



----

1	INSTITUTIONAL p. 4	3	<b>RESEARCH</b> p. 22
1.1	FOREWORD BY THE	3.1	RESEARCH LIN
	SCIENTIFIC DIRECTOR	3.1.1	ADAPTATION TO
	PROF. ANIL MARKANDYA		IMPACTS OF CLI
		3.1.2	MEASURES TO M
1.2	ISAC		CLIMATE CHANG
	INTERNATIONAL SCIENTIFIC	3.1.3	INTERNATIONAL
	ADVISORY COMMITTEE		OF CLIMATE POL
		3.1.4	DEVELOPING AN
1.3	DESCRIPTION OF THE CENTRE		RESEARCH THAT
			CLIMATE POLICY
			BASQUE COUNTI
		3.2	SCIENTIFIC PR
		3.3	SOME OF THE COLLABORATIO
		3.4	REMARKABLE

2	<b>PEOPLE</b> <i>p.</i> 8	4	KNOWLEDG
2.1	BC3 TEAM	<u> </u>	
2.2	BC3 FORMER MEMBERS	4.1	INITIATIVES
2.3	BC3 VISITORS	•	TRAINING PRO
2.4	GENERAL INFO	•	BC3 VISITING
	AND STATISTICS	•	KLIMAGUNE W BC3 POLICY B
		•	KLIMAGUNE C

PROGRAMME PROGRAMME NG PROGRAMME SCHOOL **NE WORKSHOP** Y BRIEFING SERIES **NE CONFERENCES** TRAINING CARAVAN

"Climate change is the biggest challenge mankind will have to face this century. Furthermore, the challenge has both scientific and social/political dimensions. For that end, the research program has to include the identification of the foreseen impacts and the outlining of the best strategies to adapt to these changes, reducing the magnitude of the impacts. This is an endeavour in which social and physical science has to play a key role. The regionalization and specialization of the effects observed at a global scale are among the new challenges pointed out by the United Nations Intergovernmental Panel on Climate Change (IPCC) for research in the 21st century."

Ban Ki-Moon, Secretary-General of the United Nations.

#### NES

AND THE MATE CHANGE **IITIGATE** ЭΕ DIMENSIONS LICY ND SUPPORTING **INFORMS** IN THE RΥ

#### **5 HIGHLIGHTS** p. 38

5.1 KLIMAGUNE WORKSHOP 5.2 CLIMBE 5.3 HANDBOOK OF SUSTAINABLE ENERGY 5.4 REMEDIA 5.5 LOW CARBON PROGRAMME 5.6 TRAINING CARAVAN (IKERTZAILEAK GELAN)

#### RODUCTION

ON

#### PROJECTS

### DGE ERENCE

#### **6 ANNEX**

p. 44

#### MANENT

- 6.1 LIST OF PUBLICATIONS
- 6.2 LIST OF SEMINARS

# 1. INSTITUTIONAL

# FOREWORD BY THE SCIENTIFIC DIRECTOR OF BC3 PROF. ANIL MARKANDYA



"We believe that we can only be >> successful if we are fully integrated into the network of research centres working on the same topic."

he Basque Centre for Climate Change, BC3, was established in 2008, as one of the centres of excellence established under the BERC programme. As the name suggests, it is devoted to studying the causes and consequences of climate change and the best ways of addressing it. Given the vast range of the topic, BC3 was designed to focus on the socio-economic aspects of climate change, albeit within an interdisciplinary framework that includes the natural as well as social sciences. The BC3 is one of the few centres in Europe with this specialization, and it has already established a strong reputation in the field.

Since its inception, the centre has grown rapidly; now we are a team of 31. The areas of work cover adaptation to climate change, policies and measures to reduce greenhouse gases, a study of climate agreements. BC3 has been increasingly successful in obtaining funds from competitive calls, so that in 2012 nearly one-quarter of our funds came from such sources, in Spain, the European Union and even more widely.

We believe that we can only be successful if we are fully integrated into the network of research centres working on the same topic. To this end, BC3 has developed collaborative agreements with many institutes: in Spain, across many European countries, in the United States and also in emerging economies, particularly Brazil, China and India.

A centre of excellence is evaluated primarily in terms of its scientific output and in this regard BC3 has started to make a name for itself. As the staff has increased, so has the volume of publications, principally in scientific journals, but also in books and monographs. In the 2009-2012 period we produced 226 articles (of which 73 were in journals listed in the Web of Knowledge), as well as 18 books and 49 chapters. At the same time we are mindful of the fact that a research centre working in the socio-economic domain of a problem such as climate change has a responsibility to be relevant. Hence we have participated in major fora where this subject is discussed, including the annual Conference of Parties to the Framework Convention on Climate Change, and we are contributing to the important Intergovernmental Panel for Climate Change (IPCC), which brings together the state of knowledge on research on climate and makes it accessible to policymakers. Last but not least, we have prepared policy briefs and presentations for various governments, starting with that of the Basque Country and including those of South Korea, the United Kingdom, France and Spain.

BC3 is already an established part of the network of centres on climate change and we look forward to playing an important role in this area, so is critical for the future of our planet.

# ISAC International Scientific Advisory Committee

Members are appointed as independent scientific experts on the basis of their specific skills, abilities, experience and knowledge. he International Scientific Advisory Committee is a consultative L body of independent experts created to provide advisory opinions and analysis on science to the centre. Its remit includes The committee has scientific expertise that enables it to advice matters concerning research programme and general strategy. on the decision making processes of the centre.

#### PROF. DAVID ULPH

Professor of Economics in the University of St Andrews; Director of the Scottish Institute for Research in Economics and Fellow of the Roval Society of Edinburgh, and Royal Society of Arts. Previously he was Chief Economist and Director of Analysis in HM Revenue & Customs; Professor of Économics in the University College London and Executive Director of the ESRC Centre for Economic Learning and Social Evolution

#### PROF. INES MACHO-STADLER

the Economic and Economic Histor Department of Universidad Autónoma de Barcelona, and Professor of the Graduate School of Economics Barcelona. She is a member of the Executive Committee of the European Association for Research in Industrial Economics and she serves as director in the Board of Iberdrola. She has been President of "Asociación Española de Economía", and coordinator of "Agencia Nacional de Evaluación y Prospectiva".

#### PROF. BERT METZ

Fellow at ECF and member of the Advisory Council. He focuse particularly on science and policy issues. He brings extensive experience former co-chairman of the Climate Change Mitigation Working Group of the IPCC from 1997-2008.

He also was climate change coordinator of the Ministry of Environment of the Netherlands and chief negotiator for the Netherlands and the European Union on the UN Framework Convention on Climate Change and the Kyoto Protocol, as well as head of the Global Sustainability and Climate Change Division of the Netherlands Environmental Assessment Agency.



Department of Applied Economics at the Universit of Vigo, he is the coordinator of the "Master's degree Management of Sustainable Development" and Director of "Economics for Energy". He belongs to Rede, a consolidated research group that deals with the main economic aspects of innovation, energy and the environment and a lead author of the IPCC for the elaboration of its fifth assessment report, which is due to be published in 2014



#### PROF. PEDRO MIGUEL ECHENIQUE

Professor of Physics in the University of the Basque Country. He is President of the Donostia International Physics Center (DIPC). President of the Board of Trustees of CIC Nanogune, Vicepresident of



Fundación Euskampus and President of Honor of Jakiunde. Academy of Sciences, humanity and arts. Among other distinctions he got the Prince of Asturias of Scientific Research Prize and Académie Royale des Sciences, des Lettres et des Beaux-Arts de Belgique.

#### **PROF. XAVIER LABANDEIRA**



#### PROF. PAULINA BEATO

Professor of Economic Analysis, currently she is Director of REPSOL and member of the Audi Commissions. She is econom advisor to the Iberoamerican Secretary General (Secretaria lberoamericana) General



Formerly she was Executive Chairperson of Red Eléctrica de España, Director of CAMPSA and other major industrial and financial institutions, Chief Economist in the Sustainable Development Department of Inter-American Development Bank and Consultant in the Banking Supervision and Regulation Division of the International Monetary Fund.

### 1.3 DESCRIPTION OF THE CENTRE

The BC3 aims to contribute to long term research

on the causes and consequences
of climate change in order to foster
the creation of knowledge in this
multidisciplinary science.

"In just over three years BC3 has grown and developed impressively. It has built a team of high-quality and enthusiastic researchers which has enabled it to generate: an extensive number of high quality research outputs across a range of areas; research links with major centres for climate change across the globe; and a very significant portfolio of research funding from both national and international research councils and other funding sources."

 $B^{\rm C3,\ Basque}$  Centre for Climate Change, is an excellence Government and the University of the Basque Country (UPV/EHU), with the goal of contributing to knowledge on the causes and impacts of climate change, as well as driving advancements in high level research on these issues.

BC3 was created both as part of the Basque Government's determined commitment to the promotion of science and research and as an initiative to recruit internationally renowned researchers for the Basque science system. This commitment translated into the "Plan Vasco de Ciencia, Tecnología e Innovación 2010" (PCTI or Plan for Science, Technology and Innovation), which underlined its commitment to place the Basque Country as a European reference in science and innovation.

The centre also highlights the importance that the Basque Government, through both the Basque Environmental Strategy for Sustainable Development for 2002-2020, and the Basque Plan for Combating Climate Change 2008-2012, attaches to the creation of knowledge and strategies to reconcile the improvement of the population's quality of life with the preservation of the environment and its resources or, in other words, a sustainable development.

BC3 aims to contribute to long term research on the causes and consequences of climate change in order to foster the creation of

knowledge in this multidisciplinary science. The centre seeks to engage a highly-qualified team of researchers with the primary objective of achieving excellence in research, training and dissemination.

The research lines where BC3 has developed research capabilities fall broadly into the following groups:

- Adaptation to and the impacts of climate change
- Measures to mitigate climate change
- International dimensions of climate policy
- Developing and supporting research that informs climate policy in the Basque Country

The strategic objectives that underlie BC3's strategic plan support the centre's vision and focus on its aspiration of being a research organization globally recognized in the field of climate change as a benchmark for generating and pushing back the frontiers of knowledge excellence and efficiency:

- Develop excellence-based, multidisciplinary climate change long term research capabilities to become a worldwide reference.
- 2. Participate and develop high level training programmes on climate change.
- Contribute to climate change knowledge transference and dissemination to the scientific community, policy makers and society in general.









1 INSTITUTIONAL

"It has particular strengths in the important area of climate change adaptation. It is well placed to become a major nationally and internationally recognised centre for research and policy on climate change."

PROF. DAVID ULPH ISAC MEMBER

### 21 **BC3 TEAM**

Talent Attraction. the core of BC3

> The attraction of international >> expert researchers on climate change field is the core issue for an excellence centre like BC3.

BC3 is committed to attract >> high-level researchers to promote excellent long-term research and a strong effort has been dedicated since its creation to talent attraction.



SCIENTIFIC DIRECTOR

SENIOR RESEARCHERS



#### ANIL MARKANDYA **Scientific Director**

Adaptation and health impacts. Water impacts. Mitigation policies. International dimensions of climate policy.

Anil Markandya is a resource economist who has worked in this field for over thirty years and is acknowledged as one of the leading authorities. He has divided his time between academic and advisory work. On the academic side he has published widely in the areas of climate change, environmental valuation, environmental policy, energy and environment, green accounting, macroeconomics and trade. He has held academic positions at the universities of Princeton, Berkeley and Harvard in the US and at University College London and Bath University in the United Kingdom. He was a lead author for Chapters of the 3rd and 4th IPCC Assessment Reports on Climate Change, and was one of the core team that drafted the IPCC 4th Assessment that was awarded the Nobel Peace Prize in 2007 and was nominated by Cambridge University as one of the 50 most influential thinkers on sustainability in the world.





**ALINE CHIABAI Research Professor** 

Assessment of the main threats posed by climate change on human health, ecosystems and biodiversity, including analysis of social and economic factors influencing vulnerability of people, communities and social systems. as well as their adaptive capacity. Assessment and prioritization of adaptation policies.

Aline Chiabai is an environmental economist, holding a Ph.D. in Transport, Traffic and Environment. Her research is focusing on the valuation of health and natural resources. environmental pollution impacts, including air pollution and waste, health vulnerability indicators, and sustainable tourism activities through information and communication technologies. She has carried out research also in environmental remediation, and environmental impact assessment in air and noise pollution. Past academic experience includes the position of adjunct professor at the University Cà Foscari, Venice (Italy).





#### SERGIO H. FARIA Ikerbasque Research Prof.

Environmental physics, glaciology, geomorphology and physics of geological materials. Impacts of climate change and natural hazards. Dynamics of continuous diversity and biodiversity. Multiscale modelling and emergence in natural systems.

Sérgio H. Faria is a physicist engaged in combining applied mathematics with experimental and field research in climate and environmental sciences. His main objective is to understand the multiscale processes that control the emergence of properties and structures in complex environmental systems. Through his research on glaciology, geophysical flows, population dynamics, biodiversity, and the formation of climate records, he aims at estimating the uncertainties in the medium- and long-term impacts of climate change on environment and society.





#### **ROGER FOUQUET** Ikerbasque Research Prof.

Long-term relationships between economic development, technological change, energy consumption and climate change.

Roger Fouquet is a Doctor in Economics, as a researcher, lecturer and policy-advisor for the past twenty years, Roger Fouquet has investigated the long-run evolution of energy markets and policy. In 2006, his joint article with Peter Pearson on very long run trends in lighting prices and consumption was selected for the IAEE Campbell Watkins Award for Best Paper in The Energy Journal. In 2010, his book, Heat, Power and Light, was selected by Choice Magazine, the US association of librarians, as one its Outstanding Academic Titles.





#### **IBON GALARRAGA Research Professor**

Public policies, policy instruments and economic valuation, with special attention to research that can be useful to inform Basque Climate Policy.

Ibon Galarraga holds a Ph.D. in Economics (Environmental Economics) from the University of Bath (United Kingdom), M.A. Economics at the University of Essex (United Kingdom) and B.A. Economics (speciality of International Economics and Development) at the University of Basque Country. He has worked as an environmental consultant for institutions such as the World Bank, the Department for International Development of the British Government or the Basque Government. During July 2005 and May 2009, he was the Deputy Minister for the Environment of the Basque Government.



#### SENIOR RESEARCHERS



#### **MIKEL GONZALEZ - EGUINO** Research Professor

#### Environmental and Energy Economics, Public Economics.

Mikel González-Equino has a Ph.D in Economics (University of the Basque Country) and a degree in Engineering (University of Deusto). His main interests lie in the fields of environmental, energy and public economics. His work has been published in several of the leading international journals in the field. He has worked on environmental and economy-related issues for Basque and Spanish firms and institutions and participated in several European research projects.



MARC NEUMANN Ikerbasque Research Prof.

#### Water impacts and adaptation.

Marc Neumann obtained a Ph.D in Environmental Engineering from ETH Zurich, Switzerland. He has extensive teaching and research experience on urban water networks and treatment systems. A central topic is the use of mathematical models for optimization and design of facilities and the application of uncertainty- and sensitivity analysis techniques. Current research focuses on planning strategies for water infrastructure in view of climate change.



**UNAI PASCUAL** Ikerbasque Research Prof.

The ecological-economic relationship between human well-being, biodiversity, ecosystem services and climate change.

Unai Pascual received his BA (Economics) from the University of the Basque Country and his MSc and Ph.D (Environmental Economics) from the University of York. He bridges the social and natural sciences in order to understand the links between global environmental change and human development. He has an active role as advisor to international policy bodies and his work appears in more than 150 research outputs. He has also held positions in various European universities (Manchester, York, Barcelona and Bilbao) and is Senior Lecturer at the University of Cambridge.





#### DIRK RÜBBELKE Ikerbasgue Research Prof.

#### Environmental, resource and public economics.

Before Dirk Rübbelke joined BC3. he was Senior Research Fellow at CICERO, Norway (2008-10) and Junior professor of European Economics at Chemnitz University of Technology, Germany (2002-08). Dirk did research at internationally renowned universities, inter alia, at the Australian National University, Hebrew University Jerusalem and University of Nottingham. He is a Fellow Member in the CESifo Research Network, Munich. He has published in internationally renowned journals, e.g. Economica, Economics Letters. Journal of Public Economics.





#### **JOSEPH SPADARO Research Professor**

Environmental impact assessment methodology & software development, Environmental fate analysis, Health impact assessment, Uncertainty Analysis, Energy system analysis.

Joseph Spadaro is an Environmental Research Scientist, holding a Ph.D. in Energy, specialty in Environmental Impact Assessment. He has carried out basic research on energy analysis in residential and commercial buildings and impact and damage cost assessment of environmental emissions from human activities In the area of environmental impacts, Dr. Spadaro's research has focused on analysis of air/water/soil pollutant transport modelling, health risk assessment and uncertainty analysis, cost-benefit analysis of private sector decisions and environmental legislation.











#### **FERDINANDO VILLA** Ikerbasque Research Prof.

Ecoinformatics, Ecological Economics, Ecosystem Services and technologies for aided decision-making.

Ferdinando Villa holds a Ph.D. in theoretical Ecology and had a long parallel career as a scientific software designer and engineer works at the interface of policy, ecology, economics and IT. He has authored 120+ publications, many software packages, and earned large grants from the US National Science Foundation, the EU, governments and private foundations. His ARIES project (www.ariesonline. org) is providing new ways to address the challenge of environmental decision making in the 21st century.



#### SENIOR RESEARCHERS



#### LUIS MARÍA ABADIE / Research Fellow

#### Energy Economics, Carbon Markets, GHG Emissions, Real **Options and Financial Economics.**

Luis Mari Abadie is industrial engineer (E.T.S. I) and holds a Ph.D in Economics both from the University of the Basque Country. He is graduated in computer studies (University of Deusto) and Master in Public Economic from the University of the Basque Country. Dr. Abadie's research has focused mainly in the areas of Energy and Environmental Economics. His work has been published in international journals.



RESEARCHERS

AMAIA ALBIZUA / Junior researcher - Ph.D Student

#### Soil and water management and their related policies within climate change adaptation processes.

Amaia Albizua is graduated in Environmental Sciences (University of Salamanca) and has a MSc on Soils and Water Management (ETSEA) University of Lerida and a MSc on Environmental Studies, University Autonomous of Barcelona.



#### PATRICIA GALLEJONES / Junior researcher - Ph.D Student

#### Study the potential role of typical energy cropping systems as net GHG mitigation tools.

Patricia Gallejones is graduated in Biological Sciences at the University of the Basque Country and has an MSc on Environmental Agrobiology.



