

# A NEW GENERATION OF ENERGY TAXES AND GREEN TAX REFORMS

**Xavier Labandeira**

Economics for Energy and rede, University of Vigo

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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



# 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



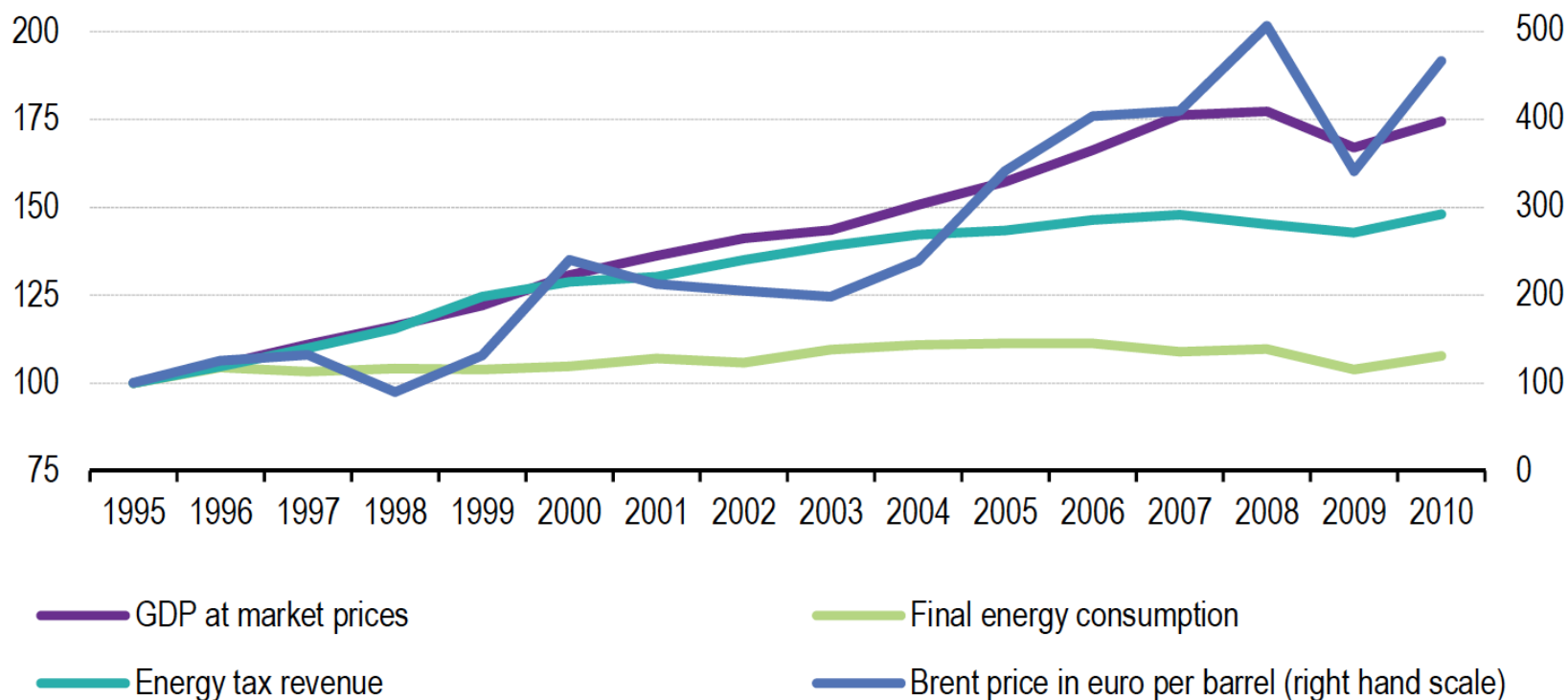
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# Reasons for energy taxes (*Limits*)

