# RENEWABLE ENERGY POLICY AND DEVELOPMENTS IN SPAIN

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ASU Global Institute of Sustainability
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# 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."


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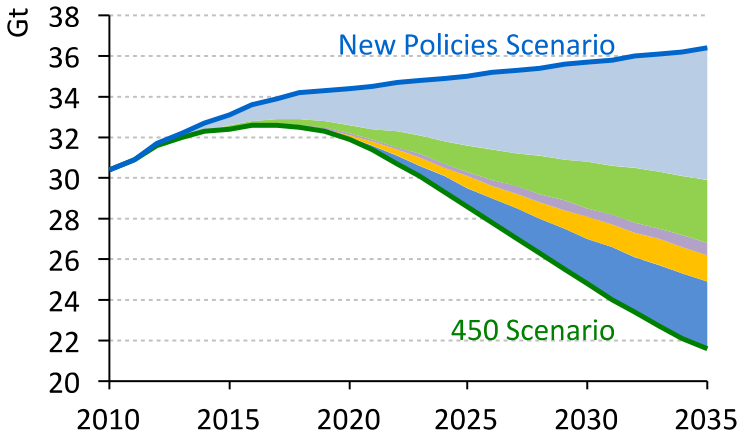
# Reasons for renewables and policies

- Climate change (cost-benefit vs. exogenous target)WEO2011:




| | Abatement 2020 | 2035 |
|---|---|---|
| Efficiency | 72% | 44% |
| Renewables | 17% | 21% |
| Biofuels | 2% | 4% |
| Nuclear | 5% | 9% |
| CCS | 3% | 22% |
| Total (Gt $CO_2$) | 2.5 | 14.8 |

Source: IEA (2012)

- Energy dependence (security and rents)
- Industrial development

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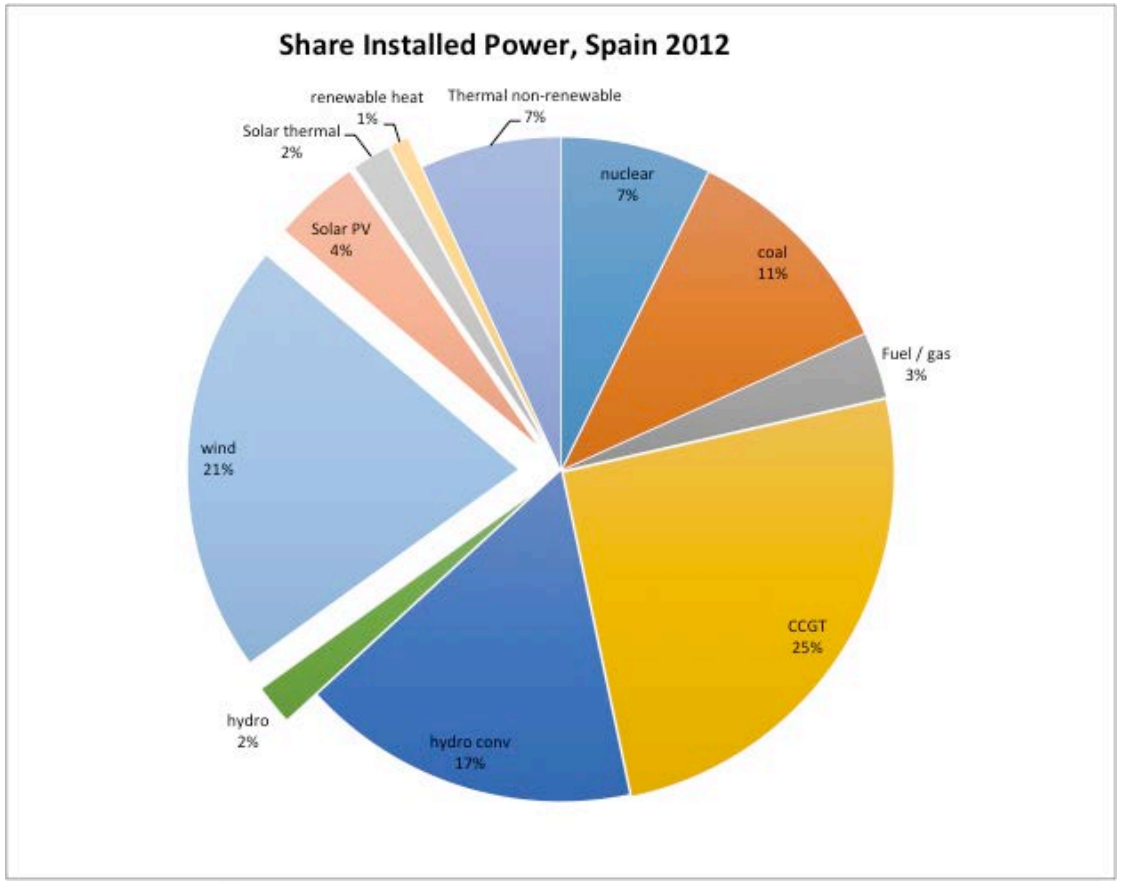
# Reasons for renewables and policies

- The technological externality
- Technology *push* (learning by research)
- Demand *pull* (learning by doing)
  - Feed In Tariffs (FIT)
    - Fixed or with premium
  - Green Certificates
  - Auctions
  - Subsidies to investment
- Relevance: 118 countries with objectives and policies in 2011
- A wider public policy (energy, finance, etc.) discussion

# The Spanish experience: Picture

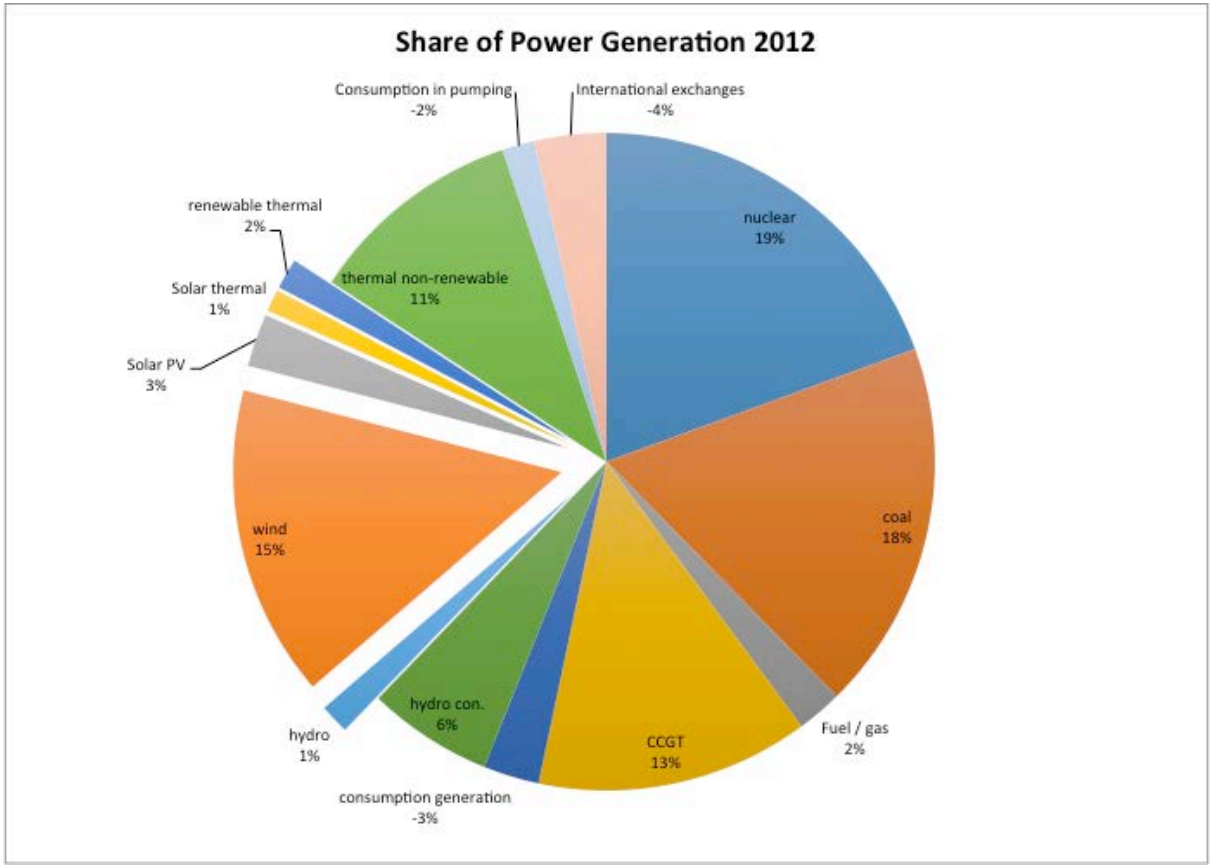
## Electricity sector




Source: FN (2013)

