Renewable Energies Conference

11th July 2003

IBERDROLA

Iberdrola:
The Iberian Growth Story

Renewable Energies, a key driver

Ignacio Galán
Executive Vice Chairman & CEO

IBERDROLA

Agenda

Energy Sector: Main trends

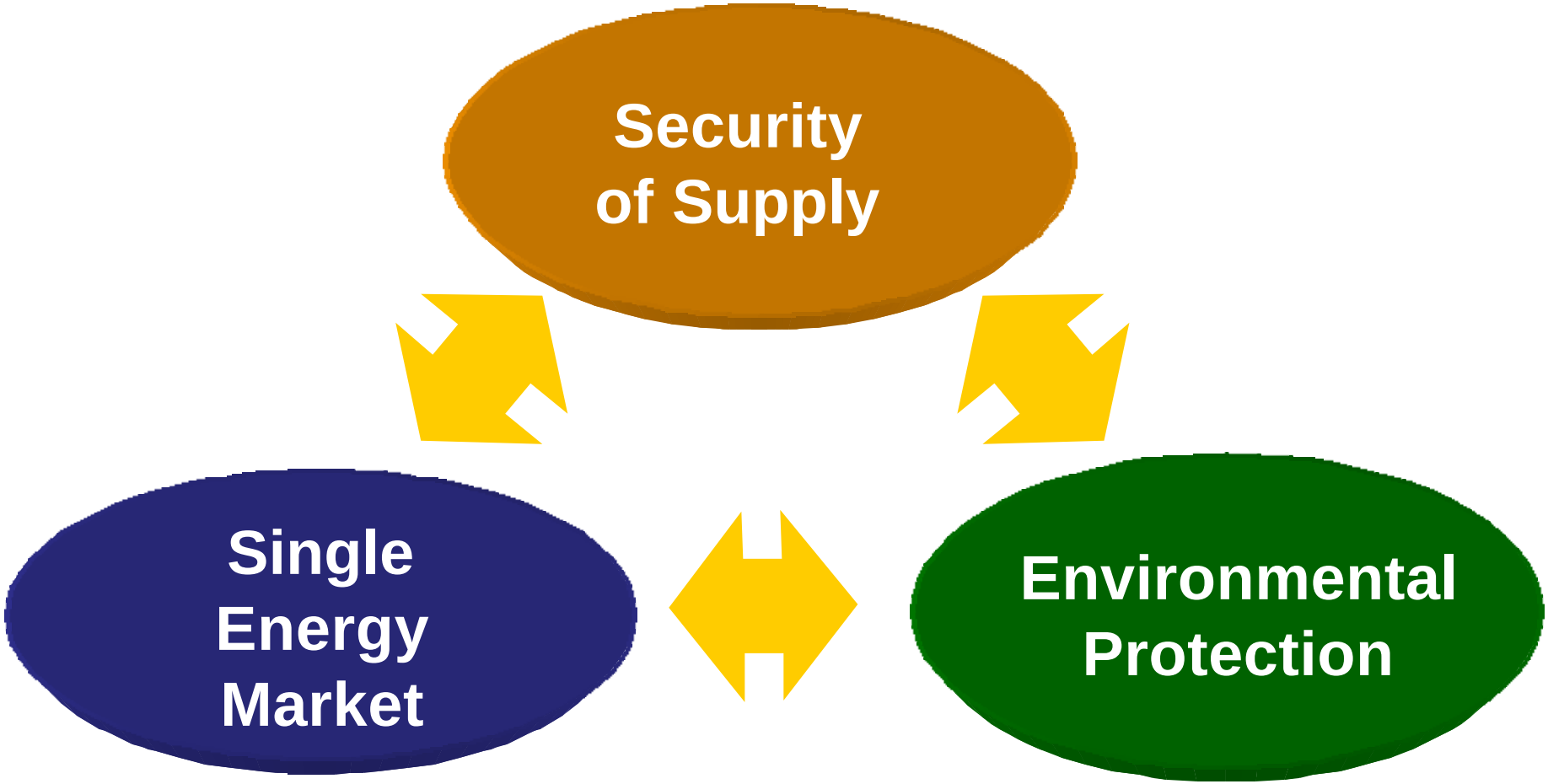
European Union

Spain

Renewable Energies: Guidelines

Conclusions

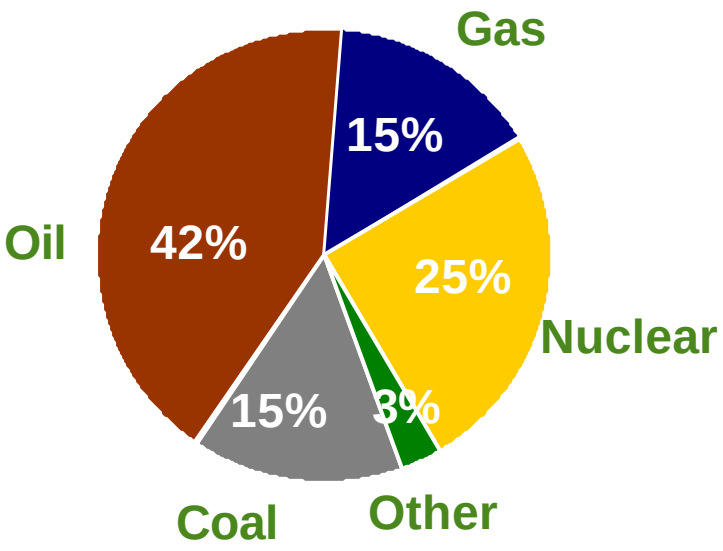
Three *MUSTs* in European Energy Policy



EU Security of Supply

Need to decrease energy dependence

EU Energy Balance (2001)



Today

Imports: 54% of total

If nothing is done by 2030

Imports: 70% of total

Single Energy EU Market

E&G Directives: Harmonising EU energy market

Market liberalisation	7/1/2004 for non residential 7/1/2007 for residential
Public service	Reasonable quality & price levels
Distribution Unbundling	Before 7/1/2007
Electricity labelling	Energy generation source
Regulatory Authorities	Objective & non discriminatory
Financing of Priority Projects	Interconnections

Liberalisation, quality, non discrimination

Environmental Protection EU

Need to reduce emissions to comply with Kyoto commitments...

Directives

- Renewable Energies
- CO_2 Emissions
- SO_2, NOx emissions

CO_2 Emission Reduction EU Objectives

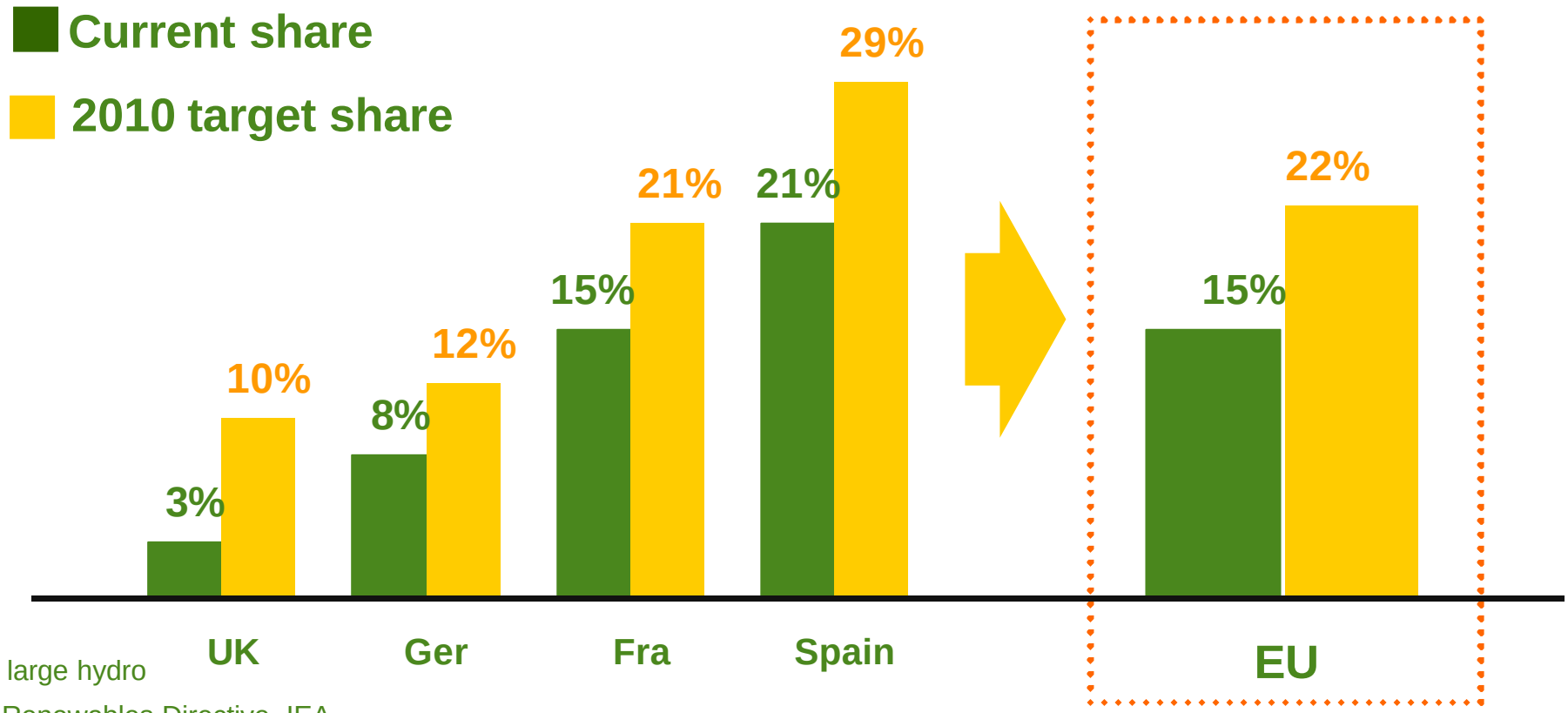
	2010 Target	1990-2001	
Germany	-21.0%	-18.3%	✓
UK	-12.5%	-12.0%	✓
Sweden	4%	-3.3%	✓
Finland	4.7%	0%	✓
France	0.0%	0.4%	X
Belgium	-7.5%	6.3%	X
Netherlands	-6.0%	4.1%	X
Italy	-6.5%	7.1%	X
Ireland	13.0%	31.1%	X
Spain	15.0%	32.1%	X
Portugal	27.0%	36.4%	X
EU	-8.0%	-2.3%	X

Source: European Environment Agency

Renewables Directive: Objectives

Renewables share: 7 full points below 2010 target

Renewables as % total generation *vs* 2010 target

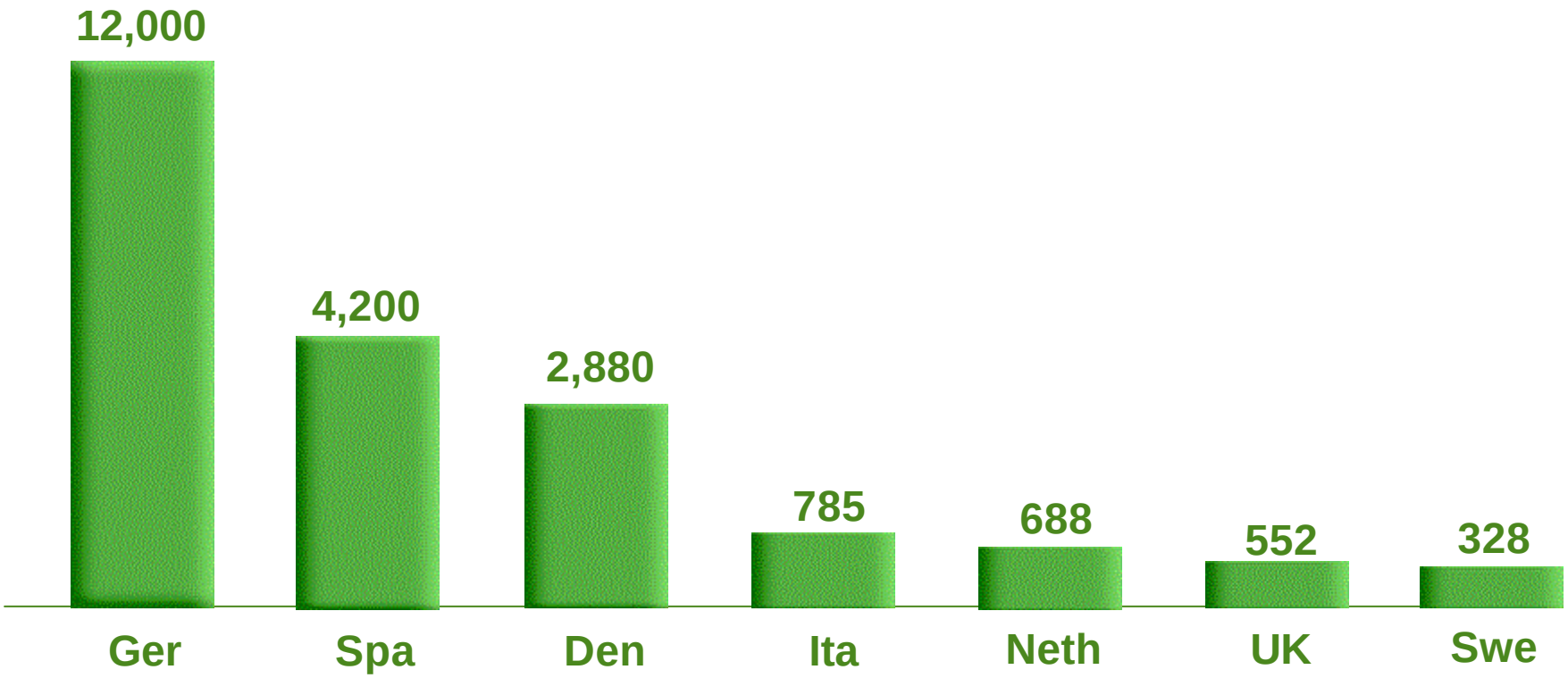


*Includes large hydro

Source: Renewables Directive, IEA

EU Renewables Installed Capacity

Installed capacity in Europe: 22,500 MW (4% of total)



Source:Wind Power Monthly

EU Emissions Directives

Incentivising low emission generation

CO_2 Emissions: Approved by EU Parliament (7/2/2003)

- **Penalties for emissions:**
  - **€ 40 per ton from 2005 to 2007**
  - **€100 per ton from 2008 to 2012**

Acid Emission Directives

- **Objective:reduce emmissions**
  - **60% NOx & 80% SO_2 by 2010**

Encouraging clean technologies

Agenda

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Energy Sector in Spain: Issues

Approved by Parliament July 2003

Policy

Security of Supply

- Cover peak demand
- Increase reserve margin
- Reduce external dependency
- Improve Gas and Electricity infrastructures
- Decommission obsolete coal and oil plants

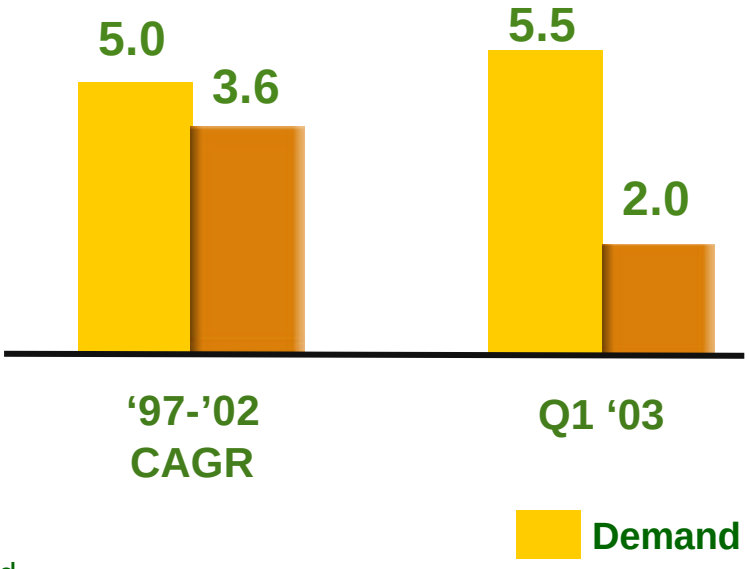
Environmental Protection

- Reduction of CO_2 emissions
- Reduction of SO_2, NOx
- Promotion of clean technologies

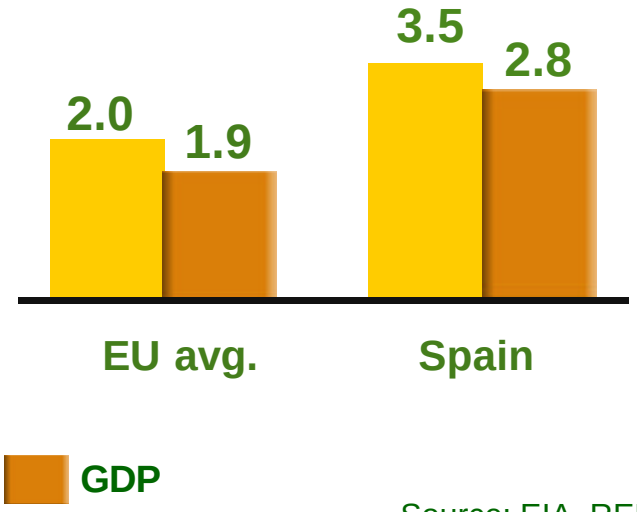
Spain's Security of Supply: Evolution of Demand

Spain's demand growing at over 5% since 1997...