- ❑ **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



# 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

WP FA04/2012

## Climate Change, Buildings and Energy Prices

Alberto Gago, Michael Hanemann, Xavier Labandeira,  
Ana Ramos

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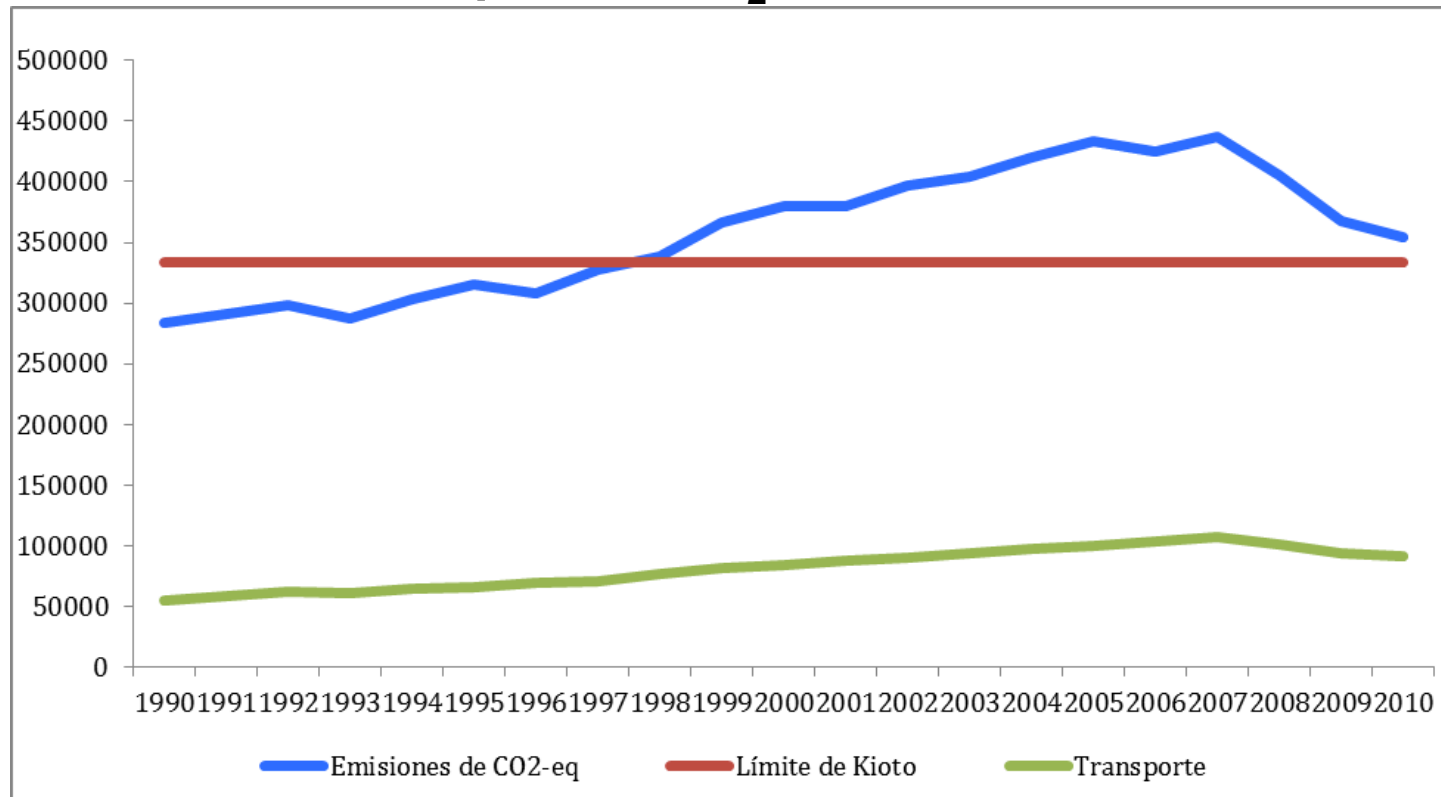


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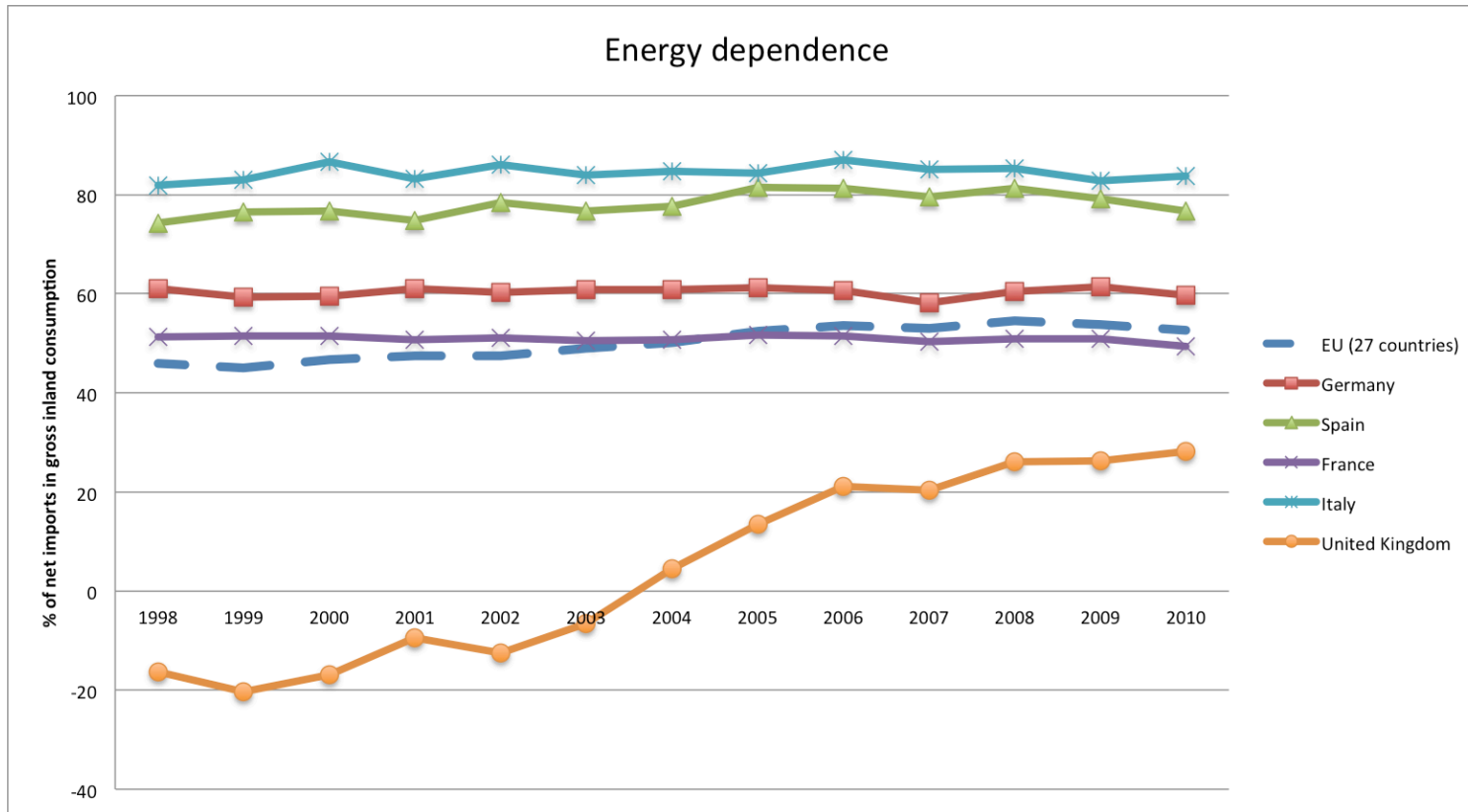
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# Spain: A picture

