HOW TO ATTRACT STUDENTS TO THE GAS INDUSTRY: THE NATURGAS ENERGIA R&D CHALLENGE

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a. Background

Naturgas Energia has launched a pilot project to attract talent to the gas industry by promoting gas Research and Development projects aiming at graduate university students. The Academic Focus Point Project ("Aula" in Spanish) is being developed in partnership with the University of the Basque Country (Spain).

The shortage of talent is currently one of the most important issues facing the gas industry worldwide. According to numerous surveys deployed by the gas industry the demand for skilled personnel has surpassed supply due to the rapid growth of new gas projects and markets. The ageing of existing staff, the retirement of many gas experts and the ever decreasing number of fresh professionals interested in the gas industry have heightened the problem.

The issue calls for a rapid industry response, taking into account regional features and involving key stakeholders such as gas companies, university, governments and energy associations

In order to better understand the demographics and issues impacting the workforce in the gas industry, the Malaysian Presidency of International Gas Union set up Task Force 1 "Building Strategic Human Capital" for the 2009-2012 Triennium.

Naturgas Energia represents the Spanish Gas Association (SEDIGAS) in Task Force 1 and has started to work on the Academic Focus Point within the University premises as a possible solution to address this problem which seems particularly acute in Europe.

This article describes the main steps to build up the "Naturgas Energia Academic Focus Point" or "Aula". The Aula project is presented as an example of good practice to be shared with the Gas Industry worldwide to attract young talent to the gas industry.

b. Objectives

Naturgas Energia's proposal aims to attract the attention of university students and foster their interest in the gas industry by focusing on the company's Research and Development work.

Although the projects have been put into practice only recently, one of the company's long-standing aspirations is seeking to establish a Framework Agreement between the University of the Basque Country – Euskal Herriko Unibertsitatea (UPV-EHU) and the Naturgas Energia Group. In parallel, within the scope of the European Gas Research Group (GERG), to which the company has belonged since January 2006 and whose current Vice-President is Dr Angel Mª Gutierrez, R&D Manager of Naturgas Energia, it became evident that European gas companies have to form closer ties with the so-called "Academy" (universities). The "GERG Academic Network" was created to promote jointly work on R&D projects related to natural gas and also activities aimed at promoting the gas industry at various European universities. .

These aspects were taken into account by the Research, Development and innovation Department, which laid the foundations for the signing of a Framework Partnership Agreement for Research, Development and Innovation between the Vice-rector of Research of the University of the Basque Country or UPV-EHU and the Chief Executive Officer of Naturgas Energia in December 2009.

One of the established aims of the UPV-EHU University partnership was the creation in the 13 of May 2011 of an Agreement for Scientific and Technology activities. Dr Juan Ramón Arraibi, Managing Director of Regulated Businesses of Naturgas Energia and Mr Rafael Careaga, Corporate Director of Resources and Institutional Relationships (See photo 1), were the key people in the setting up of the Naturgas Energia Academic Focus Point or Aula at the Faculty of Engineering in Bilbao, which is part of the University of the Basque Country-UPV-EHU.

As a feature of this partnership, it was the desire that the R&D work should be open not only to the Basque University's own students, but also to students from other Spanish and even overseas universities, subject to their acceptance by one of the University's professors and tutors.

For the pilot, Naturgas Energia proposed various R&D projects to be developed by students as an end-of-degree project at the Faculty of Engineering in Bilbao.

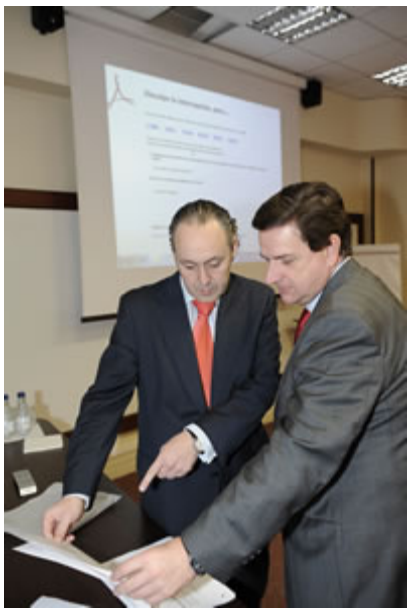

Photo 1: *Mr Juan Ramón Arraibi and Mr Rafael Careaga from Naturgas Energia*

Besides its interest in the results of the proposed academic projects, Naturgas Energía aims to foster the development of new knowledge as well as to provide the students with the opportunity to learning, experience, motivation and, above all, insight into the gas sector.

c. Methodology

Naturgas Energia has launched a pilot project to attract talent to the gas industry by promoting gas Research and Development projects to graduating university students through an Academic Focus Point (called Aula in Spanish) at the University of the Basque Country (Spain).

