IS.UPC - Research Institute for Sustainability Science and Technology

2013-2014 ANNUAL REPORT



UNIVERSITAT POLITÈCNICA DE CATALUNYA BARCELONATECH



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UPC

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1. PRESENTATION

The Research Institute for Sustainability Science and Technology of UPC - BarcelonaTech is the responsible unit for promoting, coordinating and carrying out academic activities in the fields of sustainability science and sustainable technologies.

The Institute's mission is to generate technical and conceptual tools to create a more sustainable production and development model and to collaborate in the UPC's endeavor to provide scientific and technical support for human, social, cultural and economic progress.

The IS.UPC is active in higher education, research and innovation, technology transfer and promotion of sustainability culture.

Its main objectives are as follows:

- Opening up sustainability research to UPC groups and researchers, by coordinating and promoting multi and trans-disciplinary research projects.
- Organizing and promoting specific postgraduate courses and degrees (Master's degrees, PhD programmes and other specialized teaching activities) directly linked with the UPC research in the fields of sustainability science and sustainable technologies, as well as embedding sustainability in other UPC educational programmes.
- Making the UPC management, in itself, a source for research demands in sustainability and a field of study and experimentation.
- Disseminating the results of the research carried out at the IS.UPC, both to the university community and to the society as a whole, and sparking discussion about it.
- Encouraging the commitment and interaction of the UPC within society, and encouraging UPC's support of civic demands for promoting progress towards more sustainable development models.

1.1. LETTER FROM THE DIRECTOR

The Research Institute for Sustainability Science and Technology of UPC – BarcelonaTech (IS.UPC) was formally created by the Generalitat de Catalunya, the Catalonian Autonomous Government, in November 9th of 2010. During the preceding year however, the UPC consolidated progressive steps that lead to the new Institute.

This Annual Report covers the activities of IS.UPC from January 2013 to August 2014. During this period, main efforts have focused on consolidating an interdisciplinary academic space within the UPC community to face the challenges of sustainable human development through science progress and technology innovation. The integration of economic, environmental and social aspects of technology, architecture and engineering, as well as the reference points of closing of cycles and systemic thinking, are some of the distinctive characteristics of the Institute research focus. Academic excellence, strategic international and local networking, and a transdisciplinary approach to knowledge creation and dissemination are other key characteristics the Institute.

The IS.UPC has its own Master's degrees on both Technology for Human Development and Cooperation and Sustainability Science and Technology. Besides the PhD studies in Sustainability, Technology and Humanism, and the support for interdepartmental PhD studies in Environmental Engineering.

During this period, we tried to consolidate the Institute by incorporating six new academics from different UPC Schools and with the help of our administrative staff Esperança Portet and Marta Prat. I would like to thank my two subdirectors, Agustí Pérez Folch during 2013 and Jordi Segalàs during 2014 for his support. The IS.UPC has new status similar to those of other Research Institutes at UPC, here I have to acknowledge the hard work carried out by Enric Velo.

Budget during these two years has dramatically decreased and we could not achieve a recognition similar to the other Institutes at UPC. In 2014, we had to cancel several IS.UPC initiatives such as: "Projectes Llavors" and "Concurs Idees Ambientals". However, IS.UPC has developed very interesting actions at Castelldefels Campus related to the artificial lake supported by Medi Natural (Generalitat de Catalunya). The Institute is fully committed with continuously improving the contribution of UPC to sustainability science and sustainable technologies.

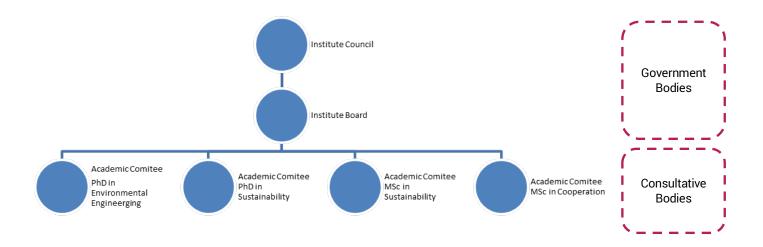
Finally, this report will be the last one that I will sign, after three years I leave the directorship of the IS.UPC. My mission was to consolidate the Institute as well as to increase the academic staff. In spite of the crisis and the changes at the University, I think that IS.UPC is better now than three years ago. My best wishes to the new director and I hope he won't find many troubles in his job. I offer my collaboration to him in anything. Institute staff expects you to enjoy the reading and consultation of this report.

Joan de Pablo, director



2. ORGANIZATION STRUCTURE

2.1. ORGANIZATION CHART



2.2. INSTITUTE BODIES

Single-member bodies

Joan de Pablo Ribas	Director
Enrique Velo García	Secretary
Agustí Pérez Foguet	Deputy Director (until February 2014)
Jordi Segalàs i Coral	Deputy Director (since February 2014)

2.3. COLLEGIATE BODIES OF GOVERNMENT AND REPRESENTATION

Institute Board

Joan de Pablo Ribas	Director
Agustí Pérez Foguet	Deputy Director (until February 2014)
Jordi Segalàs i Coral	Deputy Director (since February 2014)
Enrique Velo García	Secretary
Esperança Portet Cortes	Head of administration

Xavier Àlvarez del Castillo Alejandro Josa García-Tornel Francesc Magrinyà Torner Jordi Morató Farreras Enric Trullols Farreny Antoni Roca Rosell Elisabeth Roca Bosch Miríam Villares Junyent Gemma Tejedor Papell Josep Lluis Moner Tomas

Representative of research trainees Representative of ICE-ISUPC administrative service Unit

Institute Council

Joan de Pablo Ribas Agustí Pérez Foguet Jordi Segalàs i Coral Enrique Velo García Esperança Portet Cortes Alejandro Josa García-Tornel Jordi Morató Farreras Xavier Àlvarez del Castillo Francesc Magrinyà Torner Antoni Roca Rosell Elisabeth Roca Bosch Enric Trullols Farreny Miríam Villares Junyent Gemma Tejedor Papell Josep Lluis Moner Tomas Boris Lazzarini

Director Deputy Director (until February 2014) Deputy Director (since February 2014) Secretary Head of administration

Representative of research trainees Representative of ICE-ISUPC administrative service Unit Representative of administrative staff of IS-UPC

2.4. COLLEGIATE BODIES FOR CONSULTATION

Academic Committee of the Master's in Sustainability Science and Technology

Agustí Pérez Foguet	Chair and Director (until February 2014)
Jordi Segalàs Coral	Chair and Director (since February 2014)
Marta Prats Beltran	Secretary
José Maria Gil	
Francesc Magrinyà	
Joan de Pablo Riba	
Enrique Velo García	
Miríam Villares Junyent	

Academic Committee of the Master's in Sustainability

Agustí Pérez Foguet	Chair and Director (until February 2014)
Jordi Segalàs Coral	Chair and Director (since February 2014)
Marta Prats Beltran	Secretary
Alberto Cuchí Burgos	
Alejandro Josa García-Tornel	
Enrique Velo García	

Academic Committee of the Master's in Technology for Human Development and Cooperation

Enrique Velo García Marta Prats Beltran Agustí Pérez Foguet Jose Mª Gil Roig Eva Vidal López Chair and Director Secretary



Academic Committee of the PhD programme in Sustainability

UPC

Antoni Roca Rosell	Chair and Director
José María Gil Roig	Secretary
Agustí Pérez Foguet	(until 2014, March 11)
Antonio Aguado de Cea	(until 2013, March 13)
Jordi Segalàs i Coral	(substituting Agustí Pérez Foguet since 2014, March 11)
Enrique Velo García	
Miriam Villares Junyent	

Academic Committee of the PhD programme in Environmental Engineering

Santiago Gassó Domingo	Chair and Coordinator Dept. of Engineering Projects
Ana Andrés Lleó	Secretary
Miquel Casals Casanova	Construction Engineering Dept.
Martí Crespí Rosell	Institute of Textile Research and Industrial Cooperation. of
	Terrassa
Joan de Pablo Ribas	Dept. of Chemical Engineering
Xavier Flotats Ripoll	Dept. of Agricultural Engineering and Biotechnology
Joan García Serrano	Dept. of Hydraulic, Maritime and Environmental Engineering
Maria Teresa Martínez-Seara Alonso	Dept. of Applied Mathematics I (until October 2013)
Andrés Navarro Flores	Dept. of Fluid Mechanics
Agustí Pérez Foguet	Research Institute for Sustainability Science and Technology
Jordi Romeu Garbí	Dept. of Mechanical Engineering
Teresa Vidal Llúcia	Dept. of Textile and Paper Engineering
Alejandro Josa García-Tornel	Representative of the Master of Environmental Eng
Josep Joaquim Masdemont Soler	Applied Mathematics I Department (substituting Maria
	Teresa Martínez-Seara Alonso since October 2013)

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IS.UPC - Research Institute for Sustainability Science and Technology

Head of Administration

2.5. TEAM

2.5.1. ADMINISTRATIVE AND MANAGEMENT TEAM

- Esperanza Portet Cortes
- Marta Prats Beltran
- Araceli Adam Salvatierra
- Ofèlia Alba Soca
- Ana Andres Lleo
- Ma. Montserrat Añor Jávega
- Carme Bernaus Garcia
- Mercé Civit Payan
- Clara Cullell Tebe (until March 2013)
- Isabel Darnell Martin
- Ma. José Delgado García
- Yolanda Delgado Rodríguez
- Josefina Estepa Maria (until June 2013)
- Josep Maria Galabert i Pujol
- Felisa Lopez Lopez
- Josep Lluis Moner Tomas
- Joaquim Morte Aixandri
- Montserrat Pla Soler (until May 2013)
- Maica Sanz Gomez
- Sisco Villas Espitia

2.5.2. RESEARCH AND TECHNOLOGY TRANSFER

Academic Staff

Joan de Pablo Ribas Agustí Pérez Foguet Jordi Segalàs i Coral Enrique Velo García Alejandro Josa García-Tornel Jordi Morató Farreras Gemma Tejedor Papell Josep Lluis Moner Tomas

Boris Lazzarini Antoni Roca Rosell Elisabeth Roca Bosch Francesc Magrinyà Torner Miríam Villares Junyent Xavier Àlvarez del Castillo Enric Trullols Farreny

Technical StaffArranz Piera, PolGiné Garriga, RicardJiménez Fernández de Palencia, AlejandroBoris LazzariniTejedor Papell, GemmaYacoub López, CristinaYacoub López, CristinaProject Leaders – ResearchMiralles Esteban, NúriaPerez Foguet, AugustíRibera Sancho Samsò, MariaSegalàs Coral, JordiVelo García, Enrique

2.5.3. TEACHING

Faculty responsible for the organization and planning of master's subjets:

- Barceló Garcia, Miquel Candela, Lucila
- Cañameras Riba, Nuria
- Cuchí Burgos, Albert
- De Pablo Ribas, Joan
- Etxeberria Larrañaga, Miren
- Gassó Domingo, Santiago
- Gil Roig, José María
- Jarauta Bragulat, Eusebio

Magrinya Torner, Francesc Magrinya Torner, Francesc Miralles Esteban, Núria Morató i Farreras, Jordi Pérez Foguet, Agustí Rosas Casals, Martí Sánchez Vila, Xavier Segalàs Coral, Jordi Van Wunnik, Lucas Philippe Velo Garcia, Enrique Vidal López, Eva Villares Junyent, Míriam

PhD programme in Sustainability

UPC researchers responsible for the mentoring and/or supervising of doctoral theses (2013/2014) were:

Aguado, AntonioLópez, DavisAlier Forment, MarcMagrinyà, FÀlvarez del Castillo, XavierMayorga, MBarceló, MiquelMontserrat,Bosch, RicardMorató, JorCadafalch, JordiRiba, CarlesCarrillo, FernandoRoca RosellCònsul, RicardRodríguez CarrCuchí, AlbertRosas, Martde Felipe, José JuanSans, RamóEscribano, BeatrizSegalàs, JorFerrer Martí, LaiaTorres, AntoGarrido, NúriaVelo, EnriqueKallas, ZeinKarlas, Zein

López, David Magrinyà, Francesc Mayorga, Miguel Montserrat, José Morató, Jordi Riba, Carles Roca Rosell, Antoni Rodríguez Cantalapiedra, Inmaculada Rosas, Martí Sans, Ramón Segalàs, Jordi Torres, Antonio Luis Velo, Enrique Xercavins, Josep

PhD programme in Environmental Engineering.