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



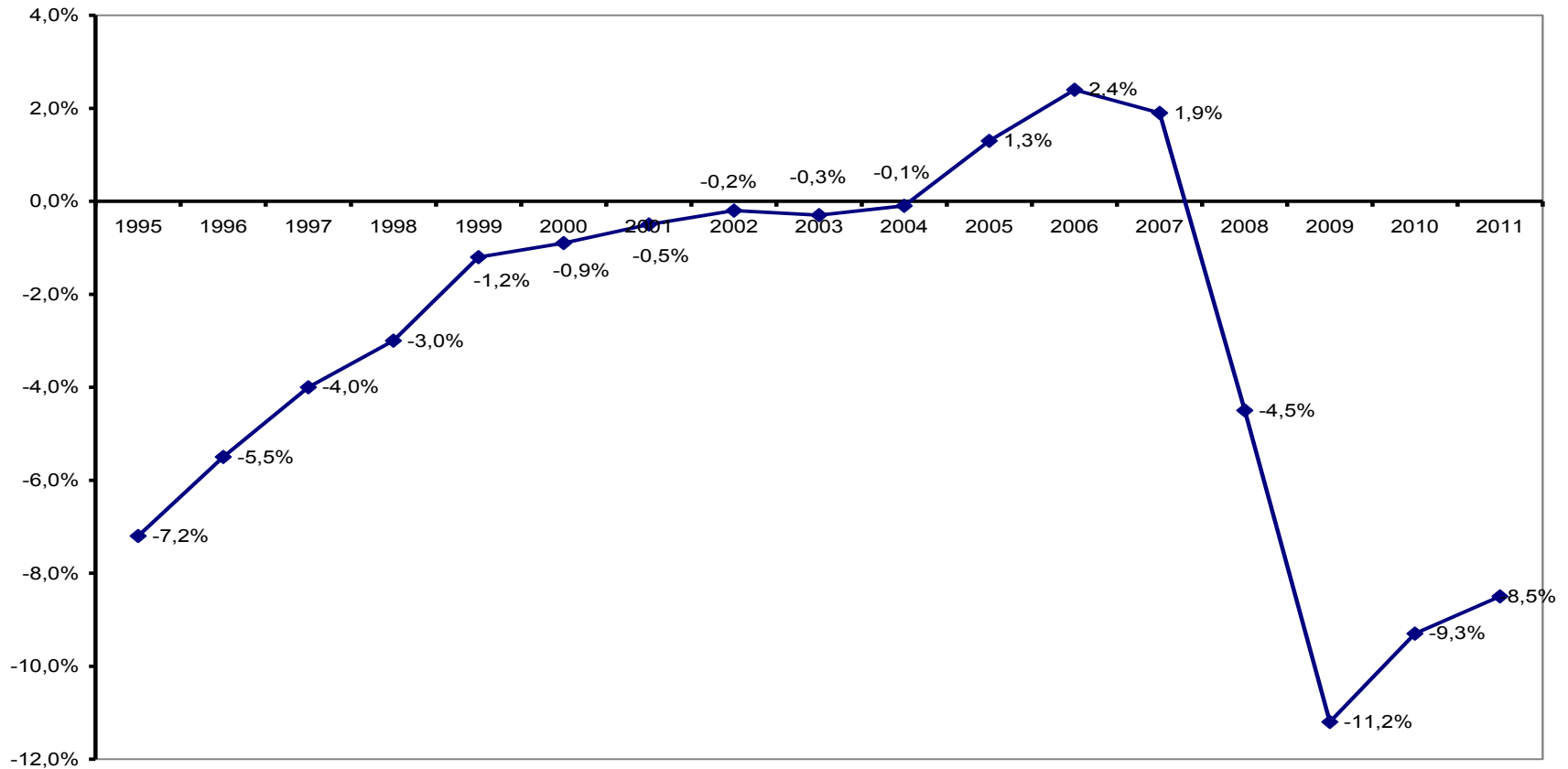
# Spanish energy dependence



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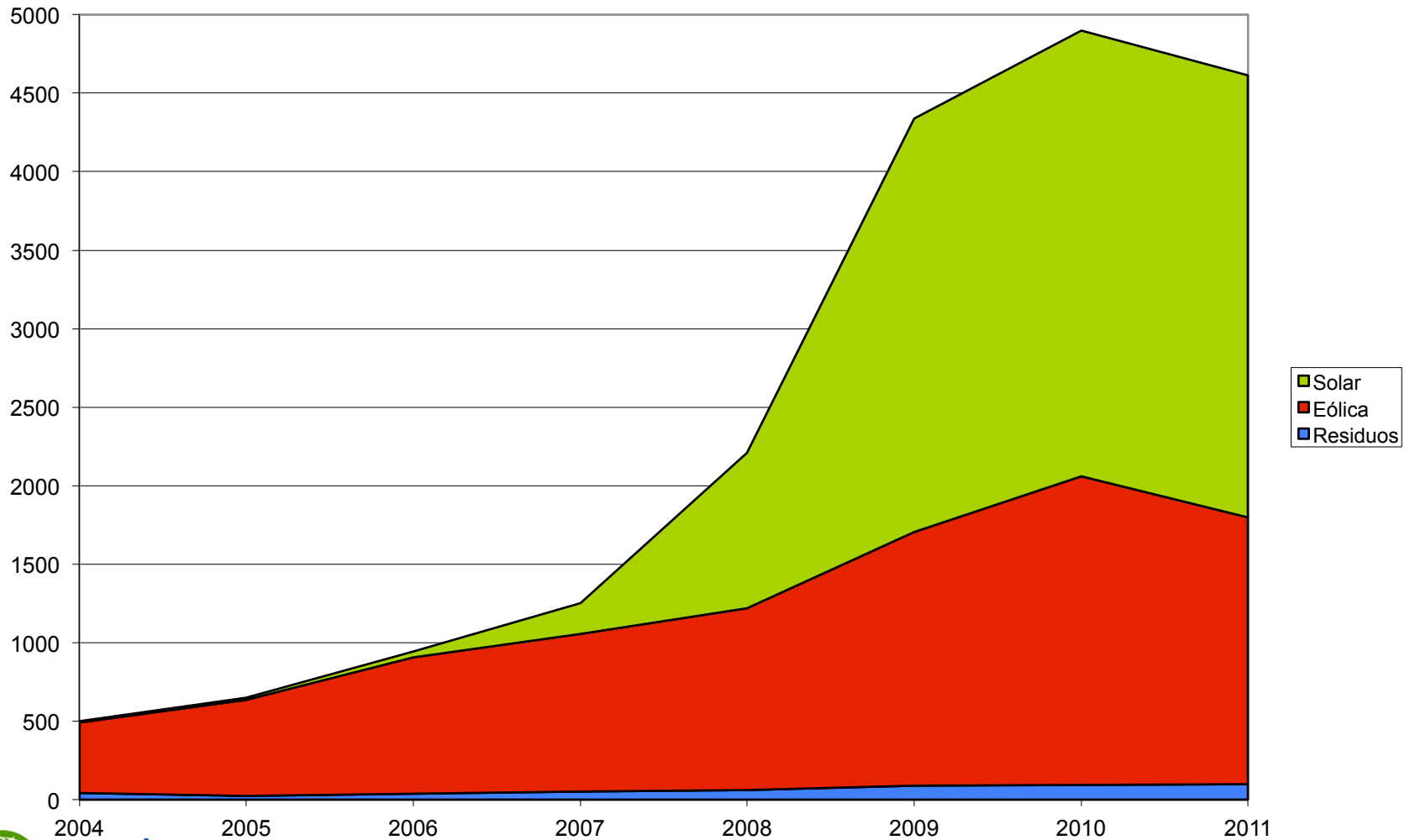