According to the students involved in the Project Aula, this represents an opportunity to get involved with the working world, as well as a chance to demonstrate their worth before finishing their studies. Their enthusiasm and dedication makes it a privilege for Naturgas Energia to work with them. The quality of the work that they are carrying out, to which their tutors make certain contributions, means that success is guaranteed.

The Agreement for Scientific and Technology activities with the School of Engineering is a general ongoing umbrella agreement. A Particular Agreement, renewed every year, includes the details of the specific projects to be worked on during each academic year. A Particular Agreement for the 2010/11 academic year was signed in November 2010 by the Director of the Faculty of Engineering, Dr Enrique Amezua, and the Corporate Director of Resources and Institutional Relationships of Naturgas Energia, Mr Rafael Careaga. The agreement specifies the initial five projects for Aula.

Prior to August the parties define the projects on which we want to work during the forthcoming academic year. Both Naturgas Energia and the Faculty of Engineering make proposals. The proposals are open to the needs of all of the company's areas and departments. Due to current physical space restrictions, Aula will have to make cuts if more than six or seven projects are submitted,. The purpose is not to cramp the students and rather provide them with a healthy and comfortable environment. The filter fundamentally consists of establishing whether the proposed projects fit in with Naturgas Energia's R&D strategy, which basically includes work on matters related to the safety of gas supplies, energy efficiency and sustainability. This last aspect is extremely important to Naturgas Energia as an energy group.

After agreeing on the projects proposed by Naturgas Energia and the Faculty of Engineering, the latter appoints a tutor for each project. The Faculty subsequently holds an open day to present the projects and to offer them to students at the beginning of the academic year. Students sign up voluntarily to the projects that they are most interested in; the Executive Management of the Aula then selects the candidates. Those who are chosen (one per project) meet with a tutor who will help and guide them through the development of the work.

At the start of each project Naturgas Energia and the Faculty hold a meeting in the Aula space to welcome the students and tutors, to personally explain what is expected from them and to offer them assistance and willingness to work with them in a close partnership. This is followed by an interim meeting in January and a final meeting in June/July, at which the students submit the final reports of their projects. .

Both Dr Juan Ramón Arraibi and Dr Angel Mª Gutierrez belong to the Naturgas Energia's Academic Focus Point Executive Committee. Faculty of Engineering professors Dr Jokin Gorozika and Dra Belén Güemez are also Committee members. Their task is to select the students and tutors and hold meetings (see photo 2) The Committee ensures that their projects are properly orientated and that they achieve their objectives at the end of the course.

Photo 2: *One of the Academic Focus Points meetings at the Aula of Naturgas Energia*

In addition, the Aula's projects are all based on international subjects. In fact, Naturgas Energia submitted two works related to the Aulas's projects no. 2 and no. 4 to a competition held as part of the EGATEC 2011 European Gas Technology Conference, which took place in Copenhagen on the 12th and 13th of May. Both projects have been accepted.. The projects were entitled: *"Hydrogen purification with hydrogen selective ceramic membranes"* and *"Design and optimization of a 10 m^3 biodigester to valorise pig manure in a small size farm".* We would like The latter project, related to renewable methane, was awarded the European third prize in the conference activity known as the "GERG Academic network", out of a total of 40 papers submitted by more than 20 European Universities - including the University of the Basque Country. Out of these only 20 made the cut to be defended at the aforementioned European conference. Therefore, both the Bilbao Faculty of Engineering and Naturgas Energia mutually congratulated on this successful partnership.

d. Results

Naturgas Energia has launched a pilot project to attract talent to the gas industry by promoting gas Research and Development projects to high-level students through an Academic Focus Point (called Aula in Spanish) at the University of the Basque Country (Spain). In the year 2010/2011 the first five R&D projects were launched as follows:

Project 1: ANALYSIS OF BIO-METHANE PURIFICATION TECHNOLOGIES.

Student: Amaia Sasiain Conde. Tutor. Laura Barrio. Department of Chemical Engineering and the Environment

This project evaluates different processes that could be adapted for the purification of methane gas from renewable production technologies –biogas-, in order to obtain natural gas of sufficient quality to be injected into the gas network or for a possible use in vehicle transport.