#### AGUSTÍN DEL PRADO / Research Fellow

#### Developing system-based modelling approaches to: (i) mitigate GHG emissions from land use and (ii) assess the impact of climate change and land use changes on services from agriculture.

Agustin del Prado holds a Ph.D in Biological Sciences at the University of the Basque Country and worked for 7 years at the Institute of Grassland and Environmental Research (IGER, United Kingdom).He is currently coordinating a project from the Spanish "Plan Nacional" programme: Developing system based mitigation strategies to reduce GHG within and between multifunctional land use elements of a landscape (2010-2012).



#### SEBASTIEN FOUDI / Postdoctoral researcher

#### Exploitation of agro ecosystems services and water resources, and on how agents face and adapt to risks such as drought risk.

Sebastien Foudi holds an MSc in Economics of the environment, natural resources, energy and agriculture an M.Phill in Economics and a Ph.D in Economic from the Toulouse School of Economics.





#### ENEKO GARMENDIA / Postdoctoral researcher

#### Integrated assessment of complex socio-ecological systems.

Eneko Garmendia holds a Ph.D in in Ecological Economics and Natural Resource Management (Autonomous University of Barcelona) and is graduated in Economics (University of the Basque Country).



#### JOSU LUCAS / Research Assistant

#### **Energy Economics**

Josu Lucas is graduated in Economics and has a master's degree in Economics both from the University of the Basque Country.



#### ESTELLE MIDLER / Postdoctoral researcher

Biodiversity economics, payment for ecosystem services, public economics, experiments.

Estelle Midler received her MSc in Environmental and Agricultural Economics together with an Engineering Degree in Agricultural Sciences, and her Ph.D in Economics from Supagro Montpellier (France).

#### RESEARCHERS



#### ELENA OJEA / Postdoctoral researcher

The economics of biodiversity and ecosystem services.

Elena Ojea is graduated in Environmental Sciences at Universidad de Salamanca, she obtained a Ph.D in Environmental Economics at Universidade de Santiago de Compostela, with European mention.



GUILLERMO PARDO / Junior researcher - Ph.D Student

GHG emissions and other environmental impacts associated to agri-food systems through LCA methodology

Guillermo Pardo is Chemical Engineer by UCLM (University of Castilla-La Mancha) specialized on Environmental Engineering. He has a MSc on Management, Treatment and Use of Organic Waste by UMH (Universidad Miguel Hernández).



#### ELENA PEREZ MIÑANA / Postdoctoral researcher

#### Ecosystem Services and Decision Support Systems.

Elena Perez Miñana holds undergraduate qualifications in Computer Science Engineering, and post-graduate qualifications in Information Technology, Environmental & Energy Studies, and Artificial Intelligence.



#### MARTA OLAZABAL / Junior researcher - Ph.D Student

#### Urban resilience and transformability

Marta Olazabal studied Chemical Engineering from 1999 to 2004 at the School of Engineering of Bilbao and she gained a MSc on Environmental Engineering in 2008. She is currently Ph.D student in the University of Cambridge, Department of Land Economy.



#### MARTA PASCUAL / Postdoctoral researcher

#### Valuation on Marine Ecosystem Services & Marine Spatial Planning.

Marta Pascual is graduated in Biology at UCM and has an MSc in Marine Environment and Resources by the University of Southampton, the University of Bordeaux and the University of the Basque Country. She is currently finishing her Ph.D.





MARIA VICTORIA ROMÁN DE LARA Junior researcher - Ph.D Student.

#### Climate finance.

Maria Victoria Román de Lara studied Business Administration at the Polytechnic University of Valencia and a MSc in Applied Economic Analysis at the University of Alcalá.



#### **ELISA SAINZ DE MURIETA** Junior researcher - Ph.D Student

Developing and supporting research that informs climate policy in the Basque Country, especially in adaptation, sea level rise, and ecosystem services related issues.

Elisa Sainz de Murieta is graduated in Geological Sciences at the University of the Basque Country, has an MSc on Environmental Management and Engineering at the EOI of Madrid and other MSc on Quaternary Geology at the University of the Basque Country.



#### ADMINISTRATION STAFF



**NEREA ORTIZ OLARRA Operations Manager** 

Nerea Ortiz is a Telecommunications Engineer from ETSI (Escuela Técnica Superior de Ingenieros) in Bilbao (2000). Holds an Executive Certificate in Management and Leadership by MIT Sloan Business School (United States) and holds an Executive Master in Business Administration (EMBA) by the University of Barcelona (UB).



**AINHOA AZKARATE Outreach Manager** 

Ainhoa Azkarate holds a degree in Sociology and Political Sciences (University of Deusto, 1995). She got a master degree in International Trade (University of Deusto 1998) and MBA in executive management (University of Deusto, 2003).



JULEN UGALDE **Project Officer** 

Julen Ugalde is a Telecommunications Engineer by the Faculty of Engineering of Bilbao (University of the Basque Country), with a specialty in Communications (2003). He worked as a researcher for 5 years, taking part in R&D projects related to wireless communications, home automation and health support.



SUSANA PÉREZ **Management Assistant** 

Susana Pérez obtained a degree in business administration in 2001, experienced in accountancy, marketing, and management assistance.

### 22 **BC3 FORMER MEMBERS**

#### FORMER RESEARCHERS

#### RAMON ARIGONI ORTIZ

Brazil Staying period: 2008-2011 Research Line: Economics of climate change.

#### **BETTINA COOPER**

Germany Staying period: 2010-2011 Research Line: Economic Analysis of Adaptation Strategies in Developing Countries.

#### DAVID HERES DEL VALLE Mexico

Staying period: 2010-2011 Research Line: Comparison of alternative policies to mitigate GHG emissions within the transportation sector; economic analysis of land use and deforestation; and evaluation of environmental policies through experimental methods.

#### **MELANIE HEUGUES**

France Staying period: 2010-2011

Research Line: International cooperation on climate change, Incentives to participate in an agreement, Strategic interactions, Non cooperative game theory.

#### **KAYSARA KHATUN**

United Kingdom Staying period: 2010-2011 Research Line: Forestry, Biodiversity, Climate Mitigation and Adaptation.



Staying period: 2009-2010

Research Line: Environmental economics: socio-economic drivers and impacts of environmental damage and climate change.

**NIGGOL SEO** South Korea

Staying period: 2008-2010

Research Line: Measuring the Impact of Climate Change and Quantifying Adaptation Behaviours in Africa, South America, and Asia.

### 2.3 **BC3 VISITORS**

BC3 has implemented a program called BC3 Visitor Programme under the attainment of its strategic objectives, talent attraction. The aim of this programme is to promote research and dialogue between BC3 and other institutions by supporting and hosting local and international professors wishing to undertake research.

This program acts as a facilitator to establish stable collaborations with other institutions and researchers, enabling BC3 to expand the frontiers of knowledge transfer both through the contribution to the BC3 working papers and to dissemination activities such as seminars.

DATE		VISITOR	INSTITUTION	POSITION	SEMINAR GIVEN
					Γ
2011	Jan	Dr. Maria Loureiro	Universidad Santiago de Compostela (Spain)	Associate Professor	Social Preferences about Climate Change: Evidence from Spain.
2011	Feb	Dr. Miguel Angel Zavala	Universidad Alcalá (Spain)	Director CIFOR-INIA	lberian forests against global change: projected impacts and adaptation mechanisms.
2011	Mar	Dr. Richard Neufville	MIT (United States)	Professor of Engineering Systems and of Civil and Environmental Engineering	Flexibility in Engineering Design: Creating Value in Technological Enterprises Using Flexibility to Exploit Uncertainties.
2011	Apr	Dr. Raul Moral	Universidad Miguel Hernández de Elche (Spain)	Professor	Synergy between organic waste management by composting and agronomy to reduce greenhouse gases emissions.
2011	Apr	Dr. Richard Cornes	Australian National University (Australia)	Professor of Economics and F H Gruen Chair in Economics	Aggregative Environmental Games.
2011	May	Dr. Ana Iglesias	Universidad Politécnica de Madrid (Spain)	Professor of Agricultural Economics and Social Sciences	Looking into the future of water and agriculture.
2011	May	Dr. Thomas Heyd	University of Canada (Canada)	Professor of Philosophy	Adaptation and Development in Times of Climate Change.
2011	Jun	Dr. Karen Pittel	lfo- Institute for Economic Research (Germany)	Head of Department Energy, Environment and Exhaustible Resources	Local and Global Externalities, Environmental Policies and Growth.
2011	Sep	Dr. Xavier Arnauld de Sartre	CNRS,University of Pau (France)	Professor	From regulatory policies to ecosystem services: political ecology in the Amazon.
2011	Oct	Dr. David Batker	Earth Economics (United States)	Director	Ecosystem Services: Ground Truthing.
2011	Nov	Dr. Charles Perrings	School of Life Sciences, Arizona State University (United States)	Professor of Environmental Economics	Precaution and proportionality in the management of Global environmental change.

DATE		VISITOR	INSTITUTION	POSITION	SEMINAR GIVEN
				Γ	Γ
2012	Feb	Dr. Alejandro Caparrós	CSIC (Spain)	Scientific Researcher	Spatial green accounting for terrestrial ecosystems: from theory to practice.
2012	Mar	Dr. Fassnacht	Colorado State University ESS- Watershed Science, Warner College of Natural Resources (United States)	Associate Professor e	Altering Hydrology due to a Changing Climate and the Perception of these Changes: Examples from the Mountains of Colorado and Mongolia.
2012	Apr	Dr. Mathew Kotchen	University of Yale (United States)	Associate Professor	Voluntary and Information Based Approaches to Environmental Management: An Impure Public Good and Club Theory Perspective.
2012	Jun	Dr. Kumiko Goto-Azuma	Ice Core Laboratory, National Institute of Polar Research (Japan)	Associate Professor	Past climate change recorded in polar ice cores.
2012	Jun	Dr. Nobuhiko Azuma	Dept. of Mechanical Engineering, Nagaoka University of Technology (Japan)	Full Professor and Dean of the Dept. of Mechanical Engineering	Deep ice core drilling, polar ice-sheet flow and its implications for climate change.
2012	Jul	Dr. Patrick Shipman	Dept. of Mathematics, Colorado State University (United States)	Assistant Professor and Head of the Laboratory for Mathematics in the Sciences	Invasive species: Economic impacts and management strategies in the face of climate change.
2012	Sep	Dr. Jacob Phelps	National University of Singapore (Singapore)	Researcher	The "slash-and-burn" solution to climate change.
2012	Sep	Dr. Erik Gómez- Baggethun	Institute of Environmental Science and Technology, Universitat Autònoma de Barcelona (Spain)	Research fellow	Theoretical issues and operational challenges in ecosystem services valuation.
2012	Oct	Dr. Rosimeiry Portela	Conservation International (United States)	Senior Director for Science and Knowledge	From Theory to Practice: The Science and Field Implementation of Ecosystem Services.
2012	Nov	Dr. Katrin Erdlenbruch	Irstea (France)	Researcher	A Water Agency faced with Quantity- Quality Management of a Groundwater Resource.
2012	Dec	Dr. Kai Konrad	Max Planck Institute for Tax Law and Public Finance (Germany)	Director	Climate Policy Negotiations with Incomplete Information.



# 2.4 GENERAL INFORMATION AND STATISTICS

CURRENTLY THERE ARE 31 PEOPLE WORKING AT BC3:

#### 26 RESEARCHERS:

Scientific Director Ikerbasque Professors Research Professors Research Fellows Post Doc Researchers Junior Researchers - Ph.D Students Research Assistant

#### **5 MANAGEMENT STAFF:**

Operation Manager Outreach Manager Project Officer Management Assistant



#### GENDER



### NATIONALITY





The Intergovernmental Panel on Climate Change (IPCC), the leading international body for the assessment of climate change established by the United Nations Environment Programme (UNEP) is reinforcing the emphasis they put on assessing the socio-economic aspects of climate change and its implications for sustainable development, risk management and the creation of a response framework through both adaptation and mitigation. It aims to provide more detailed information on climate change in the regional scope. The need to act and to deepen the scientific knowledge on climate change both locally and globally is aligned with the strategic objectives and the scientific

research lines of BC3. **>>** "BC3 carries out high-level research aimed at informing and decision and policy making"



### 3.1 RESE 1 Ada 1 Ada Clin 2 Me clin 3 Int clin 4 De res pol

### **RESEARCH LINES**

Adaptation to and the impacts of climate change

Measures to mitigate climate change

International dimensions of climate policy

Developing and supporting research that informs climate policy in the Basque Country



#### ADAPTATION TO AND THE IMPACTS OF CLIMATE CHANGE

#### **1. OBJECTIVES**

Our main goal is to assess the impacts produced by climate change on natural and anthropogenic systems, including human health, ecosystems and biodiversity and water resources and agriculture, to analyse and prioritize the main adaptation strategies and to quantify their associated costs and benefits. For this purpose, it is important to differentiate climate-related impacts, as well as adaptation, across different geographical scales and economic sectors, along a number of possible future scenarios.

#### 2. DESCRIPTION

The analysis of adaptation is closely linked with the assessment of the impacts caused by climate change, considering that these will not be equally distributed in the world. Vulnerability to climate change is affected by a number of factors such as the level of exposure, sensitivity and adaptive capacity, and is therefore expected to be higher in poorer countries and among some groups of the population.

Our first order of business is to identify and assess these impacts taking into account market activities and sectors (such as forest management and water supply) as well as non-market spheres (such as human health, leisure, environment, ecosystem services and biodiversity, for which no established market exists). In the first case we use market-based methodologies (also known as market valuation based on market prices or profits) to assess the economic impacts. In the second case we use non-market methods (known as non-market valuation, such as stated or revealed preference, production functions). Economic valuation of the impacts starts from the measurement of the physical impacts and their translation into monetary values. In this research line we make use of disaggregated, bottom-up approaches which are more case-specific, in contrast to the top-down approaches developed at a macro level and based on economy-wide models which tend necessarily to provide rougher results.

Our second main goal is to identify which adaptation policies, programmes and practices can be put in place in order to reduce or avoid the expected impacts. For this purpose, we have to identify vulnerable populations, estimate the financial resources needed for adaptation and determine what damages could be avoided through their implementation and what is the cost-effectiveness of the proposed programmes, in order to help governments in the selection of the most appropriate combination of measures. Economic techniques used for this purpose include multi-criteria, costbenefit and cost-effectiveness analysis. In these analysis it is crucial to estimate also the financial gap in funding for adaptation in poor countries, where the potential to adapt is constrained by a lack of resources, low expenditures and weak infrastructures. In the context of adaptation we address methodological issues such as uncertainty, the choice of the baseline, reversibility, distributional effects, discount rates, monetary and non-monetary evaluation, hard versus soft adaptation, private and public adaptation, and ancillary benefits.

#### **3. APPLICATIONS**

The main applications refer to forestry and natural ecosystems, ecosystem services and human health.

More specifically we mention the twoyear project CLIMBE (Climate Change and Biodiversity Loss: The Effects on Ecosystem Services), financed by FBBVA, and implemented by the Basque Centre for Climate Change (BC3) and the Centro Agronómico Tropical de Investigación y Enseñanza (CATIE). The study assessed the impacts of climate change on tropical forest ecosystems and related services in the Central America region, as well as the projected economic costs in the no-policy action case. The study developed a methodological framework that combines a set of bio-physical and economic models, performed at both regional and local scales. Three groups of models were developed, the biophysical models (assessing the impacts on forest ecosystems and the provision of related services under climate change), the economic models (assessing the monetary values of ecosystem services and projecting future economic impacts), and the land-use change and cost-benefit analysis models (assessing the ecological and economic impacts of different landuses in Costa Rica). The assessment is particularly relevant in this region as the loss of ecosystems and related services strongly impacts socio-economic vulnerability.

In the context of ecosystem services, an important contribution is provided by ARIES (Artificial Intelligence for Ecosystem Services), a web-based modelling technology offered to users such as practitioners, scientists and decision-makers including members

of NGOs, academic, or governmental institutions worldwide, to assist rapid ecosystem service assessment and valuation (ESAV). The toolkit can be used to describe, analyse and solve ecosystem services related management problems, with the final purpose of making environmental decision making processes easier and more effective. BC3, with ARIES has developed some of the most advanced methodologies (assembling deterministic or probabilistic models) to quantify and value flows of ecosystem services at the appropriate spatial scale, ecological and socio-economic context. This is done through an automated data integration process utilizing an extensive database featuring global through local scale GIS data and ecosystem service models. ARIES maps concrete, spatiallyexplicit beneficiaries of ecosystem services, and quantifies their demand for each service. Conceptualizing ecosystem services as a concrete list of benefits for concrete beneficiary groups avoids the problem of "double counting" of benefits that has plagued past ecosystem service

In the context of human health we cite the collaboration with TERI institute in New Delhi with which we developed a methodological framework to estimate the additional cost of planned adaptation in the health sector of India up to the year 2030. The approach adopted stresses on both preventive and reactive measures, under different climate scenarios (with and without mitigation), and also taking into account the influence of socioeconomic development which is to be expected in a growing economy like India, in the near future. The analysis focuses on malaria, diarrhoea and malnutrition.

valuation efforts.



PROVISIONING REGION

> NON RIVAL USE REGION







#### MEASURES TO MITIGATE CLIMATE CHANGE

#### **1. OBJECTIVES**

The driving force behind much of the mitigation research activities at BC3 is the challenge of understanding how to encourage a transition from an economic and social structure responsible for large emissions of carbon and GHG (greenhouse gases) emissions to one based on lowcarbon sources of energy and mindful of emissions from agriculture and forestry.

The main objectives of this research line can be summarized as:

- Modelling the interlinkages between the economic and the climate systems to better understand how the economy will be affected by climate change and the measures to control GHG emissions.
- Understanding the role of technology in reducing GHG emissions and what kinds of policies will be needed to best promote the right kind of technologies (carbon-free technologies).
- Designing instruments to reduce greenhouse gases at regional, national and global level.

#### 2. DESCRIPTION

Although climate change can be caused by natural factors, there is a scientific consensus that the changes in temperature, land ice cover, rainfall, storm intensity and sea level rise over the past 100 years have been caused almost entirely by human activities. This scientific consensus on climate change is leading to increased attempts to develop technologies and sciences and to carefully manage others in order to mitigate climate change.

Climate change mitigation involves efforts to reduce the concentrations of GHG, either by reducing their sources or by increasing their sinks. Mitigation efforts include: developing ways to meet the service needs of the residential sector, industrial processes, electricity generation, and transportation while reducing the energy use; switching to renewable energy sources (such as wind power, geothermal energy or solar energy) and potentially other energy sources (provided the full social costs do not outweigh the benefits); developing methods to minimise GHG emissions associated with other activities, especially agricultural activities; expanding forests and other "sinks" to remove greater amounts of carbon dioxide and other GHGs from the atmosphere.