Spain´s Demand & GDP Growth '97-Q1'03



Demand & GDP Growth Estimates '02-'05



* Mainland

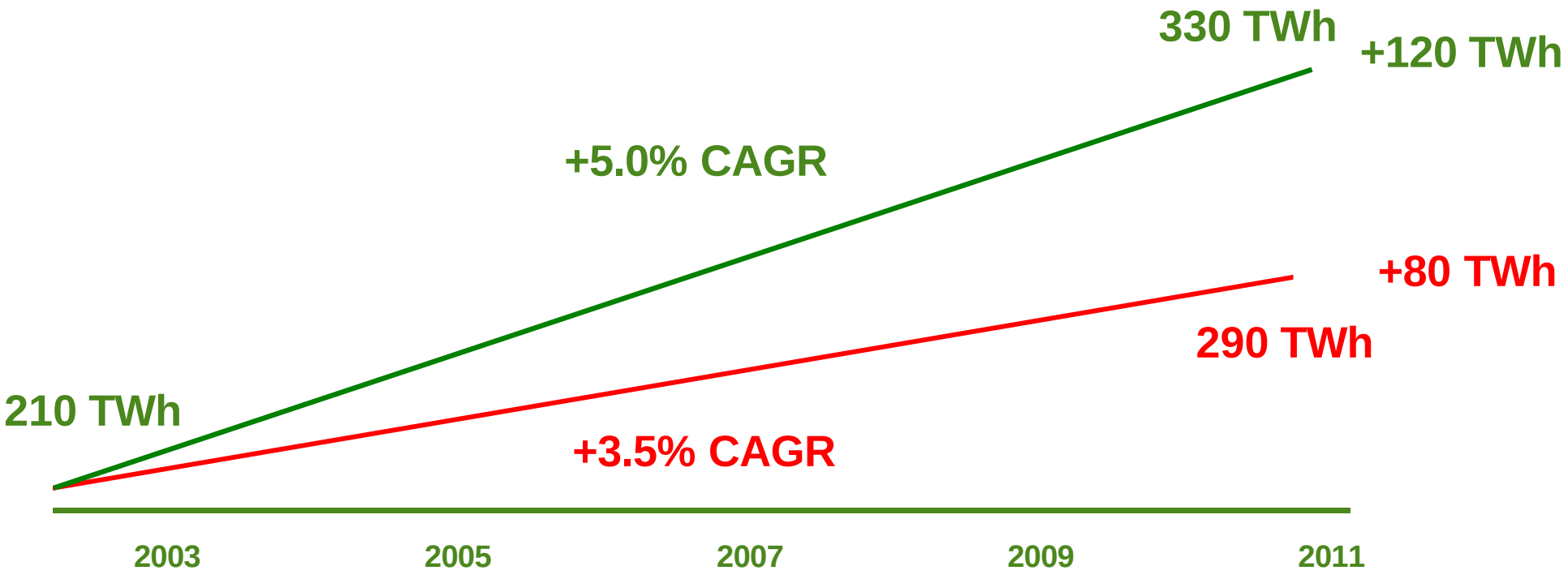
Source: EIA, REE, OECD

... reserve margin has reached 2% vs 20% European average

Spain's Security of Supply: Evolution of Demand

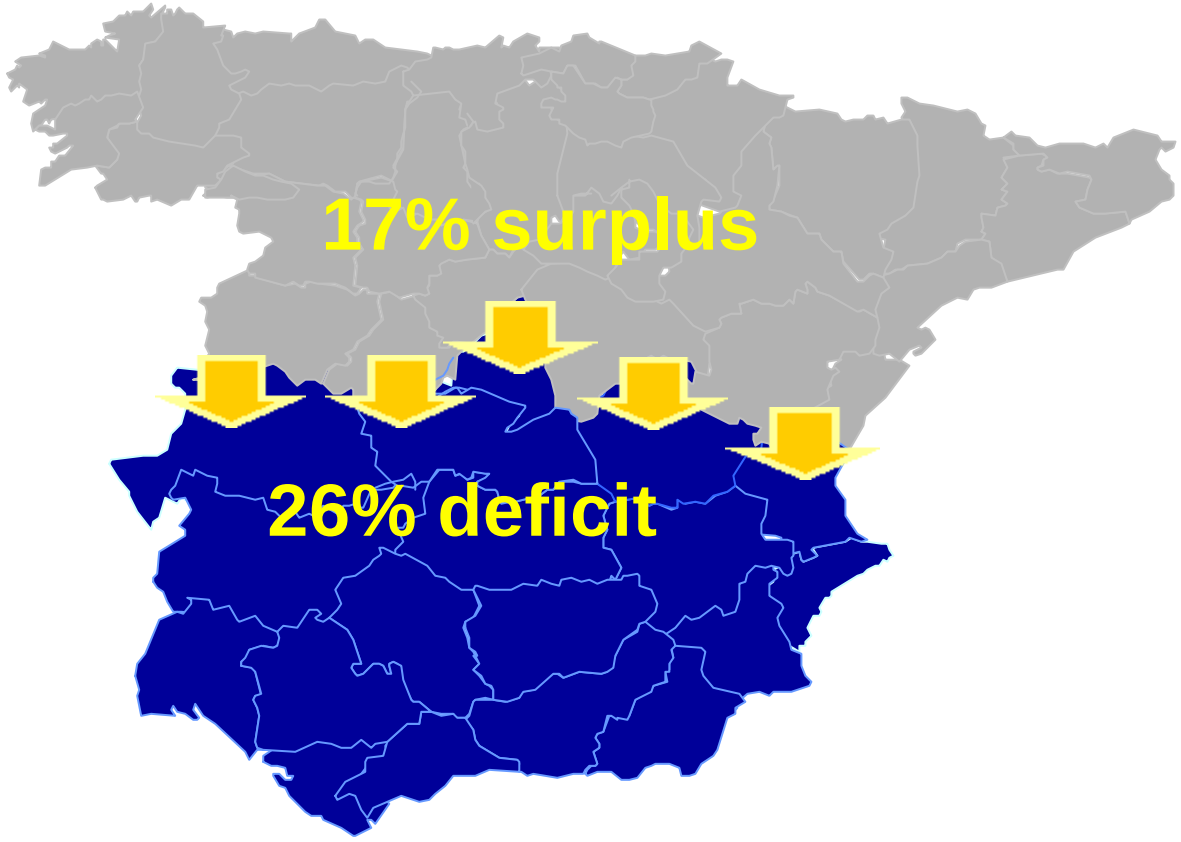
Spain needs between 80 and 120 TWh additional

Demand Growth Scenarios (2002-2011)



Spain's Security of Supply: Generation Park

Capacity vs demand: Geographic imbalance



Extra capacity is required in certain areas

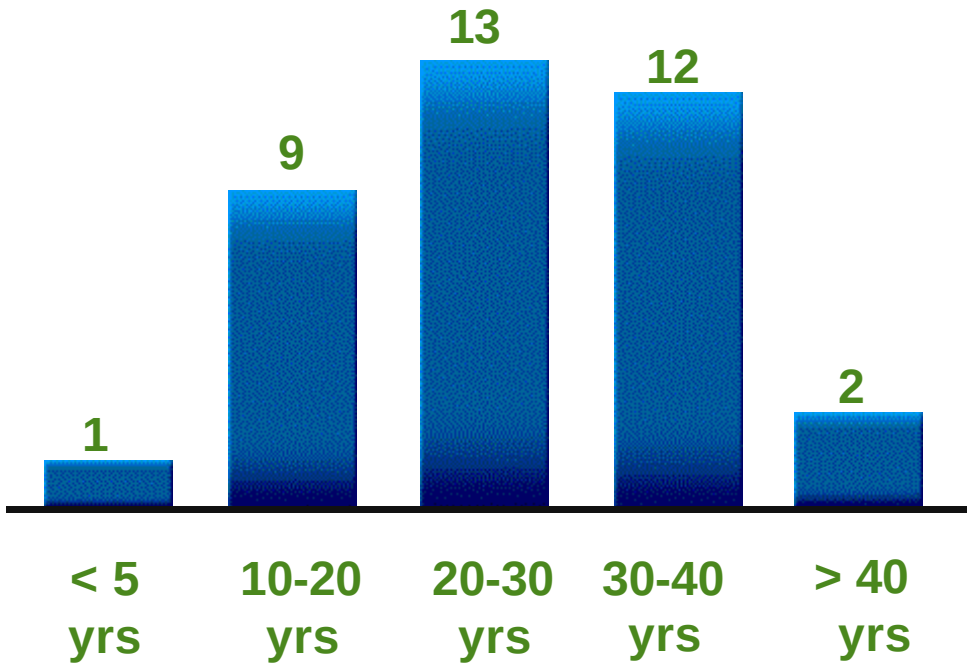
Source: Red Eléctrica de España, S.A. (2002)

Spain's Security of Supply: Generation Park

High average age of Coal & Fuel plants...

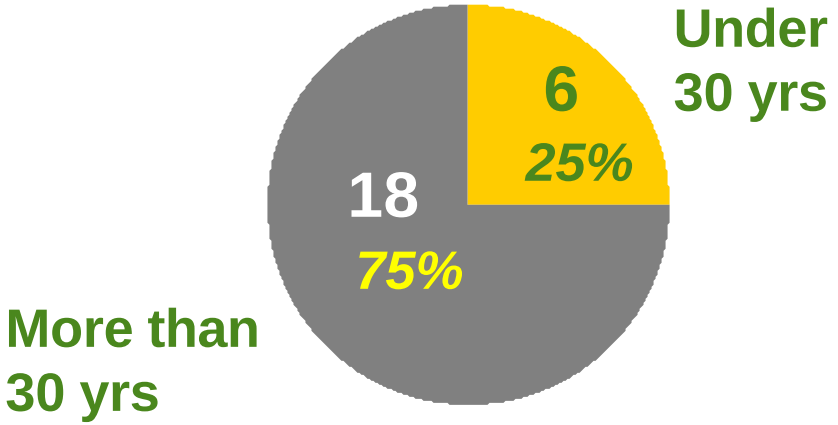
Nr of Coal plants by Age

11,600 MW



Nr of Oil plants by Age

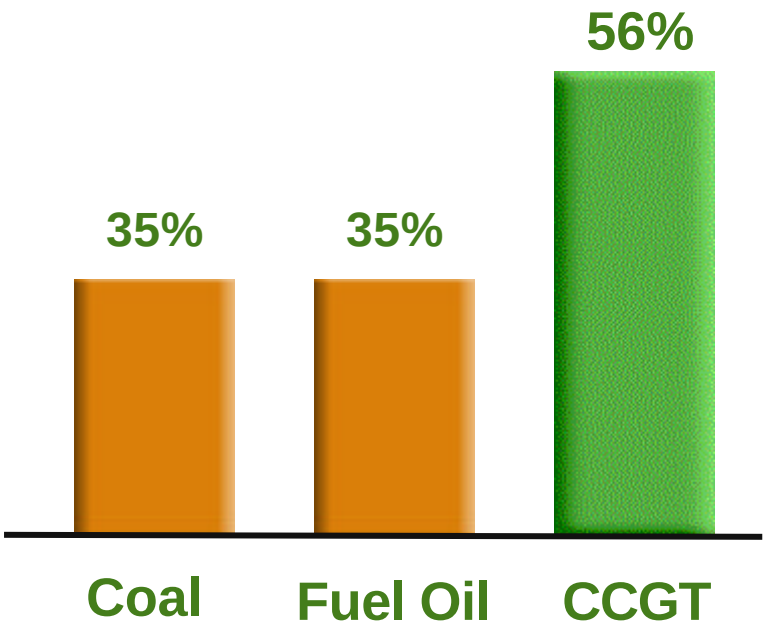
4,700 MW



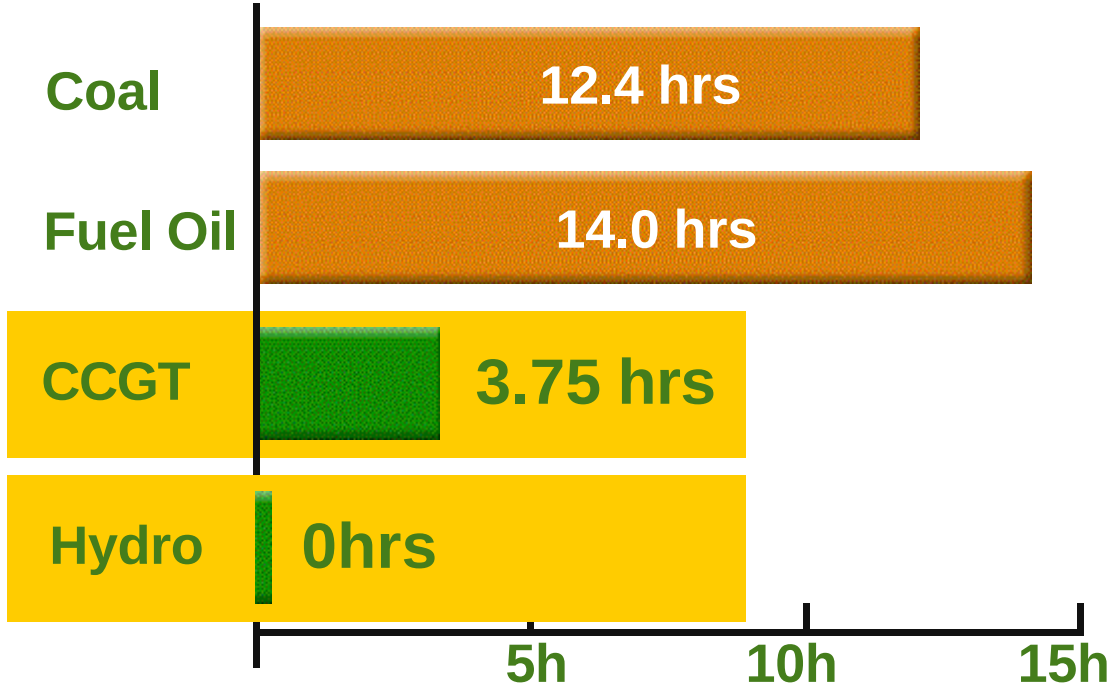
Spain's Security of Supply: Generation Park

...Coal & Fuel plants are becoming inefficient

Heat Rate



Time to supply at peak (cold shut-down)

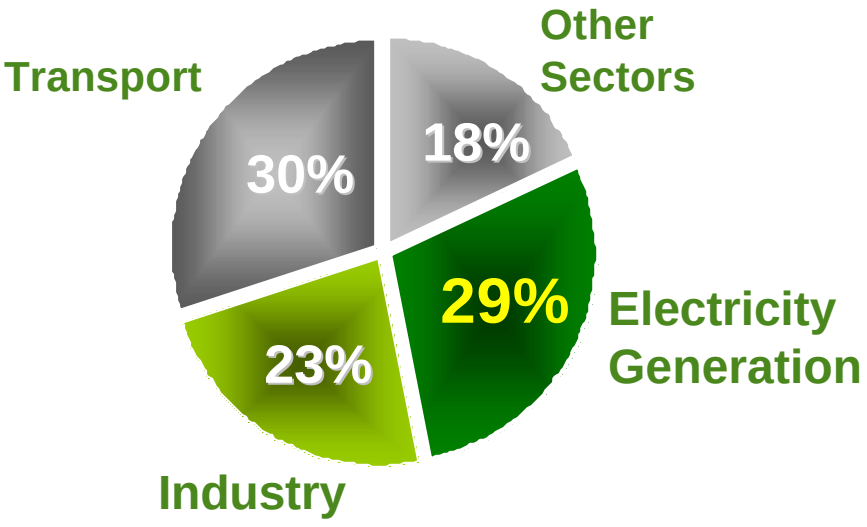


CCGTs can solve peak demand constraints faster

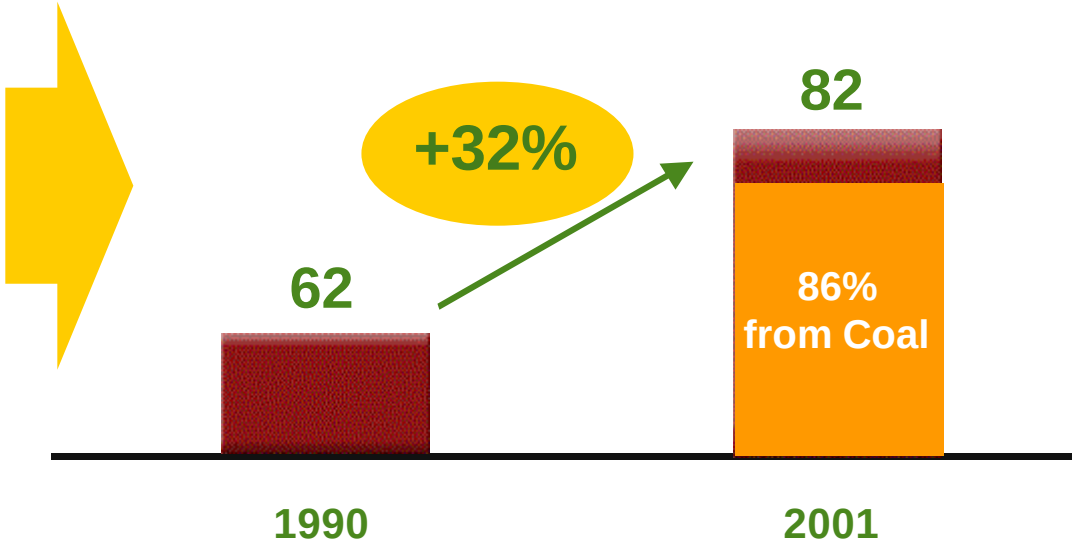
Environmental Protection
CO_2 Emissions in Spain

Electricity & Transport have boosted CO_2 emissions

Year 2001: 363 Mt CO_2



Electricity Sector CO_2 Emmissions 1990-2001



...and electricity emissions driven by Coal Generation

Source: European Commission

Environmental Protection
Spain´s Electricity emissions

g/KWh

	CO2	NOx	SOx	Particles
Coal	879-1,040	2.1-3.6	3.4-27.1	0.1-0.4
Fuel Oil	802	1.3	2.9	0.3
CCGT	365	0.35	0.0	0.0
Hydro & Wind Farm	0.0	0.0	0.0	0.0

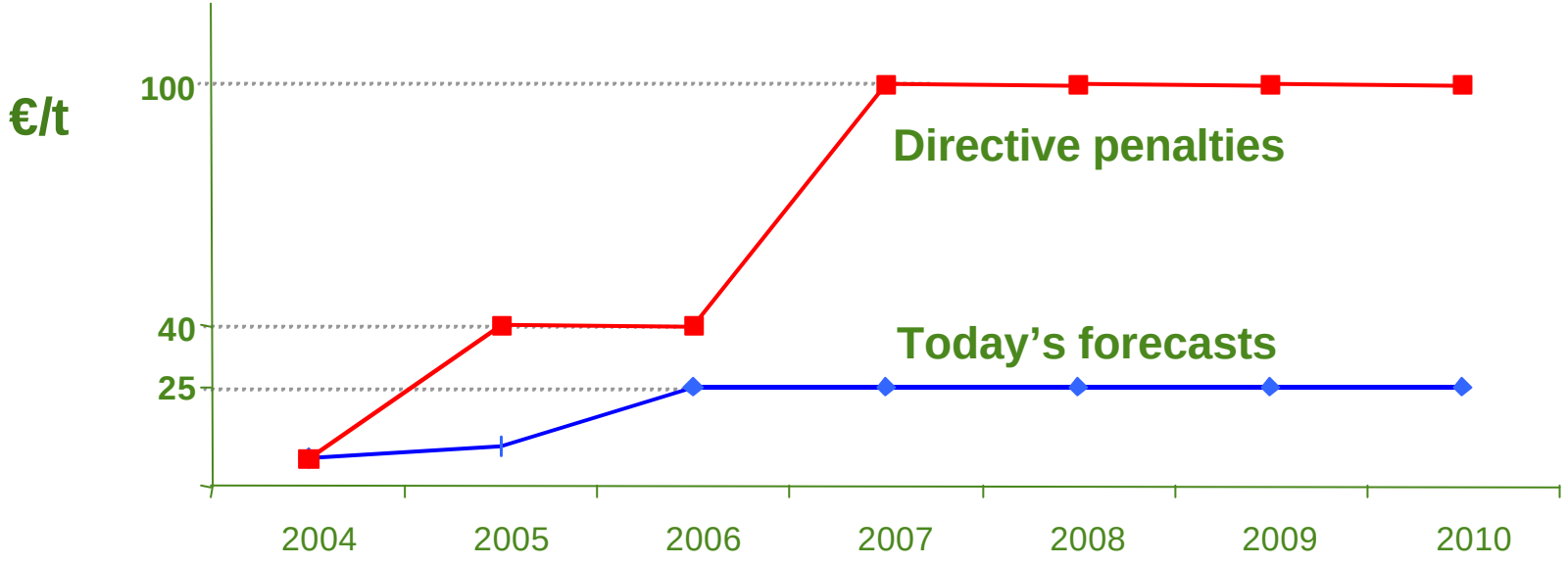
Environmentally friendly

Source: CNE 2001

Environmental Protection
CO_2 emission market

CO_2 emissions will result in extra costs or penalties

Estimated price of CO_2 emission rights and EU penalties

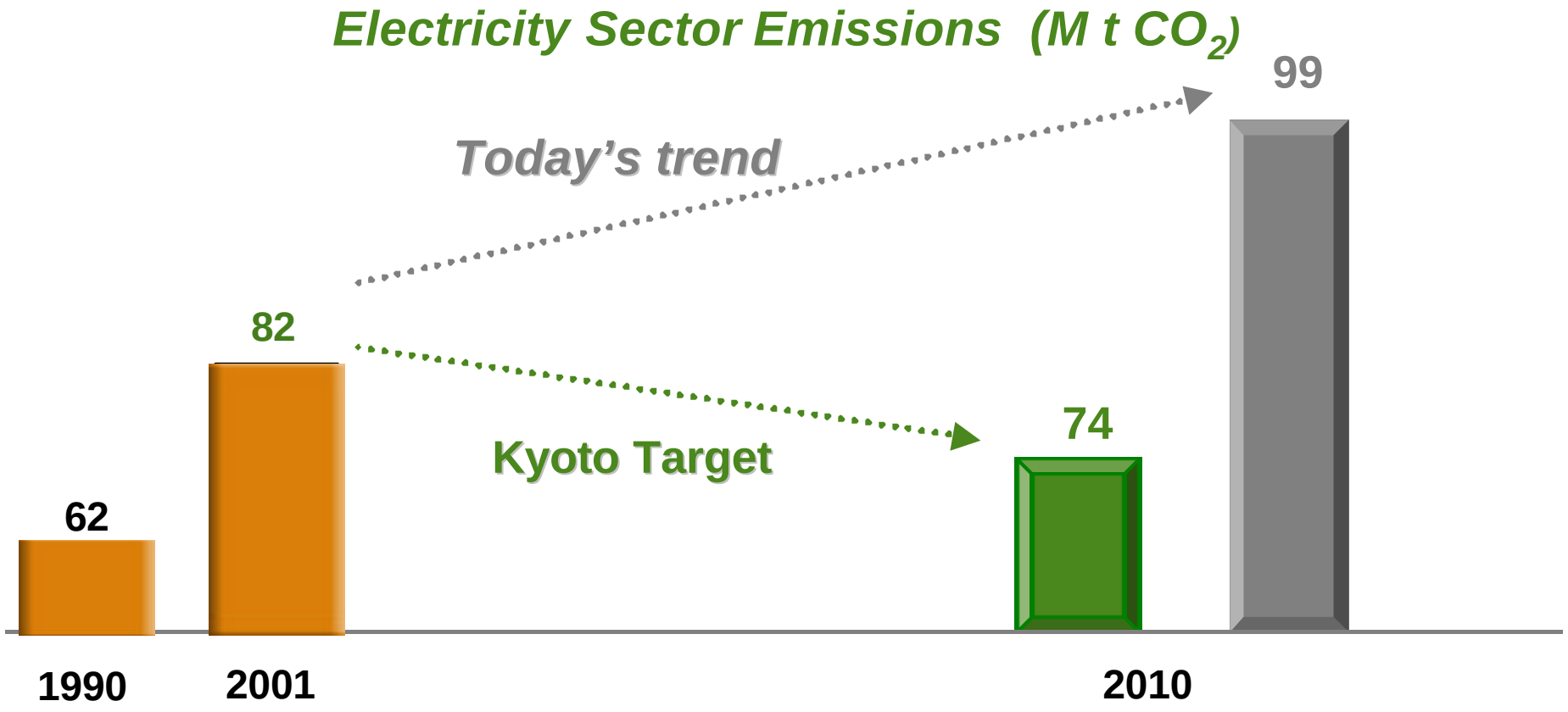


...if emissions market works

Source: Research & CO2 emission Directive Draft

Environmental Protection
Spain's Electricity sector targets

Increase in Renewables & CCGTs production...



