
Non-ETS Climate Policies in the EU

Xavier Labandeira

FSR Climate, EUI

*Climate Policy in China and Europe:
Progress and Prospects in Emissions Trading*

Mannheim, 18 and 19 December 2014



Contents

- ❑ Why this topic?
- ❑ FSR_Climate
- ❑ Renewables and Energy Efficiency policies
- ❑ Tax approaches
- ❑ Conclusions

Why this topic?

- ❑ 2050 Roadmap
- ❑ 2020 Climate and Energy Package
 - 20% reduction in EU GHG emissions from 1990
 - 20% of renewable energy consumption
 - 20% improvement in Energy Efficiency
- ❑ 2030 Framework for Climate and Energy
 - Binding EU target: -40% reduction of GHG by 2030
 - 27% of renewable energy at EU level
 - Energy efficiency increase of at least 27%
 - 15% interconnection between Member States

Why this topic?

- ❑ Coverage/non coverage by EU ETS
- ❑ Supplementary effects
 - ‘Low prices’
 - Market failures
- ❑ Other non-GHG objectives, but collateral effects
- ❑ Jurisdictional issues
- ❑ And, of course, interactions...

Why this topic?

- ❑ Renewable promotion
- ❑ Energy Efficiency policies
- ❑ Energy/carbon Taxes

Why this topic?



Energy Efficiency and Climate Policies: A Scoping Meeting for the FSR Climate

Organiser: **Xavier Labandeira** | Director, FSR Climate/EUI

Sala del Capitolo, Badia Fiesolana
Via dei Roccettini, 9 – San Domenico di Fiesole

7 November 2014

■ PROGRAMME

08.45-10.45 **Session 1: General framework**

- 08.45 Introduction and presentation of participants, **Xavier Labandeira**
- 09.00 Energy efficiency and climate policy: the big picture, **Tyler Bryant**
- 09.20 Energy efficiency policy instruments: issues for application, **Lisa Ryan**
- 09.40 EU energy efficiency policies, **Serena Pontoglio**
- 10.00 Energy efficiency and interactions with other climate policy instruments, **Oskar Lecuyer**
- 10.20 Debate

10.45-11.15 **Coffee**

11.15-13.15 **Session 2: Research needs and gaps**

- 11.15 Issues for future energy efficiency policies in the EU residential sector, **Paolo Bertoldi**
- 11.35 Energy efficiency policies: the vision of an international power company, **Gonzalo Sáenz**
- 12.55 Funding energy efficiency, **Juan Alario/Manuel Dueñas**
- 12.15 Unlocking energy efficiency in transport, **Andreas Schäfer**
- 12.40 Debate

13.15-14.30 **LUNCH**

14.30-16.40 **Session 3: Ex-post analysis**

- 14.30 Energy efficiency policy: issues, methods and data, **Matthew Kotchen**
- 15.00 An overall assessment of energy efficiency instruments, **Magnus Söderberg**
- 15.20 Nudging energy efficiency, **Giovanna D'Adda**
- 15.40 Policy packages, distribution and empirical results for Spain, **Xavier Labandeira/Ana Ramos**
- 16.00 Some empirical results for France, **Louis-Gaëtan Giraudet**
- 16.20 Some empirical results for Germany, **Kathrine Von Graevenitz**

16.40-17.30 **Debate, wrap up and departure**



Why this topic?

The screenshot shows a web browser window with the URL fsr.eui.eu/Events/ENERGY/Workshop/2014/141107EnergyEfficiency.aspx. The page header includes navigation links for 'Proyectors', 'Google Maps', 'carrentals', 'Apple', 'Yahoo!', 'YouTube', 'Wikipedia', 'Noticias', and 'Populares'. Below the header is a navigation bar with 'Home', 'Energy & Climate', 'Communications & Media', 'Transport', 'Water', 'Training & Events', 'Publication & Resources', 'About', and 'People'. The main content area is titled 'Energy Efficiency and Climate Policies: a Scoping meeting for FSR Climate' and includes a 'Find Events' sidebar with filters for 'Date From', 'Date To', 'All Areas', 'All Topics', 'All Sub Topi', 'All Programmes', and 'All Types'. The main content is divided into sections: 'DATE' (07 NOV 2014), 'ABOUT' (describing the workshop's purpose), 'LOGISTICS' (listing the location and contact person), and 'Workshop Highlights' (featuring a video of Xavier Labandeira, Director of FSR Climate).

fsr.eui.eu/Events/ENERGY/Workshop/2014/141107EnergyEfficiency.aspx

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page of Xavier Labandeira, University of Vigo, European University Institu... Energy Efficiency and Climate Policies: a Scoping meeting for FSR Climate

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Contacts

CLIMATE - ENERGY \ WORKSHOP

DATE
07 NOV 2014

SALA DEL CAPITOLO,
BADIA FIESOLANA VIA
DEI ROCCETTINI 9
SAN DOMENICO DI
FIESOLE

LOGISTICS
BARBARA MORGANTI

Energy Efficiency and Climate Policies: a Scoping meeting for FSR Climate

ABOUT

This workshop intended to provide a general overview of the role of energy policies for climate change mitigation. It was organised in three sessions on the general framework, research needs and gaps, and ex-post analysis of applications. The event was designed as a scoping meeting for future research activities of the Climate Policy Research Unit (CPRU) in this area and also to explore collaborative work with other academic and non-academic institutions operating in the field.

Workshop Highlights

Workshop Highlights | Energy Efficiency and Climate Policies: A

Xavier Labandeira
Director | FSR Climate

Find Events

Date From 17/12/2014 Date To

All Areas

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Search



Why this topic?



ENERGY/CARBON TAXATION AND CLIMATE POLICIES: A SCOPING MEETING FOR FSR CLIMATE

Academic Coordinator: **Xavier Labandeira** | Director FSR Climate/EUI

Seminar Room, Villa Malafrasca
Via Boccaccio, 151 – Florence

12 December 2014

■ PROGRAMME

- 08.45-10.55** *Session 1 Energy/Environmental Taxation and Climate Policy*
- 08.45-09.00 Introduction and presentation of participants | **Xavier Labandeira**
- 09.00-09.20 Energy taxes and climate policy: the big picture | **Mikael Skou Andersen**
- 09.20-09.40 Energy and carbon taxation in the world | **Xavier Labandeira**
- 09.40-10.00 Climate policy interactions | **Carolyn Fischer**
- 10.00-10.20 EU energy taxation: Present and future | **Carola Maggiulli**
- 10.20-10.55 Debate
- 10.55-11.20 **COFFEE BREAK**
- 11.20-13.30** *Session 2 Empirical Analysis for the EU*
- 11.20-11.40 Taxes and climate policy in Sweden | **Susanne Akerfeldt**
- 11.40-12.00 Ex-post analysis: the Dutch experience | **Herman Vollebergh**
- 12.00-12.20 Micro methods and data | **José Maria Labeaga**
- 12.20-12.40 General Equilibrium modelling | **Stefano Verde**
- 12.40-13.00 Macro methods and data | **Hector Pollitt**
- 13.00-13.30 Debate
- 13.30-14.30 **LUNCH**
- 14.30-16.10** *Session 3 Assessing Obstacles to Progress*
- 14.30-14.50 Competitiveness effects | **Sebastian Petrick**
- 14.50-15.10 Distributional issues I: methods, data and results | **Silvia Tiezzi**
- 15.10-15.30 Distributional issues II: compensatory policies | **Florens Flues**
- 15.30-15.50 Acceptability and environmental taxes | **Todd Cherry**
- 15.50-16.10 Identifying and overcoming barriers | **Stephen Smith**
- 16.10-17.15 Debate, wrap up and departure

