

2010/2011  
EDITION



**HYRREG**

**CATALOGUE OF TECHNOLOGY PROFILES**  
**HYDROGEN TECHNOLOGIES AND FUELL CELLS**

[www.hyrreg.eu](http://www.hyrreg.eu)

Funded by:



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**HYRREG**

**CATALOGUE OF TECHNOLOGY PROFILES**  
**HYDROGEN TECHNOLOGIES AND FUELL CELLS**

[www.hyrreg.eu](http://www.hyrreg.eu)





# HYRREG

## WHAT IS HYRREG?

HYRREG is an initiative financed by the European Commission through the Interreg IVB SUDOE Programme to foster the Hydrogen Economy in Southwestern Europe (SUDOE area). Hyrreg is a 30-month project, which started in April 2009 and will be finished by October 2011.

## OBJECTIVES

- To increase the competitiveness and industrial development for hydrogen technologies and fuel cells.
- To create a platform for the generation of technology and development collaboration projects between Enterprises, Universities and Technology Centres.
- To create a road map of the hydrogen economy, in order to foster the introduction and implementation of these technologies in the SODOE area.

## WHO CAN PARTICIPATE?

SMEs, Companies, Research Centres, Universities, and any organization interested in Hydrogen Technologies.

# CATALOGUE OF TECHNOLOGY PROFILES

## Contact info: SPAIN



### **Fundación para el Desarrollo de las Nuevas Tecnologías del Hidrógeno en Aragón**

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## FRANCE



ÉCOLE DES MINES D'ALBI  
C A R M A U X

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Address: Pav. Mecânica I, 2.º, Av. Rovisco Pais, 1049-001. Lisboa

PÁG. ENTITY

## TECHNOLOGY PROFILES

- 14 ACAI DEPURACIÓN, S.L
- 16 AIR LIQUIDE
- 18 AIR LIQUIDE HYDROGEN ENERGY
- 20 AIR PRODUCTS S.A.S
- 22 AITIP CENTRO TECNOLÓGICO
- 24 AJUSA
- 26 ANDALUSIAN ASSOCIATION FOR RESEARCH & INDUSTRIAL COOPERATION (AICIA)
- 34 ARAGÓN INSTITUTE OF ENGINEERING RESEARCH (13A)
- 38 ARCHIMICA
- 40 ARIEMA ENERGÍA Y MEDIOAMBIENTE
- 44 ASSOCIACIÓ CATALANA DE L'HIDROGEN I LES ENERGIES RENOVABLES (ACH2ER)
- 46 AXANE
- 50 BIOGAS FUEL CELL, S.A
- 54 BSH ELECTRODOMÉSTICOS ESPAÑA, S.A.
- 56 CARBUROS METÁLICOS, S.A
- 58 CEGASA INTERNACIONAL
- 60 CENER, CENTRO NACIONAL DE ENERGÍAS RENOVABLES
- 64 CENTRO NACIONAL DEL HIDRÓGENO (CNH2)
- 68 CENTRO TECNOLÓGICO AVANZADO DE ENERGÍAS RENOVABLES
- 70 CIDAUT FOUNDATION
- 74 CIDETEC-IK4
- 76 CLAN TECNOLÓGICA S.L.
- 78 COMPANHIA CARRIS DE FERRO DE LISBOA
- 80 DOBON'S TECHNOLOGY, S.L
- 82 EFFERGY ENERGÍA S.L.
- 84 EKA CHIMIE SAS



PÁG.	ENTITY
86	ELCOGAS S.A
90	ELECTRÓNICA CERLER, S.A
92	EMAC (SCHOOL OF MINES OF ALBI)
94	ENÁTICA ENERGÍAS RENOVABLES
98	ENERGYIN- COMPETITIVENESS AND ENERGY TECHNOLOGY CENTRE
100	EXAMECA AÉROTUBE
102	FACULTY OF SCIENCE AND TENCHNOLOGY OF THE UNIVERSITY OF COIMBRA
104	FÉDÉRAL MOGULSINTERTECH
106	FOUNDATION FOR THE DEVELOPMENT OF NEW HYDROGEN TEHNOLOGIES IN ARAGON
108	FUNDACION CIRCE- CENTRO DE INVESTIGACION DE RECURSOS Y CONSUMOS ENERGÉTICOS
112	FUNDACIÓN SAN VALERO
114	FUNDACIÓN ZARAGOZA LOGISTICS CENTER
116	GALA GAR, S.L
118	GARBITEK ENERGÍAS RENOVABLES, S.L.
120	GASIN GASES INDUSTRIAIS, S.A.
121	GESAN
124	GOING INVESTMENT, S.A.
126	H2GENERA FUEL CELL PROJECTS
128	HINICIO
130	IDOM ZARAGOZA, S.A
132	IMDEA ENERGIA FOUNDATION
138	INDUSTRIA SOSTENIBLE
140	INEGI- INSTITUTE OF MECHANICAL ENGINEERING AND INDUSTRIAL MANAGEMENT OF THE UNIVERSITY OF OPORTO -1
144	INEGI- INSTITUTE OF MECHANICAL ENGINEERING AND INDUSTRIAL MANAGEMENT OF THE UNIVERSITY OF OPORTO - 2
148	INSTITUT CARNOT CIRIMAT

PÁG.	ENTITY
150	INSTITUT DE CHIMIE DE LA MATIÈRE CONDENSÉE DE BORDEAUX (ICNCB)
152	INSTITUT EUROPÉEN DES MEMBRANES- IEM (EUROPEAN MEMBRANE INSTITUTE)
156	INSTITUTE OF MECHANICAL ENGINEERING OF INSTITUTO SUPERIOR TÉCNICO IST/IDMEC- ENERGY TECHNOLOGY LAB
158	INSTITUTE OF NANOSCIENCE OS ARAGÓN (INA)
160	INSTITUTO DE TECNOLOGÍA QUÍMICA
162	INSTITUTO NACIONAL DE TÉCNICA AEROSPACIAL (INTA)
166	INSTITUTO TECNOLÓGICO DE ARAGÓN
168	INSTRUMENTACIÓN ANALÍTICA, S.A.
170	INYCOM
176	IRMA
178	LABORATOIRE AGRÉGATS, INTERFACES ET MATÉRIAUX POUR L'ÉNERGIE / LABORATORY AGGERGATES, INTERFACES AND MATERIALS FOR ENERGY
182	LABORATOIRE DE GÉNIE CHIMIQUE
184	LAPESA GRUPO EMPRESARIAL
188	LEITAT TECHNOLOGICAL CENTER
190	LEPAE- FACULTY OF ENEGINEERING AT UNIVERSITY OF PORTO
194	LNEG (NATIONAL ENERGY AND GEOLOGY LAB)
192	LSRE- LABORATORY OF SEPARATION AND REACTION ENGINEERING OF THE FACULTY OS ENGINEERING OF THE UNIVERSITY OS OPORTO
204	MAETEL
206	MATGAS 2000 AIE
208	MONDRAGÓN COMPONENTS
212	N-GHY S.A. (+ SUBSIDIARY: EUCLHYD S.A.)
216	PRAGMA INDUSTRIES
218	PROYECTOS, SOLUCIONES E INNOVACIONES TÉCNICAS
220	SOLVENTUS, S.L.U

**PÁG. ENTITY**

222	SPANISH COUNCIL FOR SCIENTIFIC RESEARCH (CSIC)
236	SPANISH HYDROGEN & FUEL CELL TECHNOLOGY PLATAFORM
238	SPANISH HYDROGEN ASSOCIATION
240	SRE- SOLUÇÕES RACIONAIS DE ENERGIA
242	TEAM ELIAS, S.L- TECH4
244	TECNALIA
246	TRANSPORTES URBANOS DE ZARAGOZA, S.A.U.
248	UNIVERSIDAD AUTÓNOMA DE MADRID - 1
250	UNIVERSIDAD AUTÓNOMA DE MADRID - 2
252	UNIVERSIDAD AUTÓNOMA DE MADRID - 3
254	UNIVERSIDAD DE ALICANTE
256	UNIVERSIDAD DE LA RIOJA
258	UNIVERSIDAD DE ZARAGOZA
260	UNIVERSIDAD DEL PAÍS VASCO
262	UNIVERSIDAD PÚBLICA DE NAVARRA
264	UNIVERSIDAD REY JUAN CARLOS
266	UNIVERSITY CARLOS III - 1
268	UNIVERSITY CARLOS III - 2
270	UNIVERSITY CARLOS III - 3
274	UNIVERSITY OF BARCELONA
276	UNIVERSITY OF CÁDIZ
278	UNIVERSITY OF CANTABRIA
280	UNIVERSITY OF CASTILLA- LA MANCHA
284	UNIVERSITY OF CÓRDOBA
286	UNIVERSITY OF HUELVA
290	UNIVERSITY OF MÁLAGA-UMA
292	UTAD- UNIVERSITY OF TRÁS-OS- MONTES E ALTO DOURO

PÁG.	ENTITY
294	VEA QUALITAS
296	ZOILO RÍOS, S.A.
298	ZYTEL AUTOMOCIÓN, S.L.

## ANNEX:FUNDING PROGRAMES

### **EUROPEAN FUNDINGS**

304	COMPETITIVENESS AND INNOVATION FRAMEWORK PROGRAMME (CIP)
305	EUREKA
306	EUROPEAN FRAMEWORK PROGRAM
307	EUROPEAN SOCIAL FUND (ESF)
308	EUROSTARS PROGRAMME
309	FRENCH NATIONAL RESEARCH AGENCY
310	FUEL CELL AND HYDROGEN JOINT TECHNOLOGY INICIATITIVE JTI
311	IBEROEKA
312	LIFE+
313	RESEARCH FOR THE BENEFIT OF SMES CALLS
314	SEVENTH FRAMEWORK PROGRAMME / COOPERATION
315	STRUCTURING RESEARCH AND DEVELOPMENT PROJECTS OF COMPETITIVENESS POLES
316	SUPPORT TO COLLABORATIVE RESEARCH AND DEVELOPMENT PROJECTS OF COMPETITIVENESS POLES – 11TH CALL FOR PROJECTS

### **NATIONAL FUNDINGS(SPAIN)**

318	(ENISA) PARTICIPATIVE LOAN
319	CANADEKA (BILATERAL PROGRAM FOR TECHNOLOGICAL COOPERATION)
320	CDTI FUNDING
321	CHINEKA (BILATERAL PROGRAM FOR TECHNOLOGICAL COOPERATION)

<b>PÁG.</b>	<b>ENTITY</b>
322	DG-PYME (MITYC) FUNDING
323	IDAE FUNDING
324	ISP (INDIA) (BILATERAL PROGRAM FOR TECHNOLOGICAL COOPERATION)
325	JSIP (JAPAN) (BILATERAL PROGRAM FOR TECHNOLOGICAL COOPERATION)
326	KSI (COREA) (BILATERAL PROGRAM FOR TECHNOLOGICAL COOPERATION)
327	LIA FOR DEPLOYMENT AND INTERNATIONALIZATION OF THE SYSTEM
328	LIA FOR HUMAN RESOURCES
329	LIA FOR INSTITUTIONAL REINFORCEMENT
330	LIA FOR R&D&I PROJECTS
331	LIA FOR SCIENTIFIC AND TECHNOLOGICAL INFRASTRUCTURES
332	LIA FOR THE USE OF KNOWLEDGE AND TECHNOLOGY TRANSFER
333	OFFICIAL LOAN INSTITUTE (ICO)
334	R&D&I TAX EXEMPTION

#### ***REGIONAL FUNDINGS (SPAIN)***

336	REGIONAL FUNDINGS (SPAIN)
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# TECHNOLOGY PROFILES

# ACAI DEPURACIÓN, S.L.

## Department

## Web

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## Contact person

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## Category

- |  |   |
|--|---|
| <input type="checkbox"/> H <sub>2</sub> Production   | <input type="checkbox"/> Conversion & apps      |
| <input type="checkbox"/> H <sub>2</sub> Purification | <input type="checkbox"/> Promotion & perception |
| <input type="checkbox"/> H <sub>2</sub> Storage X    | <input type="checkbox"/> Electric supplies      |
| <input type="checkbox"/> H <sub>2</sub> Delivery     | <input checked="" type="checkbox"/> Others      |

## Research lines

Sewage treatment plants with low electric consumption.

## Some additional and related information

## TECHNOLOGY TRANSFER PROFILE

### Category

Technology offer

Technology Request



## Contact details

**R&D Group**  
**Name of the company**  
**Contact**

## Technology Profile

**Title**  
**Description**

### **Innovative Aspects and Main Advantages**

Sewage treatment plants in remote locations from the electric net with supply of 2kW hydrogen fuel cells generated 'in situ' or stored.

### **Intellectual Property Rights**

### **Other Aspects**

## Search for Partners

**Type of Search**  
Partners interested in the Project for economic funding.

### **Tasks to be Performed by the Partner**

# AIR LIQUIDE

## Department

Grande Industrie France  
Direction Région Sud-Ouest  
Route des Usines 64150 Pardies

## Web

## Contact person - E-mail

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## Telephone

05 59 60 43 90

## Category

- |   |   |
|---|---|
| <input checked="" type="checkbox"/> H <sub>2</sub> Production | <input type="checkbox"/> Conversion & apps      |
| <input type="checkbox"/> H <sub>2</sub> Purification          | <input type="checkbox"/> Promotion & perception |
| <input type="checkbox"/> H <sub>2</sub> Storage               | <input type="checkbox"/> Electric supplies      |
| <input checked="" type="checkbox"/> H <sub>2</sub> Delivery   | <input type="checkbox"/> Others                 |

## Research lines

Industrial gases production and distribution.

## Some additional and related information

In the South West, Air Liquide exploits several units of oxygen production from air in order to provide the industrial customers with oxygen (or nitrogen). These units are localized near the consumption sites. In addition, Air Liquide exploits a small unit of hydrogen production by natural gas reforming. Air liquide also consumes 50 m<sup>3</sup>/h of hydrogen for argon production.

# TECHNOLOGY TRANSFER PROFILE

## Category

Technology offer

Technology Request

## Contact details

**R&D Group**  
**Name of the company**  
**Contact**

Grande Industrie France  
Air Liquide

## Technology Profile

**Title**

**Description**

Industrial gaseous and liquid gases production and distribution.

**Innovative Aspects and Main Advantages**

**Intellectual Property Rights**

**Other Aspects**

## Partner Sought

**Type of Partner Sought**

Air Liquide Pardies searches to increase hydrogen production in order to answer to the demand of the enterprises in the South West France.

**Tasks to be Performed by the Partner Sought**

# AIR LIQUIDE HYDROGEN ENERGY

## Department

## Web

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## Telephone

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## Category

- |   |   |
|---|---|
| <input checked="" type="checkbox"/> H <sub>2</sub> Production   | <input type="checkbox"/> Conversion & apps            |
| <input checked="" type="checkbox"/> H <sub>2</sub> Purification | <input type="checkbox"/> Promotion & perception       |
| <input checked="" type="checkbox"/> H <sub>2</sub> Storage      | <input checked="" type="checkbox"/> Electric supplies |
| <input checked="" type="checkbox"/> H <sub>2</sub> Delivery     | <input type="checkbox"/> Others                       |

## Research lines

In the Group's laboratories, nearly a hundred people take part in research and development programs on the production, distribution and applications of hydrogen.

## Some additional and related information

The purpose is to build up a competitive sustainable hydrogen network in order to serve markets for which hydrogen and fuel cells answer to a need.

Air Liquide masters the hydrogen chain from one end to the other, from research to production and use.

Over 200 Air Liquide units worldwide (including 38 large-capacity units) produce hydrogen in gaseous form. This hydrogen is distributed to customers in small cylinders (gaseous form) or in bulk trucks (liquid -253°C or gaseous forms).

Air Liquide operates 1800 km of pipelines to transport hydrogen directly to its largest customers' industrial sites.

Air Liquide provides high-performance technologies that support car manufacturers in the development of their hydrogen vehicles.

Air Liquide coordinates various demonstration programs with the goal of testing the technologies in a "real-life situations" and of familiarizing the public with this new energy source.

# TECHNOLOGY TRANSFER PROFILE

## Category

Technology offer

Technology Request

## Contact details

**R&D Group**  
**Name of the company**  
**Contact**

## Technology Profile

**Title**

**Description**

Production, distribution and use of hydrogen.

**Innovative Aspects and Main Advantages**

High performance technologies for the development of hydrogen vehicles, stations to fill cars' tanks with gaseous hydrogen pressurized up to 700 bars. The innovative technologies that the Group's teams have developed enable a car to be filled in less than 5 minutes, under conditions as simple as those for gasoline or diesel, in complete safety. Air Liquide has already built and installed more than 50 distribution stations worldwide.

**Intellectual Property Rights**

**Other Aspects**

## Partner Sought

**Type of Partner Sought**

**Tasks to be Performed by the Partner Sought**

# AIR PRODUCTS S.A.S.

## Department

Hydrogen Energy Systems

## Web

[www.airproducts.fr](http://www.airproducts.fr)  
[www.airproducts.co.uk/hes](http://www.airproducts.co.uk/hes)

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## Telephone

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## Category

H<sub>2</sub> Production

H<sub>2</sub> Purification

H<sub>2</sub> Storage

H<sub>2</sub> Delivery

Conversion & apps

Promotion & perception

Electric supplies

Others

## Research lines

Modular H<sub>2</sub> refuelling stations up to 700 bar.  
Mobile fuelers and new H<sub>2</sub> delivery systems.  
Hydrogen storage systems to store electricity from renewables.

## Some additional and related information

Air Products S.A.S. produces and delivers industrial, high purity and medical gases, and develops new technologies and equipment for multiple applications. It's part of the Air Products Group, the world's largest supplier of hydrogen and an industry leader in hydrogen fuel infrastructure. Air Products S.A.S. delivers hydrogen in all its forms: gas, liquid and on site production.

Air Products group is at the forefront of the development of hydrogen energy technologies, working to bring safe, low-cost hydrogen production and infrastructure to the marketplace, and participating in demonstration projects in France, Europe and around the world. Air Products has more than 50 patents in the field of hydrogen fuelling technology and has installed until now more than 120 stations for fuelling cars, buses, forklift trucks, aircraft, trains and even submarines.

Air Products is based at the SODOE region Toulouse and Massiac with its recently acquired SAGA joint venture. It has several gas cylinders distribution centers spread over the region.

# TECHNOLOGY TRANSFER PROFILE

## Category

Technology offer

Technology Request

## Contact details

**R&D Group**  
**Name of the company**  
**Contact**

## Technology Profile

**Title**

**Description**

**Innovative Aspects and Main Advantages**

**Intellectual Property Rights**

**Other Aspects**

## Partner Sought

**Type of Partner Sought**

**Tasks to be Performed by the Partner Sought**

# AITIP CENTRO TECNOLÓGICO

## Department

## Web

[www.aitip.com](http://www.aitip.com)

## Contact person

Ángel Fernández Cuello

## Telephone

+ 34 976 464 544  
[aitip@aitip.com](mailto:aitip@aitip.com)

## Category

- |  |   |
|--|---|
| <input type="checkbox"/> H <sub>2</sub> Production   | <input type="checkbox"/> Conversion & apps      |
| <input type="checkbox"/> H <sub>2</sub> Purification | <input type="checkbox"/> Promotion & perception |
| <input type="checkbox"/> H <sub>2</sub> Storage X    | <input type="checkbox"/> Electric supplies      |
| <input type="checkbox"/> H <sub>2</sub> Delivery     | <input checked="" type="checkbox"/> Others      |

## Research lines

New nanoadditivated thermoplastic materials and its applications;  
Light weight plastic products.

## Some additional and related information

**1.PROJECT NANOPLAST. CREATION OF BLENDS NANOCOMPOSED BASED IN POLIOLPHINES AND POLIAMIDES IMPROVED WITH HALLOWSITE NANOTUBES (HNTs) AND CARBON NANOTUBES (CNTs).** Subprogram of Technology Centres of 'Programa Nacional de Proyectos de Desarrollo Experimental'. Project Funded by the Ministry of Science and Innovation. Plan Nacional I + D + I 2008-2011. 2009-2010 Annuity.

**PROJECT CITYELEC: SYSTEMS FOR THE MOVILITY ELECTRIFICATION IN URBAN ENVIRONMENT.** Proyecto Singular y Estratégico in electrification systems of the mobility in urban environment, in the framework of national / cross-sectoral strategic action Aerospace transport, call 2009-2010. Funded by the Ministry of Science and Innovation. 2009-2010 Annuity



# TECHNOLOGY TRANSFER PROFILE

## Category

Technology offer

Technology Request

## Contact details

### R&D Group

Name of the company

### Contact

AITIIP TECHNOLOGICAL CENTRE  
Ángel Fernández Cuello

## Technology Profile

### Title

New nanoadditivated thermoplastic materials and its applications;  
Light weight plastic products

### Description

### Innovative Aspects and Main Advantages

High value products; reduction of weight;

### Intellectual Property Rights

### Other Aspects

## Search for Partners

### Type of Search

All type of partners: RTD; SME; Large Companies to Create R&D AND/OR Industrial Consortiums.

### Tasks to be Performed by the Partner

## Department

Tecnologías del Hidrógeno

## Web

[www.ajusa.es](http://www.ajusa.es)

## Contact person - E-mail

Pedro Sánchez  
[psanchez@ajusa.es](mailto:psanchez@ajusa.es)

## Telephone

967 216 212

## Category

- |  |   |
|--|---|
| <input type="checkbox"/> H <sub>2</sub> Production   | <input type="checkbox"/> Conversion & apps            |
| <input type="checkbox"/> H <sub>2</sub> Purification | <input type="checkbox"/> Promotion & perception       |
| <input type="checkbox"/> H <sub>2</sub> Storage      | <input checked="" type="checkbox"/> Electric supplies |
| <input type="checkbox"/> H <sub>2</sub> Delivery     | <input type="checkbox"/> Others                       |

## Research lines

- PEM Fuel Cells.
- PEM Power Units.
- PEM Vehicles.
- PEM Fuel Cells components.

## Some additional and related information

AJUSA is developing the "Hydrogen City" Project composed of the following subprojects:

- Don Qhyxote Home Project.
- Don Qhyxote Car Project.
- Don Qhyxote H2 Station Project.
- Scooter Project.

# TECHNOLOGY TRANSFER PROFILE

## Category

Technology offer

Technology Request

## Contact details

**R&D Group**  
**Name of the company**  
**Contact**

Tecnologías del Hidrógeno  
AJUSA  
Pedro Sánchez

## Technology Profile

### Title

Hydrogen Technologies. PEM Fuel Cell

### Description

The company AJUSA, in its catalogue "Hydrogen Technologies", downloadable from the web page [www.ajusa.es](http://www.ajusa.es), offers:

- Fuel Cells
- Power Units
- Scooter
- Don Qhyxote Car
- Fuel Cells components

### Innovative Aspects and Main Advantages

### Intellectual Property Rights

AJUSA has patented his model of MEA with integrated seal present in their Fuel Cells.

### Other Aspects

## Partners Sought

### Type of Partner Sought

### Tasks to be Performed of the Partner Sought

# ANDALUSIAN ASSOCIATION FOR RESEARCH & INDUSTRIAL COOPERATION (AICIA)

## Department

Termotecnia, Tecnología Electrónica y Automática Industrial

## Web

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## Contact person - E-mail

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[angel.ll.miranda@upc.edu](mailto:angel.ll.miranda@upc.edu)

## Telephone

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954463153

## Category

H<sub>2</sub> Production

H<sub>2</sub> Purification

H<sub>2</sub> Storage X

H<sub>2</sub> Delivery

Conversion & apps

Promotion & perception

Electric supplies

Others

## Research lines

Design of reformed hydrogen-based systems. Electronic converters for fuel cells. Cells control Hybrid vehicles.

## Some additional and related information

AICIA participates and has participated in several projects in collaboration with the National Institute of Aerospace Technology (INTA) and the companies Hynergreen, Greenpower, Endesa and Gamesa. In these projects he has worked mainly in:

-Hydrogen Production: through electrolysis with renewable sources and by reforming.

-Hydrogen-based systems energy analysis.

-Fuel cells modelling.

-Fuel cells control.

-Development of electronic converters for electric systems based on fuel cells.

-Hybrid vehicles with fuel cells.

AICIA currently has an experimental pilot plant including the production of H<sub>2</sub> through electrolysis, hydride storage, fuel cell and electronic loads. It is also available a hybrid vehicle developed jointly with the INTA and it is being finished another vehicle within the Hercules consortium.

# TECHNOLOGY TRANSFER PROFILE

## Category

Technology offer

Technology Request

## Contact details

**R&D Group**  
**Name of the company**  
**Contact**

Termotecnia  
Aicia/Un. Sevilla  
Felipe Rosa

## Technology Profile

### Title

Integration of renewable energies and hydrogen production systems

### Description

Using hydrogen as a storage system to solve the problems derived from the increasing of renewable in the system: penetration factor, no matching supply and demand, randomness, limited waste lines, etc.

### Innovative Aspects and Main Advantages

### Intellectual Property Rights

### Other Aspects

## Partners Sought

### Type of Partner Sought

### Tasks to be Performed of the Partner Sought

# TECHNOLOGY TRANSFER PROFILE

## Category

Technology offer

Technology Request

## Contact details

**R&D Group**  
**Name of the company**  
**Contact**

Termotecnia  
AICIA  
Felipe Rosa Iglesias

## Technology Profile

### Title

Energy analysis of systems based on fuel cells

### Description

Simulation tool for energy analysis of systems based on fuel cells.

### Innovative Aspects and Main Advantages

It allows the analysis of the systems in the design stage and the evaluation of the energy output.

### Intellectual Property Rights

### Other Aspects

## Partners Sought

### Type of Partner Sought

### Tasks to be Performed of the Partner Sought

# TECHNOLOGY TRANSFER PROFILE

## Category

Technology offer

Technology Request

## Contact details

**R&D Group**  
**Name of the company**  
**Contact**

Termotecnia  
AICIA  
Felipe Rosa Iglesias

## Technology Profile

### Title

Fuel cell modelling

### Description

Development of detailed models of fuel cells and associated items as storage in hydrides, using finite element techniques.

### Innovative Aspects and Main Advantages

It allows a detailed analysis of the performance of the cells, very useful for improving its design.

### Intellectual Property Rights

### Other Aspects

## Partners Sought

### Type of Partner Sought

### Tasks to be Performed of the Partner Sought

# TECHNOLOGY TRANSFER PROFILE

## Category

Technology offer

Technology Request

## Contact details

**R&D Group**  
**Name of the company**  
**Contact**

Automática Industrial  
AICIA  
Carlos Bordons Alba

## Technology Profile

### Title

Automatic control of fuel cells

### Description

Design and real-time implementation of control strategies for fuel cells.

### Innovative Aspects and Main Advantages

Advanced design of new drivers to improve the efficiency and durability of the cells.

### Intellectual Property Rights

### Other Aspects

## Partners Sought

### Type of Partner Sought

### Tasks to be Performed of the Partner Sought



# TECHNOLOGY TRANSFER PROFILE

## Category

Technology offer

Technology Request

## Contact details

**R&D Group**  
**Name of the company**  
**Contact**

Automática Industrial  
AICIA  
Carlos Bordons Alba

## Technology Profile

### Title

Power management in hybrid vehicles with fuel cell

### Description

Real time development and implementation of the power management system in hybrid vehicles, including fuel cells and electric storage through batteries or supercapacitors.

### Innovative Aspects and Main Advantages

The management system allows for safe and efficient operation of the vehicle.

### Intellectual Property Rights

### Other Aspects

## Partners Sought

### Type of Partner Sought

### Tasks to be Performed of the Partner Sought

# TECHNOLOGY TRANSFER PROFILE

## Category

Technology offer

Technology Request

## Contact details

**R&D Group**  
**Name of the company**  
**Contact**

Ingeniería Electrónica  
AICIA  
Juan Manuel Carrasco Solís

## Technology Profile

### Title

Making electronic converters for systems based on fuel cells

### Description

Design and construction of power converters for all equipment that can appear in a fuel cell system. DC/DC converters for cells, for batteries and ultracapacitors and DC/AC converters for motors are included. Both for stationary facilities and vehicles.

### Innovative Aspects and Main Advantages

The design of converters allows for flexible management of electric power and its integration with a control system.

### Intellectual Property Rights

### Other Aspects

## Partners Sought

### Type of Partner Sought

### Tasks to be Performed of the Partner Sought



**Department**

**Web**

www.i3a.unizar.es

**Contact person**

José Ángel Peña

**Telephone**

+34 976762707  
jap@unizar.es

**Category**

- |   |   |
|---|---|
| <input checked="" type="checkbox"/> H <sub>2</sub> Production   | <input type="checkbox"/> Conversion & apps            |
| <input checked="" type="checkbox"/> H <sub>2</sub> Purification | <input type="checkbox"/> Promotion & perception       |
| <input checked="" type="checkbox"/> H <sub>2</sub> Storage X    | <input checked="" type="checkbox"/> Electric supplies |
| <input checked="" type="checkbox"/> H <sub>2</sub> Delivery     | <input checked="" type="checkbox"/> Others            |

**Research lines**

1. Processes and Recycling Division  
Hydrogen technologies

- Hydrogen production
- Hydrogen separation and storage
- Fuel Cell vehicle fleets

**Some additional and related information**

SPHERA – Hydrogen Energy Production Solutions and Recovering 2007 - 2010  
Hydrogen as new energy vector: viability of processes and REDOX reactors in its production and purification 2007-2010  
CENIT Project ECOTRANS, analyzing the deliverance and distribution of Hydrogen.  
Implementing of alternative drive systems in electric vehicles, through use of fuel cells, my means of participation in the CITY-ELEC Project.

**TECHNOLOGY TRANSFER PROFILE**

**Category**

Technology offer

Technology Request

## Contact details

**R&D Group**  
**Name of the company**  
**Contact**

GITEL  
I3A- University of Zaragoza  
Emilio Larrodé

## Technology Profile

### Title

Group of Investigation in Transportation Engineering and Logistics.

### Description

New transportation technologies regarding movable material and vehicles as well as infrastructures and the management and organization of transport systems and specially Hybrid and Electric Vehicles. To date, the results obtained by GITEL have helped shape two prototypes of electric cars driven by electric engines and fed by acid-lead batteries.

### Innovative Aspects and Main Advantages

Laboratory of Electrical Hybrid Vehicles and the Laboratory of Simulation of Conduction are focused in the accomplishment of experimental analyses of vehicles. Rooms of computer systems that include appropriate equipment to carry out numerical analyses and simulations using specific software, commercial as much own.

### Intellectual Property Rights

### Other Aspects

## Search for Partners

### Type of Search

### Tasks to be Performed by the Partner

## TECHNOLOGY TRANSFER PROFILE

### Category

Technology offer

Technology Request

### Contact details

**R&D Group**

GTP

**Name of the company**

I3A- University of Zaragoza

**Contact**

Jesús Arauzo

### Technology Profile

**Title**

Group of Thermochemical Processes.

**Description**

One of its research lines deals with hydrogen from biomass: developing a process for obtaining gas rich in hydrogen from lignocellulosic residues and bio-oil from a primary pyrolysis of those types of residues. A complete catalytic process has been designed and operated on a bench scale and now is used with other residual streams such as glycerine.

**Innovative Aspects and Main Advantages**

Bench scale facilities and Gasification pilot plants in the company TAIM WESER.

**Intellectual Property Rights**

Method of accomplishment of a book of synthetic paper.

**Other Aspects**

### Search for Partners

**Type of Search**

**Tasks to be Performed by the Partner**

# TECHNOLOGY TRANSFER PROFILE

## Category

Technology offer

Technology Request

## Contact details

**R&D Group**  
**Name of the company**  
**Contact**

CREG  
I3A- University of Zaragoza  
José Ángel Peña

## Technology Profile

### Title

Catalysis, Molecular Separations and Reactor Engineering Group (CREG)

### Description

- Production and separation of hydrocarbon mixtures with enriched hydrogen content: pyrolysis of bio-oils, biogas, catalytic thermal decomposition of natural gas... and the subsequent separation in an efficient manner, thereby avoiding the traditional cryogenic processes or those based on selective adsorption.
- Simulation and optimization of pre-commercial hydrogen fuelling stations.
- Modelling and simulation of performance for non-conventional solid storage (hydrides, oxides,...).

### Innovative Aspects and Main Advantages

Facilities for solids, catalyst and membrane preparation, characterization, and testing as well as several catalytic reactors with different schemes.

### Intellectual Property Rights

Adiabatic Reaction calorimeter and optical microscopy.

### Other Aspects

## Search for Partners

### Type of Search

### Tasks to be Performed by the Partner

## Department

Production + R&D

## Web

[www.archimica.com](http://www.archimica.com)

## Contact person - E-mail

Yves Dumond  
[yves.dumond@archimica.com](mailto:yves.dumond@archimica.com)

## Telephone

+33-5-53-69-12-84

## Category

- |  |   |
|--|---|
| <input type="checkbox"/> H <sub>2</sub> Production   | <input type="checkbox"/> Conversion & apps      |
| <input type="checkbox"/> H <sub>2</sub> Purification | <input type="checkbox"/> Promotion & perception |
| <input type="checkbox"/> H <sub>2</sub> Storage      | <input type="checkbox"/> Electric supplies      |
| <input type="checkbox"/> H <sub>2</sub> Delivery     | <input type="checkbox"/> Others                 |

## Research lines

Low and high pressure (up to 80 bars) hydrogenations with wide range of catalysts (Pd, Pt, Rh, Ru, Ni), selective reductions with hydride reagents and transfer hydrogenations. In the future, microreactors are likely to be evaluated.

## Some additional and related information

The Archimica mission is to support customers' activities in the promotion of healthcare and to improve access to life-improving treatment by helping to provide medicines at a lower cost. This is made possible by continued advancements in technology and business practices in chemical and pharmaceutical production. It is empowered by research and development and by working to the highest standards of quality, safety and efficiency.



# TECHNOLOGY TRANSFER PROFILE

## Category

Technology offer

Technology Request

## Contact details

**R&D Group**  
**Name of the company**  
**Contact**

## Technology Profile

**Title**

**Description**

**Innovative Aspects and Main Advantages**

**Intellectual Property Rights**

**Other Aspects**

## Partner Sought

**Type of Partner Sought**

Micoreactors developers , hydrogen suppliers.

**Tasks to be Performed by the Partner Sought**

# ARIEMA ENERGÍA Y MEDIOAMBIENTE

## Department

## Web

www.ariema.com

## Contact person - E-mail

Rafael Ben  
info@ariema.com

## Telephone

+34918045372

## Category

H<sub>2</sub> Production

H<sub>2</sub> Purification

H<sub>2</sub> Storage

H<sub>2</sub> Delivery

Conversion & apps

Promotion & perception

Electric supplies

Others: - Hydrogen and Fuel cells and Renewable energy Consulting.

- R&D Innovation Management.

- Technical Management.

## Research lines

## Some additional and related information

ARIEMA is formed by scientists and researchers that have been working on hydrogen and fuel cells since 1990. The experience of its professionals has permitted ARIEMA's consolidation as a leader in hydrogen and fuel cells in Spain, with a wide experience in the R+D management and specialized in innovation activities.

ARIEMA's activities include:

Equipment and facilities: From low power equipment to turnkey installations, ARIEMA has reached agreements with some of the best manufacturers to distribute and install their equipment:

-Fuel cells of different types and power.

-Membrane Compressors specially appropriated in order to not contaminate de process gas (PdC Machines Compressors are the most widely used for hydrogen refueling stations).

-Highly efficient electrolyzers of high standard pressure, 30 bar without mechanical compression, such us, H2NITIDOR pressurized alkaline electrolyser equipped with Casale Chemicals Technology, with more than 20 years experience on alkaline electrolysis (high hydrogen production capacity over 100 Nm3/h).

-Hydrogen Works polymeric electrolyzers specially designed to work in laboratories providing high purity and cheap hydrogen (250 cm3/min of 99,9999% purity hydrogen production with less than a 180 w power).

-Training sets.

Consulting and R+ D: ARIEMA is a Spanish company leader in technology consulting in the fields of hydrogen and fuel cells. ARIEMA advises on R+D management and develops its own R+D. It also performs energy audits on fishing vessels and boats conversion to LPG fuel.

Technical Management: Technology Platforms:

-Spanish Fisheries and Aquaculture Technological Platform (PTEPA) and Spanish.

-Technological Platform on Hydrogen and Fuel Cells (PTE HPC).

-ARIEMA is also participating in the launch of the European Fisheries Technology Platform (EFTP).

-Associations: Spanish Hydrogen Association (AeH2).

-Secretariat of Standardization Technical Committee AEN / CTN 181 on hydrogen technologies.

-Development and management of an International Innovation Unit in Energy.

-Training and dissemination: ARIEMA organizes since 2004 an annual course of Hydrogen and Fuel Cells.

## TECHNOLOGY TRANSFER PROFILE

### Category

Technology offer

Technology Request

### Contact details

**R&D Group**  
**Name of the company**  
**Contact**

Ariema Energía y Medioambiente S.L.  
+34 91 804 53 72/ info@ariema.com

## Technology Profile

### Title

Alkaline Electrolyser

### Description

Committed with excellence and innovation since its creation, Ariema offers H<sub>2</sub> Nitidor hydrogen alkaline electrolysers\* based on VOLTANA technology.

These are compact units of efficient hydrogen and oxygen gas production under pressure, up to 30 bar in absence of mechanical compression, therefore with the maximum energy efficiency.

Hydrogen can be used for a wide range of industrial applications (as float glass plants, steel production, semiconductors, photovoltaic cells, generator cooling, fats and oils hydrogenation, etc).

Special constructions may be provided on request for integration into energy handling systems based, for instance, on renewable energy, as PV or wind power.

Our electrolysers offers operational advantages:

- On site, on demand and reliable hydrogen source
- High purity hydrogen gas
- Up to 30 bar pressure (without a compressor)
- Automated, reliable and low maintenance system
- Possibility of use either grid electrical power or renewable electrical power
- High quality safety system

### Innovative Aspects and Main Advantages

Possibility of use either grid electrical power or renewable electrical power, especially photovoltaic or wind power.

High hydrogen pressure production up to 30 bar without compressor.

### Intellectual Property Rights

H<sub>2</sub> Nitidor hydrogen alkaline electrolysers\* are based on VOLTANA technology, property of the Company Casale Chemicals S.A.

### Other Aspects

## Partner Sought

### Type of Partner Sought

Entities with interest of on-site significant hydrogen production over 0,5 Nm<sup>3</sup>/h in order to:

- Obtain reliable autonomous hydrogen production source for industrial application.
- Develop demonstration projects of renewable energy hydrogen production.

### Tasks to be Performed by the Partner Sought

# TECHNOLOGY TRANSFER PROFILE

## Category

Technology offer

Technology Request

## Contact details

**R&D Group**  
**Name of the company**  
**Contact**

Ariema Energía y Medioambiente S.L.  
34 91 804 53 72/ info@ariema.com

## Technology Profile

### Title

Renewable Electronic and Control Technology implementation

### Description

Electronic and control solutions to improve renewable power coupling for electrolyser power supply. Particularly wind power electricity adaptation to completely energize the reliably all auxiliary systems.

### Innovative Aspects and Main Advantages

Full management of renewable power supply for reliable, safe and continuous hydrogen production.

### Intellectual Property Rights

### Other Aspects

## Partner Sought

### Type of Partner Sought

Entitles with know-how in renewable technologies (especially in power electronic devices and control systems related with wind power production).

### Tasks to be Performed by the Partner Sought

# ASSOCIACIÓ CATALANA DE L'HIDROGEN I LES ENERGIES RENOVABLES (ACH2ER)

## Department

## Web

[www.ach2.net](http://www.ach2.net)

## Contact person - E-mail

Ángel Luis Miranda Barrera  
[angel.ll.miranda@upc.edu](mailto:angel.ll.miranda@upc.edu)

## Telephone

625394991

## Category

- |  |   |
|--|---|
| <input type="checkbox"/> H <sub>2</sub> Production   | <input type="checkbox"/> Conversion & apps      |
| <input type="checkbox"/> H <sub>2</sub> Purification | <input type="checkbox"/> Promotion & perception |
| <input type="checkbox"/> H <sub>2</sub> Storage      | <input type="checkbox"/> Electric supplies      |
| <input type="checkbox"/> H <sub>2</sub> Delivery     | <input type="checkbox"/> Others                 |

## Research lines

## Some additional and related information

ACH2ER a nonprofit organization that aims to strengthen from all areas the use of hydrogen as an energy vector and renewable energies. Related activities include spreading of content, training courses, support to research groups, organization of conferences, compilation of scientific and technical information, scholarships for studies related to hydrogen and fuel cells.

# TECHNOLOGY TRANSFER PROFILE

## Category

Technology offer

Technology Request

## Contact details

R&D Group  
Name of the company  
Contact

## Technology Profile

Title

Description

Innovative Aspects and Main Advantages

Intellectual Property Rights

Other Aspects

## Partners Sought

Type of Partner Sought

Tasks to be Performed of the Partner Sought

## Department

## Web

<http://www.axane.fr/>

## Contact person - E-mail

## Telephone

## Category

- |  |   |
|--|---|
| <input type="checkbox"/> H <sub>2</sub> Production   | <input type="checkbox"/> Conversion & apps            |
| <input type="checkbox"/> H <sub>2</sub> Purification | <input type="checkbox"/> Promotion & perception       |
| <input type="checkbox"/> H <sub>2</sub> Storage X    | <input checked="" type="checkbox"/> Electric supplies |
| <input type="checkbox"/> H <sub>2</sub> Delivery     | <input type="checkbox"/> Others                       |

## Research lines

Working closely with Air Liquide research and development teams, AXANE engineers continue to improve the life span of fuel cells and to make them even more reliable and efficient. Progress over the past four years has made it possible to divide the costs of manufacturing fuels cells by 10.

## Some additional and related information

Over the last few years, AXANE has worked to improve the performances of fuel cells.

AXANE's objective is to produce, test and market fuel cells based on PEM\* technology.

An AXANE fuel cell has already supplied 7,000 hours of energy to a mobile telephony relay station isolated from the electricity network.

Today, AXANE and Air Liquide propose energy supply solutions today to the markets for which hydrogen provides a real and immediate benefit: mobile energy, backup energy, certain industrial applications, small vehicles and isolated sites.



# TECHNOLOGY TRANSFER PROFILE

## Category

Technology offer

Technology Request

## Contact details

**R&D Group**  
**Name of the company**  
**Contact**

## Technology Profile

### Title

### Description

Axane offers a range of 4 products suitable for all types of use:



Mobixane™ Base  
A stationary electric power source



Comm Pac™ Base  
A stationary electric power source



Auxipac™  
Multipurpose range extender  
power source



Comm Pac™ Backup/UPS  
A stationary electric power source

### **Innovative Aspects and Main Advantages**

Extremely long life (almost unlimited).

Easy maintenance: innovative designs combined with very carefully designed ergonomics are characteristic of Axane fuel cells, and guarantee streamlined/simple maintenance.

Reliability.

High efficiency.

### **Intellectual Property Rights**

### **Other Aspects**

## **Partner Sought**

### **Type of Partner Sought**

All people who have a precise Project.

### **Tasks to be Performed by the Partner Sought**



# BIOGAS FUEL CELL, S.A

## Department

R&D DEPARTMENT

## Web

[www.grupobfc.com](http://www.grupobfc.com)

## Contact person

Dr. Antonio Domínguez  
[a.dominguez@grupobfc.com](mailto:a.dominguez@grupobfc.com)

## Telephone

(34)984292020

## Category

- |   |   |
|---|---|
| <input checked="" type="checkbox"/> H <sub>2</sub> Production | <input type="checkbox"/> Conversion & apps            |
| <input type="checkbox"/> H <sub>2</sub> Purification          | <input type="checkbox"/> Promotion & perception       |
| <input type="checkbox"/> H <sub>2</sub> Storage               | <input checked="" type="checkbox"/> Electric supplies |
| <input type="checkbox"/> H <sub>2</sub> Delivery              | <input type="checkbox"/> Others                       |

## Research lines

- Renewable Hydrogen production.
- PEM fuel cellinte gration inmaritime sector.

