Evaluating Climate Policies

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CPRU-EUI

- Established in 2010 within the EUI (Florence)
- Dedicated to the promoting the evaluation of the EU Climate Policy at the EUI and elsewhere
- Interested in the dissemination of results, including the policy community, though meetings and other outreach activities
- Funded primarily by the European Commission (DG CLIMA)
- http://fsr.eui.eu/CPRU/Index.aspx

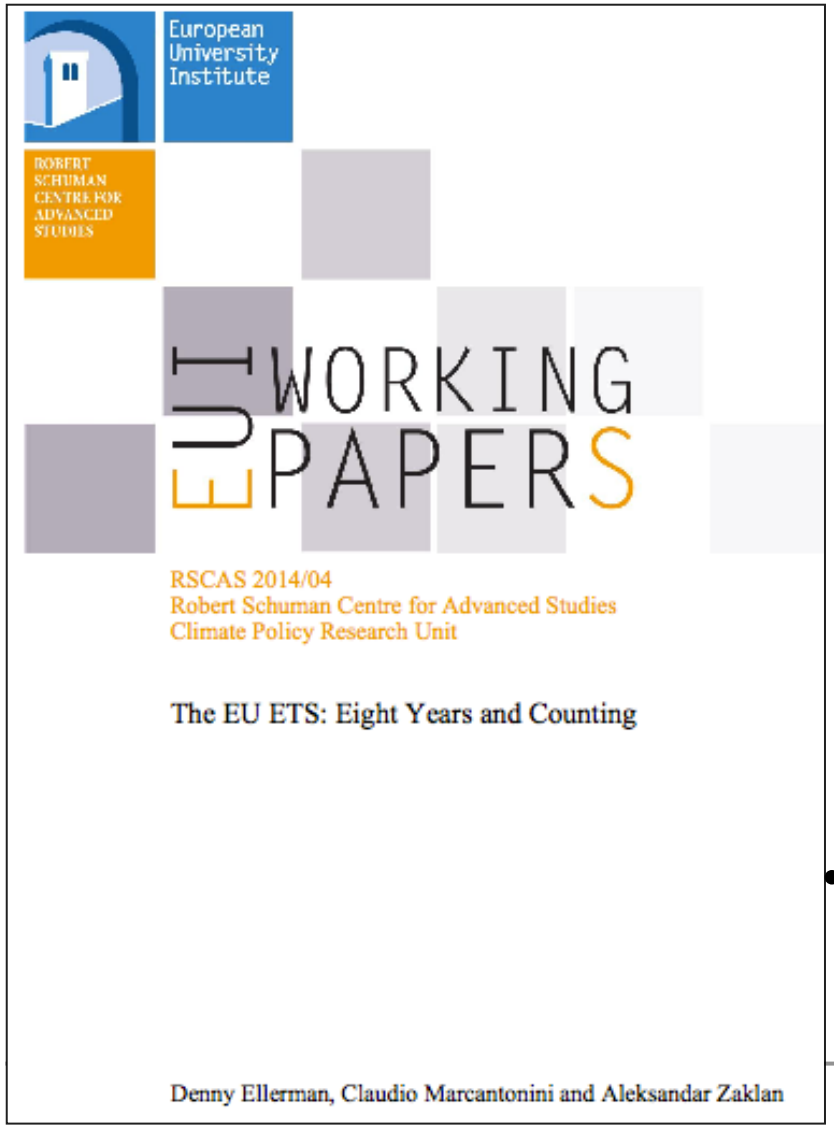
CPRU-EUI

- Main areas of research (see WP series):
  - EU Emissions Trading Scheme
  - EU and national Policies for renewable energy
  - Multinational governance mechanisms
- 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 centres (visitors programs and joint projects) and stakeholders
- Events: Annual policy conference, workshops, webiminars

CPRU-EUI

- Ownership links and enhanced EUTL dataset
  - http://fsr.eui.eu/CPRU/EUTLTransactionData.aspx
- Updated bibliography on the assessment of EU Climate Policy
  - http://euiclimatepolicybibliography.net/

