Technology Creates Business Opportunities beyond Products and Applications**

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# Fuel Cell and Hydrogen (FCH<sub>2</sub>) Technology Creates Business Opportunities beyond Products and Applications

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## 1 FCH<sub>2</sub> and Climate Policy

The evolution of advanced energy technologies over the last years is a result of the increasing focus on the significance of climate issues. Hydrogen and fuel cell technologies have been part of this evolution. Where the topics of energy demand, energy safety, greenhouse gas emissions and economic development are concerned, there is no longer any doubt that electricity and hydrogen will become the energy carriers of the future involving new and highly efficient energy converters such as fuel cells.

The German Government and the European Union directed their environmental and energy programs in directions that will continue to support the introduction of renewable energies and advanced technologies. Together with industry and the research community, funding programs have been created and gradually implemented. According to the German Federal Ministry of Transport, these activities are essential to prepare for the fuel cell and hydrogen markets of the future. As with all innovations and emerging technologies, fuel cell and hydrogen technologies will create value for companies and organisations in all types of business. The result will be the generation of new fields of work and new jobs.

## 2 FCH<sub>2</sub> and Job Creation

Although there are still only a limited number of fuel cell products on the market, the technology and its specific requirements demand know-how and skills in various fields along the value chain. Fuel cell technologies across all industries involved have matured since the early years of research and development. Funding programs for the market introduction of products and applications are intended to create the momentum necessary to accelerate widespread commercialisation. As part of this process, companies will ramp up their internal capacities which will lead to the creation of new jobs. Most of the current jobs and positions are in the field of research and development activities for products and applications.

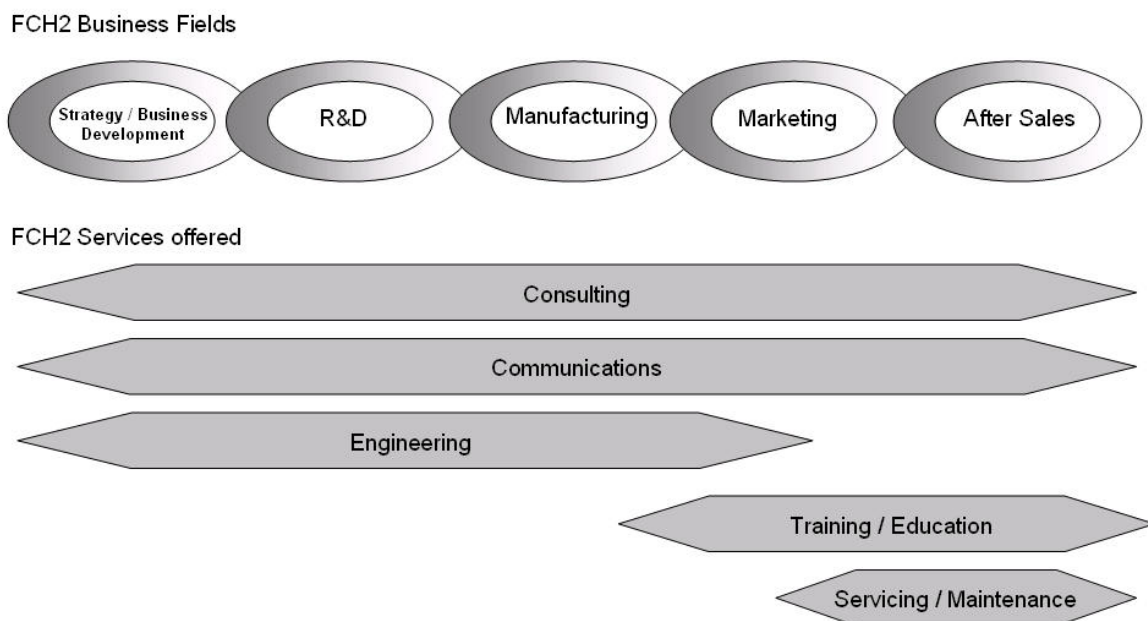
In the near future, jobs will also be created in other business fields. According to a study of Fuel Cell Today published at the end of 2009, the fuel cell industry could create 700,000 manufacturing jobs worldwide over the next decade. Looking at projections of unit shipments over this period, over a million new jobs could be created in the areas of fuel cell installation, servicing and maintenance.

