Josimar HERRERA MORENO
Institut de Recerca en Energia de Catalunya  (Barcelona, Spain)

Testing and validation of a stochastic models of user behaviour in residential buildings.

IREC is the leading research center in energy in Catalonia. It specializes in researching and developing technology in connection with energy savings and efficiency, and with renewable energies. One of its areas is the Thermal Energy and Building Performance Group whose main research subject is the Integrated and Systemic approach for Zero Energy Communities, Buildings and Industries. The group’s special focus is on the Mediterranean and other warm weather regions. The full breadth of the actions and thrust areas of the group are oriented to contributing to this main objective.

The master thesis is focused on how to characterize the electrical consumption of the residential sector in Spain analyzing two different approaches: statistical analysis (top-down) and stochastic modelling (bottom-up). Within the first approach, a characterization and analysis of the population and the relationship between electricity consumption and socioeconomic parameters is done. The second approach aims at testing a stochastic model that reproduces the detailed electricity use of appliances and devices in single-family houses located in the Mediterranean regions. Consequently, both approaches are compared and validated in order to verify the behavior and utility of the model.
Soujanya MANTRAVADI  
Alstom (Paris region, France)  
Project management related to CSR stakeholders and enhancement of EHS processes & tools.

Alstom is a global leader in power generation, power transmission and rail transport. The group is present in around 100 countries with more than 93,000 permanent employees.

The thesis is in line with the below mentioned practices of Alstom EHS team, that continuously improve its processes and tools in order to harmonize actions across the group, increase visibility and coherence and support preparation of internal & external communications on EHS / CSR:

- Management of contributors' network to answer key rating agencies' questionnaires (CDP and Dow Jones Sustainability Index) and Designing central report to support standard answers to other stakeholders' requests
- Preparation of Sustainable Development section of the annual Registration Document, including internet information update
- Increase efficiency of EHS processes and tools, Support the improvement of EHS reporting process
- Communication and deployment of Alstom's biodiversity guidelines

Lalit THITIPAISAL  
Aquasource, DEGREMONT (Paris, France)  
Technico-Economic and Environmental Analysis of Thermal Insulation Approaches for Outdoor Units.

Specialist in ultrafiltration for water production, Aquasource is a subsidiary of Degremont group, an integral part of SUEZ ENVIRONNEMENT, global leader in environmental engineering solution. The company designs water treatment solutions, produces ultrafiltration systems and filtration membranes, and provides technical supports for drinking water, industrial water, recycling water, and pretreated water for reverse osmosis desalination.

Mobile system installed outside the building has become more popular because it can serve water demand immediately and it is easy to transport, install and optimize. However, temperature fluctuation due to climate is the main constraint for these products. It causes freezing problem which harms the equipment when temperature is below zero. Also, temperature rising will change water characteristics affecting system performance.

This master thesis objective is

- To design insulation system approaches to maintain thermal comfort inside container during operation and to prevent freezing and overheating.
- To optimize energy consumption with integration of new environmental friendly approaches.
Cristina COLI  
questor centre (Belfast, UK)  
Maximization of the Value of Anaerobic Digestion Products: Biogas Upgrading and Compression.

The growing concern of climate change and global warming has made necessary to find energy sources alternative to fossil fuels. Biogas can substitute natural gas after passing through an upgrading process to be converted to biomethane, which can be injected directly to the gas grid or used as vehicle fuel. The aim of this master thesis is to maximize the value of anaerobic digestion (AD) biogas by designing a compression and upgrading model. The main focus is to separate carbon dioxide from the biogas using ionic liquids (IL). IL have many advantages for biogas cleaning over traditional solvents, including low vapour pressures, high thermal and chemical stability and low corrosion. Solubility of carbon dioxide in different IL will be tested experimentally. A mixture consisting of 50%vol. of carbon dioxide and 50%vol. of methane will be used for the experiments. The possibility of regenerating the IL using waste heat from the biogas compression process is also being considered in this project to reduce the energy consumption and costs of the biogas upgrading process.