Overview of EU ETS

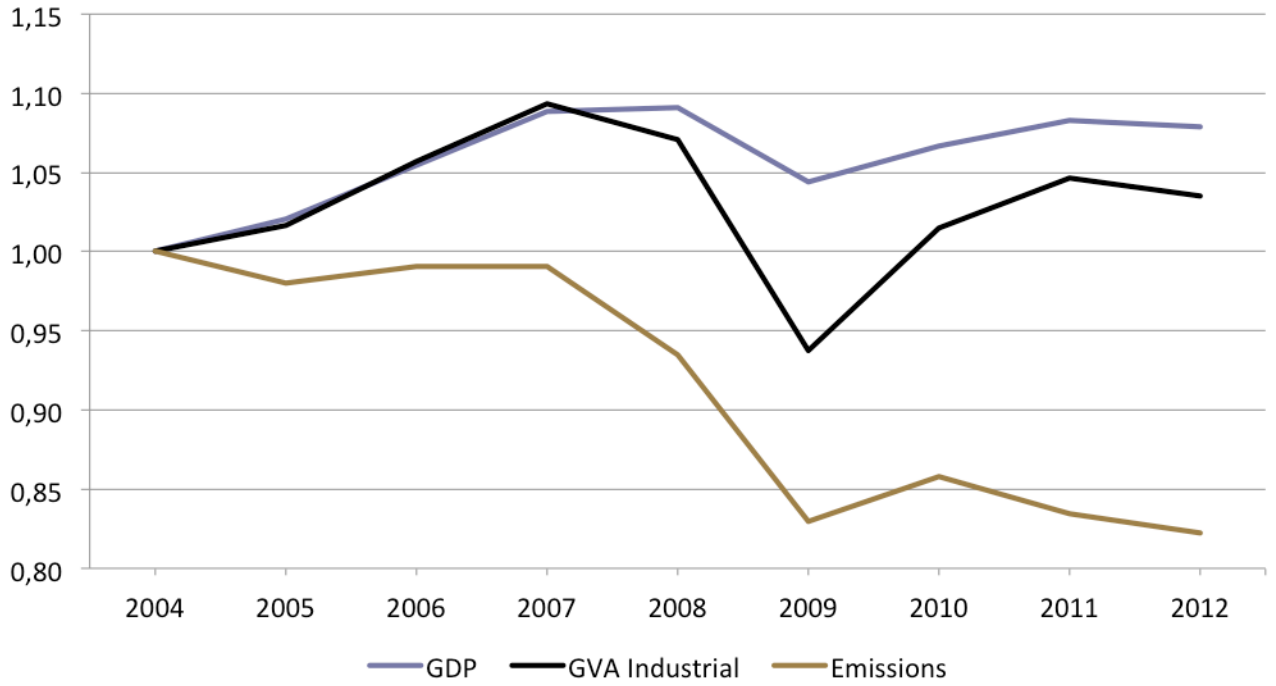


- http://fsr.eui.eu/Publications/WORKINGPAPERS/Energy/2014/WP201404.aspx

Overview of EU ETS

- Largest cap-and-trade program, 4% of global GHG emissions
- Learning by doing process: from 2005 it has evolved from a system with 25 national caps and decentralized allocation towards a centralized EU system
- EU-wide cap indefinitely declining at an annual rate
- The EU ETS would likely not exist were it not for the Kyoto Protocol (KP) but the implementation of the EU ETS is independent of the KP
- Linking with other emissions treading: announced/under negotiation

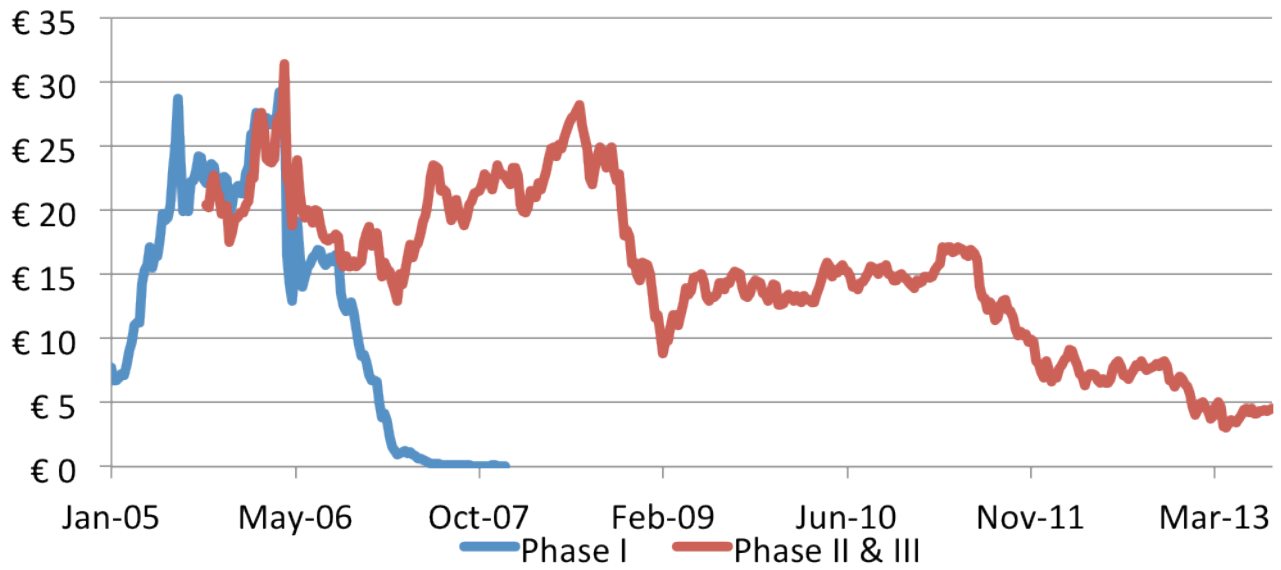
EMISSIONS vs GDP



Source: Elaborated from Eurostat and CITL/EUTL data-base.

- **The ratio of emissions to GDP has declined at an average rate of about 3.3%, while the rate of decline in the years 2000-2004 was 1%**

EUA price



Source: Point Carbon

- The EU ETS has succeeded in imposing a price on CO2 emissions
- The volume of trades involving EUAs has steadily increased over the life of the program.
- Low end of Phase II price because of economic crisis and use of offsets
- Non-trivial price despite a large surplus because of banking and the declining cap