Research related to mitigation strategies involves understanding which are the most appropriate tools and methods to encourage the transition to a low-carbon and GHG economy, to identify gaps in climate change mitigation modelling, analysis and strategies, and to develop ways to fill these gaps in knowledge. A key role of BC3's climate mitigation research is to develop questions that are relevant to stakeholders, including policy-makers at the local, regional, national or global level.

#### **3. APPLICATIONS**

At present, the team is formed by economists and natural scientists with strong capabilities in climate finance and economics, including general equilibrium, integrated assessment modelling and life cycle analysis, and in empirical analysis especially associated with medium-run to very long-run energy consumption behaviour and supply factors related to agricultural production. In addition to many publications in international journals, this expertise is providing valuable insights into our knowledge base, needed to pursue and complete the transition to a low carbon economy and for local, regional, national and international government energy and climate policies (including energy efficiency programmes, tradable permit schemes, energy transitions, and carbon offsets).

The research projects where BC3 has been participating include:

- Very long-run relationships between and technological economic development, energy use and its environmental effects: in relation to this BC3 has built the DICER model which extends the pathbreaking work of Professor Nordhaus on climate change and shows how introducing more regional variations in the data and modelling climate circulation models more realistically implies higher costs of climate change with more action needed earlier.
- Policies for promoting energy efficiency in Europe.
- Understanding public perception towards different mitigation policies.
- Regional modelling of the economy (CGE Model) and creation of a carbon market model for Brazil.
- Systems-based approaches to mitigate GHG emissions from land use at different spatial and temporal scales.
- Design of global mechanisms to reduce deforestation (REDD+) and biodiversity conservation synergies in developing countries in the context of PES (Payment for Ecosystem Services).
- · Health co-benefits from mitigation policies in high and low-income countries. An important contribution in this field has been its research on the health co-benefits of measures to reduce greenhouse gases, which have been known to be important for some time. BC3, working with the London School of Hygiene and Tropical Medicine and the WHO, published a series of papers in the Lancet, which elaborated these results further. showing that the health benefits of low carbon development are particularly high for developing countries.





RESEARCH LINE 3

#### INTERNATIONAL DIMENSIONS OF CLIMATE POLICY

#### **1. OBJECTIVES**

The research line "International dimensions of climate change" is dealing with both the policy-side and the theoretical aspects of climate change research. The 'policy-side' is concerned with topics included in the other BC3 research lines (adaptation, mitigation, developing and supporting research that informs climate policy in the Basque country), but also covers climate-change research areas not included in these research lines. The methodologies/ techniques employed are equally diverse including - amongst others - CGEmodelling, cost-benefit analysis, game theory, and integrated assessment modelling.

Both adaptation and mitigation policies are subjects of research in this research line and much of it is aligned with energy aspects (e.g., economic instruments influencing energy use in a sustainable way, vulnerability of the electricity sector). With respect to international policy, thematic foci of the research strategy are international environmental agreements and international climate finance. These involve topics such as ancillary benefits, fairness and development.

The programme aims to link research in the respective subareas (national vs. international, mitigation vs. adaptation, etc.) when this is a reasonable option, in order to derive coherent results and to develop generally acceptable policy strategies.

#### **2. DESCRIPTION**

Recent international negotiations on climate change were not capable to bring about a global agreement on climate change as a successor of the Kyoto Protocol. A global treaty, where all major polluters credibly commit to domestic emission limitations is out of sight despite the 'road map' to a global agreement by 2020 which was agreed at the Conference of Parties (COP) in Durban in 2011. Incomplete international agreements, like those between EU member countries only might be easier to attain than grand coalitions but as standard economic analysis suggests, unilateral emission reductions by such sub-coalitions are likely to be undermined by other countries raising their emission levels.

The research line "International dimensions of climate change" conducts research on improving the chances for establishing an effective international coalition combating climate change and addressing challenges with respect to adaptation to climate change. Innovative measures such as matching schemes or schemes allowing for internationalside payments are among the core research topics of the research line. Research on side-payments in the context of international climate policy got an impetus from the Cancun Accords in 2010 which pledged to mobilize USD 100 billion in international climate financing annually by 2020. The Accords' specification that adaptation must be

addressed with the same priority as mitigation is not reflected in current patterns of international climate finance, where we face a strong bias towards mitigation. Overcoming such a bias might be one of the major challenges which the research line deals with. Besides the research on the adequate disbursement of international climate funds, further pressing research questions were raised with respect to international climate finance, concerning e.g. fundraising, governance of international funds and ethical aspects of mechanisms. Ethical aspects may - in turn - exert on allocative outcomes of international negotiations and should therefore be taken into account

#### **3. APPLICATIONS**

The research line research team consisting of economists conducted research – inter alia – on the following topics:

• Strategic implications of ancillary benefits on international climate change negotiations:

Benefits of climate policy arise from the prevention of economic and environmental damages. Two different kinds of benefits, i.e. primary and ancillary benefits, are produced simultaneously. Primary benefits are the benefits derived from pursuing climate policy's primary aim, which is climate protection. In contrast, the ancillary benefits are secondary benefits such as reductions in local air pollution. We have investigated the potential impact of such benefits on individual countries conduct in the international climate policy arena.

- New incentive schemes: The research line team conducts research on socalled matching schemes. These schemes influence the incentive structure of countries in a way that brings about an improved outcome for all parties. Yet, significant problems may arise in these schemes and our research not only identified these, but also made suggestions to overcome associated problems.
- Fairness: Fairness has been stressed by both policy-makers and researchers to potentially play an important role in international negotiations. We investigated how international institutions and funds could be organized such that perceived fairness levels are increased. We showed that such improvements in fairness could bring about a more successful international climate policy.
- Mitigation bias: International climate finance mainly supports mitigation projects. In order to meet the Cancun Accords' aim of a balanced pursuit of adaptation and mitigation activities, this bias has to be reduced. The research team in charge of this research line analysed the reasons for the bias and proposed policies which might help to diminish the bias.





#### DEVELOPING AND SUPPORTING RESEARCH THAT INFORMS CLIMATE POLICY IN THE BASOUE COUNTRY

#### **1. OBJECTIVES**

The aim of this research line has been to act as the benchmark centre for research on all aspects of climate policy in the Basgue Country and Spain drawing on the substantial research that is ongoing in the universities and other research centres locally but also worldwide.

In addition, the research line has focussed on issues and topics of interest for policy and decision makers both public and private in the Basque Country, Spain and EU. For this purpose, BC3 has developed strong links with policy and decision makers, it has grown interconnections with other research centres and it has offered specific outputs for several target groups. This has allowed, on the one hand, a better understanding of the main problems decision makers are facing and, on the other, a direct way to convey the messages to policy makers.

#### 2. DESCRIPTION

Although climate change policies are mainly being discussed at international level by means of the United Nations Conventions and the Kyoto Protocol, the bulk of the impact will be felt at regional and local level. Regional and local governments are thus very important actors. Moreover, regional governments in many parts of the world hold a wide range of the jurisdictional authority to implement policy actions for both adaptation and mitigation. This is the case for Basque Autonomous Community and many other regions in the EU.

In this context, understanding the capabilities and roles of all levels of governance becomes very important: for local actors to fully comprehend the implications of the decisions taken in the international arena; for national

governments to be able to effectively design and implement policies.

In order to effectively engage in connecting these levels of governance and making a good use of "science for policy making" BC3 has developed four kinds of research outputs and services:

- Policy briefing series: directed to both public and private policy makers, the PB is an effective way to convey research outputs in a short and clear format. 16 briefs have been produced during the period 2009-2012, covering diverse areas such as the COP meetings for international climate policy, the impacts of EU ETS for different economic sectors (in Spain and in the Basque Country) or the role of energy efficiency rebates.
- · Projects of interest and executive summaries for policy makers: BC3 intensively tried to engage in projects of interest for policy makers in Basque Country and Spain, such as the economic impact of sea level rise in biodiversity in the Basque Coastline, the impact of river flooding in different areas or the analysis of some energy policies.
- Policy reports: Aimed at the members of the Basque Government, the Parliament and the climate change office, these reports (up to 14 of which have been produced) have addressed numerous policy relevant issues such as the role of cost benefit analysis in climate change adaptation or insights for the climate change act.
- Advisory support: other type of specific support has also been offered to the Basque Government in specific tasks such as dissemination with members of Parliament or the briefing for the international climate change fora.

### **3. APPLICATIONS**

Within the applications of this research line we have:

- In order to support the Basque team of the Spanish delegation to the COP 15 and 16 we carried a synthesis of documents of preparatory ideas as well as a dossier of results of the summits. This information was later prepared for general media distribution in newspapers.
- The use of sophisticated Computable General Equilibrium (CGE) models to better understand the impacts of CO2 pricing (the existing EU ETS and other potential taxes) in the Basque iron and steel industry.
- The comparative analysis of the role played by over 20 other European and American regions in terms of Climate Policy.
- The analysis of the energy efficiency rebates scheme (RENOVE programme) as well as other alternate policies (taxing bads).
- A relatively conceptual but practical quide of the role of economics of adaptation.

Many other efforts have been directed to understanding local policy alternatives by offering them different tools for policy analysis such as input-output analysis to assess the impact of certain policies (as in the case of the energy efficiency plan of Bilbao, for instance) or the economic impact of potential flooding events in the city.

Finally, BC3 researchers have participated in the preparation of a number of policy documents for institutions such as the World Bank, Committee of the Regions. IPCC, UNFCCC, UNESCO or UNEP-RISOE Centre among many others.

Regional examples of different policy instruments used in climate change policies

INSTRUMENTS	ENERGY 5 EFFICIENCY	RENEWABLE ENERGIES	TRANSPORT	AGRICULTURE, FORESTRY AND LAND USE	WASTE	EXAMPLES
TAXATION	British Columbia, Connecticut, Manitoba, Ontario	British Columbia, Connecticut, Manitoba, Ontario	Basque Country, British Columbia, Catalonia, Flemish region, Ontario, Quebec			Carbon Tax (British Columbia), Transportation Tax Reform (Flemish region), Duty on gasoline and fossil fuels (Quebec), 'Clean Technologies list' (Basque Country)
TAX EXEMPTIONS	Basque Country, Ontario	Manitoba, Ontario	British Columbia, Flemish region, Quebec			
SUBSIDIES/ GRANTS/ LOANS	Basque Country, Bavaria, British Columbia, Brittany, California, Catalonia, Connecticut, Flemish region, Manitoba, New South Wales, North Rhine- Westphalia, Ontario, Quebec, Queensland, South Australia, Wallonia, Yukon	Basque Country, Bavaria, British Columbia, Brittany, California, Catalonia, Connecticut, Flemish region, Manitoba, New South Wales, North Rhine-Westphalia, Ontario, Quebec, Queensland,Sao Paulo State, Schotland, South Australia, Victoria, Wallonia, Yukon	Basque Country, Catalonia, Ontario, Quebec, Sao Paulo State	Basque Country, Bavaria, British Columbia, California, Manitoba, Ontario, Quebec, Schotland, South Australia, Victoria, Wales, Wallonia	New South Wales, Quebec, Schotland	Sustainable Agriculture Practice Programme (Manitoba, Ontario)
CAP AND TRADE SYSTEMS	All EU regions, British Columbia, Connecticut, California, Manitoba, New South Wales, Ontario, Quebec	All EU regions, British Columbia, Connecticut, California, Manitoba, New South Wales, Ontario, Quebec, Wales	All EU regions, British Columbia, Connecticut, California, Manitoba, New South Wales, Ontario, Quebec	All EU regions, British Columbia, Connecticut, California, Manitoba, New South Wales, Ontario, Quebec	All EU regions, British Columbia, Connecticut, California, Manitoba, New South Wales, Ontario, Quebec	EU ETS, Western Climate Initiative (British Columbia, California, Manitoba, Ontario, Quebec), Regional Greenhouse Gas Initiative (Connecticut), Carbon Reduction Commitment (Schotland)

Source: Nrg4sd (www.nrg4sd.net), The Climate Group (www.theclimategroup.com) and original work. Galarraga et al (2011)



%

UTILITY

### **3.2** BC3 SCIENTIFIC PRODUCTION STATISTICS See all the production in annex

#### PUBLICATIONS



	2009	2010	2011	2012
Journal Articles	29	43	48	43+21
Other Publications	7	11	14	10
<b>Books and Specials</b>	4	5	5	4
Book Chapters	6	13	15	8+7
BC3 Working Papers	11	18	13	14
BC3 Policy Briefings	2	4	7	3

#### INTERNATIONAL RELEVANCE OF PUBLICATIONS

One of the key indicators of the international relevance of the research carried out by BC3 are the amount of publications in the most significant scientific journals. (Web of Knowledge)



	2009	2010	2011	2012	<b>Total</b> 2009-2012
Q1	3 38%	7 44%	17 58%	11 55%	<b>38</b> 52%
Q2	<b>1</b> 12%	1 7%	<b>6</b> 21%	<b>4</b> 20%	12 16%
Q3	- 0%	<b>2</b> 12%	<b>2</b> 7%	<b>2</b> 10%	<b>6</b> 8%
Q4	<b>1</b> 12%	<b>2</b> 12%	2 7%	<b>2</b> 10%	<b>8</b> 11%
NO IF	3 38%	<b>4</b> 25%	2 7%	1 5%	<b>10</b> 13%
Total	8	16	29	20	73

### SOME OF THE INTERNATIONAL SCIENTIFIC JOURNALS BC3 PUBLISHED IN

LANCET

GLOBAL ENVIRONMENTAL CHANGE HUMAN AND POLICY DIMENSIONS CONSERVATION LETTERS SCIENCE OF THE TOTAL ENVIRONMENT AGRICULTURE ECOSYSTEMS & ENVIRONMENT ECOLOGICAL INDICATORS REVIEW OF ENVIRONMENTAL ECONOMICS AND POLICY ECOLOGICAL ECONOMICS ENERGY ECONOMICS ENERGY POLICY JOURNAL OF CLEANER PRODUCTION ENVIRONMENTAL SCIENCE & POLICY ENVIRONMENTAL CONSERVATION RESOURCE AND ENERGY ECONOMICS JOURNAL OF PUBLIC ECONOMICS AMBIO CLIMATE POLICY ENVIRONMENT AND DEVELOPMENT ECONOMICS WORLD DEVELOPMENT FOOD POLICY LAND ECONOMICS ENERGY JOURNAL MARINE POLICY JOURNAL OF INDUSTRIAL ECOLOGY

### 33 **COLLABORATING INSTITUTIONS**

BC3 operates under the philosophy that effective research in climate change can only be conducted in collaboration with other research groups. To that end, BC3 has developed a wide network of international, national and local collaborators.

#### SOME OF THE COLLABORATING INSTITUTIONS

**University of Vermont** United States Center for International Climate and Environmental Research (CICERO) Norway Instituto Nacional de Investigación y Tecnología Agraria y Alimentaria (INIA) Spain University of Cambridge United Kingdom Institut für Wirtschaftsforschung (IFO) Germany Tecnalia Spain London School of Hygiene and Tropical Medicine (LSHTM) United Kingdom World Health Organization (WHO) Switzerland Fondazione Eni Enrico Mattei (FEEM) Italy

University College London (UCL) United Kingdom The Energy and Resources Institute (TERI) India **Asian Development Bank** The Philippines **Bocconi University** Italy **Energy Research Institute** China Environmental Defense Fund (EDF) United States University of the Basque Country (UPV/EHU) Spain Technical University of Madrid (UPM) Spain **Department for Environment, Food and Rural** Affairs (DEFRA) United Kingdom Centro de Investigaciones Energéticas, Medioambientales y Tecnológicas (CIEMAT) Spain

### 34 REMARKABLE PROJECTS

#### FUNDED BY





PROJECT

- - (FP7-ENV-2010).
- (FP7-ENV-2012).
- economy" (FP7-ENV-2012).
- Nacional 2010).

- Fundación Repsol).
- en economía 2011).
- International agreement).





Fundación **BBVA** 

FUNDACIÓN

RAMÓN ARECES

Fundación **REPJOL** 

Bioversity

EXIOPOL "External costs and input-output models" (FP6-2005-ENERGY) PURGE "Public health impacts in urban environments of greenhouse gas emissions reduction strategies their impacts on public health and well-being in urban areas environment" (FP7-ENV-2010).

**PREEMPT** "Policy-relevant assessment of socio-economic effects of droughts and floods" (EC ECHO Program).

PERSEUS "Policy-oriented marine environmental research in the Southern European seas" (FP7-OCEAN-2011).

ECOFINDERS "Ecological function and biodiversity indicators in European soils"

**BASE** "Bottom-up climate adaptation strategies towards a sustainable Europe"

**COMPLEX** "Knowledge based climate mitigation systems for a low carbon

CECILIA 2050"Choosing efficient combinations of policy instruments for lowcarbon development and innovation to achieve Europe's 2050 climate target" (FP7-ENV-2012).

• GHG LAND "Desarrollo de estrategias de mitigación con enfogue de sistema para reducción de gases invernadero dentro y entre elementos multifuncionales de un paisaje" (MICINN Plan Nacional 2009).

COBELOC "Consumer behaviour for a low carbon economy" (MICINN Plan

**CICLOPE** Análisis del impacto ambiental de los edificios a lo largo de su ciclo de vida en términos cuantificables de consumo energético y emisiones GEI asociadas "(MICINN Proyectos Singulares Estratégicos 2009).

WATER2ADAPT "Resilience enhancement and water demand management for climate change adaptation" (MICINN ERANET 2009).

K-Egokitzen I "Cambio Climático: Impactos y adaptación" (EJ-GV Etortek 2010). ECOAGRIWASTE "Desarrollo marco de modelización con aproximación sistemática para evaluar uso más eficiente de desechos provenientes de industria agroalimentaria para mitigación de emisiones de GEI con mínimos o positivos impactos en los servicios y bienes de ecosistemas agrarios" (EJ-GV Proyectos de Investigación 2010).

• **CLIMBE** "Climate change and biodiversity loss: The effects on ecosystem services in tropical forests in Central America" (FBBVA - V Convocatoria de ayudas a la investigación en Ecología y Biología de la conservación).

LCP "Low Carbon Programme" (Joint Research Programme agreement with

• **PAEE** "Políticas de apoyo a la eficiencia energética: impuestos vs subvenciones." (Fundación Ramón Areces - Programa ayudas a la investigación

**PACS** "Payment for agrobiodiversity conservation services" (Bioversity

IGP "India socioeconomics project" (Bioversity International agreement).