3rd July 2014 / Lecture hall Teillac

Sultan AL-SHAAIBI  
Tecnalia Research & Innovation (Derio, Vizcaya, Spain)  

TECNALIA Research & Innovation is the first privately funded applied research centre in Spain and one of the leading such centres in Europe. A renowned technological agent in the development of innovative and sustainable solutions for the energy and environmental challenges of industry and society, TECNALIA addresses the complex challenges of energy supply chain and energy systems. Contributing to these efforts, the project builds a model of the energy system in Basque Country, which is characterized by (1) high representation of industry; the most energy intensive sector (about 45% in the energy demand) (2) the high consumption of fossil fuels (about 83% of Basque energy use in 2010). These challenges (and others) along with the compliance with EU targets to reduce GHGs emissions, to promote renewables and implement measures for energy savings and efficient use of energy, are key drivers to simulate different policy-based scenarios to study and analyze the impact of these measures over different time frames.

The aim of this thesis is prepare energy scenarios for the Basque Country for 2050, taking into account different low-carbon pathways and integrating a life-cycle perspective which includes not only the impact during the use and operation phase of energy systems, but also the impacts during the other life cycle phases (manufacturing, installation, end of life).

Carlos Andres FORERO RODRIGUEZ  
Renetech (Stockholm, Sweden)  
Small/Medium scale hydro energy system for Rwanda.

With a global perspective, it is Renetech's mission to be a sustainable and environmentally adapted producer of renewable energy: vehicle fuel, electricity, heat and biogas, through solutions for waste and biomass management. Renetech's business focus is bioresource recovery of energy and by-products [eg. nutrients] from a variety of biomass materials including organic residues and waste streams. Renetech has been working on project development, research and consultancy projects in large and small scale renewable energy projects, mostly in the EU and East Africa. Renetech develops projects in collaboration with technology providers, contractors, equity partners and local stakeholders.

The thesis is formulated around a small/medium scale hydropower project development in Rwanda (RW) within the framework of sustainable development. The thesis will focus on the front end engineering phase of a real case hydro project and proposal of guidelines for proper planning of hydro energy systems in developing countries [Feasibility phase]. The work covers the feasibility study review, followed by a suitable design proposal, selection of the best available technology and supplier, and a financial model of the project. The project's socio-economic development and environmental considerations are also discussed, as well as a review of permits and agreements. Results will be used for the future implementation of the hydro energy system in the country.
Alejandro TRISTAN JIMENEZ
Budapest University of Technology and Economics (Budapest, Hungary)
Comprehensive Analysis of Organic Rankine Cycles for waste heat recovery in IC Engines and Gas Turbines.

The Budapest University of Technology and Economics, abbreviated as BME, is the most significant University of Technology in Hungary and is also one of the oldest Institutes of Technology in the world, having been founded in 1782. The Department of Energy Engineering in BME aims to define the development pathways in energy engineering and to educate students on a way that enables them to solve issues as energy engineers with scientific sophistication through developing responsibility for the future generation. This thesis project departs from the "state of the art" research in Organic Rankine Cycles (ORCs) and bridges the scientific developments in the topic with the economic issues that have halted the massive widespread of these technologies specially to recover the waste heat in industrial processes. In order to achieve a better economic viability conditions, this research studies existent commercial Gas Turbines and IC Engines, two of the most important machinery for the power generation industry, and configures the ideal bottoming ORC from a economic and environmental point of view, while achieving an increase in efficiency and power output.

Tejvir SINGH
Universidad Politécnica de Madrid (Madrid, Spain)
Techno-economical aspects for the development of new concentrating solar thermal power plants.