...is the only way to achieve targets

Spain: CCGT's and Renewables

2003-2006

CCGTs will displace Oil production

2007 onwards

CCGTs will displace Coal production

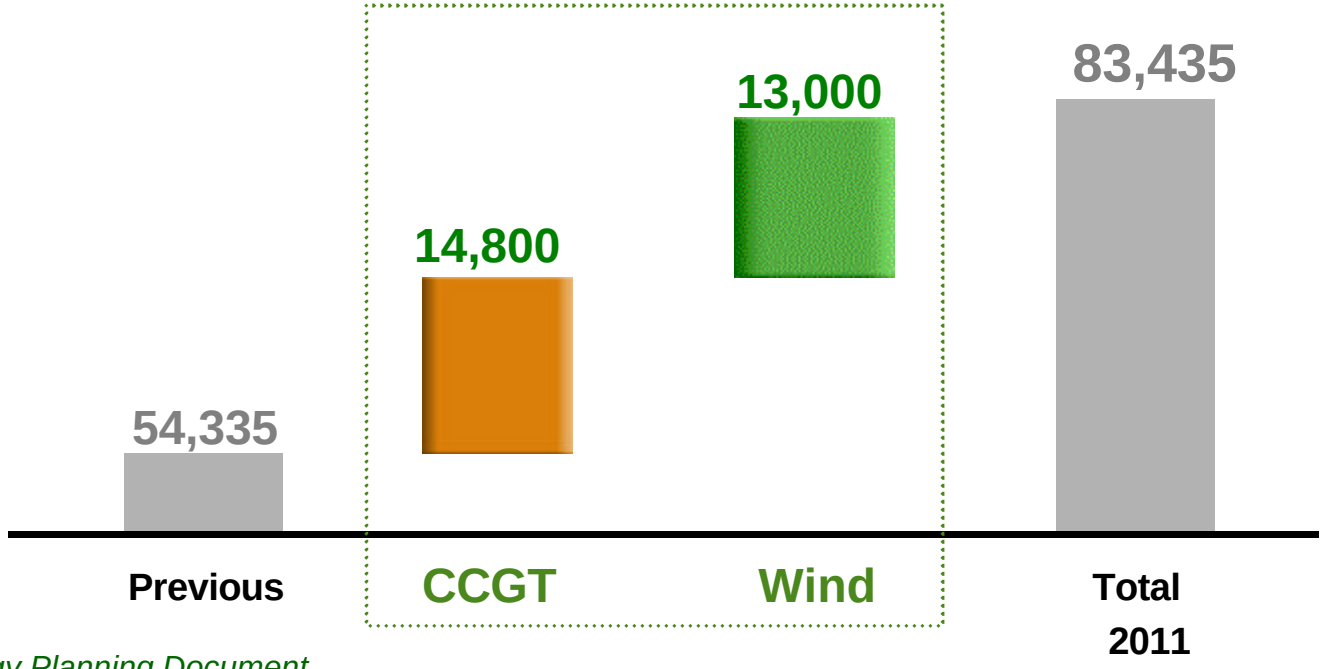
More efficiency
Lower costs
Lower emissions

... CCGTs and Renewables will cover demand growth

Spain: A new National Energy Planning

NEP to solve Security and Environmental issues...

Capacity additions 2002-2011



Source: National Energy Planning Document

27,800 MW in CCGTs and Renewables up to 2011

Agenda

Energy Sector: Main trends

- European Union
- Spain

Renewable Energies: Guidelines

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Spain: Renewables Legal Framework

Support to Renewables

Decrease Energy dependence

+

CO_2 emissions reduction

...as already done with other technologies: hydro (40s) and coal (since 50s up to date)

Spain: Renewables Legal Framework

Spanish Regulation sets ambitious targets for Renewables development...

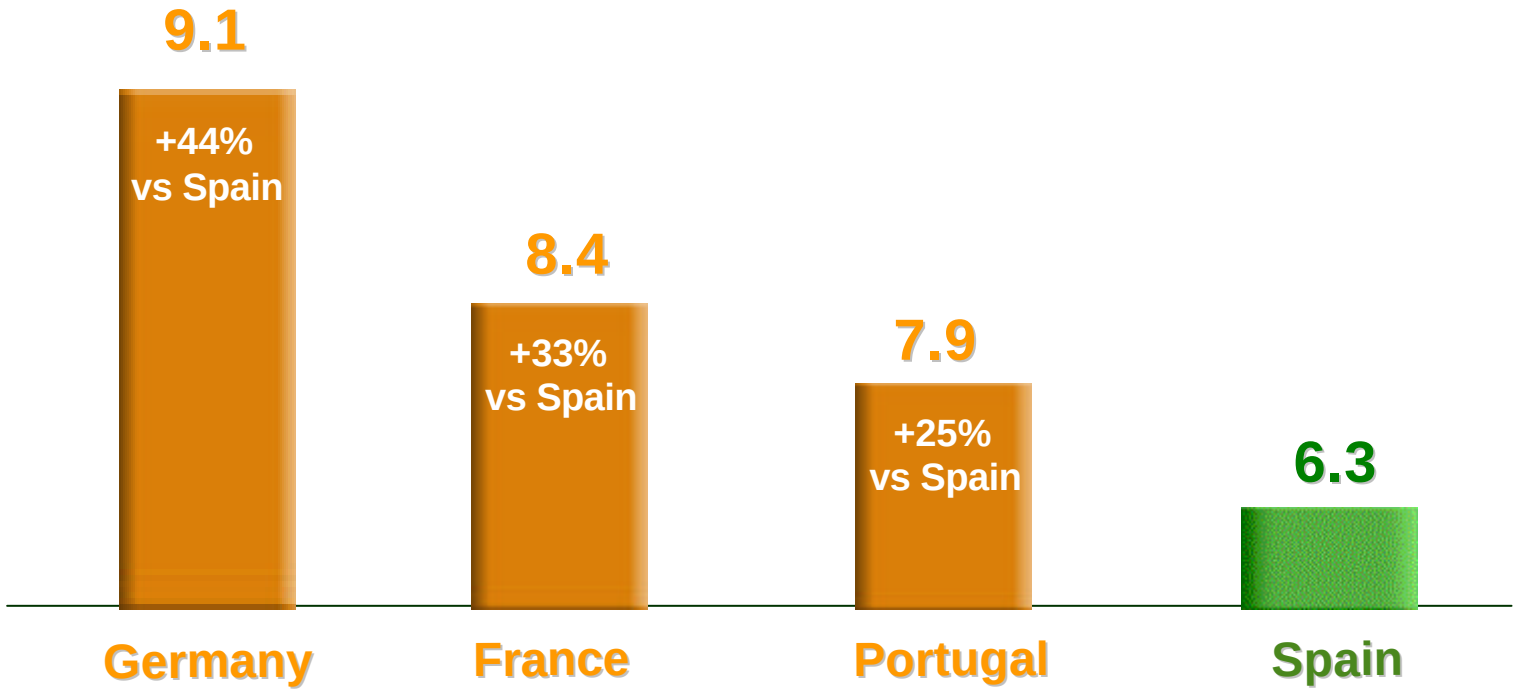
1994	1997	1999	2002
ROYAL DECREES	*ELECTRICITY LAW*	*RENEWABLES PROMOTION PLAN*	*NATIONAL ENERGY PLANNING*
• Priority access • Premium incentive	• 29% of electricity production, renewable	• 8,900 MW of wind farms by 2010	13,000 MW of wind farms by 2011

Reduce Emissions by 30 Mt CO_2 in 2010

Spain: Renewables Legal Framework

Spain´s wind electricity prices still among the lowest in Europe

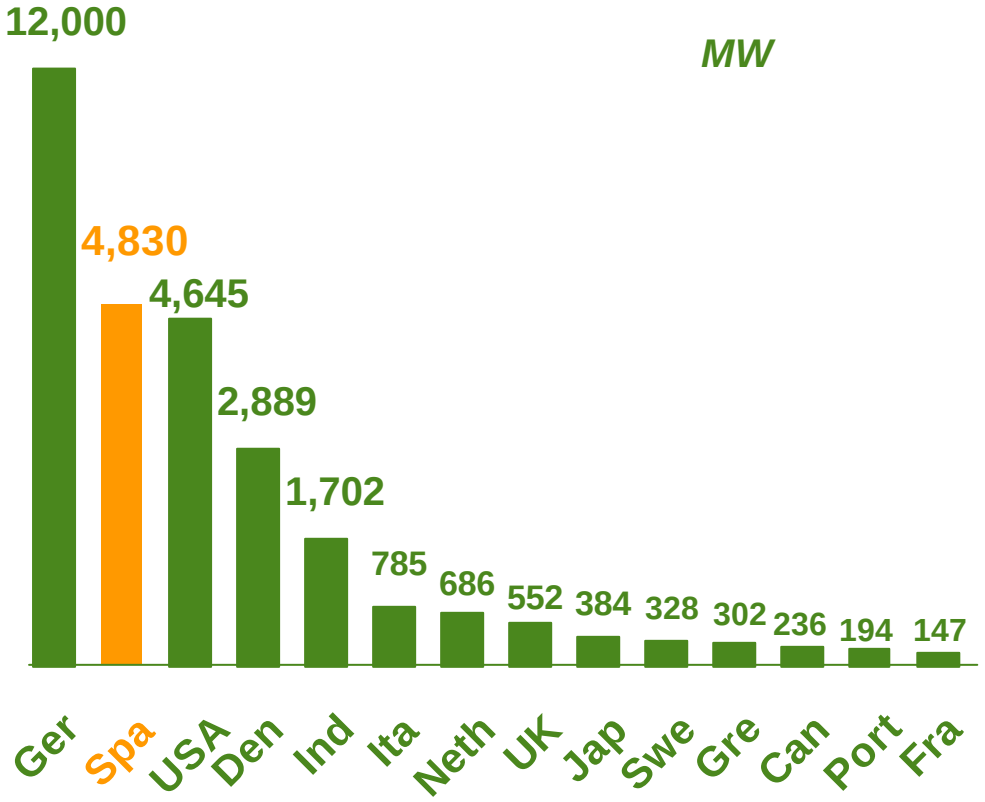
€ cts/KWh



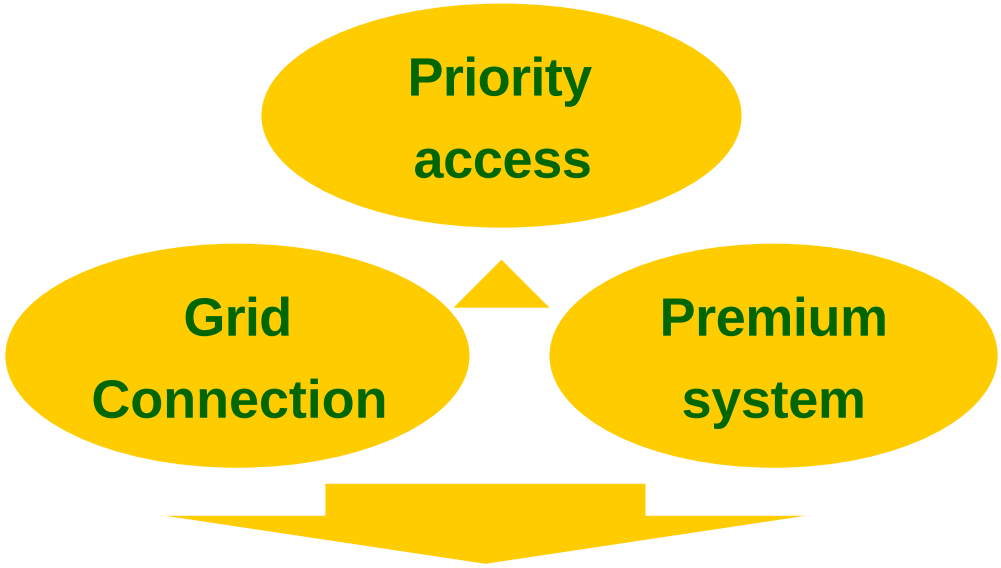
... Stable prices above 6 Eur cts in the last years

Spain: Renewables Legal Framework

Spanish Regulation has proven effective up to date...



Source:Wind Power Monthly



4,830 MW installed as of today

Spain: Renewables Legal Framework

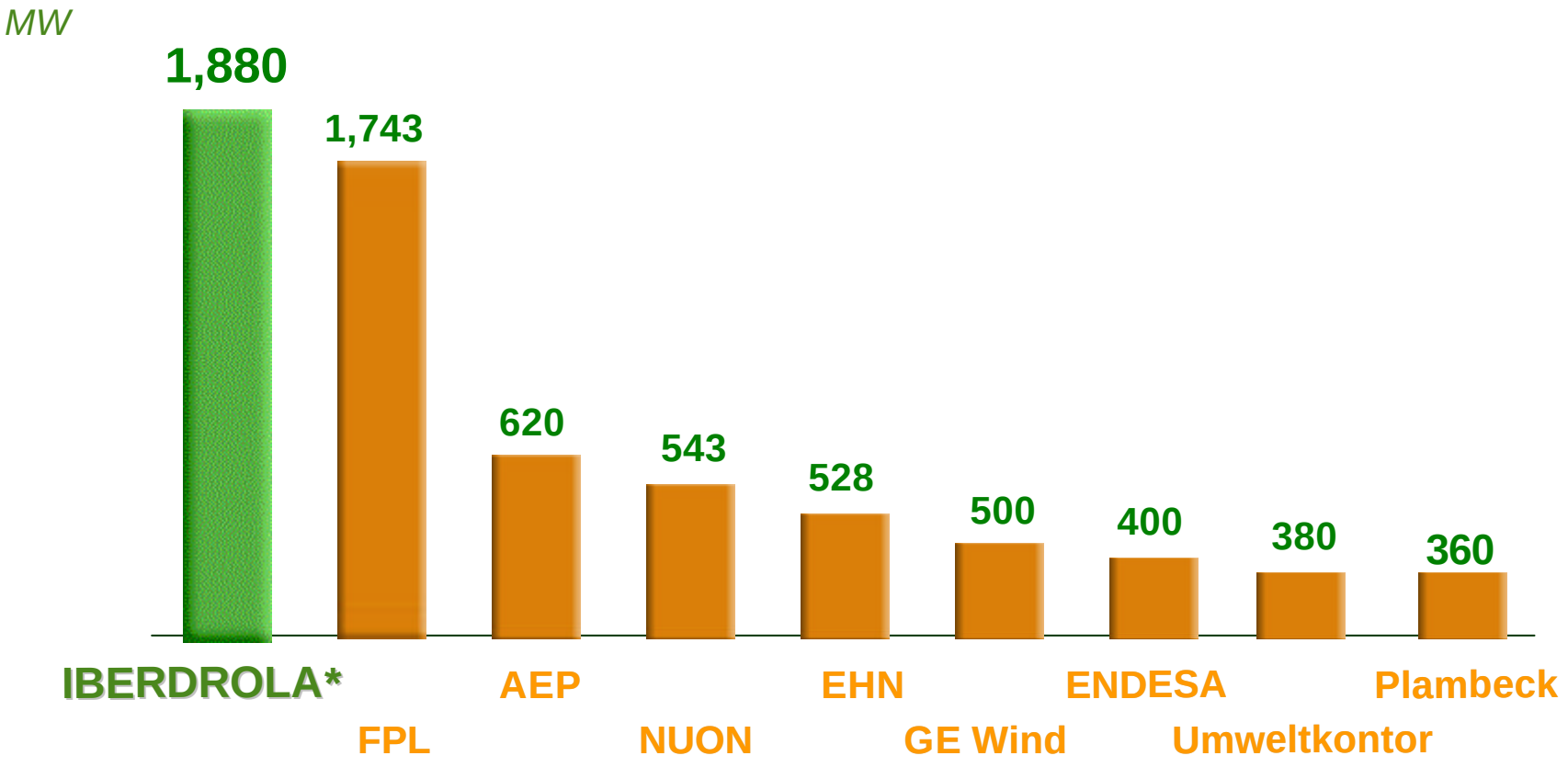
Improvement of regulation on track

Effective	→	**To promote the build up of 13,000 MW**
Efficient	→	**To incentivise wind farms with sufficient working hours**
Technical solutions	→	**Energy Management Reactive energy**

… will provide more transparency and visibility

Iberdrola Renewables Capacity (MW)

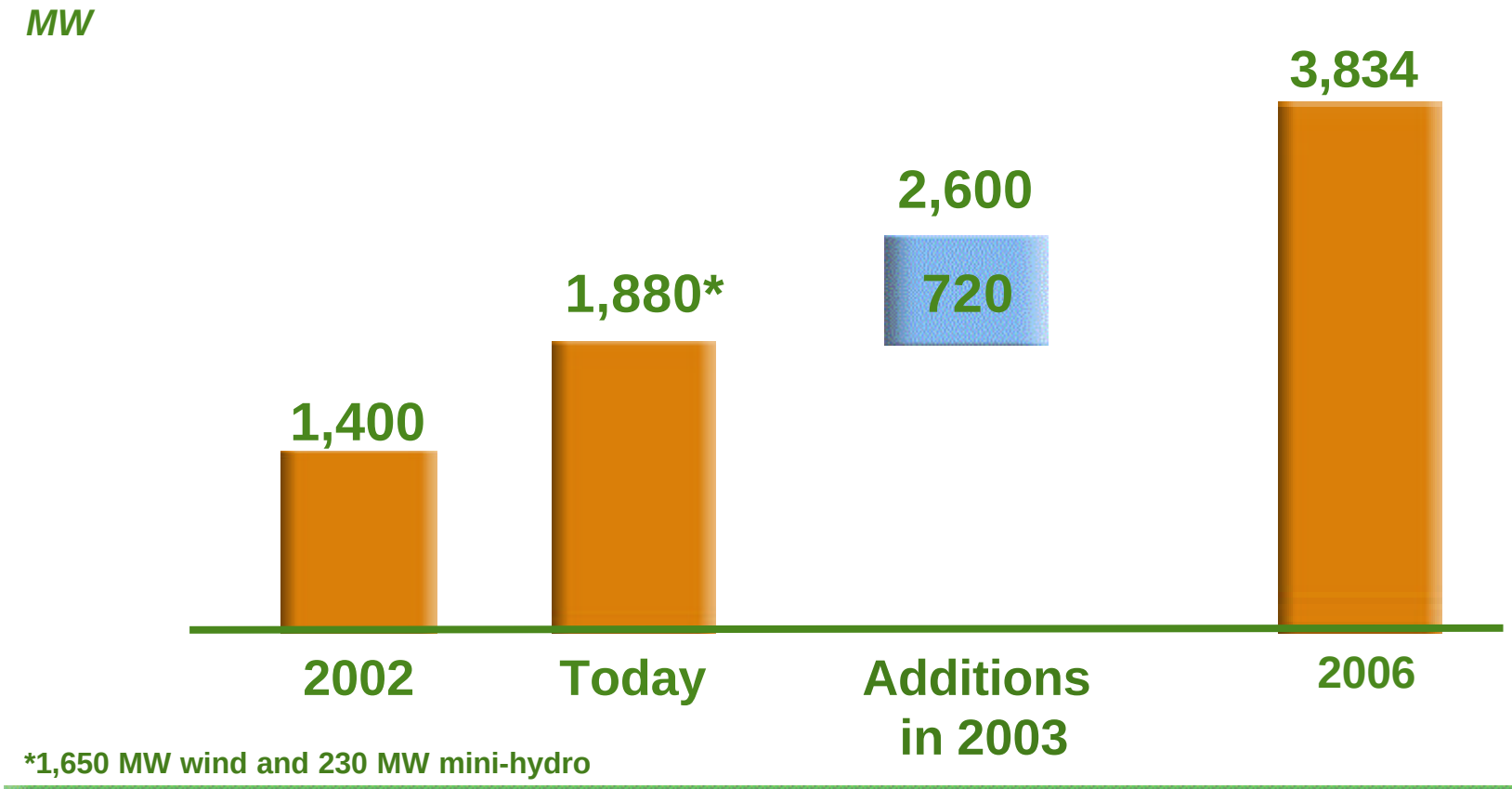
Iberdrola, worldwide leader in wind energy



Source: Companies info; Iberdrola as of June 2003

Iberdrola Renewables Capacity (MW)

2,600 MW in operation by year end



*1,650 MW wind and 230 MW mini-hydro

...beating Strategic Plan targets

Reduction of Emissions

Iberdrola will reduce emissions by focusing on Renewables and CCGTs

	Renewables	CCGTs
Capacity (MW)	3,800	4,000
	x	x
Working hours	2,400	5,500
	=	=
Production (GWh)	9,120	22,000

Reduction of emissions	- 9 Mt CO_2	+	-14.3 Mt CO_2	=	-23.3 Mt CO_2

Emissions reduced could save Eur 1 Bn in penalties

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Conclusions: Spain's System

Spain needs capacity

- Demand growth
- Peak demand growth
- Low reserve margin

Spain has to reduce emissions

- To fulfil Kyoto commitment

National Energy Planning
New Regulatory framework

CCGTs

- Security of Supply (Peak)
- Base load Energy

Renewables

- Decrease energy dependence
- Reduce CO_2 emissions

Conclusions: Iberdrola

Iberdrola: Strongly supporting NEP...