# The Spanish experience: Picture

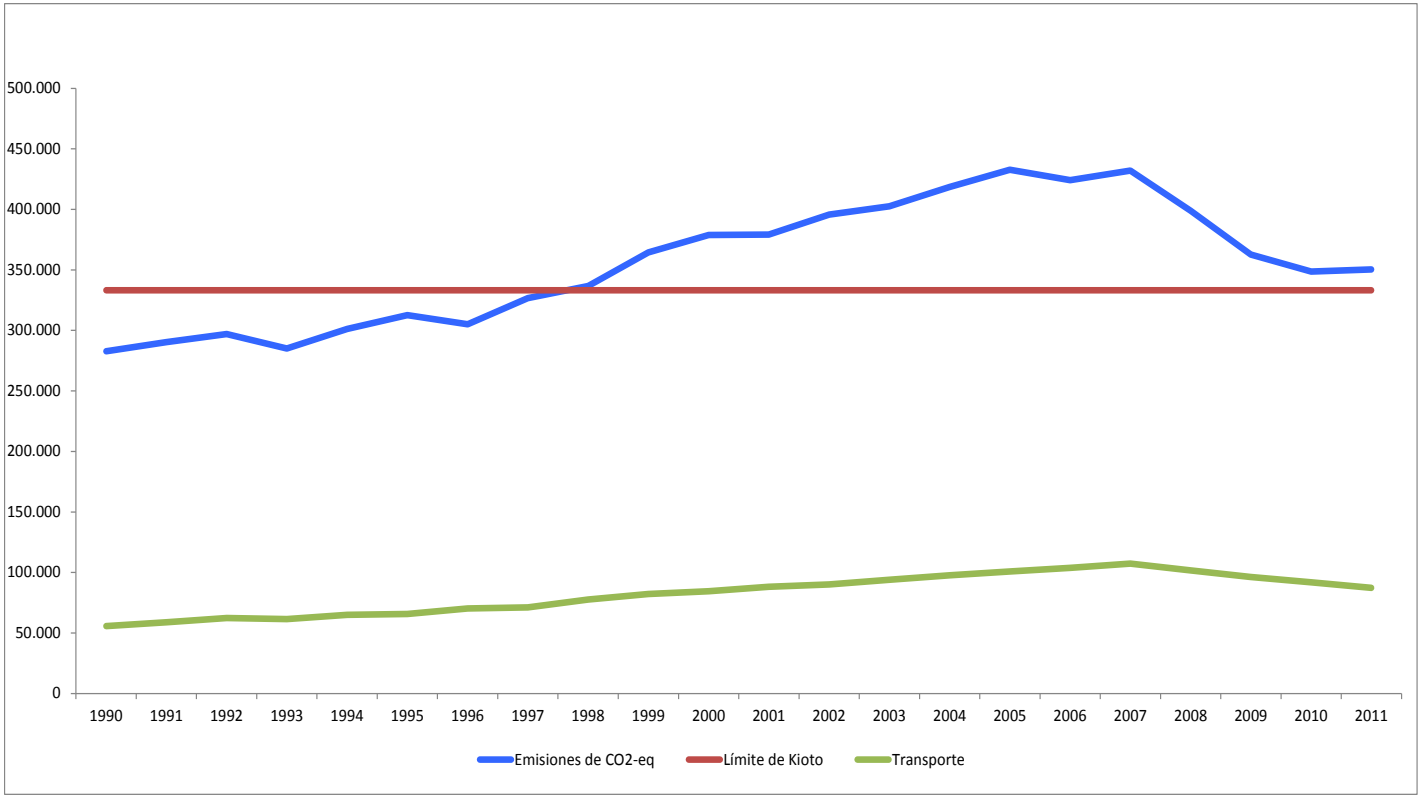
## Electricity sector




Source: FN (2013)

# The Spanish experience: Picture

## Spanish $CO_2$ emissions

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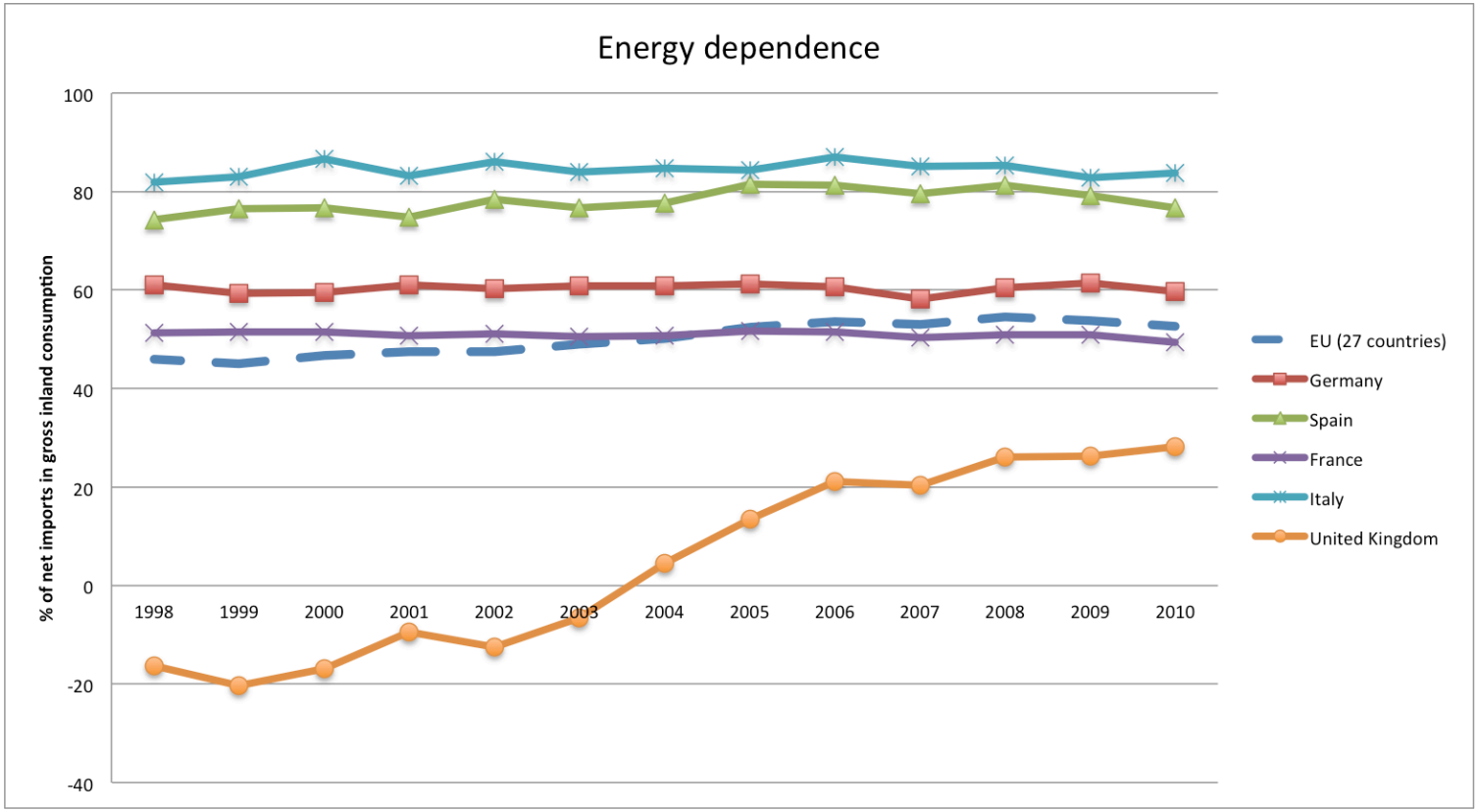
Source: OECC (2013)

# The Spanish experience: Picture

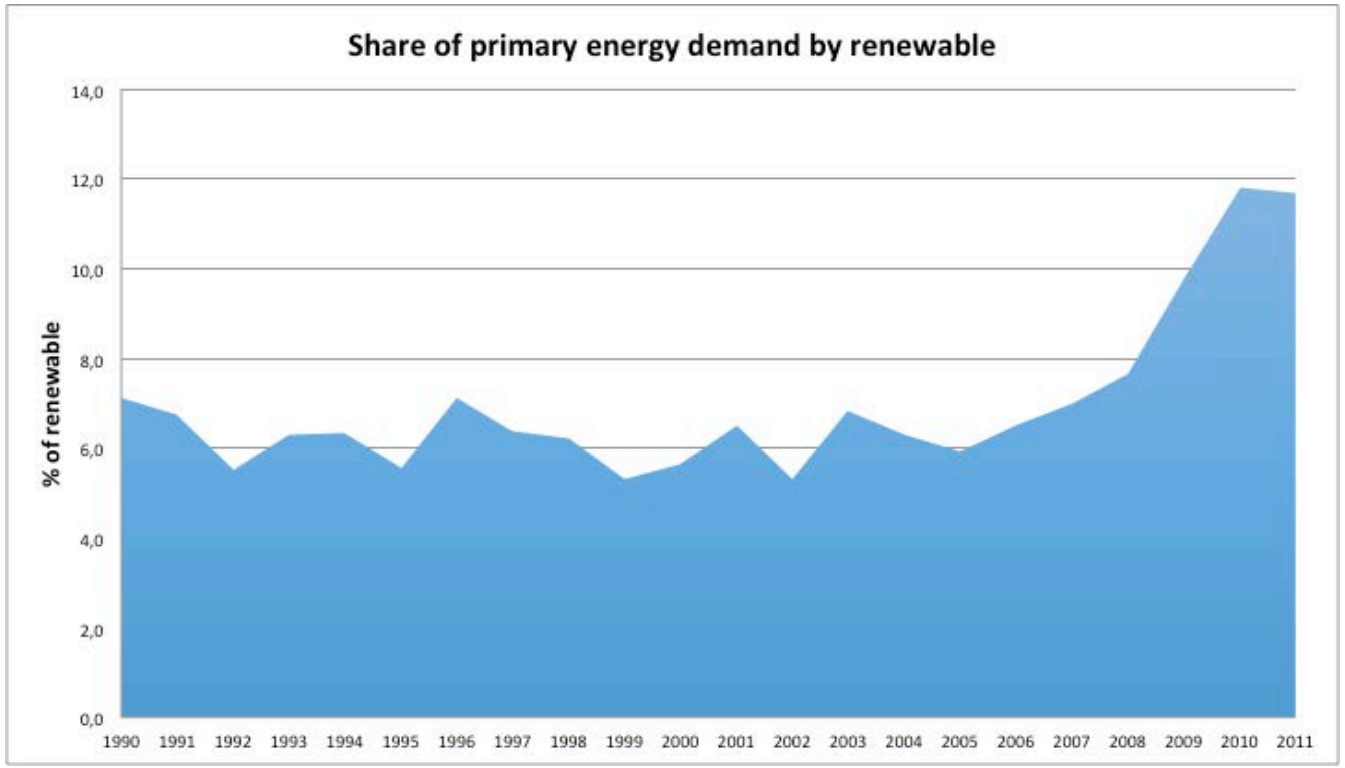
## Energy dependence




Source: IEA (2012)

# The Spanish experience: Picture

and renewables…




Source: FN (2013)