UPC

UPC researchers responsible for the mentoring and/or supervising of the doctoral theses (2013/2014) were:

André, Michel	Gonçalves Ageitos, María
Baldasano Recio, José M.	Josa, Alejandro
Barra Bizinotto, Marilda	Martí Gregorio, Vicenç
Bruno Salgot, Jordi	Mestres Ridge, Marc
Candela, Lucila	Miralles Esteban, Núria
Casals Casanova, Miquel	Navarro Flores, Andrés F.
Casas Pons, Ignasi	Perez Foguet, Agustí
Cortina Pallas, José Luis	Pérez García-Pando, Carlos
Crespi Rosell, Martí	Puigagut Juárez, Jaume
De Pablo Ribas, Joan	Riba Ruiz, Jordi-Roger
Escalas Cañellas, Antoni	Rius, Antoni
Ferrer Martí, Ivet	Riva Juan, Maria Carmen
Flotats Ripoll, Xavier	Roca Ramon, Xavier
Gangolells Solanellas, Marta	Romeu Garbí, Jordi
Garcia Serrano, Joan	Sierra Pedrico, Juan Pablo
Gassó Domingo, Santiago	Valderrama Angel, César Albert
Gibert Agulló, Oriol	Vázquez Ramonich, Enric
Giménez Izquierdo, Francisco Javier	

2.5.4. UNDERGRADUATE TRAINEES

Number of master students with a training undergraduate scholarship:

Academic year 2012-13	
Master in Sustainability	16 MECD scholarships
Master in Technology for Human Development and	
Cooperation	1 MECD scholarship
Total number of scholarships	17 scholarships

Total number of scholarships	7 scholarships
Master in Technology for Human Development and Cooperation	1 MECD scholarship
Master in Sustainability Science and Technology	3 MECD scholarships
Master in Sustainability	3 MECD scholarships
Academic year 2013-14	

2.5.5. POSTGRADUATE SCHOLARSHIPS

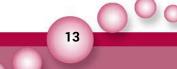
UPC

Number of postgraduate scholarships in academic year 2012-13:

PhD in Sustainability	
FPI UPC-FPU UPC	2
FI	1
PhD in Environmental Engineering	
FPI UPC-FPU UPC	6
FPU	2
FI	3
Total number of scholarships	14

Number of postgraduate scholarships in academic year 2013-14:

PhD in Sustainability	
FPI UPC-FPU UPC	2
PhD in Environmental Engineering	
FPI UPC-FPU UPC	7
FPU	2
FI	4
Total number of scholarships	15



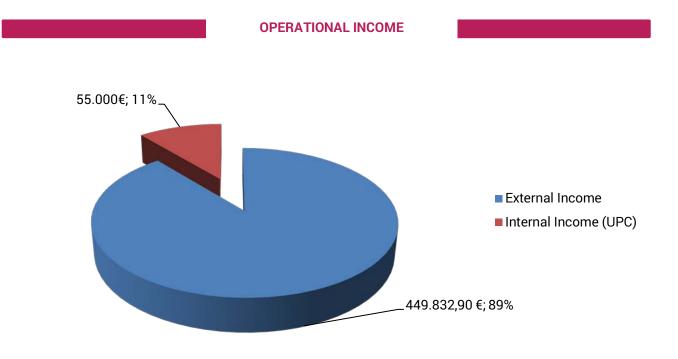
3. FINANCIAL INFORMATION

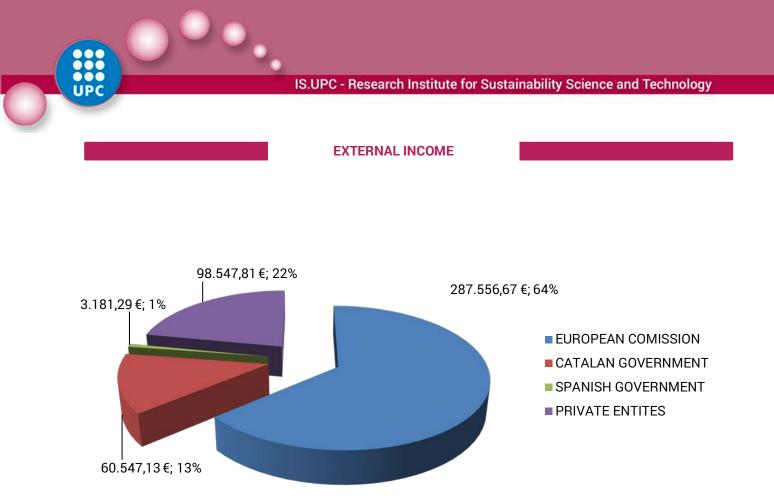
A description of IS.UPC financial accounts for the fiscal year 2013-2014 is summarized in this section.

FINANCIAL ACCOUNTS

2013-2014 OPERATIONAL INCOME

	UPC	EUROPEAN COMISSION	CATALAN GOVERNMENT	SPANISH GOVERNMENT	PRIVATE ENTITIES	TOTAL
INTERNAL.						
2015 Sustainable UPC	55.000€					55.000€
EXTERNAL						
Competitive Projects		287.556,67€	56.965,29€	3.181,29€		347.703,25€
Others			3.581,84€		98.547,81€	102.129,65€
TOTAL	55.000 €	287.556,67 €	60.547,13€	3.181,29€	98.547,81€	504.832,90€





4. UPC 2015 SUSTAINABILITY PLAN

Despite budgetary restraint and a decreased availability of resources, the UPC reaffirmed its commitment to sustainability by advancing in the application of sustainability criteria in all of its academic activities. Thus, it has maintained the objectives and actions planned in the second implementation stage of the 2011-2015 UPC Sustainability Plan (see 2012 Annual Report).

The IS.UPC's contribution to promoting and coordinating the Plan has been significantly affected by this reduction in the resources available, but it has nevertheless been able to present a methodological proposal for reviewing and concluding the Plan and to propose the foundations for it to be continued in a subsequent stage (2015-2020), and to implement and provide continuity in some of the key actions planned, as outlined below.

4.1. PROJECTS OF THE PLAN

Actions of teaching initiatives developed by the Institute of Sustainability are particularly significant in terms of their impact. The commitment of the UPC is visualized in the master's degree courses and doctoral courses developed at the institute among others. Briefly the Institute of Sustainability offers the following courses:

- Master's degree in Sustainability,
- Master's degree in Technology for Human Development and Cooperation,
- Doctoral degree in Sustainability and,
- Doctoral degree in Environmental Engineering

Additionally, the Institute realized the following initiatives:

Third Forum of the Catalan Strategy for Zero Waste (ECRZ)

The UPC, through the IS.UPC, is part of the ECRZ's promotion committee and it takes on board one of the conclusions of the previous Forum: that academia must be involved in proposing alternatives to "the current manner of producing and consuming, which is based on the mass exploitation of natural resources and excessive waste generation. This model of society has a severe impact on the environment and people's health and leads to social injustice."

Following this premise, the IS.UPC provided the venue for the Third Forum, which was held in the auditorium of the Vertex building on 19 November 2013 and chaired by the director of the IS.UPC Joan de Pablo.

The Forum assessed the strengths and weaknesses of the new institutional plan for waste management in Catalonia, PRECAT 2020, which was presented by the director of the Waste Agency of Catalonia Josep Maria Tost. The results were the following:

- New ideas were formulated to boost the actions of the administrations and the will of citizens in the same direction as the regions and cities of the world that are working to achieve the goal we have called "zero waste and emissions".
- The UPC, together with other public universities, has consolidated the University Network for Zero Waste (XURZ), which adds to the work on zero waste of other groups such as city councils, companies and social bodies.

Conservation of the Olla del Rei, the lake on the UPC campus in Castelldefels

The IS.UPC has promoted several environmental improvements on the campus:

- In 2012, the Government of Catalonia included the Olla del Rei in the Wetland Inventory of Catalonia (IZHC), whose boundaries failed to protect sensitive areas of great ecological value. On 16 May 2013, the IS.UPC presented a report justifying the conservation of the entire area, which was accepted by the General Directorate for the Environment, and it subsequently set the definitive boundaries that are now included in the official file in the Inventory.
- An official ceremony celebrating the inclusion and definitive boundary of the lake on the Baix Llobregat Campus in the Wetland Inventory of Catalonia was held in November 2013. Under the presidency of the UPC rector and the Catalan government's general director for the Environment, studies by Dr Ignasi Torre, *Els ocells de l'Olla del Rei* (Birds in the Olla del Rei), and the director of the IS.UPC Joan de Pablo, *Les actuacions de millora ambiental de l'Olla del Rei i el seu futur* (The environmental improvement of the Olla del Rei and its future), were presented. The directors of the schools and the manager of the Institute of Photonic Sciences defended the values informing efforts to protect the Olla del Rei for teaching and research.
- The Olla del Rei is subject to water pollution episodes that have on occasion caused the death of fish and wildlife. To remedy the situation, the IS.UPC, in collaboration with the Metropolitan Area of Barcelona, prepared and presented the report *El sistema de drenatge de pluvials i sanejament a l'entorn del recinte universitari de Castelldefels* (The system of rainwater drainage and sanitation around the university campus of Castelldefels, by Martin Gullón, director of the Water Cycle Services of the Barcelona Metropolitan Area, and Joan de Pablo, director of the IS.UPC, 22 July 2013), which has been submitted to the Catalan Water Agency as the basis for a structural solution to the problem.
- In June 2013, the Catalan government's General Directorate for the Environment awarded a grant of €26,993.07, which allowed the UPC to run the following three initiatives to improve the campus lake.
 Action 1. Removal of invasive and exotic flora (pampas grass and giant cane) and fauna (turtles).

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Action 2. Installation of two barrier islands of floating macrophytes in the area that connects the lake to rainwater channels, in an effort to prevent water pollution episodes.

Action 3. Installation of a fence of wood and rope to deter access to the protected area and to allow the fauna to rest.

- In June 2014, the IS.UPC presented a new project to take new actions for the recovery of the good ecological status of the Olla del Rei wetland, availing itself of the subsidy order of the Catalan government's General Directorate for the Environment, which has still not been resolved.

Sixteenth UPC Environmental and Sustainable Ideas Competition

The IS.UPC resumed the preparation and call for the sixteenth edition of the Competition, which had to be postponed in the two previous years due to lack of sponsorship. In addition to the UPC, the sponsors were the Government of Catalonia's Ministry of Spatial Planning and Sustainability, the Barcelona Provincial Council and the Metropolitan Area of Barcelona.

In view of the objectives set out in the previous edition of the Competition (see the 2012 Annual Report), two calls were organised: the university call for projects by bachelor's, master's and doctoral degree students at the UPC and the open call for members of educational communities, university graduates and social bodies.

The jury was appointed and mechanisms were put in place for the submission of projects, their assessment and the awards, which amount to a total of €8,000.

The call will be held and decided during the 2014-2015 academic year.

Support Plan for the Third Environmental Sector in Catalonia (2011-2014) and Citizen Commitment to the Sustainability of Barcelona (2012-2022)

- The IS.UPC, represented by its director Joan de Pablo, was designated by the Government of Catalonia as a member of the academic monitoring committee of the Support Plan and thus attended various meetings in which criteria were set to foster the strengthening of this key sector in the move towards a green economy.
- In December 2013, the director of the IS.UPC presented the activities and proposals for promoting and funding the projects Seeds of Sustainability of the UPC and the Environmental Marketplace of the Ministry of Spatial Planning and Sustainability, of which the former is a part.
- The IS.UPC pledged its allegiance to the Citizen Commitment and was also involved in promoting the new Citizen Council for the Sustainability of Barcelona.