Leading CCGTs and Renewables build up

- Only technologies that meet Spain´s needs
  - More production and availability
  - Low emissions

Reaffirming the Strategic Plan...

- Profitable organic growth
- Focused on core business in Spain

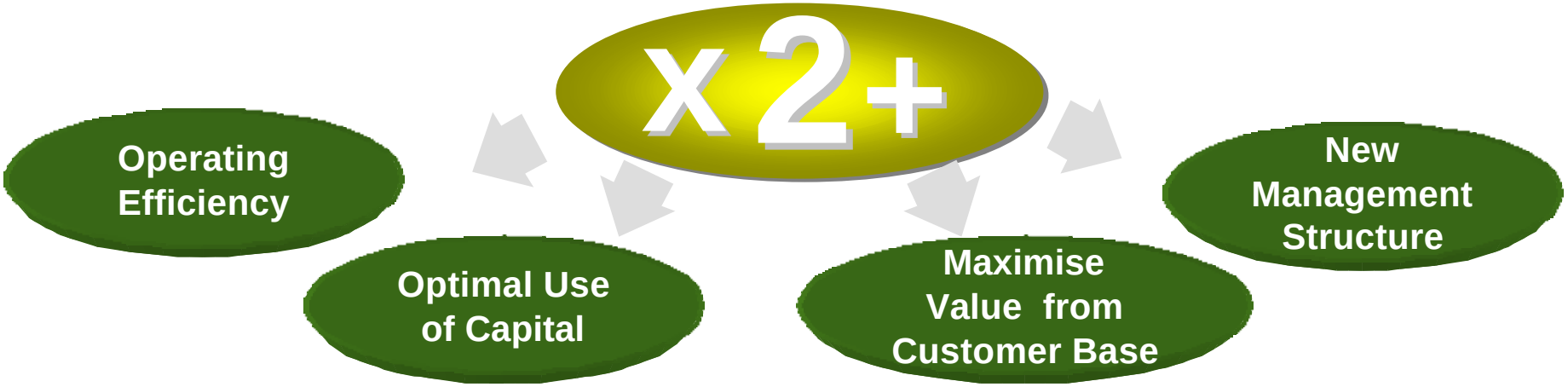
...Beating targets

- Confirming profit growth trend
- Reducing debt & leverage
- Low Risk

...by delivering its Strategic Plan ahead of schedule

Iberdrola's 2002-2006 Strategic Plan: Summary

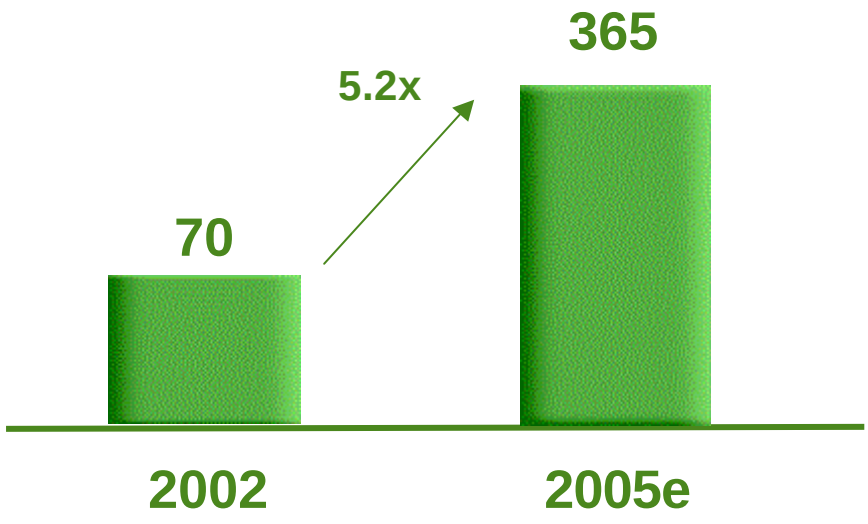
Reaffirming targets: Doubling Size and Results



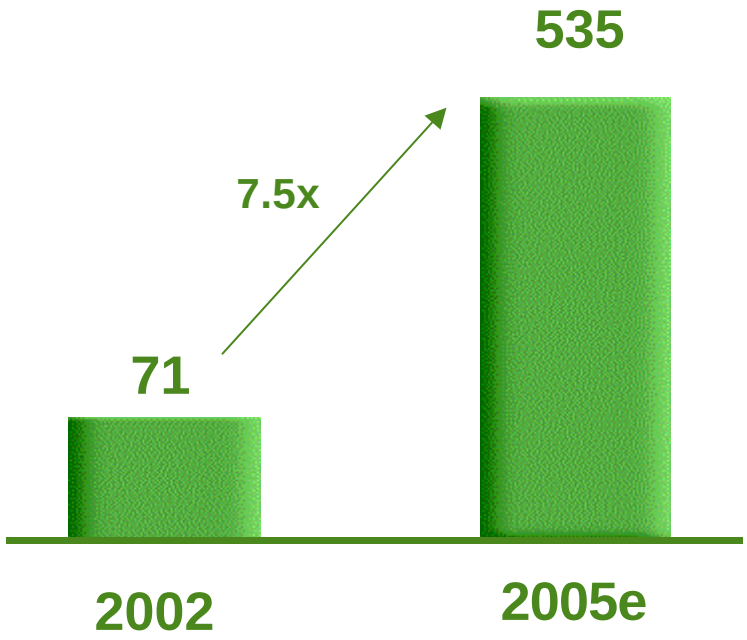
Investments	€ 12 Bn
Net Profit '06	€ 1.6 Bn
Dividend Growth p.a.	Minimum 5%
Leverage ' 06	Below 50%

CCGTs & Renewables: Growth drivers for Iberdrola

EBITDA - CCGTs*
(EUR Million)



EBITDA - RENEWABLES
(EUR Million)



** Spain and Latam*

Iberdrola's 2002-2006 Strategic Plan: Status

Year 2002: Accelerating investments...

	2002-2006 Plan	Current status
Optimal Use of Capital	CCGTs: 9,600 MW by '06	80% on track
	Renewables: 3,834 MW by '06	Completed by 2005
	Divestments up to € 3 Bn	Achieved in 2003

All targets ahead of schedule

Iberdrola's 2002-2006 Strategic Plan: Status

...and beating targets in all major parameters

	Q1 2003	Performance
Operating Efficiency	24.9% Net Op Expenses to Gross Margin	13% better than Strategic Plan estimates
Financial Efficiency	56.2% Financial Leverage	Better than Strategic Plan targets despite 500 MM higher investments

Iberdrola's 2002-2006 Strategic Plan: New Goals

Doing more than initially planned....

...in

Operating Efficiency

11% further reduction of workforce vs Plan estimates

...in

Financial Efficiency

Further reduction of leverage

...allows for higher profits

The Iberian Growth Story

Iberdrola:
Role in Renewable Energy

Pedro Barriuso Otaola

General Director of Renewable Energies

IBERDROLA

Agenda

IBERDROLA's investment in Renewable Energy

Remuneration Framework

- Europe
- Spain: Current Situation
- New Proposal

Market: Situation, Competition and Trends

Conclusion

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Market: Situation, Competition and Trends

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Why Renewable Energy?

Profitability

- Premiums are required in an initial stage as already done with other technologies
  - Hydro in the 40s
  - Coal (since 50s up to date)

Environment

- Does not generate CO2 and NOX emissions
- Fits in well with Iberdrola's strategic history of developing clean energy

Energy dependence

- Local energy source (reduces energy imports)

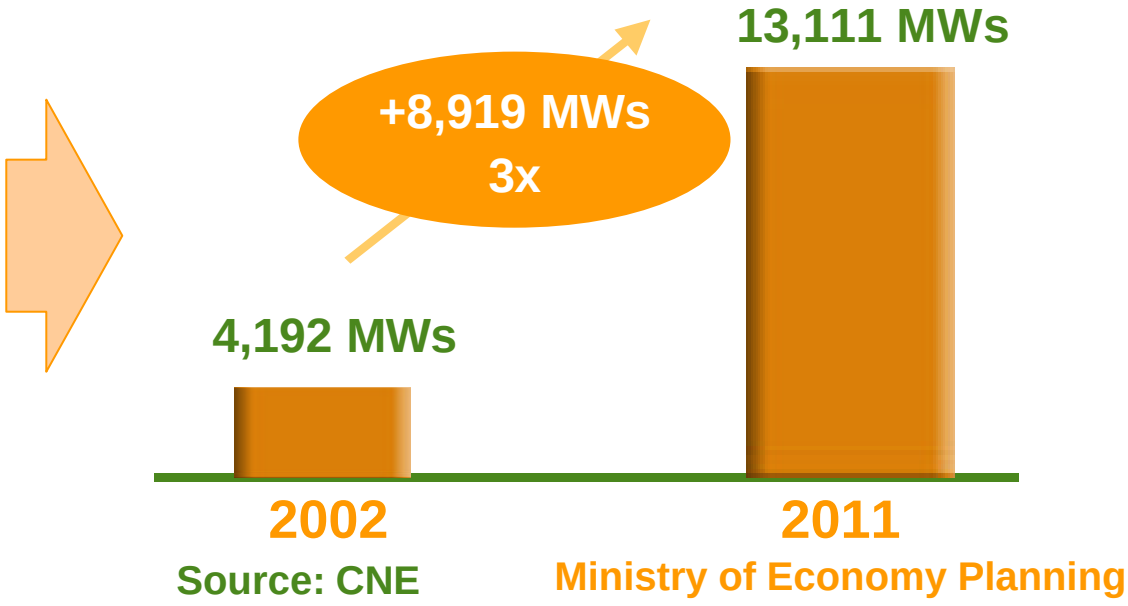
Why Renewable Energy?

Resource availability	• Inexhaustible
Commercial policy	• Image • Competition factor (sale of green energy) • Client loyalty
Spain's Energy Policy	• Increase of capacity up to 13,000 MW • Decrease energy dependence from abroad • Kyoto Protocol. CO_2 and NOx emissions reduction

Fits well with Spanish Energy Planning

Strong government emphasis in Spain on wind energy

MWs installed	Planning 2011 (1)
Mini-hydro	2,380
Wind	13,111
Biomass	3,098
Biogas	78
Solar Photovoltaic	144
Solar Thermoelectric	200
Solid Waste	262
Total electrical areas	19,162

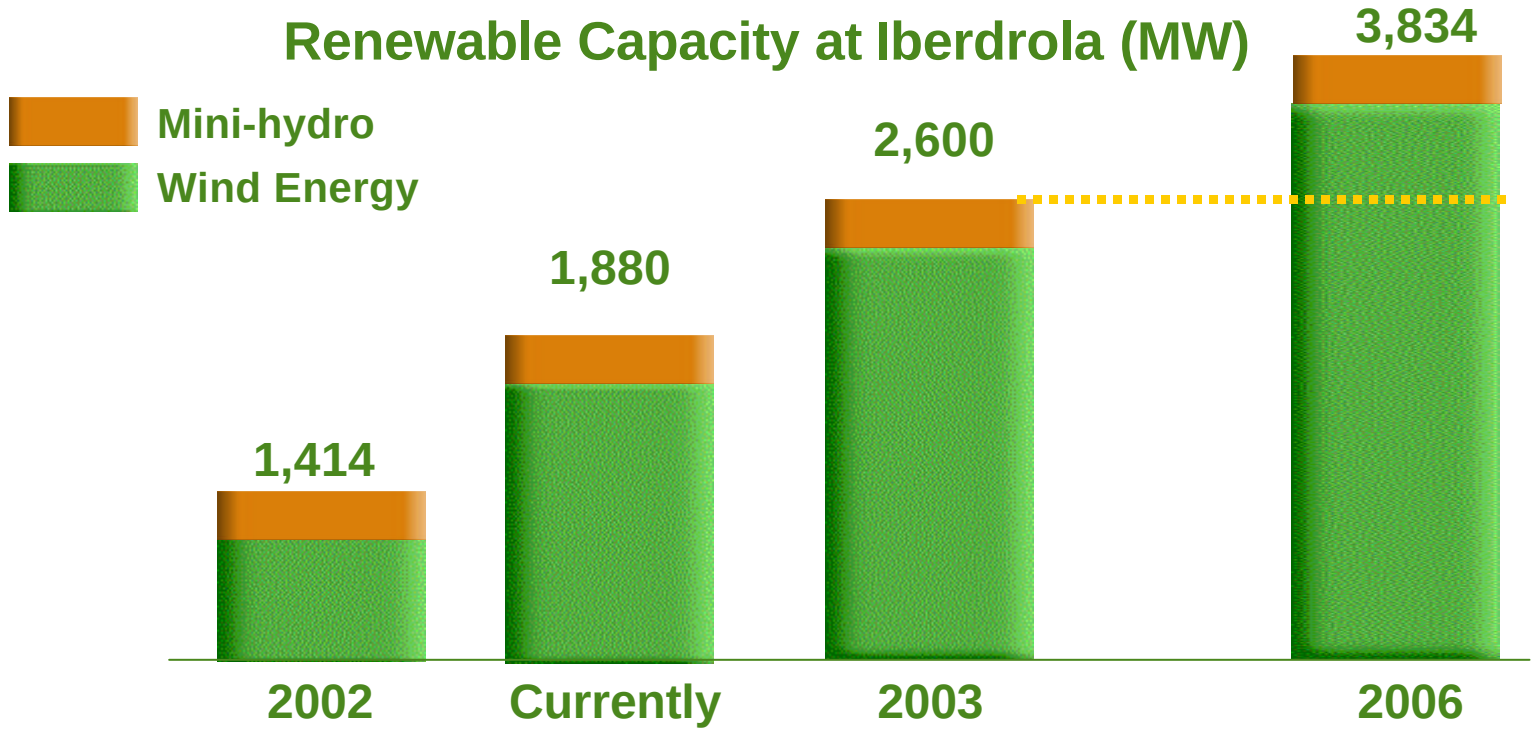


(1) Energy Planning 2002-2011 document, Ministry of Economy, September 2002

IBERDROLA, working towards the objectives of Spanish Energy Planning: Promotion and growth of renewable energy

Iberdrola's investment in Renewable Energy

Investments: Ahead of Schedule



Dec. 2003

- 2,600 MW (424 MW above planned)
- 4,300 GWh (+98% vs 2002)

Agenda

IBERDROLA's investment in Renewable Energy

Remuneration Framework

- **Europe**
- Spain: Current Situation
- New Proposal

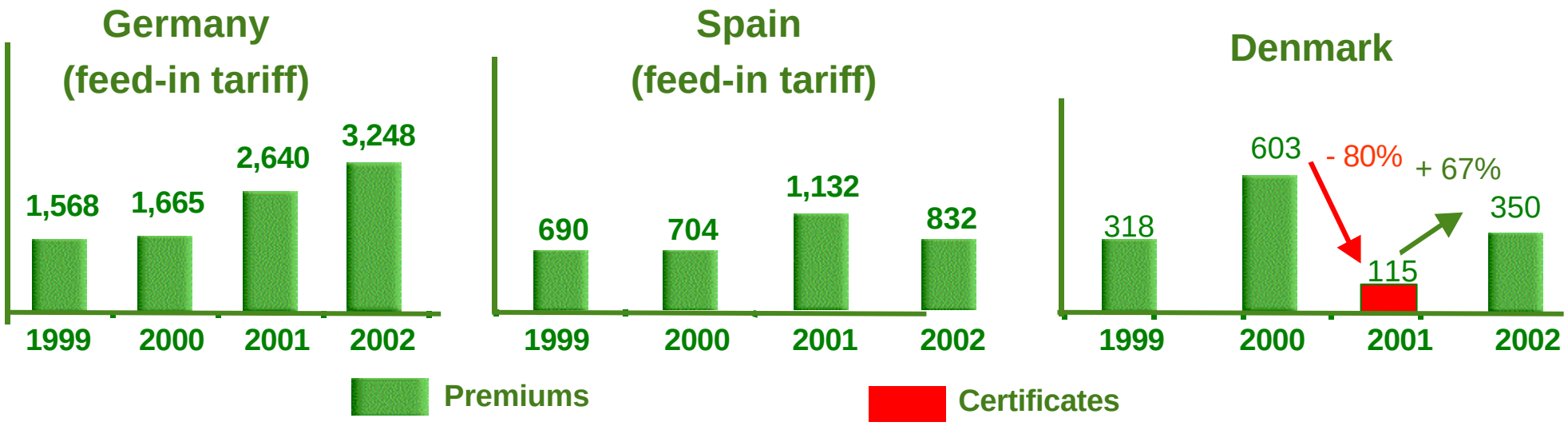
Market: Situation, Competition and Trends

Conclusion

Remuneration Framework: Europe

90% of wind power in Europe is generated under premium schemes

Capacity additions (MW)



- **Premiums: successful model. Only effective system**
- **No success stories among green certification schemes**

Agenda

IBERDROLA's investment in Renewable Energy

Remuneration Framework

- Europe
- **Spain: Current Situation**
- Spain: New Proposal

Market: Situation, Competition and Trends

Conclusion

Remuneration Framework: Spain Current Situation

Need to improve remuneration scheme to achieve targets

	2002 Capacity	2011 Target	New MW required	Invest. € /kW	Total Invest. € M	Status
Wind	4,192	13,111	8,919	1,000	8,919	
Mini-hydro	1,227	2,380	1,153	1,200	1,384	
Biomass	290	3,098	2,808	2,400	6,739	
Solar Photovoltaic	4	144	140	7,100	994	
Solar Thermoelectric	0	200	200	3,900	780	
Solid Waste + Biogas	44	340	296	2,250	666	
			Total investment		19,482	

