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# PERSPECTIVES IN MITIGATION OF CLIMATE CHANGE

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BC3/UPV-EHU SUMMER SCHOOL

Donosti, 10 July 2013



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- **IPCC WG3, AR5**
- **Reasons for energy taxes**
- **Green tax reforms**
- **Prospective**
- **Some Reflections for Spain**
  - **Anomalies**
  - **Potentials**
- **Conclusions**

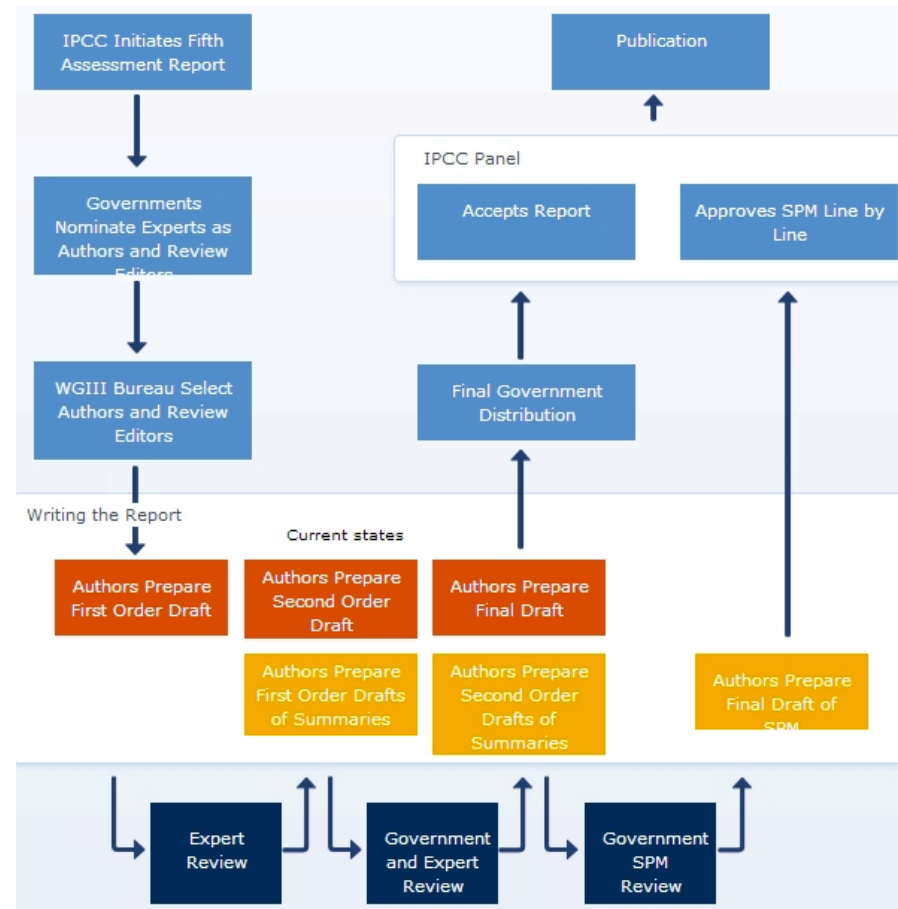


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# IPCC WG3, Fifth Assessment Report



## Timeline of WGIII Fifth Assessment Report



# Contents

## I. INTRODUCTION

### 1. Introductory Chapter

- Lessons learned from AR4
- New challenges for the AR5
- Historical, current and future trends
- The mitigation challenges

## II. FRAMING ISSUES

### 2. Integrated Risk and Uncertainty Assessment of Climate Change Response Policies

- Risk perception
- Risk and uncertainty in climate change
- Metrics of uncertainty and risk
- Managing uncertainty, risk and learning
- Tools for analyzing uncertainty and risk
- Frequently asked questions

### 3. Social, Economic and Ethical Concepts and Methods

- Assessing methods of policy choice
- Ethical and socio-economic principles
- Metrics of costs and benefits
- Economics, rights and duties
- Justice, equity and responsibility
- Behavioural economics and culture
- Policy instruments and regulation
- Technological change
- Frequently asked questions

### 4. Sustainable Development and Equity

- Determinants, drivers and barriers
- Mitigative capacity and mitigation
- Links to adaptive capacity and adaptation
- Development pathways
- Consumption patterns and carbon accounting
- Integration of framing issues in the context of sustainable development
- Implications for subsequent chapters
- Frequently asked questions

# Contents

## III. PATHWAYS FOR MITIGATING CLIMATE CHANGE

### 5. Drivers, Trends and Mitigation

- Global trends in stocks and flows of greenhouse gases and short-lived species
- Key drivers of global change
- Production, consumption and trade patterns
- Contribution of technological change to mitigation
- Contribution of behavioural change to mitigation
- Co-benefits and tradeoffs of mitigation including air pollution
- Carbon and radiation management and other geoengineering options including environmental risks
- The system perspective: linking sectors, technologies and consumption patterns
- Frequently asked questions

### 6. Assessing Transformation Pathways

- Tools of analysis
- Climate stabilization: Concepts, costs and implications for the macroeconomy, sectors and technology portfolios, taking into account differences across regions
- Integrating long- and short-term perspectives
- Integrating technological and societal change
- Sustainable development and transformation pathways, taking into account differences across regions
- Risks of transformation pathways
- Integrating sector analyses and transformation scenarios
- Frequently asked questions

### 7. Energy Systems

[Note: All sections should consider regional specificities including as appropriate to developed and developing countries and economies in transition.]

- Energy production, conversion, transmission and distribution
- New developments in emission trends and drivers
- Resources and resource availability
- Mitigation technology options and practices (including energy efficiency)
- Infrastructure and systemic perspectives
- Climate change feedback and interaction with adaptation
- Technological, environmental and other risks and uncertainties; and social acceptability
- Co-benefits, tradeoffs, spill-over effects
- Barriers and opportunities (technological, physical, financial, institutional, cultural, legal, etc.)
- Sustainable development and behavioural aspects
- Costs and potentials
- Gaps in knowledge and data
- Frequently asked questions

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## 8. Transport

[Note: All sections should consider regional specificities including as appropriate to developed and developing countries and economies in transition.]

- Freight and passenger transport (land, air, sea and water)
- New developments in emission trends and drivers
- Mitigation technology options and practices (including energy efficiency)
- Infrastructure and systemic perspectives
- Climate change feedback and interaction with adaptation
- Technological, environmental and other risks and uncertainties; and social acceptability
- Co-benefits, tradeoffs, spill-over effects
- Barriers and opportunities (technological, physical, financial, institutional, cultural, legal, etc.)
- Sustainable development and behavioural aspects
- Costs and potentials
- Gaps in knowledge and data
- Frequently asked questions

## 9. Buildings

[Note: All sections should consider regional specificities including as appropriate to developed and developing countries and economies in transition.]

- Commercial, residential and public buildings
- New developments in emission trends and drivers
- Mitigation technology options and practices (including energy efficiency)
- Infrastructure and systemic perspectives
- Climate change feedback and interaction with adaptation
- Technological, environmental and other risks and uncertainties; and social acceptability
- Co-benefits, tradeoffs, spill-over effects
- Barriers and opportunities (technological, physical, financial, institutional, cultural, legal, etc.)
- Sustainable development and behavioural aspects
- Costs and potentials
- Gaps in knowledge and data
- Frequently asked questions

## 10. Industry

[Note: All sections should consider regional specificities including as appropriate to developed and developing countries and economies in transition.]

- New developments in extractive industries, manufacturing and services (including tourism)
- New developments in emission trends and drivers
- Material substitution, material reuse and waste
- Mitigation technology options and practices (including efficiency improvements, household and industry waste)
- Infrastructure and systemic perspectives
- Climate change feedback and interaction with adaptation
- Technological, environmental and other risks and uncertainties; and social acceptability
- Co-benefits, tradeoffs, spill-over effects
- Barriers and opportunities (technological, physical, financial, institutional, cultural, legal, etc.)
- Sustainable development and behavioural aspects
- Costs and potentials
- Gaps in knowledge and data

# Contents

## 11. Agriculture, Forestry and Other Land Use (AFOLU)

[Note: All sections should consider regional specificities including as appropriate to developed and developing countries and economies in transition.]

- Introduction to integrated assessment of AFOLU
- Emission trends (including agricultural productivity) and drivers
- Competition and opportunities for land-use (energy, food, feed and timber production; housing, nature conservation, biodiversity and other land uses)
- Mitigation technologies and practices in forestry, agriculture (e.g. biochar) and livestock farming
- Mitigation effectiveness (non-permanence: human and natural impacts; displacement; saturation)
- Systemic perspectives (including integrated land-use assessment)
- Synergies, tradeoffs and interactions with adaptation and other mitigation options
- Climate change feedback, natural disturbance and extreme events
- Environmental and other risks and uncertainties
- Co-benefits, tradeoffs, spill-over effects
- Opportunities and barriers (technological, physical, financial, institutional, cultural, legal, etc.)
- Sustainable development and behavioural aspects
- Costs and potentials
- Gaps in knowledge and data
- Frequently asked questions

## 12. Human Settlements, Infrastructure and Spatial Planning

[Note: All sections should consider regional specificities including as appropriate to developed and developing countries and economies in transition.]