5. RESEARCH AND PROJECTS

This section details research projects, agreements and collaborations undertaken by IS.UPC researchers from January 2013 to December 2014.

5.1. RESEARCH AND KNOWLEDGE TRANSFER PROJECTS

STARTED PROJECTS

Consultancy to review the Conceptual Model of the Rural Water Supply and Sanitation Information System (SIASAR): Indicators, Indices, and Sanitation and Hygiene Module

In 2013 the World Bank funded an in-depth review of SIASAR, to provide concrete recommendations in order to make the SIASAR and the data it provides more useful for operational, investment and policy decisions. The final report focused on identifying main deficiencies of the tool and on developing key recommendations to support the implementation of SIASAR as an efficient tool for operational, investment and policy decisions. The recommendations were grouped in five work packages: WP1: Coordination at the regional and Work Package level // WP2: Communication and dissemination of Work Packages results // WP3: SIASAR Reliability Improvement // WP4: SIASAR Promotion and User Base Expansion // WP5: SIASAR Sustainability Promotion. According to the discussion with the countries, the most relevant recommendation included was the "WP3: SIASAR Reliability Improvement". The countries requested the WB assistance to implement this work package to improve the reliability of SIASAR. Thus, the assignment aims to support countries to increase reliability and feasibility of SIASAR as an efficient tool to support operational, investment and policy decisions. More specifically, the outputs were:

- Support countries to review the conceptual framework, facilitating the discussion on basic forms, classification matrixes, index methodologies for data collection, validation and update, and indicators composition and visualization, with special focus on the Sanitation and Hygiene module; and
- ii. Assist countries to review existing and potential tools for the visualization of indicators, and prioritize those to be presented in the different SIASAR interfaces

To do this, the study focused on assessing the validity of the data produced by the system based on needs and demands of sector stakeholders and potential users. The assignment included the following tasks: i) Revision of the conceptual framework in which aggregated indices (classification matrices) are founded, i.e. analysis of achieved results, and proposal for the improvement of the framework on the basis of reliability of system's outcomes and by identifying new potential indicators; ii) Review of indicators currently exploited that are created from available raw data, as well as the basic forms

developed for data collection. Integral to this review is the proposal of different methodologies for data collection and data update; iii) Identification of indicators that should be prioritized in the SIASAR web and / or in other tools and related services, and proposal of tools and alternatives for their visualization; iv) Review of ISSA index and proposals for improvement that would guarantee robustness and validity of this composite; v) Improvement of the Sanitation and Hygiene module of SIASAR, by facilitating discussion on this specific module and by proposing new methodologies for data collection, data integration and data visualization; and vi) Design of pilot activities to be implemented by the country teams and SIASAR partners to validate the conceptual model.

Scope: International

Agreement signed with: The World Bank - Water and Sanitation Program

Partners: Governments of Nicaragua, Honduras, Panama, Rep. Dominican Republic and Universitat Politècnica de Catalunya

Led by: Universitat Politècnica de Catalunya

Funded by: The World Bank - Water and Sanitation Program. In total, US\$ 79,900

Dates: April 2014 to December 2014

Principal researcher: Pérez Foguet, Agustí

The Global Dimension in Engineering Education - GDEE -

The Global Dimension in Engineering Education -GDEE- is an initiative that aims to increase the awareness, critical understanding and attitudinal values of undergraduates and postgraduates students in technical universities related to Sustainable Human Development (SHD) and its relationship with technology. This is being dealt with by integrating SHD as cross-cutting issue in teaching activities by improving the competences of academics and through engaging both staff and students in initiatives related to SHD.

The expected results are: i) To increase competences of academic staff to integrate SHD as cross-cutting issue in teaching; ii) To create a network of academics for promoting the integration of SHD into technology studies; iii) To facilitate the connection between theoretical knowledge (lecturers and students from universities) with practice (through NGOs).

To achieve such outcomes, GDEE will produce and spread teaching materials, train teachers in SHD integration, promote networking among them, and link academics with NGOs through formal and non-formal actions at universities.

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Scope: International

Agreement signed with: EuropeAid (Contract ref. DCI-NSAED/2012/280-929)

IS.UPC - Research Institute for Sustainability Science and Technology

Partners: Universitat Politècnica de Catalunya (Spain), Universitat Politècnica de València (Spain), Universidad Politécnica de Madrid (Spain), Università degli Studi di Trento (Italy), Loughborough University (United Kingdom), ONGAWA (Spain), Training Centre for International Cooperation (Italy), Practical Action (United Kingdom), Engineers without Borders (United Kingdom).

Led by: Universitat Politècnica de Catalunya

Funded by: EuropeAid. Call: Non-State Actors and Local Authorities in Development - Raising public awareness of development issues and promoting development education in the European Union (EuropeAid/131141/C/ACT/MULTI).

Dates: February 2013 to January 2015

Principal researcher: Pérez Foguet, Agustí

Website: http://gdee.eu/

ONGOING PROJECTS

Building and strengthening ARA-Norte capacities for the planning and management of water resources in the basins of Cabo Delgado, Mozambique

The new Mozambican water policy (2007), is a step forward to improve country's policy and regulations relating to water, setting as priorities: i) to satisfy basic needs of water for human consumption; ii) to improve sanitation conditions, and iii) to develop an efficient use of water for economic development; iv) to guarantee water for environmental conservation; v) to reduce floods' and droughts' vulnerability, and vi) to promote regional integration. Main responsibilities recall on basin authorities. The aim of this project is to improve capacities of ARA-Norte (basin authority for the northern basins of the country) in the management of the internal watersheds of Montepuez Messalo, Megaruma Sea Side and in relation to: (1) Monitoring of resources water, (2) evaluation of water infrastructure, (3) environmental management, planning and control of the water resources, leading the participation and involvement of the involved stakeholders.

Scope: International.

Partners: ARA-Norte (Mozambique), Amphos 21 (Spain), Augas de Galicia (Spain), Universidade da Coruña (Spain) and UPC (Spain). Led by: Augas de Galicia.

Funded by: EuropeAid.

Start Date: 03.01.2012. Estimated date of completion: 09.01.2014.

Principal Researcher: Agustí Pérez Foguet

Andean Network of Graduate Studies in Integrated Water Resources (RAP-GIRH)

This project has identified the growing need for professionals to have an integrated approach to water management, interdisciplinary and regional guidance. The project aims to develop graduate programs

with an innovative learning methodology, with a link with the labor, business and public, and methods that promote applied research and a permanent network of exchange and cooperation inter-university. Among others, include the following objectives:

- Strengthen educational programs on sustainability tools and mechanisms that promote active learning based on analysis of current social problems.
- To promote educational programs and research across the UPC considering the mass of water ecosystems as life support, beyond consideration as an economic resource and water planning.
- Promote partnerships with institutions (academic and non academic) working in the field of sustainability and cooperation.

Scope: International.

Partners: Wageningen University & Research centre (Holland), Universidad Mayor de San Simón (Bolivia), Universidad del Valle (Colombia), Universidad Central del Ecuador (Ecuador), Pontificia Universidad Católica del Perú (Peru), Universidad Nacional Pedro Ruiz Gallo (Peru) and Universitat Politècnica de Catalunya (Spain).

Led by: Wageningen University & Research centre.

Funded by: EuropeAid.

Start date: 01.04.2012. Estimated date of completion: 01.04.2015.

Principal Researcher: Núria Miralles

Establishing Modern Master-level Studies in Industrial Ecology (IEMAST)

The project aims to create a Master program that prepares engineers able to work on the design of technological systems, industrial and urban, industrial processes and consumer products, taking into account environmental problems and social and economic constraints in Azerbaijan, Belarus, Kazakhstan and Ukraine.

Scope: International.

University-partners: KTH-Royal Institute of Technology, Universitat Politècnica de Catalunya, TU Delft, Qafqaz University, National Aviation Academy, Belarussian National Technical University, Mogilev State University of Food Technologies, Baranovich State University, Kazakh National Technical University, Caspian State University of Technology and Engineering, Atyrau Institute of Oil and Gas, National Technical University of Ukraine "Kiev Polytechnic Institute", Chernihiv State Technological University **Society partners**: National Agency for Higher Education, Sweden, Association of power efficient engineering of Ukraine, Kazphosphate LLC, Baku City Department of Ecology and Natural Resources, Institute for Nature Management, National Academy of Science, Belarus **Led by**: Universitat Politècnica de Catalunya.

Funding agency: EACEA

Contract number: 2-517346-TEMPUSIEMAST Project number: 517346 Start date: 15-10-2011. Estimated date of completion: 14-10-2014 Project responsible: Olga Kordas (KTH), Jordi Segalàs at UPC.

Training Courses for Public Services in Sustainable Infrastructure Development in Western Balkans (SDTRAIN)

The project is designed to establish system for training of public authorities aimed at improving level of environmental expertise, facilitating good governance and sustainable infrastructure development in Western Balkan countries. To meet this overall objective, the project team will develop training programme for capacity building of the staff of public authorities in sustainable infrastructure, energy efficiency and good governance at partner Universities, that will be pilot in cooperation with EU teachers in BiH, Montenegro and Serbia; Key partner Universities teachers capacities in providing training in sustainable public infrastructure, will be improved at EU universities through retraining. A web-based toolkit will be developed as an interactive learning environment for training of public authorities. The project will ensure continuity of the training Programme and the web toolkit beyond Tempus Programme funding.

Scope: International.

University-partners: KTH-Royal Institute of Technology, Universitat Politècnica de Catalunya, TU Delft, Qafqaz University, National Aviation Academy, Belarussian National Technical University, Mogilev State University of Food Technologies, Baranovich State University, Kazakh National Technical University, Caspian State University of Technology and Engineering, Atyrau Institute of Oil and Gas, National Technical University of Ukraine "Kiev Polytechnic Institute", Chernihiv State Technological University Society partners: National Agency for Higher Education, Sweden, Association of power efficient engineering of Ukraine, Kazphosphate LLC, Baku City Department of Ecology and Natural Resources, Institute for Nature Management, National Academy of Science, Belarus Led by: Universitat Politècnica de Catalunya. Funding agency: EACEA Contract number: 2-TEMPUS 530530-SDTRAIN Project number: 530530 Start date: 15-10-2011. Estimated date of completion: 14-10-2014

Project responsible: Olga Kordas (KTH), Jordi Segalàs at UPC.

Erasmus Intensive Program: International Seminar on Sustainable Technology Development (STD)

The International Seminar on Sustainable Technological Development is a way of exchanging knowledge and information about an annual topic within the field of sustainability. It was developed during two weeks and conducted by professors from different European universities experts on future studies analysis (TUDelft, Chalmers UT, KTH, TUGraz among others). The constructive-learning activities were focused on the connections between technology development, environmental problems and societal change. The seminar developed case studies, round tables, practical visits, and other activities. This edition was focused on the production, distribution and consumption of sustainable clothing. University-partners: KTH-Royal Institute of Technology, Universitat Politècnica de Catalunya, TU Delft, Chalmers University, Graz TU, Maribor University, University of Naples "Parthenope" Funding agency: OAPEE-Unidad de Educación Superior 2013-1-ES1-ERA10-74528 Contract number: 3-ERA10-74528 Number of Agreement: 2013-1-ES1-ERA10-74528 Start date: 2011. Estimated date of completion: 2014 Contact persons: Jordi Segalàs, Gemma Tejedor Further information: https://is.upc.edu/seminaris-i-jornades/seminaris/std-2014

FINALIZED PROJECTS

15th Environmental and Sustainable Ideas Competition UPC - "Rio +20 reinforce commitment to sustainability"

The objective was to seek ideas to promote innovative projects and activities that contribute to the major changes that the world needs this century to transform the current economic model and move towards new models of development in accordance with the objectives of Millennium Development Goals.