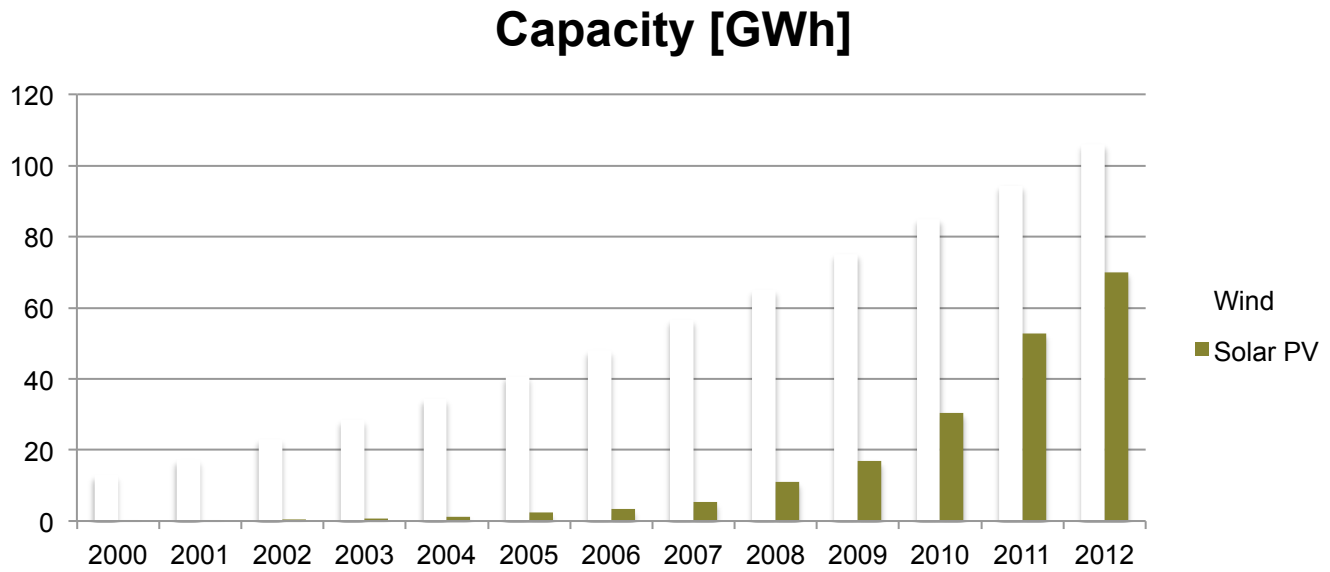
Renewables as Climate Policies

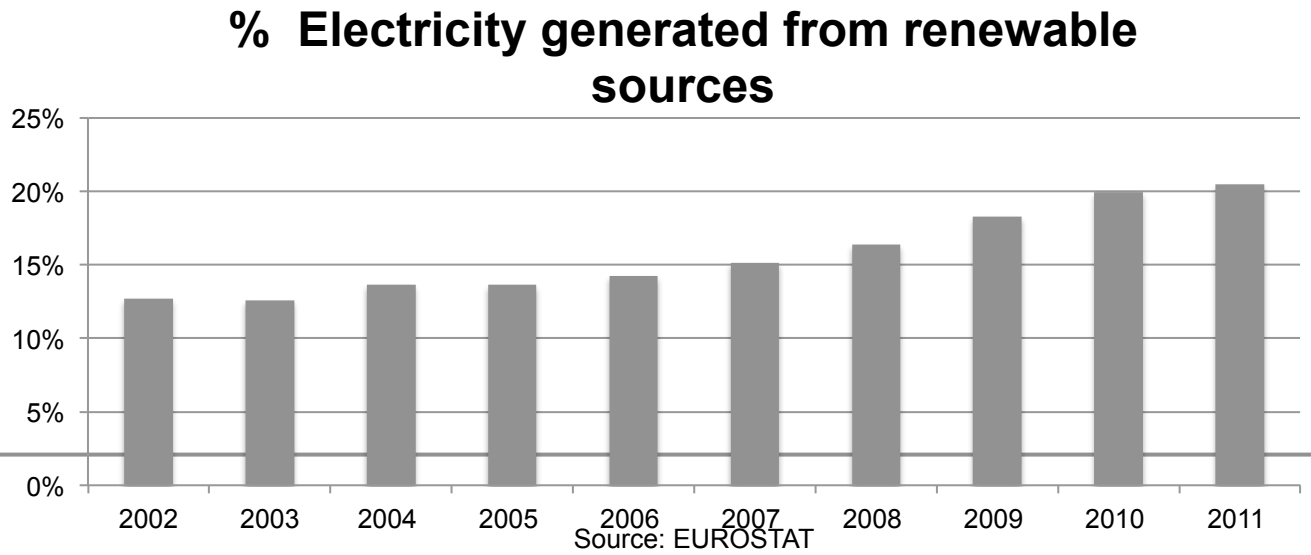
http://fsr.eui.eu/Publications/WORKINGPAPERS/Energy/2014/WP201428.aspx

Renewables as Climate Policies

- **No single EU instrument: the member states are responsible for the RE deployment**
- **Many different instruments: most of them are in a form of Feed-in tariff**
- **Very effective in deploying RE, especially wind and solar within the electricity sector**
- **High cost paid by consumers through surcharges on electricity bills**