[Note: Working Group III Plenary suggests that the WG III Bureau and the authors have the mandate to revisit the structure and the title of the bullets in this chapter based on the outcome of the Expert Meeting on "Human Settlements and Infrastructure" to be held in 2010.]

- Urbanisation challenges and opportunities for climate change mitigation
- Settlement structures, density, forms and lifecycle assessments
- Infrastructure, spatial planning and mitigation
- Lifestyle changes and efficiency
- Waste
- Water/energy nexus
- Human settlements and climate change: Experiences across countries
- Frequently asked questions

## IV. ASSESSMENT OF POLICIES, INSTITUTIONS AND FINANCE

### 13. International Cooperation: Agreements and Instruments

- Introduction
- Framing concepts and an assessment of means for international cooperation
- International agreements: Examples and lessons for climate policy
- Multilateral and bilateral agreements across different scales
- Climate policy architectures
- Mechanisms for technology and knowledge development, transfer, diffusion
- Capacity building
- Linkages between international and national policies
- Linkages between international and regional cooperation
- Interactions between climate change mitigation policy and trade
- Performance assessment on policies and institutions including market mechanisms
- Investment and finance
- The role of public and private sectors and public-private partnership
- Frequently asked questions



# Contents

## 14. Regional Development and Cooperation

- Introduction
- Opportunities and barriers of regional cooperation
- Current development patterns and goals
- Energy and development
- Urbanisation and development
- Consumption and production patterns in the context of development
- Low carbon development: Opportunities and barriers
- Links between mitigation, adaptation and development
- Investment and finance
- The role of public and private sectors and public-private partnership
- Frequently asked questions

## 15. National and Sub-national Policies and Institutions

- Introduction
- Characteristics and classification of policy instruments and packages
- Approaches and tools used to evaluate policies and institutions
- Research and development policy
- Assessment of the performance of policies and measures in developed and developing countries taking into account development level and capacity
- Framework: Role of institutions and governance
- Capacity building
- National, state and local linkages
- Links to adaptation
- Synergies and tradeoffs among policies
- Assessing policy design options
- Investment and finance
- The role of public and private sectors and public-private partnership
- The role of stakeholders including NGOs
- Frequently asked questions

## 16. Cross-cutting Investment and Finance Issues

- Financing low-carbon investments, opportunities, key-drivers and barriers
- Financing developed countries' mitigation activities
- Financing mitigation activities in and for developing countries including for technology development, transfer and diffusion
- Financing infrastructure and institutional arrangements
- Synergies and tradeoffs between financing mitigation and adaptation
- Directing and leveraging private financing
- Innovative financing
- Approaches and scale of financing at national, regional and international level in short-, mid- and long-term
- Enabling environments
- Frequently asked questions

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# Reasons for energy taxes

- ❑ Revenue-raising (Ramsey)
  - 1970s
  - Low price-elasticities
- ❑ Environmental correction (Pigou)
  - 1990s
  - Static and dynamic efficiency
- ❑ Capture of economic rents
  - Oil-shock related



WP 08/2013

A Panorama on Energy Taxes  
and Green Tax Reforms

Alberto Gago  
Xavier Labandeira  
Xiral López-Otero

[http://www.eforenergy.org/docpublicaciones/  
documentos-de-trabajo/PW08-2013.pdf](http://www.eforenergy.org/docpublicaciones/documentos-de-trabajo/PW08-2013.pdf)



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# Reasons for energy taxes (*Tax rules*)

- ❑ Final consumption
- ❑ Price-inelastic energy goods
- ❑ Origin of externalities
- ❑ Foreign supply

but,

- ❑ Trade-offs
  - Revenue-raising vs. externality correction/ capture of rents
  - Price-elasticity vs cost-efficiency



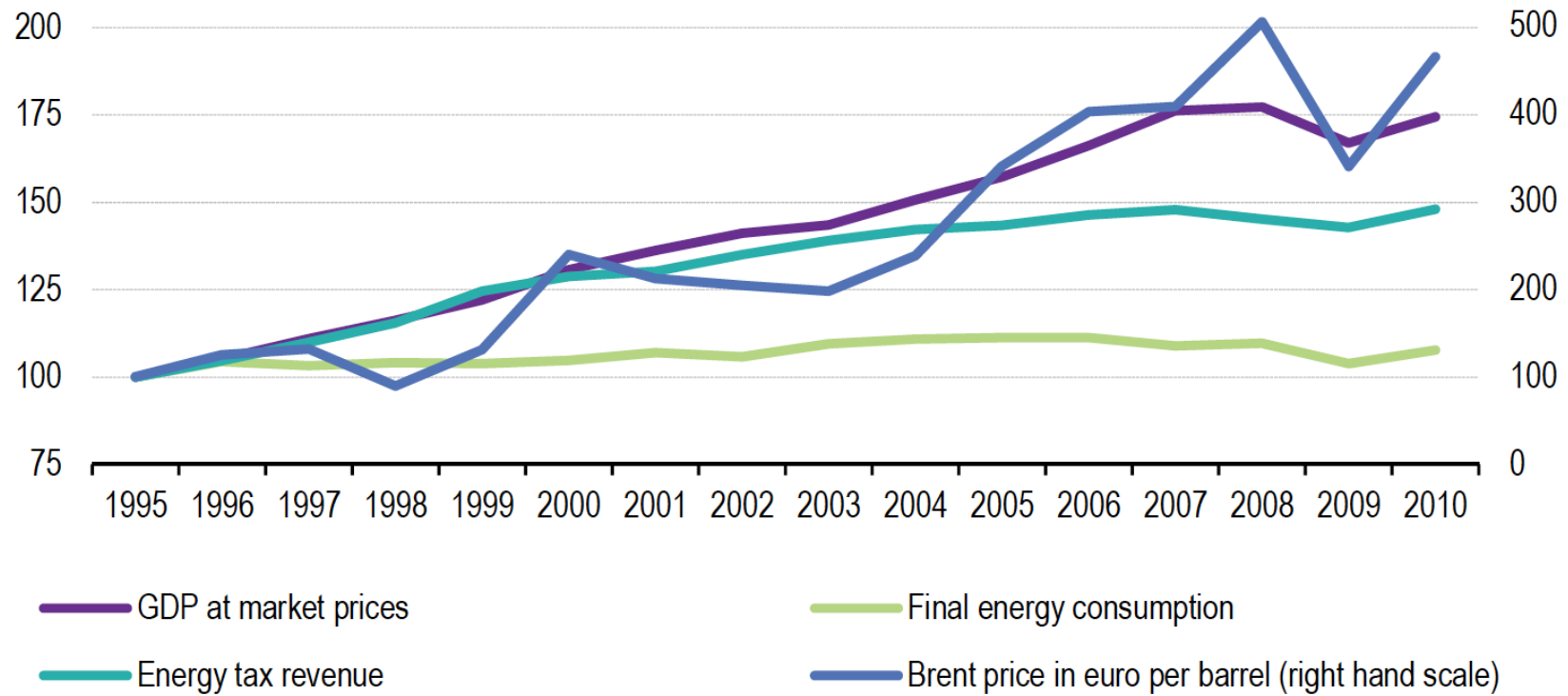
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# Reasons for energy taxes (*Limits*)

- ❑ Energy/GDP decoupling
  - Applicable to evolution
- ❑ Distributional concerns
  - Country and product dependent
- ❑ Competitiveness
  - Exemptions



**Figure 5: Energy taxes, GDP and final energy consumption, EU-27, 1995-2010 (index 1995=100)**



Source: Eurostat (online data codes: [env\\_ac\\_tax](#); [nama\\_gdp\\_c](#); [nrg\\_100a](#) and [INSEE](#))

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# Green Tax Reforms

- ❑ **Systemic approach based on energy-related taxation**
- ❑ **Based on the theory of double dividend**
  - Externality correction
  - Fiscal improvement
- ❑ **Two generations**
  - **Scandinavian model (1990s)**
    - ❑ Income and carbon taxation
  - **German model (2000s)**
    - ❑ Labour and (conventional) energy taxation



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# Prospective

- ❑ **Innovation in energy taxes**
  - Taxes on car usage
  - Border tax adjustments
  - A new tax on energy inefficiency?
  