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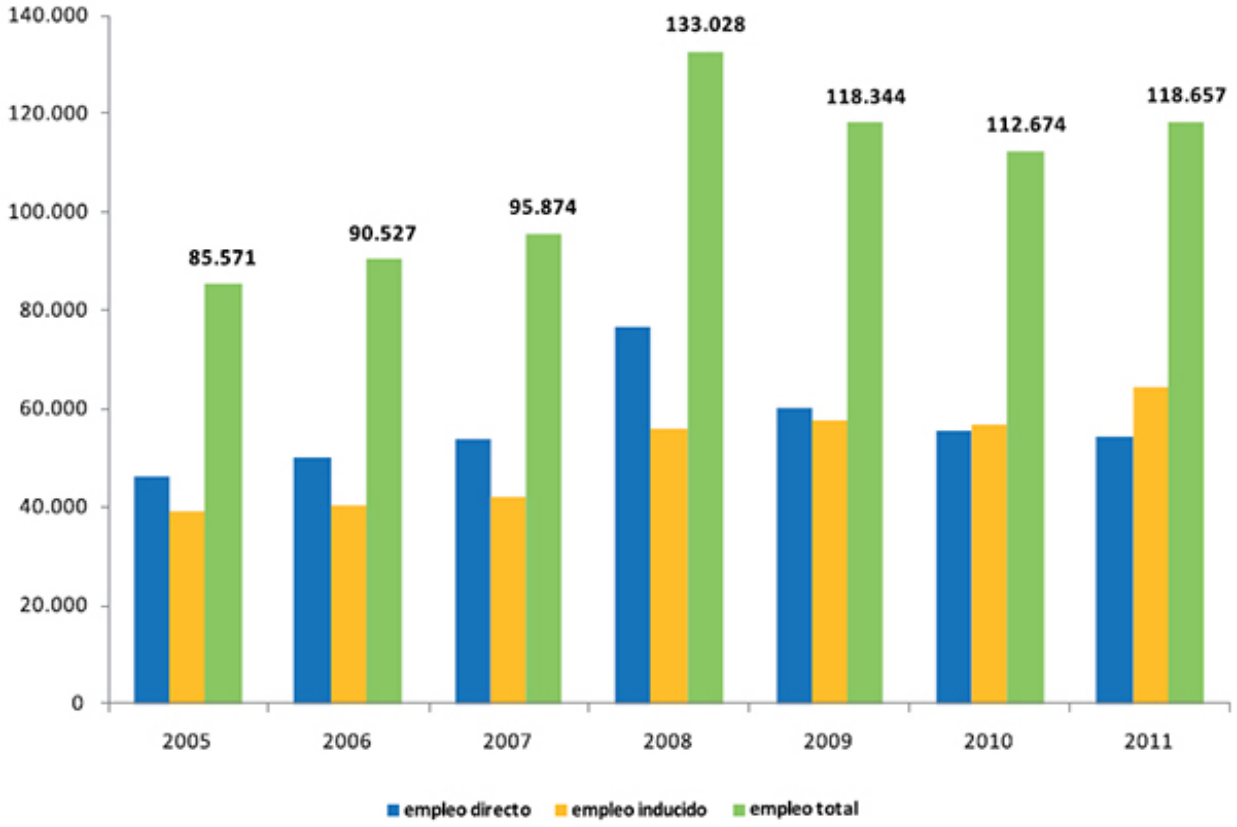
# The Spanish experience: Picture

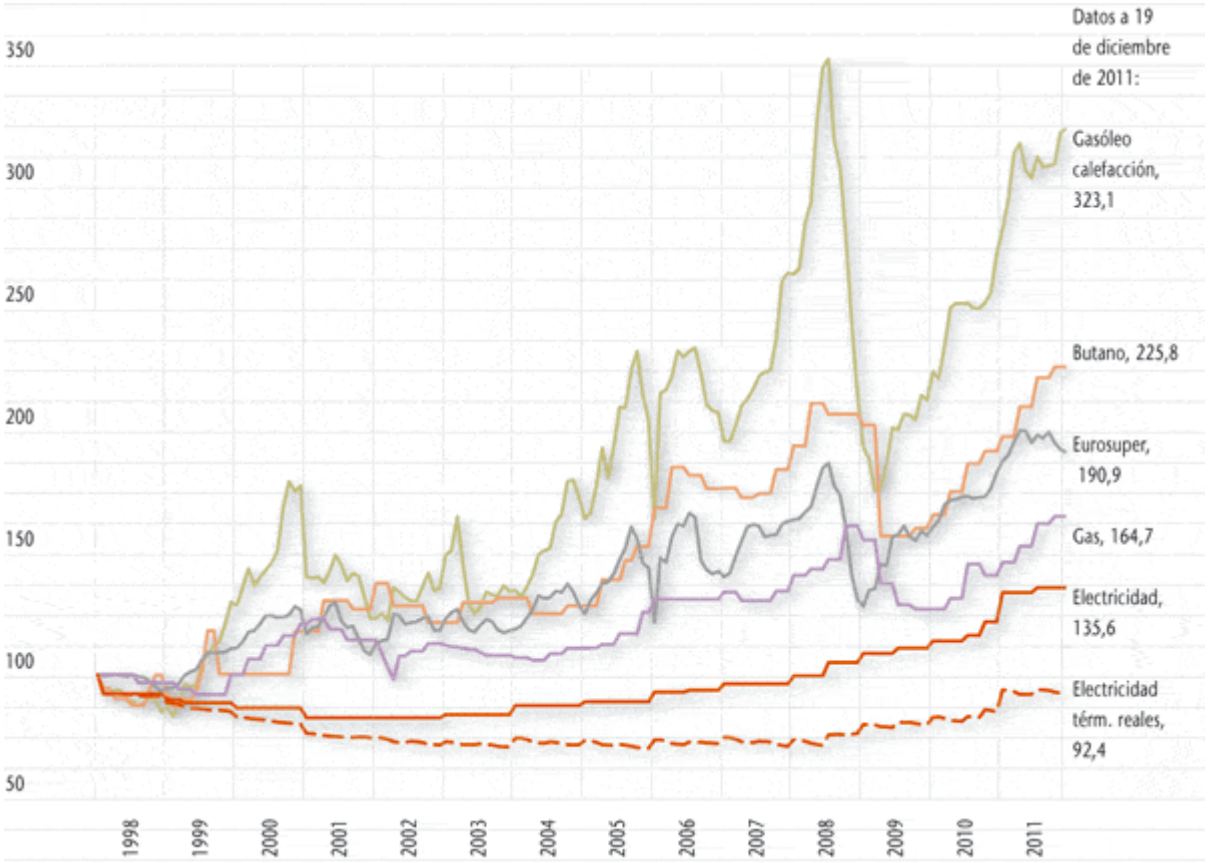
## Jobs in the Spanish renewable industry




Source: APPA (2013)

# The Spanish experience: Picture

- The electricity context: prices under “political” control…

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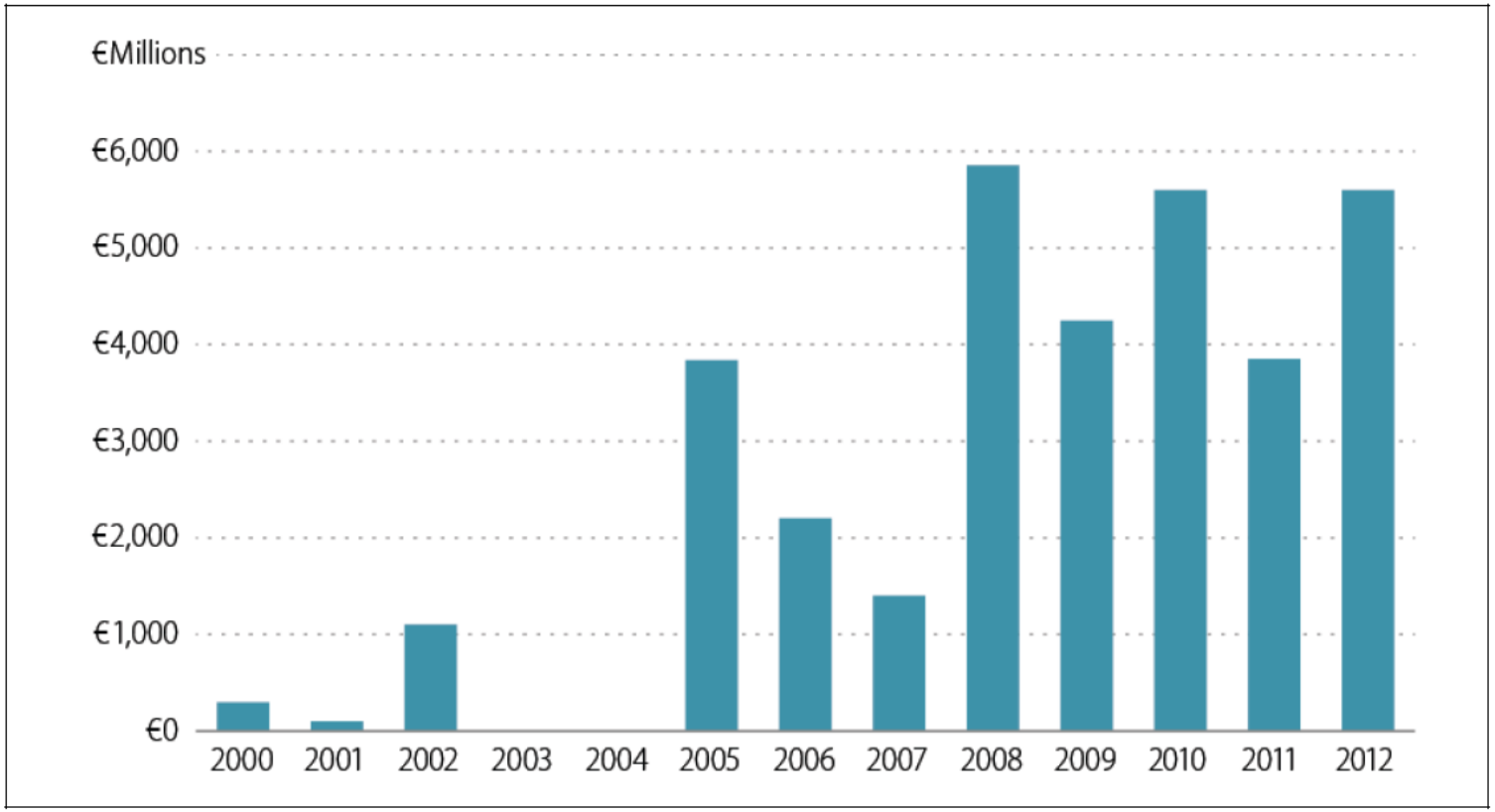
Source: FN (2013)