Market determining factors

- Lengthening of administrative processes
- Development of new projects with less wind hours
- Greater difficulty in accessing grid
- Increase in the impact of technical problems on the system

- More predictability
- Development of standards to eliminate technical problems

Remuneration Framework: Spain Current Situation

Each 1% increase in demand growth requires additional 5,700 GWh from renewable energy sources by 2011

2002 Electricity consumption in Spain (GWh)	Projected annual growth in demand	2011 Electricity consumption in Spain (GWh)	Objective for Renewable Production in 2011 (GWh, without large hydro) = 20.8%
210,000	6.0%	355,000	73,800
	5.0%	326,000	67,800
	4.0%	299,000	62,200
	3.5%	286,000	59,500

A significant percentage of this energy should be achieved by wind power

(*) Energy Planning Document

Remuneration Framework: Spain Current Situation

Principal elements

PRIORITY ACCESS TO THE GRID + **FEED-IN TARIFF SYSTEM** + **GUARANTEED PURCHASE OF ALL GENERATION**

Price setting mechanism

At the end of the year, the Government estimates **the average price of electricity (APE)** for the following year

By law, remuneration for renewable energy should fall within a range of between 80% and 90% of APE

Fixed price (Option 1)

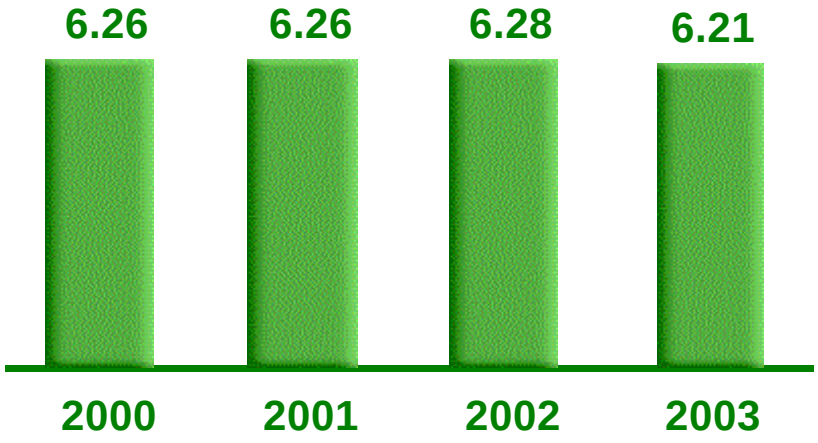
Variable price (Option 2)

Pool price + Premium

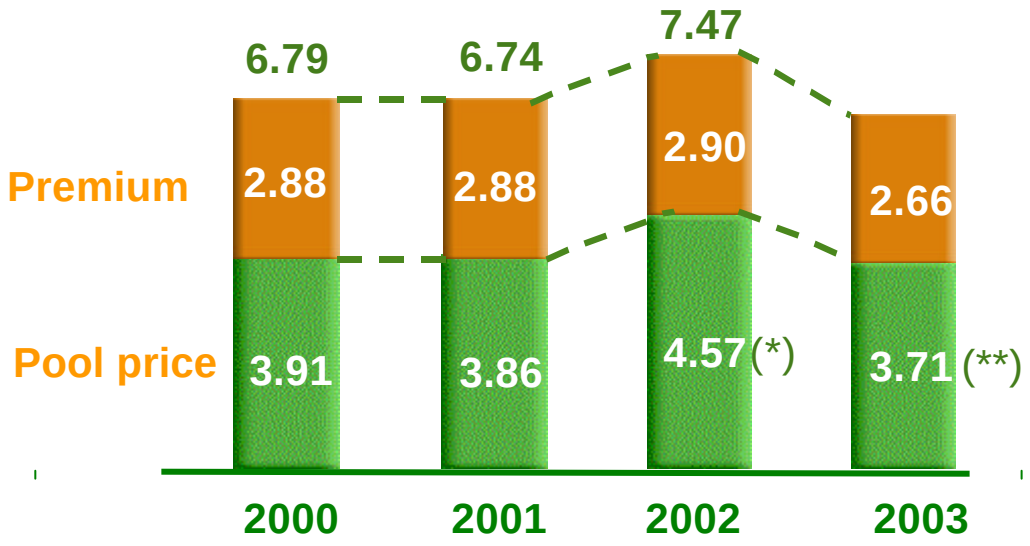
The model is revised every 4 years
Started 1/January/2003 - Valid until 31/December/2006

Remuneration Framework: Spain Current Situation

Fixed price (Euro c/KWh)



Pool + premium (Euro c/KWh)



(*) Very dry year, high energy prices
(**) Government forecast

New Tariff Methodology (2002) estimates an average annual increase in the price of electricity of between 1.4% and 2% during the period 2003-2011, which is included in the calculation of the price of renewable energy.

Agenda

IBERDROLA's investment in Renewable Energy

Remuneration Framework

- Europe
- Spain: Current Situation
- **Spain: New Proposal**

Market: Situation, Competition and Trends

Conclusion

Remuneration Framework: Spain New Proposal

Principles

- Predictability
- Efficiency
- Effectiveness
- Fits within current legal framework

Objectives

- Achieve objectives (effectiveness)
- At the lowest possible cost (efficiency)
- Sustainable from the point of view of electricity tariffs (through reduction of cost and impact on the electrical system)
- Improve the quality of energy produced
- Comply with Electricity Sector Law and allow its development by Royal Decree, which modifies Law 2818/98.

Provides security to investors and creditors encouraging investment (predictability)

Remuneration Framework: Spain New Proposal

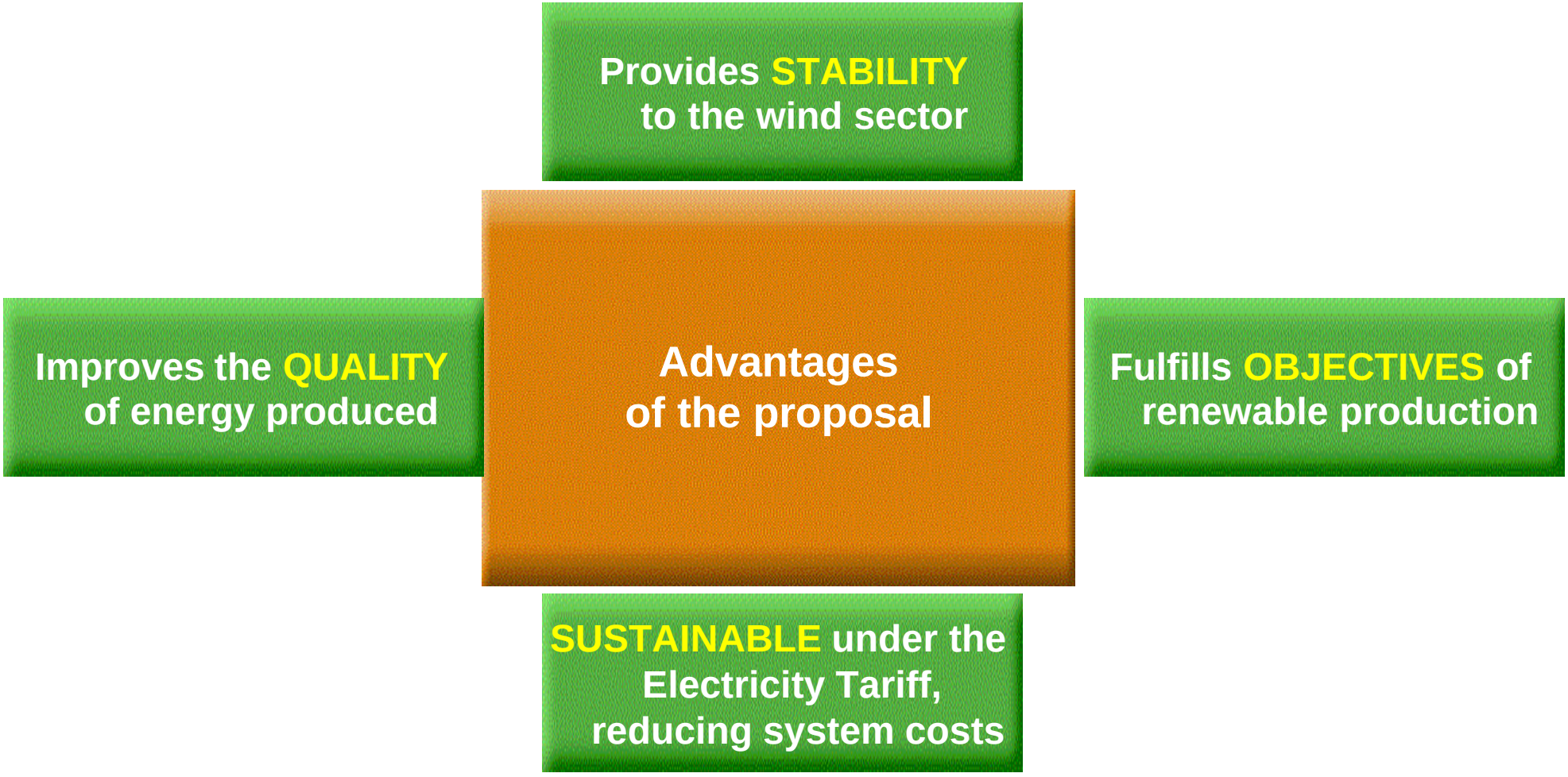
Economic Elements

- Predictable remuneration for at least the first 14 years of operation (for existing as well as new wind farms)
- Remuneration in range of 80-90% of average price of electricity
- Review after 4 years for subsequent wind farms

Technical Elements

- Contribution to voltage control (reactive energy)
- Contribution to system stability (short circuits in the grid)
- Production planning

Remuneration Framework: Spain New Proposal



Agenda

IBERDROLA's investment in Renewable Energy

Remuneration Framework

- Europe
- Spain: Current Situation
- New Proposal

Market: Situation, Competition and Trends

Conclusion

Market: Situation

From fragmentation to concentration with increasing role of Utilities

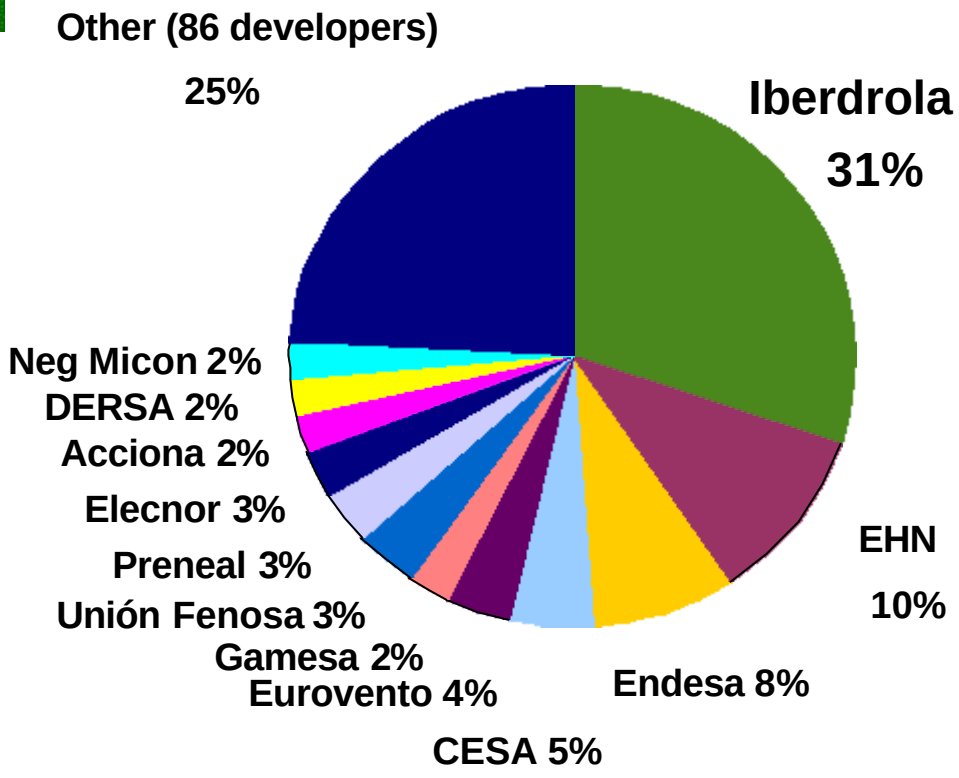
- Characterised by fragmentation
  - Almost 100 developers with operating capacity have been identified as of the end of May 2003, including manufacturers of wind turbines.
  - Average capacity is 50.7 MW/developer.
- Some small developers with installation rights are considering selling those rights, because of:
  - Lack of financial resources
  - Length of installation time (beginning of recovery) has increased and many of them have only one wind farm in their portfolio
  - Lack of knowledge of the electrical system and its development
- Utilities are entering the market: Iberdrola, ENEL, NUON, RWE, ...

Competitive landscape: Spain

Iberdrola, leader in Spain...

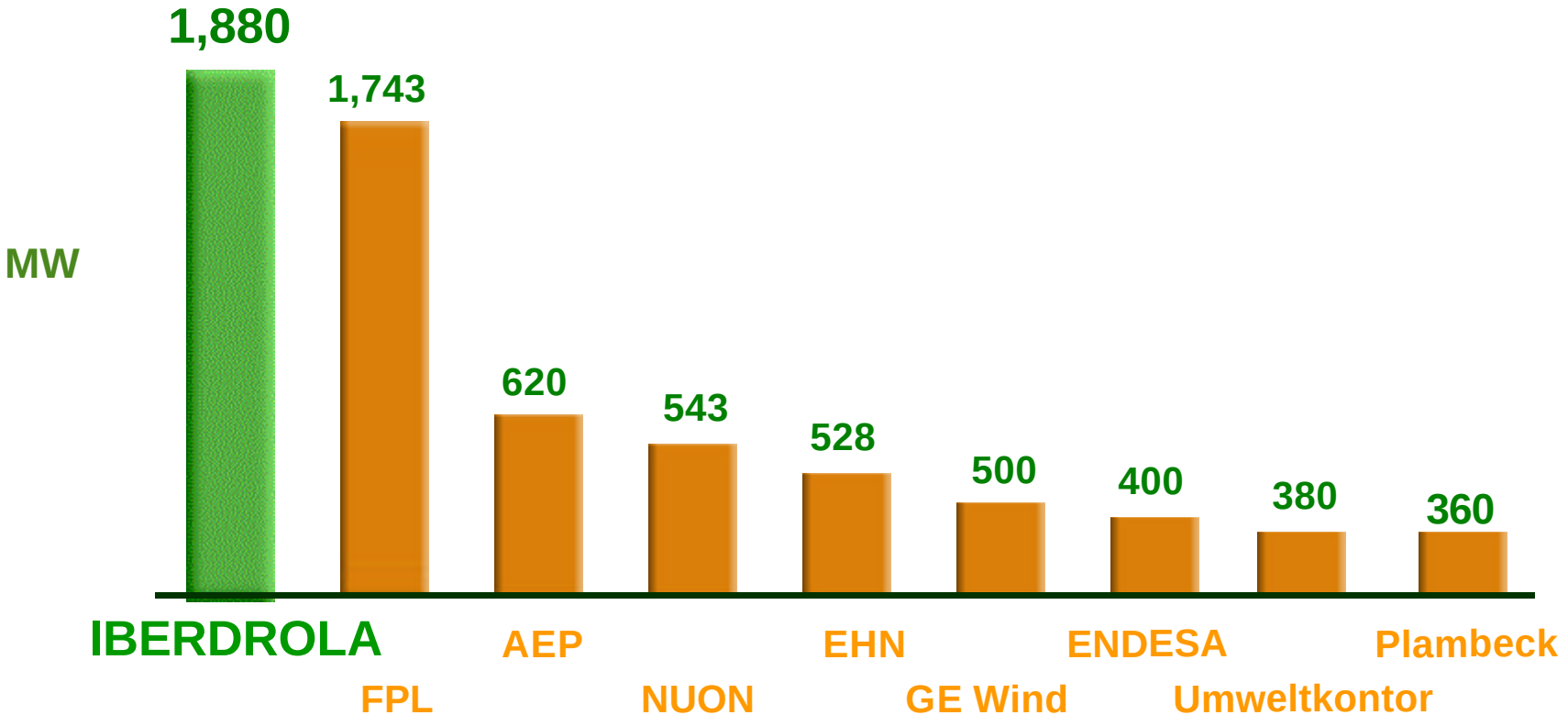
This data corresponds to Attributable Power as at end of May 2003

Rk	Developers	MW	Perc.
1	Iberdrola	1,503	30.2%
2	Corporación EHN	513	10.3%
3	Endesa	420	8.4%
4	CESA	234	4.7%
5	Eurovento	179	3.6%
6	Gamesa	122	2.5%
7	Unión Fenosa	172	3.5%
8	Preneal	151	3.1%
9	Elecnor	137	2.8%
10	Acciona	115	2.3%
11	DERSA	113	2.3%
12	Neg Micon	106	2.1%
13	Other (86 devel.)	1,204	24.2%
	TOTAL	4,969	100.0%



Competitive landscape: International

...and worldwide



Source: Companies Info, Iberdrola as of June 2003

Trends

Market

- Concentration in the sector, although there will continue to be a large number of developers.
- Manufacturers will concentrate more on their core business (manufacture of wind turbines)
- Entry of utilities (increased efficiency)
- Services (remunerated) demanded by the system and the market (sales aggregations, energy management, ...)
- Participation in some grid services (voltage control, etc.).

Technology

- Increase in unit power of wind turbines.
- Decrease in cost of investment/MW (NOT currently)
- Adapt to diverse wind conditions: structural design and rotor diameters.
- Adapt to grid characteristics: voltage and power control, improved stability.
- Production forecasting models.
- Improve coordination with grid protections.

Agenda

IBERDROLA's investment in Renewable Energy

Remuneration Framework

- Europe
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Conclusion

Conclusion

Iberdrola is uniquely positioned, due to...

- Significant economies of scale in the purchase of machinery and in contracting construction of wind farms (capital intensive business).
- Available financial capacity and access to competitive loan rates.
- Significant volume of power in operation, which enables O&M tasks to be centralised, with a consequent cost reduction and an increase in availability of machinery.
- Specialised knowledge of the market, the electrical system and the technology.
- A regulatory framework based on the premium scheme, which will be improved.
- The Spanish government's support for this type of energy.

Renewable Energy in Iberdrola is already profitable.

Wind farms:
Valuation and Financing

Mr. José Sáinz Armada
Director of Development and Finance

IBERDROLA

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Objectives of the Workshop

To identify the value drivers of wind farms

To describe financing in the wind sector

To develop a valuation model of wind business

Introduction

Market values wind business at 1 EUR M/ installed MW

NOT REFLECTING….

