The Spanish Experience

Renewable support schemes: what works and at what cost?

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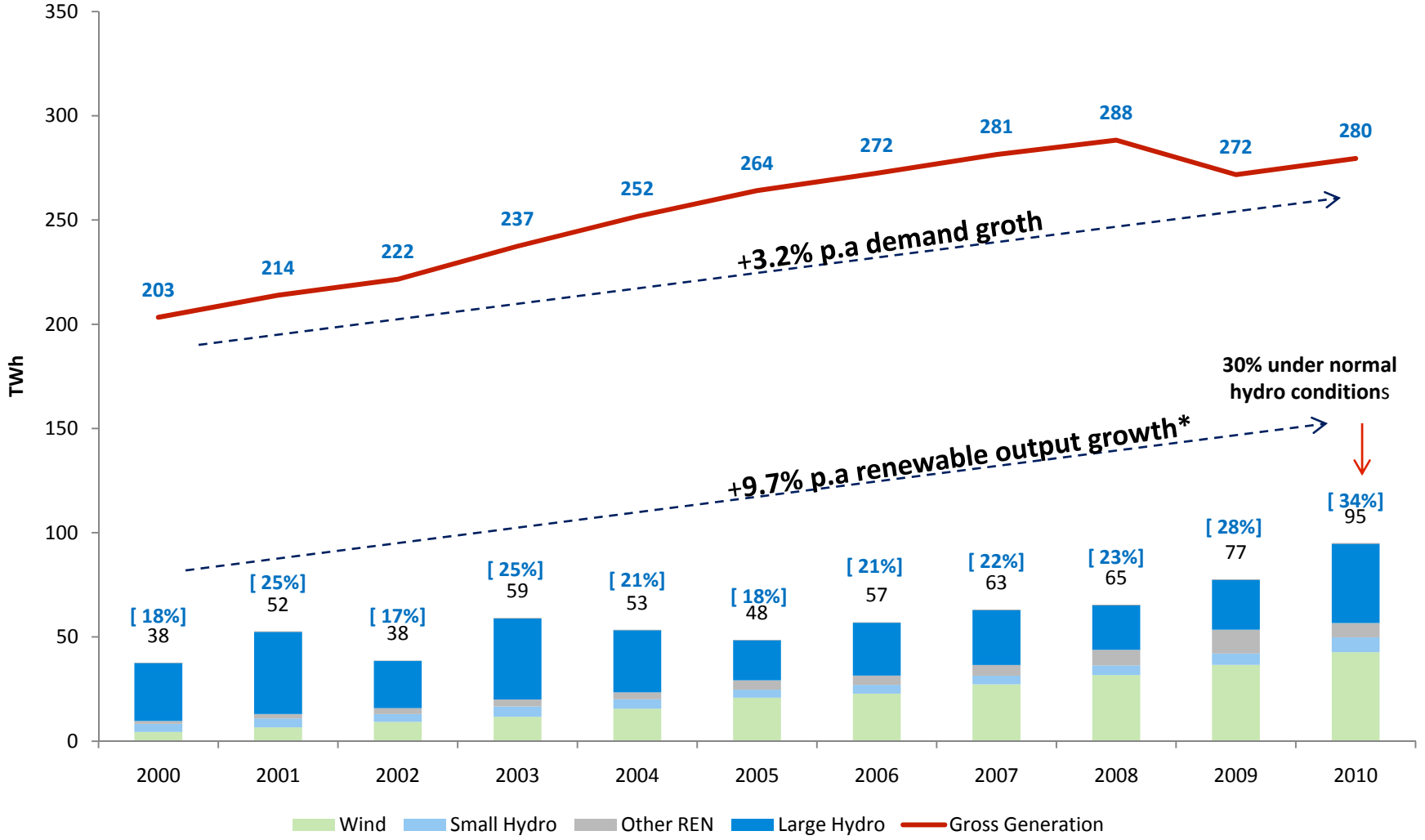
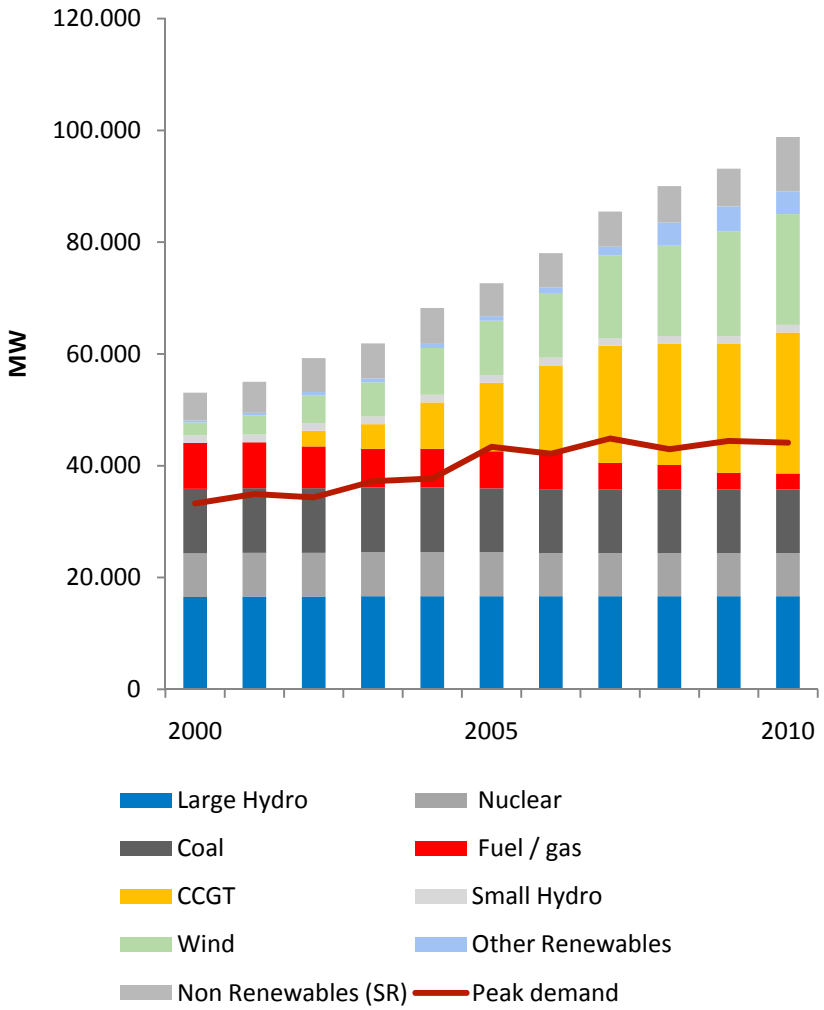
Renewable energy in Spain today