## Some additional and related information

BIOGAS FUEL CELL, S.A. (BFC) is a Spanish company founded in 2003 focused mainly in research and development in innovative solutions for the production and exploitation of biogas. The company develops around four main business areas:

- 1.R&D Projects
- 2.Project Management
- 3.Engineering
- 4.Exploitation of Biogas

The permanent strategy of the company is to create value through knowledge generation for its later application in the development of new and innovative applications that allow sustainable waste management, a valorization of biogas and, at the same time, create business opportunities that address climate change. In the year 2009, BFC began its expansion efforts in Spain and Latin America through biogas exploitation projects in Valladolid, Ciudad Real, Mexico and Colombia.

Within the R&D lines developed, hydrogen and PEM fuel cell technology is considered strategic for the company. On this basis, the company has experience in the production of bio-hydrogen from biogas and the use of hydrogen and PEM fuel cells as a sustainable alternative to conventional engines in the maritime sector. As a first step towards the integration of a PEM fuel cell in a vessel, we have tested a PEM fuel cell in an experimental bench where we have demonstrated its feasibility in propulsion and auxiliary power generation activities. Nowadays, we are focusing in the development of a sustainable zero emissions vessel through the integration of a PEM fuel cell.

With the aim of disseminate the technology, the experimental bench designed and built by BFC was containerized in a mobile stand as it is shown in the next figure. Thus, it is easily to attend to maritime fairs and disseminate hydrogen and PEM fuel cell technology. Specifically, BFC attended to the III European Maritime Day celebrated in Asturias with its stand, arousing visitors interest and appearing in different media.



Besides all the activity done in this field, BFC is working on the design of a low energy building for carbon neutral balance, where our new offices will be based. The conceptual idea of the building is to include renewable energies such as solar or micro-wind sources which, combined with hydrogen and PEM fuel cells as energy vector, will supply all the energy requirements of the building. On the other hand, since PEM fuel cell sustainability depends on hydrogen generation mechanisms, BFC has been also working in the developing of a catalytic reformer for hydrogen production using carbon neutral resources (biogas) which is able to produce 2 m<sup>3</sup>/h of hydrogen, with yields over a 70%.

From the beginning, BFC has strongly believed in Research, Development and Innovation, in a way that has lead this area to constitute an investment pillar and to receive absolute dedication from the company. Bfc has highly qualified staff distributed in its R&D, Engineering and Administration departments, along with equipment, which will definitely be able to develop the work in which we will get involved. Our experience in European, National and Regional projects related to Hydrogen fuel cell technology has provided us with a capacity and knowledge that has leaded us to have a perfect profile to participate in projects of this magnitude.

# TECHNOLOGY TRANSFER PROFILE

## Category

Technology offer

Technology Request

## Contact details

### R&D Group

**Name of the company**

BIOGAS FUEL CELL, S.A

**Contact**

Dr. Antonio Dominguez Padilla

## Technology Profile

### Title

Renewable hydrogen production and its utilization in PEMFC

### Description

BIOGAS FUEL CELL, S.A. (BFC) is a Spanish company founded in 2003 focused mainly in research and development in innovative solutions for the production and exploitation of biogas. BFC's strategy is based on the idea of generating value through gaining knowledge that is then applied for new processes development, that are able to enhance a sustainable waste management, giving added value to biogas and its byproducts and, at the same time, contributing to fight against global climate change.

Since hydrogen is called to be the fuel of the future, this transition to a new form of clean energy production and consumption, has guided the company towards the development of technologies capable of generating renewable hydrogen by biogas catalytic reforming process. Furthermore, the energetic use of hydrogen in PEM cells for stationary and mobile applications is another area in which the company operates. Specifically, the application of PEM cells in the maritime sector as an auxiliary power and propulsion unit has become of special interest within this R&D.

BFC has been working in this field during the last years, allowing us to gain a widely experience in the operation of PEM fuel cells and its integration in the maritime sector as propulsion and auxiliary power system. Nowadays, BFC is working in the design and construction of a sustainable recreational yacht based on hydrogen and PEM fuel cell technologies.

On the other hand, since PEM fuel cell sustainability depends on hydrogen generation mechanisms, BFC has been also working in the developing of a catalytic reformer for hydrogen production using carbon neutral resources (biogas).

Besides our widely knowledge in hydrogen technologies, BFC has taken part and is currently participating in important European, national and regional projects, gaining in technical, financial and administrative fields concerning to their management and development.

### Innovative Aspects and Main Advantages

BFC is a company with a widely experience in hydrogen and PEM fuel cells technologies, both in renewable hydrogen production from biogas and in stationary and mobile applications of PEM fuel cells, specifically in the maritime sector.

In this field, BFC has mainly focused in the use of hydrogen and PEM fuel cell technology in the recreational boating sector, providing an innovative alternative to reduce its GHG emissions among other advantages such as noiseless navigation.

### Intellectual Property Rights

### Other Aspects

## Partner Sought

### **Type of Partner Sought**

PEMFC manufactures, private and public companies related to building and maritime sector committed with sustainable technologies and clean energies.

### **Tasks to be Performed by the Partner Sought**

# BSH ELECTRODOMÉSTICOS ESPAÑA, S.A.

## Department

Protección del Medio Ambiente

## Web

www.bsh-group.es

## Contact person

José Angel Rupérez

## Telephone

976578113  
jose-angel.ruperez@bshg.com

## Category

- |  |   |
|--|---|
| <input type="checkbox"/> H <sub>2</sub> Production   | <input type="checkbox"/> Conversion & apps      |
| <input type="checkbox"/> H <sub>2</sub> Purification | <input type="checkbox"/> Promotion & perception |
| <input type="checkbox"/> H <sub>2</sub> Storage X    | <input type="checkbox"/> Electric supplies      |
| <input type="checkbox"/> H <sub>2</sub> Delivery     | <input checked="" type="checkbox"/> Others      |

## Research lines

R&D, Manufacturing, development and sale of electrical appliances.

## Some additional and related information

R&D in new electrical appliances.

## TECHNOLOGY TRANSFER PROFILE

### Category

Technology offer

Technology Request



## Contact details

**R&D Group**  
**Name of the company**  
**Contact**

## Technology Profile

**Title**  
**Description**

**Innovative Aspects and Main Advantages**

**Intellectual Property Rights**

**Other Aspects**

## Search for Partners

**Type of Search**

**Tasks to be Performed by the Partner**

# CARBUROS METÁLICOS, S.A.

## Department

Hydrogen Energy Systems

## Web

[www.carbueros.com](http://www.carbueros.com)  
[www.airproducts.com/H2energy](http://www.airproducts.com/H2energy)

## Contact person - E-mail

Maria del Mar Arxer Ribas  
[arxerm1@airproducts.com](mailto:arxerm1@airproducts.com)

## Telephone

+34 93 290 2705

## Category

- |   |   |
|---|---|
| <input checked="" type="checkbox"/> H <sub>2</sub> Production   | <input type="checkbox"/> Conversion & apps      |
| <input checked="" type="checkbox"/> H <sub>2</sub> Purification | <input type="checkbox"/> Promotion & perception |
| <input checked="" type="checkbox"/> H <sub>2</sub> Storage      | <input type="checkbox"/> Electric supplies      |
| <input checked="" type="checkbox"/> H <sub>2</sub> Delivery     | <input type="checkbox"/> Others                 |

## Research lines

Modular H<sub>2</sub> refuelling stations up to 700 bar.  
Mobile fuelers and new H<sub>2</sub> delivery systems.  
Hydrogen storage systems to store electricity from renewables.

## Some additional and related information

Carbueros Metalicos produces and delivers industrial, high purity and medical gases, and develops new technologies and equipment for multiple applications. It's part of the Air Products Group, the world's largest supplier of hydrogen and an industry leader in hydrogen fuel infrastructure. Carbueros Metalicos delivers hydrogen in all its forms: gas, liquid and on site production.

Air Products group is at the forefront of the development of hydrogen energy technologies, working to bring safe, low-cost hydrogen production and infrastructure to the marketplace, and participating in demonstration projects in Spain, Europe and around the world. Air Products has more than 50 patents in the field of hydrogen fuelling technology and has installed until now more than 120 stations for fuelling cars, buses, forklift trucks, aircraft, trains and even submarines.

Main projects in Spain:

-Zaragoza hydrogen fuelling station, including a hydrogen production unit (electrolyser) to refuel vehicles at 200 and 350 bar.

-Hercules Project (Seville), solar hydrogen production plant and fuelling station, to refuel at 350 bar a 4x4 FC hybrid vehicle developed within the project. Partners: Hynergreen, Abengoa Solar, Santana

-Motor, INTA, Aicia, GreenPower and Agencia Andaluza de la Energia.

-H2 and O2 refueling of FC German submarines in Spanish ports.

-Participation in renewable projects to test hydrogen production and storage as a path to store electricity:

- Sotavento wind farm (Lugo) - Gas Natural.

- Hydrohybrid and RES2H2 projects (Gran Canaria) - ITC Canarias.

- Hidrotec project (Bilbao) – Tecnalia.

- Pilot plant (Valencia) – ITE.

- Aeropila project (Valladolid) – Besel.

- Photovoltaic solar plant (Huelva) – INTA.

-Hydrogen and telemetry equipment supply for stationary remote-power applications based in fuel cells, as part of telecom and energy companies projects.

## TECHNOLOGY TRANSFER PROFILE

### Category

Technology offer

Technology Request

### Contact details

**R&D Group**

**Name of the company**

**Contact**

### Technology Profile

**Title**

**Description**

**Innovative Aspects and Main Advantages**

**Intellectual Property Rights**

**Other Aspects**

### Partner Sought

**Type of Partner Sought**

**Tasks to be Performed by the Partner Sought**

# CEGASA INTERNACIONAL

## Department

Comercial

## Web

www.grupocegasa.com

## Contact person

José Luis Arteta

## Telephone

945129500  
jarteta@grupocegasa.com

## Category

- |  |   |
|--|---|
| <input type="checkbox"/> H <sub>2</sub> Production   | <input type="checkbox"/> Conversion & apps            |
| <input type="checkbox"/> H <sub>2</sub> Purification | <input type="checkbox"/> Promotion & perception       |
| <input type="checkbox"/> H <sub>2</sub> Storage X    | <input checked="" type="checkbox"/> Electric supplies |
| <input type="checkbox"/> H <sub>2</sub> Delivery     | <input type="checkbox"/> Others                       |

## Research lines

Manufacture of stacks and complete fuel cells.

## Some additional and related information

Since february 2010, Cegasa counts with a pilot plant of stacks and fuel cells to:

- Stationary power supply
- Autonomy extension for Uninterrupted Power Supply (UPS/SAI)

Nowadays we work in diferent sectors:

- Telecommunications
- Train power supply
- Portable energy systems
- Signing equipment
- Radar systems

## TECHNOLOGY TRANSFER PROFILE

### Category

Technology offer

Technology Request

## Contact details

**R&D Group**  
**Name of the company**  
**Contact**

## Technology Profile

**Title**

**Description**

**Innovative Aspects and Main Advantages**

**Intellectual Property Rights**

**Other Aspects**

## Search for Partners

**Type of Search**

**Tasks to be Performed by the Partner**

# CENER, CENTRO NACIONAL DE ENERGÍAS RENOVABLES

## Department

IRE, Integración en Red de Energías Renovables.

## Web

[www.cener.com](http://www.cener.com)

## Contact person

Raquel Garde  
Mónica Aguado

## Telephone

948252800 / 914175042  
[rgarde@cener.com](mailto:rgarde@cener.com)

## Category

- H<sub>2</sub> Production
- H<sub>2</sub> Purification
- H<sub>2</sub> Storage X
- H<sub>2</sub> Delivery

- Conversion & apps
- Promotion & perception
- Electric supplies
- Others

## Research lines

Hydrogen production from renewable energy via electrolysis and stationary applications (home, industry, etc.) and transport.

## Some additional and related information

- Cenit SPHERA. Tasks in PEM electrolyzer technologies to analyze the market and potential of this technology and integration in Electrical System by studying the impact and potential in the integration of hydrogen from wind in the national energy market.
- Collaboration with Gas Natural as technologists in study and operation of the generation plant and storage of H<sub>2</sub> in Parque Eólico Experimental de SOTAVENTO (Galicia).
- Proyecto WindHyGen. Technical study of feasibility for installation of a wind park with hydrogen technologies storage.
- Preliminary project of generation plant of H<sub>2</sub> with wind. Technical-economical study of feasibility and development for installation and operation at industrial level of a production plant, storage and electrical energy generation from 4 wind turbines in the park of Robres, Huesca.
- Analysis and definition of a building with hydrogen supply. Research and analyze the application as energy carrier of hydrogen for domestic use (requirements and characteristics in buildings).
- Proyecto RES-FC Market. Potential market study for 3000 fuel cells placed in 10 European regions for residential use powered by renewable hydrogen from local resources. In Spain, the region analyzed was Navarra with H<sub>2</sub> produced from wind.
- Development of IT application for the sizing, economic analysis and management of wind parks with storage systems (hydrogen).

# TECHNOLOGY TRANSFER PROFILE

## Category

Technology offer

Technology Request

## Contact details

### R&D Group

IRE

### Name of the company

CENER

### Contact

Raquel Garde

## Technology Profile

### Title

Study and experimental characterization of hydrogen production plants from renewable resources by means of electrolysis.

### Description

IRE has experts in electrolysis technology and energy generation from H<sub>2</sub>. Our activity is focused as technologists in activities as essay definition, analysis, characterization and study of experimental systems in a wide range of scales in hydrogen technologies and integration in the electrical grid, particularly in wind parks.

The results can be completed with theoretical studies with our application for the management of wind parks with hydrogen technologies allowing the optimization of the system from the economic point of view and improving the hydrogen technology integration.

### Innovative Aspects and Main Advantages

The activity of the group reach from the development of the preliminary design of a installation to the analysis and study of the plant once installed both experimental and theoretical point of view.

A remarkable improvement is that IRE has a permanent contact with the wind and PV departments of CENER, which allows a wide knowledge of the technological advances in this areas just as the problems that could appear in the integration in the grid and their management, which allows to propose solutions taking in mind both renewable and hydrogen parts.

### Intellectual Property Rights

IT application WindHyGen® is registered by Cener.

### Other Aspects

## Search for Partners

### Type of Search

ALL TYPE OF PARTNERS: RTD; SME; LARGE COMPANIES TO CREATE R&D AND/OR INDUSTRIAL CONSORTIUMS.

### Tasks to be Performed by the Partner

# TECHNOLOGY TRANSFER PROFILE

## Category

Technology offer

Technology Request

## Contact details

**R&D Group**

IRE

**Name of the company**

CENER

**Contact**

Raquel Garde

## Technology Profile

### Title

Economic studies of energy scenarios with new technologies such as hydrogen, electric cars, etc.. using the TIMES model generator.

### Description

The TIMES model generator allows the development of energy scenarios for the international, national or even regional systems considering all existing generation and demand forecasts and the time frame of study. Through these models, and based on some assumptions that can take into account factors of socio-political, economic, technological development, environmental, educational, competing technologies, etc.. is possible to analyze the potential for integration of new technology and its effect on the energy system studied.

From these studies it is possible to define what should be the most suitable conditions for the introduction of new technologies in the desired degree (premiums, penalties, etc..) Or following conditions, you can define which degree studied technologies will be introduced.

### Innovative Aspects and Main Advantages

Such studies have been undertaken and are undertaken internationally to determine the potential for integration of the H2 (HyWays Project) and other technologies in different countries and can make predictions about the degree of development of technologies in different scenarios and have a vision of the energy mix in the years of study. In Spain, only one group uses this program.

### Intellectual Property Rights

### Other Aspects

## Search for Partners

### Type of Search

### Tasks to be Performed by the Partner



# TECHNOLOGY TRANSFER PROFILE

## Category

Technology offer

Technology Request

## Contact details

**R&D Group**

IRE

**Name of the company**

CENER

**Contact**

Raquel Garde

## Technology Profile

### Title

Residential applications of renewable hydrogen

### Description

The IRE Department has participated in several national and international projects for the analysis of the use of hydrogen and fuel cells in stationary applications and primarily residential. Our skills are focused on the design of systems to produce renewable hydrogen and fuel cells needed to meet the demands of different types of houses as well as analysis of potential markets for this type of stationary applications.

It has a software application to analyze these systems taking into account various parameters such as efficiencies, cost, emissions, etc.

### Innovative Aspects and Main Advantages

IRE has focused on stationary applications and / or residential for consider them as faster acceptance in our country and require less infrastructure. Cener has Bioclimatic Architecture department with a thorough knowledge of building requirements including renewable energies. This allows that collaboration with experts in residential applications could be direct and close to facilitate any project or study that might arise.

### Intellectual Property Rights

The software HYNTEGRA® is a registered product by Cener.

### Other Aspects

## Search for Partners

### Type of Search

### Tasks to be Performed by the Partner

# CENTRO NACIONAL DEL HIDRÓGENO (CNH2)

## Department

## Web

[www.cneihpc.es](http://www.cneihpc.es)

## Contact person - E-mail

Daniel Esteban  
[daniel.esteban@cneihpc.es](mailto:daniel.esteban@cneihpc.es)

## Telephone

+34915305601

## Category

- H<sub>2</sub> Production
- H<sub>2</sub> Purification
- H<sub>2</sub> Storage
- H<sub>2</sub> Delivery

- Conversion & apps
- Promotion & perception
- Electric supplies
- Others: Fuel Cells

## Research lines

Electrolyzers, Fuel cells, Behavior of Materials, Hydrogen Technologies, Safety, Regulation, Testing, Validation and Training.

## Some additional and related information

The Centre participates in several high level Spanish national projects:  
SINTER PROJECT "Grid Stabilizing Intelligent Systems" The objective of the project is to develop several demonstrators to manage the electric output of different renewable energy devices. SOFC-METAL PROJECT "Technological optimization of SOFC Fuel cells with metallic support for domestic applications" The objective of the project is to develop SOFC fuel cells, focused on domestic applications. PSEH2RENOV PROJECT "Renewable Hydrogen" The objective of the project is the development of efficient and competitive technologies for hydrogen production on the basis of renewable power sources.

# TECHNOLOGY TRANSFER PROFILE

## Category

Technology offer

Technology Request

## Contact details

### R&D Group

**Name of the company**

Centro Nacional del Hidrogeno (CNH2)

**Contact**

Daniel Esteban

## Technology Profile

### Title

The CNH2 as a new Scientific Research & Technology Development Spanish Facility

### Description

The CNH2 is a new Scientific Research & Technology Development Spanish Facility (ICTS), devoted to hydrogen and fuel cell technologies. The Centre has been created as a Consortium of the Spanish Ministry for Science and Innovation and the Castilla-La Mancha Regional Government, as part of the implementation of the Spanish Roadmap of Scientific and Technological Facilities. The Consortium was completed on December 21st 2007, and established its headquarters in Puertollano (Ciudad Real). CNH2 is devoted to scientific and technology research in all the fields related to hydrogen and fuel cell technologies, being on duty of the national research and technology community and open to international access and collaboration. CNH2 organization is composed in three departments:

- Research Department: divided into the main areas of research in hydrogen of fuel cells by technological units focused in: electrochemistry, thermal and fluid dynamics, electricity, electronic and control, material behavior and industrial process.
- Technical Department: structured by the main sectors of the field of hydrogen and fuel cells (hydrogen generation, hydrogen storage, hydrogen transformation, system integration, safety in hydrogen applications).
- External Relationships Department: take charge of project scheduling including, planning, coordination, management, supervision and delivery of results.

### Innovative Aspects and Main Advantages

The Centre is devoted to hydrogen and fuel cell technologies whose innovative aspects and objectives are:

- To lead, in the medium-term, the national strategy on hydrogen and fuel cell technologies, combining the activities of research, development and technology innovation stakeholders, in order to benefit the industrial sectors involved about the outcomes of R&D and innovation entities.
- To promote "lighthouse projects" to attract the attention of other companies and be the referent at a national level.

- To carry out the activities not covered these days by the science-technology-company national system. In principle, they will be composed of R&D&Innovation units for:

- Hydrogen production
- Hydrogen storage
- Hydrogen distribution
- Hydrogen related technologies (purification and separation)
- Hydrogen applications (mainly on fuel cell technologies).

### **Intellectual Property Rights**

### **Other Aspects**

The Centre will develop projects integrated in the following technological areas:

-Hydrogen Technology: troubleshooting related to the hydrogen production, storage, transport and hydrogen end-use as an energy carrier.

-Fuel Cell Technology: including Proton exchange membrane (PEM) fuel cells, Solid Oxide fuel cells (SOFC), Direct-methanol fuel cells (DMFC), Phosphoric Acid fuel cells (PAFC), Alkaline fuel cells (AFC), and Molten Carbonate fuel cells (MCFC). The integration of the system, balance of plant (BoP) and fuel processing activities will be also studied.

-Facilities, prototypes and preliminary fabrication technologies: they will host test bank facilities and auxiliary facilities for demonstration, among other facilities to provide the centre with all the needed services. This Centre will also take care of prototype manufacturing and the upgrading and optimization of industrial processes.

## **Partner Sought**

### **Type of Partner Sought**

### **Tasks to be Performed by the Partner Sought**



# CENTRO TECNOLÓGICO AVANZADO DE ENERGÍAS RENOVABLES

## Department

President

## Web

[www.ctaer.com](http://www.ctaer.com)

## Contact person - E- mail

Gonzalo Lobo Márquez  
[gonzalo.lobo@ctaer.com](mailto:gonzalo.lobo@ctaer.com)

## Telephone

950104546

## Category

- |  |   |
|--|---|
| <input type="checkbox"/> H <sub>2</sub> Production   | <input type="checkbox"/>                        |
| <input type="checkbox"/> H <sub>2</sub> Purification | <input type="checkbox"/> Conversion & apps      |
| <input type="checkbox"/> H <sub>2</sub> Storage      | <input type="checkbox"/> Promotion & perception |
| <input type="checkbox"/> H <sub>2</sub> Delivery     | <input type="checkbox"/> Electric supplies      |
|  | <input type="checkbox"/> Others                 |

## Research lines

## Some additional and related information

The CTAER is a technological center which principal aim is to contribute to the development of the technologies of utilization of the renewable energies.

The projects of this technological center are orientated, principally, to the improvement of the performance and cost decrease of the technologies related to the renewable basic resources as the solar radiation, the wind or the biomass.

The CTAER realizes activities of research and technological development both in own projects and in projects of collaboration or under subcontracts or direct orders of the promoters The typology of actions is, among others:

- Facilities of test for external clients.
- Projects of demonstration to industrial initiative in our areas.
- Collaborations in external projects own.
- Projects of I+D+i with eventual external collaborations.
- Certification of services (components, systems, materials...).
- Elaboration of Studies.
- Services of advising and training in Renewable Energies.

# TECHNOLOGY TRANSFER PROFILE

## Category

Technology offer

Technology Request

## Contact details

**R&D Group**

**Name of the company**

**Contact**

CTAER

Guadalupe Pinna Hernández (guadalupe.pinna@ctaer.com)

## Technology Profile

**Title**

**Description**

**Innovative Aspects and Main Advantages**

**Intellectual Property Rights**

**Other Aspects**

## Partners Sought

**Type of Partner Sought**

**Tasks to be Performed of the Partner Sought**

# CIDAUT FOUNDATION

## Department

Energy & Environment

## Web

[www.cidaut.es](http://www.cidaut.es)

## Contact person - E-mail

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[yolbri@cidaut.es](mailto:yolbri@cidaut.es)

## Telephone

+34983548035

## Category

H<sub>2</sub> Production

H<sub>2</sub> Purification

H<sub>2</sub> Storage

H<sub>2</sub> Delivery

Conversion & apps

Promotion & perception

Electric supplies

Others

## Research lines

## Some additional and related information



# TECHNOLOGY TRANSFER PROFILE

## Category

Technology offer

Technology Request

## Contact details

**R&D Group**  
**Name of the company**  
**Contact**

CIDAUT Foundation  
yolbri@cidaut.es

## Technology Profile

### Title

Hydrogen Technologies

### Description

Foundation CIDAUT is a non-profit Research and Development Centre. The principal objective of the Foundation is to nurture the competitiveness and the industrial development of the companies in the automotive and aeronautics sector, thus enabling them to develop new products and processes. In order to realize this objective, the Foundation promotes scientific investigation, technological development and innovation applicable to industry in general and to the transport and energy sectors in particular. CIDAUT has more than 300 employees.

The working plan revolves around three fundamental activities: Investigation and Technological Development, Technological Services and Specialized Training. The R+D+i section is divided into the areas of Transport Safety, Product-Process-Materials; and Energy and Environment.

The development of new technological concepts which permits the use of energy sources less polluting but economically feasible, the definition of processes which permits the minimal output of residuals, the promotion of the design of systems which transform energy and the efficient use of energy at different levels, make up the basic objectives of the research carried out in CIDAUT in Energy and Environment.

Foundation CIDAUT's energy and environment department focuses its technological innovation efforts in developing technologies and processes related to renewable energies, being its basic work lines liquid biofuels, solid biomass, hydrogen technologies, energetic design methodologies in building (sustainable building), equipment development for predictive maintenance of fluid energetic systems and development of products linked to generation, transformation, exchange and use of energy.

CIDAUT develops a strategic line of "Hydrogen technologies and Fuel Cells" carrying out activities related to:

- Design, development and optimization of reformers capable of producing a reforming gas adequate for PEM Fuel Cells.
- Development of the balance of plant for alkaline electrolyzers including the pre and post-treatment systems. Special attention was paid to the development and optimization of the gas-liquid separators.
- Development of a specific test bench for PEMFC characterization.
- Integration of the hydrogen production technologies (mainly electrolysis) with renewable energies (solar, biomass and wind). Several facilities has been developed to uncouple the produced and demanded energy and to ingrate this system as hydrogen refuelling stations
- Development and integration of hydrogen technologies in the transportation sector, especially in the railway sector. Development of a predictive model that allows the sizing and the system behaviour analysis of vehicles that integrate hybrid powertrains based on fuel cells, batteries and /or supercaps.
- Development of a facility to characterise hydrogen sensors behaviour for automotive use. Study of different places for hydrogen tanks vehicle and study of the survival space.
- Development and integration of hydrogen technologies in the building sector, Development of a predictive model that allows the sizing and the system behaviour.

### **Innovative Aspects and Main Advantages**

For developing these works, CIDAUT has available calculus and simulation codes, including own codes, as well as experimental tools for testing and validating the designed technologies. Related to CFD simulation, CIDAUT has experience in: simulation programs and specific models for reformers, fuel cells, heat exchangers including transitory processes and considering chemical kinetics if applicable.

Due to its multidisciplinary structure, CIDAUT is able to deal with the projects from different points of view. This allows us, not only to cope with the design and development of different systems for hydrogen production or the use of Fuel Cells in vehicles, but also with fatigue tests for different components, crash tests for different components of a Fuel Cell Vehicle, characterization and development of new materials for these types of applications and so on.

### **Intellectual Property Rights**

Patent WO/2008/125976 A2 "Method for Obtaining Hydrogen" (INTA, CSIC-ICP, CIDAUT).

### **Other Aspects**

## **Partner Sought**

**Type of Partner Sought**

**Tasks to be Performed by the Partner Sought**



# CIDETEC-1K4

## Department

ENERGÍA

## Web

www.cidetec.es

## Contact person

Oscar Miguel

## Telephone

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omiguel@cidetec.es

## Category

- |   |   |
|---|---|
| <input checked="" type="checkbox"/> H <sub>2</sub> Production | <input type="checkbox"/> Conversion & apps      |
| <input type="checkbox"/> H <sub>2</sub> Purification          | <input type="checkbox"/> Promotion & perception |
| <input checked="" type="checkbox"/> H <sub>2</sub> Storage X  | <input type="checkbox"/> Electric supplies      |
| <input type="checkbox"/> H <sub>2</sub> Delivery              | <input checked="" type="checkbox"/> Others      |

## Research lines

MEA & stack development for low power PEMFCs (up to 3 kW), including hydrogen generation and storage.

## Some additional and related information

Cidetec is developing a proprietary PEMFC stack technology aiming at mobile and stationary low power applications. The target power range is from below 1 kW up to 3 kW.

For this purpose, technology is being developed at the membrane/electrode assembly (MEA), bipolar plate, and balance of plant level, covering all the value chain from the basic component to the application. Further research is being done in hydrogen production via borohydrides and electrolysis, as well as in metal hydrides.

## TECHNOLOGY TRANSFER PROFILE

### Category

Technology offer

Technology Request

## Contact details

**R&D Group**  
**Name of the company**  
**Contact**

## Technology Profile

**Title**  
**Description**

**Innovative Aspects and Main Advantages**

**Intellectual Property Rights**

**Other Aspects**

## Search for Partners

**Type of Search**

**Tasks to be Performed by the Partner**

# CLAN TECNOLÓGICA S.L.

## Department

## Web

[www.clantecnologica.es](http://www.clantecnologica.es)

## Contact person - E-mail

Francisco Montalbán Gomez  
[montalban@clantecnologica.es](mailto:montalban@clantecnologica.es)

## Telephone

955338111

## Category

- H<sub>2</sub> Production
- H<sub>2</sub> Purification
- H<sub>2</sub> Storage X
- H<sub>2</sub> Delivery

- Conversion & apps
- Promotion & perception
- Electric supplies
- Others

## Research lines

Pem H2 and caustic electrolusis. For laboratories and great consumptions.

## Some additional and related information

We are finishing a new HYDROGEN STATION for vehicle refuelling. Web-available soon. Even powered by renewable energies.

We have just launched a H2 Generator with PEM technology for low consumptions, with high purity and pressures up to 11 bar, in an early future up to 18 bar.

# TECHNOLOGY TRANSFER PROFILE

## Category

Technology offer

Technology Request

## Contact details

**R&D Group**  
**Name of the company**  
**Contact**

## Technology Profile

**Title**

**Description**

**Innovative Aspects and Main Advantages**

**Intellectual Property Rights**

**Other Aspects**

## Partners Sought

**Type of Partner Sought**

**Tasks to be Performed of the Partner Sought**

# COMPANHIA CARRIS DE FERRO DE LISBOA

## Department

Development & Innovation Department

## Web

[www.carris.pt](http://www.carris.pt)

## Contact person - E-mail

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[Isabel.dias@carris.pt](mailto:Isabel.dias@carris.pt)

## Telephone

+351214138632

## Category

H<sub>2</sub> Production

H<sub>2</sub> Purification

H<sub>2</sub> Storage

H<sub>2</sub> Delivery

Conversion & apps

Promotion & perception

Electric supplies

Others

## Research lines

## Some additional and related information

Projects that Carris has been involved in the past:

1 – Vehicles powered by fuel cell.

2 – Production, storage and hydrogen supply for vehicle application.





# DOBON'S TECHNOLOGY, S.L.

## Department

I+D

## Web

www.dobontech.com

## Contact person

Francisco Dobón

## Telephone

+34 922 28 03 54  
fdobon@dobontech.com

## Category

H<sub>2</sub> Production

H<sub>2</sub> Purification

H<sub>2</sub> Storage X

H<sub>2</sub> Delivery

Conversion & apps

Promotion & perception

Electric supplies

Others

## Research lines

Solar tracking systems.  
FV Thermal and concentration tech. for high temperature processes.

## Some additional and related information

Solar tracking systems for large size parabolic reflector for high temperature. The system works with FV concentrators in Japan and Israel.

Solar tracker with high precision of large size (240m<sup>2</sup>), with an average error of 0,05°.

External combustion engine for solar applications. Water desalination systems.

FV and thermal concentrators of high, medium and low range.

Optical cavity design.

FV cell design.

## TECHNOLOGY TRANSFER PROFILE

### Category

Technology offer

Technology Request

## Contact details

**R&D Group**  
**Name of the company**  
**Contact**

I+D  
Dobon's Technology S.L.  
Francisco Dobón

## Technology Profile

### Title

Solar tracking system for parabolic reflector.

### Description

Solar tracking system with large parabolic reflector, for high temperature termosolar applications.

Consist in a tetrahedral structure that encloses a parabolic reflector, in which focus is placed the absorber or a solar furnace.

### Innovative Aspects and Main Advantages

The tetrahedral structure allows a high structural resistance wich can integrate large paraboles.

In the focus can be integrated a cavity to build a solar furnace for solar decomposition of water.

### Intellectual Property Rights

International congress publications.

### Other Aspects

Firstly developed for FV applications.

In manufacture process in their PV version.

Delivered to research groups of Japan and Israel for test of PV concentrators.

## Search for Partners

### Type of Search

Companies or Institutions interested in technology for termo solar applications.

### Tasks to be Performed by the Partner

Companies or Institutions interested in their application and companies interested in manufacture and commercialization..

# EFFERGY ENERGÍA S.L.

## Department

## Web

[www.effergyenergia.com](http://www.effergyenergia.com)

## Contact person - E-mail

Jesús Cuadrado Martínez  
Antonio López Martínez  
[effergy@effergyenergia.com](mailto:effergy@effergyenergia.com)

## Telephone

+34 950235037

## Category

- |  |   |
|--|---|
| <input type="checkbox"/> H <sub>2</sub> Production   | <input type="checkbox"/> Conversion & apps      |
| <input type="checkbox"/> H <sub>2</sub> Purification | <input type="checkbox"/> Promotion & perception |
| <input type="checkbox"/> H <sub>2</sub> Storage      | <input type="checkbox"/> Electric supplies      |
| <input type="checkbox"/> H <sub>2</sub> Delivery     | <input type="checkbox"/> Others                 |

## Research lines

- Project Management of R+D+I.
- Strategic Consulting.
- Cost Consulting and Management Projects Implementation (Solar Energy).
- Implementation of Projects of Technological Innovation.
- Energy Optimization Consulting.
- Development Events and training.

## Some additional and related information

The group "EFFERGY" includes individuals totaling more than 100 years of experience, primarily in the field of renewables, with abroad and extensive research experience, teaching and executive activities such as renewable energy, energy saving and implementation of new technologies in conventional systems.

# TECHNOLOGY TRANSFER PROFILE

## Category

Technology offer

Technology Request

## Contact details

**R&D Group**  
**Name of the company**  
**Contact**

## Technology Profile

### Title

Consulting of renewable (specially concentrating solar power) and efficiency energy

### Description

We offer a:

- High experience provided by different people with more than 25 years of professional experience in the solar field for all types of consultancy in the field of Solar Energy.
- Potential partners to bring aid programs.
- Help in making decisions on solar energy.

### Innovative Aspects and Main Advantages

### Intellectual Property Rights

### Other Aspects

## Partners Sought

### Type of Partner Sought

### Tasks to be Performed of the Partner Sought

## Department

Sodium Chlorate production

## Web

Eka.com

## Contact person - E-mail

Philippe Castermans  
philippe.castermans@akzonobel.com

## Telephone

+33 5 56 77 31 44

## Category

- |   |   |
|---|---|
| <input checked="" type="checkbox"/> H <sub>2</sub> Production | <input type="checkbox"/> Conversion & apps      |
| <input type="checkbox"/> H <sub>2</sub> Purification          | <input type="checkbox"/> Promotion & perception |
| <input type="checkbox"/> H <sub>2</sub> Storage               | <input type="checkbox"/> Electric supplies      |
| <input type="checkbox"/> H <sub>2</sub> Delivery              | <input type="checkbox"/> Others                 |

## Research lines

The R&D center is primarily focused on bleaching and paper chemicals, but a significant part of its operations involve developing separation products for the chromatographic purification of active substances used for producing pharmaceuticals, such as insulin.

## Some additional and related information

Production of sodium chlorate for the paper industry.

Electrochemical process with H<sub>2</sub> production as byproduct.

H<sub>2</sub> available about 4-5000 Nm<sup>3</sup>/h.

# TECHNOLOGY TRANSFER PROFILE

## Category

Technology offer

Technology Request

## Contact details

**R&D Group**  
**Name of the company**  
**Contact**

## Technology Profile

**Title**

**Description**

**Innovative Aspects and Main Advantages**

**Intellectual Property Rights**

**Other Aspects**

## Partner Sought

**Type of Partner Sought**

Hydrogen users.

**Tasks to be Performed by the Partner Sought**

## Department

R&D

## Web

[www.elcogas.es](http://www.elcogas.es)

## Contact person - E-mail

Pedro Casero Cabezón  
[pcasero@elcogas.es](mailto:pcasero@elcogas.es)

## Telephone

+34 926 449 763

## Category

H<sub>2</sub> Production

H<sub>2</sub> Purification

H<sub>2</sub> Storage

H<sub>2</sub> Delivery

Conversion & apps

Promotion & perception

Electric supplies

Others

## Research lines

Since 2007 ELCOGAS has defined a R&D Investment Plan to develop IGCC technology in order to decrease the environmental impact of power production as main target.

Main research lines are:

- Reduction of CO<sub>2</sub> emissions in use fossil fuels.
- Optimization of the IGCC process.
- Production of H<sub>2</sub> by gasification solid fuels.
- Diversification of fuels and products
- Other environmental improvements.
- Dissemination of results.

## Some additional and related information

ELCOGAS S.A is a Spanish utility shared by European utilities that exploits and commercializes the Puertollano 335 MW IGCC demonstration power plant. This IGCC plant is the largest IGCC plant in the world to use a single gasifier and gas turbine.



Since 2005 ELCOGAS is involved in a H<sub>2</sub> production with CO<sub>2</sub> capture research project, with the objective of validating at industrial, bench and laboratory scale the technologies of pre-combustion CO<sub>2</sub> capture and H<sub>2</sub> production associated to an IGCC Power Plant. The industrial scope will be tackled through the assessment of commercial technologies in a 14 MWt Pilot Plant installation to be integrated in the infrastructure of the Puertollano IGCC Plant. Additionally, innovative technologies at laboratory scale will be also assessed.

Such installation will become a singular carbon capture facility providing a multi-fuel capacity (coal gas with and without sulphur compounds), and generating a multi-product portfolio: 'pure' CO<sub>2</sub> (95% purity), CO<sub>2</sub> with H<sub>2</sub>S, H<sub>2</sub> rich stream (80% purity), pure H<sub>2</sub> (99,99% purity), and a residual gas (containing 50% of H<sub>2</sub>). This installation will capture around 100 tons per day of CO<sub>2</sub>, while producing 2 tons per day of pure H<sub>2</sub>.

This project is being funded jointly by Spanish Science and Innovation Ministry and Regional Government (JCCM) through the PSE Programme (Strategic and Singular Projects). First CO<sub>2</sub> was captured on 13th September 2010, and first pure H<sub>2</sub> on 20th October 2010.

## TECHNOLOGY TRANSFER PROFILE

### Category

**Technology offer**

**Technology Request**

### Contact details

**R&D Group**  
**Name of the company**  
**Contact**

R&D&I Department  
ELCOGAS  
Pedro Casero (pcasero@elcogas.es)

### Technology Profile

#### Title

#### Description

ELCOGAS offers to the industrial and research communities both the Puertollano IGCC Plant (300 MW) and the first of its kind CO<sub>2</sub> Capture and H<sub>2</sub> Production Pilot Plant, as research platforms for developing and testing new processes, materials, or technologies.

Also the great operating experience of Puertollano IGCC Plant since 1998 is available.

#### Innovative Aspects and Main Advantages

Elcogas allows installation of new equipments or pilots in its facilities.

#### Intellectual Property Rights

#### Other Aspects

Wide presence during the last decade in European (Framework Programme, RFSC) and National projects covering all aspects regarding IGCC technology. Researchers with great experience in all the stages of projects, from submission to completion.

## Partner Sought

### **Type of Partner Sought**

Elcogas is interested in participate in European projects as partner, though with certain restrictions regarding working hours and third parties subcontract (for example, Elcogas cannot act as coordinator), due to lack of economic and human resources.

### **Tasks to be Performed of the Partner Sought**



# ELECTRÓNICA CERLER, S.A.

## Department

I+D+i

## Web

www.electronicacerler.com

## Contact person

Manuel Cerqueira

## Telephone

976144670  
mcerqueira@electronicacerler.com

## Category

- |  |   |
|--|---|
| <input type="checkbox"/> H <sub>2</sub> Production   | <input type="checkbox"/> Conversion & apps            |
| <input type="checkbox"/> H <sub>2</sub> Purification | <input type="checkbox"/> Promotion & perception       |
| <input type="checkbox"/> H <sub>2</sub> Storage X    | <input checked="" type="checkbox"/> Electric supplies |
| <input type="checkbox"/> H <sub>2</sub> Delivery     | <input checked="" type="checkbox"/> Others            |

## Research lines

Power and Control electronics

## Some additional and related information

Working in a research Project about electronic and control systems for fuel cells for industrial vehicle.

## TECHNOLOGY TRANSFER PROFILE

### Category

Technology offer

Technology Request

## Contact details

**R&D Group**

I+D+i

**Name of the company**

Electrónica Cerler S.A.

**Contact**

Manuel Cerqueira

## Technology Profile

**Title**

Development and manufacturing of electronic products.

**Description**

Company with more than 15 years of experience in development and manufacturing of electronic products for a wide range of sectors as industry, electrical appliances, automotive, lighting, etc.

R&D department with development expertise in both control and power electronics. High level of productive processes and industrialization of electronic products.

**Innovative Aspects and Main Advantages**

R&D own department. Innovative systems in technology for the development and manufacturing of electronic products. Good knowledge of fuel cell-based systems.

**Intellectual Property Rights****Other Aspects**

## Search for Partners

**Type of Search**

Company interested in the development or/and manufacturing of electronic products.

**Tasks to be Performed by the Partner**

# EMAC (SCHOOL OF MINES OF ALBI)

## Department

RAPSODEE

## Web

<http://www.enstimac.fr/>

## Contact person - E-mail

S. Salvador – J. Escudero – Radu Barna  
salvador@mines-albi.fr  
jescuder@mines-albi.fr  
barna@mines-albi.fr

## Telephone

(33) 5 63 49 30 26  
(33) 5 63 49 32 75

## Category

- H<sub>2</sub> Production
- H<sub>2</sub> Purification
- H<sub>2</sub> Storage
- H<sub>2</sub> Delivery

- Conversion & apps
- Promotion & perception
- Electric supplies
- Others

## Research lines

Gasification of biomass in fluidised beds, Entrained flow reactors and staged fixed beds, supercritical gasification - research and pilot scale experiments.

## Some additional and related information

Partner of the GAYA project of GDF.

Partner of AMAZON ANR founded project.

Long term partnership with two biomass gasification teams:

- CEA for fluidized beds and entrained flow reactors
- CIRAD for staged fixed bed reactors

# TECHNOLOGY TRANSFER PROFILE

## Category

Technology offer

Technology Request

## Contact details

**R&D Group**

Rapsodee

**Name of the company**

Ecole des Mines d'Albi

**Contact**

## Technology Profile

**Title**

RFE-HT

**Description**

Laboratory (highly instrumented) Entrained flow reactor enabling the gasification with N<sub>2</sub>/air/steam/O<sub>2</sub> mixtures of solid particles or pulverised oil. Continuous solid flowrate of 0.1 to 5 g/min. Temperature up to 1600°C.

Complete set of gas analysis systems at the output.

**Innovative Aspects and Main Advantages**

**Intellectual Property Rights**

**Other Aspects**

## Partner Sought

**Type of Partner Sought**

Partners for projects concerning supercritical gasification (contact: Radu Barna).

**Tasks to be Performed by the Partner Sought**

# ENÁTICA ENERGÍAS RENOVABLES

## Department

## Web

[www.enatica.es](http://www.enatica.es)

## Contact person

Irene López de Andrés.

## Telephone

976483647  
ila@brial.es

## Category

H<sub>2</sub> Production

H<sub>2</sub> Purification

H<sub>2</sub> Storage X

H<sub>2</sub> Delivery

Conversion & apps

Promotion & perception

Electric supplies

Others

## Research lines

- H<sub>2</sub> production from renewable resources.
- H<sub>2</sub> integration in electric grid.
- Fuel Cell installation in residential sector.
- Design and execution of hybrid installations: renewable energy and hydrogen.