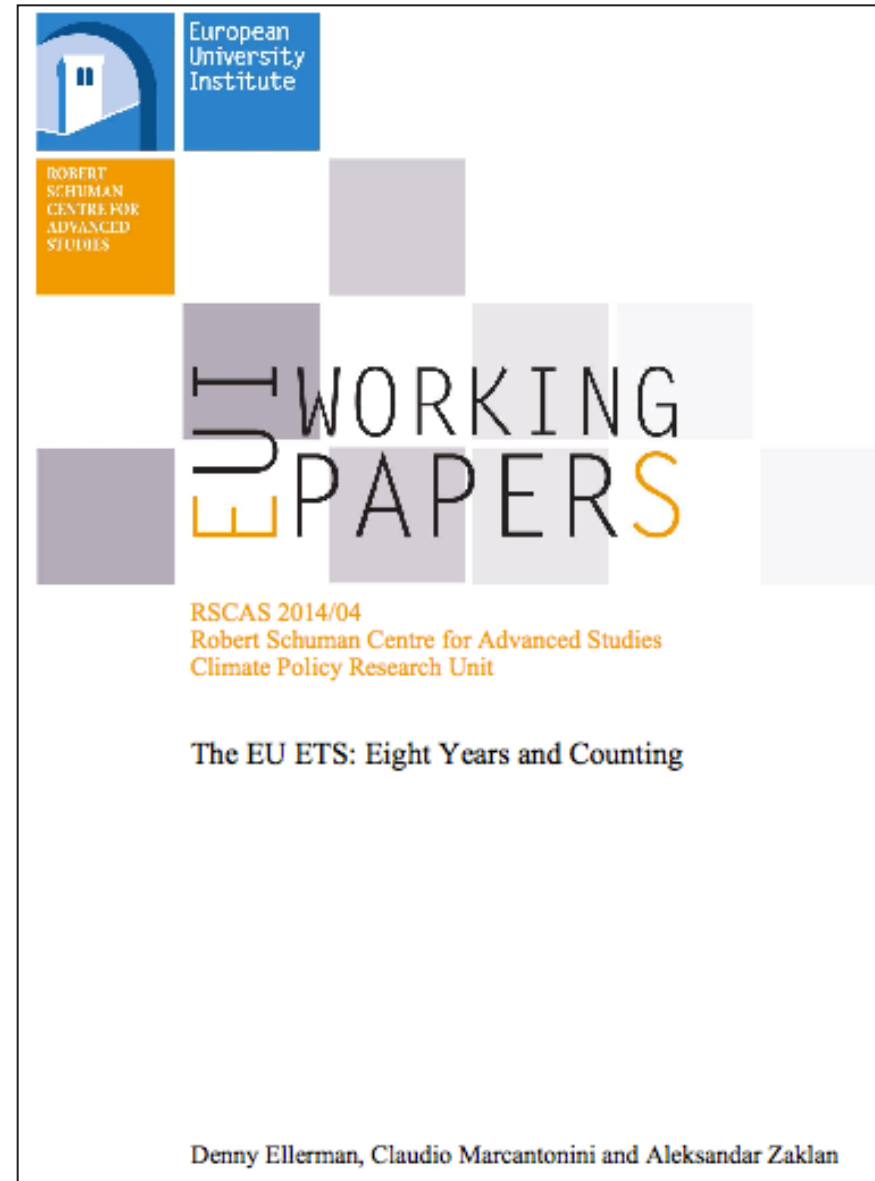


FSR_Climate (2010-)

- ❑ Main areas of research (see WP series):
 - EU Emissions Trading Scheme
 - EU and MS Policies for renewable energy
 - EU and MS Energy efficiency and energy tax policies (*new*)
- ❑ How policies are implemented; how they interact with one another and policy objectives; how effective they are in reducing GHG; how much they cost
- ❑ Partnership and collaboration with research centers (visitors programs and joint projects) and stakeholders
- ❑ Annual conference; workshops; bibliography, databases

FSR_Climate

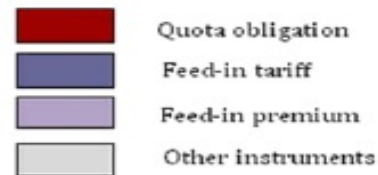
- <http://fsr.eui.eu/Publications/WORKINGPAPERS/Energy/2014/WP201404.aspx>



Renewables Policy

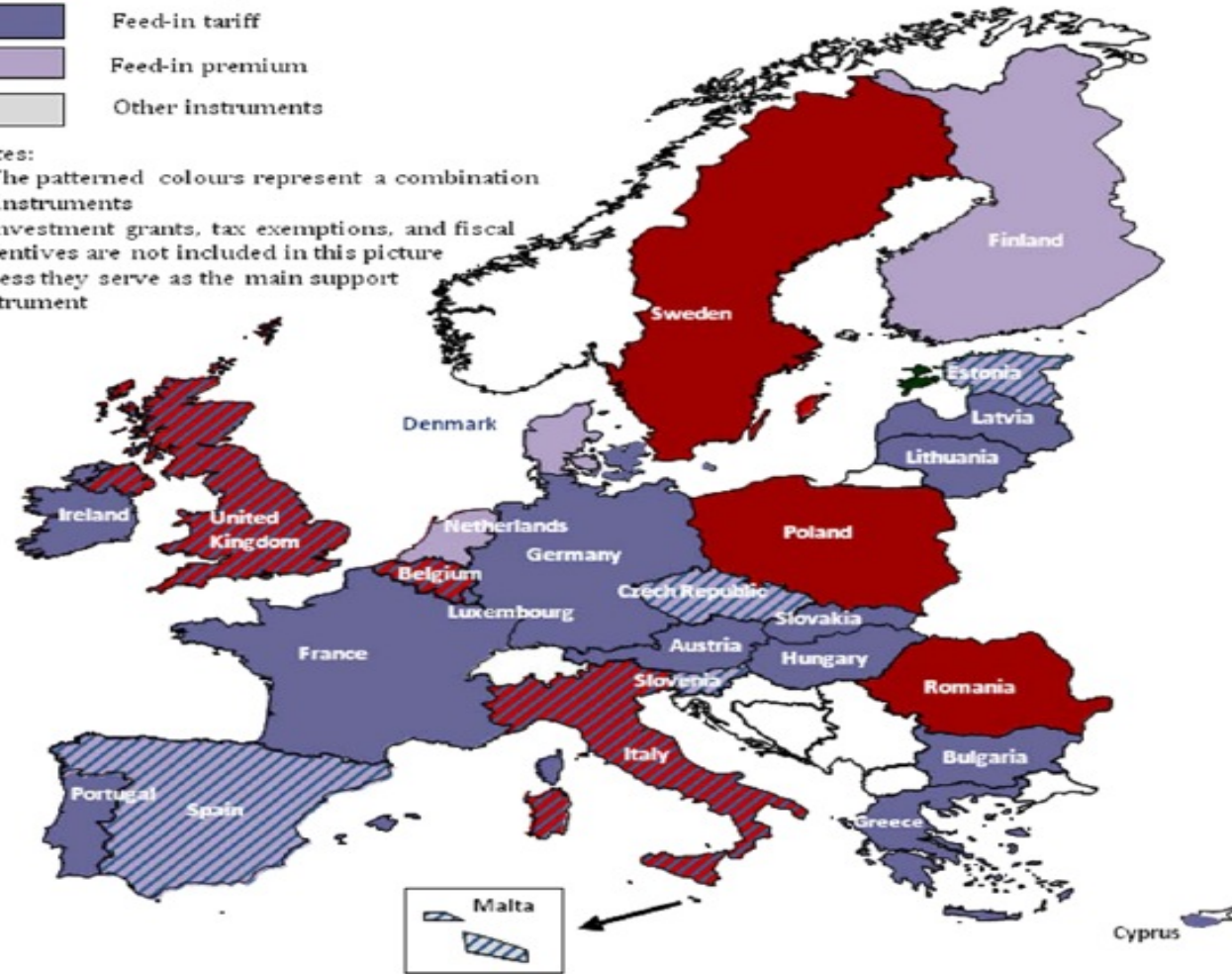
- **Directive 2009/28/EC**
 - **Mandatory national targets**
 - Overall share of energy from renewable sources in gross final energy consumption
 - Share of renewable energy in transport
 - **In order to reach the targets, Member States may apply**
 - Support schemes (investment aid, tax exemptions or reductions, tax refunds, renewable energy obligation support schemes, direct price support schemes,...)
 - Measures of cooperation between different Member States and with third countries