- ❑ **A new model of green tax reform**
  - Australia, Ireland, Japan
  - Less connected to theory of double dividend. Extra revenues devoted to:
    - ❑ Fiscal consolidation
    - ❑ Renewable/energy efficiency promotion
    - ❑ Distributional offsets





# economics for energy

This working paper has been developed within the Alcoa  
Advancing Sustainability Initiative to Research and Leverage  
Actionable Solutions on Energy and Environmental Economics



WP FA04/2012

## Climate Change, Buildings and Energy Prices

Alberto Gago, Michael Hanemann, Xavier Labandeira,  
Ana Ramos

[http://www.eforenergy.org/docpublicaciones/  
documentos-de-trabajo/WPFA04-2012.pdf](http://www.eforenergy.org/docpublicaciones/documentos-de-trabajo/WPFA04-2012.pdf)

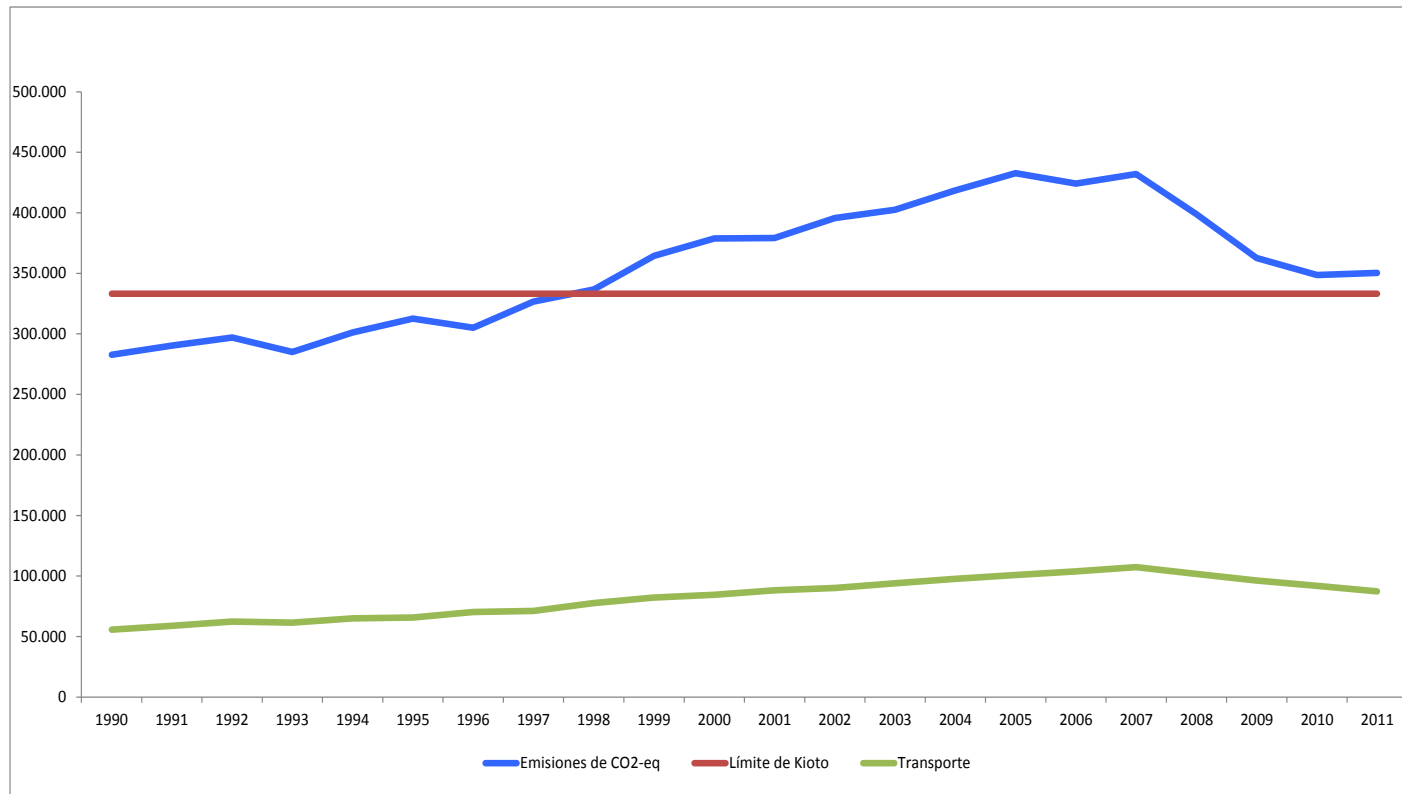


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# Spain: A picture

## Spanish CO<sub>2</sub> emissions

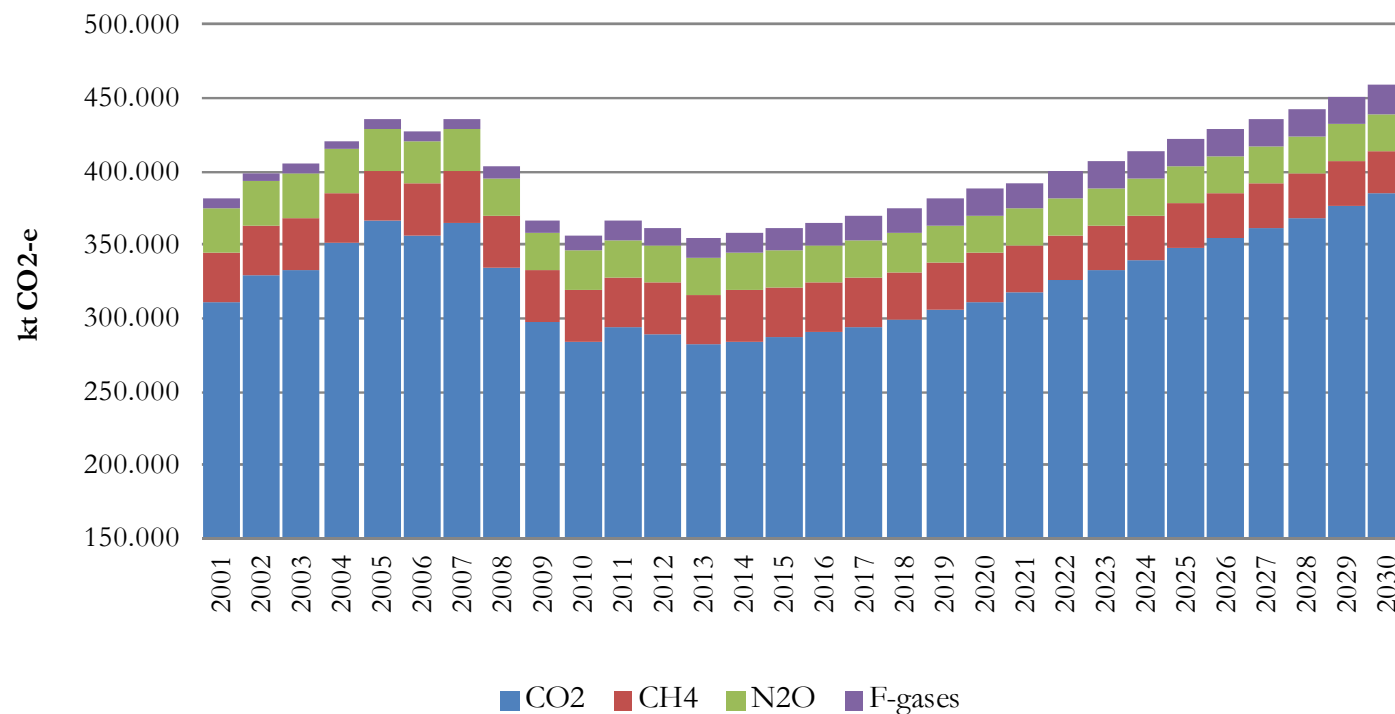


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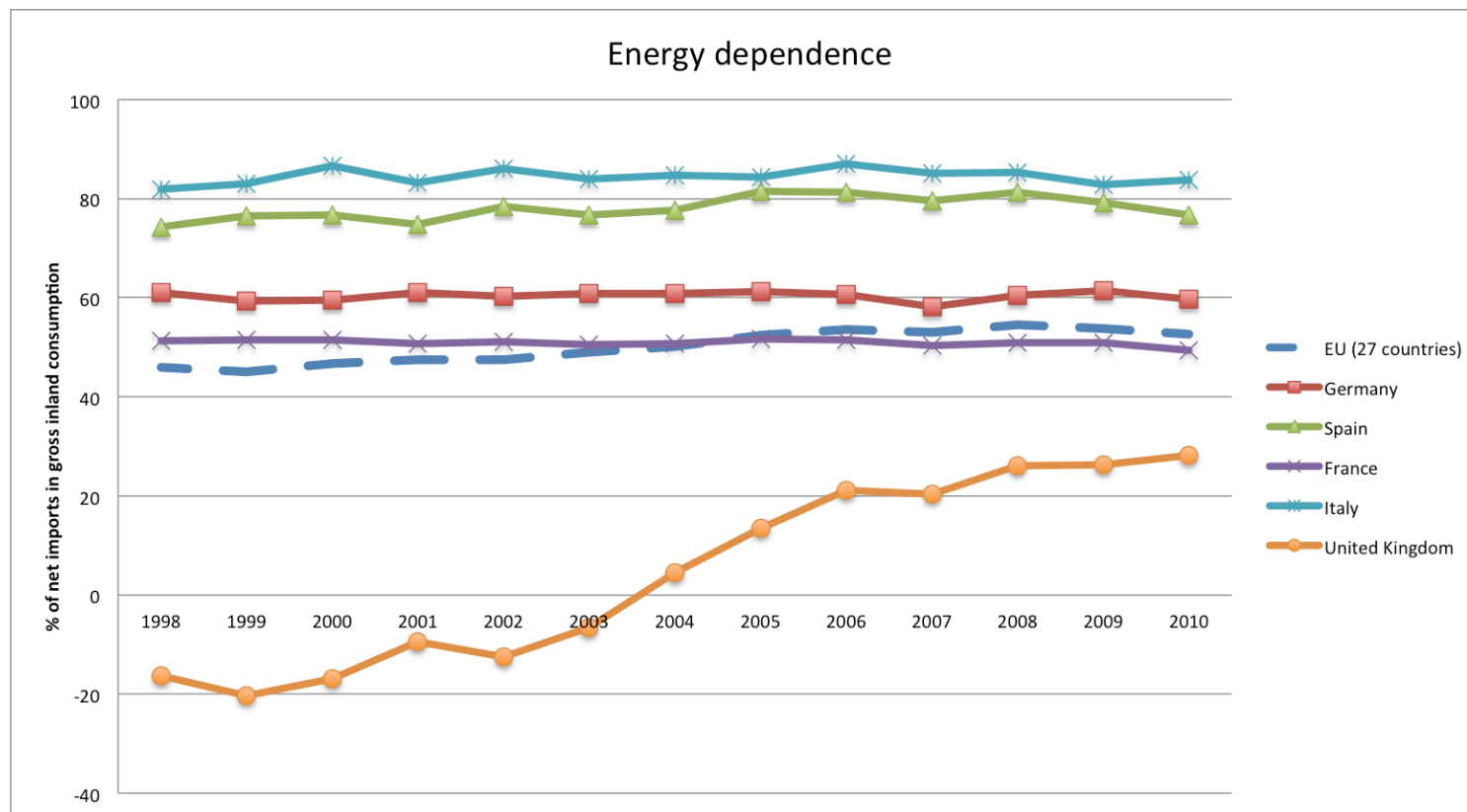
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# Spanish CO<sub>2</sub> emissions (official forecast)

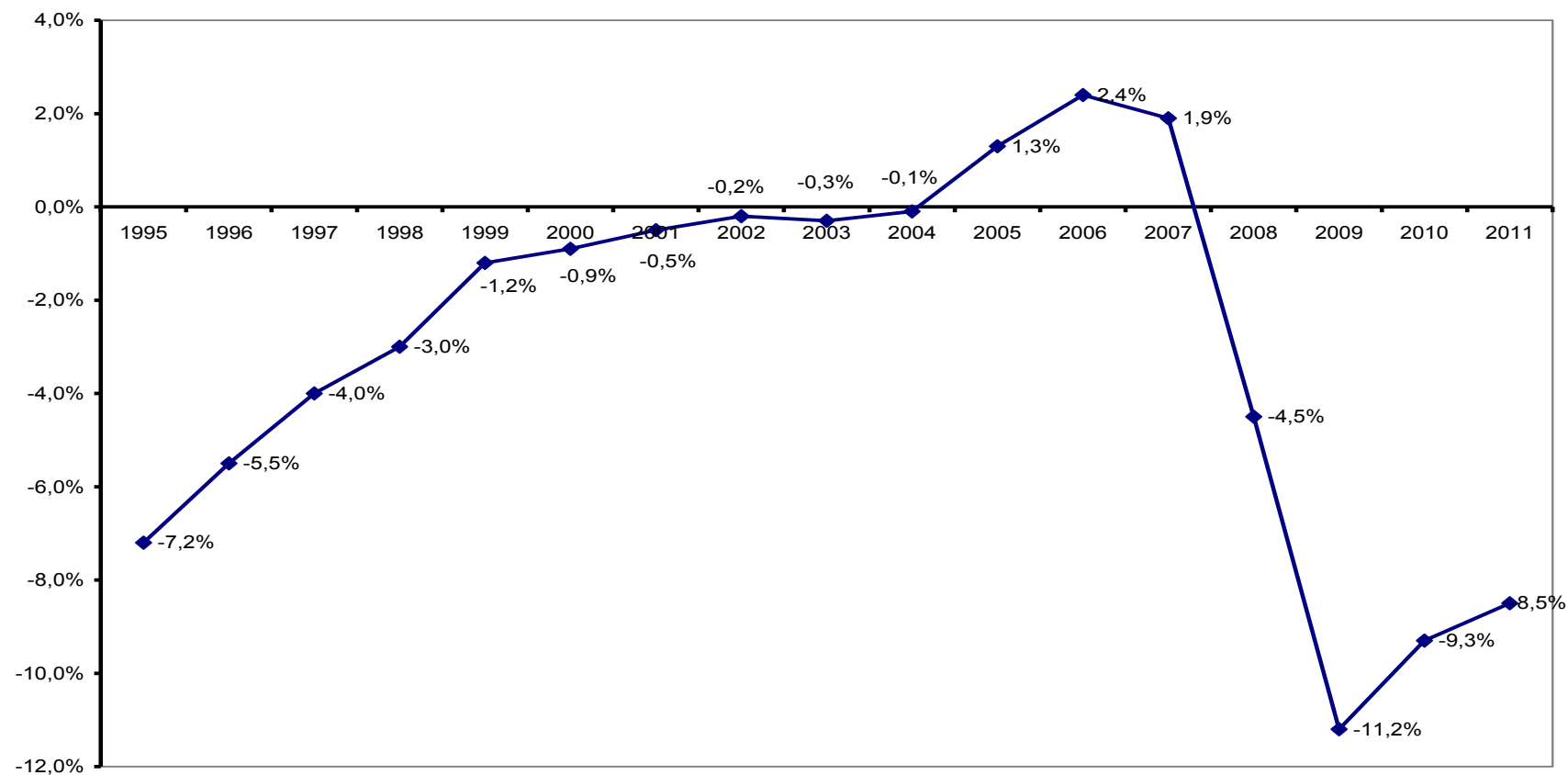
Proy. Total Inventario  
Total GEIs - Escenario WM



# Spanish energy dependence



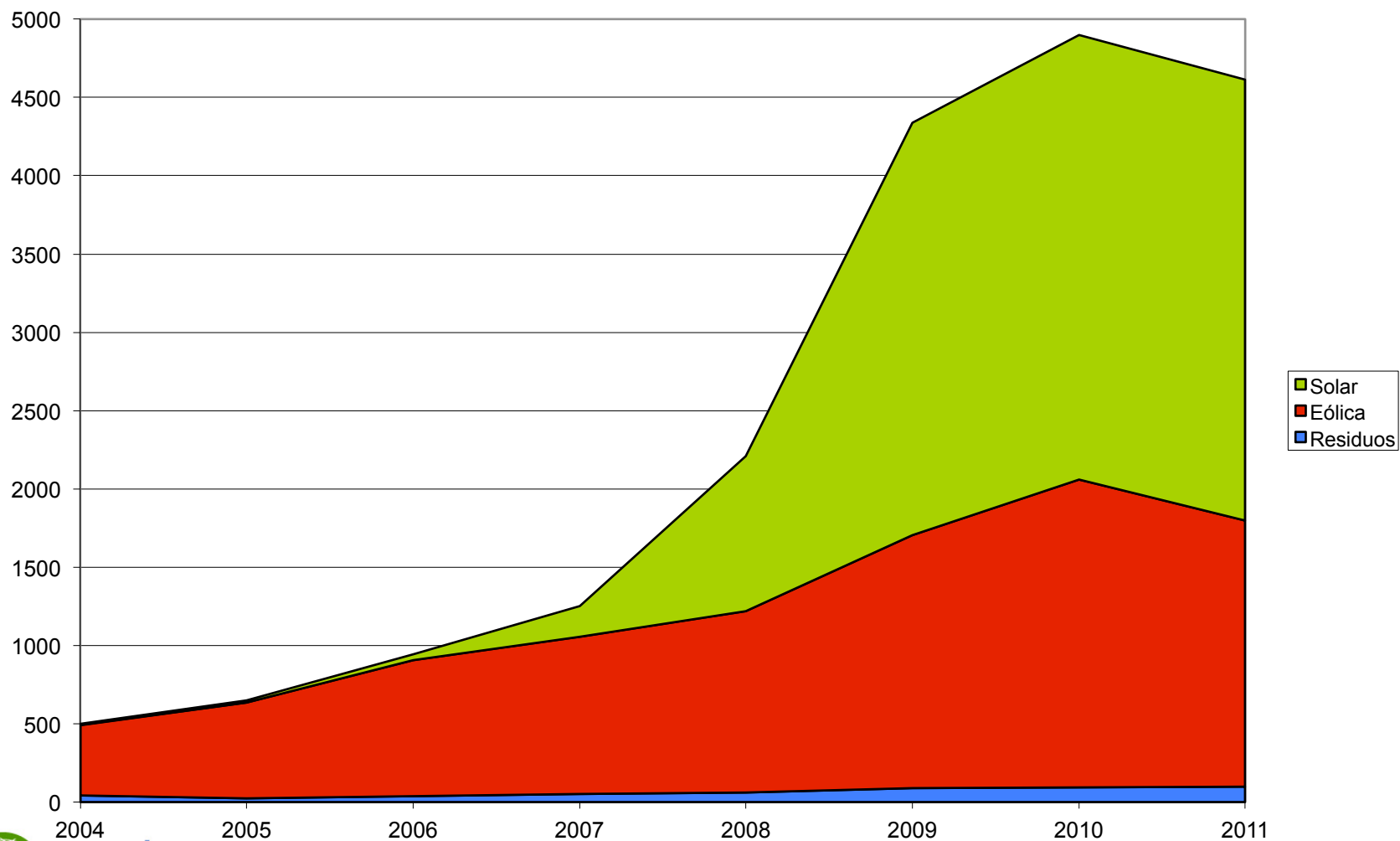
# Spanish public finances (deficit/superavit on GDP)



