

KLIMAGUNE 2010

Updating Climate Change Research in the Basque Country

University of the Basque Country

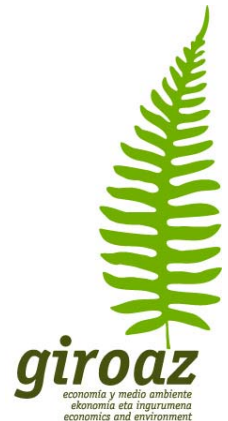
MARTA ESCAPA
(UPV/EHU)

Dpt. Foundations of Economic Analysis I
Institute of Public Economics **IEP**

eman ta zabal zazu



U.P.V. E.H.U.



Outline

1. Team

2. Research lines

A. Economics of Climate Change

LINE 1. Post-Kyoto Climate Change Policy

LINE 2. Climate and energy policies in Spain

LINE 3. Investment under uncertainty: power utilities
and climate policy

B. Natural Resource Economics

3. Research projects

1. Team

Dpt. Economic Analysis and IEP

GIROAZ: research group to study the interlinkages between the economy and the environment

- M^a Carmen Gallastegui (PhD, Brown University)
 - Professor of Economics (UPV/EHU)
- Alberto Ansuategi (PhD, University of York)
 - Associate Professor of Economics (UPV/EHU)
- José Manuel Chamorro (PhD, UPV/EHU)
 - Associate Professor of Economics (UPV/EHU)
- Marta Escapa (PhD, UPV/EHU)
 - Associate Professor of Economics (UPV/EHU)

1. Team

Dpt. Economic Analysis and BC3

- Mikel González (PhD, UPV/EHU)
 - Associate researcher (BC3) and Assistant Professor (UPV/EHU)
- Luis M^a Abadie (PhD, UPV/EHU)
 - Associate researcher (BC3)

1. Team

IEP (Environmental Economics Unit)

Post Doctoral Fellows

- Iñaki Arto (PhD, UPV/EHU)
- David Hoyos (PhD, UPV/EHU)
- Sabah Abdullah (PhD, University of Bath)

PhD Students

- Maria Federica di Nola (UPV/EHU & U. di Roma Sapienza)
- Eneko Garmendia (UPV/EHU & UAB)
- Shariyar Nasirov (UPV/EHU)

2. Research lines

A. Economics of Climate Change

L1. International environmental agreements:

Post-Kyoto Climate Change Policy

L2. Climate and energy policies in Spain: side effects and industry-level impacts

L3. Investment under uncertainty: power utilities and climate policy

2. Research lines

A. Economics of Climate Change

L1. Post-Kyoto Climate Change Policy

- Optimal design of international agreements
- Discounting in an asymmetric world

L2. Climate and energy policies in Spain: side effects and industry-level impacts

- Portfolios for a low carbon growth
- A fourth dividend for renewable energy?

L3. Investment under uncertainty: power utilities and climate policy

- The appeal of energy efficiency: the plant level
- The appeal of energy efficiency: the system level

L1. Post-Kyoto Climate Change Policy

Optimal design of international agreements

- We have used economic analysis to study:
 - difficulties to reach an agreement due to the international and intergenerational dimension of climate change
 - how distribution of gains from cooperation determines whether countries will accept the agreement

L1. Post-Kyoto Climate Change Policy

Optimal design of international agreements

- We want to analyze:
 - How transfers (monetary, technological,...) among countries and generations should be determined to facilitate cooperation?
 - How the effort of emissions reduction is shared among different players? Early action should be taken into account.

L1. Post-Kyoto Climate Change Policy

Discounting in an asymmetric world

- Costs of actions to mitigate climate change
 - have to be afforded now
 - vary widely among countries
- Benefits of climate change mitigation will
 - occur in a distant future
 - differ among countries
- Which discount rate should be used to compare those distant and different costs and benefits?

Publications

LINE 1. Post-Kyoto Climate Change Policy

- **Ansuategi A. & Escapa, M.** (2002), Economic Growth and Greenhouse Gas Emissions, *Ecological Economics*
- **Ansuategi A. & Escapa M.,** (2004). Is international cooperation on climate change good for the environment? *Economics Bulletin*
- **Arto I., M.C. Gallastegui & A. Ansuategi,** (2009), Accounting for Early Action in the European Union Emission Trading Scheme, *Energy Policy*.
- **Gallastegui, & M^a, González, M.** (2008) “El clima de la tierra: un bien público que debemos conservar” en Desarrollo sostenible y cambio climático: Economía y Sociedad, *Ekonomi Gerizan*
- **Gallastegui M^a C. & Chamorro J.M.** (2009). "Energía, medio ambiente y la necesidad de acuerdos internacionales". *Tratado de regulación del sector eléctrico*. Thomson-Aranzadi.