Main support instruments



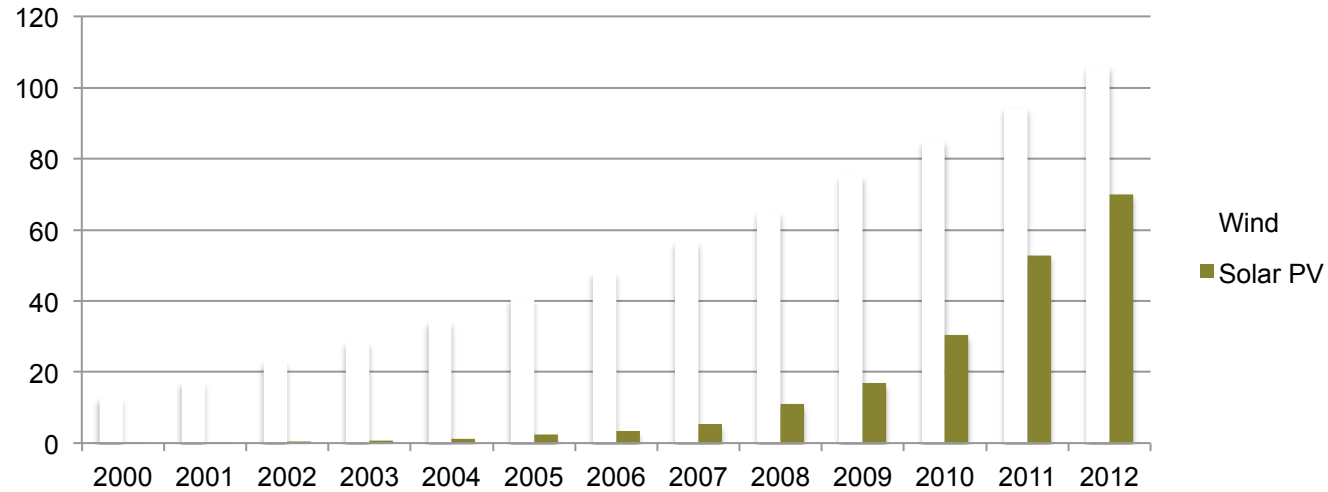
Notes:

- 1) The patterned colours represent a combination of instruments
- 2) Investment grants, tax exemptions, and fiscal incentives are not included in this picture unless they serve as the main support instrument

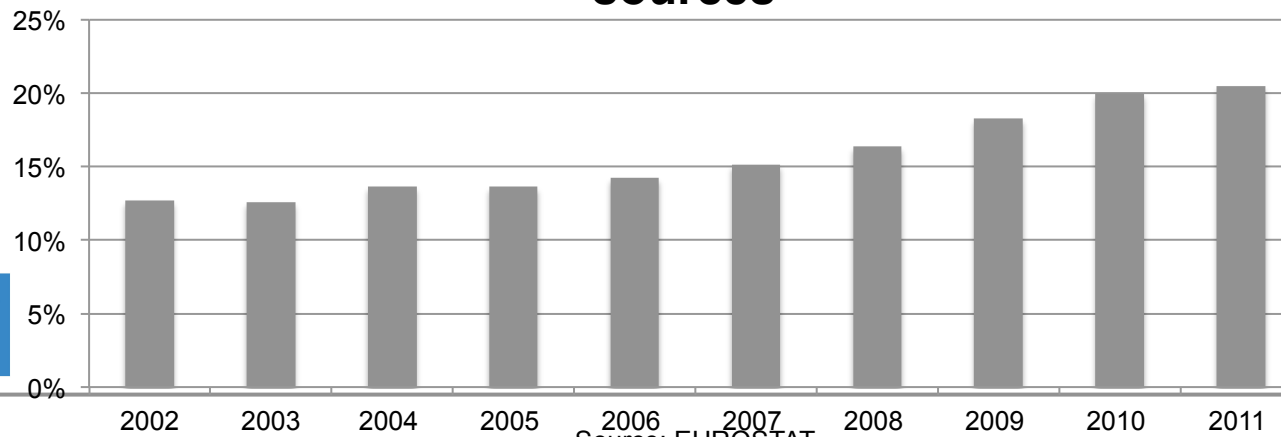


Effective promotion of renewables in the EU

Capacity [GWh]