The ideas provided should enable a quantum leap in assuming social responsibility in front of the technological environment and sustainable human development and specifically has an impact especially on our university environment and our interaction with society.

This year the calls for projects submitted taken as a reference of the Conference on Sustainable Development of the United Nations took place from 4 to 6 June.

The call for proposals particularly valued questions about how to help raise awareness and evaluate the changes caused in our territories with our actions over the last 15 years, our responsibility in social and environmental terms and what we can contribute strategically to promote this change towards sustainability.

UPC believes that the university community has an important role to play in global sustainability. For example, we want to educate our students and all people from the UPC on the effects of climate change, on the reduction of CO₂ emissions, saving on water and materials, on the prevention of waste on mobility, infrastructure and land or noise levels produced by the activities...

Then ideas, convey information and / or relevant actions that increase public awareness of our commitment to academic institutions towards sustainability were promoted in this competition.

Collective action, management of water resources and adaptation to climate change in the central region of Nicaragua

The aim of this study is to improve knowledge about the relations between collective action and water management for domestic and agricultural purposes in Jinotega and Matagalpa Departments. This is a pertinent field in Nicaraguan rural context due to the recent Nicaraguan Water Law (2007) and Water Users Associations Law (2010) which promote collective action formalization through Water Users Association (CAPS) and irrigation districts. Even more, it is especially interesting in a situation of climate variability, climate change and uncertainty, where local institutions performance and their collective action capacity to guarantee access to water resources is an essential but often less considered and analyzed mechanism.

Scope: International.

Partners: Universidad Nacional Autónoma. Managua –UNAN-Managua- (Nicaragua), Centro Agronómico Tropical de Investigación y Enseñanza –CATIE- (Costa Rica), Colegio de Posgraduados (Mexico), Universidad Politécnica de Madrid (Spain), Universidad Complutense de Madrid (Spain) and Universitat Politècnica de Catalunya (Spain). Led by: Universitat Politècnica de Catalunya.

Funded by: AECID. Code: AP/035017/11.

Start date: 01.02.2012. Date of completion: 01.02.2013.

Principal Researcher: Agustí Pérez Foguet

Energy Access for the poor in Sub-Saharan Africa to meet the Millennium development Goals. Energy for All 2030

Access to energy services is essential for achieving the eighth Millennium Development Goal (MDG). In Sub-Saharan Africa, 2 out of 3 families, especially in rural areas, live without electricity or access to modern energy services. Solutions based on decentralized infrastructures and renewable energy sources are often the only feasible option for users with low energy demands in remote areas. The main objectives of this project are i) to contribute to the achievement of the MDGs in marginalised rural and urban areas in the poorest Sub-Saharan Africa countries, through improved energy access at local level; and ii) to raise public and political support across the EU for a the European Union resolution on energy access for the poor and to ensure that support of energy access is turned into action.

Internal code: IS-P10/01

Scope: European Union

Partners: Practical Action (UK), Stockholm Environment Institute (Sweden), EDUCON (Czech Republic) and Universitat Politècnica de Catalunya (Spain)

Led by: Practical Action Funded by: EuropeAid Code: DCI-NSA ED/2009/201-885 (with co-financing of CCD - 0.7% UPC funds) Start Date: 01.04.2010. Date of completion: 01.04.2013. Principal Researcher: Enrique Velo Website: http://grecdh.upc.edu/projectes/altres/e4a-2030

Development of a participative system on the ecological quality of rivers in the region of Cajamarca

Applied research project based on the environmental quality of water in the basin Jequetepeque in northern Peru. In the region of Cajamarca, mining is an activity that can affect large-scale social and environmental terms. Then need to have accurate knowledge about the state of the environment and the possible effect of using a water resource monitoring water, sediments, and macroinvertebrate assessment of sediment toxicity is imperative. Specifically the project aims to develop a complete index to assess the state of water resources and rising easily be used for the affected population, especially the rural population, as a tool for surveillance water in ecological terms.

Scope: International.

Partners: Universidad Nacional de Cajamarca (Peru), Universitat de Barcelona (Spain) and Universitat Politècnica de Catalunya (Spain). Led by: Universitat Politècnica de Catalunya. **Funded by**: AECID. Code: AP/036126/11.

Start Date: 13.12.2011. Date of completion: 12.3.2013.

Principal Researcher: Núria Miralles

Improving assessment and planning services of water, sanitation and hygiene in rural and suburban context through the development of management tools based on rights

Access to water, sanitation and hygiene (WASH) is a priority for the international community because of its clear link to development and poverty reduction. In recent years various strategies have been applied to ensure safe access to these basic services. The aim of this study is to develop specific tools for improving the assessment and planning of WASH services at the local level. The study will be carried out in the town of Manhiça and will consider both the peri-urban area of the municipality and the rural area. Lines of action:

- 1. To identify reliable and relevant indicators for evaluating the sector.
- 2. To strength the capacity of local public institutions.
- 3. To develop urban planning projects that integrates the provision of basic services.

Scope: International.

Partners: UN Habitat (Mozambique), Municipalitat Manhiça (Mozambique), Fundació FCBarcelona (Spain) and Universidad Politècnica de Catalunya (Spain).

Funded by: AECID. Code: 11-CAP2-1562. With the co-funding of CCD - fons 0,7% UPC.Start date: 01.11.2011. Date of completion: 31.3.2013.Principal Researcher: Agustí Pérez Foguet

Creation of third cycle studies - Doctoral Programme in Renewable Energy and Environmental Technology (CREDO)

This project is designed to advance capacity in education, research, exploitation of knowledge and innovation in the area of Sustainable Energy and Environmental Technology in Ukraine and Kyrgyzstan through structured and integrated cooperation with European Universities within framework of joint Doctorate Program in this field. To reach this goal Project consortium will introduce advanced Bologna-compliant Doctorate Program in the area of Sustainable Energy and Environmental Technology at seven partner Universities, the project team will pilot joint PhD courses and provide co-supervision of the doctoral thesis as the initial stage on the way to introduction of the Joint Doctorate Program among the project partners.

Scope: International.

University-partners: KTH-Royal Institute of Technology, University of Sarajevo, University of Banja Luka, KSUCTA, Osh Technological University, Universitat Politècnica de Catalunya, TU Delft, TUT, Technical University of Moldova, State Agrarian University of Moldova, NTUU "KPI", National University of Water Management & Natures Resources Use

Society partners: National Agency for Higher Education (Sweden), European Energy Company (Ukraine), National Association for Promotion of Renewable Energy Sources (Moldova), Chamber of Economy of Federation of Bosnia and Herzegovina (Bosnia and Herzegovina), Ministry of Education and Science (Kyrgyzstan), Kyrgyzhouscommunonion under Ministry of Energy (Kyrgyzstan), Kyrgyz Scientific-Technical Centre "Energy" (Kyrgyzstan)

Funding agency: EACEA

Contract number: CRED0510952

Start date: 15-10-2010. Date of completion: 14-10-2013

Project responsible: Olga Kordas (KTH), Jordi Segalàs at UPC.

Development of a Demonstration System to Support Water Resources Management in the Pucara Basin, Bolivia (SID-AGUA)

The SID- AGUA program intends to provide conceptual and methodological basis to the National Watershed Plan (NWP) from the Ministry of Environment and Water. The PNC seeks to develop a number of steps to generate a comprehensive water management in Bolivia, to be complemented by measures to protect and conserve watershed experiences. The objective of the SID- AGUA program is based on the potential impact on water policy through the development of information systems and technical tools to

support the planning and management of water resources, material resources being considered the center point of the intervention.

The overall objective of SID- AGUA contribute to the development of technical support tools that facilitate the generation of knowledge about the water cycle and planning and decision-making for participatory watershed management. Then, their results are inputs to consolidate an approach and a strategy for the integrated management of water resources in Bolivia. The specific objectives to be achieved are:

- Generate a process of capacity building at the level of water professionals, local institutions and user organizations ("pedagogical basin "), which sets forth the various actors and constitutes an experience that supports and fed back to the PNC.
- Establish the dynamics and relationships of surface and groundwater, modeling the hydrological cycle in the basin and incorporating tools of information management in support of a knowledge base to facilitate future discussions and decisions.
- Develop and implement a system of information and indicators to collect the information and allow the exploitation of a didactic and accessible to different types of stakeholders in the basin shape, and thus facilitate planning, establishing and making agreements making in a multisectorial framework.
- Develop information on the status and quality of surface water and sediments in order to make estimates of toxicity at the basin, allowing the development processes of pedagogical discussion basin.

Scope: International.

Partners: Universidad Mayor de San Simón (Bolivia) and Universitat Politècnica de Catalunya (Spain).
Led by: Universitat Politècnica de Catalunya.
Funded by: AECID. Code: A1/036122/11.
Start Date: 13.12.2009. Date of completion: 12.3.2013.
Principal Researcher: Agustí- Pérez-Foguet

Consultancy for to Carry Out In-Depth Review of Rural Water Supply and Sanitation Information System, SIASAR

Sustainable water supply and sanitation systems are relatively limited in the Latin America and Caribbean region, particularly in Central America. Public investment in the sector has generally been biased toward new infrastructure investments with little consideration of the costs of long-term operations and maintenance, or the capacity of local or municipal service providers to sustainably deliver water and sanitation services. This situation is compounded by the lack of accurate, up-to-date and comprehensive information on the status of WSS provision in the region. Policymakers, national planners and sector professionals have little information to determine where needs lie and what priorities should guide sector

policies and interventions. As a result, these are often biased in favour of infrastructure investments, with little consideration for the sustainability of the service providers who manage the physical water systems, or for the quality and coverage of the water service in the community. The need for a comprehensive platform for managing the rural WSS sector has been expressed by several countries, donors and water institutions in the region. The SIASAR is a joint initiative launched by the governments of Honduras, Nicaragua and Panama in partnership with the World Bank, whose strategic objective is to provide a basic, updated and reliable information tool on rural water supply and sanitation services to facilitate sector decision making in the participating countries.

The objectives of the assignment were to carry out a review of the SIASAR's technical content and assess its usability for decision-making purposes, to ultimately develop concrete recommendations for improvement of the system. Specifically, the outcomes were: i) An evaluation about the current usefulness of the SIASAR, which was discussed with the participating countries and with the staff of the Bank, and ii) A proposal of recommendations for improvement of the SIASAR, with an implementation strategy.

Scope: International

Agreement signed with: The World Bank - Water and Sanitation Program Partners: Governments of Nicaragua, Honduras, Panama, and Universitat Politècnica de Catalunya Led by: Universitat Politècnica de Catalunya Funded by: The World Bank - Water and Sanitation Program. In total, US\$ 59,450 Dates: May 2013 to December 2013 Principal researcher: Pérez Foguet, Agustí

5.2. AGREEMENTS AND COLLABORATIONS

ONGOING AGREEMENTS AND COLLABORATIONS

Cross-cutting development education into technology studies in Barcelona

This project aims to provide a regional focus of the GDEE initiative on the Municipality of Barcelona. The specific objective is two-fold. On one hand, the aim is to adapt part of the GDEE teaching materials to the Catalan context, in order to engage academic staff from local universities. In addition, it also aims to bring the GDEE approaches closer to secondary school teachers in the field of technology, while promoting synergies between teachers from secondary and university level.

The main activities include i) the adaptation of teaching materials; ii) the development of two blendedlearning courses - one per university-based staff and another one for secondary school teachers -; and iii)



the implementation of workshops that bring together researchers from universities and practitioners from NGOs.