L2. Climate and energy policies in Spain: Portfolios for a low carbon growth

- We have developed a dynamic Computable General Equilibrium model (CGE) for the Spanish economy to analyze
 - economic cost of CO₂ abatement in Spain (timing & goals of climate change policies)
 - environmental tax reform and double dividend hypothesis
 - efficiency of different market-based instruments (marketable permits, taxes on energy, electricity or coal, and quotas)

L2. Climate and energy policies in Spain: Portfolios for a low carbon growth

- We aim to develop a General Equilibrium model for Energy-Economic-Environment interactions (CGE-E3) as a research tool to analyse
 - low-carbon transition and policies in Spain
 - interaction between the power sector and the transport sector
 - Impacts of renewable energy policy on: i) electricity cost, ii) pollutants, iii) energy security, iv) CO₂ emissions, ... fourth dividend?

Publications

LINE 2. Climate and energy policies in Spain

- **Arto, I., González-Eguino, M.**, (2010) “Transición hacia una economía baja en carbono”, *Ekonomiaz* (forthcoming).
- **Arto I.** (2009b) “Using Total Material Requirement to Reduce the Global Environmental Burden”, *Journal of Industrial Ecology*.
- **González, M.** (2007) “Impacto económico del control del cambio climático en España”, Estudios de la Fundación *FUNCAS*.
- **González, M., & Dellink, R.B.** (2006) “Impact of climate policy on the Basque economy”, *Economía Agraria y de los Recursos Naturales*.
- **González, M., & Gallastegui, M^a**, (2008) “Cambio climático y doble dividendo: el caso de la economía española”, *Ekonomiaz*.

L3. Investment under uncertainty, power utilities and climate policy

- Viewpoint of an individual firm:
 - investment in new power plants and/or
 - adoption of technologies to curb carbon emissions.
- Methodology: Valuation of assets
 - Investment in a Natural Gas Combined Cycle (NGCC) power plant or in an Integrated Gasification Combined Cycle (IGCC).
 - Evaluation of energy assets related to natural gas.
 - Option to install a carbon capture and storage (CCS) unit in a coal-fired power plant in a carbon-constrained environment.

L3. Investment under uncertainty, power firms and climate policy

- The appeal of energy efficiency: the plant level
 - Adoption of efficiency-enhancing technology
 - savings on fuel consumption
 - lower carbon emissions
- The appeal of energy efficiency: the system level
 - The particular plant must be integrated into a general transmission grid, this into a regional infrastructure, and so on.

LINE 3. Investment under uncertainty: power utilities and climate policy

- **Abadie L.M., Chamorro J.M.,** (2009b). Income risk of EU coal-fired power plants after Kyoto. *Energy Policy*.
- **Abadie L.M., Chamorro J.M.,** (2009a). Monte Carlo valuation of natural gas investments. *Review of Financial Economics*.
- **Abadie L.M., Chamorro J.M.,** (2008a). Valuing flexibility: The case of an Integrated Gasification Combined Cycle power plant. *Energy Economics*.
- **Abadie L.M., Chamorro J.M.,** (2008b). European CO2 prices and carbon capture investments. *Energy Economics*.

2. Research lines

B. Natural Resource Economics

- Fisheries (in collaboration with AZTI-Tecnalia)
 - Sustainability of fisheries management
 - EU projects: ELME, PECHDEV
- Natural Resource Integrated Assessment and Management.
- Waste Management: a System Dynamics approach (PhD Thesis)

3. Research projects

- Consolidated Research Group. Basque Government Research Grant, (GIC07/56-IT-383-07), 2007-2012.
- European Lifestyles and Marine Environment (ELME), European Union VI Framework (GOCE-CT-2003-505576), 2004-2007.
- Gestión Sostenible del Territorio, EKO-LURRALDEA, Basque Government, IE05-160, 2005-07.
- Collaboration Agreement between the Institute of Public Economics (IEP, UPV/EHU) and the Public Society of Environmental Management of the Basque Country (IHOBE), (2001-2009)