## Some additional and related information

ENÁTICA counts with a R&D departmen in which are developed projects related to hydrogen and fuel cells, so from 2003 is part of the Foundation for the Development of New Hydrogen Technologies in Aragón's board.

The main working areas are:

- Hydrogen production from renewable energies.
- Integration of hydrogen reconversion in electric grids.
- Cogeneration Fuel Cells in residential sector.

Nowadays, ENÁTICA is working in SPHERA project: "Soluciones la producción de hidrógeno energético y reconversión asociada", framed in the CENIT program of MITyC. Is a cofounded project by the Centro para el Desarrollo Tecnológico Industrial (CDTI).

The consortium SPHERA, led by Gas Natural SDG, if formed by 18 renowned companies in their respective business sector. It is an applied research project duration of four years from 2007 to 2010, and has a cumulative budget of over 31 MM€.



Within the framework of the SPHERA project, has been made a solar photovoltaic installation in isolation of 2.7 kW composed of: 1.08 kWp amorphous silicon technology, 0.645 kW of cadmium telluride technology and high concentration of 1 kWp photovoltaics (HCPV). The aim of this installation is to have bench-scale trials to obtain hydrogen from photovoltaic technologies and compare different efficiencies in the production of hydrogen.

## TECHNOLOGY TRANSFER PROFILE

### Category

Technology offer

Technology Request

### Contact details

#### R&D Group

**Name of the company**

ENÁTICA

**Contact**

Irene López de Andrés

### Technology Profile

#### Title

#### Description

Design and execution projects of hybrid installations: renewable energies and hydrogen.

#### Innovative Aspects and Main Advantages

ENÁTICA is a company specialized in the integral development of projects based in photovoltaic energy and wind energy..

#### Intellectual Property Rights

#### Other Aspects

### Search for Partners

#### Type of Search

#### Tasks to be Performed by the Partner

# TECHNOLOGY TRANSFER PROFILE

## Category

Technology offer

Technology Request

## Contact details

### R&D Group

Name of the company

ENÁTICA

Contact

Irene López de Andrés

## Technology Profile

### Title

### Description

ENÁTICA is interested in participating in projects within the topics of:

- Hydrogen production from renewable energies.
- H2-applicaition in residential sector.

### Innovative Aspects and Main Advantages

### Intellectual Property Rights

### Other Aspects

## Search for Partners

### Type of Search

Both collaborators and technology offers.

### Tasks to be Performed by the Partner

For equipment: companies with competitive products capacity.  
For collaborators: partners with experience in hydrogen sector both company and research level.



# ENERGYIN - COMPETITIVENESS AND ENERGY TECHNOLOGY CENTRE

## Department

## Web

[www.energyin.pt](http://www.energyin.pt)

## Contact person - E-mail

Engº. José Luis de Oliveira Paulo  
[jose.paulo@energyin.pt](mailto:jose.paulo@energyin.pt)

## Telephone

+351925666633

## Category

- H<sub>2</sub> Production
- H<sub>2</sub> Purification
- H<sub>2</sub> Storage X
- H<sub>2</sub> Delivery

- Conversion & apps
- Promotion & perception
- Electric supplies

Others: Association for the promotion of R&D activities in Portugal, in the energy sector, specially related to renewable energy systems and energy efficiency.

## Research lines

## Some additional and related information

ENERGYINS' mission is to cooperate with enterprises in the energy sector that are established in Portugal, namely equipment manufacturers and service suppliers, aiming to stimulate partnerships and improve competitiveness in the global market (with emphasis on renewable energies and energetic efficiency) through appropriate investments in Technology and innovation.

ENERGYIN has the ambition to encourage innovative entrepreneurship in these areas.

This mission requires ENERGYIN to be present and dynamic on multiple levels. ENERGYIN'S list of assignments, that is open to other suggestions coming from the business community, especially from its associates, include the following tasks:

1. Facilitate, through the search of partnerships and funding, and through the reduction of costs and risks related to R&D activities, the acquisition of innovation skills by the enterprises (mainly through the participation in R&D and demonstrative projects, etc.);
2. Conduct studies (whenever possible to be reimbursed by QREN – Portuguese national funding programme) that can contribute to attain the enterprises goals;
3. Join efforts with the aim of creating, strengthening and providing necessary infrastructures considered fundamental for the success of innovative initiatives;
4. Collaborate with the enterprises in detecting opportunities pointed out by them (R&D initiatives with certain partners, or commercial investments) and help them plan their execution;
5. Assist the enterprises with the actions that follow the creation of their prototypes helping them gain economic value;
6. Stimulate synergies and provide a reduction of costs related to international divulgation of innovative and/or competitive Portuguese products and services (for example, through the creation of a stand called "Renewables from Portugal" to be present at some international fairs).

The accomplishment of ENERGYIN'S mission involves the creation of an internationally competitive, industry, innovation and technology cluster in Portugal in the referred areas. Therefore, ENERGYIN takes on some goals, that being only intermediary, are considered essential:

- Periodic identification of strategic opportunities for the sector;
- Promotion of training initiatives in areas of knowledge considered as a priority to the enterprises;
- identification and dynamization of projects;
- Dynamization of the cooperation between national and international enterprises and entities in the energy sector and in the scientific and technological system.

# EXAMECA AÉROTUBE

## Department

Exameca Aérotube  
Z.I. du Haut Ossau 161 rue de Gère Belesten  
64121 Serres-castet

## Web

## Contact person - E-mail

Olivier Vignols Directeur Général  
vignols.o@exameca.fr

## Telephone

05 59 12 85 70

## Category

- |  |   |
|--|---|
| <input type="checkbox"/> H <sub>2</sub> Production   | <input type="checkbox"/> Conversion & apps      |
| <input type="checkbox"/> H <sub>2</sub> Purification | <input type="checkbox"/> Promotion & perception |
| <input type="checkbox"/> H <sub>2</sub> Storage      | <input type="checkbox"/> Electric supplies      |
| <input type="checkbox"/> H <sub>2</sub> Delivery     | <input type="checkbox"/> Others                 |

## Research lines

Fabrication of compact tubular exchangers.

## Some additional and related information

Historically, the core business of Aerotube and group exameca lies on the aero-space industry (today more than 85% of our sales). we manufacture tube and sheet metal assemblies not only for aerospace applications but also for ground transport, nuclear, chemical and hydrogen industries.

# TECHNOLOGY TRANSFER PROFILE

## Category

Technology offer

Technology Request

## Contact details

### R&D Group

Name of the company

Exameca Aérotubes

Contact

Olivier Vignols (general director)

## Technology Profile

### Title

### Description

Know how in the fabrication of rigid tubing with or without supple connections and tubular exchangers.

### Innovative Aspects and Main Advantages

We manufacture tube and steel metal assemblies for aircraft (planes, helicopter, armoured equipments and navy sub systems where the service pressure of the systems can be up to 8700PSI (600 Bars) but sometimes more, like 750 bars for Diesel HDI engines. We very frequently despatch our engineers at our customer premises so as to make mock-ups and on-site installation.

We already manufacture elements used to separate hydrogen and oxygen from sea water, our customer collecting the oxygen and rejecting hydrogen at sea. The purpose of our customer is to create breathable oxygen for human beings, need-less to say that this is not a common civilian application. Our design process (45 Catia work stations) and our production equipments make us fully capable to manufacture and realize on-site installation of any materials for hydrogen power plants.

### Intellectual Property Rights

NO

### Other Aspects

## Partner Sought

### Type of Partner Sought

Research laboratories and industrial companies looking for a manufacturing source already detaining technologies necessary to design and manufacture hy-drogen equipments.

### Tasks to be Performed by the Partner Sought

Providing inquiries for equipments required to:

- Produce hydrogen.
- Store hydrogen.
- Transport hydrogen.

Whatever the objective of the partner is making:

- Prototyping or Small or large scale series.

# FACULTY OF SCIENCE AND TECHNOLOGY OF THE UNIVERSITY OF COIMBRA

## Department

Departamento de Física (physics department)

## Web

## Contact person - E-mail

João Campos Gil  
jmgil@fis.uc.pt

## Telephone

+351 239 410 625

## Category

H<sub>2</sub> Production

H<sub>2</sub> Purification

H<sub>2</sub> Storage

H<sub>2</sub> Delivery

Conversion & apps

Promotion & perception

Electric supplies

Others

## Research lines

Solid materials for H<sub>2</sub> storage

## Some additional and related information



# TECHNOLOGY TRANSFER PROFILE

## Category

Technology offer

Technology Request

## Contact details

### R&D Group

### Name of the company

### Contact

CEMDRX

Faculdade de Ciências e Tecnologia da Universidade de Coimbra,  
Departamento de Física (Faculty of Science and Technology of the  
University of Coimbra – Physics Department)

Prof. João Campos Gil

## Technology Profile

### Title

Sievert-type apparatus

### Description

Adsorption/desorption isotherms; kinetic studies.

### Innovative Aspects and Main Advantages

### Intellectual Property Rights

### Other Aspects

## Partners Sought

### Type of Partner Sought

### Tasks to be Performed of the Partner Sought

# FÉDÉRAL MOGUL SINTERTECH

## Department

Usine d'Oloron  
Parc d'Activité de Légugnon  
64400 Oloron

## Web

## Contact person - E-mail

Jean-Cyrille Augros  
Responsable Achats Oloron  
jean-cyrille.augros@federalmogul.com

## Telephone

05 59 36 30 06

## Category

- |  |   |
|--|---|
| <input type="checkbox"/> H <sub>2</sub> Production   | <input type="checkbox"/> Conversion & apps      |
| <input type="checkbox"/> H <sub>2</sub> Purification | <input type="checkbox"/> Promotion & perception |
| <input type="checkbox"/> H <sub>2</sub> Storage      | <input type="checkbox"/> Electric supplies      |
| <input type="checkbox"/> H <sub>2</sub> Delivery     | <input type="checkbox"/> Others                 |

## Research lines

Pieces for automotibe industry.

## Some additional and related information

Federal Mogul Sintertech manufactures pieces for automotibe industry (PSA, Toyota, Ford,...). These pieces are made with atomized steel powders which are compacted and fritted at 1200 °C with hydrogen (which favors carbon fixation on the steel) which favors carbon fixation on the steel. Total hydrogen consumption of the plant is 300 000 to 400 000 m3/year. This gas is supplied by plants of Air Liquide which are located out of the South West region. It is delivered by road.

# TECHNOLOGY TRANSFER PROFILE

## Category

Technology offer

Technology Request

## Contact details

**R&D Group**  
**Name of the company**  
**Contact**

Usine d'Oloron  
Fédéral Mogul Sintertech  
Jean-Cyrille Augros

## Technology Profile

**Title**

**Description**

**Innovative Aspects and Main Advantages**

**Intellectual Property Rights**

**Other Aspects**

## Partner Sought

**Type of Partner Sought**

Alternative solution which would allow decreasing the supply cost of Hydrogen because hydrogen consumption has a big impact on the price of manufactured pieces.

**Tasks to be Performed by the Partner Sought**

# FOUNDATION FOR THE DEVELOPMENT OF NEW HYDROGEN TECHNOLOGIES IN ARAGÓN

## Department

## Web

[www.hidrogenoaragon.org](http://www.hidrogenoaragon.org)

## Contact person

Carmen Gonzalo

## Telephone

+34 974215258  
[cgonzalo@hidrogenoaragon.org](mailto:cgonzalo@hidrogenoaragon.org)

## Category

H<sub>2</sub> Production

H<sub>2</sub> Purification

H<sub>2</sub> Storage X

H<sub>2</sub> Delivery

Conversion & apps

Promotion & perception

Electric supplies

Others

## Research lines

Engineering and consultancy. Services:

- Technical Office: Feasibility analysis and project implementation.
- Project Office: Planning and fundraising.
- Technology Transfer, training and advice on regulations, safety and approval.
- Technology Watch (UNE 166,006)

Research and Development. Lines:

- Production of hydrogen by electrolysis from renewable sources.
- Integration of fuel cells in automotive, portable and stationary applications.
- Management systems and hydrogen storage testing and validation.

## Some additional and related information

The Foundation for the Development of New Hydrogen Technologies in Aragon is a private, nonprofit entity. Promoted by the Government of Aragon, it was founded in 2004 with the support of the administration, industry and the main society actors in a board of 61 members.

The mission of the Foundation is to promote the use of hydrogen as energy vector. Our work is centered on two areas: Engineering and Consultancy and Research and Development, in which own lines of research are development, as well as external and associated projects with other research centers, R&D departments of companies and other entities.

ITHER Project: Infrastructure of Hydrogen Technologies and Renewable Energy. PROFIT MEC. National Engineering Award 2007, PT Walqa facilities (Huesca).

SPHERA Project: Solutions for hydrogen energy production and conversion associated. CDTI CENIT Program. 2007-2010.

GEHRE Project: Management support wind farms with hydrogen to increase the penetration rate in the Electrical Network-ECC 590000-2008-145

DEBEH2 Project: Development of Balance of Plant of Alkaline Electrolyzer high pressure for integration with Wind Energy. DEX-560620-2008-112

HIDROMED Project: Instrumentation for measuring hydrogen in hydrides IAP-560410-2008-30

OPTIMIZATION OF BALANCE OF PLANT PEMFC ENE2008-06697-C04-02/CON

PPT-440000-2008-6, ALMAHI Technical Feasibility study to define a series of tests for fuel cells of low and medium power equipment in the field of storage, distribution and transport of hydrogen

Multipurpose tool teleoperated vehicle with all wheel drive powertrain and fuel cell based CIT-370000-2008-11

EVIDOS Project: Technical Feasibility Study for the Development of Cells

Portable Solid Oxide Fuel- ECC-590000-2008-100

HYRREG - Generator Platform Project and Roadmap of the European Hydrogen in the Southwest. SOE1/P1/E100. Interreg IV SUDOE. 2009-2011

SINTEER - intelligent network stabilizers.

Scientific Culture Unit Plan 2009.

PV and wind integration technologies in isolated grids with hydrogen.

ZERO HYTECHPARK Zero emissions using renewable energies and hydrogen technologies in building and sustainable mobility in Technology Parks.

Microtubule FC for solid oxide and steam electrolyzers.

AEI in hydrogen technologies.

## TECHNOLOGY TRANSFER PROFILE

### Category

Technology offer

Technology Request

### Contact details

#### R&D Group

**Name of the company**

ENÁTICA

**Contact**

Irene López de Andrés

### Technology Profile

**Title**

**Description**

**Innovative Aspects and Main Advantages**

**Intellectual Property Rights**

**Other Aspects**

### Search for Partners

**Type of Search**

**Tasks to be Performed by the Partner**

# FUNDACIÓN CIRCE -CENTRO DE INVESTIGACIÓN DE RECURSOS Y CONSUMOS ENERGÉTICOS-

## Department

## Web

[www.circe.cps.unizar.es](http://www.circe.cps.unizar.es)

## Contact person

Andrés Llombart Estopiñán

## Telephone

(+34) 976 76 18 63  
llombart@unizar.es

## Category

- |  |   |
|--|---|
| <input type="checkbox"/> H <sub>2</sub> Production   | <input type="checkbox"/> Conversion & apps      |
| <input type="checkbox"/> H <sub>2</sub> Purification | <input type="checkbox"/> Promotion & perception |
| <input type="checkbox"/> H <sub>2</sub> Storage X    | <input type="checkbox"/> Electric supplies      |
| <input type="checkbox"/> H <sub>2</sub> Delivery     | <input checked="" type="checkbox"/> Others      |

## Research lines

## Some additional and related information

CIRCE's vision embraces a commitment to energy efficiency based on the assessment of energy resources for generation, transportation and distribution as well as the rational use of energy. CIRCE's research and development activities cover four main areas in the energy sector: assessment of resources and processes, electricity generation, transportation and distribution, and the efficient use of resources. CIRCE has been self-financing through its projects and work since its foundation in 1993.

As nowadays activities can be named:

- SINTER/ ISSEG: Sistemas Inteligentes Estabilizadores de Red / Intelligent Systems to Stabilize Electrical Grids.
- RDDIG: Intelligent Distribution Grid for the integration of microgeneration.
- SAXVE: Supply systems without contact for electric vehicles.
- Development of a measure system of quality parameters of electric grid.
- CENIT DENISE: Project for Intelligent, secure and efficient energy distribution.
- CENIT EOLIA: Off-shore wind farms technologies in deep waters.
- CENIT VERDE: Strategic national consortium of technical research for studies of V.E.R.D.E's technologies.

- Growth of the wind energy competitiveness.
- REVE: Wind regulation for Electrical Vehicles.
- Monitoring Study of Wind farms.
- SmartCity: Intelligent connections.
- Wind farms energy evaluations.
- Harmonic level calculation in wind farms and installations.
- Diploma in Hydrogen Technologies and Fuel Cells.
- Feasibility techno economic study of fuel cells applied to residential sector.
- LCA of storage and production systems.
- Rewable Energies integration laboratory.
- Electrical Metrology laboratory.

## TECHNOLOGY TRANSFER PROFILE

### Category

**Technology offer**

**Technology Request**

### Contact details

#### R&D Group

**Name of the company**

Fundación CIRCE

**Contact**

Alfonso Aranda

### Technology Profile

#### Title

#### Description

In the life cycle analysis (LCA) assesses the environmental burdens associated with products, processes or activities, identifying and quantifying the use of materials, energy and discharges into the environment. Also determining the environmental impact, generating strategies for improvement.

In the life cycle analysis are evaluated and assigned the environmental burdens associated with a product, process or activity throughout its life cycle. Including extraction and processing of raw materials, production, transportation and distribution, use, maintenance, reuse and recycling and disposal of waste generated. As a result derived products and processes with low impact throughout its life cycle. This very useful tool for analysis and comparison of environmental burdens associated with different production processes and management.

#### Innovative Aspects and Main Advantages

#### Intellectual Property Rights

#### Other Aspects

### Search for Partners

#### Type of Search

#### Tasks to be Performed by the Partner

## TECHNOLOGY TRANSFER PROFILE

### Category

Technology offer

Technology Request

### Contact details

**R&D Group**  
**Name of the company**  
**Contact**

División Eléctrica  
Fundación CIRCE  
Andrés Lombart Estopiñán

### Technology Profile

#### Title

Distributed Generation-Renewable Energy Integration.

#### Description

Distributed generation: integrated generation and storage systems for weak networking. Stability studies in isolated systems and micro and static studies dynamic distributed generation systems. It conducts policy development joint control of mixed systems of generation and energy storage units at a node in the network and its extension to the case where generation systems are distributed over a weak network. To improve penetration in weak networks through the integration of management optimal supplementary distributed generation and storage spatially.

#### Innovative Aspects and Main Advantages

#### Intellectual Property Rights

#### Other Aspects

### Search for Partners

#### Type of Search

#### Tasks to be Performed by the Partner





# FUNDACIÓN SAN VALERO

## Department

INTERNACIONAL

## Web

www.svalero.es

## Contact person

Nieves Zubalez

## Telephone

+ 34 976 466 590  
nzubalez@svalero.es

## Category

- |  |   |
|--|---|
| <input type="checkbox"/> H <sub>2</sub> Production   | <input type="checkbox"/> Conversion & apps      |
| <input type="checkbox"/> H <sub>2</sub> Purification | <input type="checkbox"/> Promotion & perception |
| <input type="checkbox"/> H <sub>2</sub> Storage X    | <input type="checkbox"/> Electric supplies      |
| <input type="checkbox"/> H <sub>2</sub> Delivery     | <input type="checkbox"/> Others                 |

## Research lines

Training

## Some additional and related information

San Valero Foundation is a non-profit entity of more than 50 years experience in vocational training of professional character, initial, continuous and occupational. It hosts more than 2.500 students every year.

Promoter of the Leonardo da Vinci European Programme pilot Project H2 Training, development of the first manual in hydrogen technologies and fuel cells for trainer's training.

Partner in a "Fuel Cells and Hydrogen Joint Undertaking" project, nº project 256758: HYPROFESSIONALS.

## TECHNOLOGY TRANSFER PROFILE

### Category

Technology offer

Technology Request

## Contact details

**R&D Group**  
**Name of the company**  
**Contact**

## Technology Profile

**Title**

**Description**

**Innovative Aspects and Main Advantages**

**Intellectual Property Rights**

**Other Aspects**

## Search for Partners

**Type of Search**

**Tasks to be Performed by the Partner**

# FUNDACIÓN zaragoza LOGISTICS CENTER

## Department

Knowledge Transfer Office

## Web

[www.zlc.edu.es](http://www.zlc.edu.es)

## Contact person

Jeanett Bolther

## Telephone

+ 34 976 077 603  
[jbolther@zlc.edu.es](mailto:jbolther@zlc.edu.es)

## Category

- |  |   |
|--|---|
| <input type="checkbox"/> H <sub>2</sub> Production   | <input type="checkbox"/> Conversion & apps            |
| <input type="checkbox"/> H <sub>2</sub> Purification | <input type="checkbox"/> Promotion & perception       |
| <input type="checkbox"/> H <sub>2</sub> Storage X    | <input checked="" type="checkbox"/> Electric supplies |
| <input type="checkbox"/> H <sub>2</sub> Delivery     | <input type="checkbox"/> Others                       |

## Research lines

Global supply chain design

## Some additional and related information

Projects for the research line: global supply chain design (applied to hydrogen delivery) Logistics Models for Hydrogen Delivery and Supply (HiLOGDIS). It started in February 2007 and finished in June 2010. It has had 290.000 € funding within the SPHERA project from the CENIT programme, funded by CDTI and ACCIONA BIOCMBUSTIBLES. ([www.cenitsphera.com](http://www.cenitsphera.com))

The project goal was to develop an exhaustive model of the hydrogen supply chain that enabled the evaluation of the different storage and delivery systems that connect production with consumption. Some key aspects included in this analysis are: target efficiencies of several production, storage and transport technologies; trade-off between centralized or distributed production; appropriate network of delivery and service facilities to adjust demand and supply; and the impact of several demand scenarios according to the consumer's requirements.

The decision support model developed took into account, from a strategic planning level, the hydrogen supply chains as a whole, from production to end users. Several economic scenarios were evaluated with 2030 as the time horizon.

Supply Chain Location Problem for Electrolyser Generated Hydrogen (SMARTHLOG). Presented to the Non-Oriented Basic Research Call at the Spanish Ministry of Science and Innovation. The project goal is to understand the mechanisms within a hydrogen delivery supply chain, where hydrogen is produced by electrolyzers supplied by a mixture of fossil fuels and renewable resources.

## TECHNOLOGY TRANSFER PROFILE

### Category

**Technology offer**

**Technology Request**

### Contact details

**R&D Group**  
**Name of the company**  
**Contact**

Global supply chain design  
Fundación Zaragoza Logistics Center  
Jeanett Bolther

### Technology Profile

**Title**  
Global supply chain design

#### **Description**

In a supply chain the following key factors must be managed: product complexity, number of suppliers and customers, and materials availability; thus it can be inferred that a company manages several supply chains with different characteristics related to the above factors.

The group's research projects study the relationships in each node of the supply chain, taking into account that those relationships may be different and that not all the links among the chains are integrated and coordinated in the same way.

One of the group's fields of study is the design of hydrogen delivery supply chains.

#### **Innovative Aspects and Main Advantages**

The market application of the research results enables the companies to save on logistics costs and thus be more competitive by integrating the supply chains where they belong.

#### **Intellectual Property Rights**

#### **Other Aspects**

### Search for Partners

#### **Type of Search**

#### **Tasks to be Performed by the Partner**

## Department

## Web

www.galagar.com

## Contact person

Félix A. Casas Fanlo / Raúl Gómez

## Telephone

+34 976513055  
facasas@galasal.com / rgomez@galasal.com

## Category

- |   |   |
|---|---|
| <input type="checkbox"/> H <sub>2</sub> Production          | <input type="checkbox"/> Conversion & apps      |
| <input type="checkbox"/> H <sub>2</sub> Purification        | <input type="checkbox"/> Promotion & perception |
| <input type="checkbox"/> H <sub>2</sub> Storage X           | <input type="checkbox"/> Electric supplies      |
| <input checked="" type="checkbox"/> H <sub>2</sub> Delivery | <input type="checkbox"/> Others                 |

## Research lines

Pressure regulators for high pressures.  
Pressure regulators for pure gases.  
Regulators for low and medium pressures and flows.

## Some additional and related information

Pressure regulators certified by BAM (Federal Institute for Materials Research and Testing) for use with hydrogen.  
Participation in CENIT project "SPHERA" Development of regulators for high pressures.  
Pressure regulators certified by BAM (Federal Institute for Materials Research and Testing) for use with hydrogen.

## TECHNOLOGY TRANSFER PROFILE

### Category

Technology offer

Technology Request

## Contact details

**R&D Group**  
**Name of the company**  
**Contact**

## Technology Profile

**Title**  
**Description**

**Innovative Aspects and Main Advantages**

**Intellectual Property Rights**

**Other Aspects**

## Search for Partners

**Type of Search**

**Tasks to be Performed by the Partner**

# GARBITEK ENERGÍAS RENOVABLES, S.L.

## Department

## Web

www.garbitek.com

## Contact person

Belén Fernández Sánchez

## Telephone

943-635582  
garbitek@garbitek.com

## Category

- |  |   |
|--|---|
| <input type="checkbox"/> H <sub>2</sub> Production   | <input type="checkbox"/> Conversion & apps      |
| <input type="checkbox"/> H <sub>2</sub> Purification | <input type="checkbox"/> Promotion & perception |
| <input type="checkbox"/> H <sub>2</sub> Storage X    | <input type="checkbox"/> Electric supplies      |
| <input type="checkbox"/> H <sub>2</sub> Delivery     | <input type="checkbox"/> Others                 |

## Research lines

H2 and renewable energies educational and demonstration equipments distribution.

## Some additional and related information

## TECHNOLOGY TRANSFER PROFILE

### Category

Technology offer

Technology Request



## Contact details

**R&D Group**  
**Name of the company**  
**Contact**

## Technology Profile

**Title**  
**Description**

**Innovative Aspects and Main Advantages**

**Intellectual Property Rights**

**Other Aspects**

## Search for Partners

**Type of Search**

**Tasks to be Performed by the Partner**

# GASIN GASES INDUSTRIAIS, S.A.

## Department

Bulk Gases Division

## Web

[www.gasin.pt](http://www.gasin.pt)  
[www.airproducts.com/H2energy](http://www.airproducts.com/H2energy)

## Contact person - E-mail

Paulo Magalhaes  
[torrespa@airproducts.com](mailto:torrespa@airproducts.com)

## Telephone

+351 22 9998359

## Category

- |   |   |
|---|---|
| <input checked="" type="checkbox"/> H <sub>2</sub> Production   | <input type="checkbox"/> Conversion & apps      |
| <input checked="" type="checkbox"/> H <sub>2</sub> Purification | <input type="checkbox"/> Promotion & perception |
| <input checked="" type="checkbox"/> H <sub>2</sub> Storage      | <input type="checkbox"/> Electric supplies      |
| <input checked="" type="checkbox"/> H <sub>2</sub> Delivery     | <input type="checkbox"/> Others                 |

## Research lines

Modular H<sub>2</sub> refuelling stations up to 700 bar.  
Mobile fuelers and new H<sub>2</sub> delivery systems.  
Hydrogen storage systems to store electricity from renewables.

## Some additional and related information

Gasin produces and delivers industrial, high purity and medical gases, and develops new technologies and equipment for multiple applications. It's part of the Air Products Group, the world's largest supplier of hydrogen and an industry leader in hydrogen fuel infrastructure. Gasin delivers hydrogen in all its forms: gas, liquid and on site production.

Air Products group is at the forefront of the development of hydrogen energy technologies, working to bring safe, low-cost hydrogen production and infrastructure to the marketplace, and participating in demonstration projects in Portugal, Europe and around the world. Air Products has more than 50 patents in the field of hydrogen fuelling technology and has installed until now more than 120 stations for fuelling cars, buses, forklift trucks, aircraft, trains and even submarines.

Main projects in Portugal:

H<sub>2</sub> and O<sub>2</sub> refueling of FC Portuguese submarines.  
Hydrogen supply to telecom masts (TMN).

# TECHNOLOGY TRANSFER PROFILE

## Category

Technology offer

Technology Request

## Contact details

**R&D Group**  
**Name of the company**  
**Contact**

## Technology Profile

**Title**

**Description**

**Innovative Aspects and Main Advantages**

**Intellectual Property Rights**

**Other Aspects**

## Partner Sought

**Type of Partner Sought**

**Tasks to be Performed by the Partner Sought**

## Department

## Web

www.gesan.com

## Contact person

Javier Martínez

## Telephone

+34 902 110 316  
jmartinez@gesan.com

## Category

- |  |   |
|--|---|
| <input type="checkbox"/> H <sub>2</sub> Production   | <input type="checkbox"/> Conversion & apps      |
| <input type="checkbox"/> H <sub>2</sub> Purification | <input type="checkbox"/> Promotion & perception |
| <input type="checkbox"/> H <sub>2</sub> Storage X    | <input type="checkbox"/> Electric supplies      |
| <input type="checkbox"/> H <sub>2</sub> Delivery     | <input checked="" type="checkbox"/> Others      |

## Research lines

Applications for electric power generation

## Some additional and related information

Installations. Laboratory with the needed equipment for the realization of essays, tests and measurement in fuel cells.  
Developing projects in the field of fuel cells applied in stationary installations of surveillance and security.

## TECHNOLOGY TRANSFER PROFILE

### Category

Technology offer

Technology Request

## Contact details

**R&D Group**

Name of the company

GESAN

Contact

Javier Martínez

## Technology Profile

**Title**

Technological Development of hydrogen fuel cell applied in stationary installations of surveillance an security.

**Description**

Development of applications with high autonomy and low maintenance.

**Innovative Aspects and Main Advantages**

Knowledge of the electrical generation market with electric generating set.

**Intellectual Property Rights****Other Aspects**

## Search for Partners

**Type of Search**

No specific profile required.

**Tasks to be Performed by the Partner**

# GOING INVESTMENT, S.A.

## Department

## Web

www.going.es

## Contact person

Carlos Oehling Durán

## Telephone

976468419  
cod@going.es

## Category

- |  |   |
|--|---|
| <input type="checkbox"/> H <sub>2</sub> Production   | <input type="checkbox"/> Conversion & apps      |
| <input type="checkbox"/> H <sub>2</sub> Purification | <input type="checkbox"/> Promotion & perception |
| <input type="checkbox"/> H <sub>2</sub> Storage X    | <input type="checkbox"/> Electric supplies      |
| <input type="checkbox"/> H <sub>2</sub> Delivery     | <input checked="" type="checkbox"/> Others      |

## Research lines

Support and investment in H2 technologies based projects near to market.

## Some additional and related information

Going Investment Gestión, S.G.E.C.R. is a totally private, professional and independent management company for venture capital bodies. This project has paved the way for capital investment in Aragón since 1998, when Going Investment first started its activities.

We focus on SMes, promoting their growth and development, helping businessmen and management teams to lead their own projects and make them grow, or facilitating the formulation of subsequent solutions in family enterprises.

## TECHNOLOGY TRANSFER PROFILE

### Category

Technology offer

Technology Request

## Contact details

**R&D Group**  
**Name of the company**  
**Contact**

## Technology Profile

**Title**

**Description**

**Innovative Aspects and Main Advantages**

**Intellectual Property Rights**

**Other Aspects**

## Search for Partners

**Type of Search**

**Tasks to be Performed by the Partner**

# H2Genera FUEL CELL PROJECTS

## Department

## Web

[www.h2genera.com](http://www.h2genera.com)

## Contact person - E-mail

Ernest Montlló Casabayó  
[emontllo@h2genera.com](mailto:emontllo@h2genera.com)

## Telephone

932 444 799

## Category

- |  |   |
|--|---|
| <input type="checkbox"/> H <sub>2</sub> Production   | <input type="checkbox"/> Conversion & apps      |
| <input type="checkbox"/> H <sub>2</sub> Purification | <input type="checkbox"/> Promotion & perception |
| <input type="checkbox"/> H <sub>2</sub> Storage      | <input type="checkbox"/> Electric supplies      |
| <input type="checkbox"/> H <sub>2</sub> Delivery     | <input checked="" type="checkbox"/> Others      |

## Research lines

Fuel Cells.

## Some additional and related information

H2Genera has executed:

- Consultancy and engineering services on fuel cells and cogeneration for FC manufacturers. This includes market, legislation, technical and economic studies.
- Feasibility studies for fuel cell installations.
- A whole life simulation tool for CHP systems including fuel cells that offers economic, energy and environmental impact results.



# TECHNOLOGY TRANSFER PROFILE

## Category

Technology offer

Technology Request

## Contact details

**R&D Group**  
**Name of the company**  
**Contact**

## Technology Profile

**Title**

**Description**

**Innovative Aspects and Main Advantages**

**Intellectual Property Rights**

**Other Aspects**

## Partners Sought

**Type of Partner Sought**

**Tasks to be Performed of the Partner Sought**

# HINICIO

## Department

## Web

[www.hinicio.com](http://www.hinicio.com)

## Contact person - E-mail

Jean-Christophe Lanoix  
[jean-christophe.lanoix@hinicio.com](mailto:jean-christophe.lanoix@hinicio.com)

## Telephone

+33.(0)1.40.21.42.47

## Category

- |  |   |
|--|---|
| <input type="checkbox"/> H <sub>2</sub> Production   | <input type="checkbox"/> Conversion & apps      |
| <input type="checkbox"/> H <sub>2</sub> Purification | <input type="checkbox"/> Promotion & perception |
| <input type="checkbox"/> H <sub>2</sub> Storage      | <input type="checkbox"/> Electric supplies      |
| <input type="checkbox"/> H <sub>2</sub> Delivery     | <input type="checkbox"/> Others                 |

## Research lines

Hydrogen and fuel cells, solar energy, marine energy, bio-energy and small-scale wind.

## Some additional and related information

Hinicio is a Brussels-based strategic consulting firm specialized in sustainable energy, which focuses on strategy development, project assistance and management outsourcing in a variety of fields and applications such as standalone bio-energy, hydrogen and fuel cell, marine, solar and wind energy.

Hinicio is a young and dynamic organization built on years of the cumulated experience of its consultants in a variety of industry and consulting fields.

Our clients highly appreciate Hinicio's creativity, flexibility and experience at handling multidimensional issues such as project management, innovation management, strategy, finance, marketing, technology transfer or policy related matters.

Hinicio is headquartered in Brussels, Belgium, has an office in Caracas, Venezuela, and recently launched a new activity in Paris, France.

# TECHNOLOGY TRANSFER PROFILE

## Category

Technology offer

Technology Request

## Contact details

R&D Group  
Name of the company  
Contact

## Technology Profile

Title

Description

Innovative Aspects and Main Advantages

Intellectual Property Rights

Other Aspects

## Partner Sought

Type of Partner Sought

Tasks to be Performed by the Partner Sought

# IDOM ZARAGOZA, S.A.

## Department

## Web

www.idom.es

## Contact person

Pedro Montaner

## Telephone

976 561536 / 976 568656  
pmi@idom.com

## Category

- |   |   |
|---|---|
| <input checked="" type="checkbox"/> H <sub>2</sub> Production | <input type="checkbox"/> Conversion & apps      |
| <input type="checkbox"/> H <sub>2</sub> Purification          | <input type="checkbox"/> Promotion & perception |
| <input checked="" type="checkbox"/> H <sub>2</sub> Storage X  | <input type="checkbox"/> Electric supplies      |
| <input checked="" type="checkbox"/> H <sub>2</sub> Delivery   | <input type="checkbox"/> Others                 |

## Research lines

Consultancy

## Some additional and related information

Participation as partner in CENIT Project "Ecotrans, Ecological technologies for urban mobility". WP 9: Methodology for optimizing the logistic system for H<sub>2</sub> delivery in fleets and of urban transport modeling with energy efficiency.

Management of the of Expo Zaragoza 2008's hydrogen filling station.

Management of the Walqa's hydrogen filling station.

## TECHNOLOGY TRANSFER PROFILE

### Category

Technology offer

Technology Request

## Contact details

**R&D Group**  
**Name of the company**  
**Contact**

Energía/innovación  
IDOM Zaragoza S.A.  
Pedro Montaner

## Technology Profile

### Title

Engineering, consultancy, design, Project and information management.

### Description

Engineering, consultancy, design, Project and information management in the areas of:

- Storage, logistics and deliverance of H2
- Production of H2 from REN and no-REN
- Project integration
- Socioeconomic impact evaluation

### Innovative Aspects and Main Advantages

IDOM is a leader company in the Spanish market of professional services in Engineering, Architecture and consultancy, doing the proper steps to spread this leadership to international scope, actually counting on 14 offices in different countries of Europe, America and Africa.

IDOM has differential strengths in complex and multidisciplinary projects. Innovation is understood in IDOM as knowledge conversion in the improvement or creation of new services and the application of new technologies to our client's processes and products.

### Intellectual Property Rights

### Other Aspects

## Search for Partners

### Type of Search

Participation in projects in which supply know-how and experience in European projects.

### Tasks to be Performed by the Partner

## Department

## Web

<http://www.energy.imdea.org/>

## Contact person - E-mail

Carme Pérez  
carmen.perez@imdea.org

## Telephone

## Category

H<sub>2</sub> Production

H<sub>2</sub> Purification

H<sub>2</sub> Storage

H<sub>2</sub> Delivery

Conversion & apps

Promotion & perception

Electric supplies

Others

## Research lines

Hydrogen production by decarbonisation of hydrocarbons.

Development of hydrogen production via thermo-chemical processes using solar power and hybrid cycles.

Hydrogen generation by photobiological, photocatalytic and photoelectrochemical dissociation of water.

Fuel cell technologies (PEMFC, SOFC).

## Some additional and related information

The IMDEA Energía Foundation has been created by the Regional Government of “Comunidad de Madrid” in order to promote R & D activities in energy related themes, with main emphasis in those topics related to renewable energy and clean energy technologies.

The Scientific Programme of IMDEA Energía, managed by the Foundation, has been outlined with the aim of contributing to the future establishment of a sustainable energy system based on the development of renewable energy and clean energy technologies that have none or minimal environmental impact.

The organization outlined for the research at IMDEA Energía is based on the concept of Research Unit as the basic piece, being defined by its specialisation field. This can be considered a transversal organization, which is expected to provide high versatility for dealing with the different research topics and to possess a high flexibility for being adapted to the changes in the R&D needs along the time. Research topics addressed at IMDEA Energía Institute are concentrated within the following six areas:

- 1.Solar energy systems and technologies, with special emphasis in concentrating solar power.
- 2.Production of sustainable fuels for the transport sector: hydrogen, biofuels and waste-derived fuels.
- 3.Energy storage coupled to renewable energies.
- 4.Smart management of electricity demand.
- 5.Development of energy use systems with enhanced efficiency: fuel cells and polygeneration.
- 6.Alternatives for CO<sub>2</sub> confinement and valorization.

# TECHNOLOGY TRANSFER PROFILE

## Category

Technology offer

Technology Request

## Contact details

### R&D Group

**Name of the company**

**Contact**

IMDEA Energia

Luis M. Rubio (luis.rubio@imdea.org)

## Technology Profile

### Title

TOHPN: Towards the Optimization of Hydrogen Production by Nitrogenase

### Description

TOHPN is a "Starting Grant" research project funded by the European Research Council within the "IDEAS" specific programme of the Seventh Framework Programme. TOHPN has a total budget of 2 M€ and five years of duration. The objective of this project is to provide new eco-efficient approaches to the production of hydrogen as a biofuel. The project is focused in fundamental and applied research activities to study the assembly of nitrogenase and optimize hydrogen-producing capability of this enzyme.

### Innovative Aspects and Main Advantages

### Intellectual Property Rights

### Other Aspects

## Partners Sought

### Type of Partner Sought

### Tasks to be Performed of the Partner Sought



# TECHNOLOGY TRANSFER PROFILE

## Category

Technology offer

Technology Request

## Contact details

### R&D Group

**Name of the company**

**Contact**

IMDEA Energia

David Serrano (david.serrano@imdea.org)

## Technology Profile

### Title

CENIT-CONSOLIDA: Solar Hydrogen

### Description

Project covering the Activity 11 within the Industrial R&D Initiative CENIT “Consolida: Consortium for Solar R&D” coordinated by the companie Hynergreen Technologies and granted at the fourth call of CENIT Programme of the Ministry of Science and Education.

Within the activity “Solar Hydrogen” the program of work aims to analyze the feasibility of using thermochemical cycles for the production of hydrogen taking into account the state of the art, the fundamental research to be undertaken and the development of cycles with high potential integration with solar energy at high temperatures. The research includes the selection of a suitable cycle, thermodynamics and kinetics analyses, and the development of an appropriate solar reactor.

### Innovative Aspects and Main Advantages

### Intellectual Property Rights

### Other Aspects

## Partners Sought

### Type of Partner Sought

### Tasks to be Performed of the Partner Sought

# TECHNOLOGY TRANSFER PROFILE

## Category

Technology offer

Technology Request

## Contact details

**R&D Group**  
**Name of the company**  
**Contact**

IMDEA Energia  
Manuel Romero

## Technology Profile

### Title

RENOVAH2: Efficient production of hydrogen by water-splitting with solar and wind energy systems

### Description

Project funded by the Spanish Ministry of Industry in the last call of 2008 within the framework of the National Subprogramme of energy efficiency, renewable energy and clean energy technologies. The objective is to develop efficient hydrogen production technologies with wind and solar energy systems. The workprogramme focuses on three different technical approaches. The first task is oriented to develop the integration of electrolyzers with PV and wind energy with special attention to isolated energy systems. The second task has as main objective to develop and conduct "proof of concept" tests of a solar concentrating system (1-5 kW) and thermochemical cycles. The third task describes the work related to the production of hydrogen by means of photocatalytic systems. RENOVAH2 project tackles the development of hydrogen production with renewable energy (solar and wind) with the aim of covering short-term (electrolysis), medium-term (thermochemical cycles) and long-term (photocatalysis) conversion routes.

### Innovative Aspects and Main Advantages

### Intellectual Property Rights

### Other Aspects

## Partners Sought

### Type of Partner Sought

### Tasks to be Performed of the Partner Sought



# INDUSTRIA SOSTENIBLE

## Department

Departamento Técnico

## Web

[www.industriasostenible.com](http://www.industriasostenible.com)

## Contact person - E-mail

Susana Castilla  
[susicastila@industriasostenible.com](mailto:susicastila@industriasostenible.com)

## Telephone

+34 958612835  
+34 619036049

## Category

- |   |   |
|---|---|
| <input checked="" type="checkbox"/> H <sub>2</sub> Production | <input type="checkbox"/> Conversion & apps      |
| <input type="checkbox"/> H <sub>2</sub> Purification          | <input type="checkbox"/> Promotion & perception |
| <input checked="" type="checkbox"/> H <sub>2</sub> Storage    | <input type="checkbox"/> Electric supplies      |
| <input type="checkbox"/> H <sub>2</sub> Delivery              | <input type="checkbox"/> Others                 |

## Research lines

Consultancy and Engineering in Renewable Energy, Environment and Sustainable Technical.

## Some additional and related information

We are investigating in agreement with Cadiz and Cordoba University a project about Hydrogen Production with sustainable energy and Store it. At the moment we have not demonstrative installations; we hope to have a demonstrative installation for next year, 2011.

# TECHNOLOGY TRANSFER PROFILE

## Category

Technology offer

Technology Request

## Contact details

**R&D Group**  
**Name of the company**  
**Contact**

Industria sostenible  
Susana Castilla González

## Technology Profile

### Title

Hydrogen Production with sustainable energy and How Store it

### Description

Hydrogen Production with sustainable energy and How Store it applied to small engine.

### Innovative Aspects and Main Advantages

### Intellectual Property Rights

### Other Aspects

## Partners Sought

### Type of Partner Sought

We are looking for a invest partner.