# Spanish public finances (deficit/superavit on GDP)



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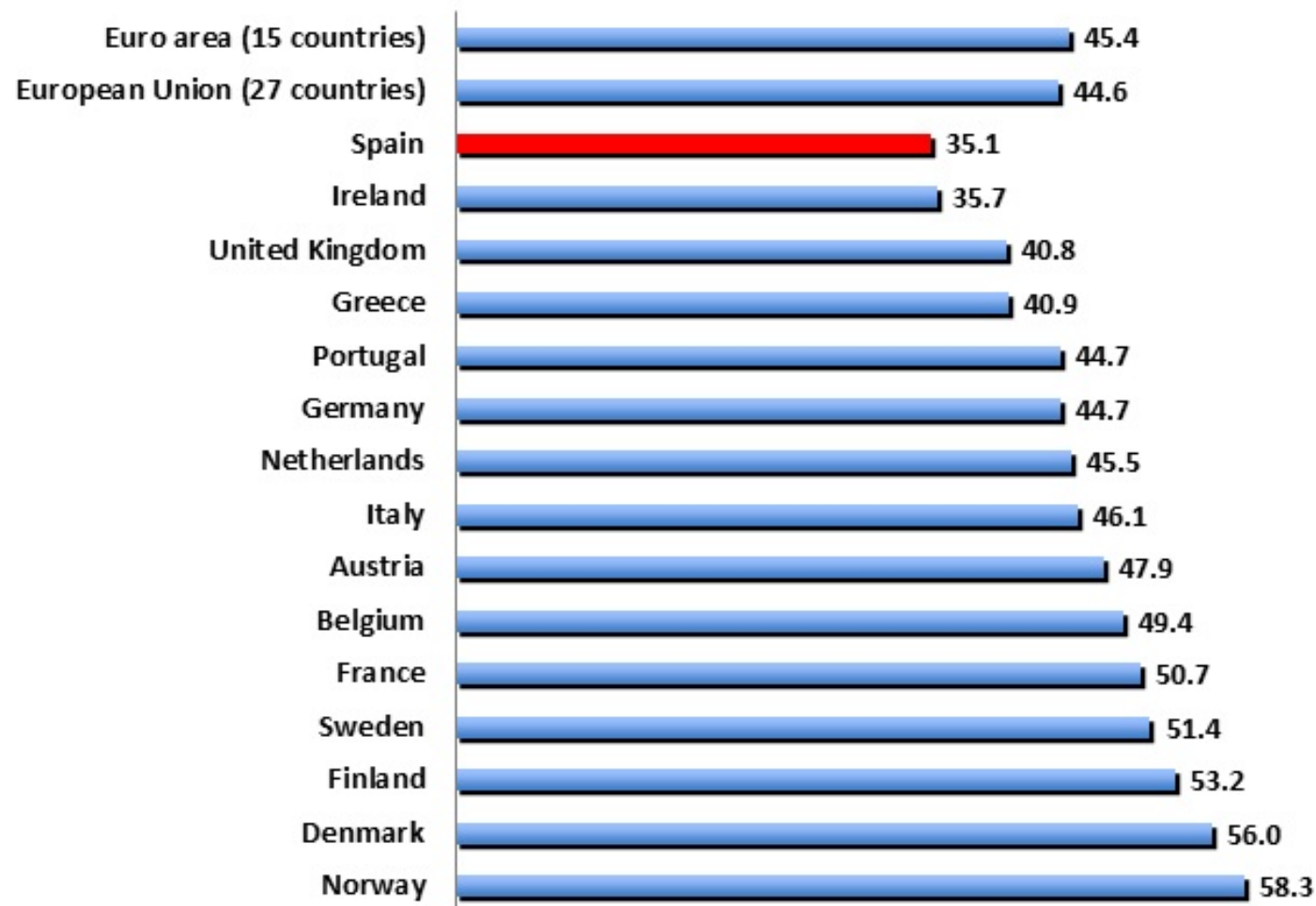
# Costs of renewable support (M€)