Source: REE.* 19.34% p.a. excluding large hydro generation

Renewable energy in Spain today

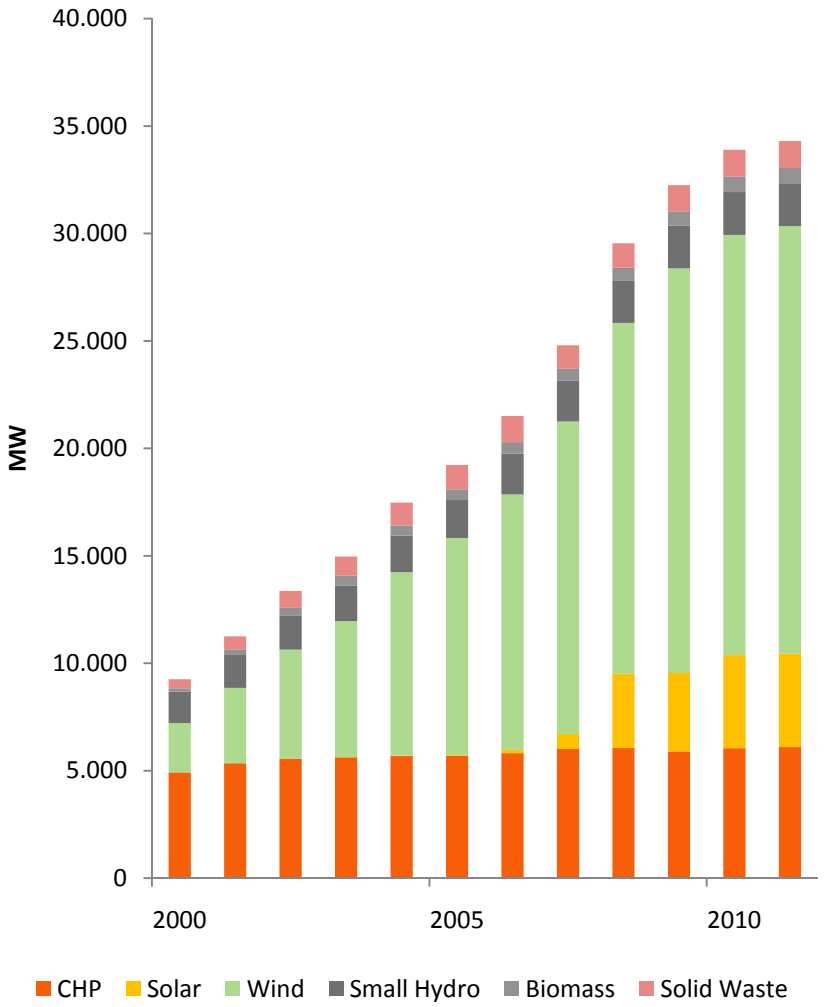


- Market liberalization in 1997
- Since 2000:
  - ✓ CCGTs: + 25,000 MW
  - ✓ Wind: +19,800 MW
  - ✓ Other Renewables (Photovoltaic):+ 4,018 MW
- Peak demand:
  - ✓ 2000: 33,236 MW
  - ✓ 2010: 44,122 MW

Source: REE
Note: Non Renewable (SR) capacity refers mainly to CHP capacity under the Spanish Special Regime

Renewable energy in Spain today

- Wind generation represents 57% of renewable (SR) capacity and 47% of totall output
- Solar PV represents 12% of capacity and 7% of production.