RE





Source: EUROSTAT

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**

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

- ***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**

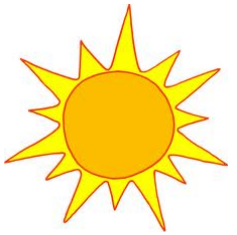
Germany
Implicit Carbon Price

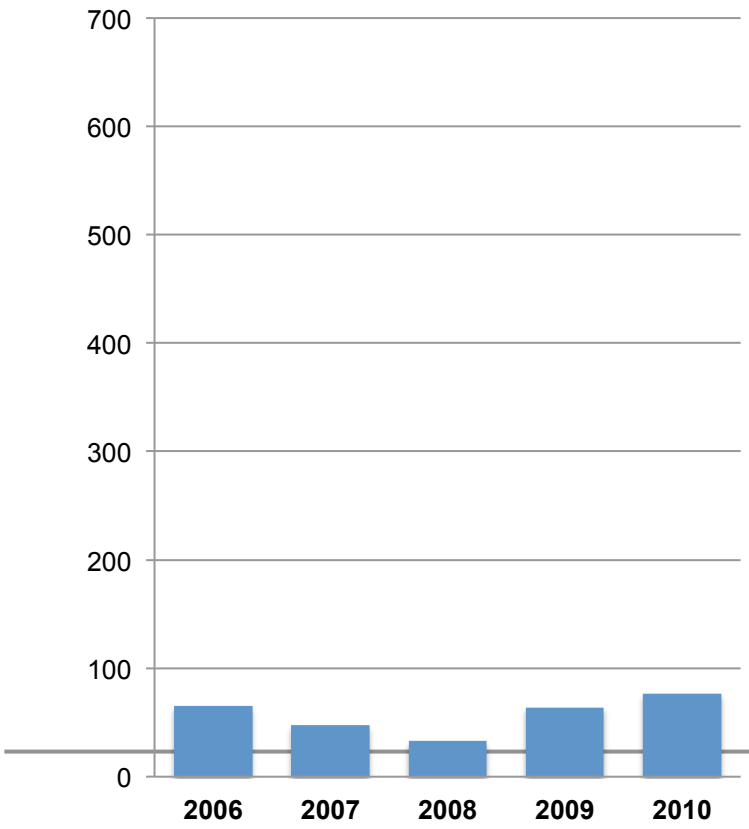
WIND

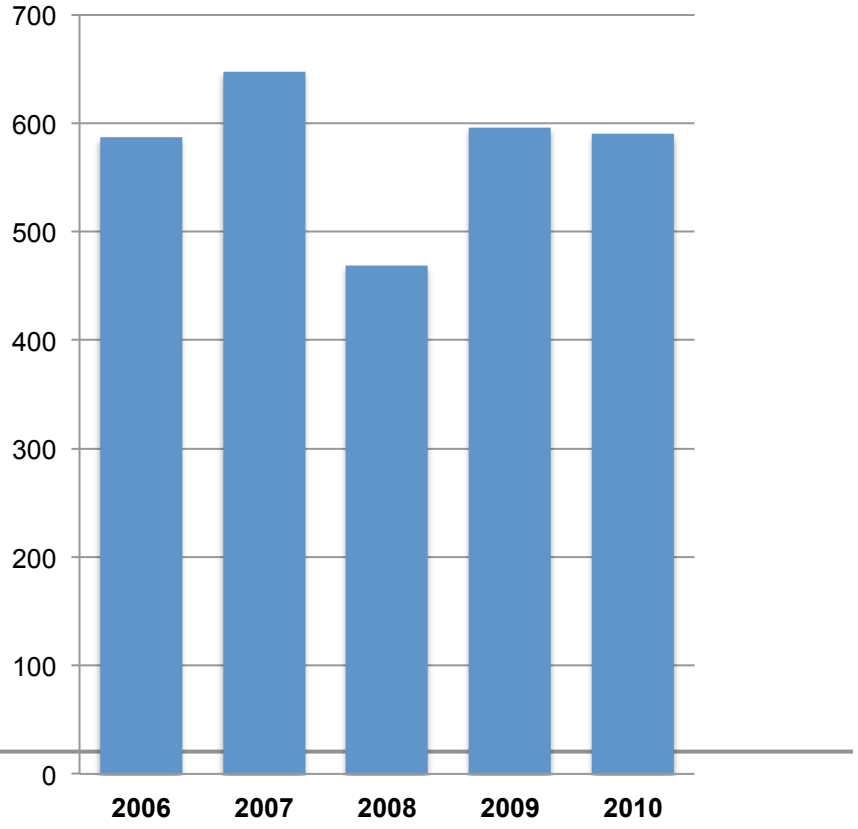
56€/tCO2

SOLAR

574€/tCO2



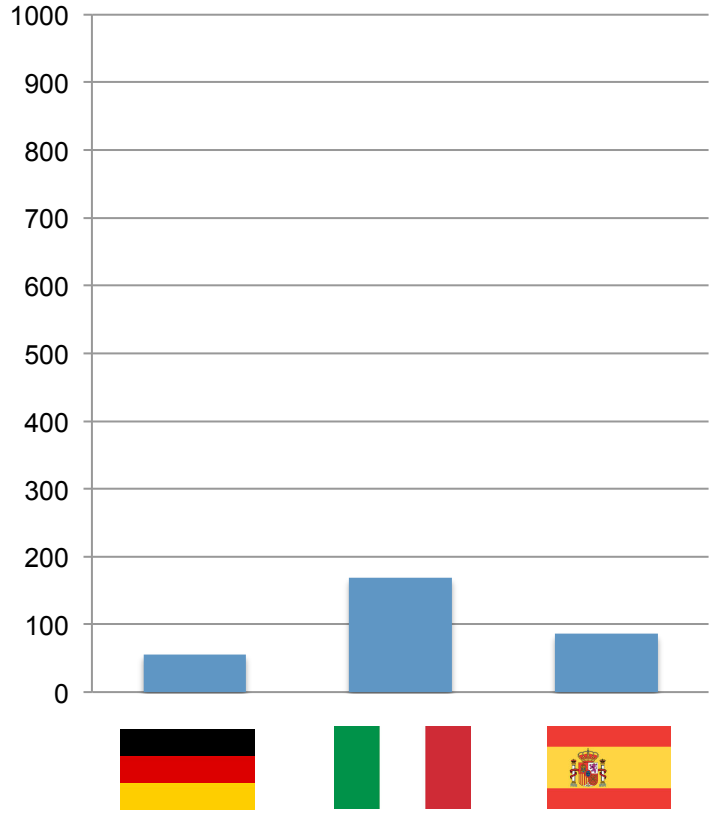


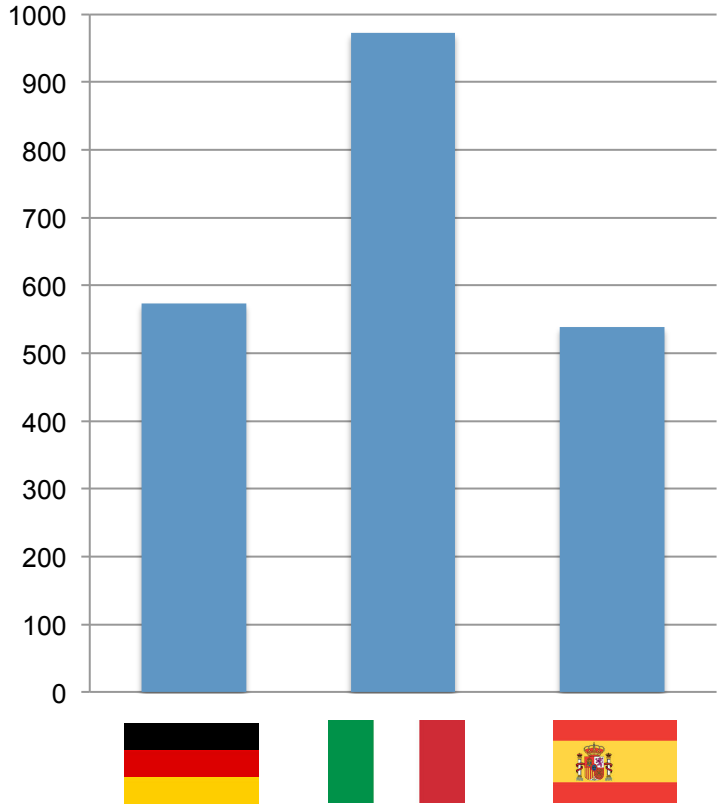


Implicit carbon price [€/tCO2]