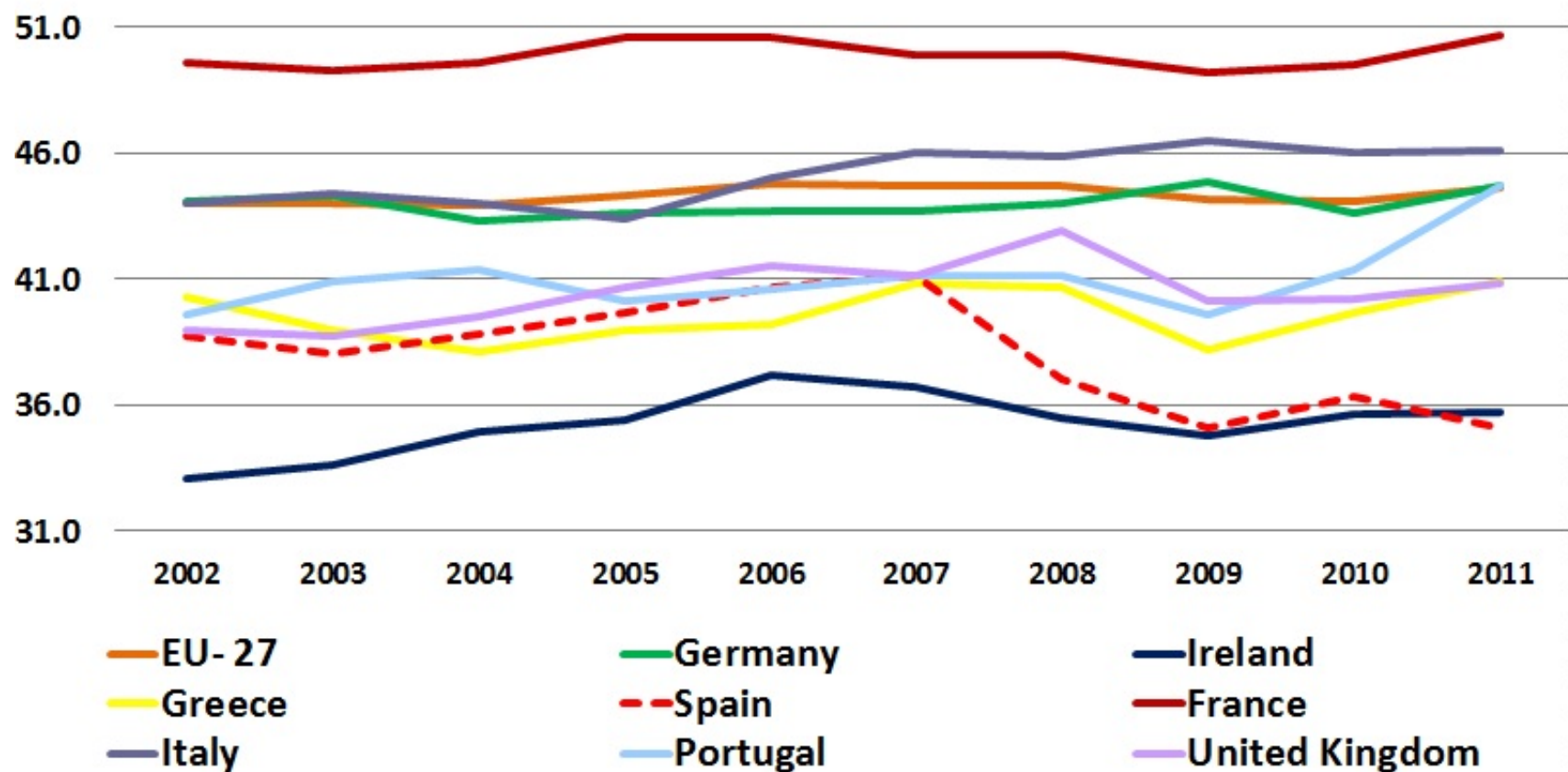
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**Figura 1. Ingresos sector público sobre PIB (2011)**



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



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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
Impuestos Especiales	17.513,7	18.022,2	18.602,3	19.786,4	19.570,0	19.349,0	19.806,2	18.983,0
	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