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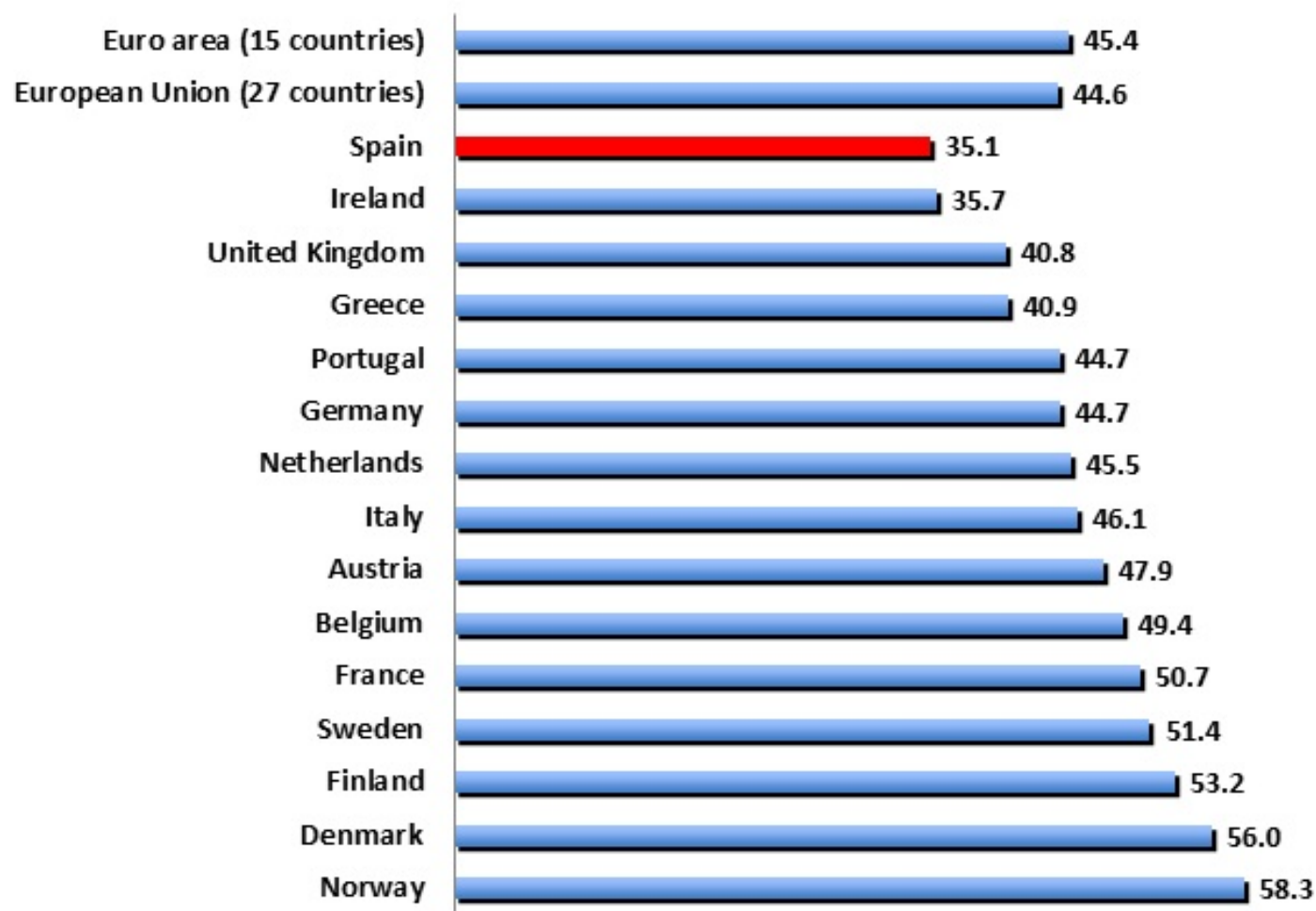
# Costs of renewable support (M€)



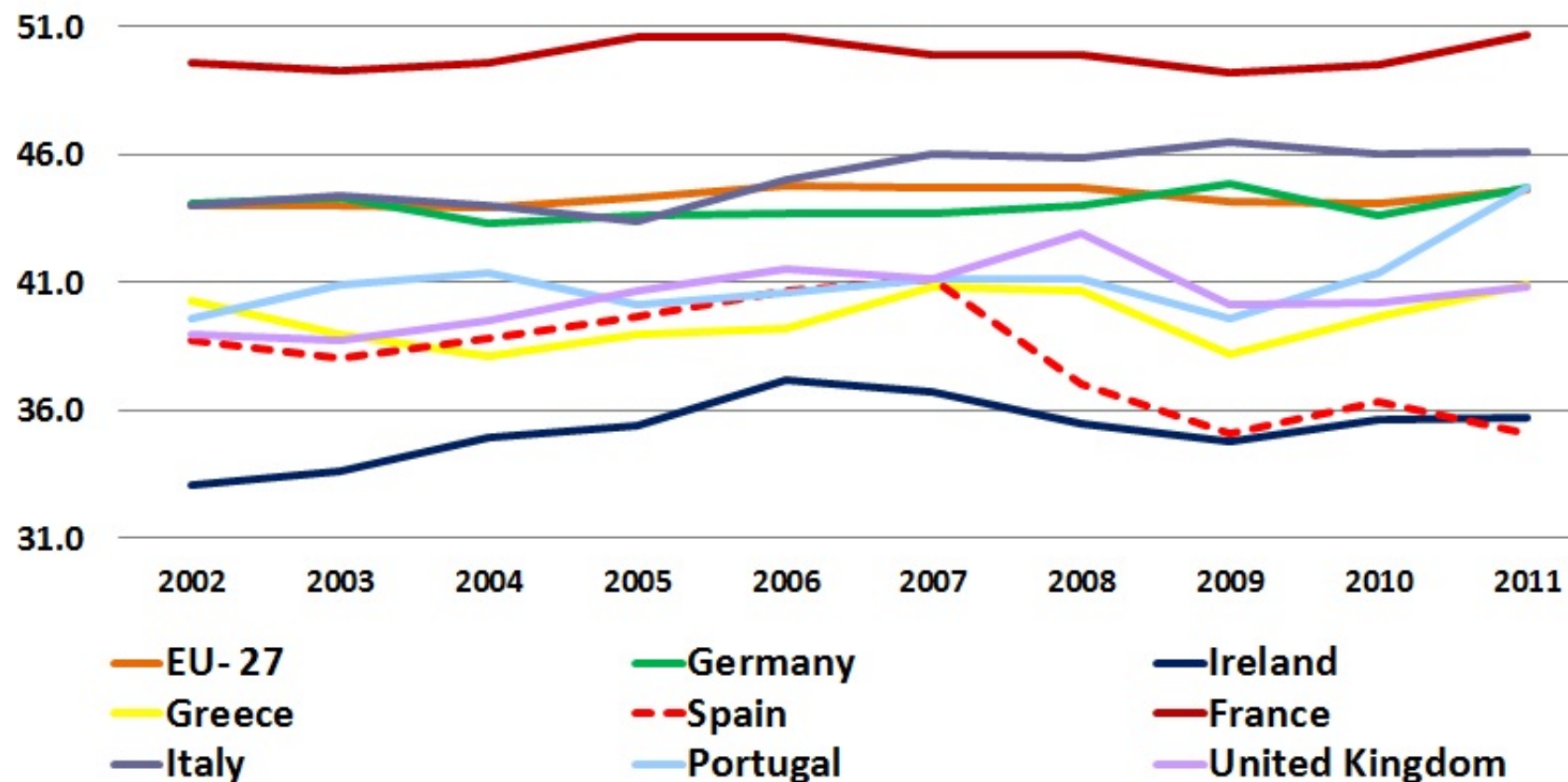
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**Figura 1. Ingresos sector público sobre PIB (2011)**