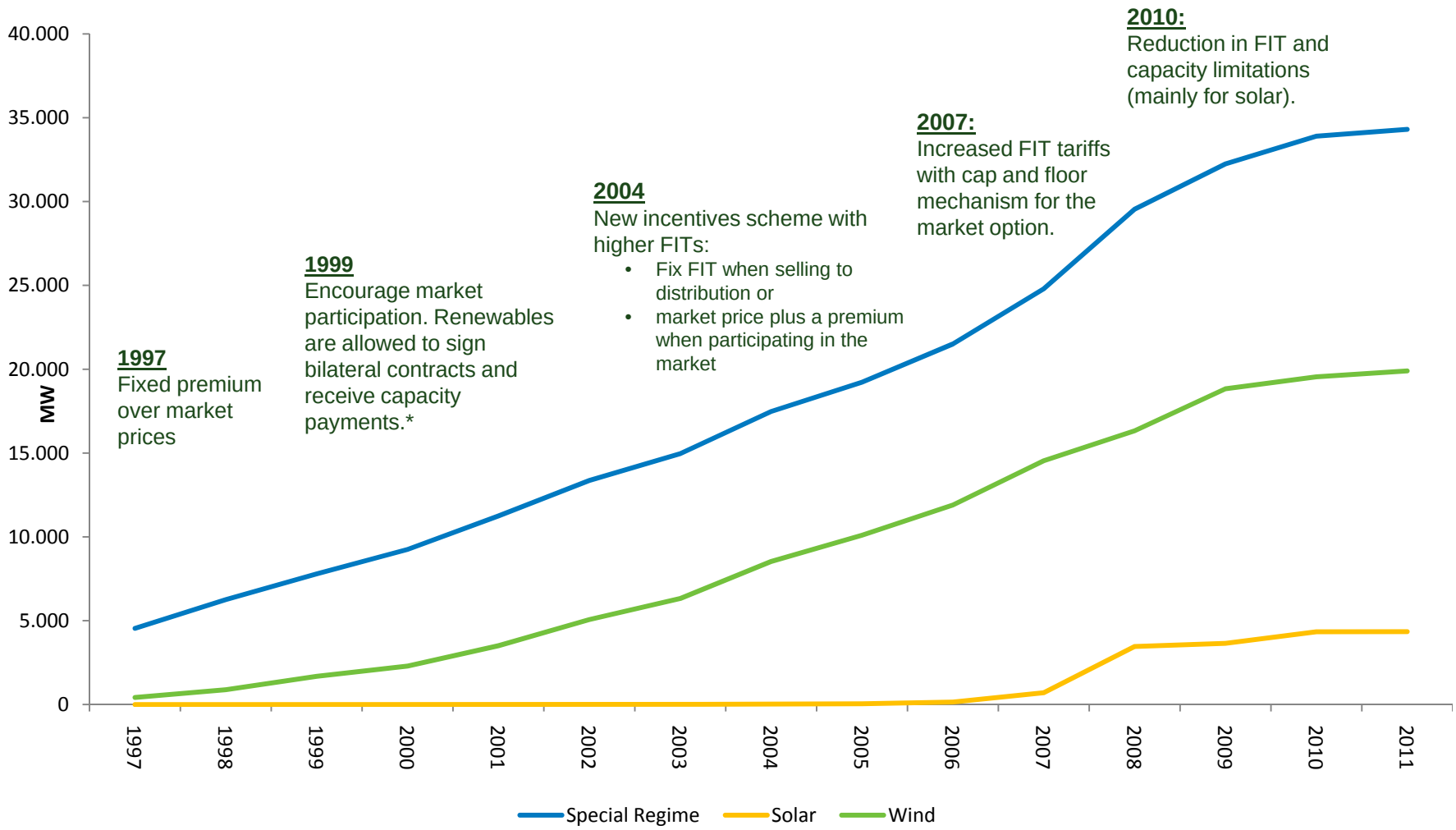


Source: REE

Policy Goals

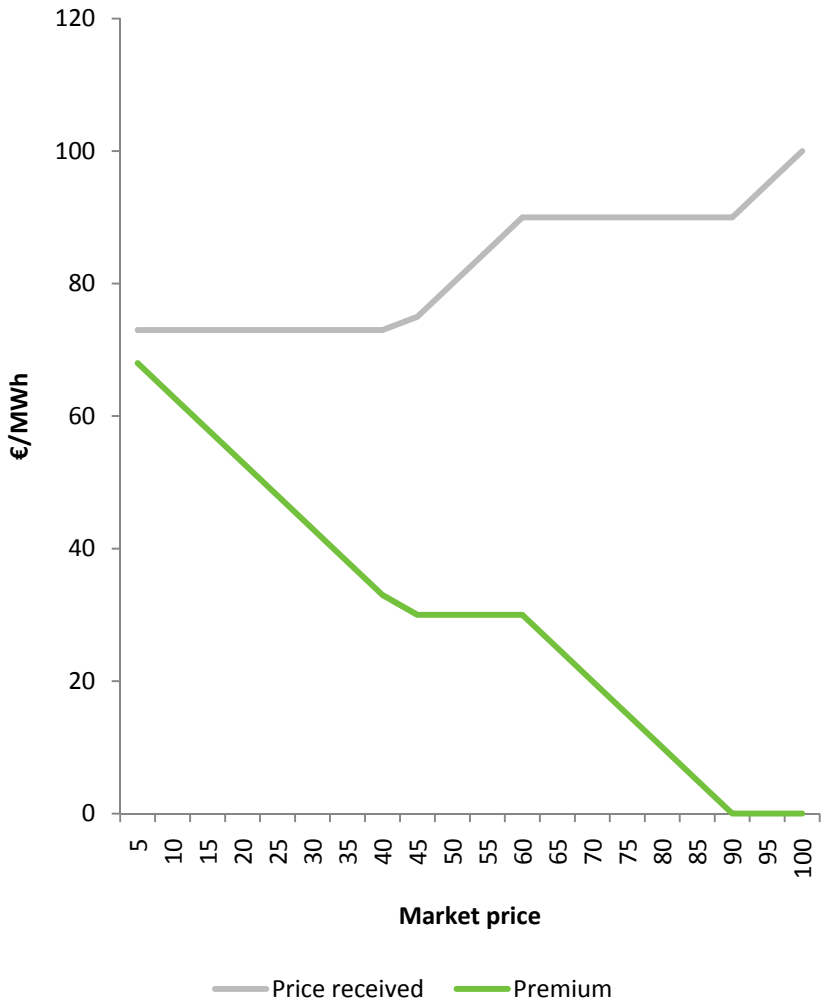
Reduction in CO2 emissions.	• As of 2005, 440.6 Mt of CO2-equivalent, 37% above the 2008-2012 target and increasing.
Increase security of supply and lower energy dependency	• Domestic primary energy production accounts for 19% of total primary energy (including nuclear).
Exert downward pressure in power prices	• Address market power problems in the power sector.

Renewable regulation



Source: REE. Note: Special regimen covers all units using renewable sources, CHP and solid waste from units below 50 MW. * Not applicable since 2007.