# The Spanish experience: Picture

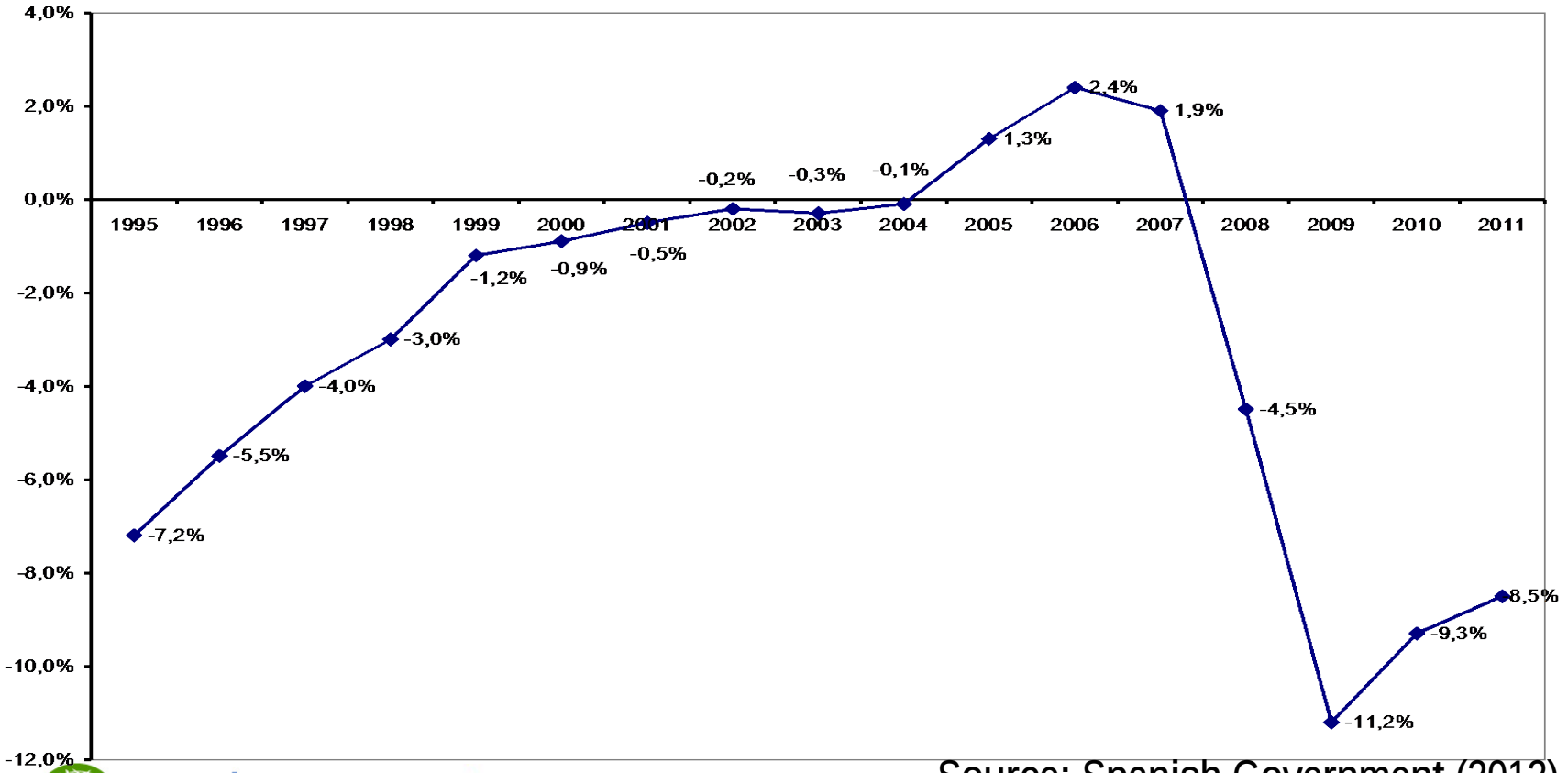
- that may result in electricity tariff deficit




Source: CNE (2013)

# The Spanish experience: Picture

## Spanish public finances (deficit/surplus, % GDP)




Source: Spanish Government (2012)

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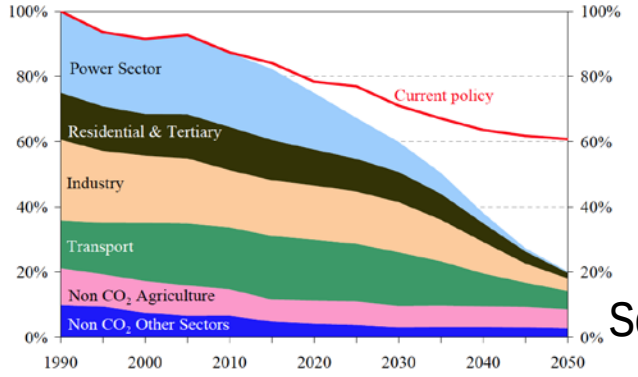
# The Spanish experience: EU setting

- EEC/EU guiding principles in this area: environment, energy security, competitiveness
- 1997 White Paper (pre-Kyoto): 12% renewables by 2010
- Directive 2001/77/EC: Non binding (above) targets: 22.1% of renewables in electricity. Total flexibility for member states:
  - Feed in Tariffs (Spain, Germany, France…)
  - Green certificates (Italy, UK…)
- EU Climate and Energy Package (2007): 20 (%renewables in final energy) -20 (%-20 GHG emissions wrt 1990) -20 (20% energy efficiency improvement wrt baseline) for 2020

# The Spanish experience: EU setting

- Directive 2009/28/EC. Again flexibility approach to member states (vs., eg, EU emissions trading scheme)
  - Binding renewable energy targets for EU members
    - Based on quality of renewable resources, country pc GDP, energy mix
      - Spain: 20%; Germany: 18%; UK: 15%; Sweden: 49%
    - Minimum of 10% transport energy from renewable sources by 2020
    - Possible joint projects among member states, and outside EU (CDM)
    - Ongoing debate on 2030 targets (2013 green paper, 2011 EU energy roadmap to 2050)

Figure 1: EU GHG emissions towards an 80% domestic reduction (100% =1990)




Source: EC (2013)

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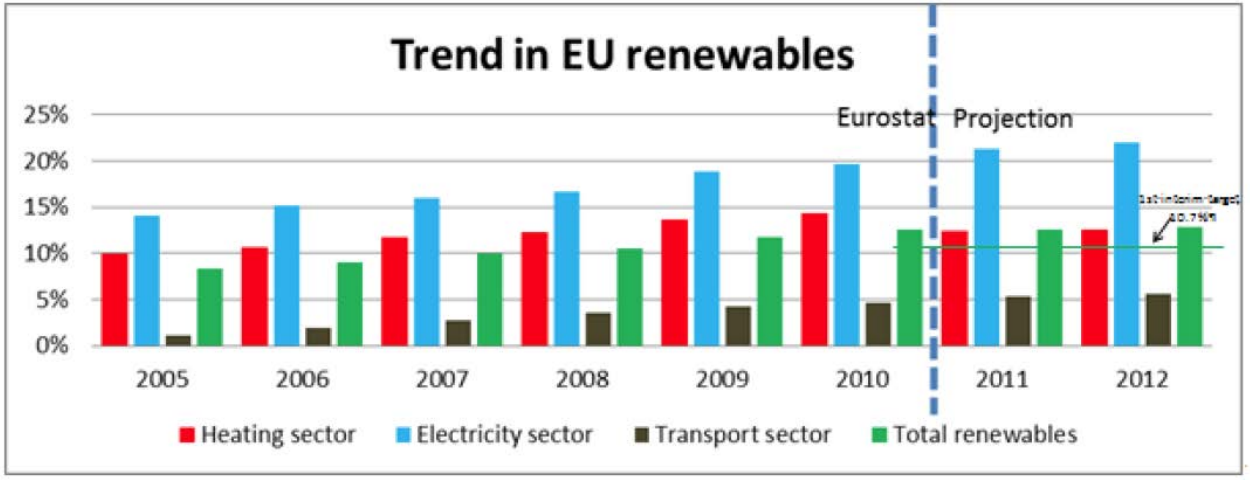
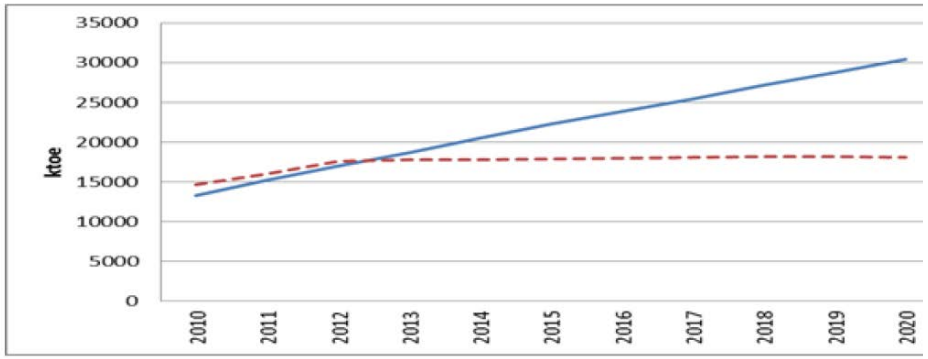
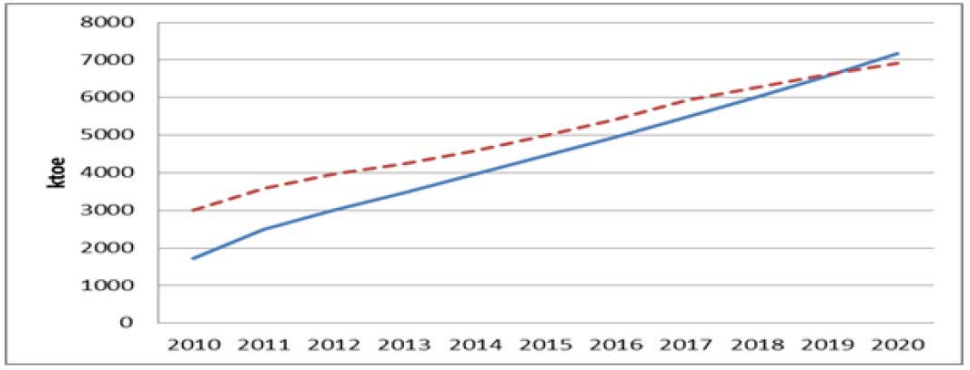
# The Spanish experience: EU setting