**Figura 2. Evolución Ingresos Fiscales sobre PIB (2002-2011)**





Millones de euros

	2004	2005	2006	2007	2008	2009	2010	2011
<b>1. Impuestos directos principales</b>	<b>73.742,2</b>	<b>87.217,9</b>	<b>100.020,7</b>	<b>117.437,4</b>	<b>98.642,5</b>	<b>84.045,4</b>	<b>83.174,9</b>	<b>86.414,0</b>
	100,0	118,3	135,6	159,3	133,8	114,0	112,8	117,2
Impuesto sobre la Renta de las Personas Físicas	47.722,3	54.722,6	62.813,1	72.614,3	71.341,1	63.856,9	66.977,1	69.803,0
	100,0	114,7	131,6	152,2	149,5	133,8	140,3	146,3
Impuesto sobre sociedades	26.019,9	32.495,3	37.207,6	44.823,2	27.301,4	20.188,5	16.197,8	16.611,0
	100,0	124,9	143,0	172,3	104,9	77,6	62,3	63,8
<b>2. Impuestos indirectos principales</b>	<b>62.021,0</b>	<b>67.892,6</b>	<b>73.254,1</b>	<b>75.637,1</b>	<b>67.590,7</b>	<b>52.915,7</b>	<b>68.892,7</b>	<b>68.285,0</b>
	100,0	109,5	118,1	122,0	109,0	85,3	111,1	110,1
I.V.A.	44.507,3	49.870,4	54.651,8	55.850,7	48.020,8	33.566,7	49.086,5	49.302,0
	100,0	112,0	122,8	125,5	107,9	75,4	110,3	110,8
<b>Impuestos Especiales</b>	<b>17.513,7</b>	<b>18.022,2</b>	<b>18.602,3</b>	<b>19.786,4</b>	<b>19.570,0</b>	<b>19.349,0</b>	<b>19.806,2</b>	<b>18.983,0</b>
	100,0	102,9	106,2	113,0	111,7	110,5	113,1	108,4
Hidrocarburos	10.122,8	10.210,0	10.413,8	10.715,0	10.152,0	9.851,3	9.913,0	9.289,0
	100,0	100,9	102,9	105,8	100,3	97,3	97,9	91,8
Electricidad	809,0	854,9	973,4	1.065,5	1.187,4	1.270,7	1.363,0	1.372,0
	100,0	105,7	120,3	131,7	146,8	157,1	168,5	169,6
Otros	6.581,9	6.957,4	7.215,1	8.006,0	8.230,6	8.227,0	8.530,0	8.322,0
	100,0	105,7	109,6	121,6	125,0	125,0	129,6	126,4



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# Comparatively lower energy taxation (2012)

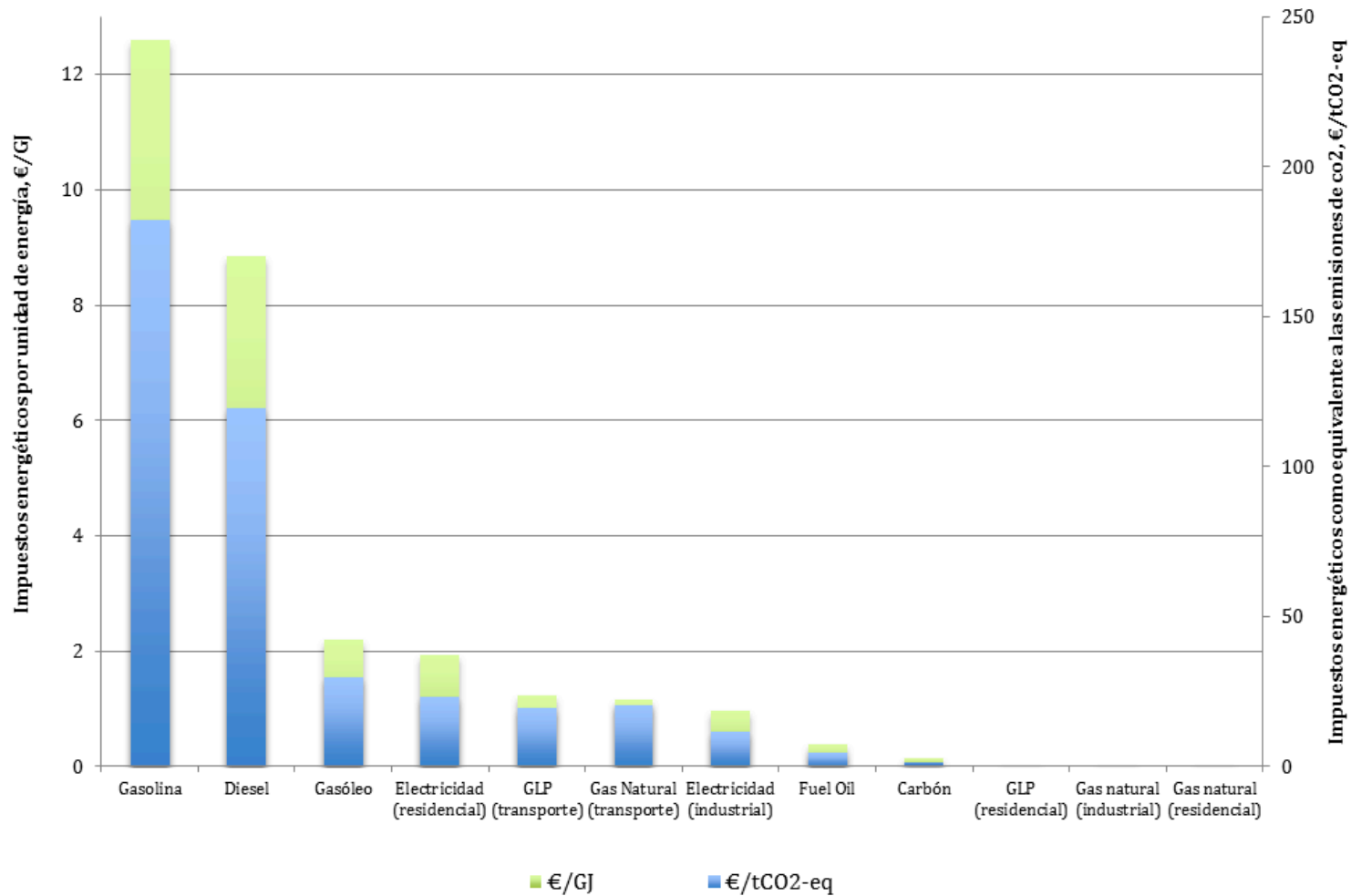
Impuestos sobre la energía (€) 2013	Fuelóleo ligero para hogares (por cada 1000 litros)				Gasóleo de automoción para uso no comercial (por litro)				Gasolina sin plomo (95 octanos) (por litro)				Gas natural para hogares (por cada MWh GCV)				Electricidad para hogares (por MWh)			
	Accisa	IVA (%)	Total	PPA (%)	Accisa	IVA (%)	Total	PPA (%)	Accisa	IVA (%)	Total	PPA (%)	Accisa	IVA (%)	Total	PPA (%)	Accisa	IVA (%)	Total	PPA (%)
Alemania	61,35	19,00	198,21	63,43	0,47	19,00	0,70	88,03	0,66	19,00	0,91	96,36	5,50	19,00	16,84	103,00	77,90*	19,00	119,90*	205,32
Austria	109,18	20,00	270,86	81,58	0,44	20,00	0,67	78,60	0,53	20,00	0,76	75,73	5,96*	20,00	17,68*	101,77	26,40	20,00	59,90	96,54
Bélgica	18,49*	21,00	173,53	51,06*	0,43*	21,00	0,69*	80,02	0,61*	21,00	0,91*	88,71	2,20*	21,00	14,20*	79,86	17,10*	21,00	50,70*	79,83
Dinamarca	347,48*	25,00	646,86	156,59*	0,40*	25,00	0,70*	66,03	0,58*	25,00	0,92*	73,86	30,15*	25,00	49,31*	228,17	108,30*	25,00	167,96*	217,59
Eslovenia	153,10*	20,00	323,00	129,20*	0,40*	20,00	0,62*	97,81	0,53*	20,00	0,77*	102,30	4,45*	20,00	17,34*	132,57	8,90*	20,00	34,00*	72,78
España	87,00	21,00	250,70	90,39	0,37	21,00	0,61	85,90	0,46	21,00	0,71	85,17	0,00*	21,00	13,67*	94,21	8,80**	21,00	41,10**	79,30
Estonia	110,95	20,00	280,49	130,55	0,39	20,00	0,62	112,90	0,42	20,00	0,65	99,61	2,47*	20,00	10,76*	95,73	14,60*	20,00	31,80*	79,21
Finlandia	160,53*	23,00	372,41	101,42*	0,47*	23,00	0,76*	81,00	0,65*	23,00	0,96*	86,79	8,13*	23,00	17,22*	89,64	17,00*	23,00	45,40*	66,17
Francia	56,60	19,60	214,87	63,96	0,44	19,60	0,66	77,33	0,61	19,60	0,87	85,79	1,19	19,60	11,30	64,29	26,87	19,60	48,29	76,92
Grecia	60,00*	23,00	242,98	88,86*	0,39*	23,00	0,67*	96,59	0,67*	23,00	0,99*	119,46	5,40*	13,00	15,04*	105,13	16,60*	13,00	32,60*	63,80
Hungría	n.d.	27,00	n.d.	n.d.	0,39*	27,00	0,71*	156,41	0,43*	27,00	0,74*	137,48	0,00*	27,00	9,73*	104,20	5,05*	27,00	39,11*	117,30
Irlanda	88,66*	13,50	219,70	66,96*	0,48*	23,00	0,77*	91,95	0,59*	23,00	0,89*	89,86	3,39*	13,50	11,41*	66,46	0,00*	13,50	25,00*	40,77
Italia	403,21*	21,00	655,26	212,34*	0,61	21,00	0,90	114,54	0,72	21,00	1,03	110,25	n.d.	21,00	26,67***	165,19	48,10*	10,00	68,50*	118,79
Luxemburgo	10,00*	12,00	97,27	26,21*	0,33*	15,00	0,49*	52,16	0,46*	15,00	0,64*	57,31	1,08**	6,00	4,07**	20,96	13,20**	6,00	22,20**	32,01
Países Bajos	254,42****	21,00	360,89	111,31****	0,44*	21,00	0,67*	81,22	0,74*	21,00	1,02*	104,53	17,05*	21,00	29,59*	174,44	7,80*	21,00	38,00*	62,72
Polonia	55,50*	23,00	240,67	136,26*	0,35*	23,00	0,60*	132,96	0,40*	23,00	0,65*	122,46	0,00*	23,00	10,19*	110,29	4,78*	23,00	32,56*	98,65
Portugal	292,50*	23,00	534,30	220,61*	0,37*	23,00	0,64*	103,23	0,58*	23,00	0,89*	121,88	0,00*	23,00	14,88*	117,43	0,00*	23,00	37,90*	83,74
Reino Unido	137,35*	5,00	178,90	54,63*	0,72*	20,00	1,01*	120,38	0,72*	20,00	0,99*	100,40	0,00*	5,00	2,72*	15,90	0,00*	5,00	8,14*	13,30
República Checa	26,28*	20,00	257,16	119,80*	0,44*	20,00	0,68*	123,79	0,51*	20,00	0,75*	116,52	0,00*	20,00	11,36*	101,19	1,19*	20,00	27,00*	67,31
República Eslovaca	n.d.	20,00	n.d.	n.d.	0,37*	20,00	0,61*	115,27	0,52*	20,00	0,77*	123,85	0,00*	20,00	8,87*	81,89	0,00*	20,00	28,90*	74,70
Suecia	450,43	25,00	766,62	192,50	0,51*	25,00	0,85*	83,41	0,62*	25,00	0,96*	79,71	30,52*	25,00	54,47*	261,42	31,49*	25,00	66,32*	89,12
Media ponderada (PPA)	178,00	18,70	390,63	100,00	0,64	20,81	1,00	100,00	0,81	20,81	1,18	100,00	3,63	18,45	20,44	100,00	35,77	17,02	73,00	100,00