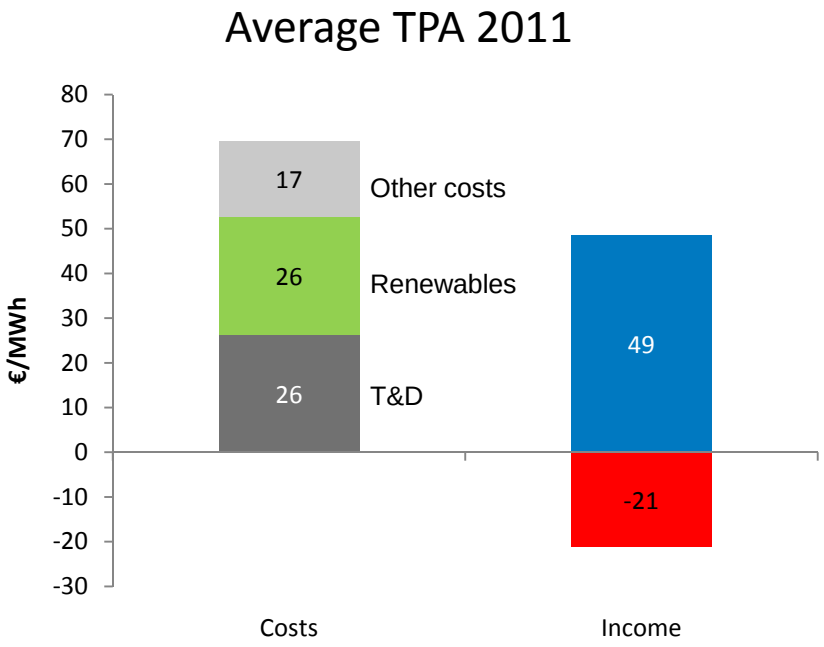
Renewable regulation

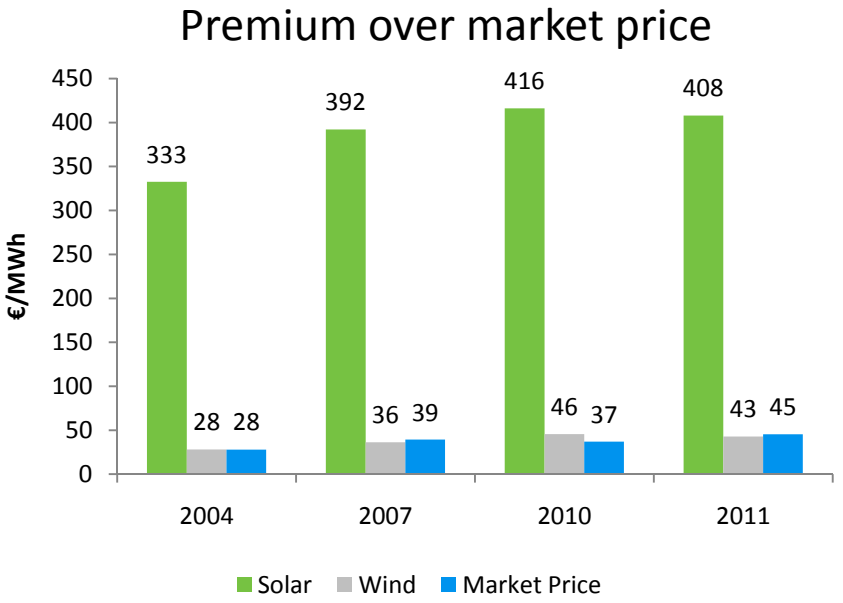


- The case of wind: example of a variable premium
  - Reference premium 30€/MWh
  - Floor at 73 €/MWh
  - Cap at 90 €/MWh
- Limits the value of the subsidies when there is no need for them and protects investors from low market prices

Renewable regulation

- Generous FIT for solar PV have led to large subsidies (6.000 M€ in 2011) which represent an increasing share of the TPA cost…..