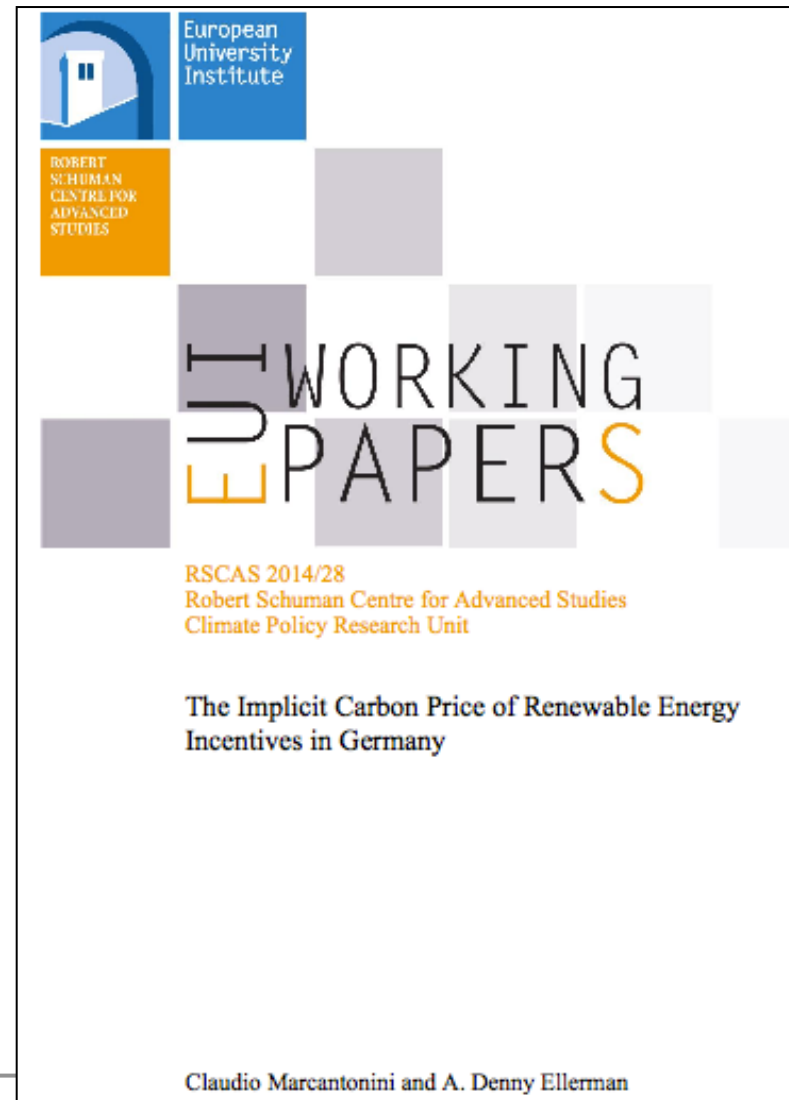
% Electricity generated from renewable sources



Source: EUROSTAT

Renewables as Climate Policies

[http://fsr.eui.eu/Publications/
WORKINGPAPERS/Energy/2014/
WP201428.aspx](http://fsr.eui.eu/Publications/WORKINGPAPERS/Energy/2014/WP201428.aspx)



REI as Climate Policy Instruments

- Have REI been efficient climate policy instruments?
- *Implicit carbon price*: It is the equivalent carbon price being paid when we think of REI as a climate instrument alone

$$\text{Implicit carbon price} = \frac{\bullet \text{ Net cost of renewables}}{\text{CO2 emission reduction}}$$

- *Net cost of renewables*: the sum of the costs and savings for consumers resulting from RE into the electric power system
- *CO2 emission reduction*: net change in CO2 emissions between the power system with and without the RE

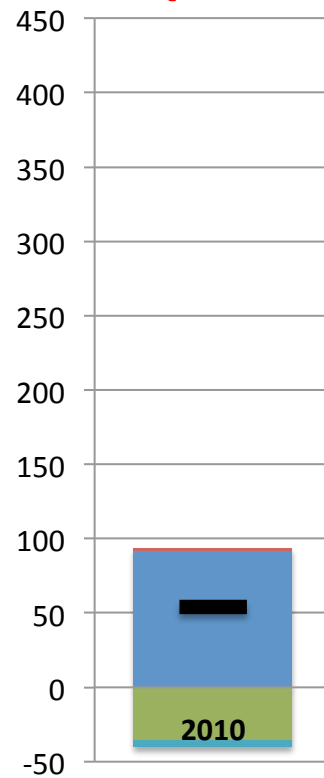


Germany

Net cost of RE

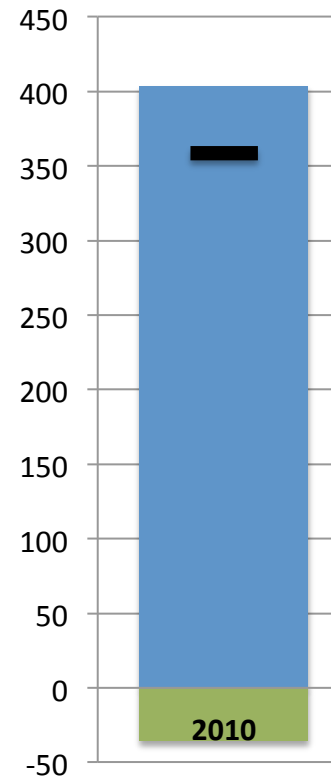
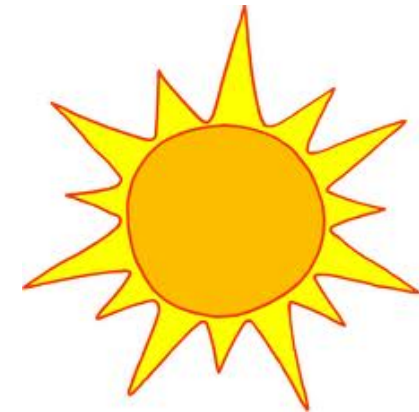
WIND

54€/MWh



SOLAR

358€/MWh



■ Equalized remuneration ■ Fuel Cost Saving ■ Capacity Saving ■ Additional Balancing Cost — Net cost