The Foundation for the Promotion of Industrial Innovation (F2I2) was established in 1993 by the Polytechnic University of Madrid (UPM) in association with the Ministry of Industry and Energy, after consulting the Higher Technical School of Industrial Engineers (ETSII). Thesis work for which grants subsidized by F2I2 focuses on performing technical and economic analysis for existing concentrated solar power (CSP) technologies and thereof comparing them with Fresnel (with molten salt storage) technology which is not commercially available on large scales. There are many challenges faced by today’s solar industry. To name the few- high prices, lack of political and policies support, lower learning curve and variability of solar radiation on planet and many more. Thesis work focuses on developing a cost competitive model with better operation adaptability for low risk power plants based on Fresnel technology. Activities include- secondary research of existing technologies and all concerned issues, technical improvements, economic analysis of different technologies, comparing all existing technologies with finally ameliorated Fresnel technology with help of SAM (System Advisor Modelling). Fresnel Technology is expected to give better and low risk power plants on the basis of all improvements suggested.

Alfredo MIRANDA
Cardiff University (Cardiff, UK)
A new frontier, shale gas in Mexico.

Cardiff University is recognised as a member of the Russell Group of the top 24 universities in the UK. Almost 60% of all its research was assessed as world leading or internationally excellent. It has over 28,000 students who come from more than 100 countries. The School of Engineering is located in the heart of the city and focuses on mechanical, civil, electrical, environmental, medical and integrated engineering. The extraction of shale gas revolutionized the gas industry in the United States and several countries are following their footsteps. An energetic reform was approved in Mexico in 2013 and one of the objectives for the development of the gas industry is the exploitation of unconventional hydrocarbon resources such as gas from shale rock. This study focuses on the Mexico’s current situation with regards to the public policy set and the measures that are necessary in order to successfully implement it from an energetic and environmental perspective. Experiments are conducted to demonstrate the great variety of properties of different Shale rocks obtained across different boreholes in the UK, emphasizing the importance of adequate studies and complete characterization of the geological sites previous to exploitation. This is a factor that the Mexican institutions must take into consideration previous to any commercialization and technology development for their specific sources.
18th September 2014 / Lecture hall Teillac

Maria Paula HELO SARMIENTO  
Micro Energy International GmbH (Berlin, Germany)  
Viability of green microfinance in México

MicroEnergy International (MEI) is a consulting company based in Berlin, Germany with a strong background in energy engineering and economics, microfinance, management and social sciences, and more than ten years of experience in more than 30 countries in Latin America, Africa and Asia. This master thesis is in line with the company’s efforts to design, evaluate and optimize energy products and services, and ensure that financial instruments are tailored to the needs of the business sector and end-users. The project focuses on the feasibility of implementing Solar Thermal Systems (STS) in the Small and Medium Enterprise (SME) sector in México through microfinance schemes, primarily for the production of tortillas [corn dough patties], a basic product within the Mexican diet. A characterization of the potential market will be performed. In addition an analysis of the current and proposed technology and their finance mechanisms will be executed using the software RETScreen International, to aid in the decision making process of implementation of green microfinance projects. This will be MEI’s first insight into the use of this software for the evaluation of projects.

Charles MANGAALI  
Constellium (Paris, France)  
Creation of Sustainable Supply Chain Policy.

The aim of the master’s thesis is to create a Sustainable Supply Chain Policy for Constellium, a global leader that develops innovative, value added aluminum products for a broad scope of markets. This policy will allow the environmental, social and economic impacts of Constellium’s operations and products to be managed. This includes the creating the following:

- Values and Vision
- Setting and Communicating Expectations to Suppliers
- Setting the scope of activities
- Assessment, Evaluation and Monitoring

The first stage in the policy is to create a supplier code of conduct, establishing Constellium’s values and communicating expectations to suppliers. This document is created with the purpose of being signed by all of Constellium’s suppliers. This policy will also include a risk assessment to determine risky suppliers and key suppliers. Finally the determination of how to evaluate and monitor these suppliers will be established. This will include creating an audit system. Additional activities may include reviewing the sustainability report and creating a recycling system across the plants.