Efficiency

- Number of wind hours per year per installed capacity

Competitive Position

- Economies of scale
- optimization of production & management

Parks under Construction

- Valued at zero, but debt accounted for

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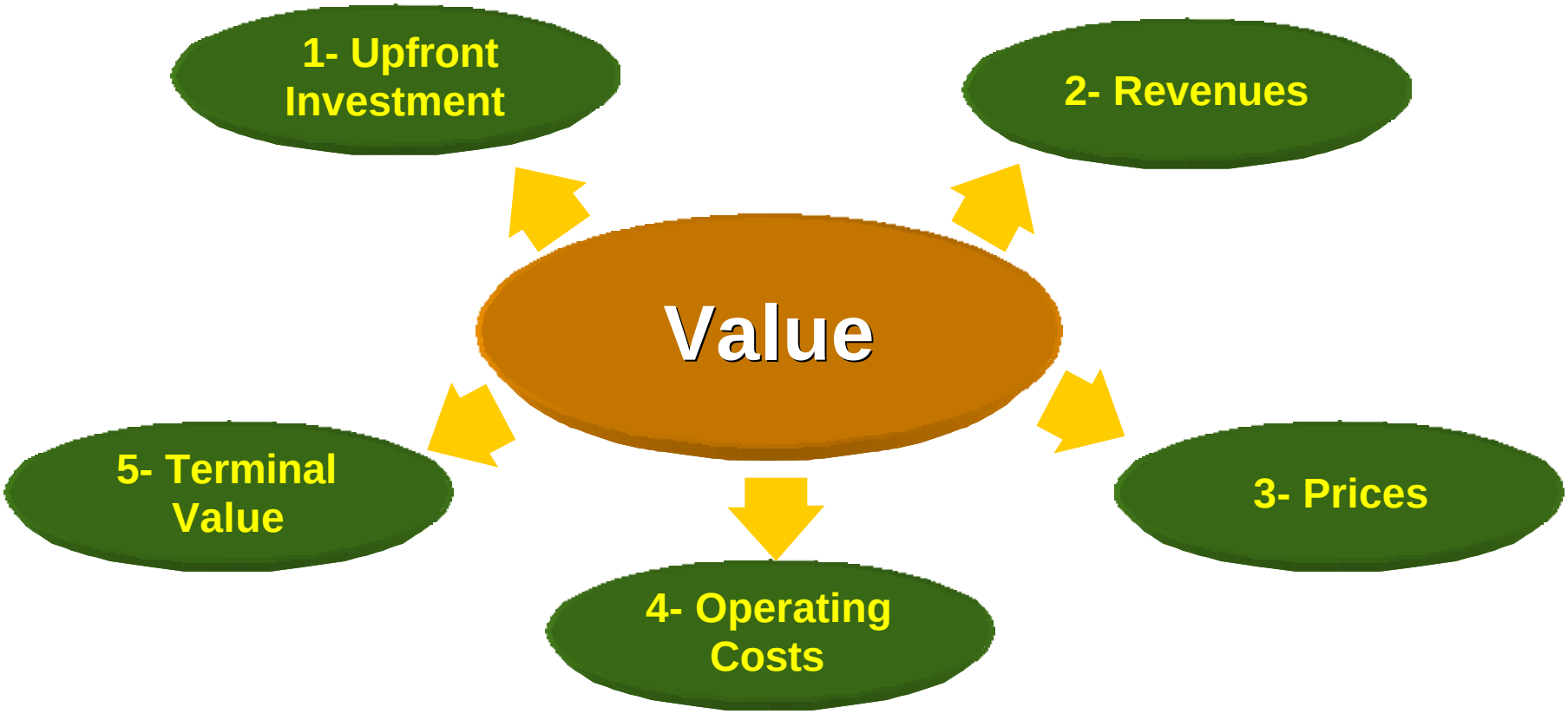
Value drivers



Proper management of these drivers extracts additional value

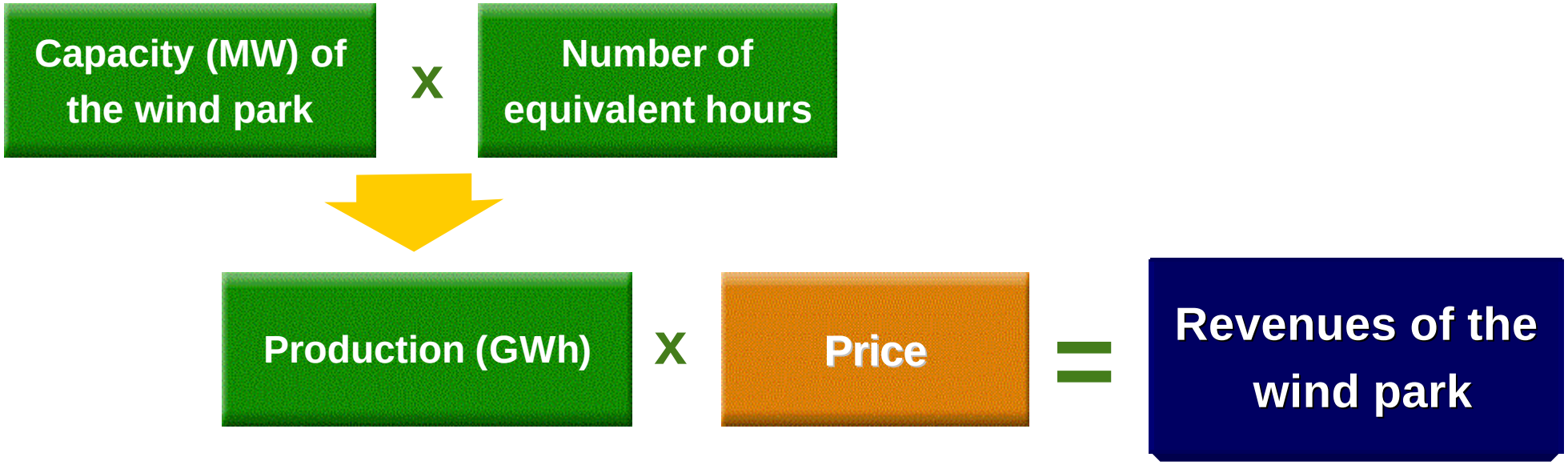
1 - Up-front Investment*

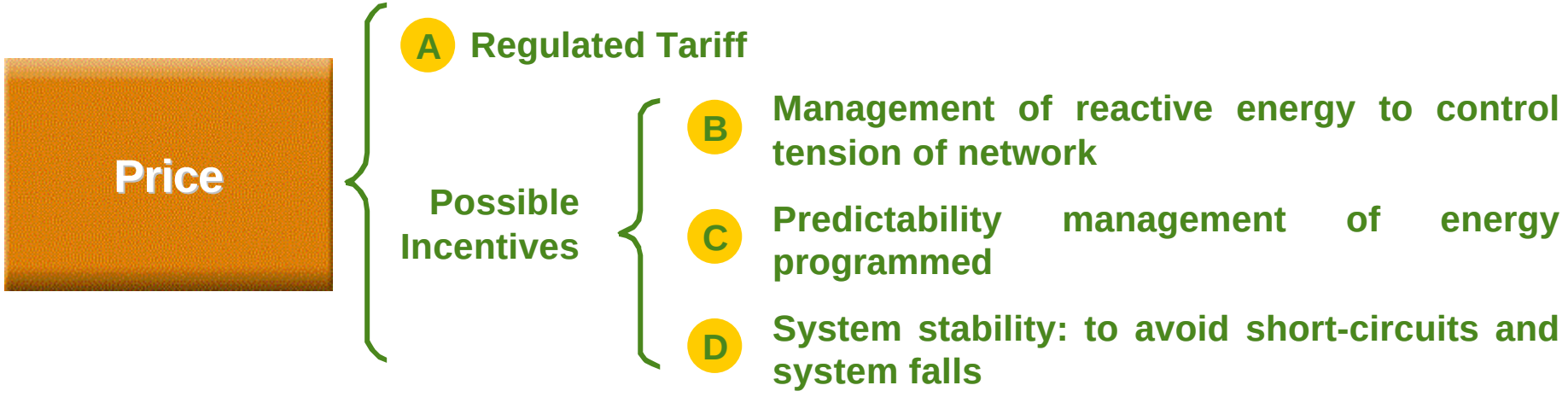
% of Costs		Key Drivers
Wind turbines	75%	– Economies of scale – Access to Gamesa (builder of WTs) – Know-how in selection and installation of WT
Electronic equipment & grid connection	14%	– Distance to grid – Concentration of capacity – Economies of scale
Civil work	6%	– Economies of scale
Promotion& Engineering&Others	5%	– Key for future performance of wind farms (+10%)
Other		– Land usually rented for more than 30 years – Concessions perpetual

Standard installation costs = aprox. 975 KEUR/MW
Up to 10% of savings + Impact on future performance

* Source: IDAE

Revenues

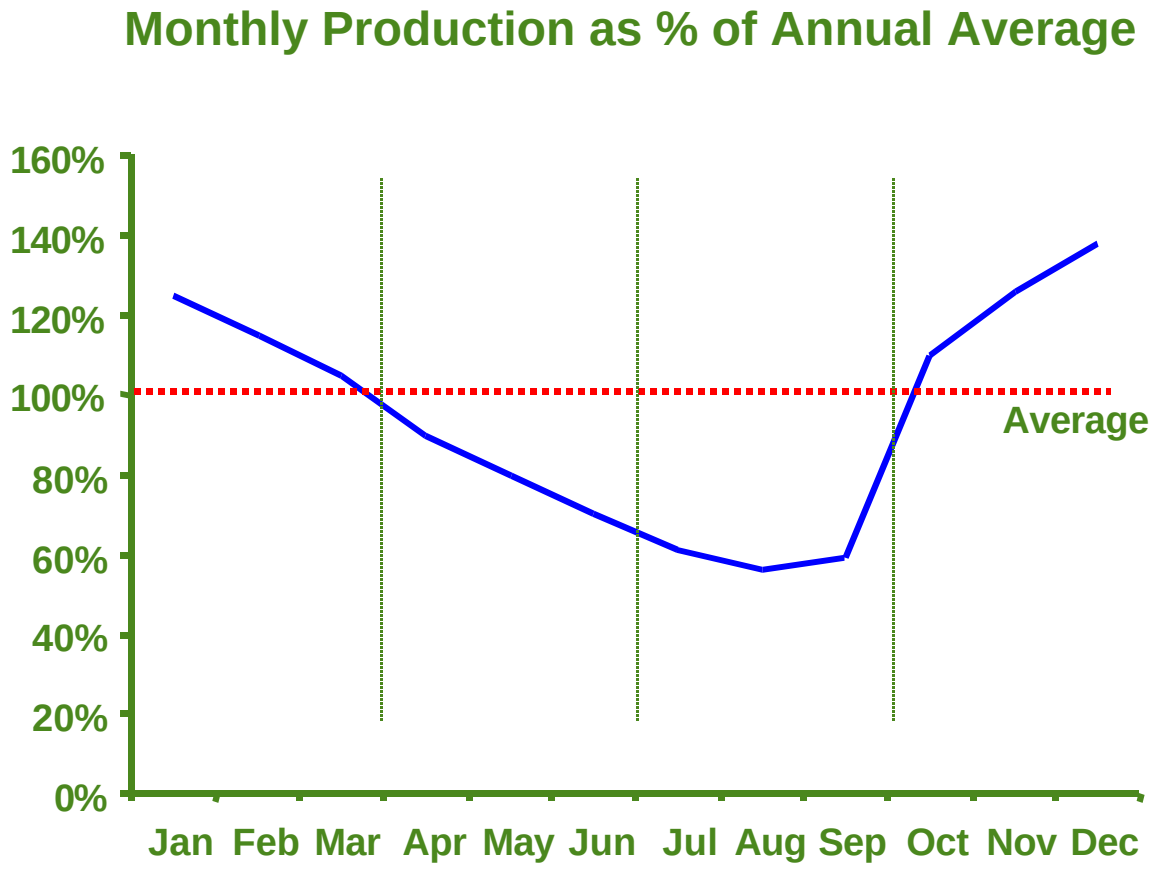

Capacity (MW) of the wind park
X
Number of equivalent hours
Production (GWh)
X
Price
=
Revenues of the wind park


Price
A Regulated Tariff
Possible Incentives
B Management of reactive energy to control tension of network
C Predictability management of energy programmed
D System stability: to avoid short-circuits and system falls

2- Production: Seasonal nature of wind

Higher production in the 1st and 4th quarters

Q1	115%
Q2	80%
Q3	60%
Q4	125%



* Based on a representative sample of 15 wind farms (c. 500 MWs)

2 - Production: Energy Index (E.I.)

Better investment valuation than using 1 EUR M/installed MW

Energy Index = $\frac{\text{Enterprise Value (EUR 000)}}{\text{MW x Hours}}$

Average +10%.....0.487 ← Expensive

Sector Average.....0.443

Average -10%..... ...0.398 ← Cheap

E.I. of wind farms acquired to Gamesa equals to 0.402 vs. average sector of 0.443

3 - Prices: Current Income Regime

+ **Regulated Tariff 2003**
  - Premium (26.64 EUR/MWh) over the Pool or a fixed price (62.14 EUR/MWh)
  - Integrated utilities to profit from their capacity to forecast the Pool

+ **Management of Reactive Energy**
  - 4% additional income on electricity sold if 0 production
  - Only for those producers on Pool regime
  - Does not help to control the tension of the network

+ **Deviations& System Stability**
  - Not existing as of today

* Electricity Law 54/1997

3- Prices: Proposed Income Regime

Remuneration: 80-90% of Average Electricity Tariff, AET (70.85 EUR/MWh in 2003)

Long term: based on year of operation and not calendar year

Stable during first years of operation, then decreasing according to working hours

Definition of categories of wind farms

Premiums for active management of reactive energy + predictability + stability

To give stability and visibility to investments
Total revenues also affected by incentives
(reactive energy, deviations and stability)

3 - Prices: Other Income Sources

+	**Regulated Tariff**	
+	**Management of Reactive Energy**	– Proactive management to adequate to tension requirements of the System – Utilities to receive an additional percentage of AET – Only for tariff related to Pool
+/-	**Management of Deviations**	– Operators to forecast wind production in advance – Incentive of a percentage of AET if production is as said – Potential looses if real production is far away from estimates
+	**System Stability**	– Complementary incentives to finance CAPEX requirements in order to wind farms been able to respond to short-circuits – A percentage of AET during four years (IRR neutral)

4 - Operating Expenses

Operating Expenses

- Unitary costs of 10-11 EUR/MWh (mainly O&M)
- No maintenance CAPEX required
- Utilties to profit from:
  - Economies of scale
  - Synergies with other areas
  - Technical know-how
- Iberdrola to profit from a unique dispatch center to manage all its wind farms (potential service to third parties)

Depreciation

- WT to be amortised on a linear basis
- Period of 15 years

Economies of scale and centralized management lead to savings of 5-10%

5 - Terminal Value

VALUE LOST

20 years useful life of wind turbines

VAULE KEPT

- Perpetual concessions and land rights
- Proven wind resource
- Civil work and access to grid
- Cash from scrap iron - dismantling costs > 0

Terminal value: aprox.10-15% of upfront investment (adjusted by cumulated inflation)

Summary: standard wind farm valuation inputs

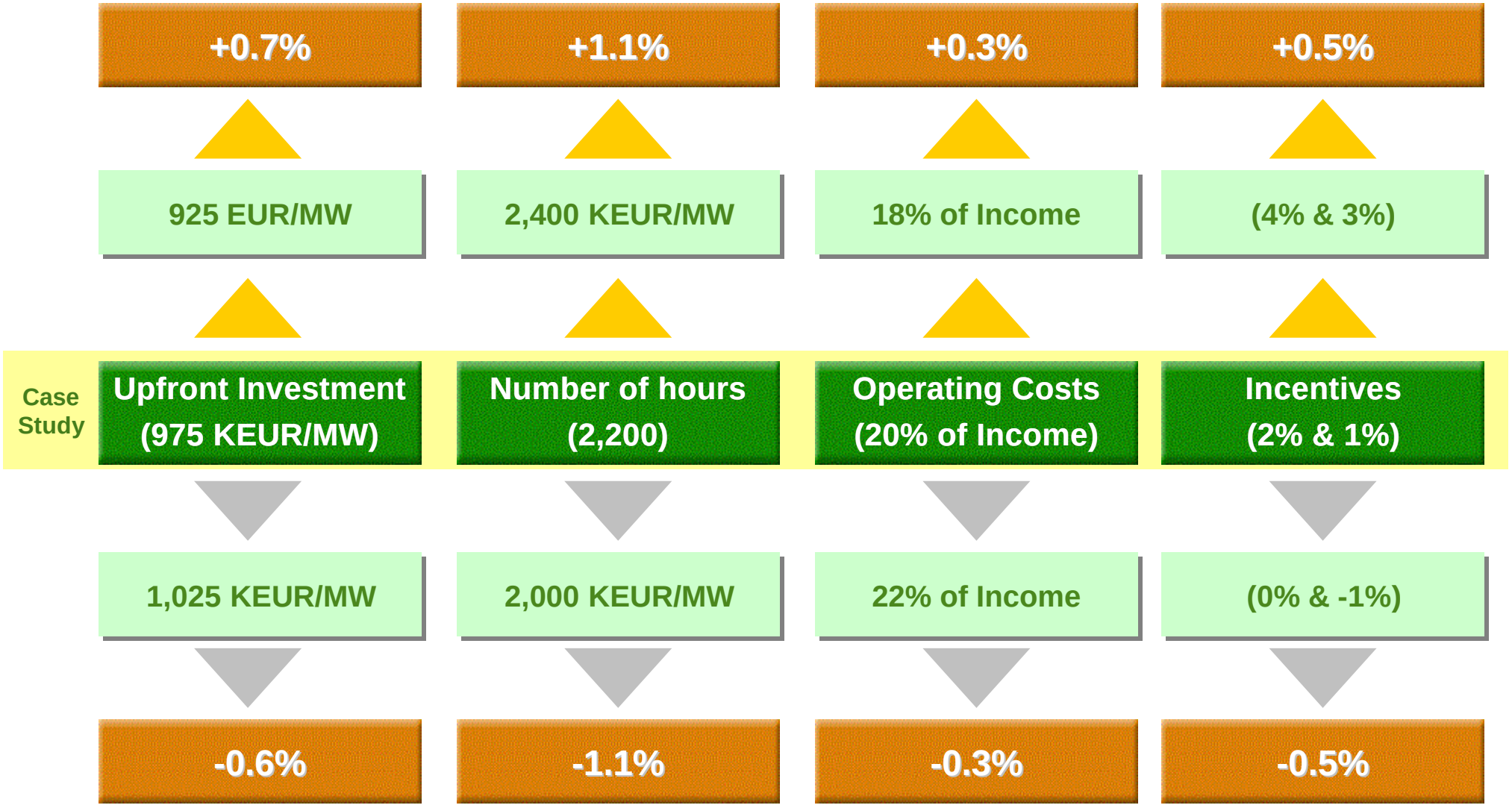
Upfront investment	975 KEUR/MW (standard wind farm of 49.5 MW)
Income	Case Study* (+2% reactive income, 1% of deviations)
Number of hours	2,200 - 2,300
Operating costs	10.5 EUR/MWh, growing with inflation (- 0.5%)
Periods	20 years of activity and 15 years linear for asset depreciation
Terminal Value	12% of initial investment adjusted by cumulated inflation
Financial Structure	75% Debt, 25% Equity

* According to an AET growing from 2004 to 2010 by 1.4% (potential upside up to 2%), 1% onwards.

Standard installation: Financial profile

Base 100		Year 1	Average 15 years	Average 20 years
	Revenues = Gross Margin	100%	100%	100%
	Operating Expenses	16%	18%	20%
	EBITDA Margin	82%	82%	80%
	Depreciation	44%	44%	33%
	EBIT Margin	38%	38%	47%
	Financial cost	25%	14%	11%
	Income taxes	5%	8%	13%
	Net Income Margin	8%	16%	23%

Sensitivities to key value drivers



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Rationale of financing

Wind farms can finance either through Project-Finance (PF) or through owner´s debt

PROJECT-FINANCE

Suitable for owners which do not have strong resources

…and projects not 100% belonging to one shareholder

FUNDS FROM OWNER

Ability to finance at better margins (lower spreads)

…if 100% owned

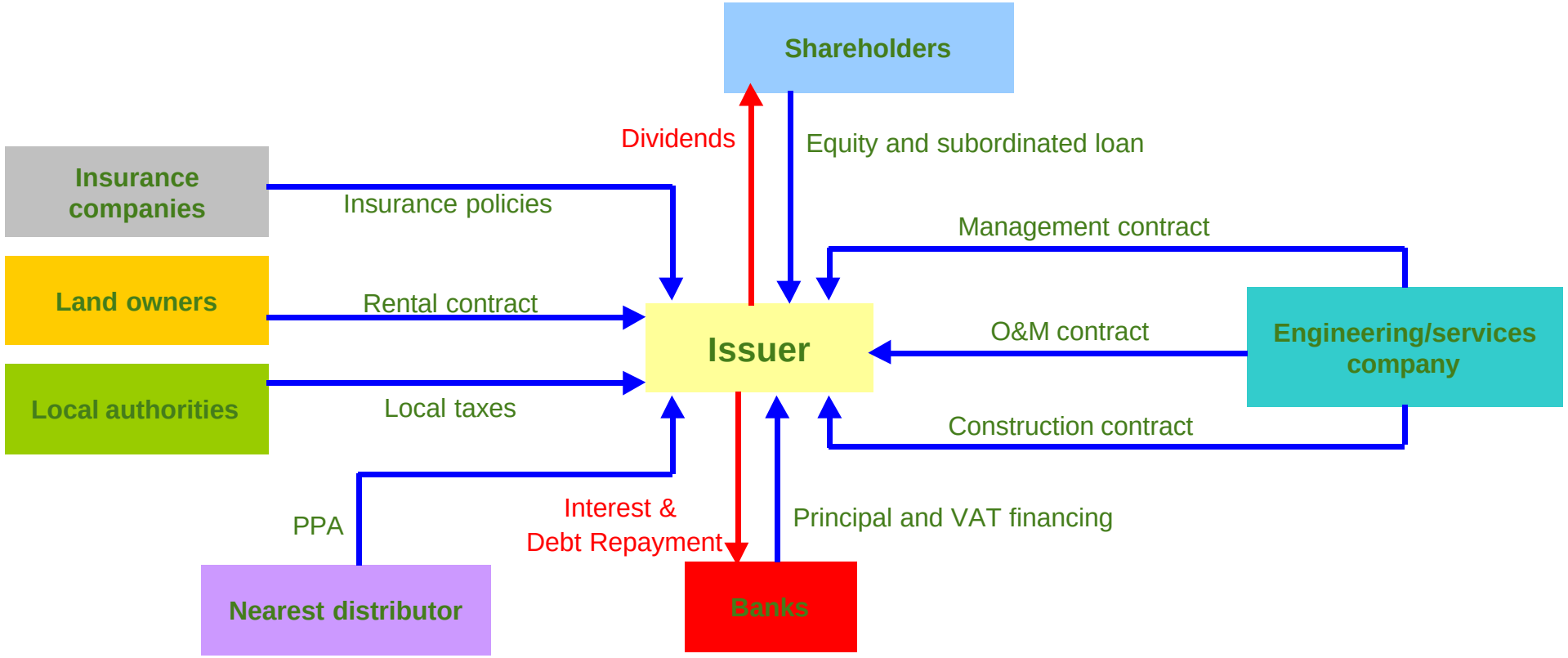
Consolidates in Balance Sheets

Rating Agencies limited value to PF if core business

Why Project Finance?