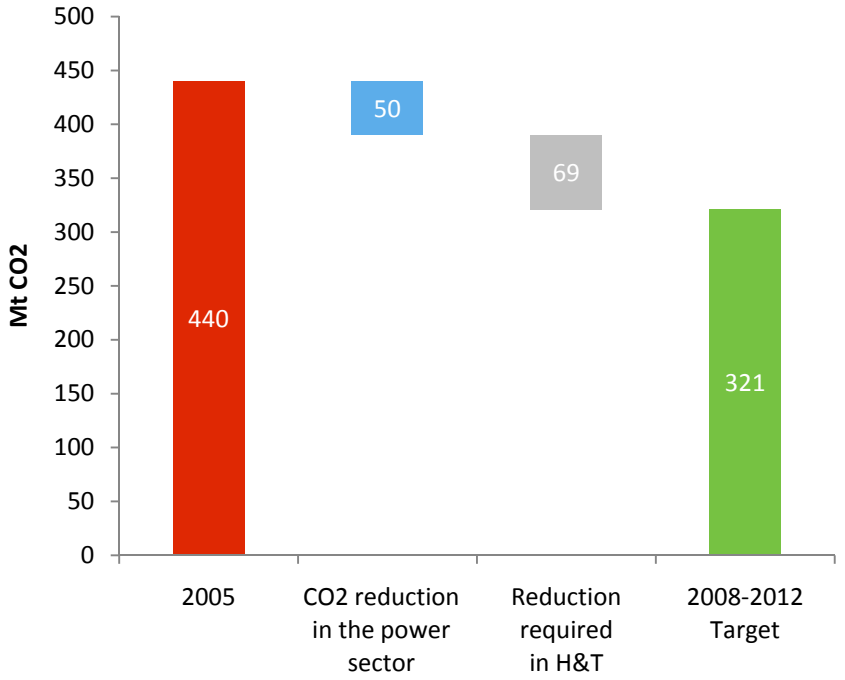
- …and increase the structural deficit. (5,200 M€ in 2011 and 20,000 M€ accumulated).
- Solar PV receive 37% of renewable subsidies and produce only 7%.

Source: REE and CNE

Assessing current policy

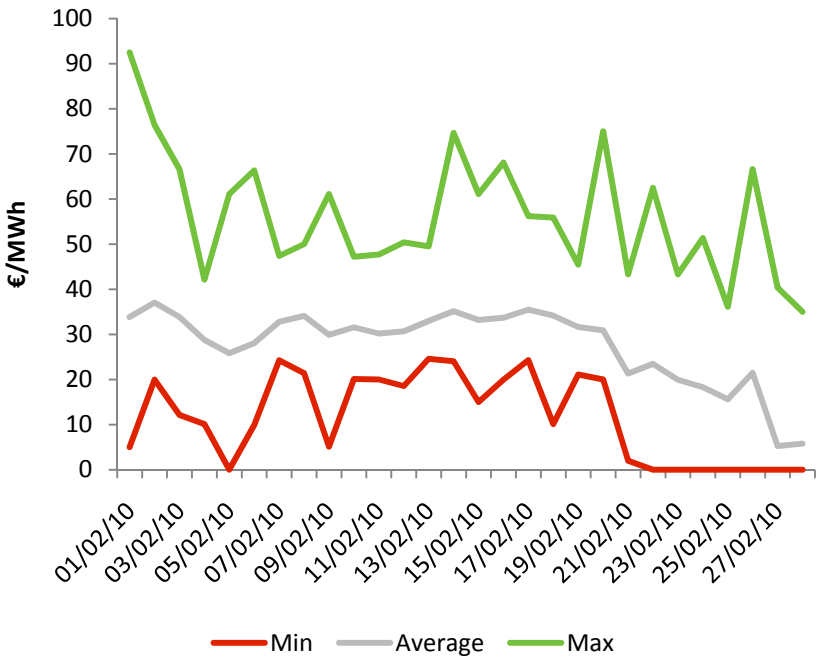
- ✓ Spain has reached the goals established in its 1999 and subsequent Renewable Energy Plans with respect to the power sector: 30% of gross generation obtained from Renewables.
- ✓ Spain is well positioned to achieve the 2020 goals: 40% of gross generation coming from Renewables.
- ✓ Renewables have reduced CO2 emissions in the power sector by approximately 50 Mt CO2 eq. in comparison with 2005 when total emissions were 440 Mt CO2 eq. (42% of the required reduction)

However…..