## 4.

# KNOWLEDGE TRANSFERENCE

# **BC3 PERMANENT INITIATIVES**

- >> Contributing to climate change knowledge exchange and dissemination to the scientific community and society in general, is one of the main strategic objectives of BC3.
- >>> We are firmly committed to value creation through knowledge transfer, with initiatives and actions being designed for training and dissemination purposes, focused on the following target groups:
- The international scientific community
- Policy makers
- Economic-business players
- The agents in the Basque Science and Technology Network and the Basque society as a whole
- Permanent initiatives





The aim of this programme jointly promoted by University of the Basque Country (UPV/ EHU) and BC3, is to contribute to climate change knowledge through a series of lectures led by recognized academicians in the field.

BC3 has contributed with its participation offering lectures in Doctorates, Master Courses in different international universities as well as tutoring local and international

The aim of this programme is to attract senior researchers working in the field of climate change in order to promote research and reinforce dialogue between BC3 and other

The objective of the summer school is to offer an updated and recent view of the ongoing trends in climate change research in an annual basis. The school is designed to approach the main scientific topics with a multidisciplinary approach, depending on the main trends on climate change issues and allowing for an integrated view and understanding of the problem. As years go by, the school might evolve its different approaches when

The Klimagune Workshop is a forum for informal discussion on climate change that is open to all the agents in the Basque Science and Technology Network. The aim of this initiative is to share knowledge, projects and developments in terms of scientific advancements, focusing on the creation of synergies and possible frameworks for cooperation between the various research groups, organisations and institutions that address this matter.

The Policy Briefings are a series of documents produced by BC3 that provide policy recommendations based on the expertise of the knowledge body of the centre and the results from research carried out at BC3. These briefings offer information and training to policy makers and public interest organisations, to help them address and respond to the environmental policy related issues.

The Klimagune Conferences are a series of lectures through which we seek to incorporate multidisciplinary insights and viewpoints into the debate on climate change, whereby we can help to build a society that is more and better informed regarding the collective venture of social and economic development from a sustainable perspective.

The Education Department of the Basque Government and BC3 have gathered to carry out the Training Caravan initiative, which has as main aim to raise research vocation among the students of the Basque Country and inform about climate change research.

# 5. | HIGHLIGHTS

### 5 **KLIMAGUNE WORKSHOP**

>> PROMOTING FORA FOCUS ON

C3 Basque Centre for Climate Change is firmly committed to **D**value creation, either through the development of research projects or through knowledge transfer; with such actions being designed for the international scientific community, the agents in the Basque Science and Technology Network, economicbusiness players, policy makers and, ultimately, Basque society as a whole.

Accordingly, BC3 launches actions designed for sharing and disclosing rigorous information on climate change, amongst these initiatives, BC3 promoted Klimagune Workshop, which provides a forum for informal discussion on climate change that is open to all the agents in the Basque Science and Technology Network.

The aim of this initiative is to share knowledge, projects and developments in terms of scientific advancements, based on the creation of synergies and possible frameworks for cooperation between the various research groups, organisations and institutions that address this matter in the Basque Country. This initiative was launched in 2010 and brought together over 100 players from the Basque science network in each of its the celebrated three editions; scientific, agents from technology centres, enterprise and associations and policy makers working in climate change related issues.





Klimagune Workshop 2010 >> Updating Climate Change Research in the Basque Country Klimagune Workshop 2011 >> Addressing Climate Change through Adaptation Klimagune Workshop 2012  $\rightarrow$  From Euskadi to Rio + 20

OCUS ON

>> INTERNATIONAL RESEARCH PROJECTS

### **CLIMBE**

This research project was carried out jointly by the BC3 ▲ Basque Centre for Climate Change and the Tropical Agricultural Research and Higher Education Centre of Costa Rica (CATIE), financed under the 2009 grant programme on Biodiversity Conservation of the BBVA Foundation.

The project addresses the impacts of climate change in tropical forest, looking at the expected changes in ecosystem services in the Central America region. This world region is particularly relevant as the loss of ecosystem services strongly impacts socio-economic vulnerability.

The project combines a set of bio-physical and economic models, performed at both regional and local scales. The first set assessed climate change impacts on forest ecosystems and the provision of related services, while through the economic approach monetary values was estimated for the changes in ecosystem services that are due to global change. A case study was developed for Costa Rica focused on biological corridors and water runoff for hydroelectric facilities.

CLIMBE project provided evidence of a general drying trend in Central America. As emissions increase, dry forests cover larger areas at the expense of more humid life zones, being these ones the most vulnerable to climate change. General trends show a likely reduction in carbon uptake and water runoff, and a likely evapotranspiration increase. In economic terms, impacts vary among countries and forest types, but overall we obtained net economic losses for all the services, with the highest loss in wet and rain forests.

Results of the project were presented in several workshops held in Turrialba (Costa Rica) and Bilbao during the years 2010 and 2011, where important feedback was obtained from the stakeholder community.



Research project funded by: Fundación **BBVA** 

### **PURGE**

**D**URGE - Public health impacts in urban environments of **I** greenhouse gas emissions reduction strategies.

As stated in its strategic goals, BC3, Basgue Centre for Climate Change, is committed to carry out excellence international collaborative research efforts, to this end, BC3 is participating as one of the 9 partners in the PURGE research project. This project, financed by the European Commission, examines the health impacts of greenhouse gas (GHG) reduction policies in urban settings in Europe, China and India, using case studies of 3-4 large urban centres and three smaller urban centres. Sets of realistic interventions are proposed, tailored to local needs, to meet published abatement goals for GHG Emissions for 2020, 2030 and 2050. Moreover, mitigation actions are also defined in four main sectors: power generation/industry, household energy, transport and food and agriculture. The chief pathways by which such measures influence health will be described, and models developed to guantify changes in health-related 'exposures' and health behaviours.

Models will include ones relating to outdoor air pollution, indoor air quality and temperature, physical activity, dietary intake, road injury risks and selected other exposures. Integrated quantitative models of health impacts will be based on life table methods encompassing both mortality and morbidity outcomes modelled over 20 year time horizons. Where possible, exposure-response relationships will be based on review evidence published by the Comparative Risk Assessment initiative or systematic reviews.



PURGE = Public health impacts in URban env

Research project funded by:



### 53 HANDBOOK OF SUSTAINABLE ENERGY

FOCUS ON

**>>** EDITING BOOKS WITH INTERNATIONAL LEADING ACADEMICS

Tn December 2011, BC3 launched the book "Handbook of L sustainable energy

The book was edited by Dr. Ibon Galarraga and Dr. Mikel González-Equino, researchers at BC3, Basque Centre for Climate Change, and its Scientific Director, Prof. Anil Markandya and was published by Edward Elgar Publishers.

This manual on sustainability in the energy field is the result of over two years of work and contains the contributions from 57 authors, leading academics from around the globe. Major contemporary issues and debates relating to the sustainable use of energy are addressed in this far-reaching Handbook. The contributing authors discuss the ongoing debates about sustainability and energy use, energy economics, renewable energy, efficiency and climate policy.

This handbook covers the full spectrum of relevant research L including: definitions of sustainability in energy use; consumer behaviour and energy markets; the impacts of innovation and new technologies; energy economics and climate modelling; low carbon economies and renewable energies. The authors critically engage with perspectives from developed and developing countries from both global and regional standpoints.

Mr. Tomás Gómez San Román, one of the co-authors of the book and Director of the Spanish Energy Commission delivered a speech during the public presentation of the book organized by BC3; "Retos para la sostenibilidad del sector eléctrico en España".



### 54**REMEDIA**

**>>** SETTING UP COLLABORATIVE SCIENTIFIC NETS FOCUS ON

**D**C3 has promoted the establishment of the RED REMEDIA The REMEDIA network has, as its core objective, to promote  ${f D}$ (Red Científica sobre Mitigación de Emisión de Gases de **L** synergies and complementarities among research groups Efecto Invernadero Provenientes del Sector Agroforestal or working in the field, from a multidisciplinary outlook. It also Scientific Network for the Mitigation of GHG Emissions from constitutes a framework for the exchange and dissemination of Agroforestry Activities). scientific and strategic information on this topic in Spain, both for the various public administrations, the private sector and REMEDIA is a new framework, created to promote exchanges the whole of society and, at an international level, contributing among the researches working the mitigation of GHG emissions to the implementation in Spain of new international initiatives. from the agroforestry industry in Spain. REMEDIA is open to this fostering a closer research collaboration other international researchers, no matter their background, that feel that can networks.

contribute to this field.

The establishment of the REMEDIA network took shape in 2011. with the "First Symposium on the Mitigation of GHG Emissions from Agroforestry Activities". This was followed by REMEDIA Workshop 2012, held in Bilbao in March 2012, which was one of its most notable milestones. This workshop, promoted and managed by BC3 Basque Centre for Climate Change, gathered over 110 researchers of the field and had Jean-François Soussana, scientific director of INRA, as keynote speaker.



Spain's Ministry of Agriculture, Food Administration and Environmental Protection (MAGRAMA or Ministerio de Agricultura, Alimentación y Medio Ambiente), has acknowledged the importance of this initiative for its contributions to the improvement of the scientific basis of the estimated GHG inventory for Spain's agroforestry industry.

Currently, REMEDIA network is composed of around 150 researches, spread through very diverse geographic regions and academic fields.



## 5.5 LOW CARBON PROGRAMME

>> JOINT RESEARCH PROGRAMMES FOCUS ON

The mission of BC3 is to provide new strength to the efforts ▲ of the Basque Country in contributing to long-term research on the causes and consequences of climate change and foster the creation of knowledge in this multidisciplinary science. This requires joining forces in cooperative endeavours with other agents and explains the growing importance of the cooperation with universities (especially with the UPV/EHU) and other public and private entities in BC3's research strategy. Thus, the centre is committed to promote the development Joint Research Programmes (JRPs) with medium to long term time horizons.

With this purpose, a JRP has been set up with the UPV/EHU and Fundación Repsol, as a framework for sharing efforts in research, training and dissemination of knowledge in the area of energy and climate economics. The Programme, named "Low Carbon Programme", will contribute to bridge some gaps between academia, business and policymaking and will play an important role in the design of a low carbon future.





### 5.6 TRAINING CARAVAN (IKERTZAILEAK GELAN)

FOCUS ON

>> INSTITUTIONAL SOCIAL RESPONSABILITY

### training caravan ikertzaileak gelan

BC3 researchers gave 26 speeches to over 1,300 students in the

Basque Country >> within the Training Caravan initiative



The Education Department of the Basque Government, ▲ Ikerbasque and BC3 have joined forces to carry out the Training Caravan (Ikertzaileak gelan) initiative. This initiative is part of BC3's Institutional Social Responsibility programme and it is the result of the strong commitment BC3 has with its immediate environment.

The three institutions gathered together to carry out the Training Caravan (Ikertzaileak gelan) initiative. The objective of this initiative is to foster the vocation for research among Basque students and to inform about the climate change research efforts carried out by BC3 knowledge body.

The initiative promotes scientific careers among the students, and to do this, a selection of experienced and international renowned researchers that work in research in the Basque Country, explain in different schools the main features of the scientific career to bring this profession closer to the pupils. The goal of the initiative is not to show their research line in depth but to transmit the reasons to choose this career, with the end purpose of making the scientific career a solid option for Basque students.

# 6. ANNEX

# LIST OF PUBLICATIONS

#### JOURNAL ARTICLES

#### 2012

A. Markandya and A. Chiabai. 2012. (Forthcoming). Economic Loss of Ecosystem Services from 1900 to 2050. Economics of Human Challenges, Lomborg B (Ed). Cambridge University Press.

A. Markandya and S. Abdullah. 2012. Rural electrification programmes in Kenya: Policy conclusions from a valuation study. Energy for Sustainable Development. 16. 103-110.

A. Markandya, J. Pan and Z. Yan. 2012. (Forthcoming). Adaptation Approaches to Climate Change in China: An Operational Framework. Economía Agraria y Recursos Naturales.

Abadie L.M, Ortiz R.A. and Galarraga I. 2012. Determinants of Energy Efficiency Investments in the U.S. Energy Policy. 45. 551-566.

Abadie, LM. Chamorro, JM, González-Eguino, M. 2012. (Forthcoming). Valuing uncertain cash flows from investments that enhance energy efficiency. Journal of Environmental Management.

Abadie, Luis M.; Ibon Galarraga and Dirk Rübbelke. 2012. (Forthcoming). An Analysis of the Causes of the Mitigation Bias in International Climate Finance. Mitigation and Adaptation Strategies for Global Change

Altemeyer-Bartscher, Martin; Anil Markandya and Dirk Rübbelke. 2012. [Forthcoming]. International Side-Payments to Improve Global Public Good Provision When Transfers Are Refinanced Through a Tax on Local and Global Externalities. International Economic Journal

Bagstad, K.J., Johnson, G.W., Voigt, B., Villa, F. 2012. Spatial dynamics of ecosystem services flows: a comprehensive approach to quantifying actual service values. Ecosystem Services. 1.

Buchholz, Wolfgang; Josef Falkinger and Dirk Rübbelke. 2012. (Forthcoming). Non-governmental Public Norm Enforcement in Large Societies as a Two-stage Game of Voluntary Public Good Provision. Journal of Public Economic Theory

Buchholz, Wolfgang; Richard Cornes and Dirk Rübbelke. 2012. Matching as a Cure for Underprovision of Voluntary Public Good Supply. Economics Letters. 117. 727-729.

C. Figuières, S.Leplay, E. Midler and S. Thoyer. 2012. (Forthcoming). The REDD Scheme to Curb Deforestation: a Well-designed System of Incentives?. Strategic Behavior and the Environment

Chamorro, J.M., Abadie, L.M.De Neufville, Richard and Ilic, Marija. 2012. Market-based valuation of transmission network expansion. A heuristic application in GB. Energy. 44. 302-320.

Chiabai A, Galarraga I, Markandya A, Pascual U. 2012. The equivalency principle for discounting the value of natural assets: An application to an investment project in the Basque Coast. Environmental and Resource Economics.

Chiabai A, Platt S, Strielkowski W. 2012. Consumers' specifications and their preferences for tourism e-services. Economics and Management. 2(76). 20-36.

Chiabai, Aline; Dirk Rübbelke and Lisa Maurer. 2012. (Forthcoming). ICT Applications in the Research into Environmental Sustainability: A User Preferences Approach. Environment, Development and Sustainability.

Corbera, E. and Pascual, U. 2012. Ecosystem services: heed social goals. Science. 335. 655-656.

Dijkstra, Bouwe and Dirk Rübbelke. 2012. (Forthcoming). Group Rewards and Individual Sanctions in Environmental Policy. Resource and Energy Economics.

E. Sainz de Murieta, I. Galarraga and A. Markandya. 2012. Klima aldaketa sozioekonomiaren ikuspegitik. EKAIA.

Finus, Michael and Dirk Rübbelke. 2012. (Forthcoming). Public Good Provision and Ancillary Benefits: The Case of Climate Agreements. Environmental and Resource Economics.

Fouquet, R. 2012. The Demand for Environmental Quality in Driving Transitions to Low-Polluting Energy Sources. Energy Policy. 50. 130-41.

Fouquet, R. 2012. Trends in Income and Price Elasticities of Transport Demand (1850-2010). Energy Policy. 50. 62-71.

Fouquet, R. and P. J.G. Pearson. 2012. The Long Run Demand for Lighting: Elasticities and Rebound Effects in Different Phases of Economic Development. Economics of Energy and Environmental Policy. 1. 83-100.

Galarraga, I., Lucas, J. and González-Eguino, M. 2012. (Forthcoming). Evaluación económica del etiquetado de eliciencia energética: el caso de las lavadoras en España. Papeles de Economía Española.

Gallastegui, MC, González-Eguino, M, Galarraga, I. 2012. Cost effectiveness of a combination of instruments for global warming: a quantitative approach for Spain. SERIEs- Journal of the Spanish Economic Association. 58. 111-132.

Garmendia, E., Gamboa, G. 2012. Weighting social preferences in participatory multi-criteria evaluations: a case study on sustainable natural resource management. Ecological Economics. 84. 110-120.

Garmendia, E., Mariel, P., Tamayo, I., Aizpuru, I., Zabaleta, A. 2012. Assessing the effect of alternative land uses in the provision of water resources: Evidence and policy implications from southern Europe. Land Use Policy. 29. 761-770.

González-Eguino, M, Galarraga, I, Ansuategi, A. 2012. The Future of Old Industrial Regions in a Carbon Constrained World. Climate Policy. 12. 164-186

Grasso M, Manera M, Chiabai A, Markandya A. 2012. The Health Effects of Climate Change: A Survey of Recent Quantitative Research. International Journal of Environmental Research and Public Health. 9. 1523-47

Hoyos, D., Mariel, P. Pascual, U., Etxano, I. 2012. Valuing a Natura 2000 network site to inform land use options using a discrete choice experiment: an illustration from the Basque Country. Journal of Forest Economics. 18. 329-344.

J. C. Refsgaard & K. Arnbjerg-Nielsen & M. Drews & K. Halsnæs & E. Jeppesen & H. Madsen & A. Markandya & J. E. Olesen & J. R. Porter & J. H. Christensen. 2012. The role of uncertainty in climate change adaptation strategies. A Danish water management example. Mitig Adapt Strateg Glob Change.

Jackson, LE, Pulleman, M, Brussaard, L, Bawa, K, Brown, G, Cardoso, I, de Ruiter, P, Garcia-Barrios, L, Hollander, A, Lavelle, P, Ouedraogo, E, Pascual, U, Setty, S, Smukler, S, Tscharntke, T, van Noordwijk, M. 2012. (Forthcoming). Social-ecological and regional adaptation of agrobiodiversity management across a global set of research regions. Global Environmental Change.

Johnson, G.W., Bagstad, K., Snapp, R., Villa, F. 2012. Service Path Attribution Networks (SPANs): A Network Flow approach to Ecosystem Service Assessment. International Journal of Agricultural and Environmental Information Systems. 3. 54-71.

Kaysara Khatun. 2012. Reform or Reversal; Implications of the Common Agricultural Policy (CAP) on Land Use, Land Use Change and Forestry (LULUCF) in Developing Countries. Conservation Letters. 5. 99-106

Longo, A; Hoyos, D; Markandya, A. 2012. Willingness to pay for ancillary benefits of climate change mitigation. Environment and Resource Economics. 51. 119-140.

Markandya, A and P. Nunes. 2012. Introduction to the Special Issue on the Socio-economics and Management of Bioprospecting. International Journal of Ecological Economics and Statistics. 26.