- Evolution of EU Renewables (report to the Parliament by the EC)




*Planned (blue) versus estimated (red/dotted) trend in EU onshore wind energy*

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Source: EC (2013)

# 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 to be 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.

| 234 5 6" | 122! | 1223 | 1224 | 1225 | 1226 | 122% | 12$2 | 12$$ |
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Source: Linares & Labandeira (2013)

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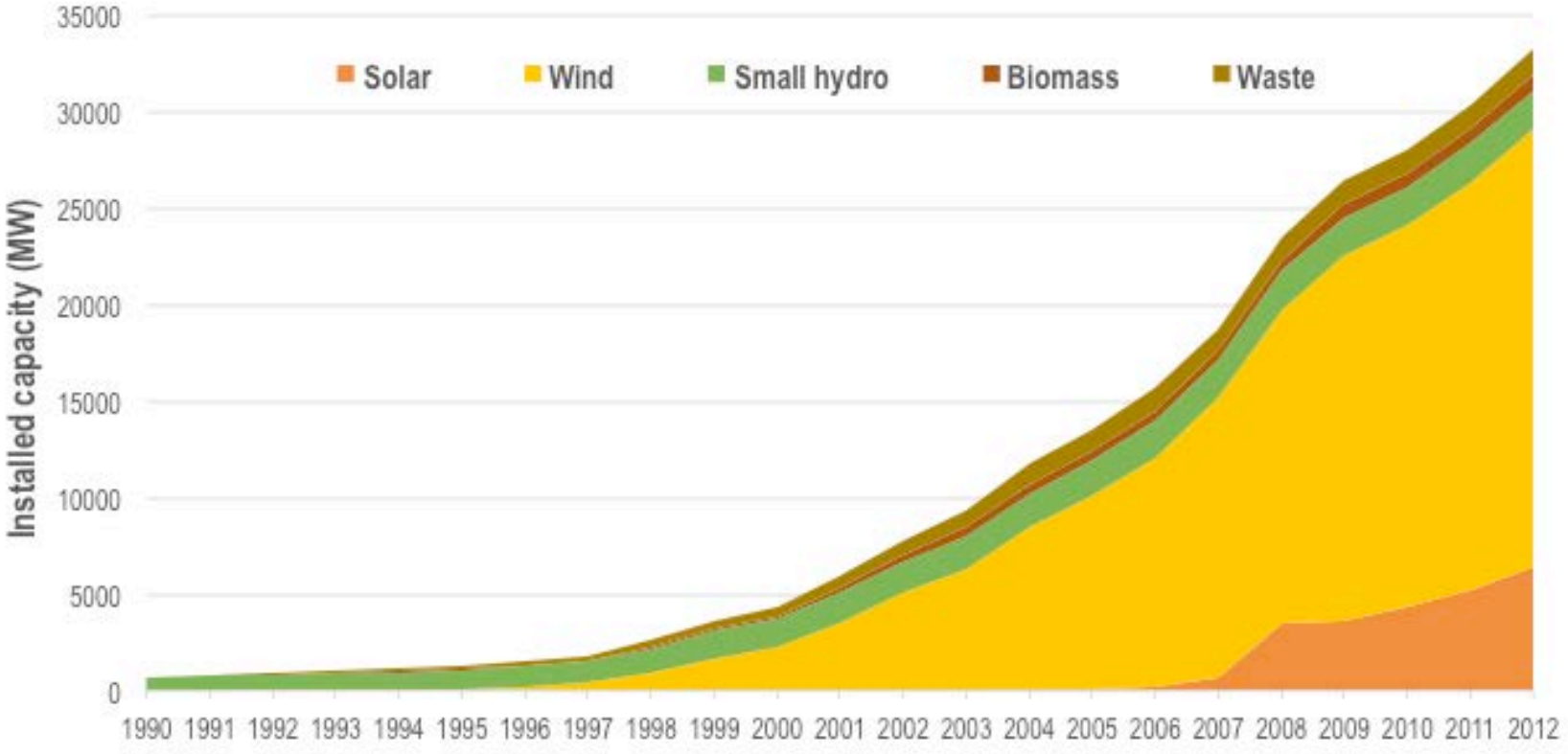
# The Spanish experience: Results

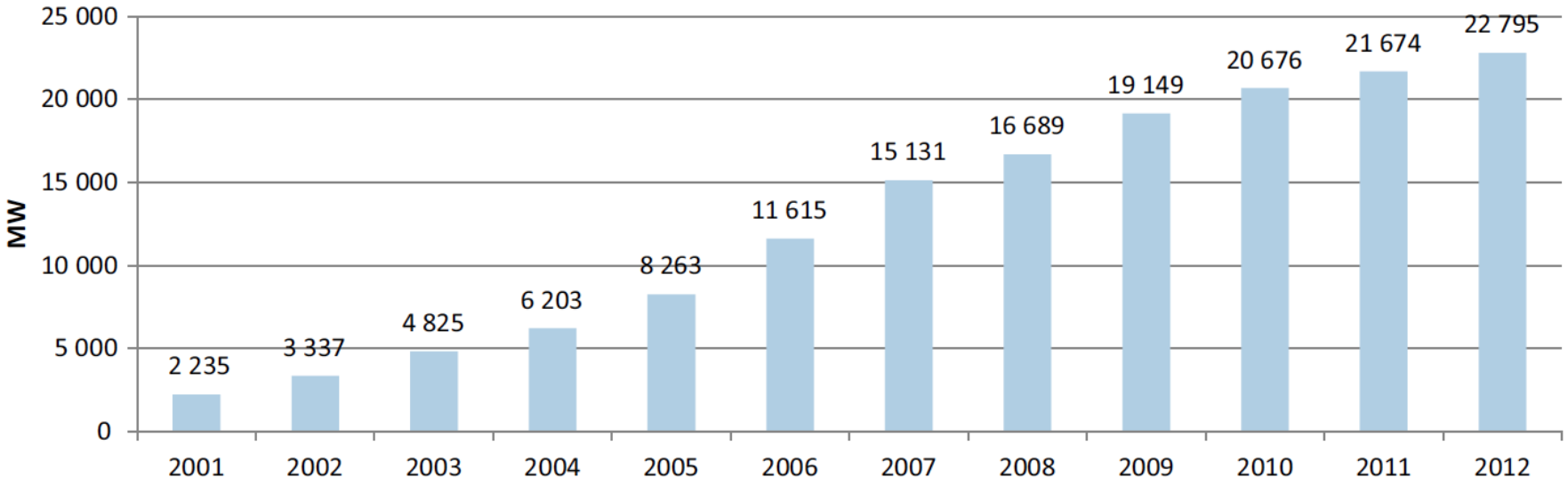
- A success story, for some…




Source: Linares & Labandeira (2013)

# The Spanish experience: Results

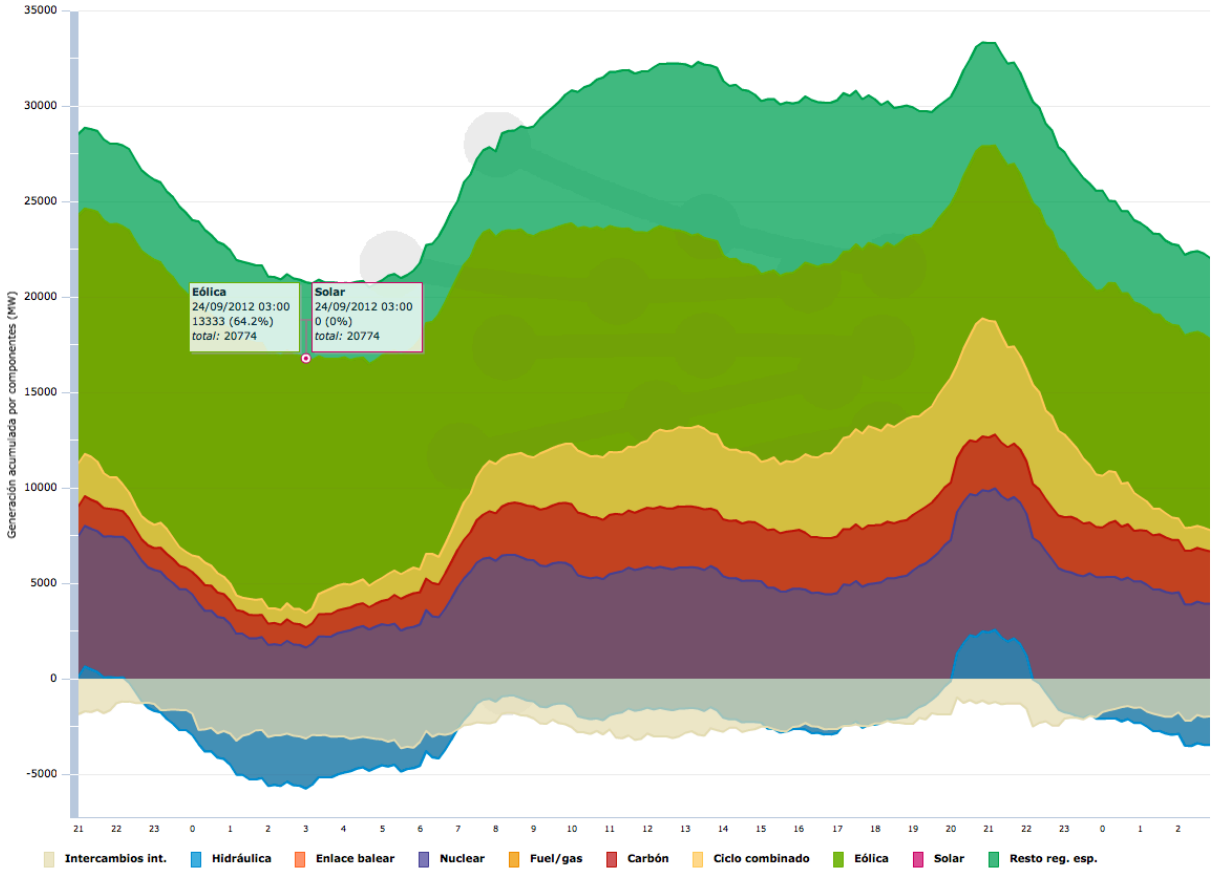
- A good job with wind
  - Balanced and consistent growth (at contained cost - see later)