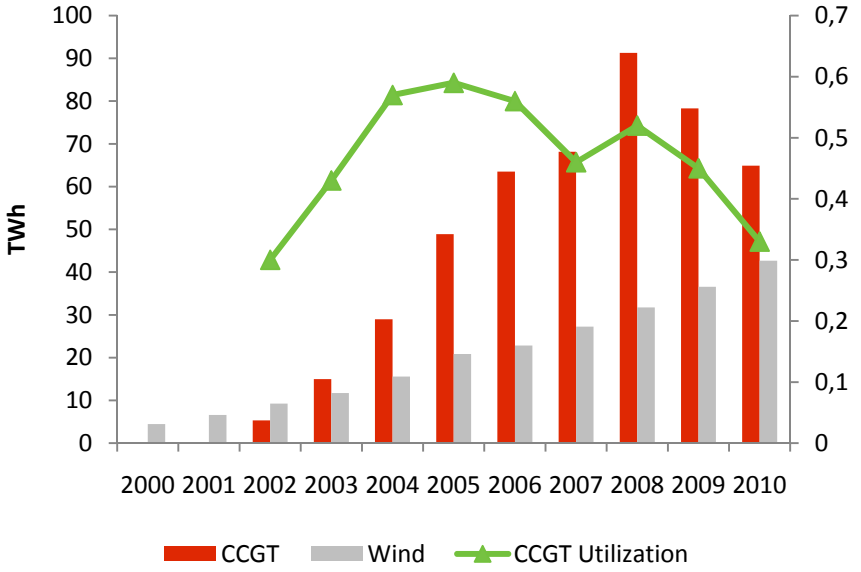
Assessing current policy

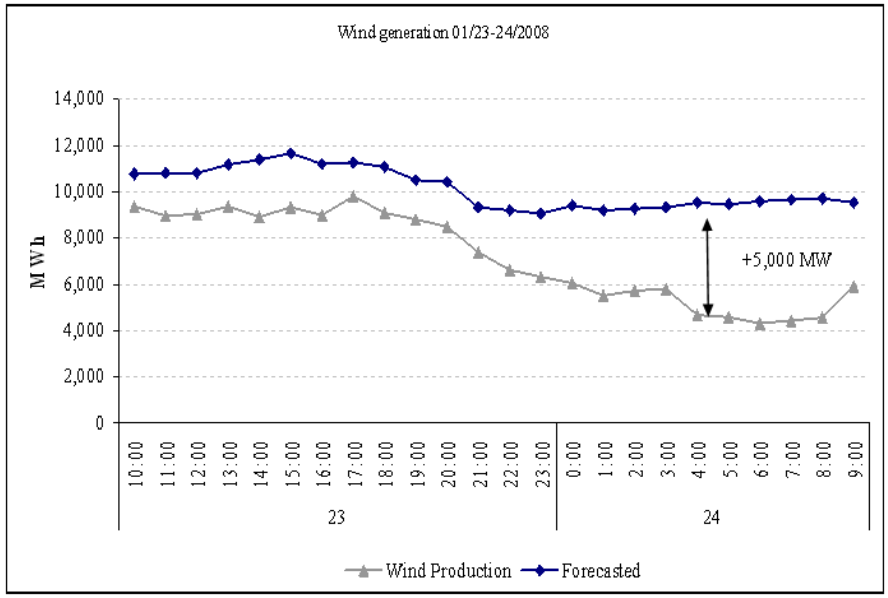
- The environmental goals have been achieved at a high costs in terms of both efficiency and reliability of the Spanish Electricity System.
- Renewables deployment has
  - Entailed higher prices for consumers, owing to renewable subsidies (not observed by consumers due to the deficit).
  - Reduced market prices, since wind and solar bid at very low prices.
  - Imposed losses on owners of conventional generation, owing both to these low prices and to low utilization of CCGTs displaced by renewables.



Assessing current policy

- CCGTs utilization has decreased dramatically from 57% in 2004 to 33% in 2010.
  - Units that were design to operate for more that 5000 hours are now operating below 3000 hours.
- This increases the complexity of operating the network:
  - Higher balancing and reserves costs and increased need for back-up capacity.





Assessing current policy

- Summary
  - The power sector has meet successfully its environmental targets. May be too early?
  - High cost for consumers and impact on structural deficit. Too much money invested in Solar PV at the wrong time?
  - Renewable energy deployment in Spain has distorted the role of the market. No incentives for new investments. Is the system security at risk?

Some answers..

- Reconsider the cost and extent of renewable support scheme
  - The government has reduced FITs, mainly to Solar technologies.
- Reduce the burden of environmental goals on the power sector
  - Renewables share in the power sector for 2020 reduced from 44% to 40%.
- Address power market reforms:
  - Increase capacity payments to back-up capacity. (Thermal and imported coal units).

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Thanks