Germany

Implicit Carbon Price

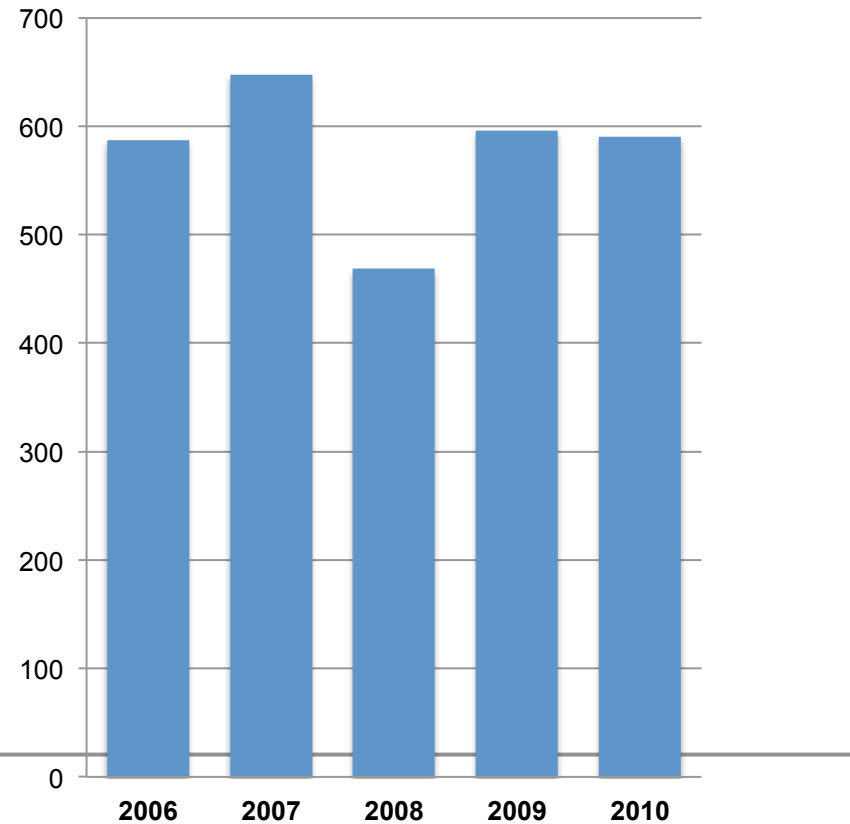
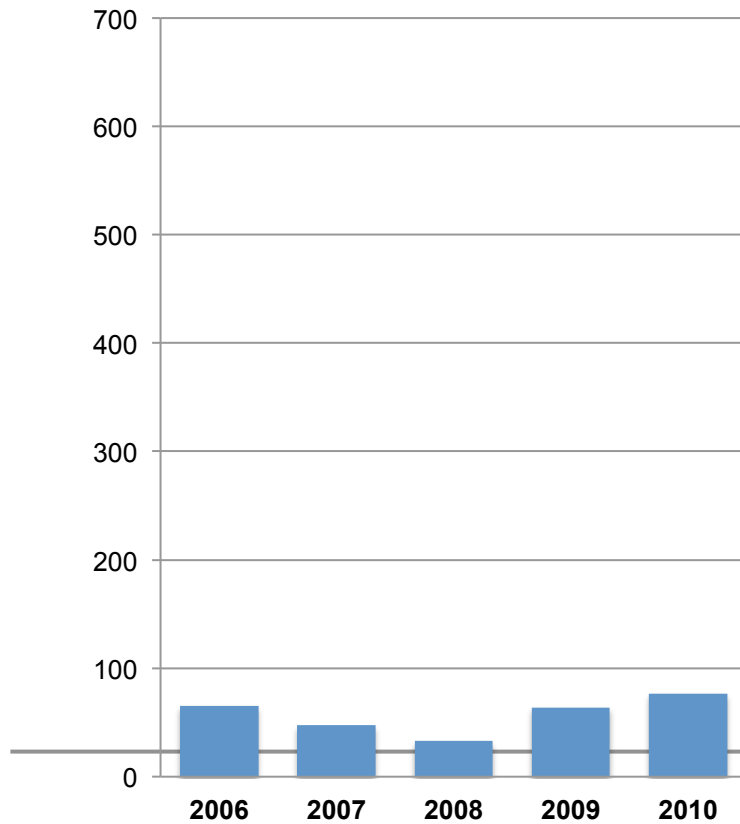
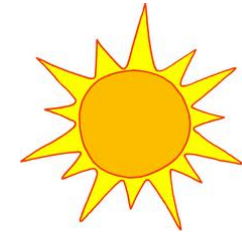


WIND

56€/tCO₂

SOLAR

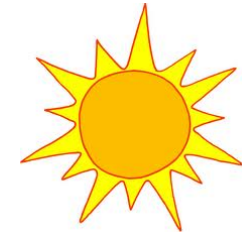
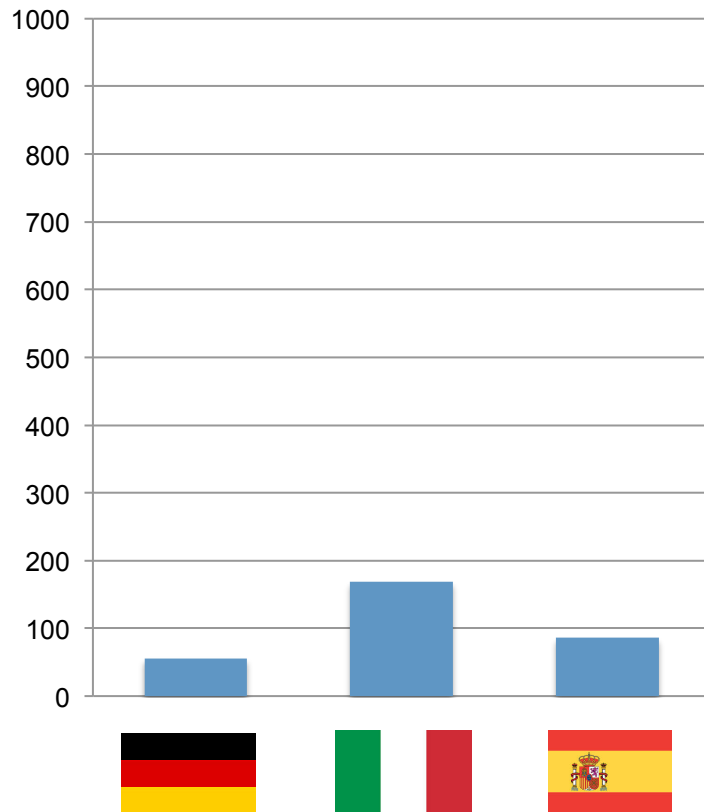
574€/tCO₂



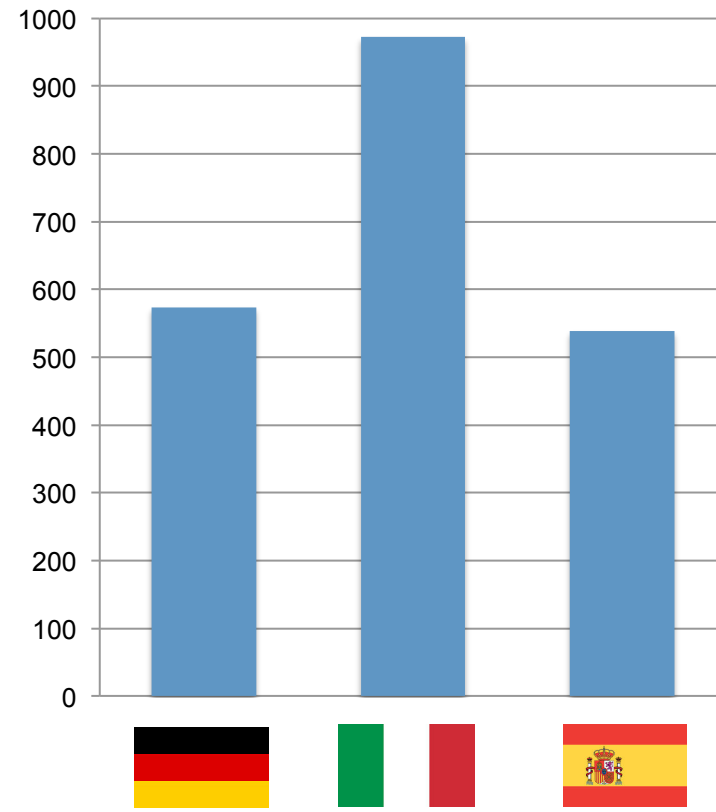
Implicit carbon price [€/tCO₂]



WIND



SOLAR



Germany 2006-2010; Italy 2008-2011; Spain 2010-2012

Summing up

- Supporting **solar energy** through RE incentives has been thus far a very expensive way of inducing CO2 emissions reduction
- Supporting **wind energy** through RE deployment incentives has been less expensive
- Non-climate goals for RE policy non included: security of energy supply, technological development, opportunities for employment and regional development

RENEWABLE ENERGY POLICY AND DEVELOPMENTS IN SPAIN

Xavier Labandeira

Economics for Energy and rede, University of Vigo

ASU Global Institute of Sustainability
Phoenix, 30 October 2013



Obama Visits Ohio Factory to Boost Clean Energy Economy

BEDFORD HEIGHTS, Ohio, January 16, 2009 (ENS) - President-elect Barack Obama today visited a factory in Bedford Heights, Ohio that is the largest manufacturer in the United States of the giant bolts used to construct wind turbines (...)