According to statistics of the German Engineering Federation (VDMA), the Centre for Solar Energy and Hydrogen Research Baden-Württemberg (ZSW) and the National Organisation for Hydrogen and Fuel Cell Technology (NOW), there are about 400 to 500 companies in Germany alone dealing in some way with FCH<sub>2</sub> technology of which 100-200 belong to the supplier industry. From 2010 onwards a strong growth in new jobs is anticipated.

In Germany, fuel cell and hydrogen technologies are considered part of the renewable energy sector. If Germany is in fact able to realise its climate objectives, an annual 2.5% growth and a creation of 630,000 additional jobs can be expected in this field by 2020<sup>1</sup>. According to the German Federal Environment Agency (UBA), climate issues (or environmental protection) will be the driver for innovation in this century.

### 3 FCH<sub>2</sub> and the Service Sector

The growing fuel cell and hydrogen sector is creating new business opportunities for specialists and experts, particularly in the service sector. Services include engineering, consulting and marketing services, services in the field of (further) education and training, and maintenance services for FCH<sub>2</sub> products.



**Figure: FCH<sub>2</sub> Business fields and services offered.**

- **Engineering** companies provide services such as simulation, software development, and design, as well as mechanical, process and production engineering and project management for all stages of the FCH<sub>2</sub> research and development process.
- Regarding **consulting** services for FCH<sub>2</sub>, the focus lies on strategic business development for small and medium-sized companies as well as for governmental institutions whose goal is the economic development of their respective regions.
- **Communication** services support the market introduction of FCH<sub>2</sub> technologies. These services ensure that information about FCH<sub>2</sub> technology and applications are communicated successfully to the stakeholders and target groups in the right context (when, where and how).

<sup>1</sup> See interview Süddeutsche Zeitung, 20.02.2010 with Jochen Flasbarth, President of the Federal Environment Agency, Germany

- Services in the field of **training and (further) education** are essential to familiarize affected professional groups with the changes in their fields of work, as well as to help schools and universities create new courses of study and adapt existing ones to meet the requirements of the FCH<sub>2</sub> industry.
- Finally, services are offered in the field of **servicing and maintenance** for existing FCH<sub>2</sub> products, owing to the limited number of educated and trained craftsmen, technicians, mechanics or electricians and because it is still too expensive for smaller organisations to invest in their own personnel.

#### **4 FCH<sub>2</sub> and Expert Services**

Conventional services as we find them in conventional industries will not be sufficient when it comes to fuel cell products and hydrogen energy. Although the services being provided for FCH<sub>2</sub> technology do not appear different on the surface, one will find that the individuals behind them have a keen insight into this new and evolving business and have – in the meantime - set up their own businesses after working many years in the FCH<sub>2</sub> industry. They are most knowledgeable about the industry and have exceptional expertise about FCH<sub>2</sub> technology having acquired their work experience in companies which belong to the pioneers of the FCH<sub>2</sub> industry in their respective countries. These experts are familiar with the industry's risks and its opportunities, because they have been involved in its evolution.

Already today experienced engineers, qualified managers and competent marketing experts are offering their know-how in services for all kinds of FCH<sub>2</sub> fields of business. They support all sizes of companies and institutions flexibly and for as long as necessary. This gives the companies and institutions employing these individuals the organizational freedom needed in a young and emerging FCH<sub>2</sub> business environment.

##### **Example 1: EMCEL Engineering – A FCH<sub>2</sub> Engineering and Consulting Company**

The areas of expertise of EMCEL Engineering are alternative drive trains and fuel cell and hydrogen technologies. The company's head is a mechanical engineer who worked for more than a decade in the research & development sector for automotive fuel cell applications before he started his own business. With the information and know-how gained in the FCH<sub>2</sub> industry, EMCEL Engineering now supports small and medium-sized companies who have discovered the FCH<sub>2</sub> industry as a potentially new market for their products. EMCEL Engineering also supports established fuel cell players in times when the work load is high and when special know-how and knowledge about specific markets is needed.

##### **Example 2: AKOMBE – Technology & Market Communications**

AKOMBE's area of expertise is in the field of advanced energy and powertrain systems including hybrid, battery and fuel cell technology, advanced ICE concepts as well as renewable energies. The owner has a business degree and worked for years in the field of marketing communication for automotive FCH<sub>2</sub> applications. During that time, she worked closely with developers, researchers and managers and acquired extensive technical know-how. She is familiar with the technical benefits and problems, understands the technology in detail, and is in a position to assess the statements of experts. This makes her a competent consulting and business partner.