### Tasks to be Performed of the Partner Sought

The sustainable partner must be emphasis for sustainable industry and development.

**Department**

UMEC

**Web**

<http://www.inegi.pt>

**Contact person - E-mail**

Hugo Faria  
[hfarria@inegi.up.pt](mailto:hfarria@inegi.up.pt)

**Telephone**

+351229578710

**Category**

- |   |   |
|---|---|
| <input type="checkbox"/> H <sub>2</sub> Production          | <input type="checkbox"/> Conversion & apps      |
| <input type="checkbox"/> H <sub>2</sub> Purification        | <input type="checkbox"/> Promotion & perception |
| <input type="checkbox"/> H <sub>2</sub> Storage             | <input type="checkbox"/> Electric supplies      |
| <input checked="" type="checkbox"/> H <sub>2</sub> Delivery | <input type="checkbox"/> Others                 |

**Research lines**

- > Composite Overwrapped Pressure Vessels (COPV).
- > Media Permeability to H<sub>2</sub>.

**Some additional and related information**

Facilities:

- Filament Winding Machine;
- Hydrostatic Pressure Testing Machines (<2100bar).

Recent projects:

- COPV for High Pressure Storage of CNG and other technical gases (not H<sub>2</sub>);
- Hyperbaric Chamber for aggressive media - SEAFLOOR  
<http://www.horta.uac.pt/projectos/fisiovent/news.htm>
- Composite-METal pressure vessel for domestic gas storage – COMET - <http://www.amtrol-alfa.com/comet/>
- COPV Online Monitoring Using Optical Sensors

# TECHNOLOGY TRANSFER PROFILE

## Category

Technology offer

Technology Request

## Contact details

**R&D Group**

UMEC

**Name of the company**

INEGI - Institute of Mechanical Engineering and Industrial Management of the University of Oporto

**Contact**

hfaria@inegi.up.pt

## Technology Profile

### Title

COPV for H2 Mobile and/or Stationary Storage

### Description

INEGI has been working in filament winding (FW) technologies and structural health monitoring (SHM) for several years. We have deep knowledge in the composite materials modelling, designing, prototyping, manufacturing, monitoring, testing and repair. Within the scope of this forum, we note our specific expertise in high and very high composite overwrapped pressure vessels (COPV) and online monitoring using acoustic emission (AE), optical (FBG) and piezoelectric (PZT, PVDF) sensors. We also do model the COPV behaviour using FEA software with proven results in recent product developments.

As for an example, in recent years, we developed products such as COMET (<http://www.amtrolalfa.com/comet/>) and SEAFLOOR (<http://www.horta.uac.pt/projectos/fisiovent/news.htm>) for two Portuguese customers/partners. Regarding H2 Storage, we developed a prototype (1.5 litres, 300bar, Aluminum Alloy/Carbon Fibre) for a fuel-cell customer/partner.

We developed also COPVs with embedded optical sensors (<http://dx.doi.org/10.1016/j.matdes.2010.03.022>). We are currently developing high-pressure and very high-pressure products. We work both with thermoplastic and thermosetting systems and, more recently, with dry fibre winding techniques.

We have also currently on-going PhD funded R&D projects focusing in numerical modelling of the FW process (since June 2007) and fundamental research in AE, FBG, PZT and PVDF sensing technologies.

Our laboratorial facilities include several equipments that reinforce our experimental capability in these fields. Namely, we have:

- > 6-axis filament winding machine, (2 optional fibre (tow) tension systems);
- > co-axial fibre feeding infrared oven
- > medium-pressure testing equipment (<100bar);
- > high-pressure testing equipment (<2100bar);
- > 4-channel multiplexing braggmeter;
- > 4x DAQ.

### **Innovative Aspects and Main Advantages**

Within the H2 Storage field, we have flexible expertise, from design, modelling to prototyping and manufacture, allowing us to develop tailored solutions, in different materials, geometries and other technical specifications. We offer a broad range of technical solutions for both mobile and stationary storage applications.

### **Intellectual Property Rights**

### **Other Aspects**

## **Partner Sought**

### **Type of Partner Sought**

Partners are sought that have a need to integrate high-pressure storage solutions. Partnership can be sought within a specific Project framework or for specific development needs of the potential partner.

### **Tasks to be Performed by the Partner Sought**





### Department

Energy and Environment Department

### Web

[www.inegi.pt](http://www.inegi.pt)

### Contact person - E-mail

Ricardo Barbosa  
[rbarbosa@inegi.up.pt](mailto:rbarbosa@inegi.up.pt)

### Telephone

+351 22 957 87 10

### Category

H<sub>2</sub> Production

H<sub>2</sub> Purification

H<sub>2</sub> Storage

H<sub>2</sub> Delivery

Conversion & apps

Promotion & perception

Electric supplies

Others

### Research lines

Hydrogen Production.  
PEM Fuel Cells.  
Solid Oxide Fuel Cells.

### Some additional and related information

INEGI energy and environment department participated in many projects on Fuel Cell and hydrogen production such as:

- INEGI had an important role in a big national Project called EDEN PROJECT. The EDEN Project - Endogenizar o Desenvolvimento de Energias Novas intended to create a technological platform contributing to maximizing the existing opportunities in the national development of the emerging Hydrogen Economy. To achieve this goal, the project integrated a consortium of national corporations and research institutes, that looked to:

- achieve know-how related to the application of fuel cells to stationary energy production, through several corroboration actions;
  - the reinforcement of the national scientific and technological knowledge related with hydrogen technology, supporting the creation of centres of excellence in specific segments;
  - suggest a national Roadmap in a way that the hydrogen technology can be constituted as a new opportunity to a competitive economy.
- INEGI has also developed studies in areas such as hydrogen production, storage and logistics, design and characterization of PEM (Proton Exchange Membrane) fuel cells and their applicability in real environment, and more recently the characterization of fuel cells as a cogeneration unit with a SOFC (Solid Oxide Fuel Cell) system that was acquired in the scope of EDEN's project;
  - Design and manufacture of proton exchange membrane fuel cells to portable applications;
  - Fuel cells performance characterization through operation parameters variation;
  - Characterization of SOFC System;
  - LUCIS project - Demonstration of the Hydrogen Fuel Cells in Real Environment under the DEMTEC. System of Incentives for Implementation of pilot projects concerning products, processes and technology systems, aimed to demonstrate the potential already available of hydrogen as an alternative energy vector through the use of Fuel Cells. This project consisted of the installation in several entities of Hydrogen Fuel cells for use in different situations and whose objectives were to:
    - test in real environment, reliability and performance of a hydrogen fuel cell produced by a Portuguese company, thus increasing the knowledge about the technology and product;
    - demonstrate the applicability of the hydrogen fuel cells in various uses, including as an energy source or a battery charger;
    - disseminate the technologies of hydrogen to the general public and entities that can provide for their use through the repeatability of statements made.

#### FACILITIES:

- Hydrogen Fuel Cell Laboratory;
- Characterization of FC:
  - Polarization curves.
  - Evaluation of the behaviour in several conditions by changing parameters such as:
    - Gas Humidity and flows
    - FC Temperature

# TECHNOLOGY TRANSFER PROFILE

## Category

Technology offer

Technology Request

## Contact details

### R&D Group

### Name of the company

### Contact

Energy and Environment

INEGI - Institute of Mechanical Engineering and Industrial Management of the University of Oporto

rbarbosa@inegi.up.pt

## Technology Profile

### Title

Hydrogen production by Westinghouse cycle

### Description

One of the ideas arising from this study and worthy of credibility was the possibility to develop a prototype of a system using solar energy, concentrated and photovoltaic panels produces hydrogen by the Westinghouse cycle. This would lead to the integration of several technologies in an autonomous unit that could allow the local hydrogen production.

The recent developments in Proton Exchange Membrane Fuel Cell (PEMFC) required the high purity hydrogen production, becoming essential to remove any existing amounts of carbon monoxide, once it poisoned those fuel cells catalysts.

There are several methods to produce hydrogen, all of them being based in the split of compounds that have hydrogen in its constitution and its recover in gaseous state.

Thermolysis, like electrolysis, is a process of water molecule decomposition achieving, directly, hydrogen. Although this reaction may seem simple, it requires high operative temperatures, which is in the origin of difficulties at material level (these must support such temperatures in hydrogen and oxygen presence) or at energetic level.

These reasons have taken the researchers to put apart this method and to replace it by thermochemical cycles. The global reaction achieved by these cycles is the same as in thermolysis (hydrogen from water). However, hydrogen and oxygen are produced in distinct reaction and the cycle should be auto-sustainable, ie, all reagents must be recycled and reused in all cycle. The main advantage is the operative temperatures range doesn't overcome 1000°C, which is, from an energetic point of view, notable.

### **Innovative Aspects and Main Advantages**

The Westinghouse cycle having only two cycles is the simpler hybrid cycle demonstrated until now. Since it involves only sulphur compounds, as well as water, hydrogen and oxygen, many of the problems associated with the more complex thermochemical processes, like contamination, secondary reactions and corrosion induced by halogens are inexistent.

A study conducted by Westinghouse has determined that at maximum temperature of the process (1 114 K), the optimum range of mass concentration of sulphur acid varies between 65 and 87%, the optimum pressure in the decompositor should be between 5 and 10 bar and the maximum efficiency is around 45%.

### **Intellectual Property Rights**

### **Other Aspects**

## **Partner Sought**

### **Type of Partner Sought**

- CSP expertises.
- Hydrogen production expertises.

### **Tasks to be Performed by the Partner Sought**

## Department

## Web

<http://www.cirimat.cnrs.fr>

## Contact person - E-mail

Pierre ALPHONSE  
alphonse@chimie.ups-tlse.fr

## Telephone

05 61 55 62 85

## Category

- |   |   |
|---|---|
| <input checked="" type="checkbox"/> H <sub>2</sub> Production | <input type="checkbox"/> Conversion & apps      |
| <input type="checkbox"/> H <sub>2</sub> Purification          | <input type="checkbox"/> Promotion & perception |
| <input type="checkbox"/> H <sub>2</sub> Storage               | <input type="checkbox"/> Electric supplies      |
| <input type="checkbox"/> H <sub>2</sub> Delivery              | <input type="checkbox"/> Others                 |

## Research lines

- Synthesis, design and shaping of active materials for SOFC and PCFC.
- Protective coatings for bipolar plates.
- Catalytic coatings on structured steel plates for fuel processors.

## Some additional and related information

Current Projects:

ARMANASOL : Architectures de Matériaux Nanostructurés Elaborés par Voie Sol-Gel  
ADEME, St GOBAIN, EDF, CIRIMAT, IEM, LEPMI, ICMCB 2005-2009

ANR CERAMET: Composite céramique-métal pour EHT et SOFC  
CEA, CIRIMAT, EDF, LERMPS, Arcelor Mittal 2007-2010

PREPAC : Pré-reformeur pour piles à combustible  
ADEME, EDF, CIRIMAT, IRCELYON, ICB 2008-2011

ANR THERMASOFC: Evaluation des propriétés thermo-radiatives d'un empilement céramique  
SOFC, CEMHTI, CIRIMAT, LEPMI 2008-2011

# TECHNOLOGY TRANSFER PROFILE

## Category

Technology offer

Technology Request

## Contact details

**R&D Group**  
**Name of the company**  
**Contact**

Institut Carnot CIRIMAT  
Pierre ALPHONSE (alphonse@chimie.ups-tlse.fr)

## Technology Profile

### Title

### Description

- Synthesis, design and shaping of active materials for SOFC, PCFC and HTE (High-Temperature Electrolysis).
- Building of planar SOFC architectures with anode supported and interconnect supported stack geometries.
- Design of protective coatings for bipolar plates (interconnects).
- Synthesis of catalytic coatings on structured steel plates for fuel processors.

### Innovative Aspects and Main Advantages

### Intellectual Property Rights

### Other Aspects

## Partner Sought

### Type of Partner Sought

### Tasks to be Performed by the Partner Sought

# INSTITUT DE CHIMIE DE LA MATIÈRE CONDENSÉE DE BORDEAUX (ICMCB)

## Department

Group 1: Hydrogen energy,  
fuel cells, Thermoelectricity

## Web

icmcb-bordeaux.cnrs.fr

## Contact person - E-mail

Jean-Claude Grenier  
Directeur de Recherche  
grenier@icmcb-bordeaux.cnrs.fr

## Telephone

05 40 00 62 62

## Category

H<sub>2</sub> Production

H<sub>2</sub> Purification

H<sub>2</sub> Storage

H<sub>2</sub> Delivery

Conversion & apps

Promotion & perception

Electric supplies

Others

## Research lines

- . High temperature fuel cells (700-800 °C).
- . Hydrogen storage/hydride.
- . High temperature electrolysis.

## Some additional and related information

M. Grenier is responsible of the national research group on membranes for high temperature fuel cells.

ICMCB (30 persons) works on materials for these fuel cells.

For the detail of the activities, see the web page.



# TECHNOLOGY TRANSFER PROFILE

## Category

Technology offer

Technology Request

## Contact details

**R&D Group**

ICMCB

**Name of the company**

**Contact**

Jean-Claude Grenier

## Technology Profile

**Title**

**Description**

**Innovative Aspects and Main Advantages**

**Intellectual Property Rights**

**Other Aspects**

## Partner Sought

**Type of Partner Sought**

Cross-border scientific and technologic partnerships in the framework of Hyrreg project or other future projects. Identification of a society (Ikerlan) which develops high temperature fuel cells near Vitoria (Pays Basque).

**Tasks to be Performed by the Partner Sought**

## Department

## Web

<http://www.iemm.univ-montp2.fr>

## Contact person - E-mail

Stéphanie ROUALDES  
stephanie.roualdes@univ-montp2.fr

## Telephone

+33 4 67 14 91 81

## Category

H<sub>2</sub> Production

H<sub>2</sub> Purification

H<sub>2</sub> Storage

H<sub>2</sub> Delivery

Conversion & apps

Promotion & perception

Electric supplies

Others

## Research lines

Devices for energy generation:

- Development of PECVD and self-organized ion-conducting hybrid supramolecular membranes for fuel cells and lithium-ion batteries.
- Implementation of in situ infrared and micro-Raman spectroscopies for understanding both proton conduction and water management in PEM fuel cells membranes.
- Enzymes-grafted carbon supports (in particular nanotubes or nanofibres), electrochemistry studies and microfluidic technology for bio fuel cells.

Gas separation/purification:

- Development of polymer, hybrid and ceramic membranes for gas separation (including H<sub>2</sub>).
- Testing of membrane performance for gas separation (permeability, separation factor) from 25°C up to 600°C.
- Modelling of transport phenomena during gas permeation through inorganic microporous silica membranes for He purification (coll. Areva) or through polymer membranes for CO<sub>2</sub> separation.
- Design and optimization of gas separation units.

H<sub>2</sub> production:

Modelling and simulation of a high temperature electrolyser for the production of H<sub>2</sub> from water vapour at high pressure (coll. Areva).

Energy storage:

Implementation of spectroscopies for understanding of materials reactivity and degradation mechanisms in batteries materials.

## Some additional and related information

National and european projects related to devices for energy generation (including fuel cells):

- \* CNRS- PIE Energie (2008-2010) – Biofuel cells, clays nanotubes.
- \* CNRS- PIE Energie (2008-2009) and Egide PHC ULYSSE (2009) – glucose/O<sub>2</sub> biofuel cells.
- \* CNRS- PIE Energie (2008-2010): AMELI-OPt – Development of PEM fuel cells with no platinum and using glycerol as fuel.
- \* ANR H'PAC (2008-2011): BODIPAC – Development of solid alkaline fuel cells using NaBH<sub>4</sub> as fuel.

National and european projects related to the development of membranes for gas separation (including H<sub>2</sub>):

- \* CNRS- PIE Energie: MENOXYHY (2009-2012) – Development of new ceramic and non-oxide hybrid membranes for H<sub>2</sub> separation.
- \* FP7-PEOPLE: IMeTI (2008-2012)- Implementation of Membrane Technology to Industry.
- \* FUJ-LR Region: MEGA (2009-2012)- Industrial development of gas separation membranes, innovating solutions for the energy of future.

National and european projects related to energy storage:

- \* CNRS- PIE Energie: PROMICRAM (2008-2009) – Implementation of an original method (Raman confocal microscopy) for the in situ determination of water profiles in fuel cells polymer membranes.
- \* ANR Stock-E : ANZAS (2009-2012) - Nickel-zinc batteries for stationary applications.

Contract with the industry:

TOTAL-AREVA (2009-2010) - Modeling and optimization of modules for CO<sub>2</sub> separation from CTL gas flows.

## TECHNOLOGY TRANSFER PROFILE

### Category

Technology offer

Technology Request

### Contact details

**R&D Group**  
**Name of the company**  
**Contact**

### Technology Profile

**Title**

**Description**

**Innovative Aspects and Main Advantages**

**Intellectual Property Rights**

**Other Aspects**

## Partner Sought

### **Type of Partner Sought**

Industries for the scale-up in the manufacture of membranes, implementation of gas separation units, development of energy generation devices.

### **Tasks to be Performed by the Partner Sought**



**Department**

**Web**

<http://www.ist.utl.pt/>  
<http://www.idmec.ist.utl.pt/>

**Contact person - E-mail**

Rui Costa Neto  
costaneto@ist.utl.pt

**Telephone**

+ 351 218417632

**Category**

- |   |   |
|---|---|
| <input checked="" type="checkbox"/> H <sub>2</sub> Production | <input type="checkbox"/> Conversion & apps            |
| <input type="checkbox"/> H <sub>2</sub> Purification          | <input type="checkbox"/> Promotion & perception       |
| <input checked="" type="checkbox"/> H <sub>2</sub> Storage    | <input checked="" type="checkbox"/> Electric supplies |
| <input type="checkbox"/> H <sub>2</sub> Delivery              | <input type="checkbox"/> Others                       |

**Research lines**

Reforming of Natural Gas and Methanol.  
Testing of fuel cells (PEM).  
Demonstration of energy storage through hydrogen.

**Some additional and related information**

Ongoing experimental work and modeling:

- Reforming of methanol with water vapor to produce hydrogen for fuel cells (pilot installations);
- Characterization of Fuel Cell and Hydrogen Monitoring Single Cell (pilot installations);
- Modelling of fuel cell running on hydrogen;
- Numerical modeling and experimental propulsion system's electrical HIDROCAT (boat) (pilot installations);
- Modelling heat transfer in tubular reforming reactor.

# TECHNOLOGY TRANSFER PROFILE

## Category

Technology offer

Technology Request

## Contact details

### R&D Group

### Name of the company

### Contact

Institute of Mechanical engineering of the Instituto Superior Técnico IST/IDMEC – Energy Technology Lab  
+ 351 218417632

## Technology Profile

### Title

Reforming of hydrocarbons with steam to produce hydrogen for fuel cells;  
Development, production, characterization and modeling of PEM fuel cells

### Description

Producing and testing several catalysts through our own process.  
Surface catalyst characterization to allow understanding the relationship between the composition of the catalyst and the reformed gas produced.  
Longevity and regeneration studies of the catalyst.  
Heat transfer evaluation in the overall system.  
Economical and energetically assessment of the processor.

Projecting, building, and modeling PEM fuel cells stacks.  
Characterization of a PEM fuel cell stack of 0,01-2,5 kW, through monitoring of the individual cells voltage over time and through performance curves. Complete quantification and dissociation between the several electric and thermal energy fraction.  
Studies of PEM fuel cell operating conditions, including, temperature, pressure, gas flows, always aimed to maximize their performance.  
Modeling of the dynamic behavior of a PEM fuel cell over time while maintaining the reduced processing time.

### Innovative Aspects and Main Advantages

### Intellectual Property Rights

### Other Aspects

## Partners Sought

### Type of Partner Sought

Industry, Research Institutes

### Tasks to be Performed of the Partner Sought

Partners interested in developing projects implemented in the area of energy storage, namely, electrochemical electrical storage, such as hydrogen fuel cells and flow batteries.

# INSTITUTE OF NANOSCIENCE OF ARAGÓN (INA)

## Department

## Web

www.ina.unizar.es

## Contact person

Susana Sangiao

## Telephone

+34 976762891  
ina.promocion@unizar.es

## Category

- |   |   |
|---|---|
| <input checked="" type="checkbox"/> H <sub>2</sub> Production | <input type="checkbox"/> Conversion & apps      |
| <input type="checkbox"/> H <sub>2</sub> Purification          | <input type="checkbox"/> Promotion & perception |
| <input type="checkbox"/> H <sub>2</sub> Storage X             | <input type="checkbox"/> Electric supplies      |
| <input type="checkbox"/> H <sub>2</sub> Delivery              | <input type="checkbox"/> Others                 |

## Research lines

Nanobiomedicine, Physics of nanosystems and Nanomaterials.

## Some additional and related information

## TECHNOLOGY TRANSFER PROFILE

### Category

Technology offer

Technology Request



## Contact details

**R&D Group**  
**Name of the company**  
**Contact**

NFP (Nanoporous Films & Particles)  
INA- University of Zaragoza  
M. Pilar Pina / mapina@unizar.es

## Technology Profile

### Title

Nanoporous Films & Particles.

### Description

Our research efforts are focused on the development of nanostructured electrolyte membrane based on a new composite multifunctional material made by the synergic combination of zeolites, ionic liquids and polymers, which is being proposed for the first time within the framework of this project.

### Innovative Aspects and Main Advantages

### Intellectual Property Rights

### Other Aspects

## Search for Partners

### Type of Search

### Tasks to be Performed by the Partner

## Department

## Web

<http://itq.webs.upv.es/>

## Contact person - E-mail

Antonio Chica Lara  
achica@itq.upv.es

## Telephone

+34963877000 ext 78508

## Category

H<sub>2</sub> Production

H<sub>2</sub> Purification

H<sub>2</sub> Storage

H<sub>2</sub> Delivery

Conversion & apps

Promotion & perception

Electric supplies

Others

## Research lines

## Some additional and related information

We are involved in the catalytic production of hydrogen from biomass derived compounds by steam reforming, autothermal reforming and liquid phase reforming. We are working also in the development of new catalytic materials for hydrogen purification through the water gas shift reaction and preferential oxidation of CO.

Currently we have three projects in these research areas with public and private funding.

# TECHNOLOGY TRANSFER PROFILE

## Category

Technology offer

Technology Request

## Contact details

**R&D Group**  
**Name of the company**  
**Contact**

## Technology Profile

**Title**

**Description**

**Innovative Aspects and Main Advantages**

**Intellectual Property Rights**

**Other Aspects**

## Partner Sought

**Type of Partner Sought**

**Tasks to be Performed by the Partner Sought**

# INSTITUTO NACIONAL DE TÉCNICA AEROSPACIAL (INTA)

## Department

Área de Energías Renovables.

## Web

[www.inta.es](http://www.inta.es)

## Contact person

Mercedes Sánchez Álvarez  
[otri@inta.es](mailto:otri@inta.es)

## Telephone

+34 91 520 65 45

## Category

- |  |   |
|--|---|
| <input type="checkbox"/> H <sub>2</sub> Production   | <input type="checkbox"/> Conversion & apps      |
| <input type="checkbox"/> H <sub>2</sub> Purification | <input type="checkbox"/> Promotion & perception |
| <input type="checkbox"/> H <sub>2</sub> Storage      | <input type="checkbox"/> Electric supplies      |
| <input type="checkbox"/> H <sub>2</sub> Delivery     | <input type="checkbox"/> Others                 |

## Research lines

Hydrogen production by renewable sources and hydrogen storage.

Hydrogen systems integration.

Polymer electrolyte membrane fuel cells Test benches.

Members of the Research Grouping of the JTI of hydrogen and fuel cells.

Inta participates in the committees of normalization ISO IEC/TC 105 and ISO/TC-197.

## Some additional and related information

Since the 70s, the Institute has devoted continuous efforts in the research and development of renewable and alternative energies.

In this context, in 1989 began a program focused on the use of hydrogen as a storage medium for solar electricity in manned space missions. Since 1994, hydrogen-related activities started to focus on the use of hydrogen in fuel cells both for non-centralized power generation and its use as a clean transport fuel.

Since May 2002, INTA is the chairman of the Spanish Hydrogen Association (Hydrogen and Fuel Cells Technologies).

Since 1991, INTA's Renewable Energies Area has acquired a great experience in the fuel cells technology. The Institute has set up facilities and operated fuel cell systems of alkaline technology, polymeric membrane (PEM) and phosphoric acid in a power range from 0.5 to 30 kW.

The lines of work on the field of hydrogen and fuel cells are focused on the following programs:

Fuel Cells for Defence Applications.

Fuel Cells for Aeronautical Applications.

Standardization of Fuel Cells Test.

## European Projects

FEBUSS. Development of regulations and CE marking for stationary and transport applications with fuel cells. INTA participates in the Security and Technology Auditing working groups.

HyApproval. Development and standardization of rules for the integration of hydrogen and fuel cells in transport applications. INTA is basically involved in the working group related to service stations.

HyWays. Development of a validated roadmap for the introduction of hydrogen into the European energy systems including stationary and mobile applications.

RES2H2. Integration of hydrogen production systems with renewable energy sources and use in fuel cells. INTA participates in the system design, data evaluation and dissemination of results.

FCTESTNET. Development of regulations for fuel cells tests. INTA participates in the development of these regulations.

STORHY. Development of hydrogen storage systems for transport applications with fuel cells. INTA participates in working groups related to security issues.

FCTESTQA. Validation of procedures for fuel cell test with different technologies and for different applications.

Participation in Working Groups of the International Energy Agency (IEA).

## National Projects

SOLGEMAC. Project to establish the scientific and technological background which allow to develop new systems of thermal and chemical conversion of concentrated solar energy in a more efficient, dispatchable and modular way.

PHISICO2. Project of research and technological development aimed at the study and development of processes for clean hydrogen production.

EPICo. Project focused on the development and evaluation of polymer membrane fuel cell in Spain.

HERCULES. Demonstration project of solar hydrogen production and its use in a vehicle propelled by a PEM fuel cell.

GENCELL. Development of inverters for stationary applications with fuel cells.

DELFIN. Development of a mobile platform for testing fuel cells for automotive applications.

Participation in standardization committees: IEC/TC 105 Fuel Cells, CTN 181 of Hydrogen Technologies and Spanish Platform of Hydrogen Technologies and Fuel Cells.

## Internal Projects

“Fuel Cells. Applications for Defence”. Development of diesel and ethanol fuels processors and their integration in a PEM fuel cell. Development of bipolar plates for fuel cells. Analysis of hydrogen-based systems.

“Renewable Energies and Environmental Technologies”. Modelling and simulation of the fuel cells fluidynamic behaviour.

# TECHNOLOGY TRANSFER PROFILE

## Category

Technology offer

Technology Request

## Contact details

**R&D Group**  
**Name of the company**  
**Contact**

## Technology Profile

**Title**

**Description**

**Innovative Aspects and Main Advantages**

**Intellectual Property Rights**

**Other Aspects**

## Partners Sought

**Type of Partner Sought**

**Tasks to be Performed of the Partner Sought**



# INSTITUTO TECNOLÓGICO DE ARAGÓN

## Department

## Web

[www.ita.es](http://www.ita.es)

## Contact person

Miguel Trallero

## Telephone

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[mtrallero@ita.es](mailto:mtrallero@ita.es)

## Category

- |  |   |
|--|---|
| <input type="checkbox"/> H <sub>2</sub> Production   | <input type="checkbox"/> Conversion & apps      |
| <input type="checkbox"/> H <sub>2</sub> Purification | <input type="checkbox"/> Promotion & perception |
| <input type="checkbox"/> H <sub>2</sub> Storage X    | <input type="checkbox"/> Electric supplies      |
| <input type="checkbox"/> H <sub>2</sub> Delivery     | <input checked="" type="checkbox"/> Others      |

## Research lines

- Materiales / Materials
- Nuevas Tecnologías de Diseño / New Design Technologies
- e-Logística / e-Logistics
- Tecnologías Multimedia / Multimedia Technologies

## Some additional and related information

**MATERIALS:** The aim of this area is to generate and develop high-end activities focused on the numerical characterization and prediction of the behavior of materials and design of multifunctional materials.

**PROJECTS:**

- KRISTAL (VI PM) Tribology
- Pedifer (MCYT) Dynamic behavior and life prediction in elastomers
- Modatif (Profit) Process influence on reinforced plastics mechanical behavior
- Nano TPE (MCYT) TPE with self-monitoring capabilities using CNT's
- Mulfater (MCYT) Fatigue in metals



**NEW DESIGN TECHNOLOGIES:** The scope of this area is to develop new tools and methodologies oriented to improve design processes and develop products by means of the convergence of different multidisciplinary technologies: numerical, experimental and hybrid.

PROJECTS:

- Provife (MCYT) Flow-structure interaction
- SAAPIN (DGA) Autonomous machines

**e-LOGISTICS:** The objectives of this area include the integration, development and experimentation with information technologies applied to improve supply chain processes.

PROJECTS:

- GlobalLog (MEC) Logistic networks analysis
- Logistics center designs
- Global distribution networks

**MULTIMEDIA TECHNOLOGIES:** This area is focused in the design and application of technological platforms (TDT, Internet, 3G) for interactive multimedia services (VoIP, VIP, interactive services). Includes the design of the systems architecture, communications infrastructure and the development of services for the end users.

PROJECTS:

- i-Lab: Network and communications Laboratory
- GenesisX: next generation services-
- MarkNext – Redes de nueva generación
- Quar2: Quality of Real-time Applications

## TECHNOLOGY TRANSFER PROFILE

### Category

Technology offer

Technology Request

### Contact details

**R&D Group**

**Name of the company**

**Contact**

Fundación CIRCE

Alfonso Aranda

### Technology Profile

**Title**

**Description**

**Innovative Aspects and Main Advantages**

**Intellectual Property Rights**

**Other Aspects**

### Search for Partners

**Type of Search**

**Tasks to be Performed by the Partner**

# INSTRUMENTACIÓN ANALÍTICA, S.A.

## Department

Ventas – Servicio Técnico

## Web

www.instru.es

## Contact person

Lorenzo Godé

## Telephone

934787161  
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## Category

- |  |   |
|--|---|
| <input type="checkbox"/> H <sub>2</sub> Production   | <input type="checkbox"/> Conversion & apps      |
| <input type="checkbox"/> H <sub>2</sub> Purification | <input type="checkbox"/> Promotion & perception |
| <input type="checkbox"/> H <sub>2</sub> Storage X    | <input type="checkbox"/> Electric supplies      |
| <input type="checkbox"/> H <sub>2</sub> Delivery     | <input checked="" type="checkbox"/> Others      |

## Research lines

Selling and technical service of equipment for measuring concentration of H<sub>2</sub> and others.

## Some additional and related information

Instrumentación Analítica supply equipment for measuring H<sub>2</sub> flows (concentration and presence of O<sub>2</sub>, CH<sub>x</sub>, CO, CO<sub>2</sub>, NO<sub>x</sub>,...) as well as other auxiliary equipment for determination of other parameters in gases and water, both process (continuous) and laboratory.

## TECHNOLOGY TRANSFER PROFILE

### Category

Technology offer

Technology Request

## Contact details

**R&D Group**  
**Name of the company**  
**Contact**

## Technology Profile

**Title**

**Description**

**Innovative Aspects and Main Advantages**

**Intellectual Property Rights**

**Other Aspects**

## Search for Partners

**Type of Search**

**Tasks to be Performed by the Partner**

## Department

R&D

## Web

[web.inycom.es/es-es/IDI/Paginas/default.aspx](http://web.inycom.es/es-es/IDI/Paginas/default.aspx)

## Contact person

José Manuel Martín Rapún

## Telephone

+34 666 474635  
[josemanuel.martin@inycom.es](mailto:josemanuel.martin@inycom.es)

## Category

- |   |   |
|---|---|
| <input checked="" type="checkbox"/> H <sub>2</sub> Production | <input type="checkbox"/> Conversion & apps            |
| <input type="checkbox"/> H <sub>2</sub> Purification          | <input type="checkbox"/> Promotion & perception       |
| <input type="checkbox"/> H <sub>2</sub> Storage X             | <input checked="" type="checkbox"/> Electric supplies |
| <input type="checkbox"/> H <sub>2</sub> Delivery              | <input checked="" type="checkbox"/> Others            |

## Research lines

- Intelligent systems to stabilize power grids integrating renewable energies, power electronics and energy storage
- Equipment to measure electric magnitudes and quality in power supply
- SCADA/EMS and communications(IEC 60870 and IEC 61850) for power supply
- Experience in software development to control hydrolysis processes.
- Electronic control of fuel cells

## Some additional and related information

-We are currently working in SINTER project to integrate renewable energies with storage, including hydrogen, either in isolated microgrids or connected to the main power grid. For more information visit [www.sinter.es](http://www.sinter.es)

-We also contribute to the Formula Zero Championship team UNIZARTECH2 taking over the electronic control of the fuel cell. Further information about Formula Zero in [www.formulazero.nl/](http://www.formulazero.nl/)

## TECHNOLOGY TRANSFER PROFILE

### Category

Technology offer

Technology Request

## Contact details

### R&D Group

Name of the company

Inycom

Contact

josemanuel.martin@inycom.es

## Technology Profile

### Title

AIRE

### Description

AIRE is a piece of equipment to measure electric magnitudes (voltage, intensity, power) and quality in power supply (harmonics, interharmonics, flicker, overfrequency, underfrequency, transients...). It is also able to monitor and record voltage sags in wind farms with automatic validation of standards (by default PO 12.3 of REE (Red Eléctrica de España))

### Innovative Aspects and Main Advantages

The equipment is able to record the information of voltage sags and process the data automatically to establish if a wind turbine or farm fulfills the standards required by the power grid operator or by law.

### Intellectual Property Rights

### Other Aspects

This equipment is being used in SINTER Project ([www.sinter.es](http://www.sinter.es)), an integration of renewable generation and hydrogen production and storage, to monitor quality in power supply.

## Search for Partners

### Type of Search

### Tasks to be Performed by the Partner

# TECHNOLOGY TRANSFER PROFILE

## Category

Technology offer

Technology Request

## Contact details

### R&D Group

**Name of the company**

Inycom

**Contact**

josemanuel.martin@inycom.es

## Technology Profile

### Title

SINTER

### Description

SINTER (Sistemas Inteligentes Estabilizadores de Red / Intelligent systems to stabilize power grids) are integrated systems of renewable energies, power electronics and energy storage (including hydrogen) used to:

- Stabilize weak or saturated power grids.
- Make renewable energy sources available to stabilize power supply even in small isolated grids.

These systems have the mission of guaranteeing the quality and security of the electrical supply. Moreover they have to be able to work isolated to provide power supply to a small group of customers, industries or rural area. The main components of these systems are:

- Energy storage: hydrogen, batteries, supercapacitors, pumped-storage
- Generation: photovoltaic, wind or hydro generators
- Electrical Grid connections: Using power electronics
- Control systems

To do this, all the elements in the system must act in concert, and subordinated to the power grid they are connected to. Further information available in [www.sinter.es](http://www.sinter.es)

### Innovative Aspects and Main Advantages

SINTER systems provide the active and reactive power required by the grid they are connected to, improving its stability and avoiding unexpected trippings, as well as other problems related to voltage fluctuations and even reducing harmonic distortion. Other advantages provided are:

- Increase the use of renewable energies, reducing the negative impact related to the traditional energy sources
- Flattening the demand curve
- Enabling the development of Distributed Generation: small and medium power
- Increase the transmission capacity without the need of new power lines or repowering the existing ones.

### Intellectual Property Rights

### Other Aspects

# TECHNOLOGY TRANSFER PROFILE

## Category

Technology offer

Technology Request

## Contact details

### R&D Group

Name of the company

Inycom

Contact

josemanuel.martin@inycom.es

## Technology Profile

### Title

Hydrolysis processes control

### Description

Inycom has been working with the FHA (Fundación Hidrógeno Aragón) and IHT to optimize the control of large electrolyzers.

### Innovative Aspects and Main Advantages

- Better information and process control
- Improve safety

### Intellectual Property Rights

### Other Aspects

## Search for Partners

### Type of Search

### Tasks to be Performed by the Partner

# TECHNOLOGY TRANSFER PROFILE

## Category

Technology offer

Technology Request

## Contact details

### R&D Group

Name of the company

Inycom

Contact

josemanuel.martin@inycom.es

## Technology Profile

### Title

Electronic control of fuel cells

### Description

Inycom has designed and built the electronic control of the fuel cell for the Formula Zero Championship team UNIZARTECH2. This system monitors the voltages and currents in the different buses of the kart and controls the fuel cell based on the information retrieved. Further information about Formula Zero in <http://www.formulazero.nl/>

### Innovative Aspects and Main Advantages

- Embedded system to control the fuel cell via standard car protocols (CAN bus)
- All systems designed without mobile parts.
- Signal conditioning for data logging and telemetry.
- Data logging in flash memory for easy processing and data retrieval.
- Software for log analysis.

### Intellectual Property Rights

### Other Aspects

## Search for Partners

### Type of Search

Tasks to be Performed by the Partner





## Department

## Web

[www.irmatech.com](http://www.irmatech.com)

## Contact person - E-mail

Christian HAMON, directeur  
[c.hamon@irmatech.com](mailto:c.hamon@irmatech.com)

## Telephone

02 97 83 55 55

## Category

H<sub>2</sub> Production

H<sub>2</sub> Purification

H<sub>2</sub> Storage

H<sub>2</sub> Delivery

Conversion & apps

Promotion & perception

Electric supplies

Others

## Research lines

## Some additional and related information

Reformer (any types of hydrocarbons) connected to fuel cell (PEM LT or HT).

# TECHNOLOGY TRANSFER PROFILE

## Category

Technology offer

Technology Request

## Contact details

**R&D Group**  
**Name of the company**  
**Contact**

IIRMA  
Christian HAMON

## Technology Profile

**Title**

**Description**

Collaboration with fuel cell maker for connection to reformer.

**Innovative Aspects and Main Advantages**

Know how in PEM HT fuel cell.

**Intellectual Property Rights**

Patent on the reformer.

**Other Aspects**

## Partner Sought

**Type of Partner Sought**

**Tasks to be Performed by the Partner Sought**

## Department

Institut Charles Gerhardt Montpellier/Charles Gerhardt Institute for Molecular Chemistry and Materials

## Web

<http://www.icgm.fr/aime>

## Contact person - E-mail

Jacques Rozière  
[jacques.roziere@univ-montp2.fr](mailto:jacques.roziere@univ-montp2.fr)

## Telephone

+33 46714 3341

## Category

H<sub>2</sub> Production

H<sub>2</sub> Purification

H<sub>2</sub> Storage

H<sub>2</sub> Delivery

Conversion & apps

Promotion & perception

Electric supplies

Others

## Research lines

Proton exchange membrane and proton ceramic fuel cell materials elaboration, characterisation and validation: single cells and stacks.

Hydrogen generation from liquid hydrocarbons.

Hydrogen purification on ceramic filtration membranes.

## Some additional and related information

European and internationally recognized leadership in materials for PEMFC in particular in the development of new concepts for electrolyte membrane materials, with participation in, and coordination of, several European framework projects in the field. Coordinator of the European Coordination Action on Research on Intermediate and High Temperature Membrane Electrode Assemblies (CARISMA). Validation of medium and high temperature MEAs at single cell level over a range of temperature (80 – 200 °C) and pressure conditions, including the effect of pollutants, influence of gas stoichiometries etc. Development of materials, MEAs and stacks for direct liquid fuel cells, in particular biomass-derived fuels. Development of materials and single cells for proton ceramic fuel cells for operation at 400-600 °C, materials and MEA validation. The laboratory is equipped with an experimental platform for characterisation and validation of fuel cell materials, membrane-electrode assemblies, single cells and short stacks, and includes hot-presses, electrolyzers for hydrogen generation, electrochemical impedance spectroscopy.

Catalytic hydrogen generation from liquid hydrocarbons for aeronautic fuel cell application and local hydrogen production. Low temperature electrolysis. Purification of biomass-derived hydrogen by ceramic membrane filtration.

# TECHNOLOGY TRANSFER PROFILE

## Category

Technology offer

Technology Request

## Contact details

### R&D Group

Laboratoire Agrégats, Interfaces et Matériaux pour l'Energie /  
Laboratory Aggregates, Interfaces and Materials for Energy.

### Name of the company

Institut Charles Gerhardt Montpellier/Charles Gerhardt  
Institute for Molecular Chemistry and Materials.

### Contact

Jacques Rozière.

## Technology Profile

### Title

Laboratory Aggregates, Interfaces and Materials for Energy

### Description

The laboratory AIME has internationally recognised experience in the development of materials for energy conversion using hydrogen as energy carrier over almost two decades. Current interests and technology offer include polymer and ceramic proton electrolyte materials and membranes, novel non-carbon and low-cost catalyst supports for high temperature PEMFC, medium and high temperature MEA materials for automotive and stationary applications of fuel cells, and the characterisation and validation of components and membrane electrode assemblies through a range of electrochemical and physicochemical methods, including single cell and stack testing facilities in dedicated laboratories. A particular effort is currently devoted to increasing the understanding of ageing and degradation mechanisms of fuel cell materials under specific operation conditions, and to proposing and validating mitigation strategies. With regard to hydrogen production, we are investigating partial dehydrogenation of hydrocarbon fuels for local hydrogen generation for fuel cells for automotive and aeronautic applications, as well as "low" temperature electrolysis using high temperature PEMFC assemblies. Ceramic filtration membranes are under development for hydrogen separation from other components of biogas. Novel hydrogen sensors have been developed for integration into fuel cell systems.

### Intellectual Property Rights

Expertise in both high temperature PEMFC and low temperature solid ceramic fuel cells with development of materials components and membrane electrode assemblies appropriate for these temperature ranges. Experience ranges from the fundamental aspects of proton conduction in electrolyte materials to materials development and integration in devices.

Experimental platform for fuel cell testing and validation, with test stands for hydrogen-fed and liquid direct fuel cells (ethanol, methanol, glycerol etc.), and operation on oxygen or air, and in the presence of controlled amounts of potential pollutant species. Access to and experience in a broad range of experimental characterisation methods by spectroscopic, electrochemical, microscopic, structural approaches. Solid international reputation, involvement and leadership of several national, European and international collaborative projects and networks. The group includes the senior editor of the journal Fuel Cells – from fundamentals to systems.

### **Intellectual Property Rights**

Intellectual property rights are agreed between the twin authorities (CNRS and University Montpellier 2) of the laboratory, and the prospective partner.

### **Other Aspects**

Interest in all R&D aspects leading to deployment of hydrogen and fuel cells in early markets, transport and stationary applications.

## **Partners Sought**

### **Type of Partner Sought**

Industrial and university/research organisation partners for collaborative research on topics of mutual interest.

Industrial partners for funding/co-funding of research on topics proposed by industrial partners designed at providing solutions to the bottlenecks to market introduction of fuel cells.

### **Tasks to be Performed of the Partner Sought**



# LABORATOIRE DE GÉNIE CHIMIQUE

## Department

## Web

<http://lgc.inp-toulouse.fr/>

## Contact person - E-mail

Catherine.AzzaroPantel@ensiacet.fr

## Telephone

(+ 33) 5 34 32 33 00

## Category

- H<sub>2</sub> Production
- H<sub>2</sub> Purification
- H<sub>2</sub> Storage
- H<sub>2</sub> Delivery

- Conversion & apps
- Promotion & perception
- Electric supplies
- Others

## Research lines

Hydrogen production by electrolysis (contact Regine.Basseguy@ensiacet.fr).  
Microbial fuel cells (contact Alain. Bergel@ensiacet.fr).  
Hydrogen production by biomass pyrolysis (contact Xavier.Joulia@ensiacet.fr).  
Hydrogen production by I-S thermochemical cycles iode-Soufre (contact Xavier.Joulia@ensiacet.fr).  
Optimization of hydrogen transport networks (contact Catherine. AzzaroPantel @ensiacet.fr).  
Technico-economical optimisation of energy conversion systems: electricity-hydrogen cogeneration from a VHTR nuclear source (Catherine. AzzaroPantel @ensiacet.fr).