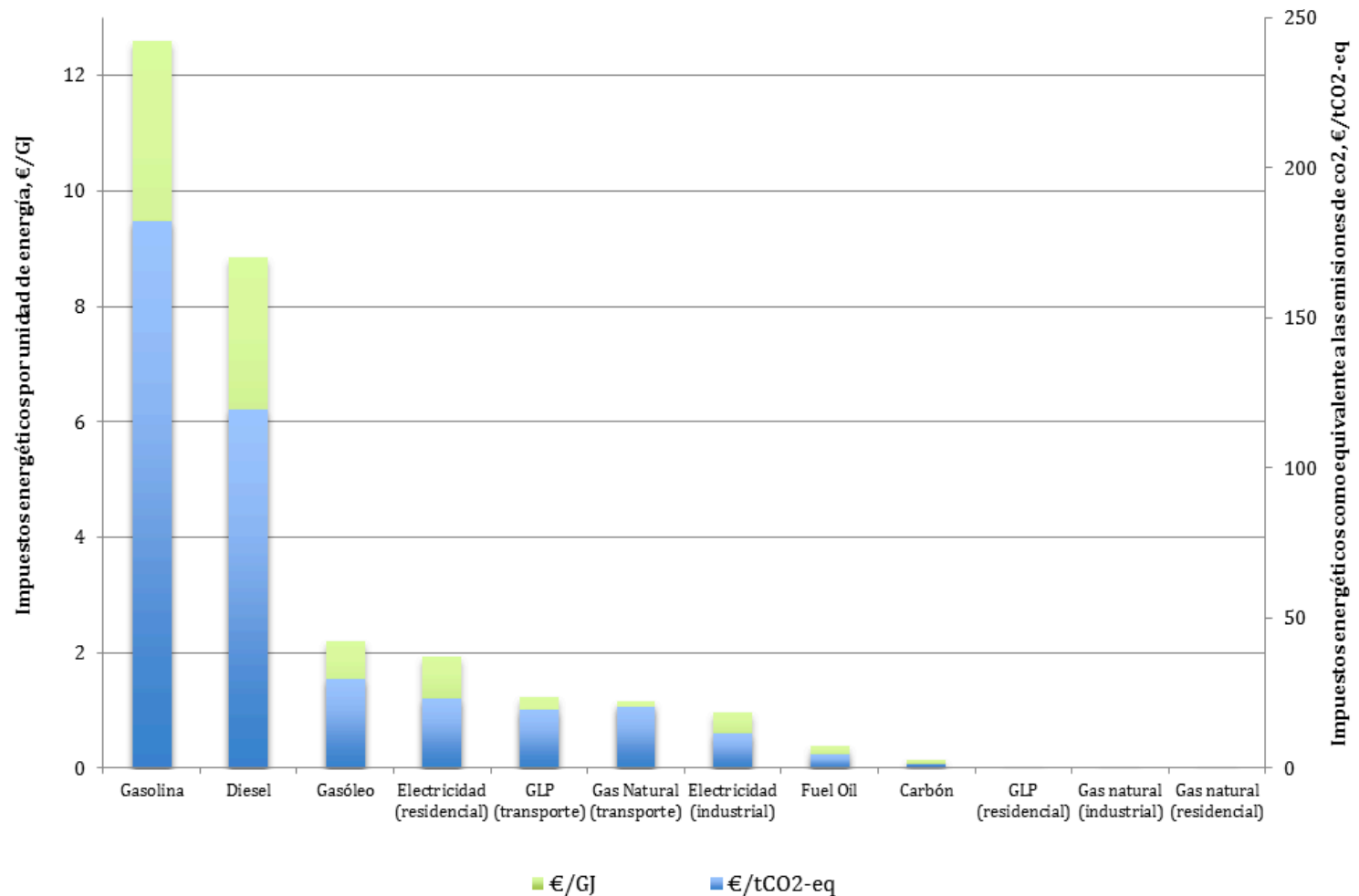
Impuestos sobre la energía (€) 2011	Fuelóleo ligero para hogares (por cada 1000 litros)				Gasóleo de automoción para uso no comercial (por litro)				Gasolina sin plomo (95 octanos) (por litro)				Gas natural para hogares (por cada MWh GCV)				Electricidad para hogares (por kWh)			
	Accisa	IVA (%)	Total	PPA	Accisa	IVA (%)	Total	PPA	Accisa	IVA (%)	Total	PPA	Accisa	IVA (%)	Total	PPA	Accisa	IVA (%)	Total	PPA
Alemania	61,35	19,00	191,67	63,69	0,47	19,00	0,70	93,64	0,66	19,00	0,90	100,25	5,50	19,00	16,13	110,94	0,073	19,00	0,113	220,36
Austria	109,18	20,00	262,81	82,19	0,44	20,00	0,66	83,08	0,53	20,00	0,78	81,10	5,96	20,00	16,48	106,68	0,021	20,00	0,053	98,09
Bélgica	18,49	21,00	159,43	48,71	0,42	21,00	0,67	83,14	0,61	21,00	0,90	91,47	1,83	21,00	11,66	73,74	0,017*	21,00	0,048*	85,25
Dinamarca	338,89	25,00	616,95	156,36	0,39	25,00	0,67	68,91	0,57	25,00	0,89	75,39	28,79*	25,00	47,62	249,82	0,106	25,00	0,165	246,31
Eslovenia	130,50	20,00	282,60	119,24	0,36	20,00	0,57	96,59	0,45	20,00	0,66	93,08	4,45	20,00	16,29	142,27	0,010	20,00	0,035	85,51
España	85,80	18,00	217,10	81,28	0,35	18,00	0,54	81,62	0,44	18,00	0,64	80,47	0,00	18,00	9,79	75,87	0,006*	18,00	0,028*	60,48
Estonia	110,95	20,00	267,75	134,29	0,39	20,00	0,60	122,30	0,42	20,00	0,63	105,46	2,28	20,00	8,75	90,84	0,012	20,00	0,028	82,78
Finlandia	160,53	23,00	360,43	100,85	0,37	23,00	0,62	70,15	0,63	23,00	0,92	85,92	8,13	23,00	16,49	95,51	0,017	23,00	0,046	75,11
Francia	56,60	19,60	202,00	61,72	0,44	19,60	0,66	80,92	0,61	19,60	0,86	87,39	1,12	19,60	10,12	64,00	0,020	19,60	0,040	71,57