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# Heterogeneous energy taxation



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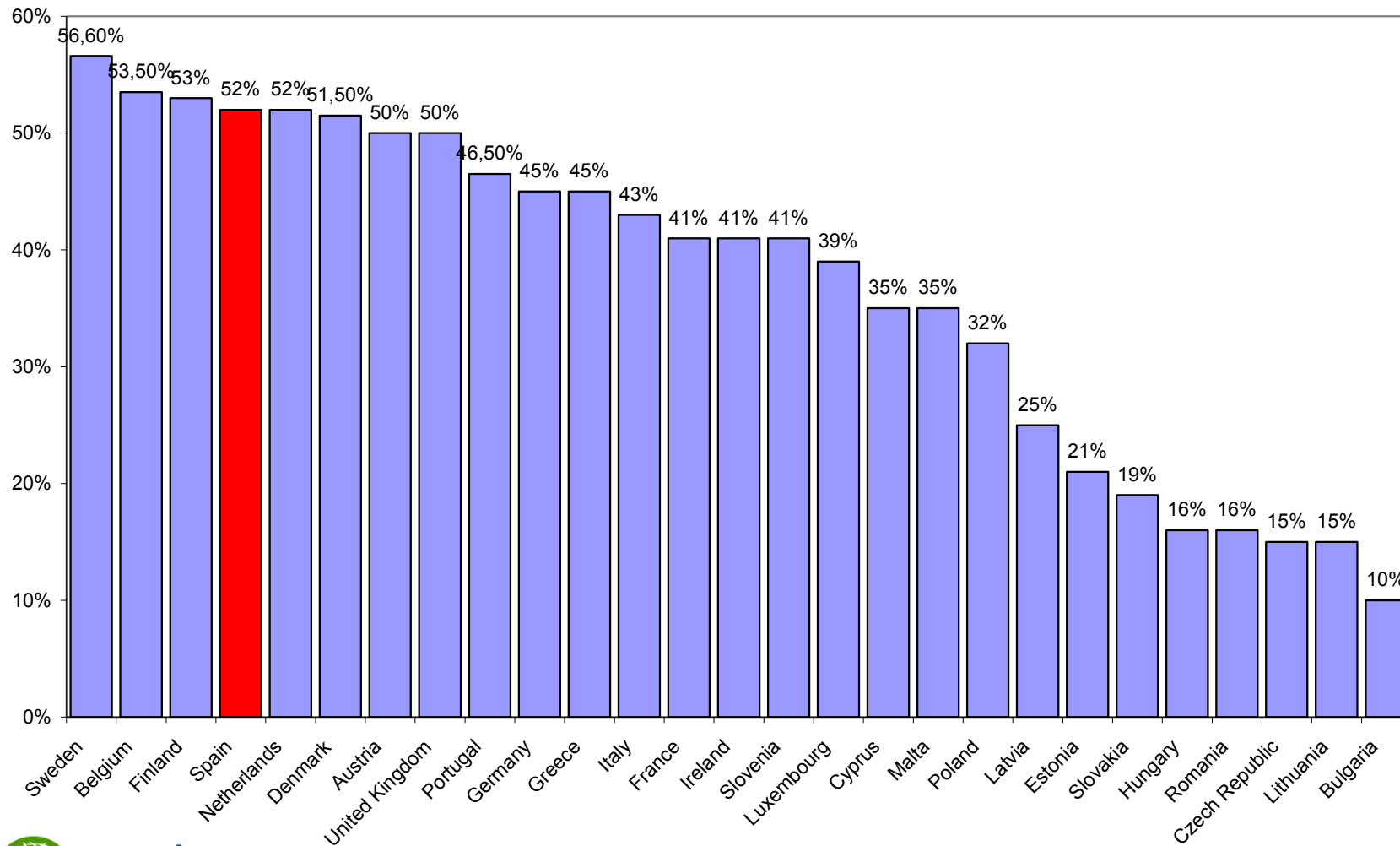
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# Spanish anomalies

- ❑ **Low levels of energy taxes**
  - January 2012 increases of personal income tax and other minor taxes;  
September 2012 VAT increase
  - IMF & EC continuous recommendations to raise energy/environmental taxes
  - December 2012 New “environmental” taxes on electricity producers and natural gas
  