## Some additional and related information



# TECHNOLOGY TRANSFER PROFILE

## Category

Technology offer

Technology Request

## Contact details

**R&D Group**  
**Name of the company**  
**Contact**

## Technology Profile

**Title**

**Description**

**Innovative Aspects and Main Advantages**

**Intellectual Property Rights**

**Other Aspects**

## Partner Sought

**Type of Partner Sought**

**Tasks to be Performed by the Partner Sought**

# LAPESA GRUPO EMPRESARIAL

## Department

## Web

[www.lapesa.es](http://www.lapesa.es)

## Contact person - E-mail

Gerardo Concheso  
[gerardo.concheso@lapesa.es](mailto:gerardo.concheso@lapesa.es)

## Telephone

976 46 51 87

## Category

- |   |   |
|---|---|
| <input type="checkbox"/> H <sub>2</sub> Production              | <input type="checkbox"/> Conversion & apps      |
| <input checked="" type="checkbox"/> H <sub>2</sub> Purification | <input type="checkbox"/> Promotion & perception |
| <input checked="" type="checkbox"/> H <sub>2</sub> Storage      | <input type="checkbox"/> Electric supplies      |
| <input checked="" type="checkbox"/> H <sub>2</sub> Delivery     | <input type="checkbox"/> Others                 |

## Research lines

## Some additional and related information

LAPESA was created in 1964. It is the head of a companies group, among them SIPEJMA SLU, ACUASAN SLU, LANGUENS Y PEREZ SLU. These companies are the manufacture units and the products are marketed by LAPESA, with their own brand. LAPESA coordinates to the subsidiary companies and carries out common services of administration, sales and research and development departments. The companies groups is located in Zaragoza, Spain.

Nowadays LAPESA has two product range. One is focused on tanks to domestic hot water (DHW) and the other one on liquid, compressed gas and liquefied gas fuel tanks, deserve special mention the models to liquefied petroleum gas (LPG), that is propane. Also there are some models to cryogenic storage, mainly to liquefied natural gas (LNG), until 200 m<sup>3</sup>.

The main product of liquid and liquefy gas fuels division are the LPG tanks, of which LAPESA is the leading Spanish manufacturer. LAPESA has done a products standardization which has become the market standardization. Also LPG vaporizers, LPG autonomous units to automotive sector and transportable tankers are made.

The facilities are composed by a group of warehouse and buildings, in total about 30.000 m<sup>2</sup>, to manufacture and storage. The manufacturing facilities have been designed to mass production and also they allow to adapt the production to short serial, to specific products.

The production activity is classified in metal transformation, in the area of boiler works, specially sheet metal forming and welding. Products design has been carried out own technical team. Each manufacture unit has a technical service, to update or adapt the products according to new client demands, as well as to implement new means of production. R&D department is managed by LAPESA with the staff of the subsidiary companies.

LAPESA has developed a lot of equipments, specially in the area of pressure equipments. Also LAPESA has carried out SPHERA project, in the framework of National Research Programs, about hydrogen storage.

LAPESA markets all their products, and the exports are 30% of total sales. The main clients are multinational companies of gas and fuel sector.

## TECHNOLOGY TRANSFER PROFILE

### Category

**Technology offer**

**Technology Request**

### Contact details

**R&D Group**

**Name of the company**

**Contact**

Técnico

LAPESA GRUPO EMPRESARIAL

Gerardo Concheso

### Technology Profile

**Title**

Hydrogen tanks

**Description**

LAPESA ha desarrollado recipientes para hidrógeno desde 2-3 bares hasta 300 bares de presión. Están preparados tanto para aplicaciones estacionarias como para aplicaciones transportables. Las tamaños y capacidades son adaptables a la aplicación final, siendo un tamaño medio 900 L geométricos, pudiéndose alcanzar tamaños mayores.

La principal ventaja son tamaños adaptables a la aplicación final, tendiendo un menor tamaño y sobre todo un menor coste que los actuales conjuntos de botellas.

Los recipientes están homologados de acuerdo a los estándares aplicables o requisitos del cliente.

Por otro lado LAPESA tiene capacidades para el desarrollo de equipos a presión de hidrógeno, como por ejemplo equipos de separación gas/liquido y recipientes de almacenamiento. Cualquier necesidad de un cliente o usuario de un equipo a presión de hidrógeno puede ser desarrollada por LAPESA, tanto desde pequeños depósitos hasta equipos complejos de mayor tamaño.

## **Innovative Aspects and Main Advantages**

Español

La principal novedad es el tamaño de los recipientes de hidrógeno a presión. Hasta el momento se trabaja principalmente con botellas de 50L de capacidad, siendo necesario construir conjuntos de botellas para aplicaciones que requieren de una cantidad mayor de hidrógeno.

Este nuevo sistema permite almacenar hidrógeno para aplicaciones estacionarias y transportables con un coste menor y con un peso total del conjunto mejor de los actuales sistemas de almacenamiento.

Los materiales han sido homologados para trabajar con hidrógeno.

The main innovative aspect is the size of the hydrogen pressure tanks. So far the 50L bottle is the principal system to storage hydrogen, and to get more capacity set of bottles or cylinder bundles have to be built.

This new system allows to storage hydrogen in stationary and transportable applications, with a lower cost and with a lower weight than current storage system.

All materials have been approved to use hydrogen.

## **Intellectual Property Rights**

## **Other Aspects**

## **Partners Sought**

### **Type of Partner Sought**

Ingenierías, ingenierías de industrias químicos, multinacionales del sector gasista y del petróleo, compañías el sector de la energía y del sector químico, y usuarios de recipientes de hidrógeno en general.

Engineering, chemical industry engineering, multinationals gas and fuel sector, companies of energy and chemical sector and user of tanks in general.

### **Tasks to be Performed of the Partner Sought**



# LEITAT TECHNOLOGICAL CENTER

## Department

R+D renewable energies

## Web

<http://www.leitat.org>

## Contact person - E-mail

Dr. David Gutiérrez-Tauste  
[dgutierrez@leitat.org](mailto:dgutierrez@leitat.org)

## Telephone

+34937882300

## Category

H<sub>2</sub> Production

H<sub>2</sub> Purification

H<sub>2</sub> Storage

H<sub>2</sub> Delivery

Conversion & apps

Promotion & perception

Electric supplies

Others

## Research lines

Photochemistry and photocatalysis. Photo(electro)chemical water splitting. Microbial Fuel Cells and Microbial Electrolytic Cells. Wastewater treatment combined with H<sub>2</sub> production. Nanomaterials for hydrogen storage, electrospinning of polymeric, ceramic and other materials Phase Change Materials micro and nanoencapsulated. Heat dissipation and storage for a wide range of application.

## Some additional and related information

Solar hydrogen production, hydrogen storage in nanomaterials (e.g. hydrides), heat dissipation and storage.

# TECHNOLOGY TRANSFER PROFILE

## Category

Technology offer

Technology Request

## Contact details

**R&D Group**  
**Name of the company**  
**Contact**

H2 production via innovative processes

## Technology Profile

**Title**

**Description**

**Innovative Aspects and Main Advantages**

**Intellectual Property Rights**

**Other Aspects**

## Partners Sought

**Type of Partner Sought**

**Tasks to be Performed of the Partner Sought**

**Department**

Department of Chemical Engineering

**Web**

**Contact person - E-mail**

Prof. Luis Miguel Madeira  
mmadeira@fe.up.pt

**Telephone**

+351-22-5081519

**Category**

H<sub>2</sub> Production

H<sub>2</sub> Purification

H<sub>2</sub> Storage

H<sub>2</sub> Delivery

Conversion & apps

Promotion & perception

Electric supplies

Others

**Research lines**

Use of processes (e.g. Pd-based membrane reactors) for simultaneous production and purification of H<sub>2</sub> (e.g., via water gas shift reaction).

**Some additional and related information**

Sorption-Enhanced Membrane Reactors using Monolith-Supported Catalysts for High-Purity Hydrogen Production (FCT project PTDC/EQU-ERQ/098730/2008);

Use of Membrane Reactors in the Water-Gas Shift Reaction (FCT project PTDC/EQU-ERQ/66045/2006);

Hydrogen-related technologies, in particular concerning its purification (e.g., with membrane-based processes);

Technology related with CO<sub>2</sub> capture and its conversion into chemicals.



# TECHNOLOGY TRANSFER PROFILE

## Category

Technology offer

Technology Request

## Contact details

**R&D Group**  
**Name of the company**  
**Contact**

LEPAE  
Faculty of Engineering at University of Porto  
Luis Miguel Madeira (mmadeira@fe.up.pt)

## Technology Profile

**Title**

### Description

In the fields of H<sub>2</sub> purification / H<sub>2</sub> production / CO<sub>2</sub> capture;  
With technologies such as chemical reactors, membrane processes and adsorption.

### Innovative Aspects and Main Advantages

### Intellectual Property Rights

### Other Aspects

## Partners Sought

### Type of Partner Sought

### Tasks to be Performed of the Partner Sought

# TECHNOLOGY TRANSFER PROFILE

## Category

Technology offer

Technology Request

## Contact details

**R&D Group**

LEPAE

**Name of the company**

Faculty of Engineering at University of Porto

**Contact**

Luis Miguel Madeira (mmadeira@fe.up.pt)

## Technology Profile

**Title**

**Description**

In the fields of H<sub>2</sub> purification / H<sub>2</sub> production / CO<sub>2</sub> capture;  
With technologies such as chemical reactors, membrane processes and adsorption.

**Innovative Aspects and Main Advantages**

**Intellectual Property Rights**

**Other Aspects**

## Partners Sought

**Type of Partner Sought**

**Tasks to be Performed of the Partner Sought**

In the fields of H<sub>2</sub> purification / H<sub>2</sub> production / CO<sub>2</sub> capture;  
With technologies such as chemical reactors, adsorption, membrane processes.



# INEG (NATIONAL ENERGY AND GEOLOGY LAB.)

## Department

Bioenergy Unit

## Web

[www.ineg.pt](http://www.ineg.pt)

## Contact person - E-mail

Paula Alexandra Marques  
Luisa Gouveia  
Patricia Moura  
Luís Alves  
[paula.marques@ineg.pt](mailto:paula.marques@ineg.pt)  
[luisa.gouveia@ineg.pt](mailto:luisa.gouveia@ineg.pt)  
[patricia.moura@ineg.pt](mailto:patricia.moura@ineg.pt)  
[luis.alves@ineg.pt](mailto:luis.alves@ineg.pt)

## Telephone

+351 210924600/1;  
Ext:4270(Paula Marques)

## Category

- |   |   |
|---|---|
| <input checked="" type="checkbox"/> H <sub>2</sub> Production   | <input type="checkbox"/> Conversion & apps      |
| <input checked="" type="checkbox"/> H <sub>2</sub> Purification | <input type="checkbox"/> Promotion & perception |
| <input type="checkbox"/> H <sub>2</sub> Storage X               | <input type="checkbox"/> Electric supplies      |
| <input type="checkbox"/> H <sub>2</sub> Delivery                | <input type="checkbox"/> Others                 |

## Research lines

- Biohydrogen production from different carbon sources by anaerobic fermentation.
- Biohydrogen production by cyanobacteria.
- Novel microorganisms for biohydrogen production.
- Characterization of hydrogenases.

## Some additional and related information

### Biohydrogen production from different carbon sources by anaerobic fermentation

- The main goal of this work is the development of a microbiological process allowing producing biohydrogen from industrial residues containing carbon sources, with its simultaneous valorization. The effect of physico-chemical parameters such as temperature, initial substrate and biomass concentrations on the biohydrogen production efficiency has been investigated.
- Oral presentation in Conferences.
- Publication of two Master degree Thesis in this area.
- Finantial Project: MICROALGAE AS A SUSTAINABLE RAW MATERIAL FOR BIOFUELS PRODUCTION (BODIESEL, BIOETHANOL, BIO-H<sub>2</sub> AND BIOGAS).

### Biohydrogen production by cyanobacteria

- Finantial Project: PTDC/ENR/68457/2006 – BIOHYDROGEN PRODUCTION FROM THE CYANOBACTERIA ANABAENA SP. AND ITS MUTANTS-
- Cyanobacteria are naturally able to produce molecular hydrogen, photosynthetically from water and light. However its productions are low. In this project four strains of the cyanobacterium Anabaena sp. PCC7120 have been studied in order to find the best hydrogen producer. The effect of several physiological factors is also being tested to find the best hydrogen production conditions. In this project a separation and purification systems is also being developed.
- Poster presentation in Conferences.
- Two Master degree in this area.

### Novel microorganisms for biohydrogen production

#### Characterization of hydrogenases

- Finantial Project: MICROALGAE AS A SUSTAINABLE RAW MATERIAL FOR BIOFUELS PRODUCTION (BODIESEL, BIOETHANOL, BIO-H<sub>2</sub> AND BIOGAS).
- This project aims to select the most efficient bacteria capable of producing biohydrogen from microalgae biomass. Hydrogenase genes from bacterial isolates of interest will be characterized aiming to improve the optimal hydrogen production by correlating gene expression results with culturing conditions.
- Poster presentation in Conferences.
- Publication of one Master degree Thesis in this area.

# TECHNOLOGY TRANSFER PROFILE

## Category

Technology offer

Technology Request

## Contact details

### R&D Group

Name of the company

### Contact

Bioenergy Unit

LNEG (National energy and geology lab.)

+351 210924600 ext. 4270

## Technology Profile

### Title

### Description

Biohydrogen is considered a clean and viable alternative fuel and “energy carrier” with a future.

One of the goals of the present technology is the development of microbiological processes allowing producing biohydrogen by different anaerobic organisms using carbohydrate-containing organic wastes and agricultural and industrial residues, as substrate.

Another interesting process is the photobiological production of H<sub>2</sub> from microalgae and cyanobacteria. This is an ideal process, given their simple nutritional requirements, consuming carbon dioxide, salts, light and water giving rise to hydrogen and oxygen.

### Innovative Aspects and Main Advantages

Biological H<sub>2</sub> production processes are becoming important mainly due to two reasons: on one hand renewable energy resources are used, on the other hand, the process usually takes place at room temperature and under atmospheric pressure unlike conventional hydrogen gas production methods which are energy intensive. In this area, fermentative hydrogen production has the advantages of high hydrogen production rate and simple operation. Moreover, it can use various organic wastes as substrate for fermentative hydrogen production, which is of great significance because it can not only treat organic wastes, but also produce very clean energy.

The biggest advantage in the production of hydrogen from microalgae and cyanobacteria is the consumption of atmospheric CO<sub>2</sub> and the possibility of using non-potable water to produce energy - H<sub>2</sub>.

### Intellectual Property Rights

### Other Aspects

## Partners Sought

### Type of Partner Sought

National/International researchers.  
Industrial partners (wastes/by-products valorization).

### Tasks to be Performed of the Partner Sought

H<sub>2</sub> purification.  
Hydrogenation process.

## TECHNOLOGY TRANSFER PROFILE

### Category

Technology offer

Technology Request

### Contact details

**R&D Group**

**Name of the company**

**Contact**

Bioenergy Unit

LNEG (National energy and geology lab.)

+351 210924600 ext. 4270

### Technology Profile

**Title**

**Description**

Biological H<sub>2</sub> production processes and photobiological production of H<sub>2</sub> from microalgae and cyanobacteria.

**Innovative Aspects and Main Advantages**

**Intellectual Property Rights**

**Other Aspects**

## Partners Sought

### Type of Partner Sought

National/International researchers.  
Industrial partners (wastes/by-products valorization).

### Tasks to be Performed of the Partner Sought

H<sub>2</sub> purification.  
Hydrogenation process.

### Department

### Web

<http://lsre.fe.up.pt/>

### Contact person - E-mail

Prof. Alírio E. Rodrigues  
[arodrig@fe.up.pt](mailto:arodrig@fe.up.pt)

### Telephone

+351 22 508 1671

### Category

H<sub>2</sub> Production

H<sub>2</sub> Purification

H<sub>2</sub> Storage

H<sub>2</sub> Delivery

Conversion & apps

Promotion & perception

Electric supplies

Others

### Research lines

Hydrogen purification by pressure swing adsorption (PSA);  
Syngas stoichiometric ratio balancing by PSA with CO<sub>2</sub> co-capture;  
Sorption-Enhanced Reaction Process (SERP);  
Steam reforming;  
Water-gas shift;  
Process modelling and simulation.

### Some additional and related information

LSRE has the following experimental units: PSA (for hydrogen purification), stainless steel stream tube reactor for SERP (hydrogen production and purification), for steam reforming (for hydrogen purification) and for water-gas shift (for hydrogen purification).

LSRE has knowledge in adsorption based processes for hydrogen purification (PSA or PSA + membranes) and in reaction based processes for hydrogen production and purification.

Additionally, our group has an extensive expertise in process modelling and simulation.



# TECHNOLOGY TRANSFER PROFILE

## Category

Technology offer

Technology Request

## Contact details

**R&D Group**

**Name of the company**

**Contact**

LSRE - Laboratory of Separation and Reaction Engineering

Faculty of Engineering of the university of Porto

Prof. Alírio E. Rodrigues (arodrig@fe.up.pt)

## Technology Profile

**Title**

Pressure swing adsorption unit for hydrogen purification

**Description**

Lab scale 4-bed pressure swing adsorption (PSA) unit for hydrogen purification. This unit can be used for testing adsorbents or operating conditions, and validation of simulation results.

**Innovative Aspects and Main Advantages**

**Intellectual Property Rights**

**Other Aspects**

## Partners Sought

**Type of Partner Sought**

**Tasks to be Performed of the Partner Sought**

# TECHNOLOGY TRANSFER PROFILE

## Category

Technology offer

Technology Request

## Contact details

### R&D Group

### Name of the company

### Contact

LSRE - Laboratory of Separation and Reaction Engineering  
Faculty of Engineering of the university of Porto  
Prof. Alírio E. Rodrigues (arodrig@fe.up.pt)

## Technology Profile

### Title

Stainless steel stream tube reactor for sorption-enhanced reaction process

### Description

Stainless steel stream tube reactor for sorption-enhanced reaction process (SERP) for hydrogen production and purification. This unit combines steam reforming with CO<sub>2</sub> sorption, which shifts the reaction equilibrium leading to better performances.

### Innovative Aspects and Main Advantages

### Intellectual Property Rights

### Other Aspects

## Partners Sought

### Type of Partner Sought

### Tasks to be Performed of the Partner Sought

# TECHNOLOGY TRANSFER PROFILE

## Category

Technology offer

Technology Request

## Contact details

**R&D Group**  
**Name of the company**  
**Contact**

LSRE - Laboratory of Separation and Reaction Engineering  
Faculty of Engineering of the university of Porto  
Prof. Alírio E. Rodrigues (arodrig@fe.up.pt)

## Technology Profile

### Title

Stainless steel stream tube reactor for steam reforming

### Description

Fully equipped stainless steel stream tube reactor for steam reforming of liquid (eg. ethanol, methanol, ...) or gaseous feedstocks (eg. methane, ...).

### Innovative Aspects and Main Advantages

### Intellectual Property Rights

### Other Aspects

## Partners Sought

### Type of Partner Sought

### Tasks to be Performed of the Partner Sought

# TECHNOLOGY TRANSFER PROFILE

## Category

Technology offer

Technology Request

## Contact details

**R&D Group**  
**Name of the company**  
**Contact**

LSRE - Laboratory of Separation and Reaction Engineering  
Faculty of Engineering of the university of Porto  
Prof. Alírio E. Rodrigues (arodrig@fe.up.pt)

## Technology Profile

### Title

Stainless steel stream tube reactor for water-gas shift

### Description

Fully equipped stainless steel stream tube reactor for water-gas shift.

### Innovative Aspects and Main Advantages

### Intellectual Property Rights

### Other Aspects

## Partners Sought

### Type of Partner Sought

### Tasks to be Performed of the Partner Sought



## Department

DIRECCION GRAL

## Web

www.maetel.com

## Contact person

José Luis Celorio

## Telephone

jcelorio@maetel.com

## Category

- H<sub>2</sub> Production
- H<sub>2</sub> Purification
- H<sub>2</sub> Storage X
- H<sub>2</sub> Delivery

- Conversion & apps
- Promotion & perception
- Electric supplies
- Others

## Research lines

Participating in engineering and execution of IHER Project.

## Some additional and related information

Participation in

- IHER (Walqa) "Infraestructura Tecnológica del Hidrógeno y las Energías Renovables"
- Zaragoza 2008 Hydrogen supply station
- Large experience in project execution on renewable energies (wind, solar PV and thermal, cogeneration and geothermal).

## TECHNOLOGY TRANSFER PROFILE

### Category

Technology offer

Technology Request

## Contact details

**R&D Group**  
**Name of the company**  
**Contact**

I+D  
Fundación Hidrógeno Aragón.  
Luis Correas.

## Technology Profile

**Title**  
**Description**

Focused in the mechanical design and manufacture of prototypes for use with hydrogen in several applications (hydrogen kart). Experience in the implantation of systems powered by hydrogen and fuel cell.

**Innovative Aspects and Main Advantages**

Design and construction of mechanical models with the experience of working with hydrogen technologies and their characteristics.

**Intellectual Property Rights**  
No.

**Other Aspects**

## Search for Partners

**Type of Search**

**Tasks to be Performed by the Partner**

# MATGAS 2000 AIE

## Department

Industrial R&D

## Web

[www.matgas.com](http://www.matgas.com)

## Contact person - E-mail

Oriol Osso  
[oriol.osso@matgas.com](mailto:oriol.osso@matgas.com)

## Telephone

+34 93 592 9971

## Category

- |   |   |
|---|---|
| <input checked="" type="checkbox"/> H <sub>2</sub> Production | <input type="checkbox"/> Conversion & apps  |
| <input type="checkbox"/> H <sub>2</sub> Purification          | <input type="checkbox"/> Promotion & perception                                       |
| <input checked="" type="checkbox"/> H <sub>2</sub> Storage    | <input type="checkbox"/> Electric supplies  |
| <input type="checkbox"/> H <sub>2</sub> Delivery              | <input checked="" type="checkbox"/> Others: CO <sub>2</sub> capture and reutilization |

## Research lines

Green hydrogen, fuel cells, sustainability and LCA techniques.

## Some additional and related information

MATGAS 2000 A.I.E. is a research centre, legally registered as a non-profit Economic Interest Group dedicated to meeting R+D demands in the field of materials and gases from a broad perspective.

MATGAS fosters synergies between the business sector, research centres and universities through extensive market knowledge and the research and teaching capacity of its three members, Carburros Metálicos, the Spanish National Research Council (CSIC) and the Universitat Autònoma de Barcelona.

At MATGAS, we bring together basic research projects, technological development and business management models. The vision of MATGAS is to become a world leading and recognized centre of excellence in the use of combined modeling-experimental approaches for the development of CO<sub>2</sub> capture and applications technology and other aspects related to energy and sustainability as green hydrogen generation and high temperature fuel cells.

Main projects:

- LoLiPEM: Long-life PEM-FCH & CHP systems at temperatures higher than 100°C. EU-FP7. [www.lolipem.eu](http://www.lolipem.eu)
- CENIT SOST-CO<sub>2</sub>: New industrial and sustainable uses of CO<sub>2</sub>. [www.sost-co2.com](http://www.sost-co2.com)
- CENIT BIOSOS: Sustainable biorefinery. [www.cenit-biosos.es](http://www.cenit-biosos.es)



# TECHNOLOGY TRANSFER PROFILE

## Category

Technology offer

Technology Request

## Contact details

**R&D Group**  
**Name of the company**  
**Contact**

## Technology Profile

**Title**

**Description**

**Innovative Aspects and Main Advantages**

**Intellectual Property Rights**

**Other Aspects**

## Partner Sought

**Type of Partner Sought**

**Tasks to be Performed by the Partner Sought**

# MONDRAGÓN COMPONENTS

## Department

## Web

[www.mondragoncomponentes.com](http://www.mondragoncomponentes.com)

## Contact person - E-mail

Javier Aranceta  
[jaranceta@mondragoncomponentes.com](mailto:jaranceta@mondragoncomponentes.com)

## Telephone

34943719438

## Category

- |  |   |
|--|---|
| <input type="checkbox"/> H <sub>2</sub> Production   | <input type="checkbox"/> Conversion & apps  |
| <input type="checkbox"/> H <sub>2</sub> Purification | <input type="checkbox"/> Promotion & perception                                     |
| <input type="checkbox"/> H <sub>2</sub> Storage      | <input type="checkbox"/> Electric supplies  |
| <input type="checkbox"/> H <sub>2</sub> Delivery     | <input checked="" type="checkbox"/> Others: Components and stack manufacturing Sofc |

## Research lines

Mondragón Components was created in 1991 with the aim of bringing together into one single group the experience and know-how of eight co-operative, now 24 production plants, companies firmly established in the sector of components. Companies combining their command of different technologies to provide an exceptional offer of technology and integral service.

## Some additional and related information

The project addresses the development of Metal Supported Cell using a porous metallic substrate. The considered porous metallic substrate will be manufactured using powder metallurgy (PM). The mechanical and thermal stability as well as the increase of lifetime will be particularly addressed in this project. Cell configurations considers: the anode side option, in which the first electrode deposited on the porous metal substrate is the anode.

The technical objective of the project is the development of a SOFC Cell with an improved lifetime thanks to the low operating temperature (600°C) while achieving good performances because of the use of advanced low temperature electrodes and electrolyte materials. The Metal Supported Cell concept (MSC) will in addition allow reducing statistically based failures, since this type of Cell is in deep more mechanically robust, and decreasing the cost by reducing the amount of expensive ceramic materials to minimum.

# TECHNOLOGY TRANSFER PROFILE

## Category

Technology offer

Technology Request

## Contact details

### R&D Group

Name of the company

Mondragón Components

Contact

## Technology Profile

### Title

### Description

IKERLAN has been developing MSC cells since 2001, when established a collaboration with LBNL for MSC technology transfer under a joint strategic initiative of Mondragon Corporation, Fagor Electrodomésticos (home appliance manufacturer) and COPRECI (components manufacturer).

Their main objective is to develop a competitive CHP generator (below 5 kWe range) for domestic applications. Tubular AMSC technology was chosen as the best option in terms of cost, robustness towards cycling, cheap fabrication and stack design simplicity. The current state of the art includes repetitive cell performances of 400 mW/cm<sup>2</sup> at operating voltage of 0.7 V and 800°C in tubes of 5-10 cm lengths and 1 cm diameter. The cell length target is 20 cm.

The processing route is based on cheap scaleable routes such as isostatic pressing/extrusion of the metal porous tubes, dip coating of the ceria based diffusion barrier layer, Ni-YSZ anode and wet automated spraying of the YSZ electrolyte.

The process to achieve gastight electrolyte layers includes cofiring at temperatures in the range of 1300-1350°C under reducing atmospheres. Cathode and current collecting layers and then dip coated and sintered in situ prior to operation.

Currently more than 350 thermal cycles at 10°C/min between 800 and 80°C have been achieved without significant loss. Long term testing has been performed during 1500 hours without significant intrinsic cell degradation at low fuel utilisations. Main causes of long term testing failure have been so far related to sealing, machining and current collection configurations. Main activities are related to long term testing of cells under higher fuel utilisation and chromium sources at the cathode side, upscaling the process to larger cells and stack interconnection and gas distribution design and development.

COPRECI has started checking technology viability in terms of cost and fabrication routes.

## **Innovative Aspects and Main Advantages**

Metal supported Cells manufacturing will include both the metal substrate development and the cell development. The materials selection within the present project will benefit from the extensive investigations on materials that have been carried out within the integrated project SOFC600, and Real SOFC to a less extent. The best performing cell materials coming out these projects will be optimised and customised to the MSC requirements in this project. In addition, a major part of the innovative activities within this project will be focussing on the manufacturing processes, that is to say how to produce the best performing/durable/cost effective cell by optimising the cell architecture in itself and its different components (thickness, microstructure, porosity, barrier layers...), and by increasing the overall quality of the cells produced and decreasing the amount of scrap.

For that purpose, classical and reliable processes will be used, but also more innovative processes will be considered, especially for the deposition of the electrolyte, which is a key issue of this project.

The main objective regarding the manufacturing process development of the porous metal substrate is to obtain a controlled and optimized microstructure for gas distribution to the electrode as well as for current collection, but also a stable microstructure at high temperature (up to 700°C) to allow long term operation without major degradation even in case of thermal and redox cycling.

The scientific objective is the understanding of the performance and the investigation of the degradation in order to allow a further optimization of such cells. In particular the robustness of the cell towards thermal and redox combined cycles will be investigated, as well as the resistance of its cathode to Chromium poisoning.

The expected impact of such developments will allow achieving an innovative Solid Oxide Fuel Cell capable of withstanding thermal and redox combined cycles.

## **Intellectual Property Rights**

### **Other Aspects**

## **Partner Sought**

### **Type of Partner Sought**

### **Tasks to be Performed by the Partner Sought**



# N-GHY S.A. (+ SUBSIDIARY: EUCLHYD S.A.)

## Department

## Web

www.n-ghy.com

## Contact person

Philippe MARTY – CEO of N-GHY S.A.  
President and CEO of EUCLHYD S.A.  
philippe.marty@n-ghy.com  
philippe.marty@euclhyd.com

## Telephone

+33 5 63 45 73 73

## Category

- H<sub>2</sub> Production
- H<sub>2</sub> Purification
- H<sub>2</sub> Storage
- H<sub>2</sub> Delivery

- Conversion & apps
- Promotion & perception
- Electric supplies
- Others

## Research lines

N-GHY S.A. is a private engineering company offering technical assistance to its industrial customers in H<sub>2</sub>-related technologies, notably H<sub>2</sub> production and FC systems. N-GHY S.A. has energy key-players among its customers and export activities represent 40% of its turnover.

In 2008, EUCLHYD S.A., a subsidiary of N-GHY S.A., was created for the distribution of qualified equipments producing and using H<sub>2</sub>, from definition to maintenance of equipments :

- On site H<sub>2</sub> generation systems (5 to 200 Nm<sup>3</sup>/h H<sub>2</sub> modules).
- H<sub>2</sub> storage equipments.
- H<sub>2</sub> distribution equipments in partnership with industrial gas suppliers.
- H<sub>2</sub> vehicles: small commercial vehicles, shuttles...

## Some additional and related information

-Demonstrative installations:

Domestic CHP Fuel Cell Systems:

- Non catalytic natural gas reformer + 1kWe SOFC (GECOPAC project).
- Non catalytic natural gas reformer + WGS + 400We HT PEMFC (THERMOCONV2 project).
- Diesel fuel oxidative steam-reformer + WGS + 4kWe HT PEMFC (GAPPAC project).

-H2 generators for fueling stations:

- 30 Nm<sup>3</sup> H<sub>2</sub>/h non catalytic diesel fuel/naphtha/ethanol/natural gas reformer + WGS + Separation membrane (GENHSTOK2 project).

-Studies:

- 200 Nm<sup>3</sup> H<sub>2</sub>/h ethanol steam-reformer + WGS + PSA (basic design, completed) (BIOHYGEN project).
- Pure H<sub>2</sub> production from landfill gas (basic design, on going).
- Ethanol pre-reforming (on going).

## TECHNOLOGY TRANSFER PROFILE

### Category

Technology offer

Technology Request

### Contact details

**R&D Group**

**Name of the company**

**Contact**

### Technology Profile

**Title**

#### Description

There is an emerging need for large centralized or small local H<sub>2</sub> production units with good energy efficiencies and little side productions of CO<sub>2</sub> and other pollutants. In addition, in many industrial sites, pure or nearly pure O<sub>2</sub> is produced without further valorization (e.g. in electrolytic H<sub>2</sub> production plants, in air distillation plants producing N<sub>2</sub>...). N-GHY S.A. is developing devices able to produce pure H<sub>2</sub> from heavy fuels with pure O<sub>2</sub> and water as oxidants. The N-GHY team has been developing for more than 10 years a unique process of H<sub>2</sub> generation from heavy fuels. This breakthrough process requires no reformer catalyst to achieve high performances. The so-called High Temperature Hybrid Steam-Reforming (HT HSR) technology is simple and fuel-flexible.

As a necessary step towards a pre-industrial scale H<sub>2</sub> production unit, the design, assembly, test and CE certification of a demonstration reforming reactor were completed. This unit (GENHSTOK) processes any kind of liquid or gaseous fuel with liquid water and pure O<sub>2</sub>. Coupled with desulphurization and WGS units and a separation membrane, it produces clean H<sub>2</sub>. Its maximum operating power is greater than 100 kWth (HHV H<sub>2</sub>) under 55 bar. Natural gas, naphtha and commercial Diesel Fuels with different sulfur contents (350 to 600 ppmw) were successfully tested during several hundreds of hours of operation.

## Innovative Aspects and Main Advantages

Feature	Resulting advantage
<ul style="list-style-type: none"> <li>▪ Use of pure O<sub>2</sub></li> <li>▪ Excellent thermal integration</li> </ul>	<ul style="list-style-type: none"> <li>• Significantly higher efficiency (&gt; 85% HHV) compared to the use of air</li> </ul>
<ul style="list-style-type: none"> <li>▪ Use of a H<sub>2</sub> permeable membrane</li> </ul>	<ul style="list-style-type: none"> <li>• Pure H<sub>2</sub> production</li> </ul>
<ul style="list-style-type: none"> <li>▪ Non-catalytic, high temperature process (1400°C)</li> </ul>	<ul style="list-style-type: none"> <li>• Complete conversion of the fuel</li> <li>• Suitable for any type of fossil or renewable fuel, even sulfured fuels</li> </ul>
<ul style="list-style-type: none"> <li>▪ High H<sub>2</sub> concentration (no dilution by N<sub>2</sub>)</li> <li>▪ High pressure operation (typically 60 bar)</li> <li>▪ Bio-fuel use</li> </ul>	<ul style="list-style-type: none"> <li>• Very efficient permeation membrane</li> <li>• Good compactness</li> <li>• Easy CO<sub>2</sub> condensation and liquid compact storage: no GHG generation (fossil fuel use) or CO<sub>2</sub> reserve (bio-fuel use)</li> </ul>
<ul style="list-style-type: none"> <li>▪ Possible coupling with water electrolysis</li> </ul>	<ul style="list-style-type: none"> <li>• Increased flexibility &amp; reliability of H<sub>2</sub> supply</li> <li>• Reduction of the cost of electrolytic H<sub>2</sub></li> <li>• O<sub>2</sub> valorization</li> <li>• Sharing of auxiliaries &amp; utilities</li> <li>• Increased H<sub>2</sub> production / kWh<sub>e</sub></li> </ul>

## Intellectual Property Rights

Patent FR 05/03381 (5 April 2005) « Enceinte de réaction et d'échanges thermiques pour la production d'hydrogène à partir d'hydrocarbures, eau et oxygène » D Grouset, S Lecoq, JC Hoguet (N-GHY), J Calvez, M Quemeneur, L Jodet (DCN).

Patent PCT FR 06/050292 (3 April 2006) « Enceinte de réaction et d'échanges thermiques pour la production d'hydrogène à partir d'hydrocarbures, eau et oxygène » D Grouset, S Lecoq, JC Hoguet (N-GHY), J Calvez, M Quemeneur, L Jodet (DCN), PCT extension of the previous patent.

Patent FR 05/50849 (31 March 2005) « Dispositif à chambre de réaction dans laquelle sont introduits des fluides réactifs préchauffés pour réaliser une réaction à température élevée » D Grouset, S Lecoq, JC Hoguet.

Patent PCT FR 06/050269 (28 March 2006) « Dispositif à chambre de réaction dans laquelle sont introduits des fluides réactifs préchauffés pour réaliser une réaction à température élevée » D Grouset, S Lecoq, JC Hoguet, PCT extension of the previous patent.

## Other Aspects

## Partners Sought

### Type of Partner Sought

Providers of:

- PSA modules for O<sub>2</sub> production from air.
- PSA modules for H<sub>2</sub> purification.
- Electrolysers for direct coupling with the GENHSTOK unit.

### Tasks to be Performed of the Partner Sought

Expertise for couplings.





# PRAGMA INDUSTRIES

## Department

## Web

[www.pragma-industries.com](http://www.pragma-industries.com)

## Contact person - E-mail

Pierre Forté  
[pierre.forte@pragma-industries.com](mailto:pierre.forte@pragma-industries.com)

## Telephone

+33 559 512 755

## Category

- |  |   |
|--|---|
| <input type="checkbox"/> H <sub>2</sub> Production         | <input type="checkbox"/> Conversion & apps            |
| <input type="checkbox"/> H <sub>2</sub> Purification       | <input type="checkbox"/> Promotion & perception       |
| <input checked="" type="checkbox"/> H <sub>2</sub> Storage | <input checked="" type="checkbox"/> Electric supplies |
| <input type="checkbox"/> H <sub>2</sub> Delivery           | <input type="checkbox"/> Others                       |

## Research lines

PEM fuel cells.  
Test equipment for fuel cells.  
Metal Hydrides H<sub>2</sub> storage.

## Some additional and related information

Based in Bidart, Southwestern France, Pragma Industries is an innovative supplier of the best of breed fuel cell test equipment. From single cell testing to stack integration, Pragma Industries will find the response to your technical requirements.

We are committed in delivering the best solutions to fuel cells engineers and scientists:

- Cell Compression Units (CCU) for advanced single cell testing.
- Proton Exchange Membrane Fuel Cells test stations from 100W to 5kW of electrical power.
- Single cells for research, training and education.
- Metal hydride tanks.
- PEMFC testing accessories.

# TECHNOLOGY TRANSFER PROFILE

## Category

Technology offer

Technology Request

## Contact details

**R&D Group**  
**Name of the company**  
**Contact**

Pragma Industries  
Pierre Forté

## Technology Profile

**Title**

**Description**

**Innovative Aspects and Main Advantages**

**Intellectual Property Rights**

Patents : Main break through innovation is achieved on the geometry and assembly process in order to drastically reduce production costs of a fuel cell. Named PragmaPac, our fuel cell technology is designed to be mass produced on a continuous automated process. The fuel cell assembly is not using bipolar plate nor gasket thus reducing even more production costs.

PragmaPac is suitable for applications having a power need in the range 100W-10kW.

Because of the low balance of plant required by our fuel cell, it suits particularly well portable applications.

**Other Aspects**

## Partner Sought

**Type of Partner Sought**

**Tasks to be Performed by the Partner Sought**

Pragma Industries is seeking for industrial partners for developing demonstration systems in the target range of power.

# PROYECTOS, SOLUCIONES E INNOVACIONES TÉCNICAS

## Department

Departamento Técnico

## Web

www.trybosingeneria.com

## Contact person

Silvia Serrano

## Telephone

976 558 006  
sserrano@trybosingeneria.com

## Category

- |  |   |
|--|---|
| <input type="checkbox"/> H <sub>2</sub> Production   | <input type="checkbox"/> Conversion & apps      |
| <input type="checkbox"/> H <sub>2</sub> Purification | <input type="checkbox"/> Promotion & perception |
| <input type="checkbox"/> H <sub>2</sub> Storage X    | <input type="checkbox"/> Electric supplies      |
| <input type="checkbox"/> H <sub>2</sub> Delivery     | <input checked="" type="checkbox"/> Others      |

## Research lines

Engineering projects, industry installations.

## Some additional and related information

Engineering project to hydrogen use in industrial facilities.

## TECHNOLOGY TRANSFER PROFILE

### Category

Technology offer

Technology Request

## Contact details

**R&D Group**  
**Name of the company**  
**Contact**

## Technology Profile

**Title**  
**Description**

**Innovative Aspects and Main Advantages**

**Intellectual Property Rights**

**Other Aspects**

## Search for Partners

**Type of Search**

**Tasks to be Performed by the Partner**

# SOLVENTUS, S.L.U.

## Department

Research Group: Environmental Technologies,  
TEP-181

## Web

[www.solventus.es](http://www.solventus.es)

## Contact person - E-mail

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[faroman@solventus.es](mailto:faroman@solventus.es)

## Telephone

+34 926552275

## Category

- |  |  |
|--|--|
| <input type="checkbox"/> H <sub>2</sub> Production   | <input type="checkbox"/> Conversion & apps   |
| <input type="checkbox"/> H <sub>2</sub> Purification | <input type="checkbox"/> Promotion & perception  |
| <input type="checkbox"/> H <sub>2</sub> Storage      | <input type="checkbox"/> Electric supplies   |
| <input type="checkbox"/> H <sub>2</sub> Delivery     | <input checked="" type="checkbox"/> Others: Electricity production through solar photovoltaic energy |

## Research lines

Renewable energies.

## Some additional and related information

### FULFILLED PROJECTS:

PV REBUSCO: Power: 700 kW  
PV CONDECILLO: Power: 1 MW  
PV ERUELA: Power: 7 MW  
PV ROMEROS: Power: 700 kW

### IN PORTFOLIO PROJECTS:

PV ARENALES: Power: 1 MW  
PV GARCES: Power: 5 MW  
PV VEGA NUEVA: Power: 40 MW

# TECHNOLOGY TRANSFER PROFILE

## Category

Technology offer

Technology Request

## Contact details

**R&D Group**  
**Name of the company**  
**Contact**

## Technology Profile

**Title**

**Description**

Renewable Energy to be used in the hydrogen generation sector.

**Innovative Aspects and Main Advantages**

High quality and performance installations in the production and supply of electricity with solar photovoltaic energy.

**Intellectual Property Rights**

**Other Aspects**

## Partner Sought

**Type of Partner Sought**

Co-workers for the hydrogen production in order to achieve the integration and use of the renewable energy with photovoltaic energy origin. And also, to reach a common aim: the integration of solar energy into the energetic sector, with its storage and utilization into industrial and tertiary sectors, as well as its shipping.

**Tasks to be Performed by the Partner Sought**

# SPANISH COUNCIL FOR SCIENTIFIC RESEARCH (CSIC)

## Department

Institute of Catalysis and Petrochemistry

## Web

[www.icp.csic.es](http://www.icp.csic.es)

## Contact person - E-mail

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[gonzalo.lobo@ctaer.com](mailto:gonzalo.lobo@ctaer.com)

## Telephone

34-91-585 4784

## Category

H<sub>2</sub> Production

H<sub>2</sub> Purification

H<sub>2</sub> Storage

H<sub>2</sub> Delivery

Conversion & apps

Promotion & perception

Electric supplies

Others

## Research lines

- Catalytic production, purification and H<sub>2</sub> storage
- Catalytic synthesis of clean fuels
- Fuel cells

## Some additional and related information

The main objective of the Institute is to carry out scientific research in the field of catalysis both in chemistry and biology, with special emphasis in the catalyst and the process. The subjects of research deal with refining, petrochemicals, fine chemicals, use and transformation of energetic products, environmental protection, sensors and synthesis of drugs, cosmetics and food products.

The Institute has Departments of Research and both Special Units and Technical Laboratories which, together with its own activity, do support the research done in the departments.

- Department of Structure and Reactivity
- Department of Applied Catalysis
- Department of Engineering of Catalytic Processes
- Department of Biocatalysis



# TECHNOLOGY TRANSFER PROFILE

## Category

Technology offer

Technology Request

## Contact details

### R&D Group

**Name of the company**

**Contact**

Institute of Analysis and Petroleum Chemistry  
SPANISH COUNCIL FOR SCIENTIFIC RESEARCH (CSIC)  
+34 91 585 49 54

## Technology Profile

### Title

Aerobic bacterial electrode for anode of a fuel cell without redox mediators nor a proton exchange membrane.

### Description

In this device *Acidiphilium* spp. cells isolated from the extreme acidic environment of the Tinto River are grown on a carbon electrode (either carbon felt or graphite bars). The cells are able to cede electrons obtained from an organic source directly to the electrode giving high electrocatalytic density currents without the need of adding redox mediators in solution. The device works equally well in presence or absence of O<sub>2</sub>. The *Acidiphilium* spp. electrode can be used as anode in a microbial fuel in which no proton exchange membrane is necessary between anode and cathode chambers.

