




Reporting on dissemination activities carried out within the frame of the DESIRE project (WP8)

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Title of dissemination	Methods used by Spanish utilities to integrate the rapidly increasing capacity of wind power in Spain into the electricity grid
Type of activity	Presentation at seminar
Title of forum	DESIRE seminar - Integration of fluctuating renewables into the grid using combined heat and power
Language	English
Date of dissemination	9-November-2005
Place of dissemination	Birmingham
Brief abstract / description of dissemination activity	The presentation described the problems that the integration of wind power into electricity grids creates on network operators. It started with an overview to the situation and the development of wind power in Spain, which problems it has created and how the system operators solve them. Conclusions are that, although wind power creates some problems to Spanish system operators, they are able to solve them at the moment, or the needed regulatory changes are under preparation, to help them in solving those problems.
Audience assessment	impact The audience seemed to be interested in the contents of the presentation, although nothing was put in motion after it.
Dissemination	Included after this form



DESIRE Presentation Seminar
Birmingham
9 November 2005



AGENDA

- Spanish energy situation overview
- Energy priorities
- Historical development of regulation affecting wind power
- Historical development of wind power
- Present regulation on wind power
- Problems faced by wind power promoters
- Problems created by wind power
- Solutions
- Future perspectives
- Comments and Questions

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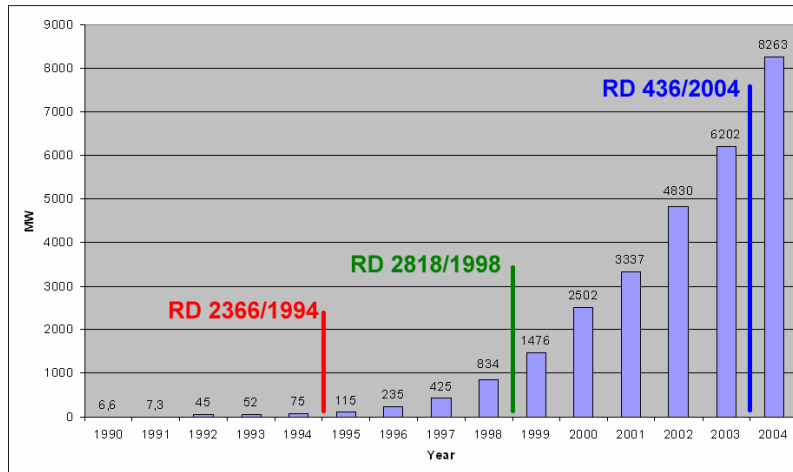
- Primary energy dependency on imports: 80%
- Electricity demand increases: 4.8% per year on average since 1994
- GHG emissions 40% over 1990 level (15% allowed)
- Renewable energy sources for electricity in 2004:
 - 14% Hydro
 - 6% Wind
 - 1% Biomass

- Reduction of electricity demand increase to GDP increase level
- Increase of bio-fuels' share up to 5.75%
- Increase electricity production from RES up to 29.4%:
 - Wind: 13.0%
 - Hydro: 11.0%
 - Biomass: 4.4%
 - Solar thermal: 0.4%
 - MSW: 0.4%
 - PV: 0.2%

- Law 82/1980: Connection of generation units in parallel to the grid
- September 1985: Connection of DG to the grid. Still in force
- RD 2366/1994: Establishment of “Special Regime”:
 - Renewable energy sources or CHP
 - Up to 100 MVA
 - Producers receive a payment for electricity and a bonus for the low environmental impact

- RD 2818/1998: New “Special Regime” definition:
 - Up to 50 MW
 - Producers have three options to sell their electricity output:
 - Sell to the DNO at a fixed price
 - Sell to the DNO and receive the average market price plus a bonus
 - Sell to the market and receive the market price plus a bonus
- Plan to foster renewables (1999): 8 974 MW wind in 2010
- RD 841/2002: “Special Regime” producers receive an incentive to enter the market
- Infrastructure planning document (2002): 13 GW wind in 2011
- RD 436/2004: Present regulation

HISTORICAL DEVELOPMENT WIND POWER



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PRESENT REGULATION FOR WIND POWER

- Up to 50 MW
- DNOs must integrate wind power generation into their grids
- Payments are related to the Reference Electric Tariff: $RET_{2005} = 73.304$ Euro/MWh
- They are not forced to enter the market, but they are encouraged to do so
- Producers have two options to sell their electricity output:
 - Sell to the DNO at a fixed price: 90% RET
 - Sell to the market and receive the market price plus a bonus and an incentive: $MP + 40\% RET + 10\% RET$
- In any option: Complement for reactive power (between -4% and 8% RET)

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- Local environmental associations (NIMBY)
- Difficult forecasting: imbalances
- Payment for feeders from wind farm to grid connection point:
 - Deep costs
 - New connections must pay for their part

1. Imbalances → More reserves in the market of AS
 - Forecasting tools / Aggregation
2. Disconnection when a voltage drop occurs
 - Payment for ride-through drops: 5% RET, 4 years
3. Anticipated clearing: 10% market price
 - Increase the cost for anticipated clearing (30% MP)
4. DNO option: No payment for imbalances
 - If capacity > 10 MW: 10% RET 01/01/2006 (± 20% imbalance cost free)
5. Difficult communication for system operators
 - Delegated dispatch centres
6. Reactive power problems
 - Complement for reactive power

6. Many requests
 - Specific studies. Delay for promoters
7. No room for other Special Regime sources
 - Improvement of the grid. Slow process
8. Excessive concentration in some transmission grid nodes
 - Offering of other connection points
9. New protection requirements
 - Upgrading of equipment
10. New lines only for wind power
 - Application of deep costs

- Obligation for wind farms to ride-through voltage drops
- Creation of delegated dispatch centres for system operators to control wind power capacity
- Improvement of forecasting ability
- Wind power forecasts for 2010:
 - Capacity: 20 155 MW
 - Production: 45 511 GWh
 - First off-shore wind farms
- Stricter requirements in DNO option



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