Markandya, A and P. Nunes. 2012. Is the Value of Bioprospecting Contracts Too Low. International Journal of Ecological Economics and Statistics. 26. 84-100.

Markandya, A. 2012. Externalities from electricity generation and renewable energy. Methodology and application in Europe and Spain. Información Comercial Española Cuadernos Económicos. 85-100.

Markandya, A., L. Brander, I. Brauer, H. Gerdes, A. Ghermandi, O. Kuik, S. Navrud, P. Nunes, M. Schaafsma, H. Vos, A. Wagtendonk. 2012. Using meta-analysis and GIS for value transfer and scaling up: Valuing climate change induced losses of European wetlands. Environment and Resource Economics. 52. 395-413,.

Markandya, Anil and Dirk Rübbelke. 2012. Impure Public Technologies and Environmental Policy. Journal of Economic Studies. 39. 128-143.

Martin-Ortega, J, González-Eguino, M, Markandya, A. 2012. The costs of drought: the 2007-2008 case of Barcelona. Water Policy. 14. 539-560.

Martin-Ortega, J., Brouwer, R., Ojea, E. and Berbel, J. 2012. Benefit transfer and spatial heterogeneity of preferences for water quality improvements. Journal of Environmental Management. 106. 22-29.

Melanie Heugues. 2012. Endogenous Timing in Pollution Control: Stackelberg versus Cournot-Nash Equilibria. Strategic Behavior and the Environment. Vol. 2. 133-158.

Melanie Heugues. 2012. International environmental cooperation: a new eye on the greenhouse gas emissions control. Annals of Operations Research.

Misselbrook T., Del Prado A., Chadwick D. 2012. (Forthcoming). Opportunities for reducing environmental emissions from forage-based dairy farms. Agriculture and Food Science.

Muradian, R., M. Arsel, L. Pellegrini, F. Adaman, B. Aguilar, B. Agarwal, E. Corbera, D. Ezzine de Blas, J. Farley, G. Froger, E. Garcia-Frapolli, E. Gómez-Baggethun; J. Gowdy, N. Kosoy, J.F. Le Coq, P. Leroy, P. May, P. Méral, P. Mibielli, R. Norgaard, 2012. (Forthcoming). Payments for ecosystem services and the fatal attraction of win-win solutions. Conservation Letters.

Narloch, U., Pascual, U., Drucker, A. 2012. Collective action dynamics under external rewards: experimental insights from Andean farming communities. World Development. 40. 2096-2107.

Nordhagen, S. and Pascual, U. 2012. (Forthcoming). The Impact of Climate Shocks on Seed Purchase Decisions in Malawi: Implications for Climate Change Adaptation. World Development.

Ojea, E. R. K. Ghosh, B. Agrawal, P.K. Joshi and A. Markandya. 2012. (Forthcoming). Setting targets for costing ecosystem adaptation. International Journal of Ecological Economics & Statistics. 24.

Ojea, E., J. Martin-Ortega and A. Chiabai. 2012. Defining and classifying ecosystem services for economic valuation: the case of forest water services. Environmental Science & Policy. 19-20. 1-15.

Ojea, E., P. Ruiz Benito, A. Markandya and M. A. Zavala. 2012. Wood provisioning in Mediterranean forests: a bottom-up spatial valuation approach. Forest Policy and Economics. 20. 78-88.

Ojea, E., R. K. Ghosh, B. Agrawal and P.K. Joshi. 2012. Costing Adaptation to Climate Change Impacts in Forest Ecosystems: A Case Study with Experiences from India. International Journal of Climate Change Strategies and Management. 4. 323-341.

P. Gallejones, A. Castellón, A. del Prado, O. Unamunzaga & A. Aizpurua. 2012. Nitrogen and sulphur fertilization effect on leaching losses, a hurrient balance and plant quality in a wheat & rapeseed rotation under a hurrient Mediterranean climate. Nutrient Cycling in Agroecosystems. 93 337-355

Pascual, U., Jackson, L., Drucker, A. 2012. (Forthcoming). Economics of Agrobiodiversity. Encyclopedia of Biodiversity. 2.

Pittel, Karen and Dirk Rübbelke. 2012. Decision Processes of a Suicide Bomber - The Economics and Psychology of Attacking and Defecting. Defence and Peace Economics. 23. 251-272.

Pittel, Karen and Dirk Rübbelke. 2012. (Forthcoming). International Climate Finance and Its Influence on Fairness and Policy. The World Fconomy

Pittel, Karen and Dirk Rübbelke. 2012. Transitions in the Negotiations on Climate Change: From Prisoner's Dilemma to Chicken and Beyond. International Environmental Agreements: Politics, Law and Economics. 12 23-39

Roessiger, J., P.D. Bons and S.H. Faria. 2012. (Forthcoming). Influence of bubbles on grain growth in ice. Journal of Structural Geology.

Roger Fouquet and Peter J.G. Pearson, 2012, Past and Prospective Energy Transitons: Insights from History (Editorial). Energy Policy. 50.

Rübbelke, Dirk and Stefan Vögele. 2012. (Forthcoming). Short-term Distributional Consequences of Climate Change Impacts on the Power Sector: Who Gains and Who Loses?. Climatic Change.

Sébastien Foudi. 2012. The role of farmers' property rights in soil ecosystem services conservation. Ecological Economics. Vol. 83. pp

Sébastien Foudi and Katrin Erdlenbruch. 2012. The role of irrigation in farmers risk management strategies in France. European Review of Agricultural Economics. 39. 439 -457.

Sunderland, L-A., Gabriel, D., Pascual, U., Schmutz, Rigby, D Godwin, R, Sait, S.M, Sakrabani, R., Kunin, W.E., Benton, T.G, Stagl, S. 2012. The "neighbourhood effect": a multidisciplinary assessment of the case for farmer co-ordination in agri-environmental programmes. Land Use Policy. 29. 502-512.

Van Vliet, N. Mertz, O., Heinimann, A., Langanke, T., Adams, C., Messerli, P., Leisz, S., Pascual, U., Schmook, B., Schmidt-Vogt, D., Castella, J-C., Jørgensen, L., Birch-Thomsen, T., Hett, C., Bech-Bruun, T., Ickowitz, A., Chi Vu, KI., Yasuyuki, K., F. 2012. (Forthcoming). Trends, drivers and impacts of changes in swidden cultivation in tropical forestagriculture frontiers: A global assessment. Global Environmental

Ziegler, A, Phelps, J, Yuen, J, W, E, Lawrence, D, Fox, J, Bruun, T, Leisz, S, Mertz, O, Dressler, W, Ryan, C, Pascual, U, Padoch, C, Koh, L.P. 2012. Carbon outcomes of major land-cover transitions in SE Asia: Great uncertainties and REDD+ policy implications. Global Change Biology. 18.3087-3099.

#### 2011

<sup>•</sup> A. Longo, A. Markandya and M. Petrucci. 2011. The Internalization of Externalities in the production of electricity: Willingness to pay for the attributes of a policy for renewable energy. Ecological Economics. 67-1. 140-152.

A. Markandya and R.A. Ortiz. 2011. Beyond Current Practices: The Role of the External Costs of Carbon in Climate Decision-Making. Journal of Industrial Ecology. 15. 666-668.

A.Markandya. 2011. Environmental Taxation: What Have We Learnt in the Last 30 years?. Rivista di Politica Economica. VII-IX. 11-58.

A.Markandya. 2011. Equity and Distributional Implications of Climate Change. World Development. 39. 1051-1060.

A.Markandya and E. Ricci. 2011. Green Taxes on Aviation: The Case of Italy: The Proposal of the Green Taxation Matrix. Rivista di Politica Economica. VII-IX. 171-210.

A.Markandya, A. Ortiz; A. Golub; O. Lugovoy; and J.Wang. 2011. DICER: a Tool for Analyzing Uncertainties in Climate Policy Analysis. Energy Economics. 33. S41 S49.

A.Markandya, V. Ponczek and S. Yi. 2011. What are the Links between Aid Volatility and Growth. Journal of Developing Areas. 44. 41-68.

A.Markandya,V. Bosetti, R. Lubowski and A. Golub. 2011. Linking Reduced Deforestation and a Global Carbon Market: Implications for Clean Energy Technology and Policy Flexibility. Environment and Development Economics. 16. 479 -505.

Abadie, L.M. and Chamorro, J.M. 2011. Valuing expansions of the electricity transmission network under uncertainty: The binodal case. Energies. 4. 1696-1727.

Abadie, L.M., Chamorro, J.M. and González-Eguino, M. 2011. Optimal abandonment of EU coal-fired stations. The Energy Journal. 32. 175-207.

Abadie, L.M., Galarraga, I. 2011. The European Emission Trading Scheme: Implication for Long-Term Investment Valuation. Climate Change Economics. 2. 129-148.

Abadie, L.M., Heres, D.R. 2011. Electricity Prices and generation cost in European futures markets with implications for Spain. Estudios de Economía Aplicada.

Ansuategi, A. and Galarraga, I. 2011. Carbon Pricing as an Effective Instrument of Climate Policy: Searching for an Optimal Policy Instrument. Rivista di Economia Politica. 20.

Bardt, Hubertus, Lars P. Feld, Kai A. Konrad, Marcel Thum, Wolfgang Buchholz, Dirk Rübbelke, Christian Hey, Karin Holm-Müller, Michael Weber, Rüdiger Pethig, Joachim Weimann and Timo Goeschl. 2011. Emissionsvermeidung oder Anpassung an den Klimawandel: Welche Zukunft hat die Klimapolitik?. ifo Schnelldienst. 64. 3-29.

Buchholz, Wolfgang, Richard Cornes and Dirk Rübbelke. 2011. Interior Matching Equilibria in a Public Good Economy: An Aggregative Game Approach. Journal of Public Economics. 95. 639-645.

Cardenas L.M., Cuttle S.P., Crabtree B., Hopkins A., Shepherd A. Scholefield D. and del Prado A. 2011. Cost effectiveness of nitrate leaching mitigation measures for grassland livestock systems at locations in England and Wales. Science of the Total Environment. 409. 1104-1115.

Chiabai A, Paskaleva K and Lombardi P. 2011. e-Participation Model for Sustainable Cultural Tourism Management: A Bottom-Up Approach. International Journal of Tourism Research.

Chiabai A, Rocca L, Chiarullo L. 2011. A Service Quality Model for Web-Services Evaluation in Cultural Heritage Management. Computational Science and its Applications\_ICSA 2011,PT II. 6783. 227-242. Chiabai A, Travisi C, Markandya A, Ding H and Nunes P. 2011. Economic Assessment of Forest Ecosystem Services Losses: Cost of Policy Inaction. Environmental and Resource Economics. 50. 405-445.

del Prado A., Misselbrook T, Chadwick D, Hopkins A, Dewhurst R.J., Davison P., Butler A., Schröder J., and Scholefield D. 2011. SIMSDAIRY: A modelling framework to identify sustainable dairy farms in the UK. Framework description and test for organic systems and N fertiliser optimisation. Science of the Total Environment. 409. 3993-4009.

Desaigues, B. et al. 2011. Economic Valuation of Air Pollution Mortality: a9-country contingent valuation survey of value of a life year (VOLY). Ecological Indicators. 11. 902-910.

F. Villa, K. Bagstad, G. Johnson, B. Voigt. 2011. Scientific instruments for climate change adaptation: estimating and optimizing the efficiency of ecosystem services provision. Economia Ambiental y Recursos Naturales. 11. 83-98.

Fouquet, R. 2011. Divergences in Long Run Trends in the Prices of Energy and Energy Services. Review of Environmental Economics and Policy. 5. 196-218.

Fouquet, R. 2011. Long run trends in energy-related external costs. Ecological Economics. 70. 2380-9.

Galarraga I, Osés N, Markandya A, Chiabai A, Khatun K. 2011. Aportaciones desde la Economía de la Adaptación a la Toma de Decisiones sobre Cambio Climático: Un Ejemplo para la Comunidad Autónoma del País Vasco. Economia Agraria y Recursos Naturales, Special Issue on "Economics of Adaptation to Climate Change in the Areas of Agriculture and Biodiversity". 11(1). 113-142.

Galarraga, I, González-Eguino, M and Markandya, A. 2011. Willingness to pay and price elasticities of demand for energy-efficient appliances: combining the hedonic approach and demand systems. Energy Economics. 33. S66-S74.

Galarraga, I, González-Eguino, M. and Markandya, A. 2011. De Cancún a Durban en un largo camino contra el cambio climático. Economistas. 127.

Galarraga, I, Heres Del Valle, D, and González-Eguino, M. 2011. Price Premium For High-Efficiency Refrigerators And Calculation Of Price-Elasticities For Close-Substitutes: A Methodology Using Hedonic Pricing and Demand Systems. Journal of Cleaner Production. 19. 2075-2081.

Galarraga, I., González-Eguino M. and Markandya, A. 2011. The Role of Regional Governments in Climate Change Policy. Environmental Policy and Governance. 21. 164-182.

González-Eguino, M. 2011. The importance of the design of Market-Based Instruments for CO2 mitigation: an AGE analysis for Spain. Ecological Economics. 70. 2292-2302.

González-Eguino, M. 2011. Costes de mitigación y escenarios post-Kyoto: un análisis de equilibro general para España. Revista de Economía Aplicada. 19. 89-121.

Halsnaes, K, A. Markandya and P. Shukla. 2011. Introduction: Sustainable Development, Energy and Climate Change. World Development. 39. 983-986.

Kaysara Khatun. 2011. Reconciling timber provision with carbon sequestration opportunities in the tropical forests of Central America Environmental Science and Policy. 14. 1091-1102.

Markandya A. and Galarraga I. 2011. Technologies for Adaptation: An Economic Perspective. Technologies for Adaptation: Perspectives and Practical Experiences. UNEP Riso centre.

Narloch, U., Drucker A. and Pascual, U. 2011. Payments for agrobiodivesity conservation services for sustained on-farm utilization of plant and animal genetic resources. Ecological Economics. 70. 1837-1845. Narloch, U., Pascual, U., Drucker, A.G. 2011. Cost-effectiveness targeting under multiple conservation goals and equity considerations in the Andes. Environmental Conservation. 38. 417-425.

Ojea, E. and M.L. Loureiro. 2011. Identifying the scope effect on a meta-analysis of biodiversity valuation studies. Resource and Energy Economics. 33. 706-724.

Ortiz, R.A.; A. Hunt; R. Seroa da Motta and V. McKnight. 2011. Morbidity Costs Associated with Ambient Air Pollution Exposure in Sao Paulo, Brazil. Atmospheric Pollution Research. 2. 520-529.

Pascual, U., Corbera, E. 2011. Payments for Environmental Services: Perspectives and innovative experiences for nature conservation and rural development. Revista Española de Estudios Agrosociales y Pesqueros. 287. 11-32.

Pascual, U., Narloch, U., Nordhagen, S., Drucker, A. 2011. The economics of agrobiodiversity conservation for food security under climate change. Economía Agraria y Recursos Naturales. 11. 191-220.

Reyes-García, V., Pascual., U., Vadez, V, Huanca, T. 2011. The role of ethnobotanical skills and agricultural labor in forest clearance. Evidence from the Bolivian Amazon. Ambio. 40. 310-321.

Rodríguez, L.C., Pascual, U., Muradian, R., Pazmino, N., Whitten S. 2011. Towards a unified scheme for environmental and social protection: Learning from PES and CCT experiences in developing countries. Ecological Economics. 70. 2163-2174.

Rübbelke, Dirk. 2011. International Support of Climate Change Policies in Developing Countries: Strategic, Moral and Fairness Aspects. Ecological Economics. 70. 1470-1480.

Rübbelke, Dirk and Stefan Vögele. 2011. Impacts of Climate Change on European Critical Infrastructures: The Case of the Power Sector. Environmental Science & Policy. 14. 53-63.

Stocker, M., Rönkkö, M. Villa, F., Kolehmainen, M. 2011. The Relevance of Measurement Data in Environmental Ontology Learning. IFIP Advances in Information and Communication Technology. 359. 445-453.

Traerup, SLM; Ortiz, RA; Markandya, A. 2011. The Costs of Climate Change: A Study of Cholera in Tanzania. International Journal of Environmental Research and Public Health. 8. 4386- 4405.

Wegner, G., Pascual, U. 2011. Cost-benefit analysis in the context of ecosystem services for human well-being: A multidisciplinary critique. Global Environmental Change. 21. 492-504.

Wu, J., Fisher, M., Pascual, U. 2011. Urbanization and the viability of local agricultural economies. Land Economics. 87. 109-125.



A. Markandya. 2010. Can Climate Change Be Reversed Under Capitalism?. Development and Change. 40. 1139-1152.

A. Markandya and M. Pemberton. 2010. Energy Security, Energy Modelling and Uncertainty. Energy Policy. 38. 1609-1613.

A. Markandya, A. Bastianin and C. Cattaneo. 2010. Are China and Europe Converging?. China Economist. July-August. 94-102.

A. Markandya, Sununtar Setboonsarng, Qiao Yu Hui, Rachanee Songkranok and Adam Stefan. 2010. The Costs of Achieving the Millennium Development Goals through Adopting Organic Agriculture. Asian Development Bank Institute. Paper 193.

A.Markandya. 2010. Misurare la Sostenabilità. Equilibri. 1/2010. 42-48.

Aakre, Stine and Dirk Rübbelke. 2010. Adaptation to Climate Change in the European Union: Efficiency versus Equity Considerations. Environmental Policy and Governance. 20. 159-179.

Aakre, Stine and Dirk Rübbelke. 2010. Objectives of Public Economic Policy and the Adaptation to Climate Change. Journal of Environmental Planning and Management. 53. 767 - 791. Aakre, Stine, Ilona Banaszak, Reinhard Mechler, Dirk Rübbelke, Anita Wreford and Harvir Kalirai. 2010. Financial Adaptation to Disaster Risk in the European Union: Identifying Roles for the Public Sector. Mitigation and Adaptation Strategies for Global Change. 15. 721-736.

Alcon F, Pedrero F, Martin-Ortega J, Arcas N, Alarcon JJ, de Miguel M. 2010. The non-market value of reclaimed wastewater for use in agriculture: a contingent valuation approach. Spanish Journal of Agricultural Research. 8. S187-S196.

Altemeyer-Bartscher, Martin; Dirk Rübbelke and Eytan Sheshinski. 2010. Environmental Protection and the Private Provision of International Public Goods. Economica. 77. 775-784.

Berbel, Martin-Ortega and Mesa. 2010. Water Framework Directive and cost-effectiveness analysis of water-saving measures. The case of the Guadalquivir river (Spain). Water Resources Management.