### Innovative Aspects and Main Advantages

The main innovative aspect of the device is that the *Acidiphilium* spp. cells from the Tinto River adsorbed on a carbon surface are able to deliver directly electrons to the support even in the presence of oxygen. This is a notable improvement over the previously reported microbial electrodes, which can only deliver efficiently electrons directly to the electrode under anaerobic conditions, either because the microorganism is strictly anaerobic, or because O<sub>2</sub> is more quickly reduced by the microorganism than the electrode.

### Intellectual Property Rights

PATENT P200701534 applied for 2007-06-24

### Other Aspects

**COMPETITIVE ADVANTAGES** The design of a microbial fuel cell including our bacterial electrode would be simpler, as no redox mediators are needed, nor a proton exchange membrane for separating cathode from anode. The absence of the membrane reduces considerably the costs of a fuel cell and decreases its internal resistance.

## Partner Sought

### **Type of Partner Sought**

The Institute is looking for Industrial Partners to license agreement.

### **Tasks to be Performed of the Partner Sought**

# TECHNOLOGY TRANSFER PROFILE

## Category

Technology offer

Technology Request

## Contact details

### R&D Group

Name of the company

Contact

Institute of Catalysis and Petrochemistry  
SPANISH COUNCIL FOR SCIENTIFIC RESEARCH (CSIC)  
+34 91 585 49 54

## Technology Profile

### Title

Hydrogenase based electrode able to act as anode in hydrogen fuel cells

### Description

Nobel metals, like platinum, are scarce and expensive. In addition to their application as catalyst, novel metals are used as anodes for hydrogen activation in fuel-cells. Whenever hydrogen-based fuel-cells go into the market, there will be scarcity of these metals, producing an exponential increase of their prices. As an alternative, nature uses hydrogenases to oxidize H<sub>2</sub>. The use of hydrogenase supported on carbon as anode of fuel cells has been extensively investigated. However, until now this technology presented serious limitations since the enzymes was not able to transmit electrons to the carbon support for the production of electricity from H<sub>2</sub>.

### Innovative Aspects and Main Advantages

In this patent-protected hydrogenase electrodes, the enzyme is covalently bonded in a preferential orientation to facilitate direct electrical communication between the catalytic center and the carbon support. This is the first time that hydrogenase immobilization procedure on carbon electrodes gives active and stable electrodes for hydrogen oxidation.

### Intellectual Property Rights

PCT/ES06/070139

### Other Aspects

## Partner Sought

### Type of Partner Sought

The Institute is looking for Industrial Partners to license agreement.

### Tasks to be Performed of the Partner Sought

# TECHNOLOGY TRANSFER PROFILE

## Category

Technology offer

Technology Request

## Contact details

**R&D Group**  
**Name of the company**  
**Contact**

Institute of Analysis and Petroleum Chemistry  
SPANISH COUNCIL FOR SCIENTIFIC RESEARCH (CSIC)  
j.maira@orgc.csic.es

## Technology Profile

### Title

Fuel cell anode electrocatalyst with extremely high level of CO tolerance

### Description

The use of both hydrogen from the reforming process as fuel for Proton Exchange Membrane Fuel Cell (PEMFC) and methanol as fuel for Direct methanol Fuel Cells (DMFC) inevitably implies the presence of CO that deactivate fuel cell anode electrocatalyst. This deactivation causes irreversible losses of ideal potential reducing the efficiency of the system. This fact constitutes one of the main problems for the implementation of the fuel cell technology. The electrooxidation of CO adsorbed on electrocatalysts (stripping technique) provides information about the capability of the electrocatalyst for CO oxidation to CO<sub>2</sub>. A low onset potential of CO oxidation indicates a good CO-tolerance of the electrocatalyst.

Recently, a Spanish research centre has prepared and patented fuel cell anodic catalysts that show a surprisingly high level of CO tolerance. It is the first time that electrocatalysts show the onset potential for CO<sub>2</sub> from 0.1 V referenced to the normal hydrogen electrode (NHE). These results are highly encouraging, since the usual onset potential for CO<sub>2</sub> obtained, at the moment, is in between 0.2-0.4V. Therefore, the electrocatalysts obtained in the present invention make possible an increment of the fuel cell potential and therefore a higher efficiency of the fuel cell.

These catalysts are based on PtRuMo supported on carbon black. An additional advantage of using these ternary catalysts for fuel cell anodes compare with the conventional binary PtRu ones is their costs. The incorporation of Mo by partially replacing Pt and Mo in the electrocatalysts reduces the costs of the system and, therefore, the anode fuel cell costs. The research centre is looking for a partner for a further development of the technology which includes:

- the incorporation of the electrocatalysts in a monocoil, and
- the development of fuel cell prototype with these kinds of electrocatalysts.

### Innovative Aspects and Main Advantages

The main innovation of this invention (and the key issue) is the preparation method used to obtain these electrocatalysts. This synthesis procedure allows the preparation of electrocatalysts with:

- High level of CO tolerance avoiding the anode deactivation when hydrogen from the reforming process or methanol is used as fuel.
- Lower cost of the electrocatalysts a reduction in the costs of the fuel cell anode by partially replacing Pt with Mo. oxidation.

## Intellectual Property Rights

PATENT 200700685, Patent applied for 2007-03-15

## Other Aspects

**COMPETITIVE ADVANTAGES** The advantages of using these ternary catalysts PtRuMeOx/C compare with the conventional binary catalysts PtRu/C for fuel cell anodes are:

(1) a reduction of the amount of Pt and Ru in the electrocatalysts by partially replacing these precious metal with Mo, decreasing the costs of the electrocatalysts and, therefore, the anode fuel cell.

(2) a significant increase of the electrocatalysts CO tolerance, avoiding the anode deactivation when hydrogen from the reforming process or methanol is used as fuel.

## Partner Sought

### Type of Partner Sought

The Institute is looking for Industrial Partners to license agreement. Companies which produce fuel cell components. Companies from the energetic or automotive sectors with a project for the development of a fuel cell.

### Tasks to be Performed of the Partner Sought

The Institute is looking for Industrial Partners to license agreement. Companies which produce fuel cell components. Companies from the energetic or automotive sectors with a project for the development of a fuel cell.

# TECHNOLOGY TRANSFER PROFILE

## Category

Technology offer

Technology Request

## Contact details

### R&D Group

**Name of the company**

**Contact**

Institute of Analysis and Petroleum Chemistry  
SPANISH COUNCIL FOR SCIENTIFIC RESEARCH (CSIC)  
m.bielza@orgc.csic.es

## Technology Profile

### Title

Novel anodic electrocatalyst for direct methanol proton exchange membrane fuel cells (DMFC's)

### Description

One of the main drawbacks of the available anodic electrocatalysts for Direct Methanol Proton Exchange Membrane Fuel Cells (DMFC) is first of all the low activity compare with their counterparts employed in hydrogen fuel cells. On the other hand the progressive deactivation which produces a decreasing in their activity. The electrocatalysts with the best performance in that sense are based on platinum and ruthenium supported on carbon black, and is the only formulation of industrial electrocatalysts available up to now.

Although even with those electrocatalysts, the activity is low and the deactivation is remarkable. The Group of Structure and Activity of Catalysts (EAC) of the Institute of Catalysis and Petrochemistry started a new research line in 2001 for the developing of these type of electrocatalysts, based in the background knowledge of the group since 1994 in the closely related area of hydrogen production for fuel cells, and, mainly, in the broad experience in the area of preparation, characterization and optimization of supported metals catalysts.

One of the main objectives in this research line consisted in the preparation of electrocatalysts for methanol electrooxidation based.

### Innovative Aspects and Main Advantages

Given that the main drawback for the stability of the DMFC is the anodic electrocatalyst deactivation, it is mandatory to obtain a very stable catalyst that increases the durability of the fuel cells before their industrial commercialization. The developed technology allows the preparation of electrocatalysts in a simple way with an extra non-complicated step in the described experimental methods which consist in the treatment of the support with low cost oxidant agents in mild experimental conditions. The electrochemical tests of the electrocatalysts prepared according to this method have shown that their activity is comparable to the commercial catalysts, or slightly better. But, more importantly, the stability was kept unchanged whilst a commercial catalyst decayed ostensibly along the time. Using this electrocatalysts in a DMFC cell would increase its durability allowing then their marketing.

### **Intellectual Property Rights**

Patent applied: Application ES200402567, 26 October 2004, Spain.

### **Other Aspects**

**COMPETITIVE ADVANTAGES** This technology would allow a company to produce an anodic electrocatalyst for direct methanol proton exchange membrane fuel cells showing a better stability than the commercial electrocatalysts. Any company planning to develop fuel cell components would have the technology for the production of this component in a competitive way. This also applies to companies dedicated to the fabrication not only the parts but the complete fuel cell stack, since this technology will be an alternative to the available products in the market.

## **Partners Sought**

### **Type of Partner Sought**

The Institute is looking for Industrial Partners to license agreement.

### **Tasks to be Performed of the Partner Sought**

# TECHNOLOGY TRANSFER PROFILE

## Category

Technology offer

Technology Request

## Contact details

**R&D Group**  
**Name of the company**  
**Contact**

Science Materials Institute  
SPANISH COUNCIL FOR SCIENTIFIC RESEARCH (CSIC)  
m.bielza@orgc.csic.es

## Technology Profile

### Title

Proton-conducting membranes based on polymers of the polybenzimidazole type and hybrid nanocomposite materials based on them. Application to PEM Fuel Cells

### Description

New hybrid and polymeric materials based on polybenzimidazoles have been developed at the Materials Science Institute (CSIC) Spain for the fabrication of proton-conducting membranes to be used as electrolytes in PEM fuel cells and other electrochemical devices.

These new materials include the polymers themselves doped with mineral acids (H<sub>2</sub>SO<sub>4</sub> H<sub>3</sub>PO<sub>4</sub>) as well as hybrid materials formed by those polymers and proton-conducting inorganic solid acids. For the fabrication of these materials it can be used commercial PBI or novel polybenzimidazoles such as ABPBI (Poly(2,5-benzimidazole)), MPPBBI (poly(m-phenylenebenzobisimidazole)) or SMPPBBI (sulfonated derivative of the latter). As inorganic components, both molecular (polyoxometalates) or extended species (cesium hydrogensulphate family) can be used, in addition to the mentioned mineral acids.

The materials developed can easily be formed into membranes with good mechanical properties by dissolution and casting. Those membranes are characterized by an excellent thermal stability, since the organic polymers resist decomposition up to temperatures around 600°C. Acid doped membranes (e.g. H<sub>3</sub>PO<sub>4</sub>) present high conductivity values and have been successfully used as solid electrolytes in fuel cells (with MEAs formed by C(Pt) inks as electrodes) as well as in other energy-storage devices such as electrochemical supercapacitors.

### Innovative Aspects and Main Advantages



## **Intellectual Property Rights**

### **Other Aspects**

COMPETITIVE ADVANTAGES Fuel Cells based on these materials and membranes can reach higher working temperatures of up to 200°C. This allows for designs in which the fuel used doesn't need to be ultra high purity Hydrogen, since this moderately high temperature has been shown to reduce poisoning of the Pt catalyst by impurities such as carbon monoxide.

## **Partners Sought**

### **Type of Partner Sought**

he group is looking for companies of energy and new material sectors for license agreement and financial resources.

- Manufacturing agreement.
- License agreement.

### **Tasks to be Performed of the Partner Sought**

# TECHNOLOGY TRANSFER PROFILE

## Category

Technology offer

Technology Request

## Contact details

**R&D Group**  
**Name of the company**  
**Contact**

Inorganic Chemistry  
SPANISH COUNCIL FOR SCIENTIFIC RESEARCH (CSIC)  
m.bielza@orgc.csic.es

## Technology Profile

### Title

Protonic solid electrolyte for fuel cells

### Description

The developed material is an oxide-type compound containing the metals sodium, niobium and tungsten, that it is easily obtained. After sintering the appropriate amounts of carbonates and oxides at 775 °C, the product  $\text{NaNbWO}_6$ , is treated at 80 °C in a refluxing system with a common mineral acid, such as nitric acid. After separation of liquid from solid phase the powdered exchanged compound is obtained. In this, sodium has been partially removed and protons have entered to replace sodium. The exchanged compound is an ionic conductor at temperatures close to 90 °C when it is immersed in a water vapour saturated atmosphere. Protons are the mobile ions giving conductivities values between 0.01 and 0.001 ohm/cm depending upon the particular composition. These high values of ionic conductivity indicate that the compound can be named as a solid electrolyte, and then it may be useful as the protonic solid electrolyte of electrochemical devices that convert chemical energy to electrical energy and for some other devices where the named property is needed, as it is the case of fuel cells.

The product is obtained as a powder so that, if it is going to be used as a protonic membrane of a fuel cell, a plastic binder, in an appropriate ratio, should be used to get a composite membrane.

Since during fuel cell operation, below 100° C, water is formed, the environment where the new material should to operate is quite similar to that one where the material was obtained, and therefore instability problems are not expected.

### Innovative Aspects and Main Advantages

A new material with high protonic conductivity that is obtained through a simple synthesis procedure in as much as an oxide type compound is treated under an aqueous acidic environment at 80 °C. The product is stable in aqueous environments as it is the environment that is produced during operation of a protonic membrane fuel cell.

### **Intellectual Property Rights**

Patent application 16/11/2001 in Spain, with number 200102544.

### **Other Aspects**

**COMPETITIVE ADVANTAGES** The synthesis of the exchanged compound starting from the sodium, niobium and tungsten oxide bronze is both very simple and cheap since the temperature used for preparing the oxide is not very high for ceramic industry purposes (775 °C), while sodium replacement is reached at 80 °C, this is below the boiling point of water. Therefore the required equipment for these purposes is very common in the ceramic and chemical industry.

Other similar protonic compound can also be obtained by exchange reactions but using ammonium nitrate, a more expensive reactant. The described procedure would reduce the cost of exchanger reactant to a 50 % approximately.

The new protonic conductor is very stable under an aqueous environment below 100 °C similar to that of the low temperature operating fuel cells.

## **Partners Sought**

### **Type of Partner Sought**

License agreement.

### **Tasks to be Performed of the Partner Sought**

Industrial sector: Energy production.

Industrial application: Fuel cells.

# TECHNOLOGY TRANSFER PROFILE

## Category

Technology offer

Technology Request

## Contact details

### R&D Group

Name of the company

Contact

Institute of Analysis and Petroleum Chemistry. Biocatalyst  
SPANISH COUNCIL FOR SCIENTIFIC RESEARCH (CSIC)  
j.maira@orgc.csic.es

## Technology Profile

### Title

Hydrogenase based electrode able to act as anode in hydrogen fuel cells

### Description

Nobel metals, like platinum, are scarce and expensive. In addition to their application as catalyst, novel metals are used as anodes for hydrogen activation in fuel-cells. Whenever hydrogen-based fuelcells go into the market, there will be scarcity of these metals, producing an exponential increase of their prices. As an alternative, nature uses hydrogenases to oxidize H<sub>2</sub>. The use of hydrogenase supported on carbon as anode of fuel cells has been extensively investigated. However, until now this technology presented serious limitations since the enzymes was not able to transmit electrons to the carbon support for the production of electricity from H<sub>2</sub>.

A Spanish research center has designed and patented a biocatalyst electrode that can be used as anode for hydrogen fuel cell, overcoming the limitations that existed with this technology. The electrode is constituted by hydrogenase enzyme on carbon support. But in this case hydrogenases molecules are covalently bonded in a preferential orientation as to facilitate direct electrical connection of the enzyme to the carbon surface.

### Innovative Aspects and Main Advantages

In this patent-protected hydrogenase electrodes, the enzyme is covalently bonded in a preferential orientation to facilitate direct electrical communication between the catalytic center and the carbon support. This is the first time that hydrogenase immobilization procedure on carbon electrodes gives active and stable electrodes for hydrogen oxidation.

### Intellectual Property Rights

Patent applied.

### Other Aspects

## Partners Sought

### Type of Partner Sought

- Technical cooperation.
- Manufacturing agreement.

### Tasks to be Performed of the Partner Sought

Type of partner sought.

Industry or academic or research group with pilot- plant facilities for growing microorganisms and protein purification.

Specific area of activity of the partner:

Biotechnology/microbiology/fermentation.

Tasks to be performed:

Growth of sulfate reducers bacteria and eventually protein purification and genetic engineering.

# SPANISH HYDROGEN & FUEL CELL TECHNOLOGY PLATFORM

## Department

## Web

[www.ptehpc.org](http://www.ptehpc.org)

## Contact person - E-mail

Javier Brey Sánchez  
[jbrey@hynergreen.abengoa.com](mailto:jbrey@hynergreen.abengoa.com)

## Telephone

95 493 71 11

## Category

- |  |   |
|--|---|
| <input type="checkbox"/> H <sub>2</sub> Production   | <input type="checkbox"/> Conversion & apps                      |
| <input type="checkbox"/> H <sub>2</sub> Purification | <input type="checkbox"/> Promotion & perception                 |
| <input type="checkbox"/> H <sub>2</sub> Storage      | <input type="checkbox"/> Electric supplies                      |
| <input type="checkbox"/> H <sub>2</sub> Delivery     | <input checked="" type="checkbox"/> Others: Technology Platform |

## Research lines

## Some additional and related information

The Spanish Hydrogen & Fuel Cell Technology Platform (PTE HPC) is an initiative developed by the Spanish Hydrogen Association, supported by the Science and Innovation Ministry and active since May 2005.

More than 120 Spanish entities, with activities related to hydrogen and fuel cell technologies, participate in this platform. These entities contribute with their experience, knowledge and opinions in the elaboration of documents, making possible the establishment of the scientific, industrial and technologic guidelines which should be adopted to promote the incorporation of these technologies, giving energetic solutions and stimulating a new industrial and technological services sector.

The main aim of the PTE HPC is to make easier and accelerate the development and use of energy systems based in hydrogen and fuel cells in their different aspects. This development is thought to be applied to the transport, stationary and portable sectors. It also considers all the Reset & Development & Technological Innovation (R&D&TI) chain.

The most important functions and targets assigned to the Platform are the following:

- The proposal of the national technological strategy to the European Platform.
- Advise to administrations and national representatives.
- Communication with the neighboring sector in order to promote joint strategies.
- To act as consultant about the legislative and regulative aspects.
- Investigation on specific technological strategy troubles.
- Preparation of a short/medium/long term planning for R&D&TI.
- Empowerment of strategic R&D&T projects.
- Establishment of alliances to strengthen technological development.
- Promotion of business activity.
- Investigation of a possible economic impact.
- Interested national sector' internal/external acts coordination improvement.

## TECHNOLOGY TRANSFER PROFILE

### Category

Technology offer

Technology Request

### Contact details

**R&D Group**  
**Name of the company**  
**Contact**

### Technology Profile

**Title**

**Description**

**Innovative Aspects and Main Advantages**

**Intellectual Property Rights**

**Other Aspects**

### Partner Sought

**Type of Partner Sought**

**Tasks to be Performed by the Partner Sought**

# SPANISH HYDROGEN ASSOCIATION

## Department

## Web

[www.aeh2.org](http://www.aeh2.org)

## Contact person - E-mail

Antonio González García-Conde  
[glezgca@inta.es](mailto:glezgca@inta.es)

## Telephone

91 520 14 78

## Category

- |  |   |
|--|---|
| <input type="checkbox"/> H <sub>2</sub> Production   | <input type="checkbox"/> Conversion & apps              |
| <input type="checkbox"/> H <sub>2</sub> Purification | <input type="checkbox"/> Promotion & perception         |
| <input type="checkbox"/> H <sub>2</sub> Storage      | <input type="checkbox"/> Electric supplies              |
| <input type="checkbox"/> H <sub>2</sub> Delivery     | <input checked="" type="checkbox"/> Others: Association |

## Research lines

### Some additional and related information

The Spanish hydrogen association (AeH2) is a non-profit organization that has as main aim the promotion of hydrogen technology development as an energy vector, and its use in industrial and commercial applications.

The AeH2 is formed by a group of companies, public and private institutions and researchers that share their interest in achieving the main purpose of the association. Its members are the most active Spanish companies, institutions and researchers in hydrogen technology, as well as those who have an interest in opening markets or in the social and environmental benefits of introducing hydrogen and fuel cells in the energy system.

The technological fields covered by the AeH2 are, among others not defined:

- Centralized and distributed hydrogen production from fossil fuels.
- Hydrogen production from other energy sources (renewable and nuclear energies).
- Hydrogen storage, transport and distribution.
- Use of hydrogen in combustion processes.
- Use of hydrogen in electricity production.
- Use of hydrogen in fuel cells.
- Use of fuel cells in centralized and distributed electricity generation.
- Use of fuel cells in applications of transport, mobile and auxiliary power systems.
- Use of hydrogen in industrial processes and facilities.
- Codes, standards and safety.



# TECHNOLOGY TRANSFER PROFILE

## Category

Technology offer

Technology Request

## Contact details

R&D Group  
Name of the company  
Contact

## Technology Profile

Title

Description

Innovative Aspects and Main Advantages

Intellectual Property Rights

Other Aspects

## Partner Sought

Type of Partner Sought

Tasks to be Performed by the Partner Sought

# SRE- SOLUÇÕES RACIONAIS DE ENERGIA

## Department

## Web

www.h2-sre.com

## Contact person - E- mail

Campos Rodrigues  
c.rodrigues@h2-sre.com

## Telephone

(+351) 261910180

## Category

- |  |   |
|--|---|
| <input type="checkbox"/> H <sub>2</sub> Production   | <input type="checkbox"/> Conversion & apps      |
| <input type="checkbox"/> H <sub>2</sub> Purification | <input type="checkbox"/> Promotion & perception |
| <input type="checkbox"/> H <sub>2</sub> Storage      | <input type="checkbox"/> Electric supplies      |
| <input type="checkbox"/> H <sub>2</sub> Delivery     | <input checked="" type="checkbox"/> Others      |

## Research lines

PEM Fuel Cells.

## Some additional and related information

Stacks of 25W nominal power.

Pilot Projects and projects related to the demonstration of communication back-ups, remote power, signalling of roadwork, battery chargers and motor applications.

Ongoing project with the Portuguese Ministry of defence to develop a portable power supply for a soldier of the future with 72h stand-by time and 30W of nominal power.

# TECHNOLOGY TRANSFER PROFILE

## Category

Technology offer

Technology Request

## Contact details

### R&D Group

Name of the company

### Contact

SRE

Campos Rodrigues (c.rodrigues@h2-sre.com)

## Technology Profile

### Title

PEM Cells

### Description

Development of applications, early markets, of small stationary power (up to 200w), portable or remote, using SRE cells that have high density of gravimetric and volumetric power. Chemical Hydride reactors that produce hydrogen on demand.

### Innovative Aspects and Main Advantages

High density cells with low internal consumption, powered by air that ensures heat management and the extraction of the water that is produced. Units powered in dead end by hydrogen. These concepts allow the internal consumption of the stacks to be less than 10% of the primary energy produced.

### Intellectual Property Rights

### Other Aspects

## Partners Sought

### Type of Partner Sought

Integrators for specific applications.

### Tasks to be Performed of the Partner Sought

Knowledge of the functioning of the cell and the hydrogen source, skills development in BoP.

# TEAM ELIAS, S.L. - TECH4

## Department

## Web

www.tech4.es / www.teamelias.com

## Contact person

Alejandro Latapia

## Telephone

976 107 502 / 615 670 909  
info@teamelias.com

## Category

- |  |   |
|--|---|
| <input type="checkbox"/> H <sub>2</sub> Production   | <input type="checkbox"/> Conversion & apps      |
| <input type="checkbox"/> H <sub>2</sub> Purification | <input type="checkbox"/> Promotion & perception |
| <input type="checkbox"/> H <sub>2</sub> Storage X    | <input type="checkbox"/> Electric supplies      |
| <input type="checkbox"/> H <sub>2</sub> Delivery     | <input checked="" type="checkbox"/> Others      |

## Research lines

Mechanical development for use with hydrogen.

## Some additional and related information

Hydrogen Kart development (Formula Zero Project)

## TECHNOLOGY TRANSFER PROFILE

### Category

Technology offer

Technology Request

## Contact details

**R&D Group**  
**Name of the company**  
**Contact**

## Technology Profile

**Title**

**Description**

Hydrogen production from renewable or alternative energies.

**Innovative Aspects and Main Advantages**

**Intellectual Property Rights**

**Other Aspects**

## Search for Partners

**Type of Search**

**Tasks to be Performed by the Partner**

## Department

ENERGY UNIT

## Web

[www.tecnalia.es](http://www.tecnalia.es)

## Contact person - E-mail

Iñaki Azkarate, Mikel Belsue, Alberto Garcia  
[inaki.azkarate@tecnalia.com](mailto:inaki.azkarate@tecnalia.com)

## Telephone

+34 943 003700

## Category

H<sub>2</sub> Production

H<sub>2</sub> Purification

H<sub>2</sub> Storage

H<sub>2</sub> Delivery

Conversion & apps

Promotion & perception

Electric supplies

Others

## Research lines

Materials and processes for the Hydrogen chain.

## Some additional and related information

Tecnalia is a Research centre working in the study, development and improvement of materials and processes related to the hydrogen production, purification, storage and use in fuel cells.

# TECHNOLOGY TRANSFER PROFILE

## Category

Technology offer

Technology Request

## Contact details

R&D Group  
Name of the company  
Contact

## Technology Profile

Title

Description

Innovative Aspects and Main Advantages

Intellectual Property Rights

Other Aspects

## Partner Sought

Type of Partner Sought

Tasks to be Performed by the Partner Sought

# TRANSPORTES URBANOS DE ZARAGOZA, S.A.U.

## Department

## Web

www.tuzsa.es

## Contact person

Rafael Fernández de Alarcón

## Telephone

976 41 39 00  
dirección@tuzsa.es

## Category

- |  |   |
|--|---|
| <input type="checkbox"/> H <sub>2</sub> Production   | <input type="checkbox"/> Conversion & apps      |
| <input type="checkbox"/> H <sub>2</sub> Purification | <input type="checkbox"/> Promotion & perception |
| <input type="checkbox"/> H <sub>2</sub> Storage X    | <input type="checkbox"/> Electric supplies      |
| <input type="checkbox"/> H <sub>2</sub> Delivery     | <input checked="" type="checkbox"/> Others      |

## Research lines

Mechanical development for use with hydrogen.

## Some additional and related information

Hydrogen Kart development (Formula Zero Project)

## TECHNOLOGY TRANSFER PROFILE

### Category

Technology offer

Technology Request



## Contact details

**R&D Group****Name of the company****Contact**

Transportes Urbanos de Zaragoza, S.A.U.  
Rafael Fernández de Alarcón

## Technology Profile

**Title**

Autobuses propulsados con hidrógeno.

**Description**

Buses propelled with hydrogen with more range in service, reduction of costs in acquisition and improvement of the safety in storage.

**Innovative Aspects and Main Advantages****Intellectual Property Rights****Other Aspects**

## Search for Partners

**Type of Search**

Companies willing test prototypes of hydrogen buses within research projects.

**Tasks to be Performed by the Partner**

## Department

## Web

www.uam.es

## Contact person - E-mail

Nuria Fernández  
nfernandez.fguam@uam.es

## Telephone

+34 91 497 34 73

## Category

H<sub>2</sub> Production

H<sub>2</sub> Purification

H<sub>2</sub> Storage

H<sub>2</sub> Delivery

Conversion & apps

Promotion & perception

Electric supplies

Others: I+D

## Research lines

- Materials of interest in renewable energy research group: Preparation of materials useful for energetic applications to their characterization and optimization in experimental devices:

- metallic hydrides as hydrogen storage materials.

- metallic dichalcogenides thin films for hydrogen production and photovoltaic and thermoelectric applications.

- Organic-inorganic porous solids and luminescent probes research group: Molecular desing of porous and insoluble solids with aplications on gas physisorption.

- Electrocatalysis and fuel cells.

## Some additional and related information

The group of materials of interest in renewable energy has wide experience in the preparation of materials like metal alloys (mechanical alloying, arc melting, thermal evaporation...) and thin films of metallic dichalcogenides (flas and thermal evaporation, sulfuration, screen printing...), as well as, in characterisation techniques (structural, compositional and morphological). The group is involved in the study of storage and kinetic properties of low weight materials based on magnesium. With respect to the metallic dichalcogenides, the research is focused in transition metal sulfides.

Projects:

- Hydrogen storage on magnesium nanoparticles.
- Complex metallic alloys.
- Solar-hydrogen system: Materials for hydrogen fotogeneration an its storage on metallic hydrides.
- Development and innovation on fuel cells of polymeric membrane and solid oxide.

Web page:

<http://www.uam.es/gruposinv/fmatmire/>

Organic-inorganic porous solids and luminiscent probes research group:

Molecular desing of porous and insoluble solids based in the piling of inorganic lamellae of phosphorous salts of transition metals to which organic phosphorous derivatives are covalently attached. These solids find applications in the field of gas physisorpiton (hydrogen technology)

Projects:

- Organic-inorganic hybrid materials for hydrogen storage, energy fotogeneration and other applications.

Web page:

<http://www.uam.es/departamentos/ciencias/qorg/investigacion/lumin/default.html>

Electrocatalysis and fuel cells.

The main objective of this research area is the development of new Pt based electrocatalyzers to be used in fuel cells with polymeric membrane (PEM), H<sub>2</sub>/air and methanol/air. The alloys being developed are Pt/Au, Pt/Co, Pt/Fe, these are synthesized and characterized; their electrochemical semi-cell behavior is studied, and finally the catalyzers are evaluated in mono-cell configuration.

Project:

- Hydrogen as clean energetic vector: new concepts of production and use.

## Department

Física de materiales

## Web

[www.uam.es/mire](http://www.uam.es/mire)

## Contact person - E-mail

Carlos Sánchez López  
[carlos.sanchez@uam.es](mailto:carlos.sanchez@uam.es)

## Telephone

34914974766

## Category

H<sub>2</sub> Production

H<sub>2</sub> Purification

H<sub>2</sub> Storage

H<sub>2</sub> Delivery

Conversion & apps

Promotion & perception

Electric supplies

Others

## Research lines

Metal-hydrides and complex-hydrides.  
H<sub>2</sub>-Photogeneration.  
Thermoelectrics generation and cooling.

## Some additional and related information

Research of novel materials for Solar-hydrogen energetic system.

Ability to synthesize metal alloys and intermetallic compounds (bulk and thin films micro and nanostructured) by different methods. Formation of hydride compounds.

Preparation of semiconductor thin films for thermoelectric applications.

Capability to obtain proper characterization of the materials (structural, kinetics, thermodynamic and transport properties).

Ability to built up small scale prototypes. H-store tanks and thermoelectric generators.

# TECHNOLOGY TRANSFER PROFILE

## Category

Technology offer

Technology Request

## Contact details

### R&D Group

Name of the company

### Contact

Mire group (Spain)

UAM

carlos.sanchez@uam.es

## Technology Profile

### Title

H-storage tanks contained solid state hydrides

### Description

Our group is able to prepare compounds to store hydrogen by different methods according to the materials and requirements demanded: melting by arc-oven, mechanical alloying..ect. Those compounds are hydrogenated at different pressures and temperatures to form their respective hydrides.

Obtained hydrides are characterized from a structural, kinetic and thermodynamic point of view. Those results provide the essential information of the hydrides: desorption temperature, hydrogen reversible capacity, etc . The life of the hydride is determined by a cyclability check. The amount of hydride inside of the tank will determine the final H-capacity of the system.

### Innovative Aspects and Main Advantages

Solid-systems provides greater H-capacity than other H-store systems (gas storage). The alloy composition which determines the absorption/desorption kinetics and cyclability of the storage system.

### Intellectual Property Rights

All the rights belong to Universidad Autónoma de Madrid.

### Other Aspects

## Partner Sought

### Type of Partner Sought

Industrial company.

### Tasks to be Performed by the Partner Sought

Industrial production of the alloy (according to the composition determined by Mire group) and the related storage tank.

## Department

Química Orgánica

## Web

[www.uam.es/lumila](http://www.uam.es/lumila)

## Contact person - E-mail

Ernesto Brunet  
[ernesto.brunet@uam.es](mailto:ernesto.brunet@uam.es)

## Telephone

0034914973926

## Category

- |  |   |
|--|---|
| <input type="checkbox"/> H <sub>2</sub> Production         | <input type="checkbox"/> Conversion & apps      |
| <input type="checkbox"/> H <sub>2</sub> Purification       | <input type="checkbox"/> Promotion & perception |
| <input checked="" type="checkbox"/> H <sub>2</sub> Storage | <input type="checkbox"/> Electric supplies      |
| <input type="checkbox"/> H <sub>2</sub> Delivery           | <input type="checkbox"/> Others                 |

## Research lines

Physisorption of Hydrogen in porous organic-inorganic matrices.

## Some additional and related information

See for example: E. Brunet et al.:

Micropor. Mesopor. Mater. 2010, doi:10.1016/j.micromeso.2010.09.027.

Chemical Engineering Journal 2010, 158, 333.

J. Mater. Sci., 2008, 43, 1155.

# TECHNOLOGY TRANSFER PROFILE

## Category

Technology offer

Technology Request

## Contact details

**R&D Group**  
**Name of the company**  
**Contact**

Ernesto Brunet et. al.  
Universidad Autonoma Madrid  
ernesto.brunet@uam.es

## Technology Profile

### Title

Physisorption of molecular hydrogen in porous organic-inorganic matrices

### Description

The reaction of laminar Zirconium Phosphate and other related salts with phosphonates and related organic derivatives leads to laminar-pillared materials with a large degree of porosity, capable of storing molecular hydrogen at low pressures and temperatures complying DOE goals for 2010 and more.

### Innovative Aspects and Main Advantages

The main advantages of storing hydrogen by physisorption are its reversibility and its extremely low cost in energy. The building of the porous matrices based in laminar inorganic salts and organic components is very versatile and can easily be scaled up for practical purposes.

### Intellectual Property Rights

Patents under submission.

### Other Aspects

## Partner Sought

### Type of Partner Sought

Investor.

### Tasks to be Performed by the Partner Sought

Financial support and profit sharing.

## Department

Carbon Materials and Environment

## Web

<http://web.ua.es/mcma>

## Contact person - E-mail

Prof. Diego Cazorla-Amoros  
[cazorla@ua.es](mailto:cazorla@ua.es)

## Telephone

+34965903946

## Category

- |   |   |
|---|---|
| <input type="checkbox"/> H <sub>2</sub> Production              | <input type="checkbox"/> Conversion & apps      |
| <input checked="" type="checkbox"/> H <sub>2</sub> Purification | <input type="checkbox"/> Promotion & perception |
| <input checked="" type="checkbox"/> H <sub>2</sub> Storage      | <input type="checkbox"/> Electric supplies      |
| <input type="checkbox"/> H <sub>2</sub> Delivery                | <input checked="" type="checkbox"/> Others      |

## Research lines

Materials for supercapacitors.  
Electrocatalysis.

## Some additional and related information



# TECHNOLOGY TRANSFER PROFILE

## Category

Technology offer

Technology Request

## Contact details

**R&D Group**

**Name of the company**

**Contact**

Carbon Materials and Environmente

Universidad de Alicante

Diego Cazorla-Amoros

## Technology Profile

### Title

Materials for hydrogen storage and supercapacitors

### Description

The Carbon Materials and Environment group of the University of Alicante has developed technology and processes to prepare superporous carbons with a homogeneous micropore size distribution and apparent surface areas above 3000 m<sup>2</sup>/g. Interestingly, the method developed permits the preparation of porous carbons with a very homogeneous micropore size distribution (almost exclusively microporosity of size between 0.7-0.9 nm) and BET surface areas above to 3000 m<sup>2</sup>/g which are of great interest for hydrogen storage and supercapacitors.

On the other hand, the research group has available the techniques for the measurement of the electrochemical performance of the materials as well as hydrogen uptake in the porous samples up to 200 atm.

### Innovative Aspects and Main Advantages

Know-how available for the synthesis of porous carbon materials suited for the applications mentioned above.

### Intellectual Property Rights

### Other Aspects

## Partner Sought

### Type of Partner Sought

### Tasks to be Performed by the Partner Sought

## Department

Ingeniería Eléctrica

## Web

## Contact person

Luis Alfredo Fernández Jiménez

## Telephone

941299473  
luisalfredo.fernandez@unirioja.es

## Category

- |  |  |
|--|--|
| <input type="checkbox"/> H <sub>2</sub> Production   | <input type="checkbox"/> Conversion & apps                 |
| <input type="checkbox"/> H <sub>2</sub> Purification | <input checked="" type="checkbox"/> Promotion & perception |
| <input type="checkbox"/> H <sub>2</sub> Storage X    | <input type="checkbox"/> Electric supplies                 |
| <input type="checkbox"/> H <sub>2</sub> Delivery     | <input type="checkbox"/> Others                            |

## Research lines

Evaluation and forecasts of renewable sources.  
Planning, operation and control of electric energy systems.

## Some additional and related information

Proyectos de investigación nacionales en curso o recientemente finalizados en el campo de evaluación y previsión a corto plazo de la generación eléctrica de origen renovable, incluyendo la planificación, gestión de la demanda y almacenamiento energético.

Active research projects on evaluation and short-term forecast of electric power production in renewable facilities, including planning, demand side management and energy storage.

## TECHNOLOGY TRANSFER PROFILE

### Category

- Technology offer  Technology Request

## Contact details

**R&D Group**  
**Name of the company**  
**Contact**

## Technology Profile

**Title**

**Description**

**Innovative Aspects and Main Advantages**

**Intellectual Property Rights**

**Other Aspects**

## Search for Partners

**Type of Search**

**Tasks to be Performed by the Partner**

## Department

Ing. Mecánica (Lab. de Motores)

## Web

## Contact person

Mariano Muñoz Rodríguez

## Telephone

976 762037  
mmunoz@unizar.es

## Category

- |  |   |
|--|---|
| <input type="checkbox"/> H <sub>2</sub> Production   | <input type="checkbox"/> Conversion & apps      |
| <input type="checkbox"/> H <sub>2</sub> Purification | <input type="checkbox"/> Promotion & perception |
| <input type="checkbox"/> H <sub>2</sub> Storage X    | <input type="checkbox"/> Electric supplies      |
| <input type="checkbox"/> H <sub>2</sub> Delivery     | <input type="checkbox"/> Others                 |

## Research lines

- Application of biofuels in diesel engines.
- Use of tail gases in Otto engines.
  - Use of hydrogen in IC engines
  - Diagnostic technics of engines and maintenance.
  - Design and development of Stirling engines.

## Some additional and related information

- **Project:** Use of hydrogen-methane mixtures in engines of internal combustion. Ministerio de Ciencia e Innovación. Ref. ENE 2008-06516-C03-02
- **Experimental installations:** Test bench for engines full equiped (measurement of characteristic curves, cylinder pressure, contaminant emissions, new fuels, durability and fatigue essays, etc.)

## TECHNOLOGY TRANSFER PROFILE

### Category

Technology offer

Technology Request

## Contact details

**R&D Group**  
**Name of the company**  
**Contact**

Ingeniería Mecánica (Laboratorio de Motores)  
Universidad de Zaragoza  
Mariano Muñoz (mmunoz@unizar.es)

## Technology Profile

### Title

Use of hydrogen-methane mixtures in engines of internal combustion.

### Description

Catalytic production of hydrogen-methane mixtures from natural gas is a effective method to obtain fuels with low CO<sub>2</sub> emissions. Moreover, the fuel obtained is able to be used in internal combustion engines keeping reasonable features and without important modifications in the engine. We develop an intense activity in this field and all related with new fuels.

### Innovative Aspects and Main Advantages

Use of new fuels in engines with low CO<sub>2</sub> emissions and pollutant gases. Possibility of obtain and use new fuels of different energy sources.

### Intellectual Property Rights

### Other Aspects

## Search for Partners

### Type of Search

To find work groups involved in as the obtention and purification of gaseous fuels that contains hydrogen from biomass (wood, water treatment muds, dump gases, etc.) as liquid biofuels (bio-oil, biodiesel, bioethanol, etc.), and in the same way are interested in finding application to these fuels for their use in engines (alternative engines of internal combustion, Wankel gas turbines, etc.)

### Tasks to be Performed by the Partner

Capacity to propose and develop investigation projects coordinated in the field of new fuels production and their use in engines.

## Department

Ingeniería Química y Medio Ambiente

## Web

[www.sc.ehu.es/iaweb/](http://www.sc.ehu.es/iaweb/)

## Contact person

Prof. Dr. Ángel Rodríguez Pierna

## Telephone

943017183  
[iapropia@sp.ehu.es](mailto:iapropia@sp.ehu.es)

## Category

- |  |   |
|--|---|
| <input type="checkbox"/> H <sub>2</sub> Production   | <input type="checkbox"/> Conversion & apps      |
| <input type="checkbox"/> H <sub>2</sub> Purification | <input type="checkbox"/> Promotion & perception |
| <input type="checkbox"/> H <sub>2</sub> Storage X    | <input type="checkbox"/> Electric supplies      |
| <input type="checkbox"/> H <sub>2</sub> Delivery     | <input type="checkbox"/> Others                 |

## Research lines

Electrocatalyzators for fuel cells manufacturing (DMFC, DEFC and PEMFC).

## Some additional and related information

Nowadays we are working in several projects about PEM fuel cells with NCR from Canada and CSIC (Spain), collaboration with CINVESTAV from Mexico and with IPEN from Brazil. Our laboratories are equipped with different methods of production at semi-industrial scale. We also characterize electrochemical catalysts, manufacture the MEAS and analyze in FC stations.

We develop new catalysts more efficient and with a very low content in Pt, wich make it more competitiveness for portable applications, in order with our objective: grow up the potencies in of alcohol oxidation, direct methanol, ethanol and bioethanol.

We are equipped with full-equipped laboratories for characterization and fabrication of catalysts, MEAs and GDLs.

# TECHNOLOGY TRANSFER PROFILE

## Category

Technology offer

Technology Request

## Contact details

R&D Group  
Name of the company  
Contact

## Technology Profile

Title

Description

Innovative Aspects and Main Advantages

Intellectual Property Rights

Other Aspects

## Search for Partners

Type of Search

Tasks to be Performed by the Partner

## Department

## Web

www.grupohidrogeno.es

## Contact person

Pedro M<sup>a</sup> Diéguez Elizondo

## Telephone

948 16 92 96  
pmde@unavarra.es

## Category

- |   |   |
|---|---|
| <input checked="" type="checkbox"/> H <sub>2</sub> Production | <input type="checkbox"/> Conversion & apps      |
| <input type="checkbox"/> H <sub>2</sub> Purification          | <input type="checkbox"/> Promotion & perception |
| <input checked="" type="checkbox"/> H <sub>2</sub> Storage X  | <input type="checkbox"/> Electric supplies      |
| <input type="checkbox"/> H <sub>2</sub> Delivery              | <input checked="" type="checkbox"/> Others      |

## Research lines

H2 via electrolysis, ATEX Security, Combustion (MCIA y burners), Mixture with CH4.

## Some additional and related information

Nowadays in a Project CENIT SPHERA (Sistemas para la Producción de Hidrógeno Energético y Reconversión Asociada) contracted by Acciona Biocombustibles, as Research Public Agent.

## TECHNOLOGY TRANSFER PROFILE

### Category

Technology offer

Technology Request



## Contact details

**R&D Group**  
**Name of the company**  
**Contact**

## Technology Profile

**Title**

**Description**

**Innovative Aspects and Main Advantages**

**Intellectual Property Rights**

**Other Aspects**

## Search for Partners

**Type of Search**

**Tasks to be Performed by the Partner**

## Department

Grupo de Ingeniería Química y Ambiental

## Web

<http://www.escet.urjc.es/giqa/>  
[www.urjc.es](http://www.urjc.es)

## Contact person - E-mail

Juan Manuel García Camús  
[Juanmanuel.garcia.camus@urjc.es](mailto:Juanmanuel.garcia.camus@urjc.es)

## Telephone

+34 91488 73 35

## Category

H<sub>2</sub> Production

H<sub>2</sub> Purification

H<sub>2</sub> Storage

H<sub>2</sub> Delivery

Conversion & apps

Promotion & perception

Electric supplies

Others

## Research lines

Hydrogen production.