Scope: Local Agreement signed with: Municipality of Barcelona Partners: Universitat Politècnica de Catalunya (Spain) Led by: Universitat Politècnica de Catalunya Funded by: Municipality of Barcelona. Barcelona Solidària 2013 (29,977.22 EUR) Dates: October 2013 to December 2014 Principal researcher: Pérez Foguet, Agustí

LCA to go PV

The goal of this project is to develop an adapted software tool addressed to Small and Medium Enterprises (SMEs) to be able to incorporate Life Cycle Analysis (LCA) into their product development and value chain proposition. IS.UPC collaborated with the Catalan partners Trama Tecnoambiental S.L. and Simpple to organize a dedicated workshop to present and discuss the LCA to GO tool with SMEs from the solar photovoltaics sector.

Scope: National Agreement signed with: ITENE Period: January 2014 Principal researcher: Pol Arranz

FINALIZED AGREEMENTS AND COLLABORATIONS

International Master's in Sustainability, Technology and innovation

The Master's in Sustainability, Technology and Innovation is an international master's created by a consortium of three universities: Dublin Institute of Technology (DIT); Purdue University (PU) and UPC. In particular, the master's curriculum is based on the existing Master's of Sustainability, Technology and Innovation (DIT), Master's in Technology (PU) and Master's in Sustainability (UPC). The Master's STI is a quality program, designed under the framework of the Atlantis project for the development of joint degrees between the European Union and the United States of America in the field of Sustainability, Technology and Innovation.

Internal code: IS-P09/01

Scope: International

Agreement signed with: EU-US Transatlantic Degree Program (Atlantis)

Partners: Dublin Institute of Technology (Ireland), Purdue University (USA), and Universitat Politècnica de Catalunya (Spain)

Funded by: Fund for the Improvement in Post-Secondary Education - FIPSE (USA), Education, Audovisual and Culture Executive Agency - EACEA (EU)
Dates: 02.2010. Date of completion: 08.2013
Agreement manager: Ribera Sancho, María

Develop a SIS (Support Information System) for GVC WASH activities in occupied Palestinian territories

The aim of the agreement is to set up a Support Information System that should respond to (i) monitoring of GVC activities on the field, (ii) measurement of impact of GVC activities; and (iii) Communication of GVC activities. The system developed should be integrated in GVC daily activities and should present the following characteristics:

- The forms for data collection should be adapted with database fields (and a GPS point will be added for the community)
- Easy data entering (decentralized every field worker could insert his data coming back from the field)
- Possibility to have an upgradable database:
- Capability of having some automatic analysis of data already inserted (and other analysis that could be added in future)
- Capability to have community profiles for monitoring of indicators per project, per sector and per geographic area.

Scope: International Partners: GVC Led by: Universitat Politècnica de Catalunya Funded by: GVC Start Date: 07.2011. Date of completion: 3.2013 Principal Researcher: Pérez Foguet, Agustí

Biomass gasification project

The purpose of the agreement was to pursue a set of training activities about biomass gasification for the Department of Uses of Forest Wood and Biomass of the CTFC. Work plan included the writing of a text book on biomass gasification, and two training workshops (from the theoretical principles to the practical details).

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Scope: National

Agreement signed with: Centre Tecnologic Forestal de Catalunya (CTFC)

Period: 14/03/2013 to 14/09/2013

Principal researcher: Enrique Velo

Post-2015 WASH targets and indicators A review from a Human Rights Perspective

The Sustainable Development Goals (SDGs) will be built on the former Millennium Development Goals (MDGs), and they will converge with the post-2015 agenda in one global development agenda beyond 2015. In the Water, Sanitation and Hygiene (WASH) sector, different consultations have been conducted in recent years, and of primary importance has been the process led by the WHO/UNICEF Joint Monitoring Programme (JMP). It takes already existing monitoring mechanisms as starting point, and makes use of the principles underlying the human right to water and sanitation as guidance for the formulation of new targets and indicators.

The aim of this research is twofold. First, it analyses the JMP post-2015 WASH targets and indicators, from a human rights perspective. Second, the study focuses on challenges and recommendations for a local level implementation of this monitoring proposal. This research builds on a combination of relevant literature review and specific local experience from four case studies, namely the district of Kibondo (Tanzania), the districts of Homa Bay and Suba (Kenya), the municipality of Manhiça (Mozambique), and the municipality of San Sebastián de Yalı (Nicaragua). All these case studies have been implemented by IS.UPC in collaboration with ONGAWA, UNICEF Kenya Country Office, UN Habitat-Mozambique and other local stakeholders.

Scope: International

Agreement signed with: ONGAWA, Ingeniería para el Desarrollo Humano

Partners: Universitat Politècnica de Catalunya

Led by: Universitat Politècnica de Catalunya

Funded by: Ministerio de Asuntos Exteriores y de Cooperación - Oficina de Derechos Humanos

Dates: July 2013 to November 2013

Principal researcher: Pérez Foguet, Agustí

Improved indicators to monitor access to water and sanitation from a human right perspective in Bolivia at the national, regional and municipal levels

The study aims to support the Government of Bolivia in the process of incorporating the principles of the Human Right to Water and Sanitation (HRWS) in policymaking. In particular, the goal is to help establish mechanisms to improve the sustainable delivery of water and sanitation services from a rights perspective at local level.

Key milestones of the study included: i) Initial discussion in a HRWS-related workshop organized by the MMAyA (Ministro de Medio Ambiente y Agua) in June 2013, ii) Review of the Internal Report of HRWS in Bolivia (draft version, October 2013), and iii) Review of the implementation strategy to measure HRWS at municipal level (November 2013)."

Scope: International

Agreement signed with: Spanish Government Ministry of Foreign Affairs and Cooperation - Spanish Agency for International Development Cooperation (AECID) Partners: Government of Bolivia Led by: Universitat Politècnica de Catalunya Funded by: Spanish Government Ministry of Foreign Affairs and Cooperation - Spanish Agency for International Development Cooperation (AECID) Dates: June 2013 to November 2013 Principal researcher: Pérez Foquet, Agustí

Technical support on Biomass

The aim of this agreement was to subcontract IS.UPC to conduct technical and scientific assistance as part of activities under ECREEE's INV.9 Workplan 2012 with project title, "Feasibility study and detailed engineering of small scale biomass gasification mini grids for electricity services in rural communities in Ghana." Description of the work: a) Collaboration in desk review and inception; b) Participation in a field visit; c) Technical and technological component analysis (supply chains, biomass resources, batteries, distribution mini-grid, possibilities for cogeneration and trigeneration, local provider capacities) - in collaboration with TEC-KNUST; d) Integration of all components into feasibility matrix and characterisation of all assessed communities, based on inputs from KITE and TEC-KNUST; e) Identification of existing financial mechanisms that can be applicable or adapted for a propoor electricity access programme based on biomass and solar resources - in collaboration with KITE; g) Elaboration of engineering and budgeting of the electricity generation systems to be installed in each selected community (ready for implementation); h) Detailed electricity service management model for each selected community (ready for implementation); i) Review of recommendations of most suitable project development mechanisms (delivery model, procurement, monitoring and evaluation) for the relevant developers or authorities -based on inputs from KITE, TEC-KNUST; j) Preparation of a joint Implementation plan report - in collaboration with KITE; k) Participation in working meeting for presentation and discussion of mid-term progress to the steering group; I) Participation in workshop for presentation of project results, with specific sessions on biomass gasification, hybrid solutions biomass-PV, integral feasibility analysis, identified areas with higher potential.

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Scope: International

Agreement signed with: KITE (Kumasi Institute of Technology) **Period**: 10/04/2013 to 10/06/2014

Principal researcher: Pol Arranz

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Technical assistance in the design of a small size gasifier

The purpose of the agreement was Vidmar advising on the design of a small-scale biomass gasifier. Work tasks included: a) the analysis of the syngas produced by a prototype; and b) recommendations for the improvement of the gasifier design, including a system for control and monitoring.

Scope: National Agreement signed with: VIDMAR RM 2000 SL Period: 20/03/2014 to 30/7/2014 Principal researcher: Enrique Velo

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6. TEACHING

6.1 MASTER'S DEGREE IN SUSTAINABILITY SCIENCE AND TECHNOLOGY

The master's degree in Sustainability Science and Technology aims to provide students with advanced interdisciplinary training to facilitate understanding of interactions between society, the economy and the environment. Graduates will also have a sound understanding of scientific and technical options and trends for tackling key challenges for the sustainable development of current socio-environmental systems.

The course will train students to become entrepreneurs and agents of change in the field of sustainable development. Based on their specialisation in areas related to biodiversity, the environment, the built environment, services, the production system and information management, graduates will be able to design, implement and evaluate sustainable solutions in different fields of engineering and technology. Graduates will work in various cultural and professional contexts, applying a transdisciplinary approach based on scientific and technologr.

This master's degree has received the International **Master's Programme distinction** (2013 call) awarded by the Government of Catalonia's Agency for the Management of University and Research Grants (AGAUR).

The Master in Sustainability Science and Technology was validated by the Universities Council's Curriculum Validation and Accreditation Committee in July 2013.

Courses offered in academic year 2013-2014:

Mandatory courses:

Code	Subject	Professor
480011	Fundamentals of Economics, Environmental Economics and Ecological Economics	José María Gil
480012	Fundamentals of Engineering, Sustainability and Development	Agustí Pérez
480021	Fundamentals of Mathematical and Systemic Sustainability Modelling	Martí Rosas
480022	Fundamentals of Applied Statistics and Sustainability and Development Measurement	Agustí Pérez
480041	Fundamentals of Social Sciences and Approaches to Socio-Environmental Conflicts	Míriam Villares
480051	Fundamentals of Geosciences and Geographic Information Systems	Xavier Sánchez
480031	Fundamentals of Ethics, Business and Innovation	Miquel Barceló
480032	Fundamentals of Sustainable Management and Environmental Management Systems	Santiago Gassó
480042	Research-Action Workshop on Sustainability Science and Technologies (4)	Jordi Segalàs

Elective courses:

Code	Subject	Professor
480602	Construction and building construction engineering and technologies (1)	Miren Etxeberria
480081	Urban Metabolism and Ecological Urbanism	Francesc Magrinya
480091	Information and Communication Technologies	Eva Vidal
480111	Integral Management of Urban and Ecological Water Cycles	Núria Miralles
480092	Industrial Ecology (4)	Joan De Pablo
480071	Biodiversity and Socio-Ecological Systems	Jordi Morató
480603	Water Resources and Infrastructure (1)	Lucila Candela
480608	Agroecosystems, Agriculture and Food (1)	Nuria Cañameras
480083	Regional and Transport Infrastructure Metabolism	Francesc Magrinya
480131	Energy Efficiency in Building Construction	Albert Cuchí
480132	Building Construction Metabolism and Construction Projects	Albert Cuchí
480152	Sustainable Design of Products and Services	Jordi Segalàs
480171	Complex and Socio-Environmental Networks	Martí Rosas
480521	Internacional Cooperation for Development (1)	Míriam Villares
480522	Development Cooperation Projects (1)	Enrique Velo
820733	Renewable energy technology (2) (4)	José Bordonau
820730	Energy Resources (2) (4)	Lluis Batet
820767	Energy economy and comprehensive energy planning models (2)	Rodrigo Ramírez
LTM323	Funding transport infrastructure (3)	Mateu Turró

(1) Subjects shared with Master's degree in Technology for Human Development and Cooperation

(2) Subjects shared with Master's degree in Enginyeria de l'Energia

(3) Subjects shared with Master's degree in Logística, Transport i Mobilitat

(4) Subjects taught in English language. Exams can be taken in Catalan, Spanish or English

6.2 MASTER'S DEGREE IN SUSTAINABILITY

The aim of the master's degree in Sustainability is to provide advanced training in sustainable human development that enables students to understand the complex interaction between society, technology, the economy and the environment, so that they can tackle the social and environmental challenges inherent to sustainability: climate change, the depletion of natural resources, North-South imbalances, environmental justice, etc. This master's degree will prepare students to become entrepreneurial professionals and agents of change for sustainability who will, depending on their specialisation, design and assess global, sustainable solutions for the uncertain, complex scenario we are living in. They will take an interdisciplinary approach and ensure scientific and technical rigour in the diverse cultural and professional contexts they work in.