Bigano, A; Cassinelli, M; Markandya, A; Sferra, F. 2010. The Role of Risk Aversion and Lay Risk in the Probabilistic Externality Assessment for Oil Tanker Routes to Europe. Journal of Transport Economics and Policy. 44, Part 1. 93-118.

Brouwer, Bateman, Barton, Georgiou, Martín-Ortega, Navrud, Pulido-Velazquez, Schaafsma. 2010. Economic Valuation of Environmental and Resource Costs and Benefits in the Water Framework Directive: Technical Guidelines for Practitioners. AquaMoney Working paper.

Brouwer, R., Martin-Ortega, J. and Berbel, J. 2010. Spatial Preference Heterogeneity: A Choice Experiment. Land Economics. 86. 552-568.

Chiabai A and Nunes P. 2010. Policy Evaluation of Oceanographic Early Warning Services. Current Development in Oceanography. Vol 1. pp 17-36.

Del Prado A., Chadwick D., Cardenas L., Misselbrook T., Scholefield D. and Merino P. 2010. Exploring systems responses to mitigation of GHG in UK dairy farms. Agriculture, Ecosystems and Environment. 136 (3-4). 318-332.

Desaigues, B. .Ortiz RA et al. 2010. Economic Valuation of Air Pollution Mortality: a9-country contingent valuation survey of value of a life year. Environmental Science and Policy. . 11(3). p.902-10.

F. Villa. 2010. Bridging Scales and Paradigms in Natural Systems Modeling. Metadata and Semantics Research. 108. 1-7.

Fouquet, R. 2010. The Slow Search for Solutions: Lessons from Historical Energy Transitions by Sector and Service. Energy Policy. 38. 6586-96.

González-Eguino, M, Olabe, A. 2010. Keys for a new deal on climate change. Ambientalia. 1. 1-19.

González-Eguino, M. 2010. Economic Impact of Post-Kyoto Scenarios in Spain. Investigaciones Economicas. 69. 139-176.

González-Eguino, M. 2010. Impactos de la mitigación de emisiones a través de un MEGA: el caso de un mercado de permisos de emisión para España. Trimestre Económico. 77. 139-176.

Hintermann, B; Alberini, A; Markandya, A. 2010. Estimating The Value Of Safety With Labor Market Data: Are the Results Trustworthy?. Applied Economics. 42. 1085-1100.

I. Galarraga and A. Markandya. 2010. El Cambio Climático y su Importancia Socioeconómica. Ekonomiaz. 25.

I. Galarraga and A. Markandya. 2010. The Road to Copenhagen-COP 15. Elhuyar. 4.

Khatun, Kaysara; Valdes, Paul J.; Knorr, Wolfgang; Khalid, Monowar Alam. 2010. Exploring synergies between the Clean Development Mechanism and national forest policies in India to advance sustainable development for a post-2012 climate policy. Climate and Development. 2. 207-220. Krishna, V., U. Pascual, D. Zilberman. 2010. Assessing the potential of labelling schemes for in-situ landrace conservation: An example from India, Environment and Development Economics, 15, 127-151

Löschel, Andreas; Ulf Moslener and Dirk Rübbelke. 2010. Energy Security: Concepts and Indicators. Energy Policy. 38. 1607-1608

Löschel, Andreas; Ulf Moslener and Dirk Rübbelke. 2010. Indicators of Energy Security in Industrialised Countries. Energy Policy. 38. 1665-

Martín-Ortega, J. and Berbel, J. 2010. Using multi-criteria analysis to explore non-market monetary values of water quality changes in the context of the Water Framework Directive. Science of the Total Environment. 408. 3990-3997.

Martín-Ortega, J. and Others. 2010. Beneficios ambientales no comerciales de la directiva marco del agua en condiciones de escasez: análisis económico para el guadalguivir. Funcas.

Martín-Ortega, J. and Others. 2010. Medida de la compensación del daño ambiental en la Directiva de Responsabilidad Ambiental. Revista Economia Agraria y Recursos Naturales. 10. 15.

Martínez-Alier, J., Pascual, U., Vivien, F-D., Zaccai, E. 2010. Sustainable de-growth: Mapping the context, criticisms and future prospects of an emergent paradigm. Ecological Economics. 69. 1741-1747

Muradian, R. Corbera, R. Pascual, U., Kosoy, N. May. 2010. Reconciling theory and practice: an alternative conceptual framework for understanding payments for environmental services. Ecological Economics. 69. 1202-1208.

Ojea, E. and M.L. Loureiro. 2010. Valuing the Recovery of Overexploited Fish Stocks in the Context of Existence and Option Values. Marine Policy. 34. 514-521.

Ojea, E., P.A.L.D. Nunes and M.L. Loureiro. 2010. Mapping Biodiversity Indicators and Assessing Biodiversity Values in Global Forests. Environmental & Resource Economics. 47. 329-347.

Omer, A., Pascual, U. and Russell, N.P. 2010. A theoretical model of agrobiodiversity as a supporting service for sustainable agricultural intensification. Ecological Economics. 69. 1926-1933.

Ortiz. R.A. 2010. Conservation versus development at the Iguacu National Park, Brazil. Ambientalia. 1. 141-160.

Pascual, U., Muradian, R., Rodríguez, L.C, Duraiappah, A. 2010. Exploring the links between equity and efficiency in payments for environmental services: a conceptual approach. Ecological Economics. 69 1237-1244

Rive, Nathan and Dirk Rübbelke. 2010. International Environmental Policy and Poverty Alleviation. Review of World Economics (Weltwirtschaftliches Archiv). 146. 515-543.

Seo, S.N. 2010. Is an integrated farm more resilient againts climate change? A microeconometric analysis of portfolio diversification in African agriculture. Food Policy. 35. 32-40.

Soto J.J. Valdivia F. Drucker A. Narloch U. Pascual U. Pinto M. 2010. Payments for agrobiodiversity conservation services (PACS) and is interlinkages with collective action and property rights. CienciaAgro. Journal de Ciencia y Tecnologia Agraria. 2. 188-198.

Stromberg, P., Pascual, U., Bellon, M. 2010. Seed systems and farmers seed choices: The case of maize in the Peruvian Amazon. Human Ecology. 38. 539-553.

#### 2009

A. Haines, A. McMichael, K. Smith, J. Woodcock, A. Markandya, B. Armstrong, D. Cambell-Lendrum, A. Dangour, M. Davies, N. Bruce, C. Tonne, M. Barrett and P. Wilkinson. 2009. Public health benefits of strategies to reduce greenhouse-gas emissions: overview for policy makers. The Lancet. 374. 2104-2114.

A. Markandya. 2009. Agriculture for Development: The World Development Report 2008: Making Agricultural Systems More Environmentally Sustainable. Rivista Dell'Associazione Rossi-Doria. 1 25-31

A. Markandya and O. Kiula. 2009. Can Transition Economies Implement a Carbon Tax and Hope For A Double Dividend? The Case of Estonia. Applied Economics Letters,(J). 16(7). 705-709.

A. Markandya. R.A. Ortiz, S. Mudgal and B. Tinetti. 2009. Analysis of Tax Incentives for Energy Efficient Durables in the EU. Energy Policy,doi:10.1016/j.enpol.2009.08.031. 37. 5662-5674.

A.Markandya. 2009. Restraining the Golden Weed: Taxation and the Regulation of Tobacco: A Comment. Finanzarchiv. 64. 502-504.

A.Markandya and Aline Chiabai. 2009. Valuing Climate Change Impacts on Human health: Empirical Evidence from the Literature. Internatioanl Journal of Environmental Research and Public Health, 6, 759-786

A.Markandya, Elías Fereres, Juan Rojo y Félix Goñi. 2009. El cambio climático, a debate. cicNetwork. 32-42.

Abadie, L.M. 2009. Valuation of Long-Term Investments in Energy Assets under Uncertainty. Energies 2009. 2(3). 738-768.

Abadie, L.M. and Chamorro, J.M. 2009. Impactos económicofinancieros de los precios del CO2. Papeles de Economía Española. 121. 193-210.

Abadie, L.M. and Chamorro, J.M. 2009. Income risk of EU coal-fired power plants after Kyoto. Energy Policy. 37. 5304-5316.

Abadie, L.M. and Chamorro, J.M. 2009. Monte Carlo valuation of natural gas investments. Review of Financial Economics 2009. 18. 10--22.

Abadie, L.M. and Chamorro, J.M. 2009. The economics of gasification: a market-based approach. Energies 2009. 2(3). 662-694.

D. Hoyos, M. Gonzalez and A. Markandya. 2009. Concienciación pública y aceptabilidad de medidas para la reducción de emisiones de gases de efecto invernadero: el caso de País Vasco. Papeles De Economía Española. 121. 68-78.

Del Prado A., Chadwick D. and Scholefield D. 2009. Simulating the effect on GHG emissions after implementing a trajectory towards sustainability of a dairy farm. Journal of Agricultural Science (41th Meeting of the Agricultural Research ModellerAs Meeting). 147. 739.

Del Prado A., Scholefield D. and Chadwick D. 2009. New integrated dairy production systems: specification, practical feasibility and ways of implementation. DEFRA Final Report. IS0214. 34.

G.Frey, M.Manera, A.Markandya and E.Scarpa. 2009. Econometric Models for Oil Price Forecasting: a Critical Survey. CESifo Forum. 1. 29-11

González-Eguino, M. 2009. Competitividad y fuga de carbono: el caso de la economía vasca. Ekonomiaz. 71. 114-135.

M. C. Gallastegui, I. Galarraga and González, M. 2009. La Ciencia del Cambio Climático: Una Visión General. Papeles de Economía Española. 25

M. González-Eguino, A. Olabe. 2009. Copenhage: una cita con la historia. Politica Exterior. 23,132. 97-106

Markandya A, Amstrong BG, Hales S, Chiabai A, Criqui P, Mima S, Tonne C, Wilkinson P. 2009. Public Health Benefits of Strategies to Reduce Greenhouse-Gas Emissions: Low-Carbon Electricity Generation. The Lancet. 374. 2006-2015.

Martin-Ortega y Berbel. 2009. Beneficios y costes ambientales en la Directiva Marco del Agua: conceptos y estimación. Revista Estudios Geograficos.

Martín-Ortega, J. and Others. 2009. El análisis coste-eficacia en los Programas de Medidas de la DMA. In: Gómez-Limón, J.A., Calatrava, J., Garrido, A., and Xabadia, A. (eds). Irrigation Water Economics in Spain. A regional overview (In Spanish). Fundación Cajamar. El Ejido, Almería

Martín-Ortega, J., Berbel, J. and Brouwer, R. 2009. Valoración económica de los beneficios ambientales de no mercado derivados de la mejora de la calidad del agua: una estimaicón en aplicación de la Directiva Marco del Agua al Guadalquivir. Economía Agraria y de los Recursos Naturales. 9. 23.

Ojea, E. and M.L. Loureiro. 2009. Valuation of Wildlife: Revising Some Additional Considerations for Scope Tests. Contemporary Economic Policy. 27(2). 236-250.

Ortiz, R.A., A. Markandya and A. Hunt. 2009. Willingness to Pay for Mortality Risk Reduction Associated with Air Pollution in Sao Paulo. RBE - Revista Brasileira de Economia Jan-Mar 2009. 63 (1). 3-22.

Seo, S.N., R. Mendelsohn, A. Dinar, and P. Kurukulasuriya. 2009. Adapting to Climate Change Mosaically: An Analysis of Adaptation in African Livestock Management across Agro-Ecological Zones. The B.E. Journal of Economic Analysis and Policy (Special issue on economic geography). 9. 4.

Seo, S.N., R. Mendelsohn, A. Dinar, R. Hassan, and P. Kurukulasuriya. 2009. A Ricardian Analysis of the Distribution of Climate Change Impacts on Agriculture across Agro-Ecological Zones in Africa. Environmental and Resource Economics, Springer Netherlands, 03.03.2009 (New Frontiers in the Economics of Climate Change). 43 (3). 313-332

Taylor, T. And R.A. Ortiz, 2009. Impacts of Climate Change on Domestic Tourism in the UK: a Panel Data Estimation. Tourism Economics. 15. 803-812

Turvani M, Tonin S, Alberini A, Chiabai A. 2009. Public policies for contaminated site cleanup: evidence from a survey of the Italian public. International Journal of Environmental Technology and Management. 11(1-3/2009). 68-87.

#### **BOOKS AND SPECIAL EDITIONS**



Aline Chiabai. 2012. Climate change, human health impacts and adaptation (Special Issue). September. International Journal of Environmental Research and Public Health.

Lorenzo Chelleri, Anna Kuath, Guido Minucci, Marta Olazabal, James J. Waters, Lilia Yumalogava. 2012. Multidisciplinary perspectives on urban resilience, Bilbao, BC3, 78,

Markandya, A. and E. Barbier. 2012. A New Blueprint for a Green Economy, London, Routledge, 200.

Roger Fouguet and Peter J.G. Pearson. 2012. Past and Prospective Energy Transitions: Insights from History (Special Issue). December. Energy Policy.



Abadie, L. M., Chamorro, J.M. 2011. Numerical Evaluation of Multidimensional Real Options. New York. Nova Science Publishers.

Ebinger, J. and Vergara, W. 2011. Climate Impacts on Energy Systems: Key issues for energy sector adaptation. Washington. The International Bank for Reconstruction and Development/The World Bank.

Galarraga, I., González-Eguino, Markandya, A. 2011. Handbook of Sustainable Energy. Cheltenham. Edward Elgard. 1-640.

John, Klaus D. and Dirk Rübbelke.2011. Sustainable Energy. Routledge; London, New York.

Michael Hofmann, Glynn Morris, Grant Ballard-Tremeer, Kaysara Khatun. 2011. Bioenergy for Sustainable Development in Africa. Netherlands. Springer.

#### 2010

A.Markandya. 2010. The Social Costs of Electricity: Scenarios and Policy Implications. Edward Elgar Publishing. 308.

A.Markandya. 2010. The Economics of Sustainable Tourism. Routledge. 192

A.Markandva and Arabinda Mishra, 2010, Costing Adaptation: Preparing for Climate Change in India. New Delhi. 258.

Julia Martin-Ortega. 2010. Beneficios ambientales de las aguas del Guadalquivir: un análisis económico. Sevilla. Fundación Estudios Andaluces

Löschel, Andreas; Ulf Moslener and Dirk Rübbelke. 2010. Energy Security - Concepts and Indicators; special issue of the journal



A.Golub and A.Markandya. 2009. Modeling Environment-Improving Technological Innovations under Uncertainty. Routledge

Carlo Carraro, Aline Chiabai, Enrica Croda, Manuela Medoro and Alessandro Stanchi. 2009. La produzione di rifiuti industriali in Italia Roma, Italy, 243.

Gallastegui, M, González-Eguino, M. 2009. Economía del cambio climático. Madrid. Papeles de Economía Española. 1-221.

Ortiz, R.A. 2009. The Value of Reducing Mortality Risk Associated with Air Pollution: a case study in Brazil. Koln. Lambert Academinc Publishing. 320.

#### **BOOK CHAPTERS**

#### 2012

Abadie, L.M. and Galarraga. 2012. (Forthcoming). European Union Greenhouse Gas Emission Trading Scheme (EU ETS). Encyclopedia of Sustainability, Afro-Eurasia: Assessing Sustainability. Great Barrington, MA, US. Berkshire Publishing Group.

Abadie, L.M. and Galarraga, I. 2012. (Forthcoming). Energy Efficiency. Encyclopedia of Sustainability, The Americas and Oceania: Assessing Sustainability. Great Barrington, MA, US. Berkshire Publishing Group.

Abadie, L.M., Ortiz, R.A., Galarraga, I., Markandya A. 2012. Energy Efficiency Policy in the US: The Impact of the Industrial Assessment Centres (IAC) Program and State and Regional Climate Policy Actions. The Dynamics of Environmental and Economic Systems. Dordrecht, Netherlands. Springer Verlag. 61-82.

Abadie, Luis M. 2012. Optimal Control and Real Options Models. Real Option Analysis. New York. Nova Science Publishers.

Bagstad, K., Semmens, D., Villa, F., Johnson, G. 2012. (Forthcoming). Quantifying and valuing ecosystem services: An application of ARIES to the San Pedro River basin, USA. Economics of Biodiversity and Ecosystem Services. Northampton, MA. Edward Elgar Publishers.

Chiabai A. 2012[Forthcoming].. Biodiversity conservation. Encyclopedia of Sustainability. Afro-Eurasia: Assessing Sustainability. Great Barrington, MA, US. Bershire Publishings Group.

Dedeurwaerdere, T., P.M. Stromberg and Pascual, U. 2012. Social motivations and incentives in ex situ conservation of microbial genetic resources. The Digital Public Domain: Foundations for an Open Culture. 1st ed. Cambridge. Openbook Publishers. 111-124.

Galarraga, I. and Abadie, L.M. 2012. Ecolabels. Encyclopedia of Sustainability, titled Measurements, Indicators, and Research Methods for Sustainability. Great Barrington, MA, US. Berkshire Publishing Group.

Markandya A and Chiabai A. 2012. (Forthcoming). Economic Loss of Ecosystem Services from 1900 to 2050. The Twentieth Century Scorecard: How Much Did Global Problems Cost the World? Progress Since 1900, Prospects to 2050. Cambridge. Cambridge University Press.

Markandya A., González-Eguino, M., Escapa, M. 2012.[Forthcoming].. Environmental fiscal reform and unemployment in Spain. Critical Issues in Environmental Taxation. Cheltenham, UK. Edward Elgar Publishing.

Michael Hofmann, Glynn Morris, Grant Ballard-Tremeer, and Kaysara Khatun. 2012. Financing of Biofuel Projects in Africa. Bioenergy for Sustainable Development in Africa. 1st ed. New York. Springer. 363-373.

Pickering, Jonathan and Dirk Rübbelke. 2012 .[Forthcoming].. International Cooperation on Adaptation to Climate Change. Routledge Handbook of the Economics of Climate Change Adaptation. 1st ed. London and New York. Routledge.

Pittel, Karen; Dirk Rübbelke and Martin Altemeyer-Bartscher. 2012. International Efforts to Combat Global Warming. Handbook of Climate Change Mitigation. New York. Springer. 89-120.

Stromberg, P.M. Pascual, U. Ituarte-Lima, C. 2012. Property Rights and Government Involvement in Market-like Biodiversity Conservation: Empirical analysis of bioprospecting. Governing the Provision of Ecosystem Services. Nijmegen, The Netherlands. Springer.