Source: IRENA (2013)

# The Spanish experience: Results

- Wind again: Spain, 26 September 2012

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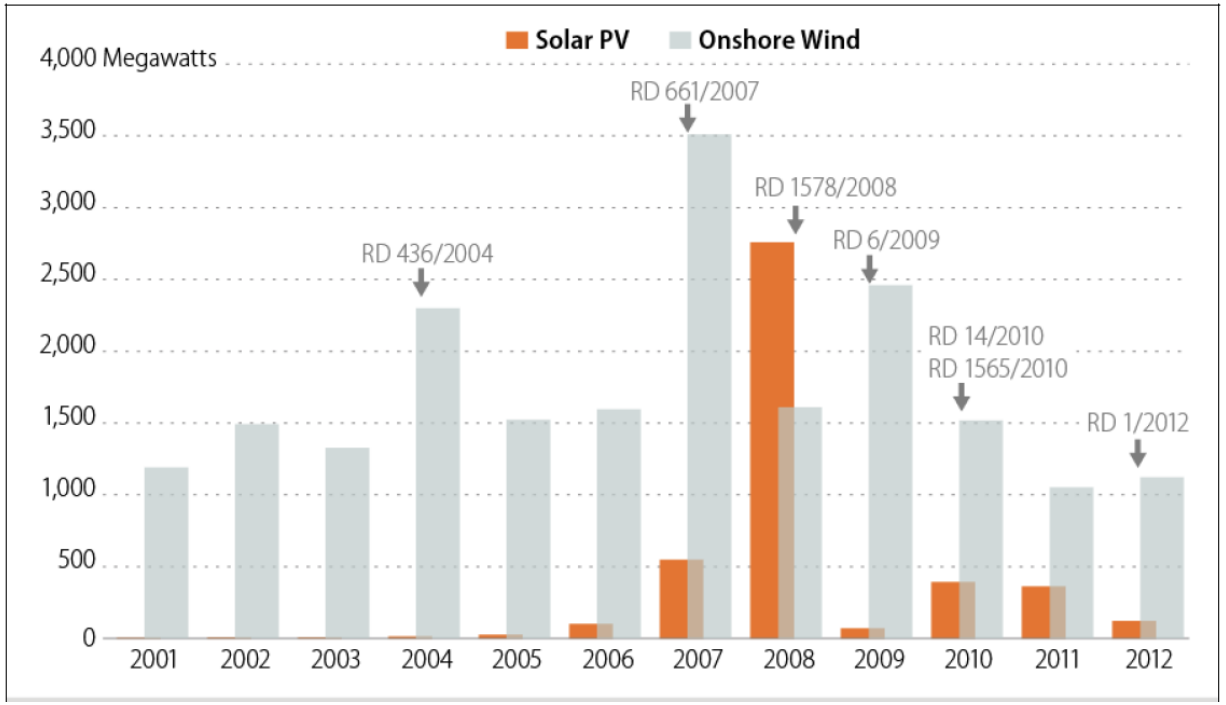
Source: REE (2013)

# 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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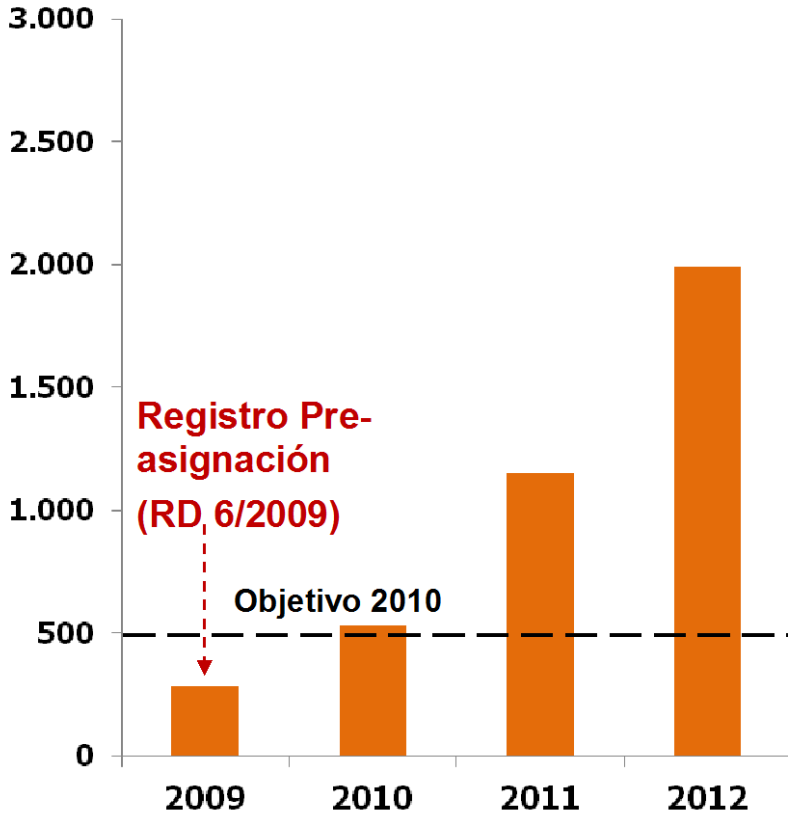
# The Spanish experience: Results

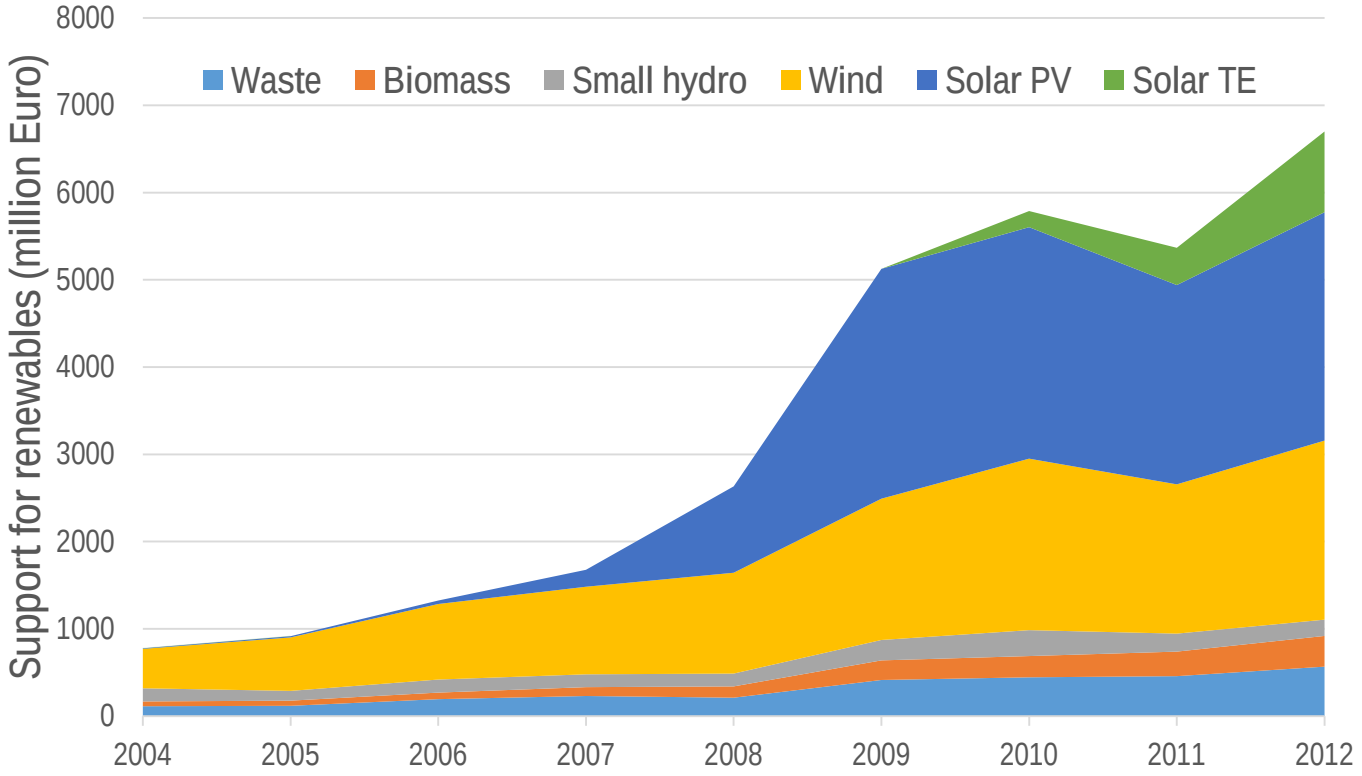
- Similar story: solar thermal




Source: CNE (2013)

# The Spanish experience: Results

- ... Costs




Source: Linares & Labandeira (2013)

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# The Spanish experience: Results