Grecia	40,50	23,00	204,39	76,52	0,41	23,00	0,68	103,39	0,67	23,00	0,98	122,33	1,80	13,00	10,73	83,15	0,012*	13,00	0,023*	50,36
Hungría	n.d	25,00	n.d	n.d	0,37	25,00	0,65	147,36	0,45	25,00	0,73	136,40	0,00	25,00	9,29	108,18	0,003	25,00	0,036	120,55
Irlanda	88,66	13,50	209,23	66,21	0,45	23,00	0,70	88,79	0,54	23,00	0,80	84,60	2,77	13,50	9,71	63,60	0,000	13,50	0,022	41,27
Italia	403,21	21,00	631,98	209,99	0,46	21,00	0,70	94,31	0,60	21,00	0,86	95,37	n.d	20,00	26,67*	183,43	0,039	10,00	0,057	110,67
Luxemburgo	10,00	12,00	89,15	25,48	0,32	15,00	0,47	54,47	0,46	15,00	0,63	60,10	1,06*	6,00	3,56	21,06	0,020*	6,00	0,029*	49,03
Países Bajos	254,42*	19,00	360,89*	115,58	0,43	19,00	0,65	83,40	0,72	19,00	0,99	105,39	16,77	19,00	27,88	184,82	0,006	19,00	0,033	62,46
Polonia	58,10	23,00	230,38	130,77	0,32	23,00	0,56	127,98	0,42	23,00	0,66	124,16	0,00	23,00	8,49	99,75	0,005	23,00	0,033	108,38
Portugal	245,20	23,00	366,70	154,72	0,36	23,00	0,62	105,79	0,58	23,00	0,87	122,80	0,00	23,00	6,63	57,91	0,000	23,00	0,016	40,65
Reino Unido	130,26	5,00	168,01	58,08	0,68	20,00	0,95	132,20	0,68	20,00	0,94	108,07	0,00	5,00	2,25	16,09	0,000	5,00	0,007	14,43
República Checa	26,12	20,00	239,64	115,81	0,43	20,00	0,66	128,63	0,51	20,00	0,74	118,78	0,00	20,00	9,66	96,67	0,001	20,00	0,026	73,02
República Eslovaca	n.d	20,00	n.d	n.d	0,37	19,00	0,59	122,18	0,52	19,00	0,76	129,15	0,00	19,00	8,25	87,30	0,000	19,00	0,029	87,08
Suecia	399,83	25,00	670,40	190,78	0,45	25,00	0,75	85,71	0,55	25,00	0,84	79,87	23,78*	25,00	45,03	265,24	0,028*	25,00	0,061*	102,34
Media ponderada (PPA)	143,60	19,77	301,66	100,00	0,41	21,03	0,65	100,00	0,55	21,03	0,81	100,00	5,21	18,91	15,31	100,00	0,02	18,43	0,04	100,00