Yeager, K., F. Dayo, M. Dominik, R. Fouquet, A. Gilau, R. Hosier, A. Miller, S. Rao, S. Sethi. 2012. Economy and Energy. Global Energy Assessment. Cambridge. Cambridge University Press.

#### 2011

A. Markandya and R.A. Ortiz. 2011. Estimating Environmental Health Costs: General introduction to valuation of human health risks. Encyclopedia of Environmental Health. Five-Volume set. 1st ed. London. Elsevier. 871-878.

A.Markandya with several authors. 2011. Rewarding Benefits Through Payments and Markets. The Economics of Ecosystems and Biodiversity in National and International Policy Making. London: Earthscan. 352.

Abadie, Luis M. 2011. Risk Premium, Market Price of Risk and Stochastic Price Models for Commodities. Financial Asset Pricing: Theory, Global Policy and Dynamics. New York. Nova Science Publishers.

Abadie, Luis M. 2011. The multidimensional Brownian Motion: Numerical valuation of american and bermudan options. Brownian Motion: Theory, Modelling and Applications. 1st ed. New York. Nova Science Publishers.

Abadie, Luis M. and Chamorro, J.M. 2011. Valuing Efficiency Gains in EU Coal-based Power Generation. Handbook of Sustainable Use of Energy. 1st ed. Cheltenham, UK. Edward Elgar. 285-313.

Heres, D.R. and Lin, C. 2011. Californía's energy-related greenhouse gas emissions reduction policies. Handbook of Sustanaible Energy. Cheltenham,UK. Edward Elgar.

Ishihara, I., Pascual, U. 2011. Global Environmental Commons: Analytical and Political Challenges in Building Governance Mechanisms. Social Capital and Collective Action in Environmental, Governance Revisited. Oxford, UK. Oxford University Press. Chapter 1 (Part III).

John, Klaus D. and Dirk Rübbelke. 2011. Sustainable Energy - An Introduction to the Topic. Sustainable Energy. London, New York. Routledge. 1-20.

Pittel, Karen and Dirk Rübbelke. 2011. Characteristics of Terrorism. Handbook on the Economics of Conflict. Cheltenham; Northampton. Edward Elgar. 143-171.

Pittel, Karen and Dirk Rübbelke. 2011. Energy Supply and the Sustainability of Endogenous Growth. Handbook of Sustainable Energy. Cheltenham; Northampton. Edward Elgar. 161-180.

Rabl, A., Spadaro, JV. and Bachmann, TM. 2011. Monetary Valuation of Trace Pollutants. Encyclopedia of Environmental Health, Vol 3. Editors Nriagu, Kacew, Kawamoto, Patz and Rennie. Italy. Elsevier. 856-869.

Rodrigues, R., Gómez-Plana, A.G, González-Eguino, M. 2011. Energy-Economic-Environmental models: a survey. Handbook of Sustainable Energy. Cheltenham. Edward Elgar. 132-161.

Roger Fouquet. 2011. The Sustainability of 'Sustainable' Energy Use: Historical Evidence on the Relationship between Economic Growth and Renewable Energy. Handbook of Sustainable Energy. Cheltenham, England and Northampton, MA, USA. Edward Elgar Publications.

Ruiz-Benito, P. M.A. Zavala, E. Ojea et al. 2011. 4.2 Los ecosistemas forestales. Biodiversidad en España. Base de la Sostenibilidad ante el cambio Global. Madrid. Observatorio de la Sostenibilidad en España.

Theobald M. Baez D., Gomez F., Merino P., Pinto M., del Prado A., Sanchez L., Sanz-Cobeña A., Vallejo A., Ochoa R. and Manrique E. 2011. Section 3-National contributions to COST Action 729. As13. Spain. Final Report COST Action 729: Assessing and Managing Nitrogen Fluxes in the Athmosphere-Biosphere System in Europe. Wageningen. Wageningen Academic Publishers.

#### 2010

A. Markandya and J. Mysiak. 2010. The Economic Costs of Droughts. Options Méditerranéennes: Economics of Drought and Drought Preparedness in a Climate Change Context. CIHEAM, Zaragoza.

Gallastegui, M.C. and Galarraga, I.. 2010. Climate Change and Knowledge Communities. Knowledge Communities. Reno, Center for Basque Studies, UNR.

A.Markandya. 2010. Involving Developing Countries in Global Climate Policies. Climate Change Policies: Global Challenges and Future Prospects, Edward Elgar Publishing.. 187-199.

A.Markandya with several authors. 2010. Climate Impacts on Energy Systems: Key Issues for Energy Sector Adaptation. ESMAP. 1st ed. The World Bank.

Abadie, L.M. and Chamorro, J.M. 2010. Toward Sustainability through Investments in Energy Efficiency. Handbook of Sustainable Energy. New York. Nova Science Publishers. 735-774.

Chiabai A, Balakrishnan S, Sarangi G, Nischal S. 2010. Human Health. Costing Adaptation. Preparing for Climate Change in India. New Delhi India. The Energy and Resources Institute. 66.

Elena Ojea, Ranjan K. Ghosh, Bharat B. Agrawal and P.K. Joshi. 2010. Forest Ecosystems. Costs of Adaptation to Climate Change in India. New Delhi, India.

Galarraga, I. 2010. A Discussion of 'Involving Developing Countries in Global Climate Policies' by Markandya A. Climate Change Policies: Global Challenges and Future Prospects. 1st ed. UK. Edward Elgar.

Gallastegui, M.C. and Galarraga, I. 2010. La Union Europea frente al cambio climático: el paquete de medidas sobre cambio climático y energía (20-20-20). Tratado de Energías Renovables. Madrid. Iberdrola-Thompson -Aranzadi.

Mota, J. A; M. Burstzyn; J. O. Candido Jr. and R.A. Ortiz. 2010. A Valoração da Biodiversidade: conceitos e concepções metodológicas. Economia do Meio Ambiente. 2nd ed. Rio de Janéiro. Editora Campus. 22.

Mudgal, S.; B. Tinet; A. Markandya; R.A. Ortiz. 2010. Tax-Incentive Options to Promote Environmentally Friendly Products: the case of energy-efficient domestic appliances. Critical Issues in Environmental Taxation - International and Comparative Perspectives vol. VIII. Oxford. Oxford University Press.

Mulligan, M. A. Guerry, K. Arkema, K. Bagstad and F. Villa. 2010. Capturing and quantifying the flow of ecosystem services. Framing the flow: Innovative Approaches to Understand, Protect and Value Ecosystem Services Across Linked Habitats. Cambrdige. UNEP World Conservation Monitoring Centre.

Pascual, U., Muradian, R., Brander, L., Gómez-Baggethun, E., Martín-López, M, Verman, M., Armsworth, P., Christie, M., Cornelissen, H., Eppink, F., Farley, J., Loomis, J., Pearson, L., Perrings, C., Polasky, S. .2010.The economics of valuing ecosystem services and biodiversity .The Economics of Ecosystems and Biodiversity Ecological and Economic Foundations. London



A.Markandya. 2009. Climate Change: Alternative Perspectives. Global Crises, Global Solution 2nd Edition. Cambridge: Cambridge University Press. 298-304.

A.Markandya. 2009. 19-20 November 2007 Conference Proceedings, European Commission, Luxemburg. Beyond GDP: Measuring Progress, True Wealth and the Wellbeing of Nations.

A.Markandya, A. Sgobbi, A. Goria and C. Giuponi. 2009. A Pilot Study on Payment for Ecological and Environmental Services in Lashihai Nature Reserve, China. Payments for Environmental Services: Ecological Economics and Human Wellbeing. New Delhi: Oxford University Press. 110-141.

Galarraga, I. 2009. El Coste de la No Europa: La Política Ambiental. El Coste de la No Europa: Qué sería de nuestro continente sin la UE. European Free Alliance, European Parliament. European Parliament. 12.

Martín-Ortega, J. and Others. 2009. El análisis coste-eficacia en los Programas de Medidas de la DMA. Irrigation Water Economics in Spain. El Ejido, Almería. Fundación Cajamar.

Roger Fouquet. 2009. A brief history of energy. International Handbook of the Economics of Energy. Cheltenham, UK, and Northampton, MA, USA. 15-40.

#### **OTHER PUBLICATIONS**

#### 2012

Buchholz, Wolfgang, Richard Cornes and Dirk Rübbelke. 2012. Potentially Harmful International Cooperation on Global Public Good Provision. CESifo Working Paper No. 3891, CESifo, Munich.

Buchholz, Wolfgang, Richard Cornes and Dirk Rübbelke. 2012. Potentially Harmful International Cooperation on Global Public Good Provision. RECAP15 Discussion Paper No. 5, European University Viadrina, Frankfurt (Oder).

Buchholz, Wolfgang, Richard Cornes and Dirk Rübbelke. 2012. Potentially Harmful International Cooperation on Global Public Good Provision. Working Paper in Economics & Econometrics No. 584, College of Business & Economics, Australian National University, Canberra

Cornes, Richard and Dirk Rübbelke. 2012. On the Private Provision of Contentious Public Characteristics. Working Paper in Economics & Econometrics No. 577, College of Business & Economics, Australian National University, Canberra.

Cornes, Richard and Dirk Rübbelke. 2012. On the Private Provision of Contentious Public Characteristics. CESifo Working Paper No. 3881, CESifo, Munich

Joseph Spadaro. 2012. Low Carbon Energy Scenarios for China, India and the UK. Projections for 2020, 2030 and 2050. European Commission, ENV.2010.1.2.3-2, Project No. 265325.

Joseph Spadaro. 2012. Economic Costs of Health Effects. European Commission, ENV.2010.1.2.3-2, Project No. 265325.

Joseph Spadaro and Anil Markandya. 2012. Modeling of Electricity Generation-Related Exposures relevant to Health. European Commission

Rosimeiry Portela, Ferdinando Villa, Laura Onofri, Paulo A.L.D. Nunes, and Anderson Shepard. 2012. A demonstration case study for the wealth accounting and the valuation of ecosystem services (waves) global partnership. World Bank. 55pp.

Vögele, Stefan und Dirk Rübbelke. 2012. Decisions on Investments in Photovoltaic and Carbon Capture and Storage: A Comparison between two different Greenhouse Gas Control Strategies. STE Preprint No. 22/2012-05, Institute for Energy and Climate Research - Systems Analysis and Technology Evaluation, Forschungszentrum Jülich.

### 2011

A. Markandya. 2011. Policy Briefing 1. FEEM. 34. 78-95.

Bateman, I., Abson, D., Beaumont, N., Darnell, A Fezzi, Hanley, N., Kontoleon, A., Maddison, D., Morling, P., Morris, J., Mourato, S., Pascual, U., Perino, G., Sen, A., Tinch, D., Turner, K., Valatin, G. 2011. Chapter 22: Economic Values from Ecosystems. In: UK National Ecosystem Assessment. The UK National Ecosystem Assessment Technical Report. UNEP-WCMC, Cambridge.

Buchholz, Wolfgang, Josef Falkinger and Dirk Rübbelke. 2011. Non-governmental Public Norm Enforcement in Large Societies as a Two-stage Game of Voluntary Public Good Provision. Working Paper in Economics & Econometrics No. 566, College of Business & Economics, Australian National University, Canberra.

Buchholz, Wolfgang, Richard C. Cornes and Dirk Rübbelke. 2011. Matching as a Cure for Underprovision of Voluntary Public Good Supply: Analysis and an Example. CESifo Working Paper No. 3374, CESifo,

Buchholz, Wolfgang, Richard C. Cornes and Dirk Rübbelke. 2011. Matching as a Cure for Underprovision of Voluntary Public Good Supply: Analysis and an Example. Working Paper in Economics & Econometrics No. 541, College of Business & Economics, Australian National University, Canberra.

Cardenas L.M., Cuttle S.P., Crabtree B., Hopkins A., Shepherd A. Scholefield D. and del Prado A. . 2011. Land management changes required to tackle nitrate pollution. Science for Environment Policy. Issue 236

Chamorro, J.M., Abadie, L.M.De Neufville, Richard and Ilic, Marija, 2011. Market-based valuation of transmission network expansion. Massachusetts Institute of Technology Engineering Systems Division. ESD-WP-2011-14.

De la Puente A. and Galarraga I.. 2011. Evaluación de la normativa europea y estatal, vigente y en preparación, relativa a la evaluación de impactos ambientales y económicos de los edificios. GiGa (ESCI-UPF). Universidad Pompeu Fabra.

del Prado A (as co-author). 2011. Ruminant Nutrition Regimes to Reduce Methane & Nitrogen Emissions (AC0209). DEFRA

Elisa Sainz de Murieta. 2011. Reconstrucción paleoambiental a partir del registro geológico en las marismas de Urdaibai: cambios en el nivel del mar. Sociedad de Ciencias Aranzadi Zientzia Elkartea. 171-181.

Markandya A and Chiabai A. 2011. "The Cost of Health Protection from Climate Change in Developing Countries". Conference proceeding AERC Conference on Natural Resource Management and Climate Change in Africa, Nairobi

Rübbelke, Dirk and Pia Weiss. 2011. Environmental Regulations, Market Structure and Technological Progress in Renewable Energy Technology - A Panel Data Study on Wind Turbines. Fondazione Eni Enrico Mattei (FEEM), Milan. Nota di Lavoro 32.2011.

Rübbelke, Dirk and Stefan Vögele. 2011. Distributional Consequences of Climate Change Impacts on the Power Sector: Who Gains and Who Loses?. CEPS Working Document No. 349, Centre for European Policy Studies Brussels

Spadaro, JV. 2011. The Uniform World Model: A Methodology for Predicting the Health Impacts of Air Pollution.

#### 2010

A.Markandya. 2010. Working Paper Feem. Feem. 45-78.

A.Markandya, Mysiak, J., Palatnik, R., Breil, M. and Martin-Ortega. J. 2010. Economic and Social Impacts of Droughts and demand side options. Xerochore Background Document.

Alberto Ansuategi, Mohammed Boulahya, John M. Callaway, Jens Hesselbjerg Christensen, John Christensen, Ole Bossing Christensen, Ibon Galarraga, Lucy Hancock, Michael Harrison, Anil Markandya, Anne Olhoff, Aferdita Ponari, Roberto Schaeffer, Alexandre Salem Szklo, Alberto Troccoli, Shuntung Yang, Xianli Zhu, Jonathan Coony Alejandro Deeb , Jane Ebinger, Irene Leino, Oeyvind Lier, Vanessa Lopes, Marcelino Madrigal, Walter Vergara. 2010. Climate Impacts on Energy Systems: Key issues for energy sector adaptation. World Bank.

Altemeyer-Bartscher, Martin; Dirk Rübbelke and Eytan Sheshinski. 2010. Konditionale Transfers im internationalen Klimaschutz.

Bigano, A.; R.A. Ortiz; A. Markandya; E. Menichetti and R.Pierfederici . 2010. The linkages between energy efficiency and security of energy supply in Europe. Fundazione Eni Enrico Mattei FEEM Nota di Lavoro.

Ding H, Silvestri S, Chiabai A, Nunes PALD. 2010. A Hybrid Approach to the Valuation of Climate Change Effects on Ecosystem Services: Evidence from the European Forests. FEEM Working Paper. 2010,5. 30.

Dirk Rübbelke in cooperation with Kristin Linnerud and Stefan Vögele. 2010. Hetebolger kan stenge kjernekraftverk. Klima. Issue 2.

Galarraga I., Chiabai A., Markandya A., Oses N., Khatun K., Damm B. . 2010. Insights on the economics of adaptation for decision making process in climate change policies: Inputs for K-Egokitzen Project. Basque Government. Adaptation to climate change.

Grasso M, Manera M, Chiabai A, Markandya A. 2010. The Health Effects of Climate Change: A Survey of Recent Quantitative Research. The Centre for Research on Energy and Environ Economics and Policy, Bocconi Univ. ISSN 1973-0381. 47.

Linnerud, Kristin, Dirk Rübbelke and Stefan Vögele, 2010, Climate Challenges for European Critical Infrastructure Protection: Nuclear Power and Water Supply. International Association for Energy Economics (IAEE). Conference Proceedings of the 11th IAEE European Conference.

Moran D., Topp K., Wall E., Wreford A., Chadwick D., Hall C., Hutchins M., Mitchell M., del Prado A., Tolkamp B. and Lianhai W. 2010. Climate Change impacts on the livestock sector. Final DEFRA Report AC0307.



A.Markandya and Suzette Pedroso-Galinato. 2009. Economic Modeling of Income, Different Types of Capital and Natural Disasters. World Bank Policy Paper 4875. Natural Disasters, Impacts on Income and Capital.

Carraro C, Bosello F, Cai M, Chiabai A, De Cian E, Ding H, Eboli F, Ghermandi A, Lugato E, Nunes PALD, Macagno G, Palatnik R, Parrado R, Rosa N, Silvestri S. 2009. Impacts of Climate Change and Biodiversity Effects. Conference Proceedings 11th BIOECON Conference, 21-22 September 2009.

Chiabai A, Travisi C, Ding H, Markanya A, Nunes PALD. 2009. Economic Valuation of Forest Ecosystem Services: Methodology and Values. FEEM Working Papers. 12,09. 31.

Ding H. Silvestri S. Chiabai A. Nunes PALD, 2009, A Hybrid Approach to the Valuation of Climate Change Effects on Ecosystem Services:



Evidence from European Forests. Conference Proceedings 11th BIOECON Conference, Venice 21-22 September 2009.

Elena Ojea, Paulo A.L.D. Nunes and Maria L. Loureiro. 2009. Mapping of Forest Biodiversity Values: A Plural Perspective. FEEM.