The Master in Sustainability was substituted by the new Master in Sustainability Science and Technology, which was validated by the Universities Council's Curriculum Validation and Accreditation Committee in July 2013. Students had the option to adapt to the new study plan or finish their studies taking the third semester of elective subjects and final master project (fourth semester) in their original plan of study.

Code	Subject	Professor
820767	Energy economy and comprehensive energy planning models	Rodrigo Ramírez
480171	Complex and Socio-Environmental Networks	Martí Rosas
480521	International Cooperation and Development	Miriam Villares
480522	Development Cooperation Projects	Enrique Velo
32931	Sustainable Design Projects	Jordi Segalàs
480083	Regional and Transport Infrastructure Metabolism	Francesc Magrinà
820730	Energy Resources	Lluis Batet
32932	Workshop on Energy Efficiency in Building Construction	Alberto Cuchí
820733	Renewable energy technology	José Bordonau
480132	Building Construction Metabolism and Construction Projects	Albert Cuchí
LTM323	Funding transport infrastructure	Mateo Turró

Elective courses offered in academic year 2013-14:

Defended TFMs (January 2013-August 2014)

Initial studies on determination of key master variables and radionuclide behavior in the SFR environment

Levels of exposure to particulate matter (PM) in schools in Barcelona

Situación e Impacto de los Residuos de Aparatos Eléctricos y Electrónicos (RAEE). Caso de Estudio: los Ordenadores

Evaluación para la implementación de un proyecto de Gestión Integrada de Residuos Sólidos en Constanza, municipio de la Vega, Rep. Dominicana

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Prospecció sobre la producció orgànica: discursos sobre l'evolució del sector a Catalunya

Diagnóstico de generación de residuos urbanos de la Universidad Politécnica de Catalunya

Análisis de políticas ambientales en torno a la Ecología Industrial en México y Cataluña

EU Aid Policy as a political instrument? Case study analysis in Latin America

Transforma Porta! Dinàmiques participatives d'apropiació de l'espai public urbà.

Generación de banco de propagación de Bambú - Guadua en zonas áridas de la costa peruana regado con distintos tipos de agua

Uso de No Tejidos de Fibras Vegetales en Matrices de Cemento para Materiales de Construcción

Blade performance analysis and design improvement of a small locally produced wind turbine for rural areas

Mobile phone based imaging systems for selected tele-healthcare applications

Persuasive real-time feedback on electricity consumption to induce conservation behaviors: an experimental way to further reduce electricity use in a leed-certified building at Purdue University

Potential for electrical power generation using forest wood biomass in rural areas of Catalonia

Water, energy and carbon footprints of a pair of leather shoes

Estratègia de sistematització de la presa de decisions en la millora energètica d'habitatges existents a Catalunya

A feasibility assessment for the application of biogas and wind power in the farm environment as sustainable sources of energy

Propuesta de mejora de eficienca energética, viabilidad técnica y económica en edificio existente

An agent-based modeling approach to predict the impact on the environment of the introduction of cellphones for shepherds in Gujarat, India

Las Agendas 21 a la luz de Río+20

L'Aigua a Vilanova i la Geltrú: Anàlisi i Escenaris Futurs

Impacto ambiental del sector hotelero en clima cálido húmedo. Evaluación y propuestas de mejora.

Recuperación de los Espacios fluviales del Río Bogotá por medio de la transformación urbanística y paisajística. Comparación con el caso de Barcelona: Plan Delta del Río Llobregat

Som conscients del malbaratament alimentari que generem? Percepció social i proposta de mesura.

Aplicaciones de Geología Industrial en la Gestión Integral de Residuos Peligrosos

Indicadores ambientales de espacio público en Bogotá

Evaluación ambiental de la arquitectura urbana moderna en Cali

Valorización de residuos de las industrias de acetileno y de centrales térmicas en materiales para uso en Ingeniería Civil y Arquitectura

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Búsqueda y análisis de prácticas agrícolas tradicionales en el sector de la uva en Catalunya

Análisis mediante simulación para la comparación y cuantificación de residuos. Estudio inicial del sector hotelero para la Rep. Dominicana

Sobirania alimentària, gastronomia i alimentació a Catalunya. Un model sostenible?

La gobernanza participativa del espacio de lo público como herramienta para disminuir desigualdades sociales urbanas

Eco-design integration into new product development processes: Comparisson between LCA software and CADintegrated tools

Study of the suitability of a vertical farm in an urban environment in the state of Indiana: the comparative analysis of a vertical farm versus open-field conventional farming

Comparative LCA of stand-alone power systems applied to remote cell towers

Examining Sustainability Attitudes and Practices Among Over-the-road Logistics Companies Operating in Indiana

Smart Sustainable Cities: a new paradigm to urban sustainable development?

How might the collaborative economy influence sustainability of tourism in Barcelona?

Análisis urbano y estrategias para la reforma del centro de Monterrey

Anàlisi del Cicle de Vida de diferents tecnologies de tractament de lixiviats procedents de dipòsits controlats de residus

Vivienda Progresiva y Tejido Social en Zonas Marginales de Ciudad Juárez

Evolución de la segregación espacial en Barcelona (2007-2013). Análisis y políticas urbanas

Hacia una gestión sostenible de residuos sólidos urbanos

Green buildings en países de Europa y su inserción en la espacialidad urbana de países en vías de desarrollo

Aproximación al discurso Ecofeminista y de Economía Ecológica en los movimientos sociales del País Vasco

Programa de rescate integral del río Magdalena en México D.F.

Resiliència urbana. Una aproximació a les dinàmiques de la ciutat. El cas de Mataró.

Análisis y definición de servicios ecosistémicos aplicados al Territorio del Ecosistema Guayas, Ecuador

La educación integral en Sostenibilidad y su influencia en el cambio de consciencia para el desarrollo humano. A partir del análisis de la red del Máster en Sostenibilidad de la Universidad Politécnica de Cataluña

Metodologia d'avaluació dels mapes conceptuals mitjançant la teoria de xarxes: Cas pràctic Darwin's Nightmare

Implementación de un modelo dinámico simplificado y análisis de la Sostenibilidad sobre el caso del turismo en las Islas Galápagos

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Análisis de la sostenibilidad urbana mediante entropía de la información. [Aplicación a los distritos de Ciutat Vella, l'Eixample, Les Corts y Gràcia]

6.3. MASTER'S DEGREE IN TECHNOLOGY FOR HUMAN DEVELOPMENT AND COOPERATION

The first edition of the Master's in Technology for Human Development and Cooperation started in September 2012. The Master is oriented to applied research and innovation in the areas of intersection between technology, sustainable development and cooperation for development. The master's degree in Sustainability Science and Technology aims to provide students with advanced interdisciplinary training to facilitate understanding of interactions between society, the economy and the environment. Graduates will also have a sound understanding of scientific and technical options and trends for tackling key challenges for the sustainable development of current socio-environmental systems.

Due to the lack of enough number of new registrations, the 2nd edition was cancelled by the UPC academic authorities. However, in the academic year 2013-14 the Master's in Technology for Human Development and Cooperation finalized his first edition and offered the subjects corresponding to its third semester in order to guarantee the graduation of the enrolled students.

Courses offered:

Mandatory courses:

Code	Subject	Professor
480521	International Cooperation and Development	Míriam Villares
480522	Development Cooperation Projects	Enrique Velo
480011	Fundamentals of Economics, Environmental Economics and Ecological Economics	José María Gil
480012	Fundamentals of Engineering, Sustainability and Development	Agustí Pérez
480700	Master's Thesis	Alejandro Josa

(1) Subjects shared with Master's degree in Sustainability Science and Technology

Elective courses:

Code	Subject	Professor
480602	Construction and Building Construction Engineering and Technologies	Miren Etxebarria
480603	Water Resources and Infrastructure	Lucila Candela
480608	Agroecosystems, Agriculture and Food	Nuria Cañameras

Defended TFMs

Viabilidad para el manejo comunitario del cultivo de bambú y su aprovechamiento en construcción en la comunidad de Iguapeigenda, Argentina

Evaluación del funcionamiento de los Comités de Agua en El Distrito de Funhalouro en Mozambique

Aceptabilidad social de tecnologías sostenibles para el tratamiento de aguas residuales en áreas urbanas de India. Caso de estudio en Nagpur

6.4. DOCTORAL PROGRAMME IN SUSTAINABILITY

Sustainability research involves specialists from different origins and backgrounds with a variety of disciplinary perspectives but with the common will to contribute to the development of society by providing future generations with the options and skills required to forge their own path.

The doctoral programme in Sustainability encompasses the research and courses that deal with the current challenges to sustainability: exhaustion, distribution and management of natural resources, including energy and water; climate change impacts and adaptation and mitigation mechanisms; modelling of socioenvironmental systems and assessment of their evolution and development; poverty and imbalances in urban and rural environments; technological innovation and integrated concepts in construction, architecture and management of public services and the environment; and preservation and promotion of environmental and cultural heritage.

Sustainability science and technology is a highly interdisciplinary field of research that offers the opportunity to make original contributions in understanding and solving problems that affect the welfare and development of peoples and societies, and in shaping a new perspective from which to analyse our reality, integrating approaches from different disciplines and embracing the very agents of change.

This programme, in which highly diverse research lines and fields of interest converge, may benefit from cross-disciplinary exchange between the different research lines. For this reason, in addition to the activities in which each research group is involved, a framework for discussion of research in progress is provided in the form of the Research Monitoring and Support Working Session. This session is held every academic year and is open to all doctoral candidates and lecturers who are interested in sustainability science and technology.

The doctoral programme in Sustainability was validated by the Universities Council's Curriculum Validation and Accreditation Committee, in accordance with the provisions of Royal Decree 99/2011, of 28 January, regulating official doctoral studies.

Access and enrolment	
New doctoral students	5
Doctoral students already enrolled	66
Total students	71
Defended thesis proposals / Research plans	
Thesis proposals	11
Research plans	3
Total thesis proposals / research plans defended	14
Doctoral graduates /read doctoral thesis	
Total doctoral graduates / read doctoral thesis	8

6.5. DOCTORAL PROGRAMME IN ENVIRONMENTAL ENGINEERING

The doctoral programme in Environmental Engineering provides doctoral students with advanced training and a high capacity for research in the field of environmental engineering, that is, having a knowledge and understanding of the impacts on the environment, both derived from human activities and natural processes, with the ability to evaluate the interactions between them, and the ability to propose and define possible actions to protect and recover the environment.

This programme is a multidisciplinary training framework in an international context that allows doctoral students to obtain the scientific, methodological and technical skills to address the challenges of innovation and research that society demands in the field of environmental engineering. It can be considered the first doctoral programme in Environmental Engineering imparted in Spain. Additionally, it has the purpose of increasing internationalization and quality requirements defined by the "mention to excellence" of the PhD program in Environmental Engineering.

The doctoral degree in Environmental Engineering has been an interdepartmental programme since May 1999. The Institute for Sustainability Science and Technology, which began to contribute to the programme in the 2011-2012 academic year, manages the programme and provides coordination support.

On 15 November 2013 was announced in the Official Gazette of the Spanish Government the validation of the doctoral degree in Environmental Engineering by the Universities Council's Curriculum Validation and

Accreditation Committee, in accordance with the provisions of Royal Decree 99/2011, of 28 January, regulating official doctoral studies.