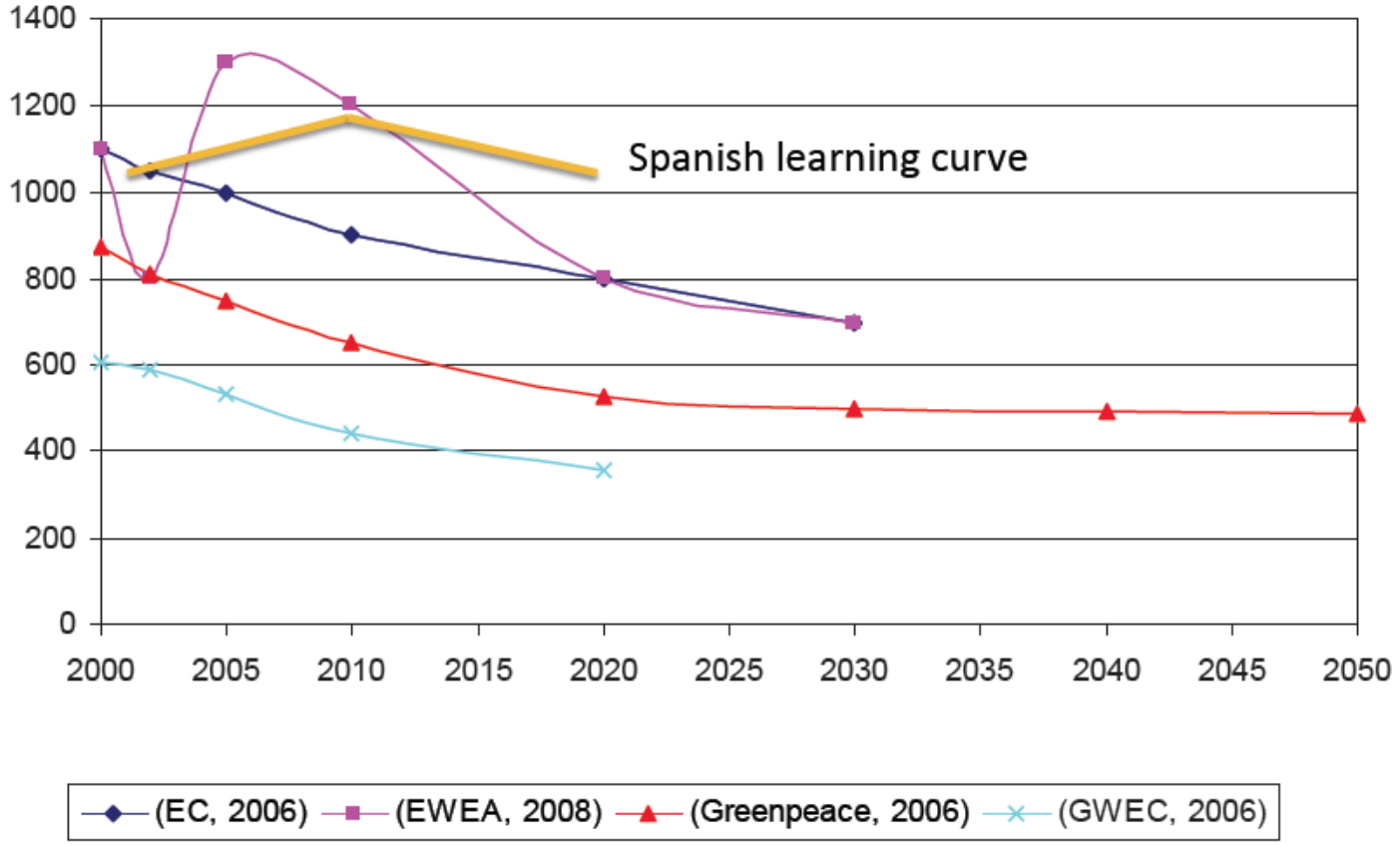
- In 2012, costs of support for renewables were around 6,700 M Euros, around 30% of total costs of the system
- Figures for 2009 show large imbalances:

| | Share of total system costs | Share of electricity demand |
|---|---|---|
| **Wind** | 6 | 15,2 |
| **Small hydro** | 1 | 2,3 |
| **Biomass and waste** | 3 | 1,1 |
| **Solar** | 10 | 3 |

Source: Linares & Labandeira (2013)

# The Spanish experience: Results

- Learning curves: Wind

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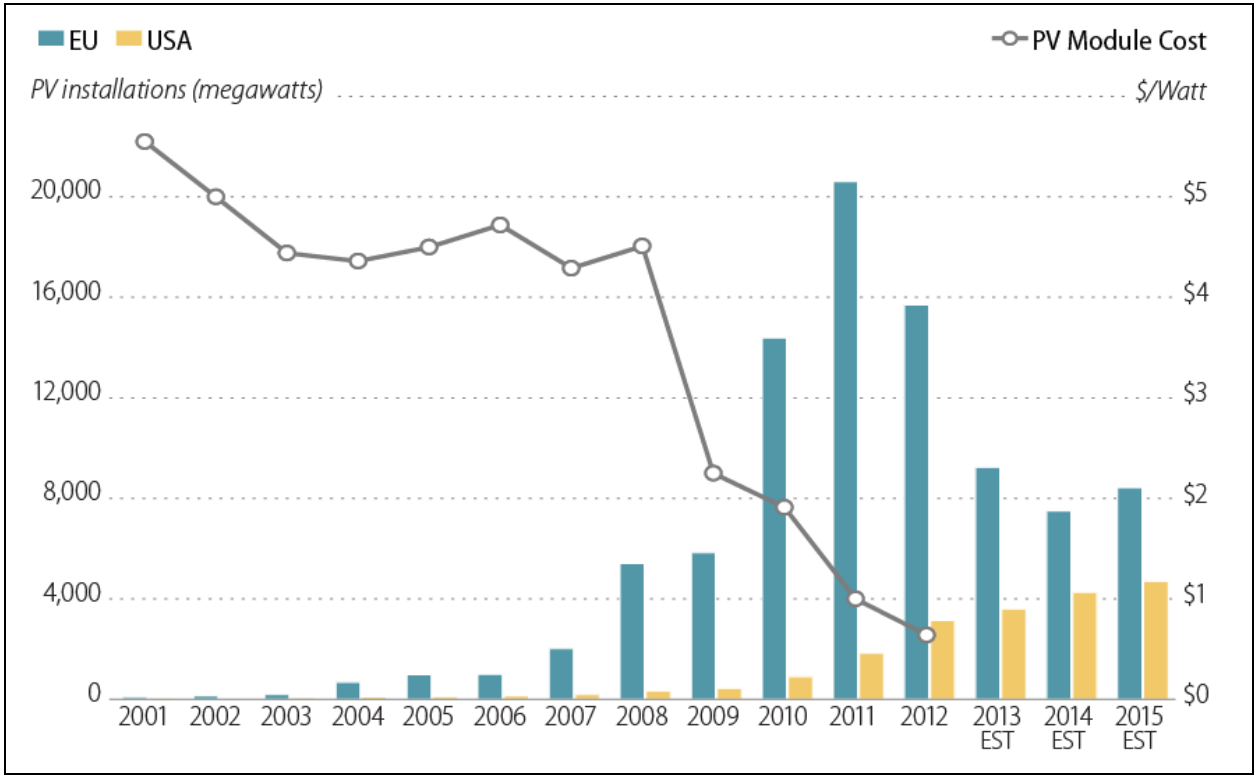
# The Spanish experience: Results

- Learning curves: PV Solar




Source: CRS; Bloomberg NEF (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: Results

- More on industrial effects
  - Limited effects of Feed in Tariffs
    - Wind industry developed by regions (licensing, etc.)
    - Solar PV has virtually disappeared
      - Most PV panels installed during the 2008 boom were imported
      - Technological breakthroughs came from other countries

# The Spanish experience: Wider policy debate

- Links to other EU-derived policy instruments
  - Emissions Trading Scheme
  - Recent focus on energy efficiency policies
  - Negative interactions and synergies?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Source: EEA (2013)

# The Spanish experience: Wider policy debate

- Links to electricity and energy policy
  - Effects on wholesale prices (Gelabert, Labandeira & Linares, 2011)
    - Short-term reductions of prices
    - Effects on investments
    - In the line of the empirical academic literature
  - Grid issues
  - Renewable intermittency and capacity needs
  - Effects on conventional utilities
  - Energy poverty

# The Spanish experience: Wider policy debate

Literature on price effects of renewable generation.
Source: The authors.