Obama pointed to **Spain**, Germany and Japan, where, he said "they're making real investments in renewable energy" and "surging ahead of us, poised to take the lead in these new industries." "This isn't because they're smarter than us, or work harder than us, or are more innovative than we are," he said. "It's because their governments have harnessed their people's hard work and ingenuity with bold investments - investments that are paying off in good, high-wage jobs - jobs they won't lose to other countries."



The New York Times

October 8, 2013

Renewable Energy in Spain Is Taking a Beating

By ANDRÉS CALA

MADRID — Years of disastrous policies, coupled with the economic crisis, have recast renewable energy in Spain. Once touted as the embodiment of progress, wealth and sustainability, the industry is now seen as an unwanted and costly extravagance.



Rationales for Complementary Renewable Energy Policies

Carolyn Fischer
Resources for the Future and FEEM

December 12, 2014



European
Commission

Energy Efficiency Policy

Serena Pontoglio

**Energy Efficiency Unit
Directorate-General for Energy
European Commission**



Energy



The legal framework



Energy Efficiency Directive



EED 2012/27/EU

- EU target : **1483 Mtoe** primary energy and 1086 Mtoe final energy in 2020
- Indicative **national targets** (Art 3) – 28 MS
- **Long-term building renovation strategies** (Art 4)
by 30 April 2014, updated every 3 years
- Central **government building's 3% target** (Art 5)
- **Public procurement**
- **EEOS or alternatives (yearly 1,5% end-use energy savings in 2014-2020) (Art 7)** – 17 MS
- **Energy audits** & management systems (Art 8)
- **Smart metering and billing**
- **Heating & cooling**, district heating/cooling, cogeneration, waste heat recovery
- Energy grids, **demand response**, distributed generation
- **Energy services, ESCO** market (Art 18)
- **Financing** (Art 20)
- Consumer **information**, awareness raising
- **Training, education**
- Removal of barriers

Publication in OJ:
14 November 2012

Entry into force:
4 December 2012

General transposition:
5 June 2014



Official Journal of the European Union

ISSN 1977-0677

L 315

Volume 55
14 November 2012

English edition Legislation

Contents

1 Legislative acts

DIRECTIVES

* Directive 2012/27/EU of the European Parliament and of the Council of 25 October 2012 on energy efficiency, amending Directives 2009/125/EC and 2010/30/EU and repealing Directives 2004/8/EC and 2006/32/EC (*) 1

* Directive 2012/29/EU of the European Parliament and of the Council of 25 October 2012 establishing minimum standards on the rights, support and protection of victims of crime, and replacing Council Framework Decision 2001/220/JHA 57

* Directive 2012/30/EU of the European Parliament and of the Council of 25 October 2012 on coordination of safeguards which, for the protection of the interests of members and others,

EPBD – Key elements (2002/91/EC and 2010/31/EU)

Methodology to rate energy performance of buildings

Minimum energy performance requirements for new and existing buildings that undergo major renovation + cost optimal methodology

Energy performance certificates (EPC)

**Introduction of "nearly zero energy buildings" 2021
(public sector 2019)**





How do we achieve energy efficiency in product design?

Combined effect ensures a dynamic improvement of the market:



Ecodesign Directive 2009/125/EC

Energy Labelling Directive 2010/30/EU

+ Labelling of Tyres (Regulation 1222/2009)

+ Energy Star (Regulation 106/2008)

Both Directives are «frameworks» defining the «rules» for setting product-specific requirements through Regulations.



Energy efficiency of the EU economy is steadily increasing; and economic growth is being decoupled from energy consumption



Source: Energy efficiency Communication 2014 - COM(2014) 520

About us
Ergon is a consortium created in 2014 by four European research institutions, CEPE-ETH, Economics for Energy, FEEM and ZEW, to explore in depth the different economic aspects related to energy efficiency. Our objective is to carry out collaborative, state-of-the-art, economic research

News
Workshop on Energy Efficiency and Climate Policies: Florence, 7 November 2014
New Ergon members, July 2014
Ergon is officially presented in A Toxa (Spain), 25 June 2014

Partners
Ergon is open to collaboration and partnership with research centres across the world that are interested in the economics of energy efficiency.
The activities of Ergon may be partially developed and funded in partnership with private and public institutions.

Find

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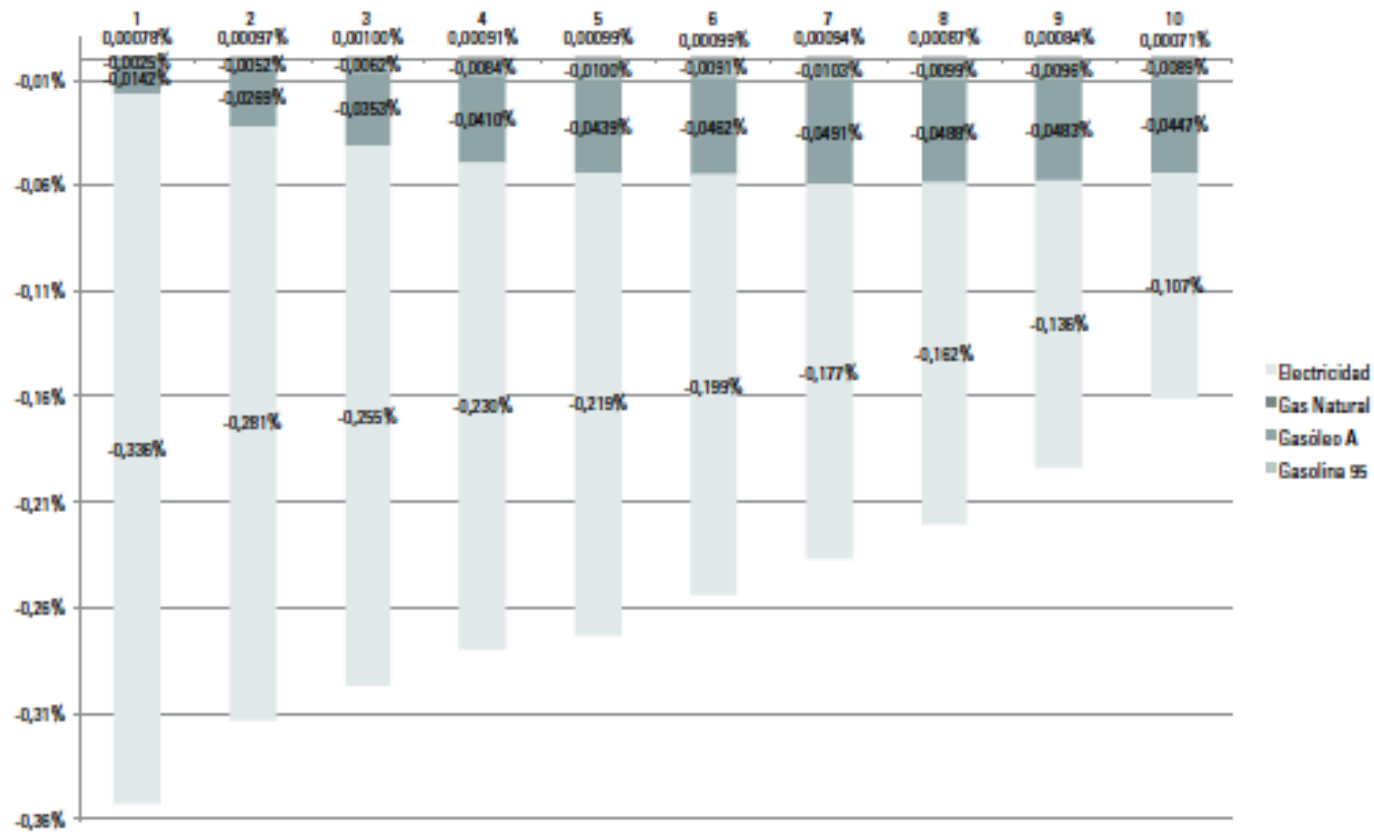