UPO

PhD in Environmental Engineering – Facts & Figures 2013-14

Access and enrolment	
New doctoral students	7
Doctoral students already enrolled	37
Total students	44
Defended thesis proposals / Research plans	
Thesis proposals	2
Research plans	7
Total thesis proposals / research plans defended	9
Doctoral graduates /read doctoral thesis	
Total doctoral graduates / read doctoral thesis	2



7. DISSERTATIONS

7.1. DOCTORAL PROGRAMME IN SUSTAINABILITY

7.1.1 PhD theses read between January and August 2013

Agredo Cardona, Gustavo Adolfo Thesis title: La cuenca urbana como unidad territorial para la planificación del desarrollo. sostenible en ciudades Supervisor: Javier Àlvarez Del Castillo

Co-supervisor: Luz Stella Velásquez Barrero

Reading date: 17.07.2013

Casañ Guerrero, María José

Thesis title: Extensió dels Learning Management Systems cap al m-learning des d'una perspectiva sostenible Supervisor: Miguel Barceló Garcia *Reading date:* 14.03.2013

7.1.2 PhD theses read during academic year 2013-14

Alvarez Del Castillo, M. Dolores

Thesis title: Análisis de la gestión de los residuos municipales generados en un entorno metropolitano utilizando un enfoque multicriterio Supervisor: Antonio Luis Torres (Dept. Enginyeria Tèxtil i Paperera, UPC) Co-supervisor: Ramón Sans Fonfria (Dept. Enginyeria Química, UPC) Reading date: 25.06.2014

Fittipaldi Gustavino, Mariana

Thesis title: Reclaimed Water Use Pilot Scale Practices in the Catalonian Region. Viability Quantitative PCR for Microbial Water Quality Monitoring Supervisor: Jordi Morató Farreras (Facultat d'Òptica i Optometria), Laboratori de Microbiologia Sanitària i Mediambiental (MSMLab). Aquasost, Cátedra UNESCO de Sostenibilidad) Co-supervisor: Verónica Beatriz Rajal (Universidad Nacional de Salta (UNSa). Facultad de Ingeniería, Instituto de Investigaciones para la Industria Química (INIQUI), CONICET) Tutor: Antoni-Maria Claret Roca Rosell Reading date: 05.06.2014

Guesmi, Bouali

Thesis title: The productive effciency in agriculture: recent methodological advances Supervisor: Teresa Serra Devesa Tutor: Jose Maria Gil Roig Reading date: 23.01.2014 *With International Doctorate certification

Horta Bernus, Ricard

Thesis title: Lleis d'Escala i Complexitat Estructural de les Infraestructures Tecnològiques. Els Sistemes Biològics com a Analogia pel Disseny i Optimització del Transport i Distribució de l'Energia Elèctrica Supervisor: Martí Rosas (Dept. Màquines i Motors Tèrmics, UPC) Reading date: 25.04.2014

Jimenez Redal, Ruben

Thesis title: Desafíos en la implementación de proyectos de cooperación en servicios de agua dentro del proceso de urbanización sostenible Supervisor: Francesc Magrinyà (Dept. d'Infraestructures del Transport i Territori, UPC) Reading date: 22.07.2014

Michelutti, Enrico

Thesis title: An Institutional Approach to Urban Fragmentation: Power and Sustainability in Un-recognized Settlements of Mumbai Supervisor: Harry Smith (Heriot-Watt University, School of the Built Environment) Co-supervisor: Javier Álvarez del Castillo (Dept. Enginyeria Mecànica, UPC) Reading date: 10.01.2014 *With International Doctorate certification

Paolini Ruiz, Jorge

Thesis title: Una propuesta metodológica para la modelación y prospección de la sostenibilidad de las cuencas hidrográficas en la Guayana Venezolana Supervisor: José Juan De Felipe Blanch (Departament de Màquines i Motors Tèrmics, UPC) Co-supervisors: Judith Del Carmen Rosales Godoy (Centro de Investigaciones Ecológicas de Guayana CIEG. Universidad Nacional Experimental de Guayana) and Barbara Sureda Carbonell (Dept. Expressió Gràfica a l'Enginyeria. EUETIB, UPC) Reading date: 14.01.2014

Yangui, Ahmed

Thesis title: Consumer Preference Heterogeneity Towards Olive Oil Virgin Extra: Hypothetical and Non-Hypothetical Choice Experiments

Supervisor: José María Gil (Eng.Agroalimentària i Biotecnologia, UPC. Institut de Recerca i Teconologia Agroalimentàries (IRTA), CREDA-UPC-IRTA)

Co-supervisor: Montserrat Costa-Font (Centre de Recerca en Economia i Desenvolupament Agroalimentari, CREDA-UPC-IRTA)

Reading date: 29.05.2014

7.1.3 Theses proposals and research plans defended between January and August 2013

Proposta metodològica per a la rehabilitació energètica d'edificis d'ús docent en la ciutat mediterrània. Cas a estudi, ciutat de Barcelona

Participación ciudadana en las decisiones y actuaciones urbanísticas de rehabilitación barrial en Barcelona y en Valparaíso. Estudio comparado de experiencias de transformación urbana institucionales y autogestionadas hacia la sostenibilidad social.

Mejoras en la gestión de la red viaria para el desarrollo local y turístico del territorio como estrategia de accesibilidad patrimonial

De la sostenibilidad urbana a la resiliencia urbana: los barrios de El Coll y de Vallcarca colindantes con el Parque de Tres Turons en Barcelona

Heterogeneity of consumers' wine preferences in Catalonia: A dual response choice experiment approach

Propostes d'optimització del parc edificat atenent els criteris de la sostenibilitat (impactes ambientals, econòmics i socials), a partir de tipologies i solucions constructives. Determinació de nous nivells d'exigència de les normatives per a edificis d'habitatge de consum d'energía quasi nul.

The productive efficiency in agriculture: recent methodological advances

Conceptos y Metodología para la aplicación y evaluación de la norma territorial sostenible de la Bioregión en Colombia. Estudio de Caso: Bioregión Centro Sur del Departamento de Caldas en Colombia

Assessment of risk in the agricultural sector using statistical copulas

Propuesta conceptual y metodológica para la "práctica aplicación" del ordenamiento territorial urbano ambiental sostenible en corredores de ciudades intermedias de Colombia.Estudio de caso: corredor Palmira-Buga-Tuluá. Valle del Cauca

Innovación para el Modelo Proceso-Equipo en un Entorno Sostenible.

La transdisciplinarietat per a la sostenibilitat en els estudis d'Enginyeria

Comsumer's behavior towards extra virgin olive oil: hypothetical and non-hypothetical discrete choise experiment methods.

7.1.4 Theses proposals defended during academic year 2013-14

Propuesta metodológica para el fomento de la sostenibilidad en proyectos de vivienda de interés social en Latinoamérica.

Impacto del análisis sensorial y de la información sobre las preferencias de los consumidores hacia la carne de vacuno enriquecida con ácidos grasos polinsaturados.

Valoración integrada y su incorporación en los marcos teóricos de sostenibilidad. Diagnosis y aplicación de una herramienta sistèmica.

Disseny d'un sistema d'avaluació de la competència en sostenibilitat en educació superior tecnològica. Cas d'estudi: Universitat Politècnica de Catalunya Barcelona Tech.

Instruments de renovació de polígons d'activitat econòmica des del metabolisme urbà

Seguridad energética a largo plazo en la escala nacional y regional. Evaluación a partir de modelos de agotamiento del petróleo y el gas, y metodología para la evaluación de los mercados eléctricos.

Análisis de las repercusiones de las políticas de producción de biocombustibles -ligadas a los temas climáticos y energéticos- en las producciones alimentarias mundiales. Estado del tema, tendencias fundamentales y realización de escenarios de futuro para extraer conclusiones sobre las interferencias y/o realimentaciones entre los temas en cuestión

Assessing sustainability in cities. A complexity science approach to the concept of happiness in the urban environament.

Sistemas de climatización integrando bombas de calor y energía solar térmica

Sopravvivere alla città. Valutazione del neo-ecosistema resiliente nella relazione tra acqua e forma urbana

Prospectiva i planificació estratègica de l'energia al Principat d'Andorra. Model integrat d'avaluació de la seguretat energètica per a la transició cap a un escenari sostenibilista.

7.1.5 Research plans defended during academic year 2013-14

Energy efficiency of existing buildings: multilevel and multicriteria analisys of neihgbourhoods.

The Role of Community-based Tourism in Sustainable Rural Development: Case Studies from Ecuador.

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La importància de la innovación espanyola en la agroempresa

7.2. DOCTORAL PROGRAMME IN ENVIRONMENTAL ENGINEERING

7.2.1 PhD theses read between January and August 2013

Affes Salah, Rim

Thesis title: Study of methods for the improvement of the anaerobic digestion of lipids and long chain fatty acids Supervisor: Dr. Xavier Flotats Ripoll (Dept. Enginyeria Agroalimentària i Biotecnologia - UPC) Co-upervisor: Dr. Jordi Palatsi Civit (Programa GIRO, IRTA) Reading date: 14.05.2013 *With International Doctorate certification

Rincón Rodríguez, Angel Alberto

Thesis title: Sistema de pronóstico de radiación solar a corto plazo a partir de un modelo meteorológico y técnicas de post-proceso para España Supervisors: Oriol Jorba Casellas (Barcelona Supercomputing Center - BSC) - Dept. Ciències de la Terra) i José María Baldasano Recio (Departament de Projectes d'Enginyeria - UPC) Reading date: 28/06/2013

Yacoub López, Cristina

Thesis title: Developing tools to evaluate the environmental status of Andean basins with mining activities Supervisor: Dra. Núria Miralles Esteban (Departament d'Enginyeria Química) Co-supervisor: Dr. Agustí Pérez Foguet (Departament de Matemàtica Aplicada III) Reading date: 13/05/2013 *With International Doctorate certification

7.2.2 PhD theses read during academic year 2013-14

Ávila Martín, Cristina

Thesis title: Effect of design and operational factors on the removal efficiency of emerging organic contaminants in constructed wetlands for wastewater treatment Supervisors: Joan García Serrano (Enginyeria Hidràulica, Marítima i Ambiental, UPC) i Josep Maria Bayona i Termens (Instituto de Análisis Ambiental y Estudios del Agua. CSIC. Departament de Química Ambiental) Reading date: 9.10.2013

Samso Campà, Roger

Thesis title: Numerical modelling of constructed wetlands for wastewater treatment Supervisor: Joan García Serrano (Enginyeria Hidràulica, Marítima i Ambiental, UPC Reading date: 28.03.2014 *With International Doctorate certification

7.2.3 Theses proposals and research plans defended between January and August 2013

Análisis del Ciclo de Vida para el Estudio Ambiental de Tratamientos de Reutilización de Aguas Residuales

Desarrollo de un modelo para la estimación de las emisiones atmosféricas en España orientado a la modelización de la calidad del aire

Biodigestión seca de pastos y forrajes. Desarrollo y optimización de un sistema apropiado a zonas rurales tropicales

Modelling strategy of volcanic ash dispersal and management of impacts on civil aviation

Characterization of atmospheric pollution dynamics i Spain by means of air quality modelling

7.2.4 Theses proposals defended during academic year 2013-14

Comportamiento de actínidos y productos de fisión en el medio ambiente

Characterization of hydrological processes in a Mediterranean mountain research catchment combining distributed hydrological measurements and environmental tracers

7.2.5 Research plans defended during academic year 2013-14

Assessment of PBL schemes over Europe with air quality modelling, lidar measurements, and satellite observations

Modeling And Risk Assessment Of Emerging Contaminants In Wastewater treatment plants and receiving waters in Spain

Meteorological Microscale Forecasting using a CFD Model

Analysis of the aerosol radiative effects through the use of coupled air quality-climate modelling systems

Combinació de Digestió Anaeròbia i Sistemes Bioelectroquímics per optimitzar la recuperació d'energia i nitrogen

Combined Heat and Power generation systems for optimum technical, environmental and economic performance: A case study in Catalonia

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Determination of key master variables and radionuclide behavior in the Swedish Final Repository environment

Productos de cuidado personal y medioambiente: presencia, destino y efectos, del doctorand Daniel Molins Delgado

Assessment of the dynamic aerosol-radiation interaction on meteorological forecasts

UPC

High-resolution dust simulations based on the non-hydrostatical multiscale NMMB/BSC-Dust model

8. PUBLICATIONS

8.1. SCIENTIFIC PRODUCTION

Arellano Escudero, Nelson; Roca Rosell, Antoni. *La ingeniería británica de desalación de agua mediante el uso de la energía solar en Chile en el siglo XIX*. *Quipu, Revista Latinoamericana de Historia de las Ciencias y la Tecnología,* vol. 15, núm. 2, mayo-agosto de 2013, 163-191. *CLAVE: A*

Flores, O., Jiménez, A., & Pérez Foguet, A. (2013). *Monitoring access to water in rural areas based on the human right to water framework: a local level case study in Nicaragua.* International Journal of Water Resources Development, 29(4), 605–621. doi:10.1080/07900627.2012.757017

Gabarrell, X. Morales-Pinzón, J. Rieradevall, M. R. Rovira, G. Villalba, A. Josa y C. Martínez-Gaso, A. C. Dias and D. X. Martínez-Aceves. *Plugrisost: a model for design, economic cost and environmental analysis of rainwater harvesting in urban systems*. Water Practice & Technology. 9, pp. 243 - 255. (United Kingdom): IWA Publishing 2014, 01/01/2014.