WIND

SOLAR





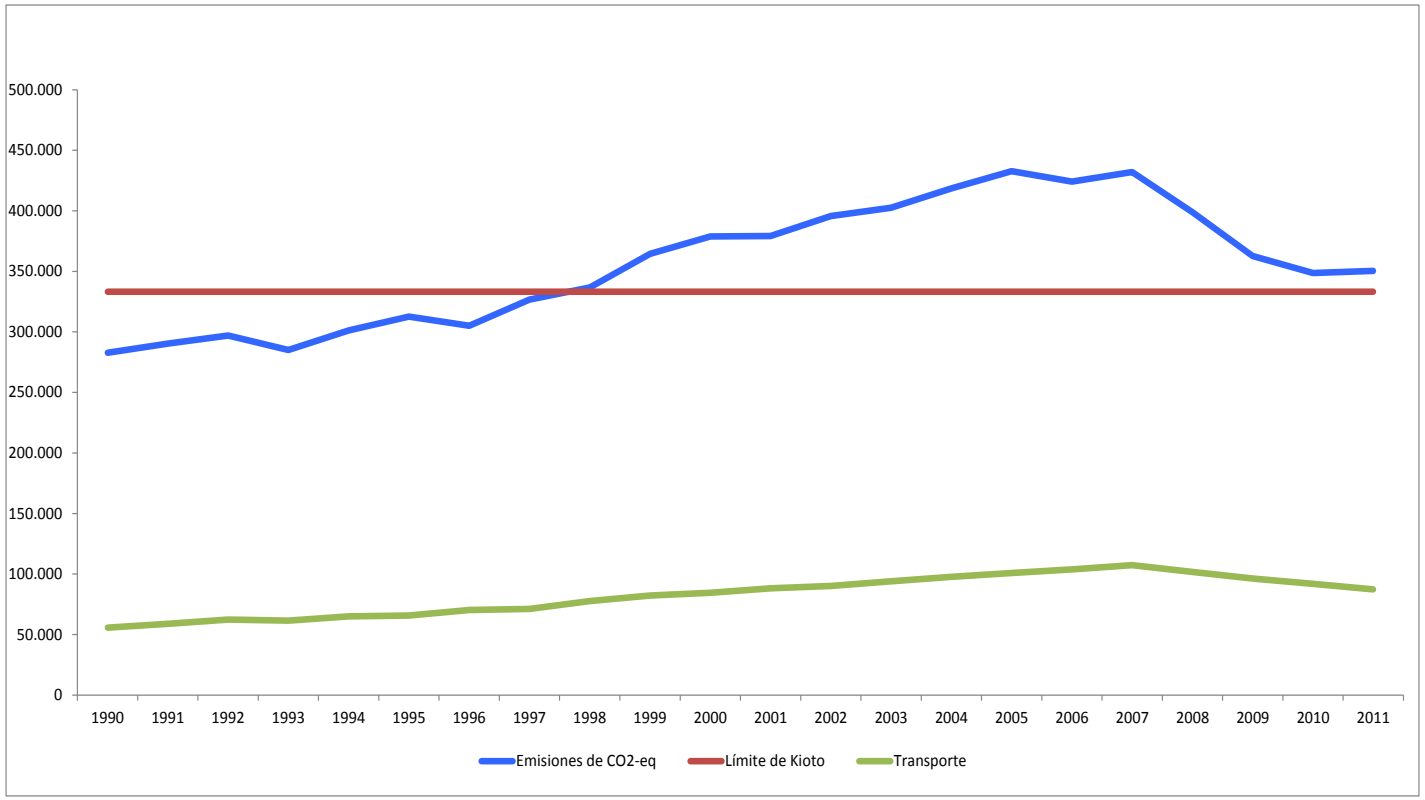
Germany 2006-2010; Italy 2008-2011; Spain 2010-2012

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

The Spanish experience: Picture

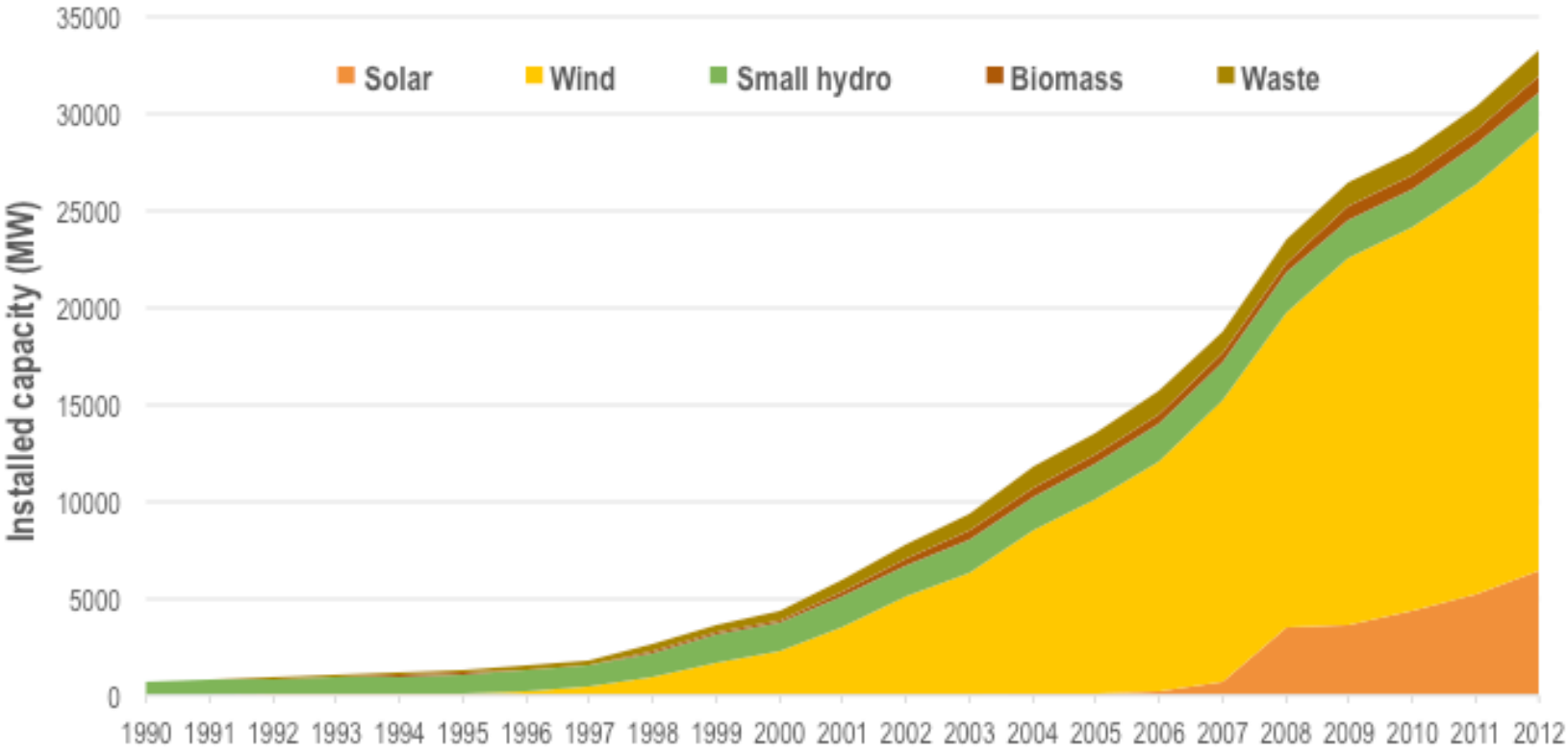
Spanish CO_2 emissions



Source: OECC (2013)