Project 2: DESIGN OF A BIOGAS PRODUCTION PLANT.

Student: Leire Saez de Arregui. Tutor. Belén Güemez. Department of Chemical Engineering and the Environment

The aim of this project is to define the most suitable operating parameters to allow a biogas production process to be designed and optimised. The paper will include: a) an analysis of the most appropriate raw material (purine) for generating a biogas, that is from a single origin or a mixture of several origins; b) the definition of site logistics based on the choice of raw material; c) the design of the main operating units, including those used for purification; and d) the storage of the biogas that is produced.

Project 3: MODELLING OF A PIPELINE DISTRIBUTION NETWORK FOR THE TRANSPORT OF MIXTURES OF HYDROGEN AND NATURAL GAS.

Student: José Pablo Morato Lorenzo. Tutor. Gustavo Esteban. Department of Nuclear Engineering and Fluid Mechanics

This project analyses the possibility of using current gas infrastructure to transport hydrogen by mixing it with natural gas, such as to improve the efficiency of combustion processes and to decrease emissions of polluting gases.

Project 4: DEVELOPMENT OF ADVANCED HYDROGEN GENERATION PROCESSES.

Student: Gonzalo Miguel De Diego. Tutor. Esther Acha. Department of Chemical Engineering and the Environment

This is experimental work being carried out at the facilities of the Department of Chemical Engineering and the Environment, in which new technologies are being tested, such as the use of selective membranes for the purification of currents obtained from steam reforming processes or the partial oxidation of methane.

Project 5: MODELLING OF DOMESTIC MARKET NATURAL GAS DEMAND FORECASTS

Student: Verónica De Prado Acuñas. Tutor. Ernesto Cilleruelo. Department of Business Organisation

This project is establishing correlations between the consumption of gas by domestic and commercial clients and the seasonal nature of this consumption and other significant variables. The aim is to improve gas management and demand forecasts. This project is being carried out on the express request of Naturgas Energía Servicios Company.

To consolidate the Academic Focus Point or Aula, and to keep it functioning well, in itself a complex task; we believe that this will allow us to use innovation to create a good impression of gas in society.

However, looking to the future Naturgas Energia is aiming at creating a Masters Degree in Gas, which would be run at the facilities of the Faculty of Engineering, taking advantage of the positive impression of the initiative among students.

For illustrative purpose, three students, who have worked on the projects 1, 3 and 4; have given their impressions and opinions about the Aula experience:

1) Student: José Pablo Morato Lorenzo (see photo 3)

Photo 3: *The student José Pablo Morato*

"…I have to submit my end of course project this year in order to finish my studies. When the University offered me the chance to work in partnership with Naturgas Energia to develop a research project for them, I liked the idea. It was going to be interesting work that I could also use as a basis for my end of course project. The project that I am working on is entitled "The modelling of the distribution network for the transport of hydrogen / natural gas mixtures". It is very interesting for me because I am working with matters related to gas and hydrogen technologies, which were not, included as part of my previous course studies. In addition, I am taking advantage of the great opportunity to start learning about the working world, as it is one thing to like what you study, but quite another to be given the chance to start applying what you learn to the real world. It is doubly satisfying: on the one hand you get to work on the project itself, and on the other you are doing useful work that may serve as a basis for future investments that Naturgas Energia wants to make…"

2) Student: Gonzalo Miguel De Diego (see photo 4)

Photo 4: *The student Gonzalo Miguel*

"…In the end we are all here for the same reason mentioned by Pablo. I would just like to add that it is also very helpful to us to have the support of tutors that guide us through the realisation of the project and the periodic supervision of Naturgas. For us this is a big advantage when it comes to working on our end of course project…"

3) Student: Amaia Sasiain Conde (see photo 5)

Photo 5: *The student Amaia Sasiain*

"…*I think that it is a very good idea, because as well as finishing the project it is a very good thing that it is related to renewable energies, on which a heavy emphasis is currently being placed. I think it is great. Above all they give you the chance to work for a company…*"

e. Summary / Conclusions

The Aula project has been implemented very recently but so far it has been very successful in its objectives. Aula was set-up for the academic year 2010/2011 and it began with five R&D projects. Due to the success of the initiative among the Academy, seven new R&D projects are being developed for 2011/2012.

The main conclusions of the Naturgas Energia initiative are the following:

1. – The project was successful in attracting the best Engineering students to gas subjects.

2. – Aula has the potential to attract talented workforce for R&D projects developed by the gas company.

3. – The project enhances the image of the gas industry within the Academy by means of innovation.