- Ability to fund projects off balance sheet with limited or no recourse to the equity investors
- Reduces equity injections
- It allows financing of industrial projects with limited impact on the holding
- Risk of repayment passed into the project
- It allows reduction of overall percieved Cost of Capital

PF: paid back by the Project´s cash-flows



Complex structure, with higher financial costs

Financing costs of a standard PF

Amount	75% of up-front investment + VAT (during construction)
Interest rate structure	Average Spreads: Lower during construction (75 bps) Based on Debt Service Coverage Ratio during operation (120 bps)
Other fees	Upfront, Availability and Agency fees
Repayment	Linear, 12- 15 years in average

All-in costs of 130 bps over Euribor based on Project Finance structures

Financing guarantees of a standard PF

Shareholders guarantees

- Debt/equity ratio: 75/25
- Completion: commitment to have farms in operation before agreed date (in case of delay, repayment of debt)

Structure of guarantees

Pledge of:

- 100% of the Share Capital
- Rights associated to contracts
- Rights associated to insurance policies

* 3 years, after which equivalent working hours are reestimated (“wind auditor”)

…not all playing in the same league

Project-Finance	Iberdrola is currently obtaining all-in costs of 110 bps
Owner´s Support	Iberdrola can provide funds to its wind farms at 60 bps The best rating and CDS (31 bps) among the Spanish integrated utilities
Potential	Additional value could be created through alternative financial structures

Index

Our positioning in the renewable business...

	June 2003	Dec-03	Dec-04	Dec-05	Dec-06
Operating wind MWs	1,610	2,325	2,805	3,200	3,494
Operating mini-hydro	270	275	340	340	340
Total Operating	1,880	2,600	3,145	3,540	3,834
Wind MWs under construction	385	175	318	35	35

- Robust portfolio with an average figure of working hours of 2,410 hours
- Parks acquired from Gamesa in 2003 valued at 1.08 EUR M/MW, but good E.I.
- Own developed wind farms investment 0.9 EUR M/MW (c. 2,400 hours)

…and our competitive advantages (I)

Investment

- Largest buyer of turbines in Spain
- Long term agreement with Gamesa (7% discount on Iberdrola terms)
- Best engineering company for Renewables (Iberinco: 100% owned)
- Best knowledge of the Grid to connect
  - ✓ Select the best places: distance and availability
- Best conditions to:
  - ❶ Contract civil work
  - ❷ Purchase of electronic equipment

Production

- Best wind park portfolio: over 2,400 wind hours
- Optimization of price; technology to choose between pool and fixed price
- Management optimization of:
  - ✓ Reactive electricity (premium)
  - ✓ Predictability (premium)
  - ✓ Stability

…and our competitive advantages (II)

Operational expenses

- 1 center to management all wind farms
- Largest manager of wind farms, economies of scale

Terminal value

- Very good wind locations. First mover.
  - ✓ Agreement with Gamesa and other partners
- Economies of scale in replacing and dismantling

Financing

- Best rating among large developers:
  - ✓ Lower cost of funds
  - ✓ Access to capital

Iberdrola, the most efficient company in wind farms development and management

…let us to extract more value

	Inefficient	Average	Efficient
Investment costs,KEUR/MW	1,000	950-1,000	900-950
Number of equivalent hours	1,900-2,200	2,200-2,300	2,300-2,500
Operational Costs (EUR/MWh)	11	10.5	10
Incentive Reactive Energy	0%	2%	4%
Incentive for Deviations	-1%	1%	3%
All-in cost (over Euribor)	150 bps	130 bps	PF:110 bps Owner: 60 bps
Project IRR	**6%-8%**	**8%-9%**	**10.5%-12%**
Shareholders IRR	**8%-9%**	**13%-14**	**18-19%**

*Based on Case Study

Conclusion

Iberdrola renewable business has a strong hidden value

1. **Growing electricity source because Europe and Spain support its development as it is clean and self sufficient.**

2. **Iberdrola can extract significantly more value than other renewable companies due to its positioning, technology, economies of scale, and lower cost of financing.**

Promotion and Selection of Technologies in a Wind Farm

Xabier Viteri

Director of Development Renewable Energies

IBERDROLA

Wind farm: project development and technology selection

Key development aspects

Wind energy resources

Environmental feasibility

Grid availability

Agenda

Wind resources and technical design

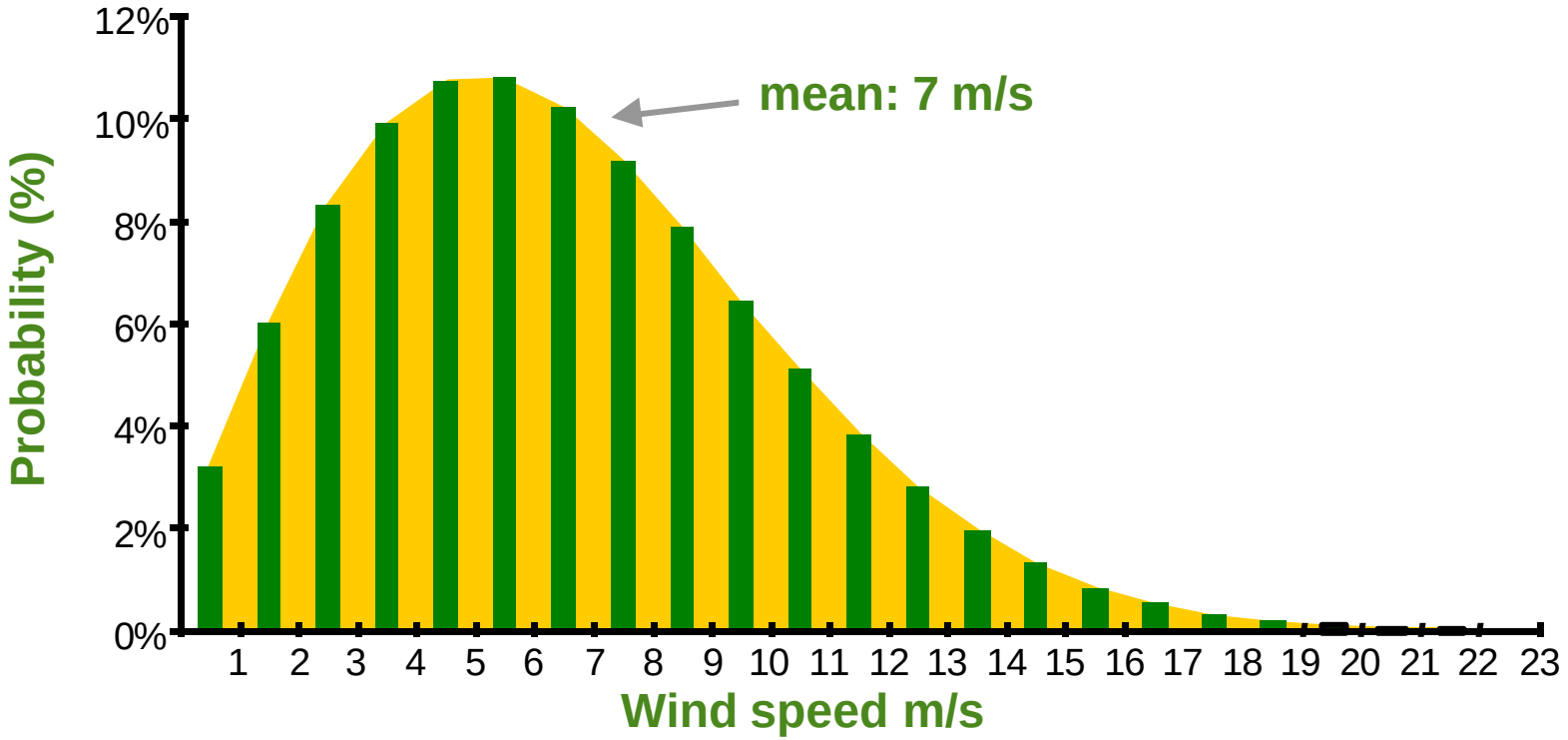
Authorisation process

Grid access

Annex: Case - Yerga Wind Farm (La Rioja)

Wind data - Probability

Mean speed defines wind distribution shape

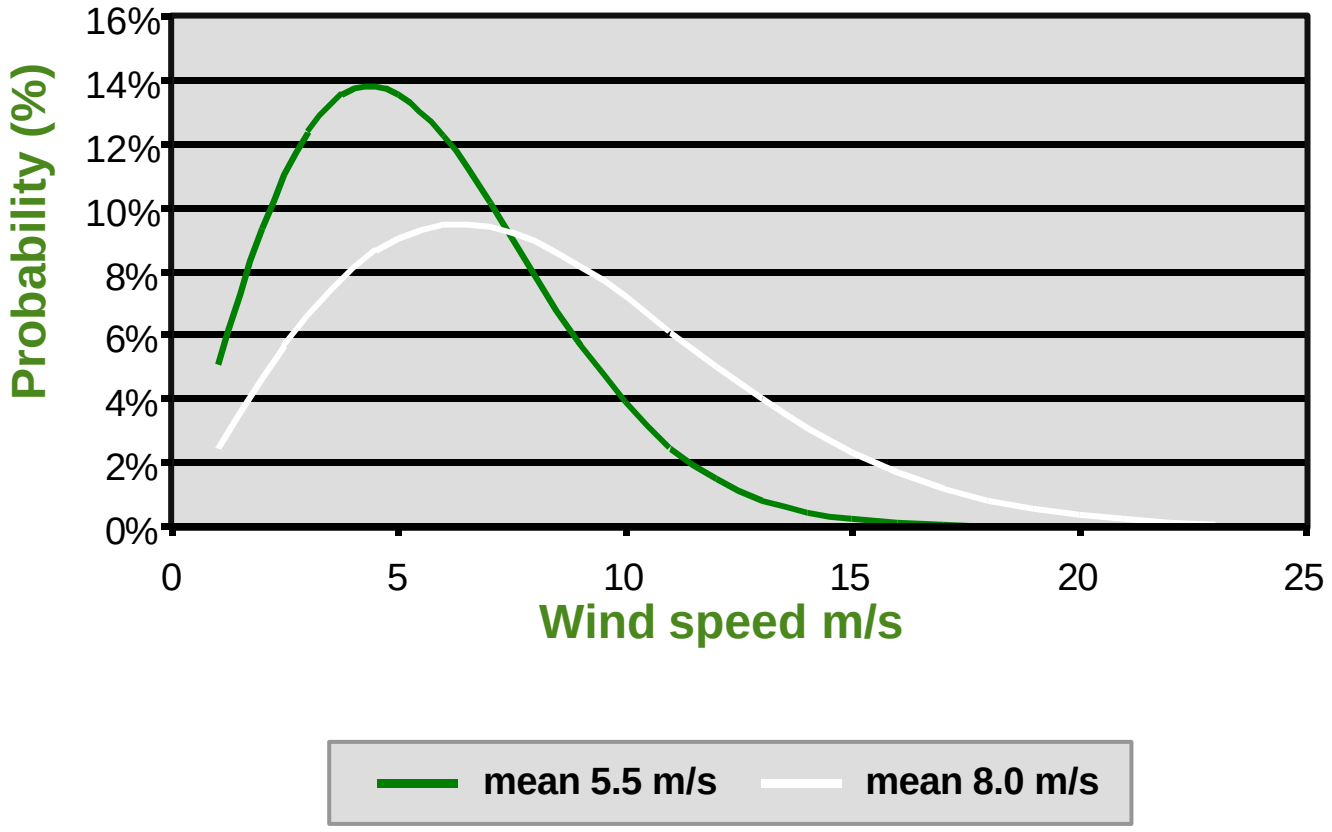


Typical probability density function, defined by:

- **Scale parameter (wind speed on site, related to mean value)**
- **Shape parameter (typical value 2)**

Wind data - Probability and mean

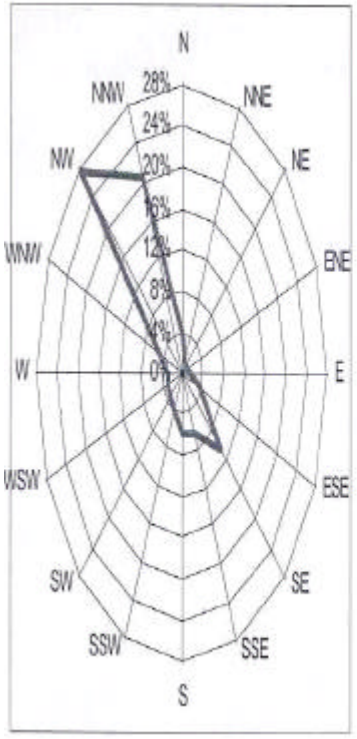
Significant increase of probability of high speed range

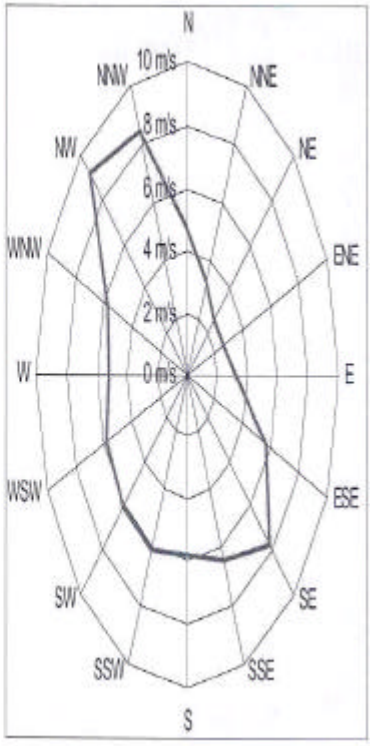


Wind data - Directional Distribution

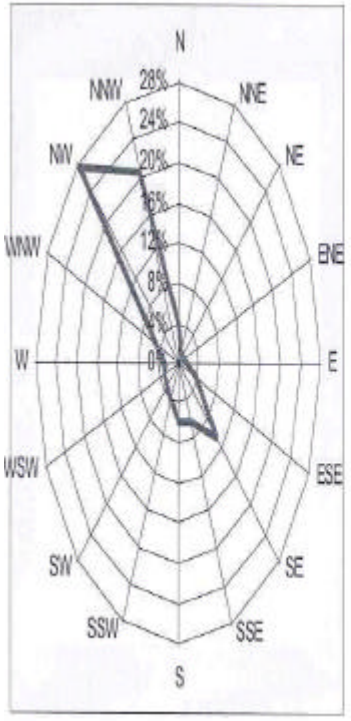
Site characteristics: turbines arrayed in opposition to main wind direction

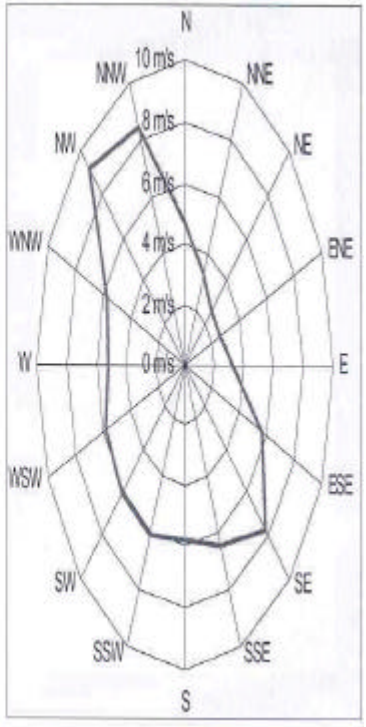
Frequency





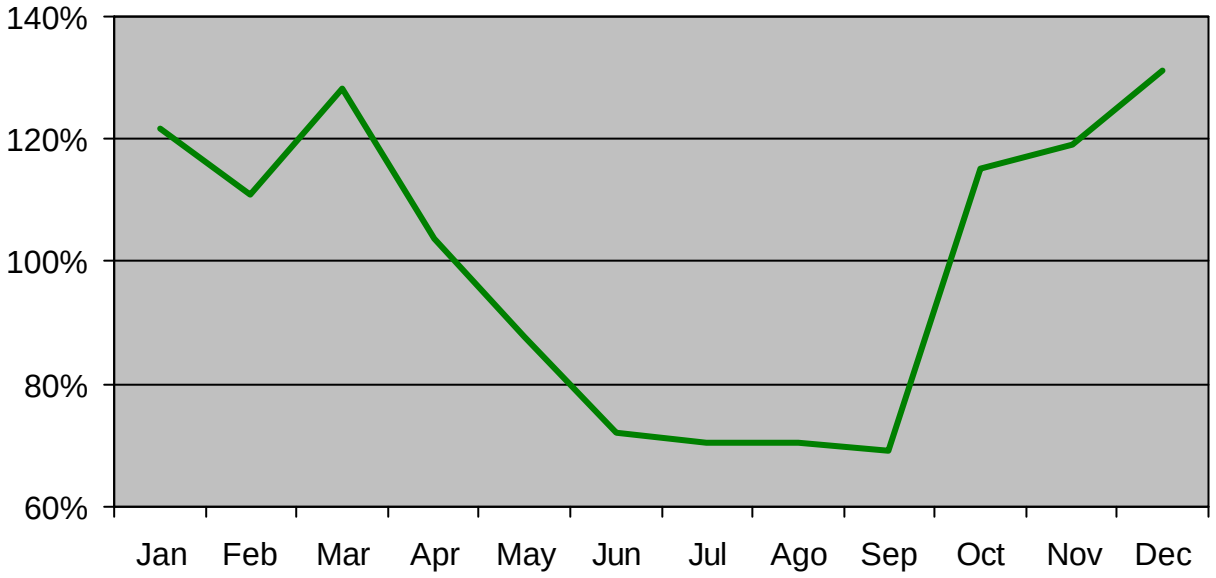
Mean





Wind data - Seasonal variation

No significant changes year on year...