Hydrogen storage.

Elimination and storage of CO<sub>2</sub>.

## Some additional and related information

Nowadays, the Chemical and Environmental Engineering Group of the Universidad Rey Juan Carlos is formed by 5 full professors, 17 associate professors, 23 assistants (some of them being also Ph. D. Students), 34 grant holders, 11 laboratory technicians and a considerable number of undergraduate students who are initiated in active research.

Currently, the 80% of the world-wide consumption of primary energy corresponds to the use of fossil fuels, from which the most demanded one is the petroleum. The continuous increase in the power demand supposes a challenge in the fuels supply since the fossil fuel reserves are limited and their use have an environmental impact. In order to reduce these serious problems, it is proposed the use of alternative energies. Hydrogen obtained from renewable sources could be considered as one of the most innovating system of energy, clean and careful with the environment. A promising route for hydrogen production involves the steam reforming of "bioethanol". The ethanol obtained from biomass called "bioethanol" is a liquid fuel that presents several advantages like its easy handling, low cost, high power content and low carbon dioxide emissions. In this sense, it is necessary to make an effort focused on the development of selective catalysts for "bioethanol" conversion to hydrogen, minimizing the formation of by-products. Particularly, this research group is working in the development of metal catalysts supported on amorphous mesoporous materials for the hydrogen production from bioethanol.

On going Projects:

- "Nuevos materiales adsorbentes de aplicación en tecnologías energéticas: Separación y almacenamiento de hidrógeno y metano".  
(Financiación: CICYT).
- "Desarrollo de catalizadores y membranas para aumentar el rendimiento en hidrógeno en la reacción de gas de agua".  
(Funded by: CICYT).
- "Producción limpia de hidrógeno sin emisión de CO<sub>2</sub>".  
(Funded by: CAM).
- "Secuestro y captura de CO<sub>2</sub>".  
Funded by: Programa CENIT con ENDESA).
- Obtención de Hidrógeno mediante reformado con vapor de bioetanol y reacción de desplazamiento de gas de agua (WGS) en reactores de membrana".  
(Funded by: CICYT).

## Department

Grupo de Sistemas Electrónicos de Potencia

## Web

<http://gsep.uc3m.es>

## Contact person

M<sup>ra</sup> Dolores García-Plaza  
[comercialización@pcf.uc3m.es](mailto:comercialización@pcf.uc3m.es)

## Telephone

+34 91 624 40 23

## Category

- |  |   |
|--|---|
| <input type="checkbox"/> H <sub>2</sub> Production   | <input type="checkbox"/> Conversion & apps            |
| <input type="checkbox"/> H <sub>2</sub> Purification | <input type="checkbox"/> Promotion & perception       |
| <input type="checkbox"/> H <sub>2</sub> Storage      | <input checked="" type="checkbox"/> Electric supplies |
| <input type="checkbox"/> H <sub>2</sub> Delivery     | <input checked="" type="checkbox"/> Others            |

## Research lines

Modeling, Control and Design of Conditioners and power systems based on fuel cells for aircraft systems, mobile systems, electric vehicles, etc.

## Some additional and related information

The Group for Power Electronics Systems at the Carlos III University of Madrid develops for R&D&I tasks in the field of power systems and conditioning of electricity through power electronic systems for various applications such as aeronautical systems, railroad, electric vehicles, solar energy, industry, etc. They specialize in the control, modeling and design of electronic systems for the conversion of electrical energy. It has a clear vocation for applied research, having completed over 50 projects funded by private companies, as well as an extensive research experience having made more than 120 international publications in various scientific forums.



## Department

Grupo de Síntesis y Procesado de Materiales

## Web

[www.uc3m.es/grupos/sintesis\\_procesado\\_materiales](http://www.uc3m.es/grupos/sintesis_procesado_materiales).

## Contact person - E-mail

M<sup>a</sup> Dolores García-Plaza  
[comercializacion@pcf.uc3m.es](mailto:comercializacion@pcf.uc3m.es)

## Telephone

+34 91624 40 23

## Category

H<sub>2</sub> Production

H<sub>2</sub> Purification

H<sub>2</sub> Storage

H<sub>2</sub> Delivery

Conversion & apps

Promotion & perception

Electric supplies

Others

## Research lines

Batteries of Li and fuel Cells.

## Some additional and related information

### Projects in course

- "Materiales para la Energía y Relacionados (MATERYENER)" (Comunidad de Madrid S-0505/PPQ-0358). (Enero 2006-Diciembre 2009).
- "Materiales para la Energía y Relacionados (MATERYENER-II)" (Comunidad de Madrid S2009/PPQ-1626. (Enero 2010-Diciembre 2013).
- "Nuevos materiales para dispositivos electroquímicos: Electroodos y electrolitos para baterías recargables de litio y pilas de combustible" (Ministerio de Educación y Ciencia, CICYT (MAT-2007-64486-C07-06)).(Enero 2008-Diciembre 2010).
- "Síntesis, Caracterización y Procesado de materiales para baterías y pilas de combustible" (Solicitado a Ministerio de Ciencia e Innovación en Enero 2010).

### Pilot Plants

We have a laboratory of complete synthesis, characterization and processing of materials very well equipped. In particular we have a full equipped processing laboratory of Powder Injection Moulding (PIM) and Powder Extrusion Moulding, which allow developing and optimizing different steps of the processes.

### Experiences

We make pieces by means of Powder Injection Moulding and Powder Extrusion Moulding with YSZ, Ni-YSZ and ferrous stainless steel, for their use in Solid Oxide Fuel Cells (SOFC) auto-supported, anode-supported and metal-supported respectively.

### Publications related with Fuel Cells

- "Optimisation of the Processing of 8-YSZ Powder by Injection Moulding for SOFC Electrolytes Internacional".

Journal of Applied Ceramic Technology. Vol.: 5(6); Págs/Pages: 574-581, fecha/date: 2008.  
Autores/Authors: T. Jardiel, M.E. Sotomayor, B. Levenfeld and A. Várez.

- "Fabrication of 8-YSZ Thin-Wall Tubes by Powder Extrusion Moulding for SOFC Electrolytes".

Ceramics International. Vol.: 5(6); Pág/Pages: 574-581, fecha/date: 2009.  
Autores/Authors: T. Jardiel, B. Levenfeld, R. Jiménez and A. Várez.

- "Powder extrusion moulding of 430L stainless steel thin-tubes for porous metal-supported SOFCs".

Powder Metallurgy. Fecha/Date: 2009.

Autores/Authors: M.E. Sotomayor, B. Levenfeld and A. Várez.

## Department

Fluid Mechanics Research Group

## Web

<http://fluidos.uc3m.es>

## Contact person - E-mail

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[comercializacion@pcf.uc3m.es](mailto:comercializacion@pcf.uc3m.es)

## Telephone

+34 91624 40 23

## Category

- |  |   |
|--|---|
| <input type="checkbox"/> H <sub>2</sub> Production   | <input type="checkbox"/> Conversion & apps                                  |
| <input type="checkbox"/> H <sub>2</sub> Purification | <input type="checkbox"/> Promotion & perception                             |
| <input type="checkbox"/> H <sub>2</sub> Storage      | <input type="checkbox"/> Electric supplies                                  |
| <input type="checkbox"/> H <sub>2</sub> Delivery     | <input checked="" type="checkbox"/> Others: Research and advanced education |

## Research lines

Combustion / Reacting Flows:  
- Hydrogen Combustion.  
- Fuel Cell Modelling (DMFCs).

## Some additional and related information

The Fluid Mechanics Research Group is part of the Department of Thermal Engineering and Fluid Mechanics at the School of Engineering of the Universidad Carlos III de Madrid. Our mission is to perform research and education in the field of fluid mechanics and combustion theory.

Currently our group counts ten research members, of which five professors and five PhD students. We work on a wide range of research topics, varying from fundamental studies of combustion and fluid mechanics, through numerical simulations of jets, to the experimental investigation of jets and waves.

Research: Combustion / Reacting Flows



## - Hydrogen Combustion

Researchers:

Daniel Fernández Galisteo  
Antonio Luis Sánchez Pérez  
Eduardo Fernández Tarrazo  
Amable Liñán Martínez (Universidad Politécnica de Madrid)  
Vadim Kurdyumov (CIEMAT)  
Forman A. Williams (UCSD)

Description:

The design of advanced combustors for hydrogen and hydrogen-containing fuel mixtures requires a deeper knowledge of the associated combustion processes, including the underlying reduced kinetic account that describe the combustion within the whole range of flammable conditions, flame stability, structure and dynamics of flame balls, ignition processes and flame propagation, flash-back, effects of stretch, flame anchoring, triple-flame propagation and turbulent nonpremixed autoignition. Because of its unique characteristics (high diffusivity, high reactivity, low molecular weight), these flame phenomena are poorly understood in the case of hydrogen.

We have coordinated efforts with three other research groups (1) (2) (3) with complementary expertise, to advance our knowledge of hydrogen combustion by combining numerical integrations with theoretical and experimental analyses. Quantities of practical interest, such as critical conditions for ignition and for flame anchoring, front propagation velocities and flame stability limits are being computed for the conditions of pressure, preheat and composition typical of practical applications.

Related papers:

- G. del Alamo, F. A. Williams, A. L. Sánchez. Hydrogen-Oxygen Induction Times Above Crossover Temperatures. *Combust. Sci. Tech.*, 176 1599-1626 (2004).
- D. Fernández-Galisteo, A. L. Sánchez, A. Liñán, F. A. Williams, One-step reduced kinetics for lean hydrogen-air deflagration, *Combust. Flame*, 156 985-996 (2009).
- D. Fernández-Galisteo, A. L. Sánchez, A. Liñán, F. A. Williams, The hydrogen-air burning rate near the lean flammability limit, *Combust. Theory Modelling*, 13 741-761 (2009).
- M. Sánchez-Sanz, M. Vera, A. L. Sánchez, The Hydrogen Laminar Jet, *Int. J. Hydrogen Energy*, in press (2010).
- E. Fernández-Tarrazo, A. L. Sánchez, A. Liñán, F. A. Williams, The structure of lean hydrogen-air flame balls, *Proc. Combust. Inst.* submitted (2010).
- P. Boivin, C. Jiménez, A. L. Sánchez, F. A. Williams, An explicit reduced mechanism for hydrogen-air combustion, *Proc. Combust. Inst.* submitted (2010).

Fuel Cell Modelling (DMFCs)

Researchers:

Marcos Vera Coello

#### Description:

Fuel cells are electrochemical devices that convert the chemical energy of an energy carrier (typically hydrogen) and an oxidizer (typically the oxygen of the air) directly into electricity and heat. In contrast to most polymer exchange membrane fuel cells (PEMFCs), operating with hydrogen, liquid-feed direct methanol fuel cells (DMFCs) use liquid methanol as energy carrier, which makes them good candidates as small autonomous power sources. In particular, due to the high energy density of methanol, up to 100 times higher than state-of-the-art lithium-ion batteries, DMFCs are regarded as a potential substitute to conventional power generating equipment for portable electronic devices.

In our active research line we have developed a single-phase model for liquid feed direct methanol fuel cells (DMFCs), validated against experimental results. The model considers three-dimensional (3D) laminar, isothermal, steady flow in the anode channels and gas diffusion layer of the DMFC, coupled to a one-dimensional (1D) across-the-membrane model for the MEA and the cathode. The 3D model accounts for the convective/diffusive transport of both methanol and CO<sub>2</sub> at the anode channels and gas diffusion layer, methanol consumption and CO<sub>2</sub> generation at the anode catalyst layer, and the transport of electrons from the catalyst layer to the current collector rib. The 1D model accounts for the electrochemical reactions kinetics, water and methanol crossover, and oxygen transport from the cathode channel to the cathode catalyst layer. As a straightforward application, we have investigated the effect of electron transport for different channel cross-section geometries, showing that the power output of the cell may drop significantly due to ohmic losses in the anode gas diffusion layer.

#### Related papers:

-M. Vera. A single-phase model for liquid-feed DMFCs with non-Tafel kinetics. *J. Power* 171, 763-777 (2007).

-M. Vera. Desarrollo de un modelo matemático y numérico monofásico para pilas de combustible de metanol directo (DMFC). Libro de comunicaciones II Congreso Nacional de Pilas de Combustible (CONAPPICE 2006), pp. 219-222 (2006).

-M. Vera. Modelización Matemática de una pila DMFC: Efecto combinado del potencial electrónico y la geometría de los canales. Libro de comunicaciones III Congreso Nacional de Pilas de Combustible (CONAPPICE 2008), In press.



## Department

Inorganic Chemistry

## Web

[www.qi.ub.es/matcat](http://www.qi.ub.es/matcat)

## Contact person - E-mail

Narcis Homs  
Pilar Ramírez de la Piscina  
[narcis.homs@qi.ub.es](mailto:narcis.homs@qi.ub.es)

## Telephone

934037056

## Category

H<sub>2</sub> Production

H<sub>2</sub> Purification

H<sub>2</sub> Storage

H<sub>2</sub> Delivery

Conversion & apps

Promotion & perception

Electric supplies

Others

## Research lines

## Some additional and related information

# TECHNOLOGY TRANSFER PROFILE

## Category

Technology offer

Technology Request

## Contact details

**R&D Group**  
**Name of the company**  
**Contact**

## Technology Profile

**Title**

**Description**

We offer knowledge in the materials preparation field, characterization and testing in reformation processes.

We request advanced technologies in photoreactors.

**Innovative Aspects and Main Advantages**

**Intellectual Property Rights**

**Other Aspects**

## Partner Sought

**Type of Partner Sought**

**Tasks to be Performed by the Partner Sought**

## Department

Research Group: Environmental Technologies,  
TEP-181

## Web

[www.uca.es/grupos-inv/TEP181](http://www.uca.es/grupos-inv/TEP181)

## Contact person

Rafael Jiménez Castañeda  
[rafael.castaneda@uca.es](mailto:rafael.castaneda@uca.es)

## Telephone

+34635835388

## Category

- |  |   |
|--|---|
| <input type="checkbox"/> H <sub>2</sub> Production   | <input type="checkbox"/> Conversion & apps            |
| <input type="checkbox"/> H <sub>2</sub> Purification | <input type="checkbox"/> Promotion & perception       |
| <input type="checkbox"/> H <sub>2</sub> Storage      | <input checked="" type="checkbox"/> Electric supplies |
| <input type="checkbox"/> H <sub>2</sub> Delivery     | <input type="checkbox"/> Others                       |

## Research lines

Electric Energy production with photovoltaic technologies.

## Some additional and related information

Now I work in PV stand-alone applications in aquiculture plants in central-america. I work too, in other applications for PV technologies in industrial not connected to grid user, i.e. small water purify plant. In this project we work with a 1 kW hydrogen fuel cells for energy storage in renewable energy production.

# TECHNOLOGY TRANSFER PROFILE

## Category

Technology offer

Technology Request

## Contact details

**R&D Group**  
**Name of the company**  
**Contact**

Environmental Technologies  
Cadiz University  
Rafael Jiménez Castañeda

## Technology Profile

### Title

Hydrogen Fuel Cells for PV insolated installations

### Description

Hydrogen fuel cells solutions for energy storage in PV insolated installations.  
PV applications for hydrogen production.

### Innovative Aspects and Main Advantages

### Intellectual Property Rights

### Other Aspects

## Partner Sought

### Type of Partner Sought

### Tasks to be Performed by the Partner Sought

## Department

Ingeniería Química

## Web

<http://grupos.unican.es/pasep/>

## Contact person - Email

Prof. Inmaculada Ortiz  
ortizi@unican.es

## Telephone

+34942201585

## Category

- |   |   |
|---|---|
| <input type="checkbox"/> H <sub>2</sub> Production              | <input type="checkbox"/> Conversion & apps      |
| <input checked="" type="checkbox"/> H <sub>2</sub> Purification | <input type="checkbox"/> Promotion & perception |
| <input type="checkbox"/> H <sub>2</sub> Storage                 | <input type="checkbox"/> Electric supplies      |
| <input type="checkbox"/> H <sub>2</sub> Delivery                | <input type="checkbox"/> Others                 |

## Research lines

Hydrogen recovery from gas streams through selective membranes.

## Some additional and related information

Ongoing project: selective recovery of hydrogen from representative mixtures of the tail current of the carbon black reactor, using commercial polymeric membranes.



# TECHNOLOGY TRANSFER PROFILE

## Category

Technology offer

Technology Request

## Contact details

**R&D Group**  
**Name of the company**  
**Contact**

Grupo Procesos Avanzados de Separación (PAS)  
Universidad de Cantabria  
Prof. Inmaculada Ortiz (ortiz@unican.es)

## Technology Profile

### Title

Selective hydrogen recovery from gaseous mixtures using polymeric membranes

### Description

Currently we are working on developing new processes for gas separation with membranes, for its application in the chemical and processing industry. As case study it was chosen the valorisation of the tail current of the carbon black production process, product also called black smoke. Using the membrane separation technology to obtain a gas stream enriched in H<sub>2</sub>, CO and CH<sub>4</sub> gases that would be reintroduced into the production process, providing heating power and raw material (carbon). Based on available commercial membranes for hydrogen separation, the major scientific advances that arise are the development of a selective membrane for separating carbon/nitrogen monoxide and the synthesis of the overall process that integrates the hydrogen, carbon monoxide and methane separation stages.

### Innovative Aspects and Main Advantages

Membrane technologies have a modular design and lower operating costs than conventional technologies. The design of an industrial process requires the selection of the optimum operating conditions on optimal design of the process. This last point is particularly important in the case of separation operations in which the best alternative may be a combination of different operations and is a daily reality when it comes to separation operations across membranes. The result of the optimum design is the integrated process diagram that allows recovering hydrogen and carbon monoxide from the waste gas stream from the manufacture of carbon black, identifying the operating conditions that provide greater energy recovery at minimum cost.

### Intellectual Property Rights

### Other Aspects

## Partners Sought

### Type of Partner Sought

### Tasks to be Performed of the Partner Sought

## Department

CHEMICAL ENGINEERING

## Web

[www.uclm.es/dep/diq/](http://www.uclm.es/dep/diq/)

## Contact person - E-mail

Justo Lobato  
[justo.lobato@uclm.es](mailto:justo.lobato@uclm.es)

## Telephone

+34 926 295300

## Category

- |  |   |
|--|---|
| <input type="checkbox"/> H <sub>2</sub> Production   | <input type="checkbox"/> Conversion & apps              |
| <input type="checkbox"/> H <sub>2</sub> Purification | <input type="checkbox"/> Promotion & perception         |
| <input type="checkbox"/> H <sub>2</sub> Storage      | <input type="checkbox"/> Electric supplies              |
| <input type="checkbox"/> H <sub>2</sub> Delivery     | <input checked="" type="checkbox"/> Others: PEMFC; DAFC |

## Research lines

- Study of PBI-based membranas.
- Study of catalytic layer.

## Some additional and related information

Our group is involved in the Project of "Development of a High Temperature PEMFC Stack"

- Banch scale Fuel cell station for Single PEM Fuel cell test (5 and 50 cm<sup>2</sup>) fed with hydrogen.
- Banch scale Fuel cell station for Single PEM Fuel cell test (5 and 50 cm<sup>2</sup>) fed with alcohols.
- Equipments for the preparation of MEA up to 100 cm<sup>2</sup>.
- Semi-pilot plan scale for Stack PEM Fuel cell test.
- Current distribution measurements.

# TECHNOLOGY TRANSFER PROFILE

## Category

Technology offer

Technology Request

## Contact details

### R&D Group

**Name of the company**

**Contact**

Electrochemical Engineering & Membrane Technology

UNIVERSITY OF CASTILLA-LA MANCHA

Dr. JUSTO LOBATO (justo.lobato@uclm.es)

## Technology Profile

### Title

Technology based on high temperature PEMFC

### Description

The most important driving force for the development of HT-PEMFC is provided by the automotive industry. Work at high temperature (100-200 °C) allows us to enhance the kinetic reactions, improve the CO tolerance, an easy water management and higher efficiency because of the heat recovery. Moreover, work at high temperatures can be a good opportunity for the fuels based on alcohols to increase the power output.

Our Technology is based on the use of polybenzimidazole (PBI) based membranes for high temperature PEMFCs (HT-PEMFC). The PBI is one of the most interesting candidates for HT-PEMFC membranes are indeed PBI and its derivatives.

Our group has experience in all the aspects of the Technology, not only on the membranes but also on the electrodes, modellisation of the processes and studies with the stack. We have also prepared and tested catalyst for the electrooxidation of alcohols in a HT-PEMFC based on PBI membranes.

### Innovative Aspects and Main Advantages

Our group has the capacity of the synthesis of the polymer and the study of the different components of the MEA (the heart of the PEMFCs). Moreover, it has also facilities to test different components for the stack and knowledge for the modelisation of the process. Thus, our group can collaborate with any Research Group because we can interact with all the groups that study PEMFCs.

We have the skills for the preparation of membranes, catalysts, characterisation of MEAs, and test MEAs of 50 cm<sup>2</sup> in a stack.

So, we are opened to collaborate with everybody and in any topic related with HT-PEMFC.

### Intellectual Property Rights

### Other Aspects

## Partner Sought

### Type of Partner Sought

- Industries to collaborate with us in order to test their materials (membranes, new catalysts, bipolar plates,...) for a potential use in this Technology.
- Universities to participate in European or National Research Projects.
- Research Centres to participate in European or National Research Projects.

### Tasks to be Performed by the Partner Sought

The tasks of the partner are open and complementary to our tasks. Taking into account that we have studied all the components of the MEA, we have also carried out tests in single PEMFC and stack we can collaborate with anyone in any topic.

For example, we could test new catalysts in our fuel cell for the electrooxidation of alcohols at high temperature.

We can also test candidate membranes (with ionic Liquids) at high temperature PEMFCs.

## TECHNOLOGY TRANSFER PROFILE

### Category

Technology offer

Technology Request

### Contact details

**R&D Group**  
**Name of the company**  
**Contact**

Electrochemical Engineering & Membrane Technology  
UNIVERSITY OF CASTILLA-LA MANCHA  
Dr. JUSTO LOBATO (justo.lobato@uclm.es)

### Technology Profile

#### Title

Technology based on high temperature PEMFC

#### Description

When PBI is used in PEMFC technology, temperature operation can be set up to 473 K, with the consequent remarkable kinetic improvement and thus possible catalyst saving. Moreover catalyst is prevented from CO poisoning to some extents, water management becomes no longer an essential problem, as it is generated in vapor phase, much easier to remove from the system, and even residual heat could be used to generate low pressure steam in a hypothetical stationary application. Nonetheless increasing operation temperature also results in some problems mainly related to material degradation or corrosion, issues that still need to be improved.

## **Innovative Aspects and Main Advantages**

### **Intellectual Property Rights**

### **Other Aspects**

## **Partner Sought**

### **Type of Partner Sought**

- Industries related with the synthesis of potential materials to be used in HT-PEMFC.
- Universities to participate in European or National Research Projects.
- Research Centres to participate in European or National Research Projects.

### **Tasks to be Performed by the Partner Sought**

The tasks of the partner are open and complementary to our tasks. Taking into account that we have studied all the components of the MEA, we have also carried out tests in single PEMFC and stack we can collaborate with anyone in any topic.

For example, we could test new catalysts in our fuel cell for the electrooxidation of alcohols at high temperature.

We can also test candidate membranes (with ionic Liquids) at high temperature PEMFCs.

## Department

Física

## Web

[www.uco.es/grupos/gep](http://www.uco.es/grupos/gep)

## Contact person - E-mail

M<sup>ra</sup> Dolores Calzada  
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## Telephone

957-211026

## Category

H<sub>2</sub> Production

H<sub>2</sub> Purification

H<sub>2</sub> Storage

H<sub>2</sub> Delivery

Conversion & apps

Promotion & perception

Electric supplies

Others

## Research lines

Plasmas (partially ionized gas):

Hydrogen production, carbon deposition. Food preservation. Detection of arsenic in solution.

## Some additional and related information

R&D Project (Ministry of Innovation and Science): Hydrogen production from the decomposition of organic compounds using a microwave plasma.

Infrastructure Project (Junta de Andalucía): Creation of a laboratory for materials processing and analysis.

Preliminary research on seed and wines treatment by plasma.

# TECHNOLOGY TRANSFER PROFILE

## Category

Technology offer

Technology Request

## Contact details

### R&D Group

Name of the company

### Contact

Grupo de Espectroscopía de Plasmas (GEP)

Universidad de Córdoba

M<sup>a</sup> Dolores Calzada

## Technology Profile

### Title

Hydrogen production from organic compounds decomposition by using microwave plasmas

### Description

The objective is the development of a process of molecular hydrogen generation, which may be used in fuel cells, from the decomposition of organic compounds (alcohols and methane as well as biogas emitted from landfills, using a plasma as the reaction medium.

### Innovative Aspects and Main Advantages

Preliminary results in this direction point to a clean process as non-polluting gaseous byproducts such as CO or CO<sub>2</sub> are not generated. We have found another subproduct such as solid carbon (pure) with potential applications in different scientific fields such as chemistry and material processing.

### Intellectual Property Rights

Those derived from the developed processes and devices.

### Other Aspects

## Partners Sought

### Type of Partner Sought

Participation of companies dedicated to the scaling, at a pre or industrial level, processes developed and tested in the laboratory.

### Tasks to be Performed of the Partner Sought

Collaboration and commitment in the medium term.

## Department

Department of Electronic, Computer Science and Automatic Engineering

## Web

<http://www.uhu.es/diesia>

## Contact person - E-mail

José Manuel Andujar Márquez  
[andujar@diesia.uhu.es](mailto:andujar@diesia.uhu.es)

## Telephone

619175693

## Category

H<sub>2</sub> Production

H<sub>2</sub> Purification

H<sub>2</sub> Storage

H<sub>2</sub> Delivery

Conversion & apps

Promotion & perception

Electric supplies

Others

## Research lines

Design of Irbid systems: green hydrogen production and storage, photovoltaic systems, battery bank, fuel cells. Design and build of power and control electronics and software development at low and high level.

## Some additional and related information

### PROJECTS

Project Title: Ecological auxiliary power unit. Application to large trucks refrigerated transport (DPI2010-17123).

Funding agency: Ministry of Science and Innovation.

Participating entities: UHU.

Duration from: 2010 till: 2013.

Grant Amount: 223,850 Euros.

Researcher: Dr. José Manuel Andújar Márquez.

Number of participants: 9.



Project Title: Hybrid system independent power generator, continuous and not contaminant (DPI2007-62336).

Funding agency: Ministry of Education and Science.

Participating bodies: Universidad de Huelva.

Duration, from: 01/10/2007 until: 30/09/2010.

Grant Amount: 121,000 Euros.

Researcher: Dr. José Manuel Andújar Márquez.

Number of participants: 12.

Project Title: Design, development, construction and testing of a power generating system power based on fuel cells, integrating a hydrogen and an electrolyzer to its production Type of contract: 68/83.

Business / Management company: Company Hynergreen Technologies, SA.

Participating bodies: Universidad de Huelva.

Duration, from: July 2006 to: September 2008.

Researcher: Dr. J. M. Andújar Márquez.

Number of participants: 6.

TOTAL PROJECT PRICE: 208,800 Euros.

Project Title: Design of a propulsion system controlled by fuzzy logic for a vehicle zero emission (DPI2005-01065).

Funding agency: Ministry of Education and Science.

Participating bodies: Universidad de Huelva.

Duration from: 15.10.2005 to: 10.14.2006.

Grant amount: 11,900 Euros.

Researcher: Dr. José Manuel Andújar Márquez.

Number of participants: 16.

## **PUBLICATIONS OF MAXIMUM IMPACT INDEX**

Title: Analog Current Control Techniques for Power Control in PEM Fuel Cell Hybrid Systems: A Critical Review and a Practical Application.

Authors: Segura, F. ; Andújar, J. M.

Journal: IEEE Transactions on Industrial Electronics. ISSN: 0278-0046.

In press, <http://dx.doi.org/10.1109/TIE.2010.2049710> Date: 2010.

Quality Ratios: Review included in the JCR. Is number 1 in the category "automation & control systems."

Impact factor 2009: 4,678. Pos 1 / 59.

Title: A Methodology for Optimizing Stand-Alone PV-System Size Using Parallel-Connected DC/DC Converters.

Authors: Vasallo, M.; Andújar, J. M., Segura F.

Journal: IEEE Transactions on Industrial Electronics. ISSN: 0278-0046.

Volume: 55(7) Pages, Initial: 2664 final: 2673 Date: 2008.

Quality Ratios: Review included in the JCR. Is number 1 in the category "Energy & Fuels." Index Impact factor 2009: 4,678. Pos 1 / 59.

URL: <http://dx.doi.org/10.1109/TIE.2009.2021171>.

Title: Fuel Cells: History and Update. A Walk Along two Centuries.  
Authors: Andujar, J. M., Segura F.  
Journal: Renewable & Sustainable Energy Reviews. ISSN: 1364-0321.  
Volume: 13 (9) Pages, Initial: 2309 final: 2322 Date: 2009.  
Quality Ratios: Review included in the JCR. Is number 3 in the category "Energy & Fuels." Index Impact 2009: 4,842. Pos 4 / 71.  
URL: <http://dx.doi.org/10.1016/j.rser.2009.03.015>.

Title: Design, building and testing of a stand alone fuel cell hybrid system.  
Authors: Segura, F., Durán, E., Andújar, J. M. Journal:  
Journal of Power Sources. ISSN: 0378-7753.  
Volume: 193 (1) Pages, Initial: 276 final: 284 Date: 2009.  
Quality Ratios: Review included in the JCR. Is number 4 in the category "Energy & Fuels." Index Impact 2008: 3,792. Pos 9/ 71.  
URL: <http://dx.doi.org/10.1016/j.jpowsour.2008.12.111>.

Title: A Model Suitable for Control of Plant Fuel Cell-DC/DC the Set Converter.  
Authors: Andújar, J. M., Segura, F., Vasallo, M. J.  
Journal: Renewable Energy. ISSN: 0960-1481.  
Volume: 33 (4) Pages, Initial: 813 final: 826 Date: 2008.  
Quality Ratios: official journal of WREN (World Renewable Energy Network). Magazine included in the JCR in category "Energy & Fuels."  
Impact factor 2009: 2,226. 22/71 Pos.  
URL: <http://dx.doi.org/10.1016/j.renene.2007.04.013>.

Title: A Methodology for Sizing Backup Fuel-Cell/Battery Hybrid Power Systems.  
Authors: Vasallo, M.J.; Andujar, J.M.; Garcia, C.; Brey, J.J.  
Journal: IEEE Transactions on Industrial Electronics. ISSN: 0278-0046.  
Volume: 57 (6) Pages, Initial: 1964 final: 1975 Date: 2010.  
Quality Ratios: Review included in the JCR. Is number 1 in the category "Energy & Fuels." Index Impact factor 2009: 4,678. Pos 1 / 59.  
URL: <http://dx.doi.org/10.1016/j.jpowsour.2008.12.111>.

## TECHNOLOGY TRANSFER PROFILE

### Category

Technology offer

Technology Request

### Contact details

**R&D Group**  
**Name of the company**  
**Contact**

TEP 192  
University of Huelva  
[andujar@uhu.es](mailto:andujar@uhu.es)

## Technology Profile

### Title

Design and building of fuel cell hybrid systems

### Description

The aim is to design and build electrical power generation systems autonomous continuous and non-polluting. It consist of system which by means of hydrogen vector, can operate 24 hours every day of the year by generating their own fuel on a non-polluting and producing electricity to power AC and DC loads, also in non-polluting way. The renewable energy source is photovoltaic, and is used both to produce electricity and to produce hydrogen through water electrolysis. This means that hydrogen production is done completely "clean." When there is no sunlight, electricity is produced by fuel cells, using hydrogen produced and stored during the day. The process can be further strengthened from the standpoint of performance using fuel cell high temperature, as this allows heat cogeneration waste generated.

### Innovative Aspects and Main Advantages

Hybrid systems based on fuel cells can circumvent the disadvantages of fuel cells and ensure continued supply, so that each renewable source is present in the system when it is available. On the other hand, the possibility of generating hydrogen in renewable way and store it in the site is to be consumed, opens up tremendous possibilities for truly autonomous systems, since it is only necessary to have sunlight and water. The cycle renewable hydrogen generation + storage + consumption (fuel cell) generating water vapor as waste lets talk about AUTONOMOUS POWER GENERATION SYSTEMS, CONTINUOUS AND ZERO POLLUTION IN THE FULL CYCLE.

### Intellectual Property Rights

The research group has several patents on technology that is offered.

### Other Aspects

The Group has the know-how to design full hybrid systems: renewable hydrogen production and storage, photovoltaic + battery bank + fuel cell. Design and construction of all the electronics (control and power converters) and software at high and low level. The technology developed is applicable in other fields, such as vehicles, auxiliary power units (APUs), etc.

## Partner Sought

### Type of Partner Sought

Apply for European projects with government and / or private companies.

### Tasks to be Performed of the Partner Sought

Able to provide some insight into the techniques and technologies involved.

## Department

Ingeniería Química. Facultad de Ciencias

## Web

<http://www.ciencias.uma.es/grupos/295-tecnologia-de-procesos-cataliticos-procat>

## Contact person - E-mail

Luis J. Alemany Arrebola  
luijo@uma.es

## Telephone

+34952131919

## Category

H<sub>2</sub> Production

H<sub>2</sub> Purification

H<sub>2</sub> Storage X

H<sub>2</sub> Delivery

Conversion & apps

Promotion & perception

Electric supplies

Others

## Research lines

Study of catalyzed processes for energy and environmental applications: Conversion of Natural Gas, Light Hydrocarbons and Renewable. Production of Synthesis Gas (H<sub>2</sub> + CO). Reevaluation of biosolids and biogas for H<sub>2</sub> production.

## Some additional and related information

Development of catalysts to control catalytic properties.

Studies of reactivity, surfaces and reaction mechanisms (in situ, steady and transient) and intensification of processes by microreactors.

Study of the catalytic dry reforming (CO<sub>2</sub>) for obtaining H<sub>2</sub> and synthesis gas (H<sub>2</sub> + CO) for Fischer-Tropsch. Reference ENE2004-06 176.

Getting synthesis gas and hydrogen by hydrocarbons reforming on nanostructured nickel catalysts. Reference ENE2007-67 926.

# TECHNOLOGY TRANSFER PROFILE

## Category

Technology offer

Technology Request

## Contact details

### R&D Group

Ingeniería Química. PROCAT-Tecnología de Procesos Catalíticos

### Name of the company

Universidad de Málaga-Facultad de Ciencias

### Contact

Luis J. Alemany Arrebola (lujjo@uma.es)

## Technology Profile

### Title

H<sub>2</sub>(+CO) production through catalytic reforming

### Description

Development of catalysts, stable and with low carbon formation, partially thio-resistant, operating under less severe conditions for the generation of hydrogen and syngas from the light hydrocarbons reforming, oxo-compounds and alternative sources such as biosolids and biogas, and its possible application in the intensification of the process.

### Innovative Aspects and Main Advantages

Supported and formed bimetallic nanostructured catalysts operating with very low carbon formation and that allow to modulate H<sub>2</sub>/CO selectivity from light HC reforming.

### Intellectual Property Rights

### Other Aspects

Study and development of catalysts for catalytic processes.

## Partners Sought

### Type of Partner Sought

### Tasks to be Performed of the Partner Sought

## Department

Department of Chemistry

## Web

[www.utad.pt](http://www.utad.pt)

## Contact person - E-mail

Prof. José Manuel Ribeiro de Sousa  
[jsousa@utad.pt](mailto:jsousa@utad.pt)

## Telephone

+351-259350225

## Category

H<sub>2</sub> Production

H<sub>2</sub> Purification

H<sub>2</sub> Storage

H<sub>2</sub> Delivery

Conversion & apps

Promotion & perception

Electric supplies

Others: PEM Fuel cells

## Research lines

- Methanol and methane steam reforming for hydrogen production using membrane reactors.
- Syngas production and water splitting using photoelectrochemical cells.
- Synthesis of methane through the Sabatier reaction and synthesis of methanol using a membrane reactor for chemical hydrogen storage.
- High and low temperature polymer electrolyte membrane fuel cells – hydrogen, methanol and formic acid.
- High permeation ceramic supported palladium membranes for dehydrogenation reactions using membrane reactors.
- Carbon molecular sieve membranes for hydrogen purification.
- Biomass gasification for syngas production (research area to start soon).
- Modeling and simulation of the relevant processes involved in the research areas.

## Some additional and related information

- Polymer Electrolyte Membrane Fuel Cells – Various Strategies for Increasing the Performance. FCT Project – PTDC/EQU-EQU/70574/2006.
- Micro Steam Reforming of Methanol for Fuel Cell Applications. FCT Project – PTDC/EQUEQU/71617/2006.
- Innovative Approaches to the Methanol Crossover and Catalyst Activity in Direct Methanol Fuel Cells. FCT Project – PTDC/CTM/108454/2008.
- New Fuel Cell System Using High Efficient Composite Palladium Membranes. FCT Project –PTDC/EQU-EQU/104217/2008.
- Sorption-Enhanced Membrane Reactors using Monolith-Supported Catalysts for High-Purity Hydrogen Production. FCT Project – PTDC/EQU-ERQ/098730/2008.
- HPSA – Collaborative project with Air Products, Allentown, USA.
- NanoPEC - Nanostructured Photoelectrodes for Energy Conversion (European project). NMP-2008-2.6-1.

# TECHNOLOGY TRANSFER PROFILE

## Category

Technology offer

Technology Request

## Contact details

**R&D Group**  
**Name of the company**  
**Contact**

Department of Chemistry  
University of Trás-os-Montes e Alto Douro  
José Manuel Ribeiro Sousa (jsousa@utad.pt)

## Technology Profile

### Title

Production, Purification, Chemical Storage of Hydrogen and its Conversion in Electric Power

### Description

- Chemical reactors and membrane separation technologies.
- Electrochemical membrane reactors (hydrogen and oxygen electrochemical pumping).
- Photoelectrochemical cells technology including dye sensitized solar cells.
- Polymer electrolyte membrane fuel cells.
- Pressure swing adsorption.
- Modeling and simulation of processes.

### Innovative Aspects and Main Advantages

### Intellectual Property Rights

### Other Aspects

## Partner Sought

### Type of Partner Sought

### Tasks to be Performed by the Partner Sought

# VEA QUALITAS

## Department

Dpt. Energía

## Web

www.veaqualitas.com

## Contact person

Manuel Aranguena

## Telephone

976 301 113  
maranguena@veaqualitas.com

## Category

- |   |   |
|---|---|
| <input checked="" type="checkbox"/> H <sub>2</sub> Production | <input type="checkbox"/> Conversion & apps      |
| <input type="checkbox"/> H <sub>2</sub> Purification          | <input type="checkbox"/> Promotion & perception |
| <input type="checkbox"/> H <sub>2</sub> Storage X             | <input type="checkbox"/> Electric supplies      |
| <input type="checkbox"/> H <sub>2</sub> Delivery              | <input checked="" type="checkbox"/> Others      |

## Research lines

R&D projects related to H2 and FC.

## Some additional and related information

Technical consultancy specialized in project management of R&D in hydrogen.  
Topics of Projects developed: PEMFC, electrolyzers, self-supplying by means of hydrogen.

## TECHNOLOGY TRANSFER PROFILE

### Category

Technology offer

Technology Request



## Contact details

**R&D Group**  
**Name of the company**  
**Contact**

## Technology Profile

**Title**

**Description**

**Innovative Aspects and Main Advantages**

**Intellectual Property Rights**

**Other Aspects**

## Search for Partners

**Type of Search**

**Tasks to be Performed by the Partner**

# ZOILO RÍOS, S.A.

## Department

Técnico

## Web

www.zoilorios.com

## Contact person

Ignacio Ríos Torre

## Telephone

976 403 403  
irios@zoilorios.com

## Category

- |   |   |
|---|---|
| <input type="checkbox"/> H <sub>2</sub> Production          | <input type="checkbox"/> Conversion & apps      |
| <input type="checkbox"/> H <sub>2</sub> Purification        | <input type="checkbox"/> Promotion & perception |
| <input type="checkbox"/> H <sub>2</sub> Storage X           | <input type="checkbox"/> Electric supplies      |
| <input checked="" type="checkbox"/> H <sub>2</sub> Delivery | <input type="checkbox"/> Others                 |

## Research lines

Application and supply of hydrogen in service stations.

## Some additional and related information

- Partner in Project EDHA “Estrategia y Desarrollo de Oportunidades del Hidrógeno para las Pymes Aragonesas” with the Project of installation of a hydrogen supply Station in Zaragoza, in foreseen of the European Hydrogen Highway, within the Competitiveness and Consolidation Plan for the SME – MITYC 2005.
- Awarded of the Hydrogen supply station made for Expo Zaragoza 2008.
- Partner in Project “H2 Training”, of the European program Leonardo for the Development of Innovation in the technical-professional training (2008).

## TECHNOLOGY TRANSFER PROFILE

### Category

Technology offer

Technology Request

## Contact details

**R&D Group**  
**Name of the company**  
**Contact**

## Technology Profile

**Title**

**Description**

**Innovative Aspects and Main Advantages**

**Intellectual Property Rights**

**Other Aspects**

## Search for Partners

**Type of Search**

**Tasks to be Performed by the Partner**

# ZYTEL AUTOMOCIÓN, S.L.

## Department

Ingeniería, desarrollo e Investigación

## Web

www.zytel.es

## Contact person

David Puértolas Sanz

## Telephone

+34 976 141819  
david.puertolas@zytel.es

## Category

- |  |   |
|--|---|
| <input type="checkbox"/> H <sub>2</sub> Production   | <input type="checkbox"/> Conversion & apps      |
| <input type="checkbox"/> H <sub>2</sub> Purification | <input type="checkbox"/> Promotion & perception |
| <input type="checkbox"/> H <sub>2</sub> Storage X    | <input type="checkbox"/> Electric supplies      |
| <input type="checkbox"/> H <sub>2</sub> Delivery     | <input checked="" type="checkbox"/> Others      |

## Research lines

Manufacture and developmen of vehicles based in hydrogen technologies.

## Some additional and related information

Project for the development of a hydrogen technologies based vehicle on universal use platform.

## TECHNOLOGY TRANSFER PROFILE

### Category

Technology offer

Technology Request

## Contact details

**R&D Group**  
**Name of the company**  
**Contact**

I+D+i  
ZYTEL AUTOMOCIÓN S.L.  
David Puértolas Sanz

## Technology Profile

### Title

Base vehicle for hydrogen technologies.

### Description

Design, development and construction of prototype for pre-serial production of vehicles with a base and common power train to integrate in the same base different systems of energy storage (electrochemical or hydrogen technologies, mainly fuel cells).

### Innovative Aspects and Main Advantages

Use of a common base for different features, use in commercial vehicles of hydrogen technologies.

### Intellectual Property Rights

### Other Aspects

## Search for Partners

### Type of Search

Fuel cell providers, management system and periferics necessities for vehicle integration.

### Tasks to be Performed by the Partner



# FUNDING PROGRAMMES





# EUROPEAN FUNDINGS

# COMPETITIVENESS AND INNOVATION FRAMEWORK PROGRAMME (CIP)

## Contact

[http://cordis.europa.eu/fp7/cip\\_en.html](http://cordis.europa.eu/fp7/cip_en.html)

## Beneficiary

It covers entrepreneurship, SME policy, industrial competitiveness, innovation, ICT development and use, environmental technologies and intelligent energy.

## Funding

With a proposed **budget of EUR 4,212.6 million**, the CIP will fund actions in three different work programmes:

- The Entrepreneurship and Innovation Programme, with a special focus on SMEs.
- The ICT Policy Support Programme, supporting the use of ICT in businesses.
- The Intelligent Energy Europe Programme.