"The energy efficiency market is increasingly delivering outcomes that can help address important public policy challenges"



Energy Efficiency and Distribution

Figura 21. Simulación 2B. Efecto total por decilas de renta



Energy Efficiency and Distribution

UK

- > Warm Front Scheme**
- > Green Deal**
- > Energy Companies Obligations**

Tax Approaches

- ❑ Proposal for a Council Directive (2011-)
 - Harmonized European energy taxation
 - CO2 component
 - Energy component

- ❑ Energy taxes at national level



EU energy taxation: Present and future

Carola Maggiulli

EUROPEAN COMMISSION

DG Taxation and Customs Union

**Energy/Carbon Taxation and Climate Policies: a
Scoping meeting for FSR-Climate**

Florence, 12 December 2014

Impact on rates – motor fuels



- New minimum rates introduced in stages
 - Tax based on CO₂ emissions: 20€/t CO₂
 - Tax based on energy content: gradual increase to 9.6€/GJ
- This results in the following overall rates expressed in current units:

	Current rate	1 step	2 step	3 step
Petrol (euro per 1000 litres)	359	359	359	359
Diesel (euro per 1000 litres)	330	341	362	390
Kerosene (euro per 1000 litres)	330	356	377	392
LPG (euro per 1000 Kg)	125	125	311	500
Natural gas (euro per GJ)	2.6	2.6	6.6	10.7

Impuestos sobre la energía (€) 2013	Households light fuel oil (per 1000 litres)				Non-commercial automotive diesel (per litre)				Unleaded gasoline (per litre)				Households natural gas (per MWh GCV)				Households electricity (per kWh)			
	Excise	VAT (%)	Total	PPP (%)	Excise	VAT (%)	Total	PPP (%)	Excise	VAT (%)	Total	PPP (%)	Excise	VAT (%)	Total	PPP (%)	Excise	VAT (%)	Total	PPP (%)
Germany	61,35	19,00	194,63	58,70	0,47	19,00	0,70	87,76	0,66	19,00	0,91	96,20	5,50	19,00	16,88	100,65	96,30	19,00	142,90	221,44
Austria	109,18	20,00	267,00	75,68	0,42	20,00	0,65	76,45	0,51	20,00	0,74	73,42	5,96	20,00	17,62	98,73	30,70	20,00	64,90	94,51
Belgium	18,49	21,00	164,89	46,73	0,43	21,00	0,68	80,70	0,61	21,00	0,90	89,42	2,60	21,00	14,05	78,73	19,60	21,00	54,80	79,80
Denmark	403,87	25,00	714,14	164,00	0,40	25,00	0,71	67,69	0,59	25,00	0,93	74,87	35,39	25,00	54,96	249,53	109,95	25,00	169,35	199,82
Slovenia	176,60	21,00	351,40	137,78	0,45	21,00	0,69	111,80	0,57	21,00	0,82	113,25	4,79	21,00	16,78	130,07	16,50	21,00	44,30	89,24
Spain	87,30	21,00	245,60	84,97	0,37	21,00	0,61	87,27	0,47	21,00	0,71	86,46	0,18	21,00	14,33	98,01	8,80*	21,00	41,10*	73,06
Estonia	110,95	20,00	277,03	118,49	0,39	20,00	0,61	109,32	0,42	20,00	0,64	96,25	2,18	20,00	10,51	88,87	13,20	20,00	35,15	77,25
Finland	163,43	24,00	377,19	97,51	0,47	24,00	0,76	82,00	0,65	24,00	0,97	87,63	10,33	24,00	19,85	101,45	17,00	24,00	46,50	61,76
France	56,60	19,60	208,59	58,42	0,44	19,60	0,66	76,94	0,61	19,60	0,87	84,92	1,29	19,60	11,29	62,51	25,14	19,60	46,65	67,13
Greece	330,00	23,00	567,24	205,30	0,33	23,00	0,59	88,44	0,67	23,00	0,98	124,71	5,40	13,00	18,53	132,59	26,10	13,00	44,85	83,40
Hungary	n.d.	27,00	n.d.	n.d.	0,38	27,00	0,69	157,35	0,42	27,00	0,71	137,68	0,00	27,00	8,27	89,90	4,10	27,00	32,37	91,45
Ireland	88,66	13,50	215,50	62,59	0,48	23,00	0,76	92,24	0,59	23,00	0,89	90,10	3,70	13,50	12,39	71,14	0,00	13,50	26,20	39,10
Italia	403,21	21,25	650,56	204,06	0,62	21,25	0,91	118,56	0,73	21,25	1,04	113,80	n.d.	21,25	26,67**	165,38	56,20	10,00	77,10	124,26
Luxemburg	10,00	12,00	96,58	24,70	0,34	15,00	0,49	52,58	0,46	15,00	0,64	57,01	1,08	6,00	4,44	22,45	11,40	6,00	20,20	26,54
Netherlands	254,42**	21,00	360,89	102,29	0,45	21,00	0,69	81,76	0,75	21,00	1,05	104,72	19,28	21,00	32,84	184,02	11,40	21,00	45,00	65,53
Poland	55,27	23,00	229,66	125,99	0,35	23,00	0,59	134,87	0,40	23,00	0,64	123,33	0,00	23,00	9,58	103,87	4,76	23,00	32,40	91,32
Portugal	323,70	23,00	564,40	221,29	0,37	23,00	0,63	102,33	0,59	23,00	0,88	121,08	0,00	23,00	16,55	128,29	0,00	23,00	39,40	79,37
United Kingdom	131,17	5,00	170,27	49,30	0,68	20,00	0,96	115,53	0,68	20,00	0,95	95,97	0,00	5,00	2,76	15,77	0,00	5,00	8,24	12,26
Czech Republic	25,40	21,00	254,62	117,00	0,42	21,00	0,66	126,79	0,49	21,00	0,74	118,55	0,00	21,00	10,97	99,66	1,15	21,00	28,02	66,16
Slovakia	n.d.	20,00	n.d.	n.d.	0,37	20,00	0,60	115,59	0,52	20,00	0,77	123,69	0,00	20,00	8,87	80,89	0,00	20,00	29,50	69,92
Sweden	451,94	25,00	760,10	179,05	0,53	25,00	0,87	85,40	0,62	25,00	0,95	78,61	30,62	25,00	55,13	256,77	31,90	25,00	67,04	81,14
Weighted average (PPP)	201,39	18,74	425,08	100	0,66	20,88	1,02	100	0,83	20,88	1,21	100	3,96	18,50	21,50	100	42,76	17,07	82,73	100