- ❑ **Regional involvement in energy taxation**

# Income taxation in the EU



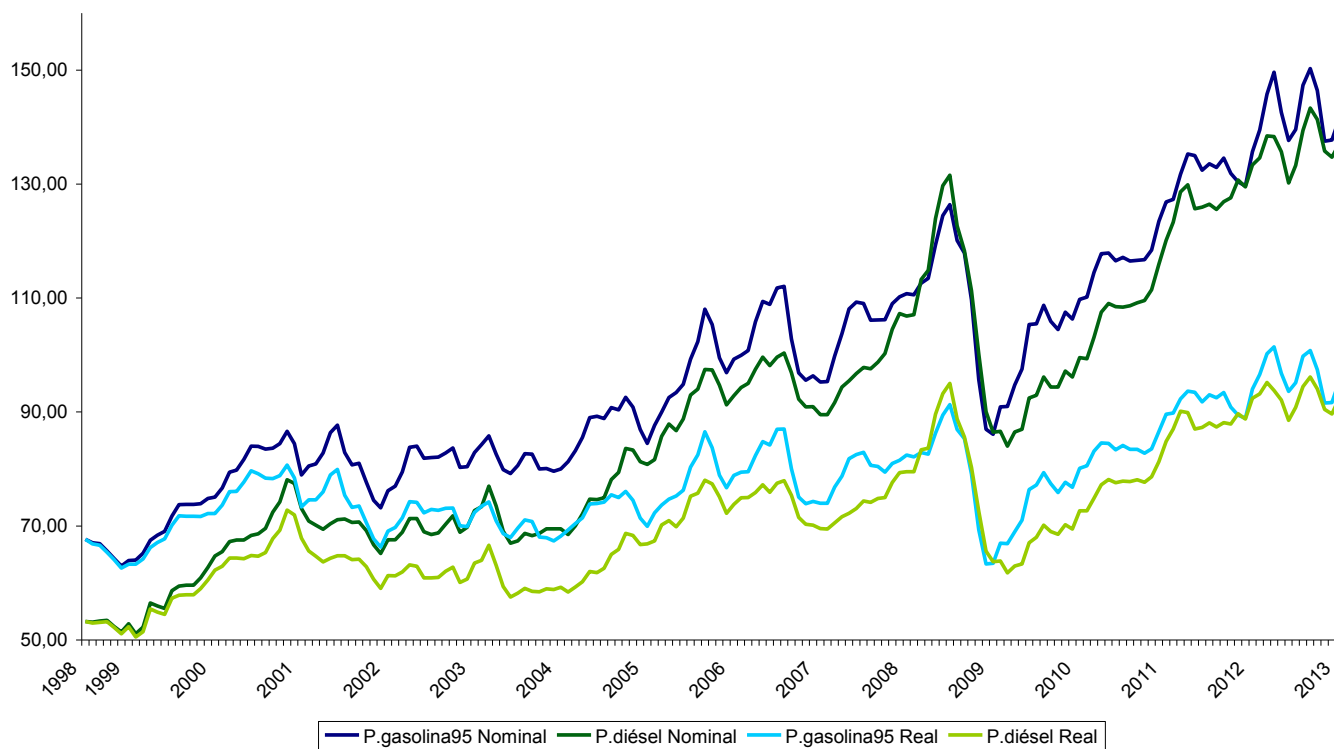
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# The Spanish anomalies (1)

- ❑ **Low energy taxation**
  - **Positive results from academic simulations**
    - ❑ Environmental effectiveness
    - ❑ Distributional effects
    - ❑ Economic dividend
  - **Political constraints?**
    - ❑ Competitiveness and growth
    - ❑ Social preferences
      - Results from a CV study on Spanish CC policies
    - ❑ Fiscal inertia

# Evolution of car fuels in Spain (1998-2013)

Evolución precios carburantes España 1998-2013 (€/l)



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# Academic Literature

- ❑ **General simulations for Spain (within EU modeling)**
  - Carraro et al. (JPE, 1996); Barker and Köhler (1998); Conrad and Schmidt (1998); Bosello and Carraro (Energy Economics, 2001), mainly through GEM
  - Broadly positive effects (employment, GDP) when recycling carbon tax revenues (usually designed to achieve -10% reductions of EU CO<sub>2</sub> emissions) to reduce labour taxes (social security contributions paid by employers)





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# Academic Literature

## □ Specific simulations for Spain

- Labandeira and Labeaga (*Fiscal Studies*, 1999): input-output + microsimulation (after energy demand estimation); Labandeira and Labeaga (*Energy Policy*, 2002) input-output price-effects; Labandeira et al. (*European Environment*, 2004) GEM+microsimulation; Labandeira and Rodríguez (*Climate Policy*, 2010) GEM. Recent demand results: Labandeira et al. (*Energy Journal*, 2006), Labandeira et al. (*Energy Economics*, 2012)
- Environmental effectiveness (reaction); broadly positive effects (employment, GDP) when recycling carbon tax receipts to reduce distortionary taxes; efficiency gains from extending the EU ETS to non subject sectors; (decreasing) trend to proportionality (slight regressivity)
- Results confirmed by Gallastegui et al. (*Series*, 2011), González-Eguino (*Ecological Economics*, 2011) and Manresa and Sancho (*Energy Policy*, 2005) through GEM and different alternatives



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WP 01/2013

Transport, Climate Change,  
and Policy Intervention:  
A Study of Social Preferences  
in Spain

María L. Loureiro  
Xavier Labandeira  
Michael Hanemann

[http://www.eforenergy.org/docpublicaciones/  
documentos-de-trabajo/WP01-2013.pdf](http://www.eforenergy.org/docpublicaciones/documentos-de-trabajo/WP01-2013.pdf)



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# The study on Spanish preferences

- ❑ Hanemann, Labandeira and Loureiro (2011a, 2011b, 2013)
- ❑ CV application to assess policy options, with exploration of attitudinal questions
- ❑ Questions on electricity and transport influenced by
  - ❑ Focus groups
  - ❑ Positive WTP for electricity and transport policies



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## The Spanish anomalies (2)

- ❑ **Subnational growing use of (energy-related) environmental taxes**
  - **Why?**
  - **Strange recent (inefficient) experiences: Regional taxes on hydro generators and on windmills**
  - **Another reason to act in this area (use of extra revenues to compensate regions)**



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## A simulation

- ❑ **Based on the Directive proposal (April 2011) on harmonized energy taxation**
- ❑ **Energy and CO<sub>2</sub> components**
- ❑ **Objective for Spain: Taxation of all energy goods (energy efficiency), the increase of transport taxes to EU average levels, with an equal tax treatment of petrol and diesel.**



# Distributional concerns

		Simulación A	Simulación B
Recaudación adicional	Total <sup>a</sup> (M€)	6.127,85	8.583,45
	Media hogar <sup>b</sup> (€)	141,82	314,40
Modificación de la renta disponible (media por hogar, en %)	Decila 1	-1,26	-1,43
	Decila 2	-1,08	-1,74
	Decila 3	-0,80	-1,39
	Decila 4	-0,82	-1,70
	Decila 5	-0,66	-1,43
	Decila 6	-0,65	-1,58
	Decila 7	-0,63	-1,52
	Decila 8	-0,57	-1,42
	Decila 9	-0,52	-1,28
	Decila 10	-0,39	-0,99
Media	-0,61	-1,35	
Efecto redistributivo (índice de Reynolds-Smolensky)		-0,0010698	-0,0011550

Compensación 3 primeras decilas			
Compensac. necesaria	Total (M€)	497,65	759,26
	Media hogar (€)	96,58	147,36
Modificación de la renta disponible (media por hogar, en %)	Decila 1	0,00	+0,49
	Decila 2	0,00	-0,09
	Decila 3	0,00	-0,18
Efecto redistributivo (índice de Reynolds-Smolensky)		0,0001851	0,0007716
Compensación 5 primeras decilas			
Compensac. necesaria	Total (M€)	927,7	1.667,00
	Media hogar (€)	108,5	194,16
Modificación de la renta disponible (media por hogar, en %)	Decila 1	+0,03	+0,89
	Decila 2	+0,03	+0,25
	Decila 3	+0,02	+0,07
	Decila 4	-0,03	-0,27
	Decila 5	-0,01	-0,26
Efecto redistributivo (índice de Reynolds-Smolensky)		0,0007722	0,0021752

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# Some comparisons

- ❑ **Combined A+B potential revenue increase: + 11.700 M€ (+90% over 2010)**
- ❑ **Other consolidation efforts**
  - **Greece: +42% increase in energy tax revenues (2011/2008)**
  - **Italy: +27% (petrol) and +43% (diesel) increases (June 2012/April 2011)**
- ❑ **Previous Spanish revenue increases:**
  - **Zapatero's 2010/11 tax rises: VAT + 5500 M€, IT +200 M€**
  - **Rajoy's 2012 tax rises: VAT +7500 M€, IT +5300 M€, 'Environment' 3000 M€**
  - **Regional energy and energy-environmental taxes (2012): 250 M€**

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# Conclusions

- ❑ **Current state of IPCC's WG3, AR5**
- ❑ **New trends and perspectives in energy taxation and green tax reforms for climate change mitigation**
- ❑ **The behavior of Spanish governments towards energy taxes has been reactive and completely unrelated to the positive signals from several angles. This may be solved by following the new developments in this area.**



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**THANKS**

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