The Spanish experience: Results

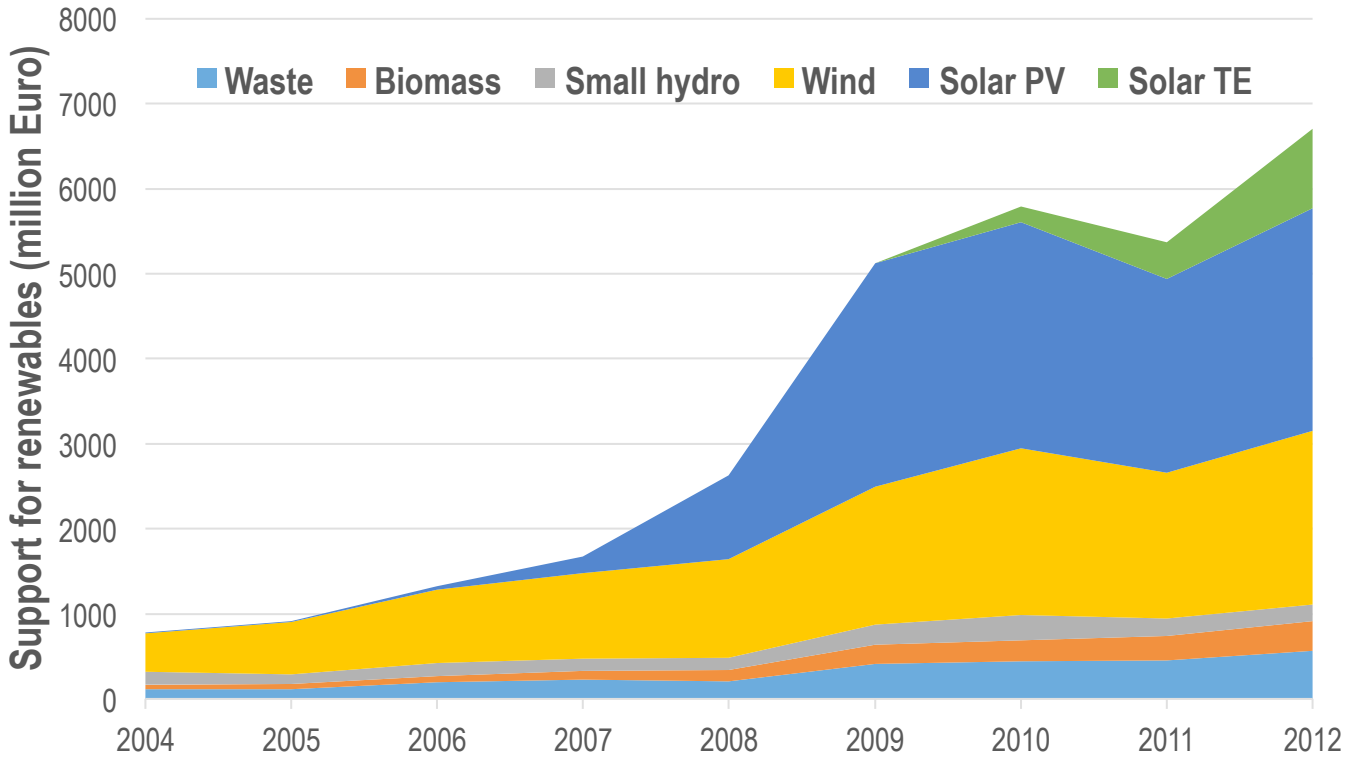
- **A success story, for some…**



Source: Linares & Labandeira (2013)

The Spanish experience: Results

- **… Costs**



Source: Linares & Labandeira (2013)

Energy taxation in Spain

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**

Ex ante and Ex post

- **Ex ante evaluation of climate policy instruments**
  - **Mild macro impacts**
  - **Double dividends**
  - **Minor distributional concerns**
- **Lack of action by the Spanish government: in particular no price transmission to consumers (before 2010)**
- **Citizens' preferences on climate policy instruments?**
- **The current debate: energy poverty (electricity)**

THANKS

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The Spanish experience: Policy developments

- The objectives: 1) energy dependence, 2) generation of a national industry, 3) environment
- First moves: 1980 (Law for Energy Conservation)
- 1990s: General framework (ordinary/special regimes; FIT; increasing renewable objectives); 1994 wind boom starts
- 2004-2008: Ambitious objectives and expansion; 2007 PV solar boom
- 2009-2011: Cost containment efforts, Thermo-solar expansion
- January, 2012: Suspension of incentives for new projects
- July, 2013: Energy reform (still being developed)