## Programmes

**The Entrepreneurship and Innovation Programme:** specifically targets SMEs and aims to foster sector-specific innovation, clusters, public-private innovation partnerships and innovation management. It will also support the implementation of the Environmental Technologies Action Plan and the development of innovation governance, benchmarking and mutual policy learning. The programme will also support easier access to finance, such as early stage or seed capital, in order to address one of the most important barriers to entrepreneurship and innovation in enterprises.

**The ICT Policy Support Programme** aims to promote the adoption of information and communication technologies (ICT) in businesses, administrations and public services.

**The Intelligent Energy - Europe Programme** aims to support the development of sustainable and environmentally friendly energy sources; securing energy supply and competitiveness by focusing on the removal of non-technical barriers, the creation of market opportunities and by raising awareness. Divided into three separate strands, the programme aims to increase investments in new and effective technologies, promote energy efficiency, assist work on new and renewable energy sources and focus on energy-related aspects of transport. It will also serve as a tool to bridge the gap between the development of innovative energy technologies and their deployment in the market, either by helping with promotion and dissemination or by assisting the systematic deployment of new sustainable energy technologies.

## Contact

[www.eurekanetwork.org](http://www.eurekanetwork.org)

CDTI carries out general promotion activities for Eureka in Spain and the coordination, evaluation, financing and follow-up of proposals and projects presented by Spanish enterprise.

Tel: +34 91 581 55 00/ +34 91 209 55 00

Fax: +34 581 55 94

## Beneficiary

The program is targeted at any company or research centre with the capacity to carry out an R&D project of an applied nature in collaboration with at least one company and / or research centre of another Eureka country.

## Funding

Each country takes on the financing of its companies and institutes. Eureka certifies approved projects by means of a “**stamp of quality**” which, apart from being a promotional element and of acknowledgement of the technological level of the promoted project, makes the project eligible for public financing.

## Requierements

In EUREKA there are no pre-set technological lines. **All technologies are suitable**, as long as they are innovative. The content of the projects is promoted in accordance with the particular needs of each company. Nevertheless, Eureka can promote the development of projects in technological areas that are considered to be of strategic importance.

# EUROPEAN FRAMEWORK PROGRAM

## Contact

[http://cordis.europa.eu/fp7/home\\_es.html](http://cordis.europa.eu/fp7/home_es.html)

## Beneficiary

- Small and medium enterprises.
- Universities and Research Centers.
- Public and Private Research Centers.
- Associations.
- Public Administration.

## Web Site

**-Cooperation:** its goal is to stimulate the cooperation between industry, universities and research center. Budget: 32.413 M€.

**-Ideas:** to reinforce excellence, dynamism and creativity in European research and improve the attractiveness of Europe for the best researchers from both European and third countries, as well as for industrial research investment, by providing a Europe-wide competitive funding structure, in addition to and not replacing national funding, for 'frontier research' executed by individual teams Budget: 7.510M€.

**-People:** Entirely dedicated to human resources in research. To promote professional training, mobility and research career development. Budget: 4.750M€.

**-Capacities:** to enhance research and innovation capacities throughout Europe and ensure their optimal use. Budget: 4.097M€.

## Funding

- Until 50% for research and technological development.
- Until 75% for SME, nonprofit organizations, educational centers, nonprofit research organizations.
- Until 50% for demonstration activities.
- Until 100% for management activities, training, audit certificates.

## Requirements

R&D projects and activities, technological demonstrations, products, process, services, applications, tests, training, normalization...and any other activities related with project management that have an innovation degree and a high value in the European research level. The project must have participation of three different entities from different countries of the European Union or Associated States to the Seventh Framework program.

The total budget of the projects can vary between 0.5 and couple of million of euros, and the length between 1 and 5 years (depending on the activities).

# EUROPEAN SOCIAL FUND (ESF)

## Contact

[http://ec.europa.eu/regional\\_policy/funds/prord/prord\\_en.htm](http://ec.europa.eu/regional_policy/funds/prord/prord_en.htm)

## Beneficiary

The ESF is devoted to promoting employment in the EU. It helps Member States make Europe's workforce and companies better equipped to face new, global challenges.

Funding is spread across the Member States and regions, in particular those where economic development is less advanced. It is a key element of the EU's 2020 strategy for Growth and Jobs targeted at improving the lives of EU citizens by giving them better skills and better job prospects.

## Funding

Over the period 2007-2013 some €75 billion will be distributed to the EU Member States and regions to achieve its goals.

In Spain the level of ESF funding differs from one region to another depending on their relative wealth.

# EUROSTARS Programme

## Contact

<http://www.eurostars-eureka.eu/>

In Spain CDTI is the responsible for Eurostars programmes:  
<http://www.cdti.es/index.asp?MP=7&MS=554&MN=3>

## Beneficiary

The Eurostars Programme addresses a niche market of research and innovation-performing businesses that fulfill the EU-adopted definition of an SME, are based in a Eurostars participating country and that, in addition, invest 10% or more of full-time equivalent or annual turnover in research activities.

## Funding

Eurostars projects will be funded primarily through national funding schemes. The amount of funding and costs eligible for funding will follow national rules and procedures. It may therefore vary between Eurostars member countries.

## Requirements

It can address any technological area, but must have a civilian purpose and be aimed at the development of a new product, process or service. A Eurostars project is collaborative, meaning it must involve at least two participants (legal entities) from two different Eurostars participating countries. In addition, the main participant must be a research-performing SME from one of these countries.

The role of the SME participants in the project should be significant. At least 50% of the project's core activity should be carried out by SMEs. This percentage can, however, include minor contracting. The consortium should be well balanced, which means that no participant or country will be required to invest more than 75% of the total project costs.

A Eurostars project must have a maximum duration of three years, and within two years of project completion, the product of the research should be ready for launch onto the market. The exception to this rule applies to biomedical or medical projects, where clinical trials must be started within two years of project completion.

# FRENCH NATIONAL RESEARCH AGENCY

## Web Site

<http://www.agence-nationale-recherche.fr>

## Contact

<http://www.agence-nationale-recherche.fr/Plan>

## Beneficiary

The ANR has the role of intensifying collaborations between public research and private research.

Thus the agency supports of a share, the partnership research of collaborative nature resulting from the research projects answering the calls for projects of the agency and of another share, the contractual research which closely binds public laboratories and companies through the contracts of research.

Within the framework of collaboration agreement NSF-ANR in the field of chemistry and materials, two calls for projects (AAP) international will be open in the program Blanc (opening of l' AAP about on October 30).

## Funding

<http://www.agence-nationale-recherche.fr/documents/uploaded/2007/reglement-modalites-attribution-aide.pdf>

## Requirements

Each programme can have specific requirements. Here are different programme in relation with energetic aspects:

- Programme SEED / Systèmes énergétiques Efficaces et décarbonés.
- Programme PROGELEC / Production (Renouvelable) et Gestion de l'électricité.
- Programme Transports Terrestres Durables.
- Programme ECOTECH / Production Durable et Technologies de l'Environnement.
- Programme MATETPRO.
- Programme Bio-Matières et Energies (BIO-ME).

# FUEL CELL AND HYDROGEN JOINT TECHNOLOGY INITIATIVE JTI

## Contact

[http://ec.europa.eu/research/fch/index\\_en.cfm](http://ec.europa.eu/research/fch/index_en.cfm)  
Interim Executive Director: Philippe Vannson  
Secretariat: Lourd McCabe/ Anne Roehrig  
Tel: +32 2 221 81 29 Fax: +32 2 221 81 26  
E-mail: FCH-JU@fch.europa.eu  
E-mail for all Project-related queries: fch-projects@fch.europa.eu

## Beneficiary

Participation in projects shall be open to legal entities and international organizations once the minimum conditions have been satisfied:

-At least 3 legal entities must participate, each of which must be established in a Member State or an Associated Country, and no two of which are established in the same Member State or Associated Country.

-All 3 legal entities must be independent of each other as defined in Article 6 of the Rules for Participation of the Seventh Framework Programme 11;

-At least 1 legal entity must be a member of the Industrial grouping or the Research grouping.

## Funding

Industry (other than SME):

-RTD activities: maximum 50% (Collaborative project).

-Demonstration activities: maximum 50% (Collaborative project).

-Other activities refer to management activities, training, coordination, networking and dissemination (including publications): maximum 100% (Collaborative project/ Coordination and Support Action).

SME:

-RTD activities: maximum 75% (Collaborative project).

-Demonstration activities: maximum 50% (Collaborative project).

-Other activities refer to management activities, training, coordination, networking and dissemination (including publications): maximum 100% (Collaborative project/ Coordination and Support Action).

Non-profit public bodies, universities & higher education establishments, nonprofit Research organizations:

-RTD activities: maximum 75% (Collaborative project).

-Demonstration activities: maximum 50% (Collaborative project).

-Other activities refer to management activities, training, coordination, networking and dissemination (including publications): maximum 100% (Collaborative project/ Coordination and Support Action).

## Requirements

-Minimum three legal entities established in different member states or associated countries (maximum two entities per State).

-At least one of the participants of each project must belong to the Industrial grouping or scientific grouping of JTI.

-Every legal entity and international organization has the opportunity to participate.

-The proposal's coordinator must belong to an entity of the Industrial grouping or scientific grouping of JTI.



## Contact

[http://www.cyted.org/cyted\\_innovacion/en/presentacion.php](http://www.cyted.org/cyted_innovacion/en/presentacion.php)

CDTI, as the Spanish management organization of the Iberoeka projects, promotes the participation of Spanish companies in this initiative by advising on the presentation of new proposals, on the search for partners and on access to sources of financing.

<http://www.cdti.es/index.asp?MP=15&MS=65&MN=3>

## Beneficiary

The Iberoeka projects are instrument which support technological business cooperation in Latin America. This initiative is included within the Latin American Programme of Science and Technology for Development (CYTED).

## Funding

Each country is the responsible of the funding of each project and its conditions.

In Spain CDTI offers to Spanish companies that participate in Iberoeka project, funding at an interest rate of 0%, until 75% of the total budget of the project.

## Requirements

It is essential that the project involves the participation of independent partners from at least two member countries. It must be innovative in the sense that the outcome produces new substantially improved products or processes. It must generate a product, process or service close to the market.

## Contact

<http://ec.europa.eu/environment/life/funding/lifeplus2010/call/index.htm>

## Beneficiary

Proposals must be presented by entities registered in the Member States of the European Union being public and/or private bodies, actors and institutions.

The following themes are covered by this announcement:

- LIFE+ Nature and Biodiversity
- LIFE+ Environment Policy and Governance
- LIFE+ Information and Communication

## Funding

### **-LIFE+ Nature and Biodiversity projects**

The rate of the Union financial support shall be a maximum of 50 % of the eligible costs. Exceptionally, a maximum cofinancing rate of 75 % is applicable to proposals which target priority habitats/species of the Birds' and Habitats' Directives.

### **-LIFE+ Environment Policy and Governance**

The rate of the Union financial support shall be a maximum of 50 % of the eligible costs.

### **-LIFE+ Information and Communication**

The rate of the Union financial support shall be a maximum of 50 % of the eligible costs.

## Requirements

Proposals must be written on specific application forms. These forms and the application guide that includes detailed explanations in regard to eligibility and procedures can be obtained from the Commission's website on the following address:

<http://ec.europa.eu/environment/life/funding/lifeplus.htm>

Proposals must be submitted on CD-ROM or DVD.

# RESEARCH FOR THE BENEFIT OF SMES CALLS

## Web Site

[http://cordis.europa.eu/fp7/dc/index.cfm?fuseaction=UserSite.CapacitiesDetailsCallPage&call\\_id=311](http://cordis.europa.eu/fp7/dc/index.cfm?fuseaction=UserSite.CapacitiesDetailsCallPage&call_id=311) and [http://cordis.europa.eu/fp7/dc/index.cfm?fuseaction=UserSite.CapacitiesDetailsCallPage&call\\_id=321](http://cordis.europa.eu/fp7/dc/index.cfm?fuseaction=UserSite.CapacitiesDetailsCallPage&call_id=321)

## Beneficiary

SMEs for the whole technologies and fields of research and development.

## Funding

- Research for SMEs: € 110 000 000.
- Research for SME associations: € 79 000 000.
- Demonstration actions: € 15 000 000.

## Requirements

Funding scheme Minimum conditions.

See:  
[ftp://ftp.cordis.europa.eu/pub/fp7/docs/calls/capacities/sme/p-gfa-201101\\_en.pdf](ftp://ftp.cordis.europa.eu/pub/fp7/docs/calls/capacities/sme/p-gfa-201101_en.pdf)

# SEVENTH FRAMEWORK PROGRAMME / COOPERATION

## Web Site

[http://cordis.europa.eu/fp7/home\\_en.html](http://cordis.europa.eu/fp7/home_en.html)

## Contact

Seventh Framework Programme web site.

## Beneficiary

All partners public or private on the territory of the European Union but also organisations and researchers from more than 100 countries all over the world are already involved in EU research programmes.

## Funding

Total of 300 000 000 euros (with different calls for projects)  
45% max for PME on the territory of the poles  
30% max for PME outside the territory of the poles  
30% max for enterprises with intermediate size on the territory of the poles  
25% max for the other enterprises  
40% for public research institutions)

## Requirements

- At list 2 enterprises and 1 public research organism or training organism.
- Project run by an industrial enterprise developing RandD works.
- Project approved by at least 1 competitiveness pole and majority of woks developed on the territory of the pole.
- Prove economical benefit of the project for the concerned territory.
- At least 20% of expenses realized by the PME.

# STRUCTURING RESEARCH AND DEVELOPMENT PROJECTS OF COMPETITIVENESS POLES

## Web Site

<http://competitivite.gouv.fr/les-investissements-d-avenir-de-lemprunt-national-une-opportunité-pour-les-poles-de-competitivite/les-projets-de-r-d-structurants-une-opportunité-pour-les-poles-de-competitivite-658.html>

## Beneficiary

All enterprises (whatever the size) with Research and development activities.  
Laboratories and research institutions.  
Training centers.  
All organizations developing Research and Development works.

## Funding

Total of 300 000 000 euros (with different calls for projects)  
(45% max for PME on the territory of the poles  
30% max for PME outside the territory of the poles  
30% max for enterprises with intermediate size on the territory of the poles  
25% max for the other enterprises  
40% for public research institutions)

## Requirements

- At list 2 enterprises and 1 public research organism or training organism.
- Project run by an industrial enterprise developing RandD works.
- Project approved by at least 1 competitiveness pole and majority of works developed on the territory of the pole.
- Prove economical benefit of the project for the concerned territory.
- At least 20% of expenses realized by the PME.

# SUPPORT TO COLLABORATIVE RESEARCH AND DEVELOPMENT PROJECTS OF COMPETITIVENESS POLES - 11TH CALL FOR PROJECTS

## Web Site

<http://competitivite.gouv.fr/les-appels-a-projets-de-r-d-dans-le-cadre-du-fui-fonds-unique-interministeriel/le-11e-appel-a-projets-de-r-d-714.html>

## Beneficiary

All enterprises (whatever the size) with Research and development activities.  
Laboratories and research institutions.  
Training centers.  
All organizations developing Research and Development works.

## Funding

From 2009 to 2011: Total of 495 000 000 euros (with different calls for projects)  
(45% max for PME on the territory of the poles  
30% max for PME outside the territory of the poles  
30% max for enterprises with intermediate size on the territory of the poles  
25% max for the other enterprises  
40% for public research institutions)

## Requirements

- At list 2 enterprises and 1 public research organism or training organism.
- Project run by an industrial enterprise developing R&D works.
- Project approved by at least 1 competitiveness pole and majority of woks developed on the territory of the pole.
- Prove economical benefit of the project for the concerned territory.
- At least 20% of expenses realized by the PME.

## national fundings (Spain)

# (ENISA) PARTICIPATIVE LOAN

## Contact

<http://www.enisa.es/> (+34 915 708 200)

## Beneficiary

Small and Medium Enterprises.

## Funding

- Variable interest rate (with maximum and minimum).
- Amount of finance between 100.000 Euros and 1.000.000 Euros and never more than its own company resources.
- Financing every type of investment

Find out more information:

[http://www.enisa.es/Financiacion\\_Enisa.aspx](http://www.enisa.es/Financiacion_Enisa.aspx)

## Requirements

- It is required a technical and economical feasibility promoted by a team of proven professionalism.
- The project must co-financed: own funds  $\geq$  given loan.
- Having audited financial states.



# CANADEKA (BILATERAL PROGRAM FOR TECHNOLOGICAL COOPERATION)

## Contact

<http://www.cdti.es/index.asp?MP=15&MS=187&MN=3>

## Beneficiary

The program is an attempt to promote business Technological Cooperation between entities from Spain and Canada on technology transfer project, technological development and innovation in order to create economic profits for Spain and Canada

## Funding

The financing of projects by CDTI will be subject to the following conditions:

- Soft credit of up to 75% of the budget of Spanish participation.
- A period of amortization of up to 10 years.
- Possibility of a non-reimbursable tranche of 33% of the credit granted by the CDTI

## Requirements

Any Spanish company which has an idea for a project submits a brief preliminary report to CDTI. This report, which should be approximately 3 to 4 pages long, is focused on the Spanish participation in the project and must reflect the most notable technical characteristics and the commercial feasibility of the project, along with general information regarding the company. It serves as a foundation for being able to give the company a first option on the project proposal, and to suggest, where appropriate, any modifications or changes in focus that improve on the project.

Once the project is defined among all the participants, the Bilateral Program form must be submitted to both CDTI in Spain and to the NRC in Canada, once agreed upon by all the parties. This document must place an emphasis on the project as a whole, the participants' activities and the importance thereof for all of the partners.

# CDTI FUNDING

## Contact

<http://www.cdti.es/index.asp?idioma=2>

## Beneficiary

CDTI evaluates and finances R&D projects developed by companies regardless of their activity sector and size. The total amount of financing offered generally fluctuates between 150.000 and 3.000.000 euros.

The entities that may receive financing in the form of credits granted by CDTI are Commercial Companies with the technical capacity to undertake a project involving research, development or technological innovation and sufficient financial capacity to cover a minimum of 30% of the total budget for the project with their own resources.

## Programmes

- CENIT Programme.
- Research and individual development Projects.
- CDTI loans for financing technological innovation.
- Bank Prefinancing line.
- Technological fund.
- National cooperation inter enterprises projects.
- Neotec initiative.

## Requirements

The financing CDTI offers to companies consist of credits with a zero rate of interest and long-term amortization that covers up to 60% of the total budget for the project. CDTI only backs projects that are technically and economically viable, but does not demand real guarantees from the promoting company for the awarding of its credits. The financing given by CDTI basically comes from the Centres own resources and from the **European Fund for Regional Development**.

# CHINEKA (BILATERAL PROGRAM FOR TECHNOLOGICAL COOPERATION)

## Contact

<http://www.cdti.es/index.asp?MP=15&MS=188&MN=3>

## Beneficiary

The Bilateral Spanish-Chinese Program for Technological Cooperation (Chineka) promotes international technological cooperation between entities in Spain and China, through projects led by companies with the goal of **promoting the competitiveness** of Spanish and Chinese company, by fomenting and supporting the execution of joint technological projects oriented towards the development and/or adaptation of new products, processes or services intended for international markets.

Two or more business entities from both countries can take part in this program.

## Funding

Each country, through its managing entities, CDTI in Spain and Torch in China, is responsible for evaluating and later certifying the projects approved with a **“seal of quality”**.

For the Spanish part, CDTI will grant financing to the approved projects under preferential conditions:

- Soft credit of up to 75% of the budget of Spanish participation.
- A period of amortization of up to 10 years.
- Possibility of a non-reimbursable tranche of 33% of the credit granted by the CDTI.

## Requirements

In order to participate in the program, any Spanish company which has an idea for a project must provide CDTI with a brief preliminary report. This report, which should be 3-4 pages long, is focused on the Spanish participation in the project and must state the most notable technical characteristics and commercial feasibility of the project, along with general information regarding the company. This is used as a foundation to be able to give the company a first opinion on the project proposal and to suggest, where appropriate, any modifications or changes in focus that improve upon the project.

Once the project has been defined among all the participants, the Chineka Program form must be submitted to both CDTI in Spain and to the Torch in China, once agreed upon by all the parties. This document must place an emphasis on the project as a whole, the participants' activities and the importance thereof for all of the partners.

# DG-PYME (MITYC) FUNDING

## Contact

Small and Medium Enterprise General Direction  
SME's. Information Area: +34 900 19 00 92  
<http://www.ipyme.org/es-ES/SubvencionesAyudas/Paginas/Subhome.aspx>

## Beneficiary

This Business Promotion Plan aims to help SME's in order to:

- Promote the initiative and the business spirit in the society, especially among youth and some enterprising sectors.
- Create new innovative companies.
- Help the growth and consolidation of the new and existing companies markets.
- Company internationalization.

## Funding

### -Program Innoempresa:

With the following financing lines:

- Organization Innovation and advanced management
- Quality and Technological Innovation
- Collaborative Innovation Projects

### -Find out more information:

<http://www.ipyme.org/es-ES/SubvencionesAyudas/InnoEmpresa/Paginas/InnoEmpresaNuevo.aspx>

### -Program Innovative Business Associations:

Find out more information:

<http://www.ipyme.org/es-ES/SubvencionesAyudas/AEI/Paginas/AEINueva.aspx>

### -Program Innovative Business Associations:

Find out more information:

<http://www.ipyme.org/es-ES/SubvencionesAyudas/AEI/Paginas/AEINueva.aspx>

### -Company Social Responsibility-SME's:

Find out more information:

[http://www.ipyme.org/es-ES/SubvencionesAyudas/RSE/Paginas/ResponsabilidadSocialEmpresa\\_Ficha.aspx](http://www.ipyme.org/es-ES/SubvencionesAyudas/RSE/Paginas/ResponsabilidadSocialEmpresa_Ficha.aspx)

### -Enterprising Support Centers:

Find out more information:

[http://www.ipyme.org/es-ES/SubvencionesAyudas/CentrosApoyoEmprendedores/Paginas/Ceaes\\_Ficha.aspx](http://www.ipyme.org/es-ES/SubvencionesAyudas/CentrosApoyoEmprendedores/Paginas/Ceaes_Ficha.aspx)

### -Business Angels Net:

Find out more information:

<http://www.ipyme.org/es-ES/SubvencionesAyudas/RedesBusinessAngels/Paginas/ImpulsoRedesBusinessAngels.aspx>

### -Plan of Business Continuity:

Find out more information:

<http://www.ipyme.org/es-ES/IniciativaEmprendedora/Paginas/PlandeContinuidadEmpresarial.aspx>

### -SME's Support Center in Industrial Property Management:

Find out more information:

<http://www.cevipyme.es/>

# IDAE FUNDING

## Contact

IDAE (Diversification and Energy Save Institute):  
+34 91 456 49 00

<http://www.micinn.es/portal/site/MICINN/menuitem.d20caeda35a0c5dc7c68b11001432ea0/?vgnextoid=2c3b282978ea0210VgnVCM1000001034e20aRCRD>

## Programmes

**-Third-Party Financing (TPF):** this is one of the most appropriate mechanisms available to undertake investment projects in energy saving and efficiency and energy generation using various sources, including renewable energy sources. The IDAE, the main promoter of this financing mechanism in Spain, has been using it successfully since 1987.

Find out more information:

<http://www.idae.es/index.php/mod.pags/mem.detalle/idpag.38/relcategoria.1024/re/menu.60>

**-Project finance and Provision of services:** a financing mechanism applicable to projects investing in energy saving, energy efficiency and renewable energy sources, which have undergone a prior economic/technical feasibility analysis. It is a new model of financial collaboration which entails drawing up and signing two contracts: framework collaboration and service provision contract and a project finance contract.

Find out more information:

<http://www.idae.es/index.php/mod.pags/mem.detalle/idpag.44/relcategoria.1024/re/menu.61>

**-Programme of aid for strategic projects:** This is a line of IDAE support aimed at financing energy saving and efficiency projects. The programme is set in the context of the IDAE's direct actions under the 2008-2012 Action Plan for the 2004-2012 Spanish Energy Saving and Efficiency Strategy (E4).

Find out more information:

<http://www.idae.es/index.php/mod.pags/mem.detalle/relcategoria.1160/id.514/re/menu.138>

# ISP (INDIA) (BILATERAL PROGRAM FOR TECHNOLOGICAL COOPERATION)

## Contact

<http://www.cdti.es/index.asp?MP=15&MS=234&MN=3>

## Beneficiary

The India-Spain Bilateral Technology Cooperation Program promotes joint technology cooperation projects between companies from India and Spain via technology transfer, industrial research, technological development and innovation. The objective of this program is to promote, assist and fund the development of joint technology cooperation from India and Spain in areas of mutual interest for the purpose of generating economic benefits for both countries.

Two or more business entities from both countries can take part in this program. They design and manage a shared project in any technical field. Moreover, the participation of other business entities or public research bodies within the consortium is permitted.

## Funding

Each country, through its managing entities, CDTI in Spain and TDB in India, is responsible for evaluating and later certifying the projects approved with a **"seal of quality"**

For the Spanish part, CDTI will grant financing to the approved projects under preferential conditions:

- Soft credit of up to 75% of the budget of Spanish participation.
- A period of amortization of up to 10 years.
- Possibility of a non-reimbursable tranche of 33% of the credit granted by the CDTI

## Requirements

In order to participate in the program, any Spanish company which has an idea for a project must provide CDTI with a brief preliminary report. This report, which should be 3-4 pages long, is focused on the Spanish participation in the project and must state the most notable technical characteristics and commercial feasibility of the project, along with general information regarding the company. This report is used as a source of information to give the company a first opinion on the project proposal and to suggest, where appropriate, any modifications or changes in focus that improve upon the project.

Once the project has been defined among all the participants, the India-Spain Innovating Program Application form must be submitted to both CDTI in Spain and to the TDB in India, once agreed upon by all the parties. This document must place an emphasis on the project as a whole, the participants' activities and the importance thereof for all of the partners.

# JSIP (JAPAN) (BILATERAL PROGRAM FOR TECHNOLOGICAL COOPERATION)

## Contact

<http://www.cdti.es/index.asp?MP=15&MS=251&MN=3>

## Beneficiary

The Japan-Spain Bilateral Technology Cooperation Program promotes joint technology cooperation projects between companies from Japan and Spain via technology transfer, industrial research, technological development and innovation. The objective of this program is to promote, assist and fund the development of joint technology cooperation from Japan and Spain in areas of mutual interest for the purpose of generating economic benefits for both countries.

## Funding

Each country, through its managing entities, CDTI in Spain and NEDO in Japan, is responsible for evaluating and later certifying the projects approved with a **“seal of quality”**

For the Spanish part, CDTI will grant financing to the approved projects under preferential conditions:

- Soft credit of up to 75% of the budget of Spanish participation.
- A period of amortization of up to 10 years.
- Possibility of a non-reimbursable tranche of 33% of the credit granted by the CDTI.

## Requirements

In order to participate in the program, any Spanish company which has an idea for a project must provide CDTI with a brief preliminary report. This report, which should be 3-4 pages long, is focused on the Spanish participation in the project and must state the most notable technical characteristics and commercial feasibility of the project, along with general information regarding the company. This report is used as a source of information to give the company a first opinion on the project proposal and to suggest, where appropriate, any modifications or changes in focus that improve upon the project.

Once the project has been defined among all the participants, the Japan-Spain Innovation Program Application form must be submitted to both CDTI in Spain and to the NEDO in Japan once agreed upon by all the parties.

# KSI (COREA) (BILATERAL PROGRAM FOR TECHNOLOGICAL COOPERATION)

## Contact

<http://www.cdti.es/index.asp?MP=15&MS=235&MN=3>

## Beneficiary

The KSI (Korea & Spain Innovating) Bilateral Technology Cooperation Program promotes joint technology cooperation projects between companies from South Korea and Spain via technology transfer, industrial research, technological development and innovation. The objective of this program is to promote, assist and fund the development of joint technology cooperation from South Korea and Spain in areas of mutual interest for the purpose of generating economic benefits for both countries.

Two or more business entities from both countries can take part in this program. They design and manage a shared project in any technical field. Moreover, the participation of other business entities or public research bodies within the consortium is permitted.

## Funding

Each country, through its managing entities, CDTI in Spain and ITEP in South Korea, is responsible for evaluating and later certifying the projects approved with a “**seal of quality**”.

As for CDTI's financing, preferential funding of projects can be awarded subject to the following conditions:

- Credit of up to 75% at zero rate of interest of the budget of the Spanish participation.
- Period of amortization of up to 10 years with a grace period of 3 years.
- Up to 33% of the R&D related costs of the credit granted by CDTI may be non-reimbursable.

This public aid is compatible with other aids.

## Requirements

In order to participate in the program, any Spanish company which has an idea for a project must provide CDTI with a brief preliminary report. This report, which should be 3-4 pages long, is focused on the Spanish participation in the project and must state the most notable technical characteristics and commercial feasibility of the project, along with general information regarding the company. This report is used as a source of information to give the company a first opinion on the project proposal and to suggest, where appropriate, any modifications or changes in focus that improve upon the project.

Once the project has been defined among all the participants, the KSI Program Application form must be submitted to both CDTI in Spain and to the ITEP in South Korea, once agreed upon by all the parties. This document must place an emphasis on the project as a whole, the participants' activities and the importance thereof for all of the partners



# LIA FOR DEPLOYMENT AND INTERNATIONALIZATION OF THE SYSTEM

## Contact

Science and Innovation Ministry  
+34 902 218 600/ +34 914 959 554

<http://www.micinn.es/portal/site/MICINN/menuitem.d20caeda35a0c5dc7c68b11001432ea0/?vgnvxtoid=2c3b282978ea0210VgnVCM1000001034e20aRCRD>

## Programmes

### National Network Programme

- Subprogramme: support for innovative business groups (AEI).
- Subprogramme: support for technological platforms.

### National public-private cooperation programme

- Subprogramme: support for National Strategic Consortia for Technical Research (CENIT).
- Subprogramme: support for special strategic projects.
- Extraordinary call 2009, PSE/Energy Subprogramme. Plan E.
- Subprogramme: Support for public-private cooperation programmes related to transport and infrastructures.
- Subprograma INNFACTO.

### National R&D Internationalisation Programme

- Subprogramme: EUROINVESTIGACIÓN.
- Subprogramme: promoting international scientific cooperation (FCCI).
- Sub-programme of specialisation in International Organisations.
- Sub-programme of actions relating to international scientific infrastructures.
- Subprogramme: support for the participation of technology centres in International R&D Programmes (INNOEUROPA).
- Subprogramme TECNOEUROPA.

# LIA FOR HUMAN RESOURCES

## Contact

Science and Innovation Ministry  
+34 902 218 600/ +34 914 959 554

<http://www.micinn.es/portal/site/MICINN/menuitem.d20caeda35a0c5dc7c68b11001432ea0/?vgnextoid=d585b9746e160210VgnVCM1000001034e20aRCRD>

## Programmes

### National Programme for Training Human Resources

- Predoctoral Research Grants
- Subprogramme: Training university lecturers (FPU)
- Subprogramme: grants for developing doctoral theses “Junta para la Ampliación de Estudios” (CSIC-JAE-Predoc)
- Subprogramme: training food and agriculture research personnel (FPI-INIA)

### National Human Resources Mobility Programme

- Subprogramme: mobility of Spanish university lecturers and researchers in foreign centres
- Subprogramme: mobility of foreign university lecturers and researchers in Spanish centres
- Subprogramme: postdoctoral mobility in foreign centres

### National Programme for Recruitment and Incorporation of Human Resources

- Ramon y Cajal Subprogramme: 250 aids in order to contract doctor by Research and Development Centers, for 5 years.
- Juan de la Cierva Subprogramme: 350 aids in order to contract doctors by R&D Centers for 3 years.
- Technical Support staff Subprogramme: 320 aids in order to contract technical staff by R&D centers.
- Torres Quevedo Subprogramme: 1300 aids in order to contract R&D staff by enterprises, Research centers, Enterprises Associations and Scientific and Technological Park, for 3 years.
- Subprogramme: recruitment of doctors from the “Junta para la Ampliación de Estudios” (CSIC-JAE-Doc).
- Subprogramme: recruitment of research technicians from the “Junta para la Ampliación de Estudios (CSIC-JAE-Tec).
- INNCORPORA

# LIA FOR INSTITUTIONAL REINFORCEMENT

## Contact

Science and Innovation Ministry  
+34 902 218 600/ +34 914 959 554

<http://www.micinn.es/portal/site/MICINN/menuitem.d20caeda35a0c5dc7c68b11001432ea0/?vgnextoid=2c3b282978ea0210VgnVCM1000001034e20aRCRD>

## Programmes

### National Programme for Institutional Reinforcement

-Support for strategic research programmes to be carried out by excellence centres and institutions.

# LIA FOR R&D&I PROJECTS

## Contact

Science and Innovation Ministry  
+34 902 218 600/ +34 914 959 554

<http://www.micinn.es/portal/site/MICINN/menuitem.d20caeda35a0c5dc7c68b11001432ea0/?vgnextoid=2c3b282978ea0210VgnVCM1000001034e20aRCRD>

## Programmes

### National Programme for Fundamental Research Projects

- Subprogramme: non-guided fundamental research projects.
- Subprogramme: complementary actions for non-guided fundamental research projects.
- Subprogramme: fundamental research projects for the Transfer of Knowledge to Enterprises (TRACE).
- Subprogramme: fundamental research projects for agrarian resources and technologies in partnership with autonomous regions, and of complementary actions.
- Subprogramme: CONSOLIDER research projects.

### National Programme for Applied Research Projects

- Subprogramme: applied industrial research.
- Subprogramme: collaborative applied research projects.
- Subprogramme: applied aerospace research projects.
- Subprogramme: applied research projects in technology centres.

### National Programme for Experimental Development Projects

- Subprogramme: industrial experimental development projects.
- Subprogramme: experimental development projects in technology centres.
- Subprogramme: experimental development projects for the environment and eco-innovation, National Parks subsection.

### National Programme for Innovative Projects

- Subprogramme: InnoEmpresa.

# LIA FOR SCIENTIFIC AND TECHNOLOGICAL INFRASTRUCTURES

## Contact

Science and Innovation Ministry  
+34 902 218 600/ +34 914 959 554

<http://www.micinn.es/portal/site/MICINN/menuitem.d20caeda35a0c5dc7c68b11001432ea0/?vgnextoid=2c3b282978ea0210VgnVCM1000001034e20aRCRD>

## Programmes

-Subprogramme: design, viability, access and improvement of Unique Scientific and Technical Facility (ICTS).

-Subprogramme: Scientific and Technological Activities in Science and Technology Parks (ACTEPARQ).

-Subprogramme: creation and consolidation of technological centres (CREA).

-Subprogramme: acquisition of scientific and technological infrastructure in food and agriculture R&D centres belonging to the INIA and autonomous regions.

-Subprogramme: scientific and technological projects co-funded by the European Regional Development Fund (ERDF).

-Subprogramme: support for the implementation of management systems and R&D&I departments in companies.

# LIA FOR THE USE OF KNOWLEDGE AND TECHNOLOGY TRANSFER

## Contact

Science and Innovation Ministry  
+34 902 218 600/ +34 914 959 554

<http://www.micinn.es/portal/site/MICINN/menuitem.d20caeda35a0c5dc7c68b11001432ea0/?vgnextoid=2c3b282978ea0210VgnVCM1000001034e20aRCRD>

## Programmes

- Subprogramme: support for the transfer function in research centre (INNCIDE).
- Subprogramme: support for young innovative enterprises (JEI).
- Subprogramme: Creation of innovative technology-based companies in science and technology parks (CEIPAR).
- Subprogramme: NEOTEC.

# OFFICIAL LOAN INSTITUTE (ICO)

## Contact

<http://www.ico.es/web/contenidos/home/home.html> (+34 900 121 121)

## Beneficiary

ICO has a number of funding Lines whose objectives are to promote and support productive investment for: Entrepreneurs, SME's Strategic investment promotion, Spanish companies' internationalization, incorporation of productive innovation.

## Funding

Funding are long repayment loans, with preferential interest rate, with easy processing. The maximum loan will be 1,5 million of Euros.

Programs:

- PROINMED Program
- ICO-PYME line
- ICO-Emprendedores Line
- ICO-Crecimiento Empresarial Line
- ICO-Internacionalización Line
- ICO-Liquidez Line
- Plan Avanza Loan
- ICO-ICEX Line

Find out more information:

<http://www.ico.es/web/contenidos/home/home.html>

# R&D&I TAX EXEMPTION

## Contact

Spanish Tax Agency: [www.aeat.es/](http://www.aeat.es/)

## Beneficiary

Entities located in Spain that carry out R+D+I activities as described in the RD 4/2001.

## Funding

R+D+i activities with Tax Exemption according to the Law of Company Taxes being these activities classified as:

- Research and Development.
- Technological Innovation.

The following activities will not be considered as R+D or Technological Innovation:

- Activities that do not produce a scientific or technological innovation.
- Industrial production management activities.



## REGIONAL FUNDINGS (SPAIN)

# REGIONAL FUNDINGS (SPAIN)

## ANDALUCÍA

### Andalusian Innovation and Development Agency (IDEA)

**Contact:** +34 900 850 011

**Web:** <http://www.agenciaidea.es/cocoon/index.html>

Innovation and Business Development Incentive Program:

- Jeremie Andalucía. Reimbursable funds.
- Business Development Support Fund.
- Sustainable Economy Fund.
- Renewable Energies and Energy Efficiency Promotion Fund.
- Innovation Cheque.

Find out more information:

<http://www.agenciaidea.es/cocoon/ai-estatico-.html?p=/Inicio/Incentivos/&c=Incentivos>

## ARAGÓN

### Promotion Aragonese Institute

**Contact:** +34 976702100

**Web:** <http://www.iaf.es/>

Find out more information:

<http://www.iaf.es/webiaf.nsf/indiceayudas?openview>

## BALEARES

### Business Innovation Institute of the Balearic Islands

**Contact:** +34 971 176 055

**Web:** <http://www.idi.es>

- Innoempresas Program
- Renewable Energies and Energy Efficiency Promotion Funding.
- Industrial Companies Funding

Find out more information:

<http://www.idi.es/web/servicios.php/3>

## CANARIAS

### Business Innovation Institute of Canary Islands

**Web:** [www.proexca.es/](http://www.proexca.es/)

Find out more information:

[http://www.gobcan.es/tramites/faces/catalogo/listado-procedimientos.jsp?oM=5s&ord=2&idFamilia=ops\\_f\\_Subvenciones&enplazo=true&idTema=opc\\_materia\\_industria](http://www.gobcan.es/tramites/faces/catalogo/listado-procedimientos.jsp?oM=5s&ord=2&idFamilia=ops_f_Subvenciones&enplazo=true&idTema=opc_materia_industria)

## CANTABRIA

### IDICAN

**Contact:** +34 942 29 00 03

**Web:** [www.idican.es/](http://www.idican.es/)

Find out more information:

[http://www.gruposodercan.es/enlaces/apost\\_innov/ampliar.php?Id\\_contenido=637&v=0](http://www.gruposodercan.es/enlaces/apost_innov/ampliar.php?Id_contenido=637&v=0)

## CASTILLA Y LEÓN

### ADE INVERSIONES Y SERVICIOS

**Contact:** +34 900 30 60 90

**Web:** <http://www.ade.jcyl.es/>

Find out more information:

[http://www.ade.jcyl.es/web/jcyl/ADE/es/Plantilla66y33/1257516022637/\\_/\\_/](http://www.ade.jcyl.es/web/jcyl/ADE/es/Plantilla66y33/1257516022637/_/_/)

## CASTILLA LA MANCHA

### CLMINOOVACIÓN

**Web:** <http://www.clminnovacion.com/>

Find out more information:

[http://www.clminnovacion.com/index.php?option=com\\_ayudas&view=ayudas&Itemid=5&lang=es](http://www.clminnovacion.com/index.php?option=com_ayudas&view=ayudas&Itemid=5&lang=es)

## CATALUÑA

### ACC10

**Contact:** +34 934 76 72 00

**Web:** <http://www.acc10.cat/ACC10/cat/>

-ICF ACC10 Innovation Line.

-Innovation Loan.

Find out more information:

<http://www.acc10.cat/ACC10/cat/innovacio-tecnologica/>

## COMUNIDAD DE MADRID

### IMADE

**Contact:** +34 934 76 72 00

**Web:** <http://ayudas.imade.es/>

-Innoempresa Program

-Business Innovation Plan

Find out more information:

[http://ayudas.imade.es/programas\\_ayuda.htm](http://ayudas.imade.es/programas_ayuda.htm)

## COMUNIDAD FORAL DE NAVARRA

### NAVARRAINNOVA

**Web:** <http://www.navarrainnova.com>

Find out more information:

<http://www.navarrainnova.com/es/ayudas-y-apoyos-i+d+i/>

### SODENA

**Contact:** +34 848 421942

**Web:** <http://www.sodena.com/>

Entity for business finance in Navarra

## COMUNIDAD VALENCIANA

### IMPIVA

**Contact:** +34 934 76 72 00

**Web:** <http://www.impiva.es/index.php?lang=castellano>

- Research and technological development for large Enterprises Program.
- Research and technological development for SME's Program.
- Technological base enterprise creation Program.
- Expande Program.

Find out more information:

[http://www.impiva.es/index.php?option=com\\_content&task=blogcategory&id=124&Itemid=265](http://www.impiva.es/index.php?option=com_content&task=blogcategory&id=124&Itemid=265)

### AVEN

**Contact:** +34 963 427 900

**Web:** <http://www.aven.es/ayudas/index.html>

## EXTREMADURA

### EXTREMADURA EMPRESARIAL

**Contact:** +34 913 49 56 00

**Web:** <http://www.extremaduraempresarial.es/>

Find out more information:

<http://www.extremaduraempresarial.es/?page=226>

## GALICIA

### IGAPE

**Contact:** +34 981 541 147

**Web:** <http://www.igape.es/>

Find out more information:

<http://app.igape.es/.axudas/>

## LA RIOJA

### **Economic Development Agency of La Rioja (ADER)**

**Contact:** +34 941 29 15 00

**Web:** <http://www.ader.es>

Find out more information:  
<http://www.ader.es/ayudas/>

## PAÍS VASCO

### **SPRI**

**Contact:** +34 94 403 70 00

**Web:** <http://www.spri.es>

Find out more information:  
<http://www.ader.es/ayudas/>

## PRINCIPADO DE ASTURIAS

### **IDEPA**

**Contact:** +34 98 598 00 20

**Web:** <http://www.idepa.es/sites/web/idepaweb/>

Find out more information:  
<http://www.idepa.es/sites/web/idepaweb/servicios/innovacion/index.jsp?csection=2&section=2&pos1=4&pos2=-1&pos3=-1>

## REGIÓN DE MURCIA

### **Economic Development Agency of La Rioja (ADER)**

**Contact:** +34 968 36 28 00

**Web:** [www.institutofomentomurcia.es](http://www.institutofomentomurcia.es)

Find out more information:  
<http://www.institutofomentomurcia.es/web/innova>



FOUNDATION FOR THE  
DEVELOPMENT OF NEW  
HYDROGEN TECHNOLOGIES  
IN ARAGON

[www.hidrogenoaragon.org](http://www.hidrogenoaragon.org)



Innovación y Tecnología

[www.iat.es](http://www.iat.es)



GOBIERNO DE ESPAÑA  
MINISTERIO DE DEFENSA

[www.inta.es](http://www.inta.es)



Castilla-La Mancha

[www.jccm.es](http://www.jccm.es)



Universidad Rey Juan Carlos

cinttec  
Universidad Rey Juan Carlos

[www.urjc.es](http://www.urjc.es)



ECOLE DES MINES D'ALBI  
C A R M A U X

[www.enstimac.fr](http://www.enstimac.fr)

*PHYRENEES*  
Association Hydrogène

<http://blogs.enstimac.fr/phyrenees/>



[www.isq.pt](http://www.isq.pt)



INSTITUTO  
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[www.ist.utl.pt](http://www.ist.utl.pt)