Ortiz, R.A.; A. Bastianin; A. Bigano; C. Cattaneo; A. Lanza, A. Markandya; M. Manera; M. Plotegher and F. Sfera. 2009. Energy Efficiency in Europe: trends, convergence and policy effectiveness. MPRA 1-34

Ortiz, R.A; H. Walton; T. Taylor, S. Arnold and A. Markandya. 2009. Accounting Framework for the Assessment of Externalities. EU-DG Research

#### 6 ANNEX

#### **BC3 POLICY BRIEFINGS**

YEAR	AUTHOR(S)	BRIEFING TITLE
2012	Anil Markandya, Mikel González-Eguino and Marta Escapa	Environmental fiscal reform and unemployment in Spain in the presence of an informal sector
2012	Roger Fouquet	The Role of the Demand for Environmental Quality in Driving Transitions to Low-Polluting Energy Sources
2012	Anil Markandya, Mikel González-Eguino, Patrick Criqui and Silvana Mima	Low Climate Stabilisation under Diverse Growth and Convergence Scenarios
2011	Roger Fouquet	Long Run Trends in the Price of Energy and Energy Services
2011	Gallastegui, M.C., González-Eguino, M. and Galarraga, I.	Cost effectiveness of a combination of instruments for global warming: a quantitative approach for Spain
2011	Ibon Galarraga, David R. Heres and Mikel González-Eguino	Evaluating the role of energy efficiency labels in the prices of household appliances: the case of refrigerators
2011	Roger Fouquet	Lessons from History for Transitions to a Low Carbon Economy
2011	Elena Ojea, Julia Martin-Ortega and Aline Chiabai	Economic Valuation of Ecosystem Services: Conflicts in Classification
2011	lbon Galarraga, Mikel González-Eguino and Anil Markandya	The Cancun Climate Summit: a Moderate Success
2011	Kaysara Khatun	Competing Ecosystem services: an Assessment of Carbon and Timber in the Tropical forests of Central America
2010	Ibon Galarraga, Mikel González-Eguino and Anil Markandya	Evaluating the role of energy efficiency labels: the case of Dish Washers
2010	Dirk Rübbelke and Stefan Vögele	Effects of Climate Change on the European Nuclear Power Sector
2010	Mikel González-Eguino, Ibon Galarraga and Alberto Ansuategi	Carbon leakage and the future of Old Industrial Regions
2010	Mikel González-Eguino	Competitividad y fuga de carbono: el caso de la economía vasca
2009	Ramon Arigoni Ortiz and Anil Markandya	Which policy option can be more cost-effective in promoting the use of energy efficient appliances in Europe? A comparison of energy taxes, subsidies, tax credits and bans.
2009	Ibon Galarraga, Mikel González-Eguino and Anil Markandya	What happened during the climate change negotiations in Copenhagen 2009?

#### **BC3 WORKING PAPERS**

YEAF	R AUTHOR(S)	PAPER TITLE
2012	Julia Martin-Ortega, Elena Ojea, Camille Roux	Payments for Water Ecosystem Services in Latin America: Evidence from Reported Experience
2012	Helen Ding, Anil Markandya and Paulo A.L.D. Nunes	The Economic Impacts of Biodiversity Policy for Improving the Climate Regulating Services Provided by EU Natura 2000 Habitats
2012	Helen Ding and Paulo A.L.D. Nunes	Modeling the Links between Biodiversity, Ecosystem Services and Human Wellbeing in the Context of Climate Change: Results from an Econometric Analysis on the European Forest Ecosystems
2012	Luis M. Abadie and José M. Chamorro	Valuation of wind energy projects: A real options approach
2012	Iker Etxano, Eneko Garmendia, Unai Pascual, David Hoyos, María A. Díez, José A. Cadiñanos, Pedro J. Lozano	Towards a Participatory Integrated Assessment Approach for Planning and Managing Natura 2000 Network Sites
2012	María-Angeles Díez, Iker Etxano, Eneko Garmendia,	Evaluating Governance and Participatory Processes in Natura 2000: Lessons Learned and Guidance for Future Prospects
2012	Roger Fouquet	Economics of Energy and Climate Change: Origins, Developments and Growth
2012	Ferdinando Villa, Ken Bagstad, Gary Johnson, Brian Voigt	Towards a Comprehensive Approach to Quantifying and Mapping Ecosystem Services Flows
2012	Eneko Garmendia and Gonzalo Gamboa	Weighting social preferences in participatory multi-criteria evaluations: a case study on sustainable natural resource management
2012	Dirk Rübbelke, Stefan Vögele	Effects of Carbon Dioxide Capture and Storage in Germany on European Electricity Exchange and Welfare
2012	Anil Markandya, Mikel González-Eguino and Marta Escapa	Environmental Fiscal Reform and Unemployment in Spain
2012	Mikel González-Eguino, Anil Markandya and Marta Escapa	From Shadow to Green: Linking Environmental Fiscal Reforms and the Informal Economy
2012	Sébastien Foudi	Exploitation of soil biota ecosystem services in agriculture: a bioeconomic approach.
2012	Roger Fouquet	Trends in Income and Price Elasticities of Transport Demand (1850-2010)
2011	Thomas Heyd	Climate change, Responsibilities, and Defeatism and Complacency
2011	Joseph V. Spadaro	The Uniform World Model: A Methodology for Predicting the Health Impacts of Air Pollution
2011	Roger Fouquet	The Demand for Environmental Quality in Driving Transitions to Low Polluting Energy Sources
2011	Aline Chiabai, Ibon Galarraga, Anil Markandya and Unai Pascual	The Equivalency Principle for Discounting the Value of Natural Assets: An Application to an Investment Project in the Basque Coast
2011	Martin Altemeyer-Bartscher, Anil Markandya and Dirk T.G. Rübbelke	The Private Provision of International Impure Public Goods: the Case of Climate Policy

YEAR	AUTHOR(S)	PAPER TIT
2011	Anil Markandya, Mikel González-Eguino, Patrick Criqui and Silvana Mima	Low Climat
2011	Ibon Galarraga, David Heres Del Valle and Mikel González-Eguino	Price Prem for Close-S
2011	Roger Fouquet and Peter J.G Pearson	The Long R Phases of E
2011	Wan-Jung Chou, Andrea Bigano, Alistair Hunt, Stephane La Branche, Anil Markandya, Roberta Pierfederici	Households
2011	Karen Pittel and Dirk Rübbelke	Internation
2011	Melanie Heugues	Endogenou Equilibria
2011	Dirk Rübbelke	Internation Moral and F
2011	Roger Fouquet	Long Run
2010	Aline Chiabai, Dirk Rübbelke and Lisa Maurer	ICT Applica
2010	Luis Mari Abadie, Ramon Arigoni Ortiz and Ibon Galarraga	The Deterr
2010	Margherita Grasso, Matteo Manera, Aline Chiabai and Anil Markandya	The Health
2010	Karen Pittel and Dirk Rübbelke	Local and (
2010	Kaysara Khatun	Competing Tropical Fo
2010	Aline Chiabai,Chiara Travisi,Anil Markandya,Helen Ding and Paulo Nunes	Economic A
2010	Elena Ojea, Julia Martin-Ortega and Aline Chiabai	Classifying services
2010	Ramon Arigoni Ortiz, Alexander Golub,Oleg Lugovoy, Anil Markandya and James Wang	The DICER
2010	Karen Pittel and Dirk Rübbelke	Energy Sup
2010	Roger Fouquet	The Sustair Relationshi
2010	Dirk Rübbelke and Stefan Vögele	Impacts of Power Sect
2010	Luis M. Abadie, Mikel González-Eguino and José M. Chamorro	Optimal Ab
2010	Ibon Galarraga, Mikel González-Eguino and Anil Markandya	Evaluating
2010	Roger Fouquet	The Slow Service
2010	Giacomo Giannoccaro and Julia Martin-Ortega	Environmer Envelopme
2010	Roger Fouguet	Divergence
2010	Ansuategi	Carbon leal
2010	Sara L. M. Trærup, Ramon Arigoni Ortiz and Anil Markandya	The Health
2009	Luis M. Abadie, José M. Chamorro, Mikel González- Eguino	Optimal Inv
2009	Elena Ojea, Ranjan Ghosh, Bharat B. Agrawal and P. K. Joshi	The Costs o
2009	ulia Martin-Ortega and Anil Markandya	The Costs o
2009	Ibon Galarraga and Anil Markandya	Climate Ch
2009	Agustin del Prado, Anita Shepherd, Lianhai Wu, Cairistiona Topp, Dominic Moran, Bert Tolkamp and David Chadwick	Modelling t Dairy Syste
2009	Ramon Ortiz and Anil Markandya	Literature F Emphasis c
2009	M.C. Gallastegui and Ibon Galarraga	Climate Ch
2009	Ibon Galarraga, Mikel González-Eguino and Anil Markandya	The Role of
2009	Aline Chiabai	Analysis an Change
2009	Mikel González-Equino	Market Inst
2009	Valentina Bosetti, Ruben Lubowski, Alexander Golub	Linking Red
	anu Aniil Mdi Kdiiuyd	⊢inancial F

#### TLE

te Stabilisation under Diverse Growth and Convergence Scenarios

nium for High-Efficiency Refrigerators and Calculation of Price-Elasticities Substitutes: Combining Hedonic Pricing and Demand Run Demand for Lighting: Elasticities and Rebound Effects in Different

Economic Development s' WTP for the Reliability of Gas Supply

al Climate Finance and its Influence on Fairness and Policy

us Timing in Pollution Control: Stackelberg versus Cournot-Nash

al Support of Climate Change Policies in Developing Countries: Strategic, airness Aspects

Trends in Energy-Related External Costs

ations in the Research for Environmental Sustainability

minants of Energy Efficiency Investments in the U.S

Effects of Climate Change: A Survey of Recent Quantitative Research

Global Externalities, Environmental Policies and Growth Ecosystem Services: an Assessment of Carbon and Timber in the rests of Central America

Assessment of Forest Ecosystem Services Losses: Cost of Policy Inaction

Ecosystem Services for Economic Valuation: The case of forest water

Model: Methodological Issues and Initial Results

oply and the Sustainability of Endogenous Growth

nability of `Sustainable' Energy Use: Historical Evidence on the

ip between Economic Growth and Renewable Energy

Climate Change on European Critical Infrastructures: The Case of the tor

andonment of Coal-Fired Stations in the EU

the Role of Energy Efficiency Labels: the Case of Dish Washers

earch for Solutions: Lessons from Historical Energy Transitions by Sector

ntal Concerns in Water Pricing Policy: an Application of Data ent Analysis (DEA)

es in the Long Run Trends in the Price of Energy and of Energy Services kage and the future of Old Industrial Regions after Copenhagen

Impacts of Climate Change: A Study of Cholera in Tanzania

vestment in Energy Efficiency under Uncertainty

of Ecosystem Adaptation: Methodology and Estimates for Indian Forests

of Drought: the Exceptional 2007-2008 Case of Barcelona

hange and Its Socioeconomic Importance

the Effect of Climate Change on Environmental Pollution Losses from ems in the United Kingdom

Review of Integrated Impact Assessment Models of Climate Change with on Damage Functions

ange and Knowledge Communities

Regions in Climate Change Policy

nd Use of Information and Communication Tools in Economics of Climate

truments and CO2 Mitigation: A General Equilibrium Analysis for Spain duced Deforestation and a Global Carbon Market: Impacts on Costs, lows, and Technological Innovation

### 6.2 LIST OF SEMINARS

DATE	YEAR	SEMINAR TITLE	LECTURER	INSTITUTION
27-mar	2009	"Convergence validity between revealed and stated recreation demand data: some empirical evidence".	Dr. David Hoyos	UPV/EHU (Spain)
30-abr	2009	"Planning for Adaptation to Climate Change in India: Methodology and Some Results".	Dr. Aline Chiabai	BC3 (Spain)
22-may	2009	"WTP for global and ancillary benefits of climate change mitigation".	Dr. David Hoyos	UPV/EHU (Spain)
19-jun	2009	"Economic Valuation of Forest Ecosystem Services: Methodology and Values".	Dr. Aline Chiabai	BC3 (Spain)
16-oct	2009	"Investments in energy efficiency under climate policy uncertainty".	Dr. Jose Manuel Chamorro	UPV/EHU (Spain)
27-oct	2009	"Global costs of climate change adaptation in the industrial and municipal water supply sector".	Dr. Luke Brander	Vrije Universiteit (Holland)
3-feb	2010	"Market Power and Competition in the Iberian Electricity Market".	Shariyar Nasirov	UPV/EHU (Spain)
24-feb	2010	"The Long Run Demand for Lighting (1711-2008): The Effects of Economic Development and Technological Innovation".	Dr. Roger Fouquet	BC3 (Spain)
26-mar	2010	"Valuing reliability of electricity services in rural Kenya".	Dr. Sabah Abdullah	UPV/EHU (Spain)
28-abr	2010	"The DICER model: methodological issues and initial results of calibration".	Dr. Ramon Arigoni Ortiz	BC3 (Spain)
26-may	2010	"Pigou versus Confucius: The effect of experience on the acceptability of Pigouvian taxes in a lab experiment".	Dr. Steffen Kallbekken	CICERO (Norway)
4-oct	2010	"A system dynamics approach to waste management: the case of Naples".	Federica di Nola	UPV/EHU (Spain)
15-oct	2010	"Climate Challenges for European Critical Infrastructure Protection: Nuclear Power and Water Supply".	Dr. Stefan Vögele	Institute of Sustainable Economic Development (Germany)
1-dic	2010	"Challenges and perspectives in ecosystem services assessment and valuation: towards a new science of integrated human/natural systems".	Prof. Ferdinando Villa	BC3 (Spain)
3-dic	2010	"Environmental problems: How can System Dynamics complement Economics?".	Dr. Erling Moxnes	University of Bergen (Norway)
29-abr	2010	"Synergy between organic waste management by composting and agronomy to reduce greenhouse gases emissions".	Prof. Raul Moral	Universidad Miguel Hernández de Elche (Spain)
20-may	2010	"Evaluación del impacto y adaptación al cambio climático en los sistemas agrícolas de la Península Ibérica".	Dr. Margarita Ramos	Universidad Politécnica de Madrid (Spain)
14-ene	2011	"Evaluation of externalities. The corporate ecological footprint: MC3 methodology and application".	Dr. Ingrid Mateo Mantecón	Universidad de Cantabria (Spain)
27-ene	2011	"Social Preferences about Climate Change: Evidence from Spain".	Dr. Maira Loureiro	Universidad de Vigo (Spain)
2-feb	2011	"Iberian forests against global change: projected impacts and adaptation mechanisms".	Dr. Miguel A. Zavala	CIFOR- INIA (Spain)
17-mar	2011	"Flexibility in Engineering Design: Creating Value in Technological Enterprises Using Flexibility to Exploit Uncertainties".	Dr. Richard de Neufville	MIT (United States)
01-abr	2011	"Aggregative Environmental Games".	Dr. Richard Cornes	Australian National University (Australia)
20-may	2011	"Looking into the future of water and agriculture".	Dr. Ana Iglesias	Universidad Politécnica de Madrid (Spain)
02-jun	2011	"Local and Global Externalities, Environmental Policies and Growth".	Dr. Karen Pittel	lfo Institute for Economic Research (Germany)
24-jun	2011	"Selecting random parameters in discrete choice experiment for environmental valuation: A simulation experiment P. Mariel, A. de Ayala, D. Hoyos, S. Abdullah".	Amaia de Ayala	UPV/EHU (Spain)

DATE	YEAR	SEMINAR TITLE	LECTURER	INSTITUTION
			ſ	
13-jul	2011	"The benefits and costs of heat waves prevention in a context of rising temperatures".	Gerardo Sanchez	UPV/EHU (Spain)
30-sep	2011	"From regulatory policies to ecosystem services: political ecology in the Amazon".	Dr. Xavier Arnauld de Sartre	CNRS - University of Pau (France)
06-oct	2011	"Promoting Renewable Energy in the EU".	Dr. Juan Delgado	Former Chief Economist of the Spanish Competition Commission CNC. (Spain)
10-oct	2011	"Ecosystem Services: Ground Truthing".	Dr. David Batker	Earth Economics (United States)
08-nov	2011	"Precaution and proportionality in the management of global environmental change".	Dr. Charles Perrings	Arizona State University (United States)
31-may	2011	"Adaptation and Development in Times of Climate Change".	Dr. Thomas Heydt	University of Canada (Canada)
22-feb	2012	"Spatial green accounting for terrestrial ecosystems: from theory to practice".	Dr. Alejandro Caparros	CSIC (Spain)
23-mar	2012	"Altering Hydrology due to a Changing Climate and the Perception of these Changes: Examples from the Mountains of Colorado and Mongolia".	Dr. Fassnacht	Colorado State University (United States)
03-abr	2012	"Integrating biophysical and socioeconomic issues regarding adaptation to climate change in California".	Dr. Louise Jackson	University California Davis (United States)
11-abr	2012	"Voluntary and Information Based Approaches to Environmental Management: An Impure Public Good and Club Theory Perspective".	Dr. Mathew Kotchen	University of Yale (United States)
24-may	2012	"Market-based valuation of transmission network expansion. A heuristic application in GB".	Dr. Jose Manuel Chamorro	UPV/EHU (Spain)
21-jun	2012	"Past climate change recorded in polar ice cores".	Dr. Kumiko Goto-Azuma	Ice Core Laboratory, National Institute of Polar Research (Japan)
21-jun	2012	"Deep ice core drilling, polar ice-sheet flow and its implications for climate change".	Dr. Nobuhiko Azuma	Dept. of Mechanical Engineering, Nagaoka University of Technology (Japan)
11-jul	2012	"Invasive species: Economic impacts and management strategies in the face of climate change".	Dr. Patrick Shipman	Dept. of Mathematics, Colorado State University (United States)
18-sep	2012	"The 'slash-and-burn' solution to climate change".	Dr. Jacob Phelps	National University of Singapore (Singapore)
24-sep	2012	"Theoretical issues and operational challenges in ecosystem services valuation".	Dr. Erik Gómez-Baggethun	Institute of Environmental Science and Technology, Universitat Autònoma de Barcelona (Spain)
24-sep	2012	"Valuing the Water Purification/Filtration Service of Temperate Coastal Rainforests in Southwestern British Columbia: A Stochastic Production Function Approach".	Dr. Duncan Knowler (Simon Fraser University jointly with Ashley Page)	Simon Fraser University (Canada)
04-oct	2012	"From Theory to Practice: The Science and Field Implementation of Ecosystem Services ".	Dr. Rosimeiry Portela	Conservation International (United States)
09-nov	2012	"Large Scale Integration of Renewables in Power Systems: Flexibility Assessment and Market Rules Design".	Dr. Fernando Sisternes	MIT (United States)
15-nov	2012	"An early warning system for desertification".	Dr. Javier Ibáñez Puerta (Universidad Politécnica de Madrid) and Dr. Jaime Martínez Valderrama (CSIC)	UPM y CSIC (Spain)
29-nov	2012	"Impact of climate policy and external shocks on innovation in renewable energy technologies".	Dr. Pia Weiss	Nottingham University (United Kingdom)
13-dic	2012	"Climate policy negotiations with incomplete information".	Dr. Kai Konrad	Max Planck Institute for Tax Law and Public Finance (Germany)
14-dic	2012	"The Value of Adaptation: Climate Change and Timberland Management".	Dr. Christopher Costello	Bren School of Environmental Science & Management (United States)





#### www.bc3research.org

BC3, Basque Centre for Climate Change - Klima Aldaketa Ikergai Alameda Urquijo 4, 4th floor, 48008 Bilbao (Spain) tel: + 00 34 94 401 46 90 / email: info@bc3research.org