| (1) Paper | (2) Meth. | (3) Country | (4) Type | (5)Period | (6)Reported price change (€/MWh unless stated) | (7) As per | (8)Common measure* | (9) Difference + | (10) Wind share | (11) Ratio (8)/(10) |
|---|---|---|---|---|---|---|---|---|---|---|
| Bode and Groscurth (2006) | S | Germany | All | Roughly 2005 | (−0.50, −0.60) | 1 GW A G | (−0.50, −0.60) | | 1.41 | (−0.35, −0.43) |
| Fürsch et al. (2012) | S | Germany | All | 2015–2030 (F) | 2015: −2.00 | A vs. 2010 P | −0.40 | 5.02 | | |
| | | | | | 2020: −4.00 | A vs. 2010 P | −0.35 | 11.42 | | |
| | | | | | 2025: −5.00 | A vs. 2010 P | −0.37 | 13.70 | | |
| | | | | | 2030: −10.00 | A vs. 2010 P | −0.61 | 16.32 | | |
| Neubarth et al. (2006) | E | Germany | Wind | 2004–2005 | −1.89 | 1 GW A G | −1.89 | | 1.41 | −1.34 |
| Sensfuss (2011) | S | Germany | All | 2007–2010 | 2007: −5.82 | N vs. N | −0.77 | 7.58 | 1.37 | −0.56 |
| | | | | | 2008: −5.83 | N vs. N | −0.71 | 8.22 | 1.38 | −0.52 |
| | | | | | 2009: −6.09 | N vs. N | −0.71 | 8.57 | 1.48 | −0.48 |
| | | | | | 2010: −5.27 | N vs. N | −0.55 | 9.58 | 1.40 | −0.39 |
| Sensfuss et al. (2008) | S | Germany | All | 2001, 2004–2006 | 2001: −1.70 | N vs. N | −0.94 | 1.80 | 1.50 | −0.63 |
| | | | | | 2004: −2.50 | N vs. N | −0.60 | 4.18 | 1.42 | −0.42 |
| | | | | | 2005: −4.25 | N vs. N | −0.86 | 4.97 | 1.41 | −0.61 |
| | | | | | 2006: −7.83 | N vs. N | −1.34 | 5.59 | 1.38 | −0.97 |
| Traber and Kemfert (2011) | S | Germany | Wind | 2007–2008 | −3.70 | N vs. N | −0.80 | 4.65 | 1.38 | −0.58 |
| Traber et al. (2011) | S | Germany | All | 2020 (F) vs. 2010 | −3.20 | A vs. 2010 P | −0.24 | 13.07 | 1.61 | −0.15 |
| Weber and Woll (2007) | S | Germany | Wind | 2006 | −4.04 | N vs. N | −1.15 | 3.51 | 1.38 | −0.84 |
| Weigt (2009) | S | Germany | Wind | 2006–2008 | 2006: −6.26 | N vs. N | −1.78 | 3.51 | 1.38 | −1.30 |
| | | | | | 2007: −10.47 | N vs. N | −2.30 | 4.54 | 1.37 | −1.68 |
| | | | | | 2008: −13.13 | N vs. N | −2.83 | 4.65 | 1.38 | −2.05 |
| Gelabert et al. (2011) | E | Spain | All | 2005–2010 | 2005: −3.80 | 1 GW A G | −3.80 | | 3.36 | −1.13 |
| | | | | | 2006: −3.40 | 1 GW A G | −3.40 | | 3.25 | −1.04 |
| | | | | | 2007: −1.70 | 1 GW A G | −1.70 | | 3.16 | −0.54 |
| | | | | | 2008: −1.50 | 1 GW A G | −1.50 | | 3.14 | −0.48 |
| | | | | | 2009: −1.10 | 1 GW A G | −1.10 | | 3.39 | −0.32 |
| | | | | | 2010: −1.70 | 1 GW A G | −1.70 | | 3.18 | −0.54 |
| Gil et al. (2012) | E | Spain | Wind | 2007–2010 | −9.72 | N vs. N | −2.15 | 4.51 | 3.21 | −0.67 |
| Linares et al. (2008) | S | Spain | All | 2020 (F) | 2020: −1.74 | A vs. A | −0.70 | 2.49 | 2.32 | −0.30 |
| Sáenz de Miera et al. (2008) | S | Spain | Wind | Jan 2005–May 2007 | 2005: −7.08 | N vs. N | −2.99 | 2.37 | 3.36 | −0.89 |
| | | | | | 2006: −4.75 | N vs. N | −1.83 | 2.60 | 3.25 | −0.56 |
| | | | | | 2007: −12.44 | N vs. N | −3.99 | 3.12 | 3.16 | −1.26 |
| Holttinen et al. (2001) | S | Nordpool | Wind | 2010 (F) | −2.00 per year | 10 TWh A G | −1.70 | | 2.18 | −0.02 |
| Jonsson et al. (2010) | E | Denmark | Wind | 2006–2007 | Roughly −40% | L vs. H | −9.87 | 0.63 | 20.63 | −0.48 |
| Ostergaard et al. (2006) | E | Denmark | Wind | 2004–2006 | 2004: −1.00 | N vs. N | −1.33 | 0.75 | 21.66 | −0.06 |
| | | | | | 2005: −4.00 | N vs. N | −5.28 | 0.76 | 24.17 | −0.22 |
| | | | | | 2006: −2.50 | N vs. N | −3.58 | 0.70 | 19.21 | −0.19 |
| Nieuwenhout and Brand (2011) | E | Holland | Wind | 2006–2009 | −5% | N vs. N | −6.17 | 0.43 | 8.25 | −0.75 |
| O'Mahoney and Denny (2011) | E | Ireland | Wind | 2009 | −0.0099 | 1 MW A G | −9.90 | | 31.02 | −0.32 |
| Nicholson et al. (2010) | E | Texas | Wind | 2007–2009 | (−0.67, −16.4) ($/MWh) | 1 GW A G | (−0.47, −11.60) | | 2.87 | (−0.16, −4.04) |
| Woo et al. (2011) | E | Texas | Wind | 2007–2010 | (−13, −44) ($/MWh) per 15 min | 1 GWh A G | (−2.34, −7.91) | | 2.87 | (−0.82, −2.76) |

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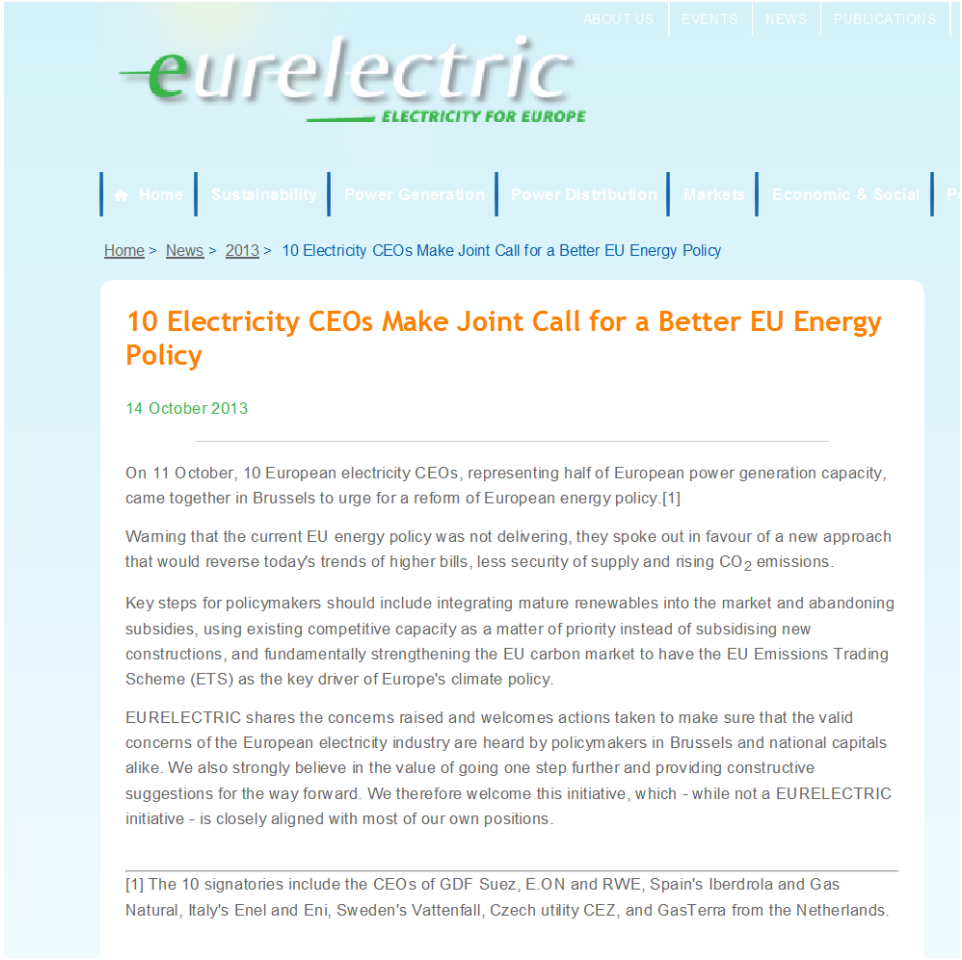
Source: Würzburg, Labandeira & Linares (2013)

# The Spanish experience: Wider policy debate



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## 10 Electricity CEOs Make Joint Call for a Better EU Energy Policy

14 October 2013

On 11 October, 10 European electricity CEOs, representing half of European power generation capacity, came together in Brussels to urge for a reform of European energy policy.[1]

Warning that the current EU energy policy was not delivering, they spoke out in favour of a new approach that would reverse today's trends of higher bills, less security of supply and rising $CO_2$ emissions.

Key steps for policymakers should include integrating mature renewables into the market and abandoning subsidies, using existing competitive capacity as a matter of priority instead of subsidising new constructions, and fundamentally strengthening the EU carbon market to have the EU Emissions Trading Scheme (ETS) as the key driver of Europe's climate policy.

EURELECTRIC shares the concerns raised and welcomes actions taken to make sure that the valid concerns of the European electricity industry are heard by policymakers in Brussels and national capitals alike. We also strongly believe in the value of going one step further and providing constructive suggestions for the way forward. We therefore welcome this initiative, which - while not a EURELECTRIC initiative - is closely aligned with most of our own positions.

[1] The 10 signatories include the CEOs of GDF Suez, E.ON and RWE, Spain's Iberdrola and Gas Natural, Italy's Enel and Eni, Sweden's Vattenfall, Czech utility CEZ, and GasTerra from the Netherlands.

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# 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

# The Spanish experience: Wider policy debate

## 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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# A cautionary tale

- Wrapping up:
  - Spain, an early achiever in renewable promotion: before EU focus on this area, and probably because of that
  - mainly related to energy dependence and industrial concerns
  - Feed in Tariff approach for all renewable energies
  - A satisfactory result with wind;
  - A solar bubble, related to a generous tariff and limited capacity of reaction (also related to lack of coordination with regional governments)

# A cautionary tale

- Wrapping up (2):
  - Dubious positive industrial effects
  - Problems magnified by the difficulties to transmit costs to consumers and the economic crisis, leading to significant ‘tariff deficit’
  - Strong implications on the electricity system, and on other public policies

# A cautionary tale

- Renewable technologies are different: regulation may need to be different too (one size does not fit all)
- Need for stable and prudential regulation, to
- Avoid boom-and-bust episodes, which may hamper the credibility and future of the whole renewable sector
- Need for coordination among governments in decentralized settings
- Need to coordinate with other energy, environmental and public finance policies

# A cautionary tale

- Potentially large distributional effects across different agents
- In sum, RE is not a niche policy in Spain and in an increasing number of EU countries anymore
  - Structural changes in energy systems
  - New policy challenges, outside but related to RE promotion (eg capacity)

- Quo vadis, Spain
  - The current electricity reform
  - Compliance with 20-20-20 and beyond?

# A cautionary tale (comments on NYT, again)

- "The Spanish regulatory system for renewables was badly designed and very expensive, but the proposed solution risks making some problems worse"
- "The July Decree was designed to discourage further investment in renewable generation and reduce output from existing renewable facilities, mainly because of the substantial renewable capacity already on the system and the steep decline in electricity demand"
- "The pendulum on renewable energy is swinging from heavily subsidizing mainly large centralized installations to the other extreme of introducing barriers to the development of competition form decentralized renewable energy, which is the future of electricity systems worldwide"

THANKS

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