Gabarrell, X.; Morales-Pinzón,T.; Rieradevall, J.; Rovira, M.R.; Villarba, G.; Josa, A.; Martínez- Gasol, C. *PLUGRISOST: a model for design, economic cost and environmental analysis of rainwater harvesting in urban systems*. 3rd International IWA Conference on Water Economics, Statistics and Finance & Asset management for enhancing energy efficiency in water and wastewater systems. Marbella (España) 24/04/2013

Giné Garriga, R., & Pérez Foguet, A. (2013). Unravelling the Linkages Between Water, Sanitation, Hygiene and Rural Poverty: The WASH Poverty Index. Water Resources Management, 27(5), 1501–1515. doi:10.1007/s11269-012-0251-6

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Giné Garriga, R., Jiménez, A., & Pérez Foguet, A. (2013). *Water-sanitation-hygiene mapping: An improved approach for data collection at local level*. Science of the Total Environment, 463-464, 700–711. doi: http://dx.doi.org/10.1016/j.scitotenv.2013.06.005

Kordas, O.; Mulder, K.; Nikiforovich, E.; Segalàs, J.; Pasichny, A. and Pereverza, K. (2013). *Advancing ESD in Ukraine: from awareness to orientation towards long-term thinking and societal needs*. Proceedings of the VI International Conference on Engineering Education in Sustainable Development. September 22-25 2013. Cambridge, UK

Matteo Ranaboldo, Laia Ferrer-Martí & Enrique Velo (2014). *Micro-Scale Wind Resource Assessment for Off-Grid Electrification Projects in Rural Communities. A Case Study in Peru*. International Journal of Green Energy (ISSN: 1543-5075), 11(1): 75-90. 10.1080/15435075.2013.769878

Mendoza JM., Capitano C., Peri G., Josa A., Rieradevall J., Gabarrell X., J Clean Prod. *Environmental management of granite slab production from an industrial ecology standpoint*. (2014) In press DOI: 10.1016/j.jclepro.2014.03.056

Mendoza JM., Feced M., Feijoo G., Josa A., Gabarrell X., Rieradevall. *Life cycle inventory analisys of granite production from cradle to gate*. J. Int J Life Cycle Assess (2014) 19, 153 – 165 DOI 10.1007/s11367-013-0637-6 ISSN 0948-3349

Mendoza JM., Sanyé-Mengual E., Angrill S., Gonzalez-Garcia S., Garcia-Lozano R., Feijoo G., Moreira MT., Josa A., Gabarrell X., Rieradevall J. *Promoting sustainable mobility through the ecodesign of multifunctional urban infrastructures in the context of smart cities*. The 6th International Conference on Life Cycle Management - LCM 2013. Gothenburg, Sweden.

Mulder, K.; Ferrer-Balas, D.; Segalàs, J.; Kordas, O.; Nikiforovich, E. & Pereverza, K. (2013). *Being scared is not enough! Motivators for education for sustainable development. In: Caeiro, S.; Filho, W.; Jabbour, C. & Azeiteiro, U. Sustainability assessment tools in higher education institutions*. Mapping trends and good practices around the world. ISBN: 978-3-319-02374-8 (Print) 978-3-319-02375-5 (Online). Springer International Publishing Switzerland, pp. 29-45

Mulder, K; Ferrer, D; Segalàs, J.; Kordar, O.; Kidiforovich, E. and Pereverza, K. (2013). **Beyond the fear of** *catastrophe!: motivating students and lecturers for education in sustainable development*. Proceedings of the VI International Conference on Engineering Education in Sustainable Development. September 22-25 2013. Cambridge, UK

Oliver, A., Montero, G., Montenegro, R., Rodríguez, E., Escobar, J. M., & Pérez-Foguet, A. (2013). *Adaptive finite element simulation of stack pollutant emissions over complex terrains*. Energy, 49, 47–60. doi:10.1016/j.energy.2012.10.051

Pérez-Foguet, A., Casoni, E., & Huerta, A. (2013). *Dimensionless Analysis of HSDM and Application to Simulation of Breakthrough Curves of Highly Adsorbent Porous Media*. J. Environ. Eng., 139(5), 667–676.

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9. ACTIVITIES

9.1. RESEARCH SEMINARS AND WORKSHOPS

What really matters to improve urban water services?

Speaker: Dr. Lina Suleiman is postdoctoral researcher at the Royal Institute Technology of the KTH (Sweden) Date: 25th October 2013

Developing aggregated indicators to measure water poverty

Speakers: Agustí Pérez Foguet, Associate Professor at the Applied Math III Dept. and member of the Board of IS.UPC (Universitat Politècnica de Catalunya), and Ricard Giné (researcher at IS.UPC) Date: 7 and 8 April 2014 Place: Università degli Studi di Brescia - CeTAmb Lab Seminars 2014 Web: http://www.ing.unibs.it/~cetamb/index.php/it/seminari.html

7th International Seminar on Sustainable Technology Development: Sustainable Clothing: Production and Consumption

Date: 9 to 20th June 2014

Place: Vilanova i la Geltrú

The International Seminar on Sustainable Technology Development was developed in the framework of the Master for Sustainability during two weeks. Professors from different european Universities, experts on future studies analysis (TUDelft, Chalmers UT, KTH, TUGraz and others: Maribor U, U Parthenope) conducted the seminar. The constructive-learning activities were focused on the connections between technology development, environmental problems and societal change. This edition was focused on the production, distribution and consumption of sustainable clothing in order to analyze:

- How society can design, promote and demand sustainable and ethical ways of producing and consuming clothing.
- The ecological footprint derived from a global model of clothing production and consumption without consumption and production strategies that account for territory, generating social and environmental externalities.
- The preventing factors of the sustainable clothing market to expand and overcome the remaining niche.
- The technological solutions in order to address a trade-off between localisation and delocalisation of the global fashion industry.

Sustainability of water and sanitation services implemented under the Spanish Cooperation Fund for Water and Sanitation in Latin America and the Caribbean in Bolivia: a methodological proposal Speaker: Cristina Mecerreyes, WASH specialist. Date: 4th July 2014

From one to multi-dimensional poverty metrics. Application to RWSS planning

Speaker: Agustí Pérez Foguet, Associate Professor at the Applied Math III Dept. and member of the Board of IS.UPC (Universitat Politècnica de Catalunya) Date: 16th May 2014

Hydrogeological Study of shallow aquifer in the Gran Chaco: toward an integrated water resources management in indigenous communities Speakers: Manuela Barbieri y Alejandro Blanco Date: 31st May 2013

9.2. PRESENTATIONS

Seminar on "Promoting Global Learning in Barcelona"

The workshop was aimed at debating around development education and global learning in the context of Barcelona. Specifically, the goal was to discuss about the nature of main barriers to an effective introduction of development and global themes in higher and in secondary education. Also, in a second session, various good practices were presented and discussed.

Presentations: In first seminar (2nd July) the debate was moderated by Dr Agustí Pérez (UPC), and invited key speakers included Mrs Judit Rifà (Ajuntament de Barcelona), Mrs Maíta Fernández-Armesto (UN Habitat), Dr Daniel López (UPC) and Mr Martí Boneta (Dpt. Ensenyament). In second seminar (9th July) the discussion was moderated by Dr Eva Vidal (UPC), and key speakers also included Dr Jordi Garcia (UPC), Mrs Núria Vives (INS Ramon Berenguer IV) and Dr Josep Masalles (ICE - UAB).

Date: 2 and 9 July 2014

Presentation of the Global Dimensions in Engineering Education (GDEE)

The Global Dimensions in Engineering Education (GDEE) was presented in a meeting that took place at the Engineering Education for Sustainable Development (EESD) conference in Cambridge, UK (22-25 September, Cambridge University).

The session was kicked off by Professor Paul Jowitt, a Professor of Civil Engineering Systems and Executive Director of the Scottish Institute of Sustainable Technology at Heriot-Watt University in Edinburgh. During the meeting, attendees were introduced to the GDEE project by various members of the GDEE academic and NGO project teams. Concluding the session was the presentation of the first European Award for Best Practices for the Integration of Sustainable Human Development into Technology/Engineering.

Date: 22-25 September 2013

The challenges of global learning at higher education

This debate was organised in the frame of the 14th EADI General Conference, in Bonn (23 to 26 June 2014). The discussion panel aimed to contribute to the current debates around development education and global learning. Specifically, the goal was to examine the nature of main barriers to an effective introduction of development and global themes in higher education, but also, more broadly, the challenges, threats and opportunities to the promotion of global learning within universities. The debate has been organized around three central guiding questions, namely i) why global learning should be promoted in a University environment?; ii) which are the main barriers and opportunities to effectively promote it?; and iii) which are the main recommendations to be translated to policy makers, university teachers and students to spread global learning?

These topics have been debated by three key speakers: Matt Baillie Smith, from Northumbria University; La Salete Coelho, from Instituto Politécnico de Viana do Castelo; and Elisabeth Miles, from Coventry University; in a discussion moderated by Alejandra Boni (Universitat Politècnica de València).

To conclude the session, Agustí Pérez (Universitat Politècnica de Catalunya) and Manuel Sierra (Universidad Politécnica de Madrid) have introduced the GDEE project Date: 23 to 26 June 2014

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10. ANNEX

Academics with formal adscription to IS.UPC and research activity related:

- Pablo Ribas, Joan de (http://futur.upc.edu/JoandePabloRibas)
- Segalàs i Coral, Jordi (http://futur.upc.edu/JordiSegalasCoral)
- 9 Pérez Foguet, Agustí (http://futur.upc.edu/AgustiPerezFoguet)
- Velo García, Enrique (http://futur.upc.edu/EnriqueVeloGarcia)
- Alvarez del Castillo, Xavier (http://futur.upc.edu/JavierAlvarezDelCastillo)
- Josa García-Tornel, Alejandro (http://futur.upc.edu/AlejandroJosaGarciatornel)
- Magrinyà Torner, Francesc (http://futur.upc.edu/FrancescMagrinyaTorner)
- Morató Farreras, Jordi (http://futur.upc.edu/JordiMoratoFarreras)
- General Bosch, Elisabeth (http://futur.upc.edu/ElisabetRocaBosch)
- Roca Rosell, Antoni (http://futur.upc.edu/AntonimariaClaretRocaRosell)
- Trullols Farreny, Enric (http://futur.upc.edu/EnricTrullolsFarreny)
- Villares Junyent, Miríam (http://futur.upc.edu/MiriamVillaresJunyent)