The Spanish experience: Policy developments

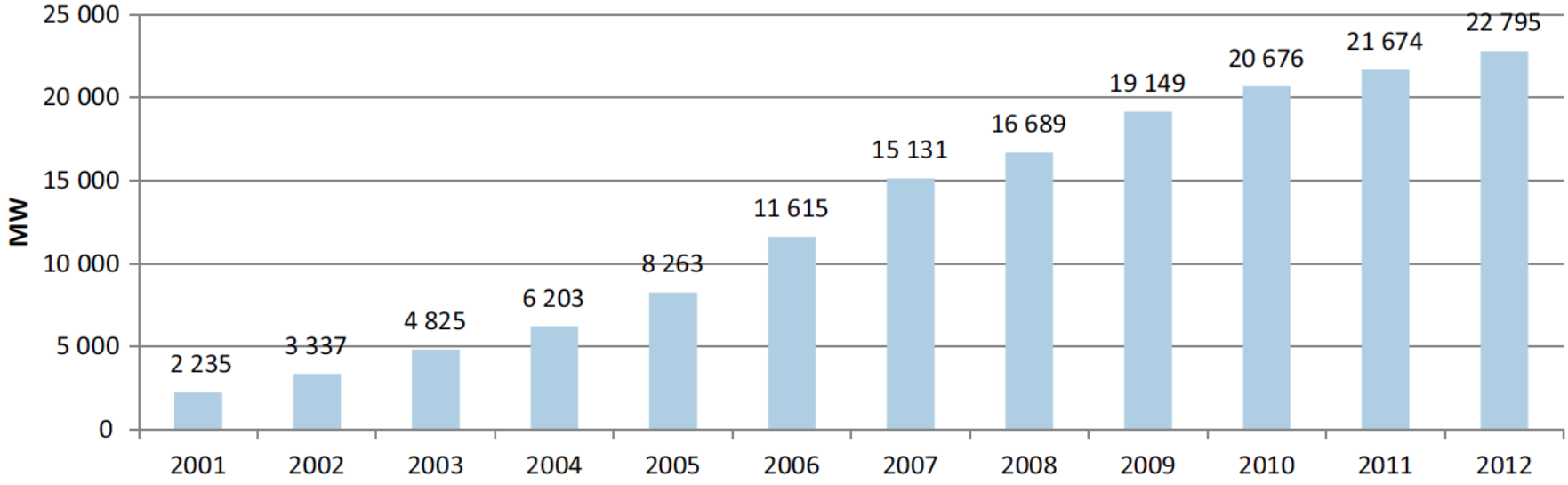
- **The instrument: Feed in Tariff (with some twists: premiums added to market prices, with cap and floor) and targets.**

€/MWh	2004	2005	2006	2007	2008	2009	2010	2011
Solar PV	332,52	340,40	374,06	392,14	388,74	424,63	414,23	389,59
Solar TE							267,33	239,93
Wind	28,08	28,92	37,37	36,35	35,97	42,35	45,56	40,87
Small hydro	31,72	29,31	36,06	35,61	31,69	42,99	44,01	39,02
Biomass	30,54	27,87	35,17	46,71	52,06	74,26	77,51	75,01

Source: Linares & Labandeira (2013)

The Spanish experience: Results

- **A good job with wind**
  - **Balanced and consistent growth (at contained cost - see later)**



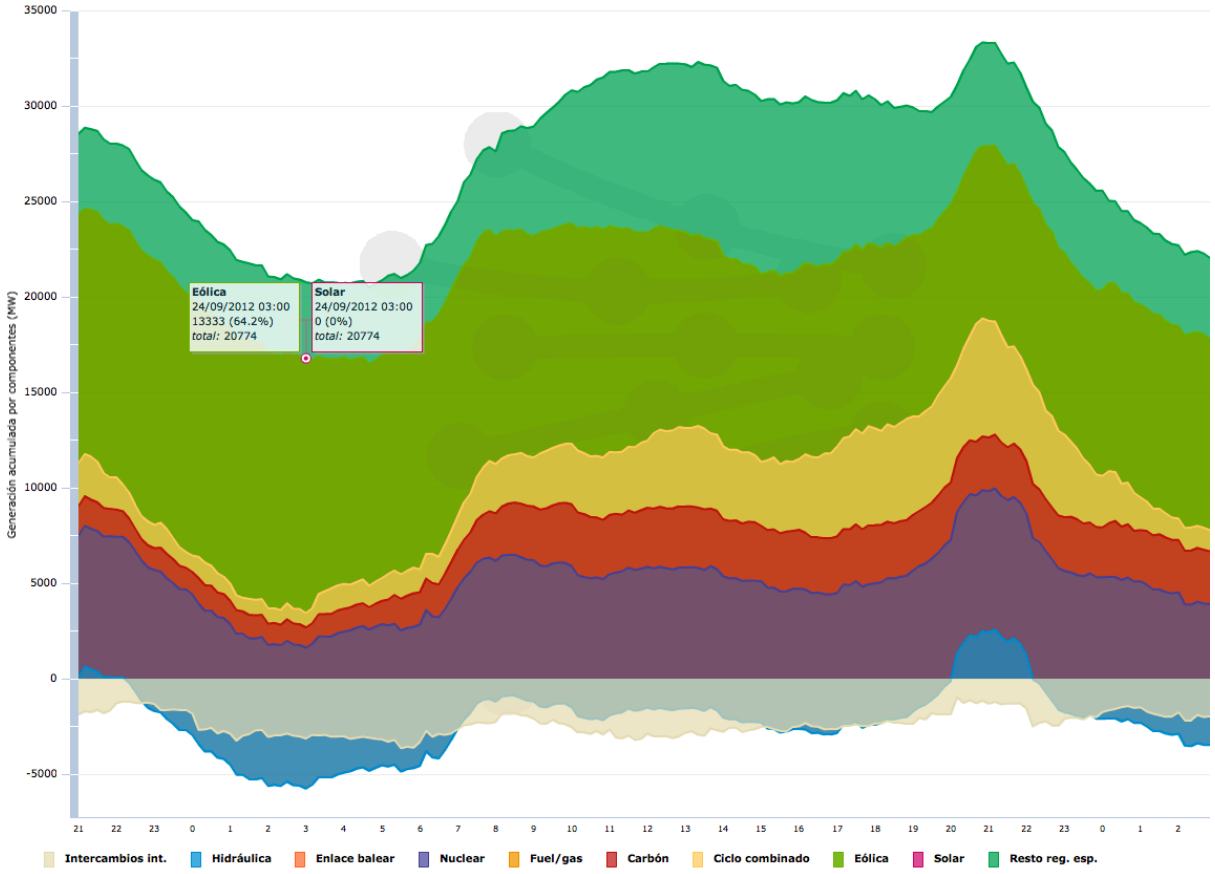
Source: IRENA (2013)