Carbon Taxation

- ❑ Tax base: potentially most GHG emissions, carbon emissions; product; upstream/downstream; the role of exemptions (competitiveness, interactions, etc.)
- ❑ Tax rate: Pigouvian approach; exogenous target; evolution
- ❑ Revenues: Budget; earmarked; revenue-neutral
- ❑ Jurisdictional allocation

- ❑ Border tax adjustments
- ❑ Carbon taxes and pre-existing energy taxes

More on carbon taxation

- ❑ Three generations of green tax reforms:
 - Scandinavian model (1990s): Carbon taxes and income taxation
 - German model (2000s): Energy taxes and labour taxes
 - New approaches (2008-): Variable recycling

- ❑ Assessing carbon taxes and GTRs:
 - Environmental effectiveness
 - Economic effects
 - Distribution

Carbon taxes in EU countries

- Finland (1990)

- Fossil fuels
- Tax rate: 35€/tCO₂e (2013)
- -4 million tCO₂ between 1990-1998

- Netherlands (1990)

- Mineral oil excises, energy taxes (heating & motor fuels), motoring (sales of motor vehicles, user taxes)
- -(1.7-2.7) million tCO₂ in 2000 (5% of emissions covered)

Carbon taxes in EU countries

- ❑ Norway (1991)

- Gasoline, light and heavy fuel oil, and oil and gas in the North Sea
- Tax rate: 4.69 \$/tCO₂e (2013)
- The tax cover approximately 68% of Norway's CO₂ emissions

- ❑ Sweden (1991)

- Natural gas, gasoline, coal, light and heavy fuel oil, LPG, heating oil
- Tax rate: 168 \$/tCO₂e (2014)
- -15% CO₂ emissions between 1990-1995

Carbon taxes in EU countries

- ❑ Denmark (1992)
 - Fossil fuels
 - Tax rate: 31\$/tCO₂e (2014)
 - -15% carbon emissions per capita between 1990-2005

- ❑ United Kingdom (2001)
 - Natural gas, coal, electricity and LPG
 - Tax rate: 15.75 \$/tCO₂e (2014)
 - Carbon price floor (2013) on fossil fuels used to generate electricity

Experiences

❑ Ireland (2010)

- All energy products except electricity
- Tax rate: 20 €/tCO₂e (2013)
- Fiscal consolidation

❑ France (2014)

- Household use of gas, heating oil and coal (transport fuels in 2015)
- Tax rate: 7€/tCO₂e (2014)
- Revenues: funding energy transition

Evaluating Experiences

Table 6. Estimated Emissions Reductions in Jurisdictions with Carbon Taxes^a
 Unless otherwise noted, decreases in emissions represent total emission reductions, not emission reductions that are due to a carbon tax.

Jurisdiction	Start Date	Change in CO ₂ Emissions	Source
Finland	1990	Emissions were 7% lower in 1998 than they would have been without a tax.	Prime Minister's Office, Finland (2000)
Netherlands	1990	Emissions were expected to be reduced by 1.7 to 2.7 million metric tons CO ₂ annually in 2000. In covered sectors, emissions were expected to be reduced by approximately 5%.	Netherlands Ministry of Housing, Spatial Planning and the Environment (n.d.)
Norway	1991	Emissions increased by 15%—and GDP increased 70%—from 1991 to 2008.	Abboud (2008)
Sweden	1991	Emissions were reduced by about 15% from 1990 to 1996 because of the carbon tax. Emissions decreased by 9% from 1990 to 2006. Emissions decreased by more than 40% from the mid-1970s to 2008.	Johansson (2000) Ministry of the Environment, Sweden (2008)
Denmark	1992	Emissions decreased by 15% per capita from 1990 to 2005.	Prasad (2008)
United Kingdom	2001	Emissions decreased by more than 58 million metric tons CO ₂ from 2001 to 2005. Emissions are expected to be reduced by 12.8 million metric tons CO ₂ per year (15% of commercial and public sector energy demand) in 2010 because of the Climate Change Levy.	Cambridge Econometrics (2005) cited in Her Majesty's Treasury (2008:101)
Boulder, CO	2007	Emissions in 2007 and 2008 decreased from 2006 levels. Greatest reductions due to programs funded by the carbon tax: <ul style="list-style-type: none"> • Renewable energy activities (60,000 metric tons CO₂e) • Transportation (33,000 metric tons CO₂e) • Energy efficiency (6,700 metric tons CO₂e) 	City of Boulder (2009b)
Quebec	2007	Emissions were expected to be reduced by 11.2 million metric tons CO ₂ by 2012 due to the carbon tax.	Quebec (2008)
British Columbia	2008	GHG emissions were expected to be reduced emissions by up to 3 million metric tons CO ₂ annually in 2020 due to the tax.	Ministry of Finance, British Columbia (2008)

^a BAAQMD implemented a carbon tax in 2008 and is tracking data but has not issued a report. France and CARB each proposed but have not implemented a program.



Evaluating experiences

- ❑ Martin et al (2014). Climate change levy UK. Strong negative impact on energy intensity and use of electricity
- ❑ Hammar et al (2013). Sweden's CO2 tax. Major impact on fuels used for heating purposes.
- ❑ Lin and Li (2011). Northern European carbon taxes. Stronger effectiveness of the Finish tax due to exemptions in other countries
- ❑ Johansson (2000). Carbon tax Sweden. Reduction in emissions due to tax reform, increase of biomass use
- ❑ Bohlin (1998). Idem

CONSTRAINTS FOR ECONOMIC INSTRUMENTS IN SPANISH ENERGY AND ENVIRONMENTAL POLICIES

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Policy Evaluation Lecture

Copenhagen, 22 September 2014

Conclusions

- ❑ Several non-EU ETS GHG mitigation policy instruments
- ❑ Mostly at a MS level
- ❑ Limited empirical evidence on effects
- ❑ Synergies and interactions may occur
- ❑ But non-GHG mitigation reasons are significant
- ❑ Limits to energy/carbon taxation

THANKS

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