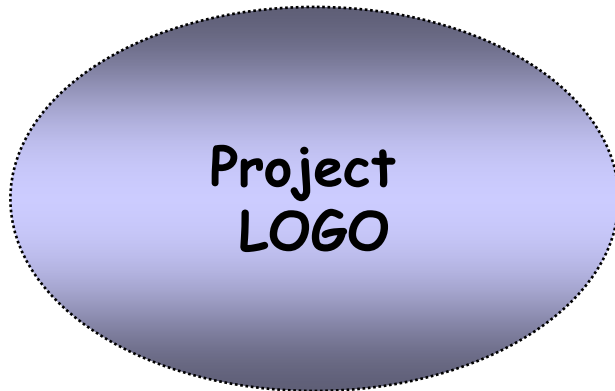


RES FC EIE/05/214/SI2.420237

Regional markets for RES fuel cell systems for households



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Supported by

Intelligent Energy  **Europe**

Main Activities

- ❖ ISR-UC is a Research & Development institute of the University of Coimbra
- ❖ ISR-UC promotes the penetration of advanced energy-efficient technologies through innovative projects, demonstration, education, training, dissemination, energy monitoring, energy audits, and design of energy policies, in collaboration with the utilities, local and regional authorities, industry, building operators, and gas and electricity utilities.



Main Activities

Participation in:

- ❖ European Projects (JOULE, THERMIE, SAVE, EIE, COOPENER);
- ❖ Projects co-financed by the Foundation for Science and Technology;
- ❖ Project partnerships with national companies;
- ❖ Demonstration projects;
- ❖ Energy audits and Power Quality monitoring;
- ❖ Training seminars and workshops to promote energy-efficient technologies, namely in the area of electricity end-use efficiency;
- ❖ ISR-UC has experience in the preparation of brochures and leaflets concerning the efficient use of energy and renewable energies.



List of Energy related projects

"Improving the Penetration of Energy Efficient Motors and Drives" (SAVE II)	finished
"Demand side management in health care facilities" (SAVE)	finished
Conference: "Energy Efficiency Improvements in Rotating Machinery "(SAVE)	finished
"BIOCOSTS-Use of Biomass for Combined Heat and Power"	finished
"Analysis of Regional Markets for Air Conditioning Technologies in Tertiary Sector Buildings and impact of the Development of these Technologies"	finished
"Remote Metering of Electricity - Provision of Information to Customers on Energy Consumption based on Individual Circumstances"	finished
"Providing Energy Services With Fuel Cells in a Liberalised Energy Market"	finished
"Dissemination, Extension and Application of the Motor Challenge Program" (DEXA-MCP)	ongoing
"Motor Challenge Programme - Energy Efficient Electric Motor Systems in New Member and Candidate Countries" (4EM-MCP)	ongoing
"Residential Monitoring to Decrease Energy Use and Carbon Emissions in Europe" (REMODECE)	ongoing
"Monitoring Electricity Consumption in the Tertiary Sector" (EL-TERTIARY)	ongoing



Recent related projects

- Providing energy services with fuel cells in a liberalised energy market (SAVE II), 2002-2004, (<http://embedded.deec.uc.pt/EU-savefuelcell>; <http://www.isr.uc.pt/fuel-cell-services>)

Promotion of fuel cell energy services, namely combined heat and power (CHP), in the buildings sector and in industrial small and medium enterprises (SMEs), through the identification of cost-effective opportunities, by increasing the awareness of the benefits of fuel cell options, and by developing appropriate strategies to foster fuel cell energy services in those types of consumers.



Project Work Programme

- ❖ **WP 1: Analysis of energy services options in a liberalised market**
- ❖ **WP 2: Development of cost benefit analysis methodology for fuel cell energy services**
- ❖ **WP 3: Analysis of the distributed generation fuel cell market potential as well as the associated primary energy and carbon savings in the countries involved**
- ❖ **WP 4: Analysis of market barriers**
- ❖ **WP 5: Identification of possible strategies to promote fuel cell energy services**
- ❖ **WP 6: Dissemination**



Main Conclusions

- ❖ Technology still under development. Equipment is available for commercialisation from the four main categories (PEMFC, PAFC, MCFC, SOFC), however the prices are still too high.
- ❖ Based on the economic analysis carried out (one hospital and one hotel), the application of PEMFC to operate on peak hours (1040 hours per year) and excluding cooling charges, is cost effective even at the present market conditions, with payback time of 10 years.
- ❖ The need to provide high reliability electricity to a growing number of customers and environmental concerns, are key strategies to promote the large-scale penetration of FC.



Barriers

The majority of barriers for energy services lay in the economic and technical fields:

- ❖ Lifetime, reliability and high investment costs
- ❖ Infrastructure and grid connection issues
- ❖ Production, distribution and storage of H₂
- ❖ Necessity of greater public money needs to be spent on FC R&D.



Recent related projects

- **Fuel Cell Test and Integration for High Power Quality Application, 2005-2007**

Objective: the comprehensive research of dynamic behavior of the fuel cell based system, including different modes of utilization (e.g. energy storage option and grid interface connection). These tasks include dynamic modeling tools development and capabilities for simulation of the state-of-the-art fuel cell technologies and verification of reliability of the computer system by an experimental approach.

- **CISEPI - 2005-2006**

ISR-UC is carrying out with the National Grid (REN) the CISEPI project dealing with the large scale penetration of wind power, analysing possible energy storage and distributed generation options, which includes the use of hydrogen and fuel cells as one of the options.

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