rede research in economics, business and the environment

economics for energy

The Spanish experience: Results

- **Wind again: Spain, 26 September 2012**



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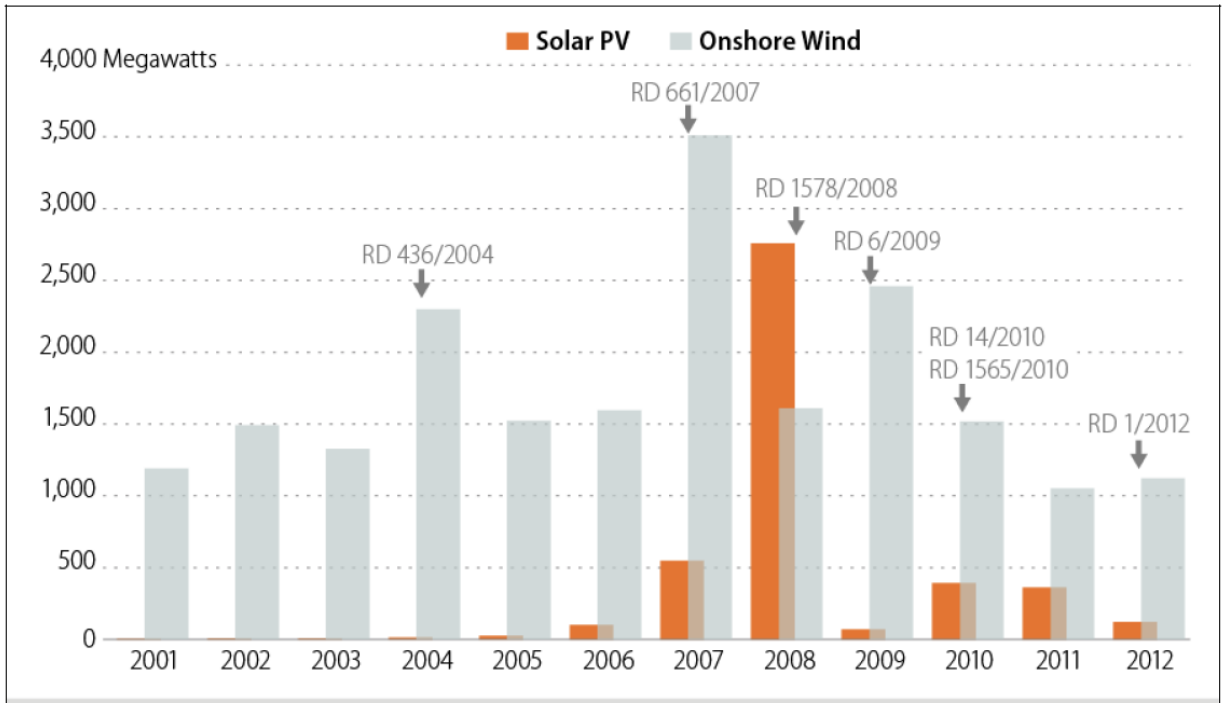
Source: REE (2013)

The Spanish experience: Results

- **Large installation of solar PV in a short time span**

Figure 4. Spain: Annual Wind and Solar PV Capacity Additions
(2001 to 2012)



Source: CRS; Bloomberg NEF (2013)

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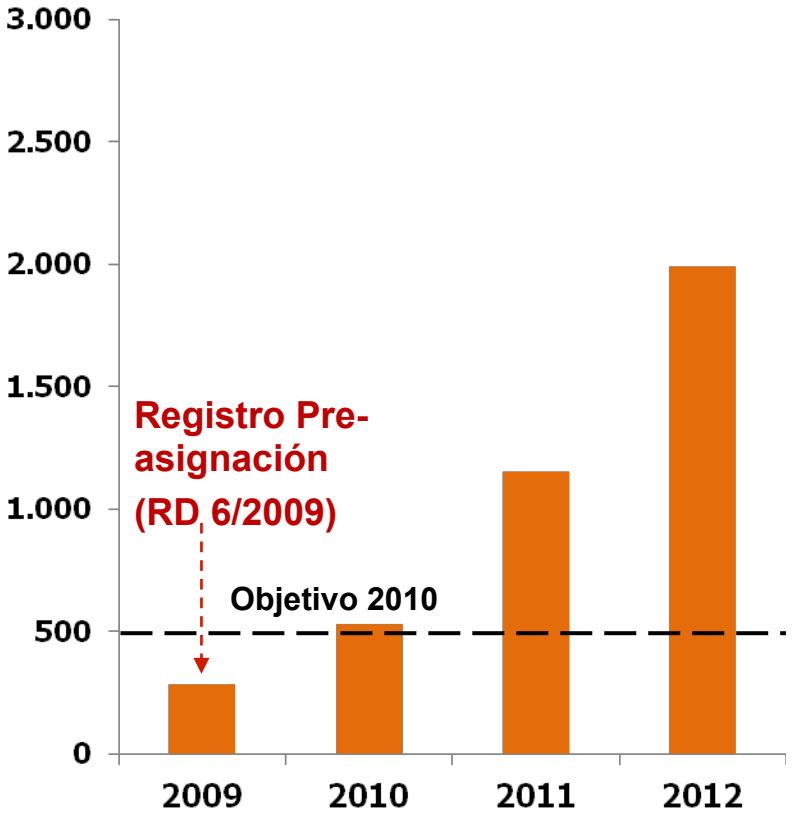
The Spanish experience: Results

- **Similar story: solar thermal**



Source: CNE (2013)

The Spanish experience: Results

- **Benefits and flaws of a de-centralized setting**
  - **Rush for developments**
    - **Industrial policies**
    - **Rent extraction (tenders, regional taxes)**
  - **Not always related to the quality of the resource**
    - **Wind**
  - **Final say with regions: difficulties to plan ex-ante and surprises such as the solar 2008 episode**

The Spanish experience: Wider policy debate

- **Links to the Spanish discussion on environmental taxes**
  - **Anomalous situation in the EU context**
    - **Are low energy taxes another symptom of price constraints?**
    - **Ubiquity of (inefficient) regional energy-environmental taxes**
    - **Ex ante positive (academic) results**
    - **Involvement of non-electricity consumers and sectors**
    - **Raising taxes would provide public revenues for fiscal consolidation, renewable promotion, distributional and regional offsets.**
  - **Citizens preferences (Hanemann, Labandeira & Loureiro, 2011)**
    - **Focus groups**
    - **Feasible price/taxes packages to promote renewables in electricity and transport**