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# Heterogeneous energy taxation



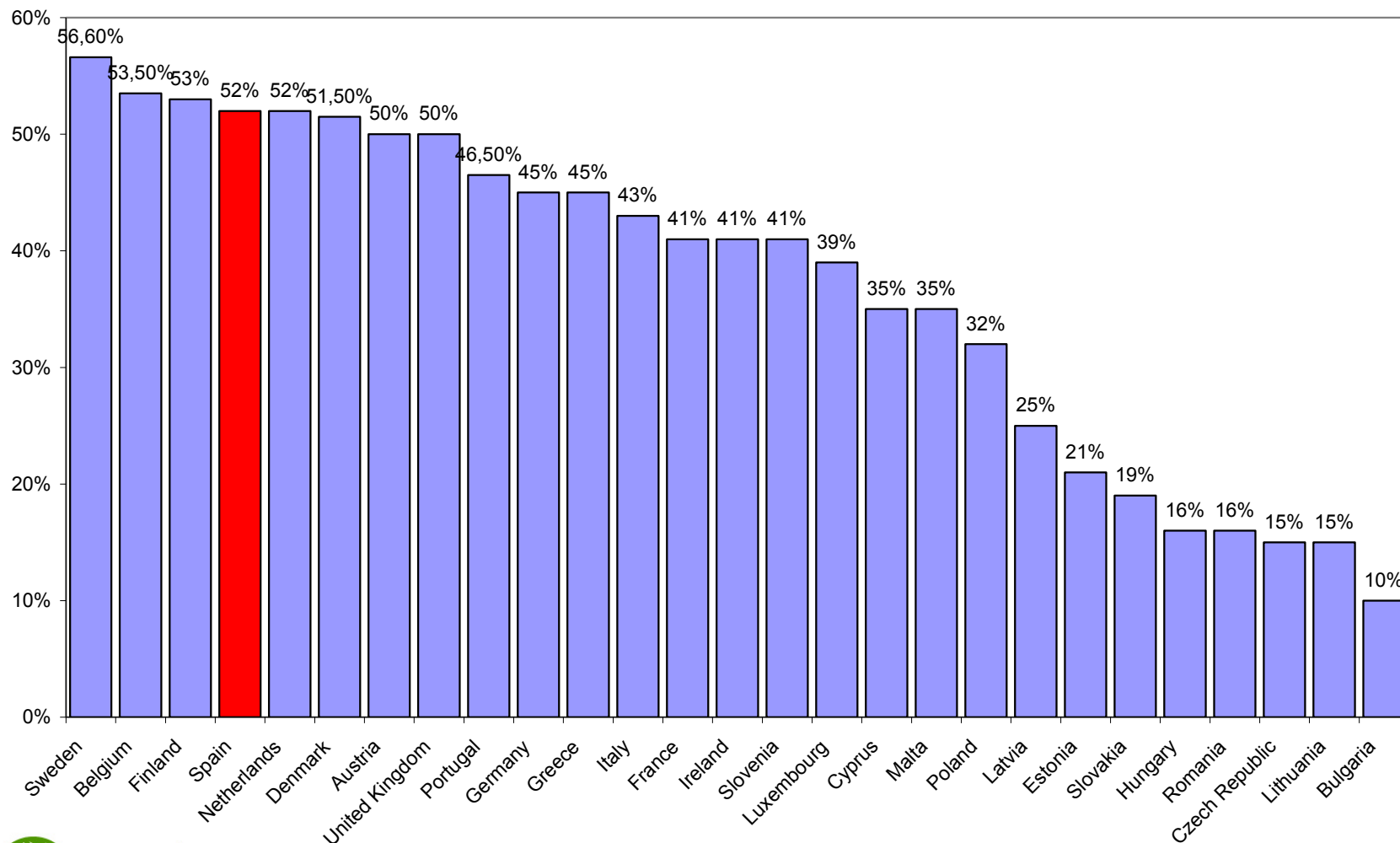
# Spanish anomalies

## ❑ 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



# 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**

# 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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Preferencias Sociales sobre  
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Evidencia para España

Michael Hanemann  
Xavier Labandeira  
María L. Loureiro

info@eforenergy.org  
www.eforenergy.org  
917208433

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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)**

# 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.

# Results

## Tax simulations on energy content (A) and transport (B)

	Base case 2010				Simulation A: energy component without transport					Simulation B: transport				
	Current tax rates	Tax rates (energy)	VAT on excises	Total	Tax rates (CO2)	Tax rates (energy)	Tax rates (CO2+energy)	VAT on excises	Total	Tax rates (CO2)	Tax rates (energy)	Tax rates (CO2+energy)	VAT on excises	Total
	€/GJ	€/GJ	Million €	Million €	€/GJ	€/GJ	€/GJ	Million €	Million €	€/GJ	€/GJ	€/GJ	Million €	Million €
Petrol	0,403 €/litre	12,558	399,86	2.352,09	1,384	9,600	10,984	370,32	2.057,34	1,384	13,685	15,069	508,05	2.822,51
Diesel	0,307 €/litre	8,575	1.173,18	6.901,05	1,480	8,200	9,680	1.402,19	7.789,96	1,480	13,685	15,165	2.196,74	12.204,13
Subsidized diesel	0,079 €/litre	2,199	95,16	559,79	1,480	3,000	4,480	205,35	1.140,81	1,480	3,000	4,480	205,35	1.140,81
Total liquid fuels			1.668,20	9.812,93				1.977,86	10.988,12				2.910,14	16.167,45
Total Electricity	5,60 €/MWh	1,556	234,76	1.380,95	0,000	3,000	3,000	479,39	2.663,27	0,000	1,556	1,556	248,57	1.380,95
LPG (except transport sector)	0,00	0,000	0,00	0,00	1,260	3,000	4,260	79,64	442,44	1,260	0,150	1,410	26,36	146,44
Natural gas (except transport sector)	0,00	0,000	0,00	0,00	1,122	3,000	4,122	395,69	2.198,29	1,122	0,150	1,272	122,11	678,37
Total LPG and natural gas				0,00				475,33	2.640,73				148,47	824,81
Main fuels and electricity taxes			1.902,96	11.193,89				2.932,58	16.292,12				3.307,18	18.373,21
Total revenues			13.096,85				19.224,70					21.680,39		

Note: Assuming consumption of 2010 and not including País Vasco and Navarra.

Source: Compiled from AEAT (2011), IDAE (2010) and European Commission (2007)

# Distributional concerns

		Simulación A	Simulación B
<b>Recaudación adicional</b>	Total <sup>a</sup> (M€)	6.127,85	8.583,45
	Media hogar <sup>b</sup> (€)	141,82	314,40
<b>Modificación de la renta disponible (media por hogar, en %)</b>	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
<b>Efecto redistributivo (índice de Reynolds-Smolensky)</b>		-0,0010698	-0,0011550

Compensación 3 primeras decilas			
<b>Compensac. necesaria</b>	Total (M€)	497,65	759,26
	Media hogar (€)	96,58	147,36
<b>Modificación de la renta disponible (media por hogar, en %)</b>	Decila 1	0,00	+0,49
	Decila 2	0,00	-0,09
	Decila 3	0,00	-0,18
<b>Efecto redistributivo (índice de Reynolds-Smolensky)</b>		0,0001851	0,0007716
Compensación 5 primeras decilas			
<b>Compensac. necesaria</b>	Total (M€)	927,7	1.667,00
	Media hogar (€)	108,5	194,16
<b>Modificación de la renta disponible (media por hogar, en %)</b>	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
<b>Efecto redistributivo (índice de Reynolds-Smolensky)</b>		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€**

# Conclusions

- ❑ Spain faces complex challenges in its economy, and particularly in its energy and public sectors
- ❑ The behavior of Spanish governments towards energy taxes has been reactive and completely unrelated to the positive signals received from academia
- ❑ The current crisis may bring out an opportunity to change this through a green tax reform of 3<sup>rd</sup> generation, with revenues partly allocated to fiscal consolidation, reduction of labour taxes (implicit devaluation) and funding of energy efficiency and renewables



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# THANKS

<http://webs.uvigo.es/xavier>

[xavier.labandeira@eforeenergy.org](mailto:xavier.labandeira@eforeenergy.org)



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