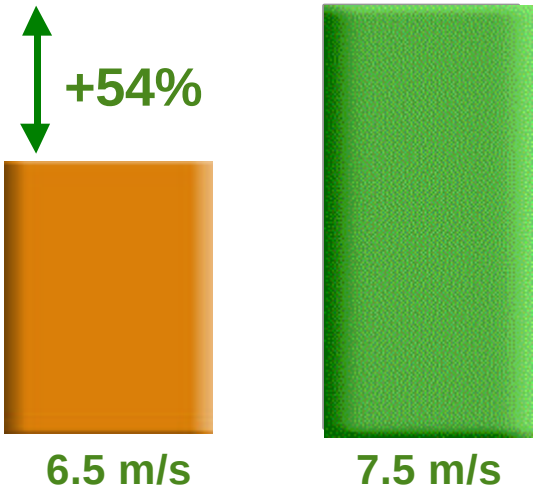


...but important variations are observed on a monthly basis

Power

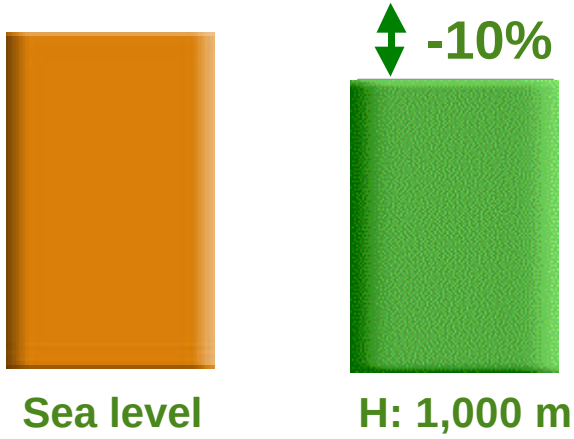
Power equals Energy per unit time in the wind

Power vs Wind speed



Proportional to cube of wind speed

Power vs air density (height)



Proportional to air density

Need for accurate long-term measurement and site modelling

Power - Wind energy conversion

1/3 of wind Energy is finally converted to electricity

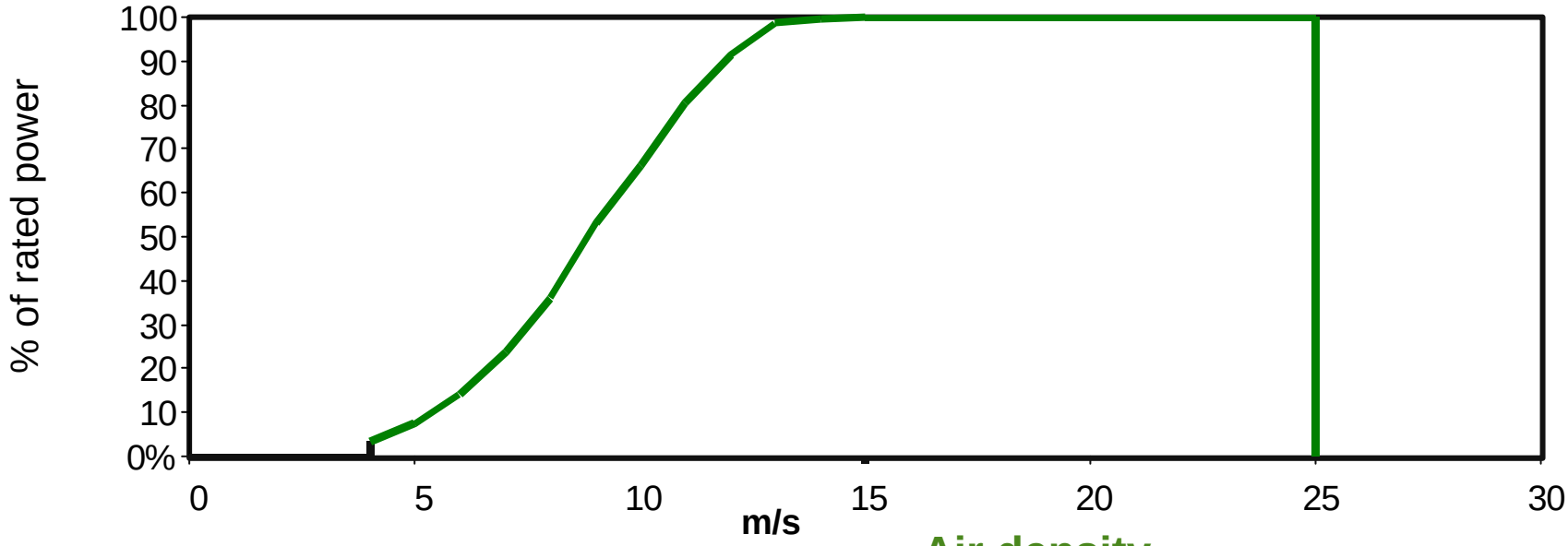
Theoretical limit	• 59% of wind energy is converted to useful energy by a turbine (Betz limit) • Real turbine efficiency > 40%	>40%
−		−
Losses	• Array effect, turbulence • Electrical losses • Availability	-3% to -5% -1% to -3% -3%
=		=
Energy Converted	• Energy Converted	1/3

Annual global conversion : 1/3

Power - Turbine power curve

Turbine power curve shows electric output for each wind speed

Electrical power (% rated power)

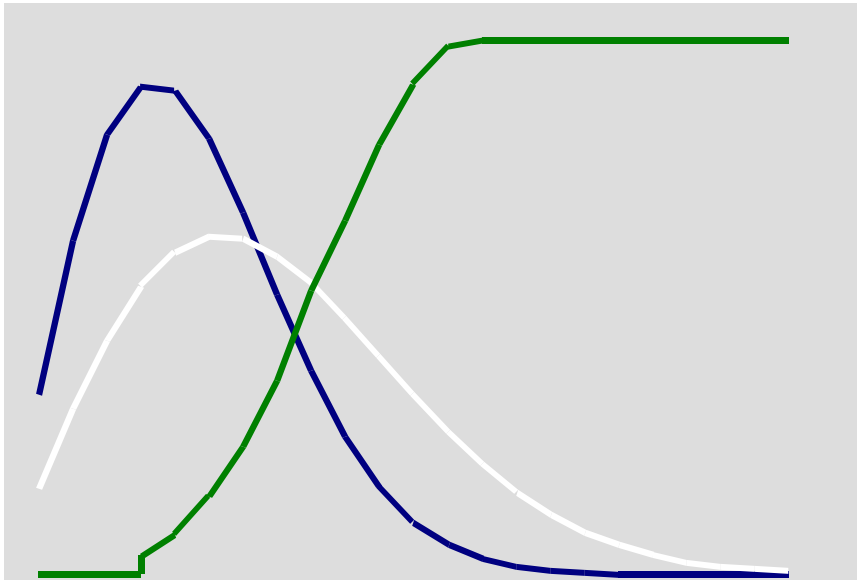


Defined by

- Air density
- Cut-in speed (4 m/s)
- Cut-out speed (25 m/s)
- Rated wind speed (14 m/s)

Power - Annual Energy Output

Annual Energy Yield (kWh/yr): å Frequency (h/yr) x Capacity (kW)

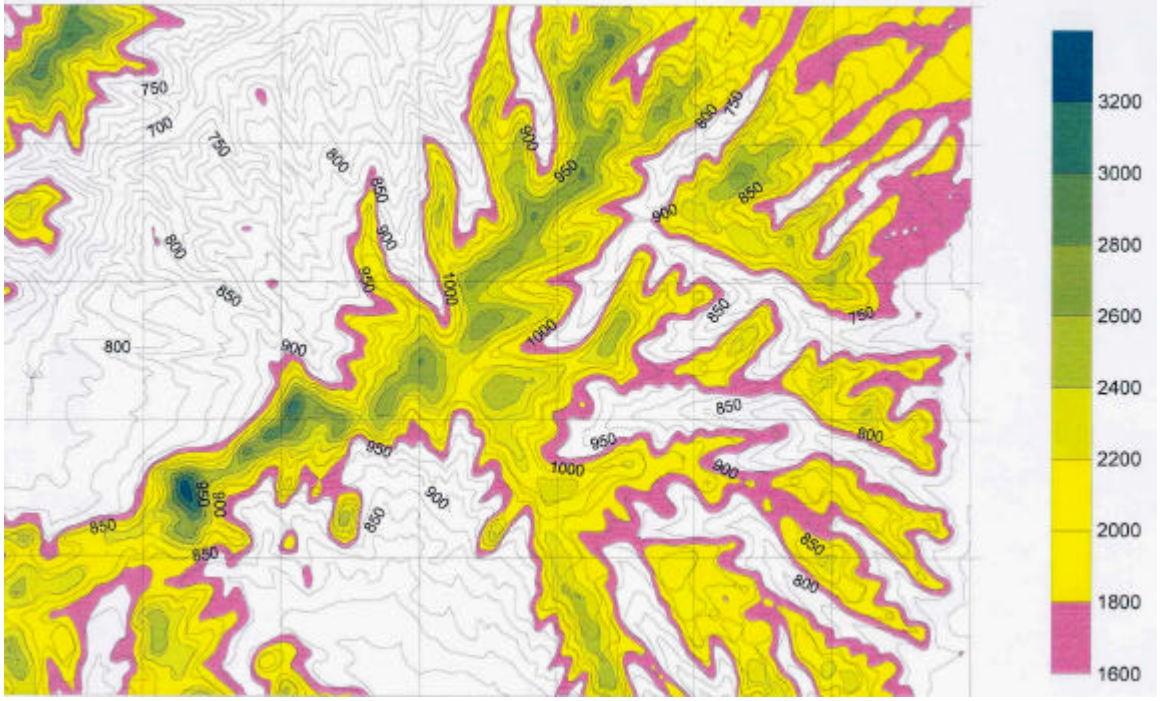


For a standard turbine:

m/s	Energy output
5.5	-31%
6.0	-16%
6.5	Refer
7.0	+15%
7.5	+30%
8.0	+44%

Power - Site energy map

Detailed knowledge of the wind is required, especially in complex terrain



Minimum one year measurement campaign needed

Turbine selection - Characteristics

Turbine is selected according to site requirements

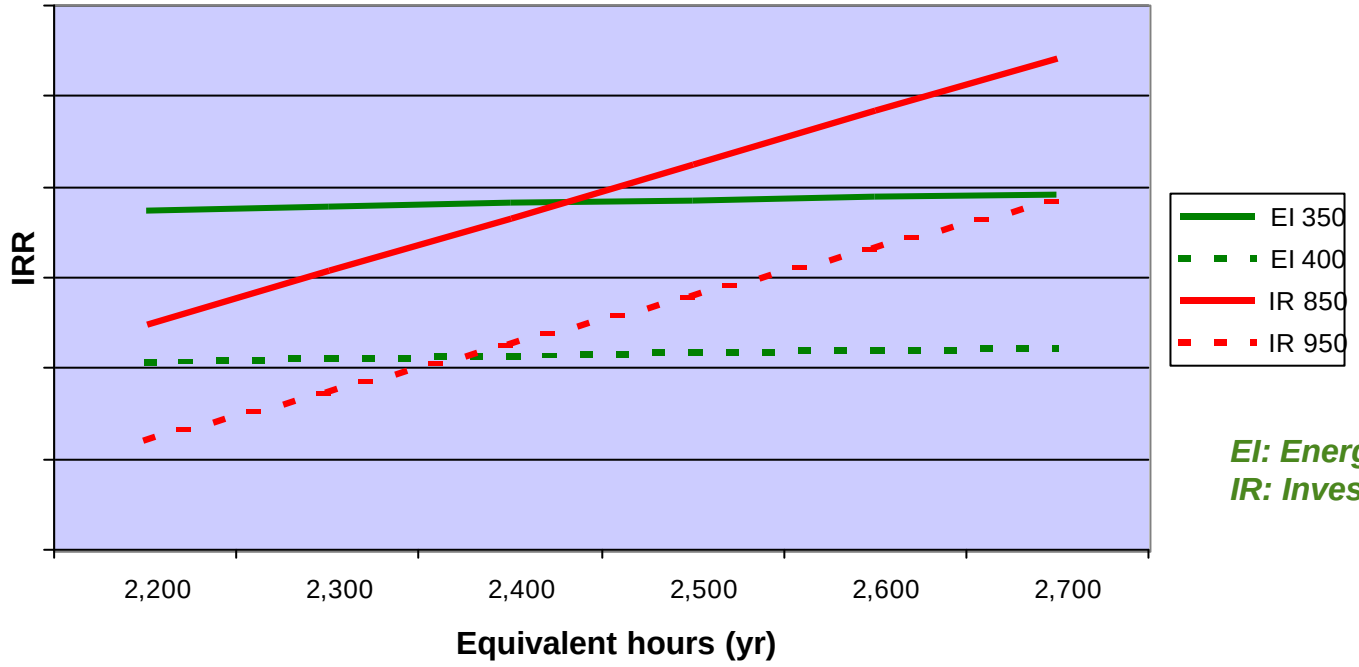
Site	Turbine
Type (speed and turbulence)	Rated power : 800 to 2,000 kW)
Road width	Hub height (vertical wind speed increase)
Foundations and basements	Power regulating techniques (pitch/stall)
Electrical power network	Fixed or variable speed

Turbine selection - Main ratios

Wind Farm Cost vs performance measurement

Running	Turbine available to produce power and wind speed between cut-in and cut-out speed (i.e. 7,500 hr/yr; >85%)
Equivalent hours	Energy generated in the year/rate power Capacity factor (i.e. 2,200 – 2,700 hr/yr; 30%)
Investment ratio	Wind farm Investment/rated power (i.e. 940 euros/kW)
Energy index	Wind farm Investment/Energy generated in the year (i.e. 400 euros/MWh)

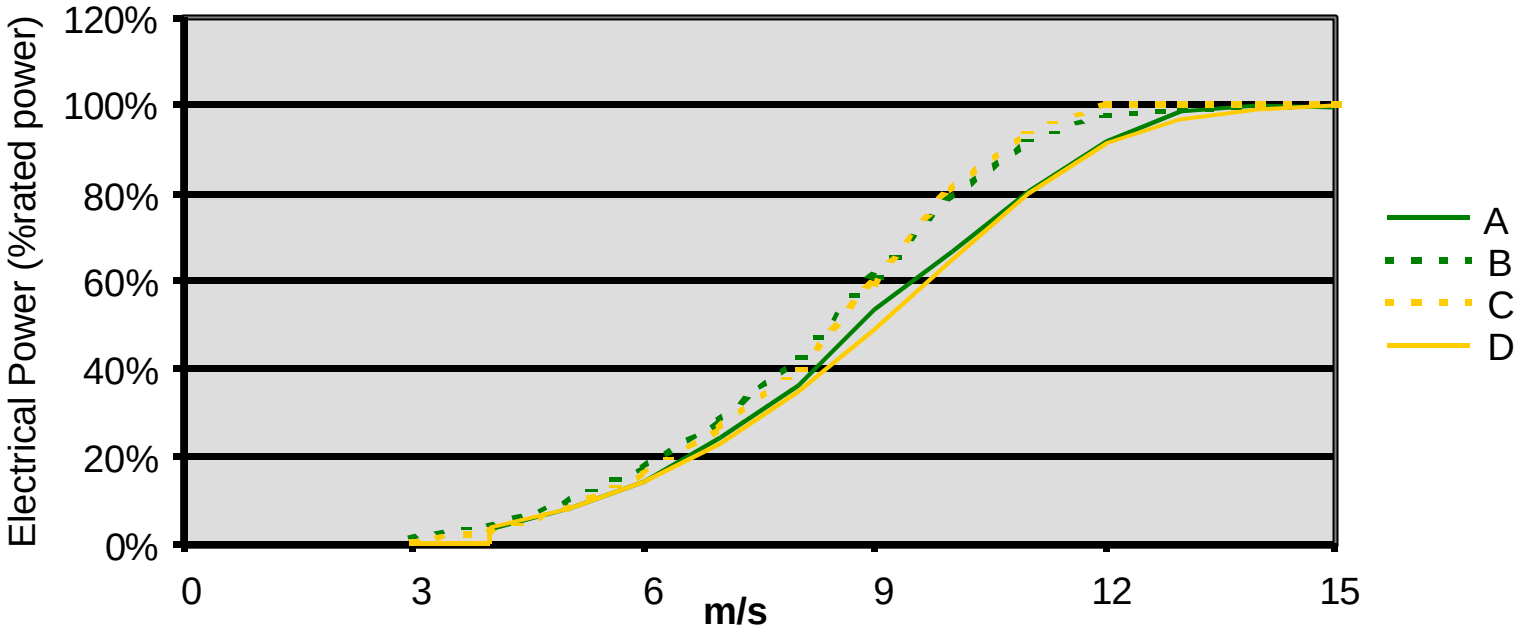
Turbine selection - Profitability ratio



EI: Energy Index (€/MWh)
IR: Investment Ratio (€/kW)

Energy index related to project profitability (small variations due to fixed costs)

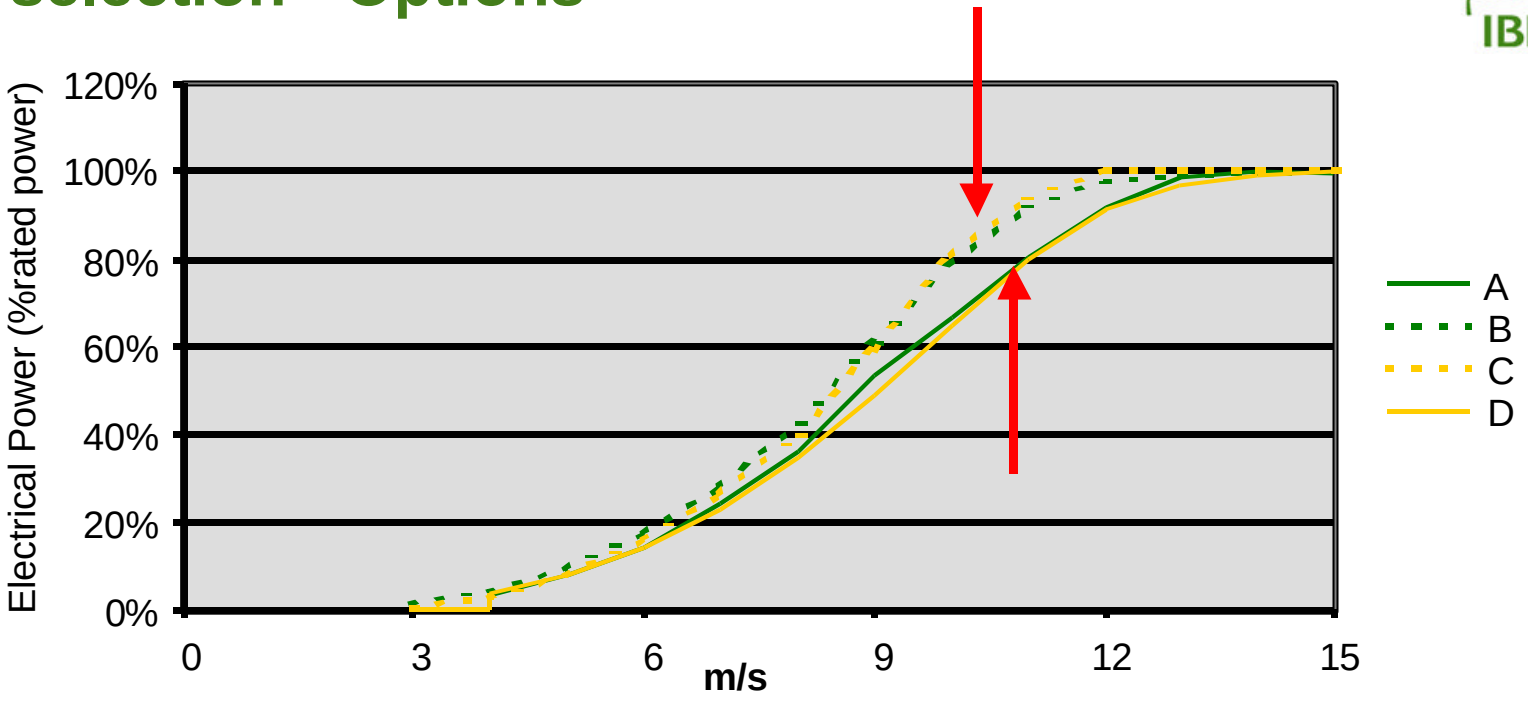
Turbine selection - Options



Turbine	Rated power	Hub height (m)	Class	Cost (euros / kW)
A	<1,000 kW	55	high	900
B	<1,000 kW	55	low	975
C	>1,000 kW	60	low	1080
D	>1,000 kW	65	high	935

Basic data

Turbine selection - Options

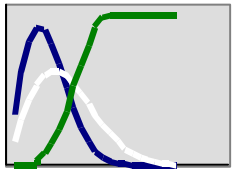


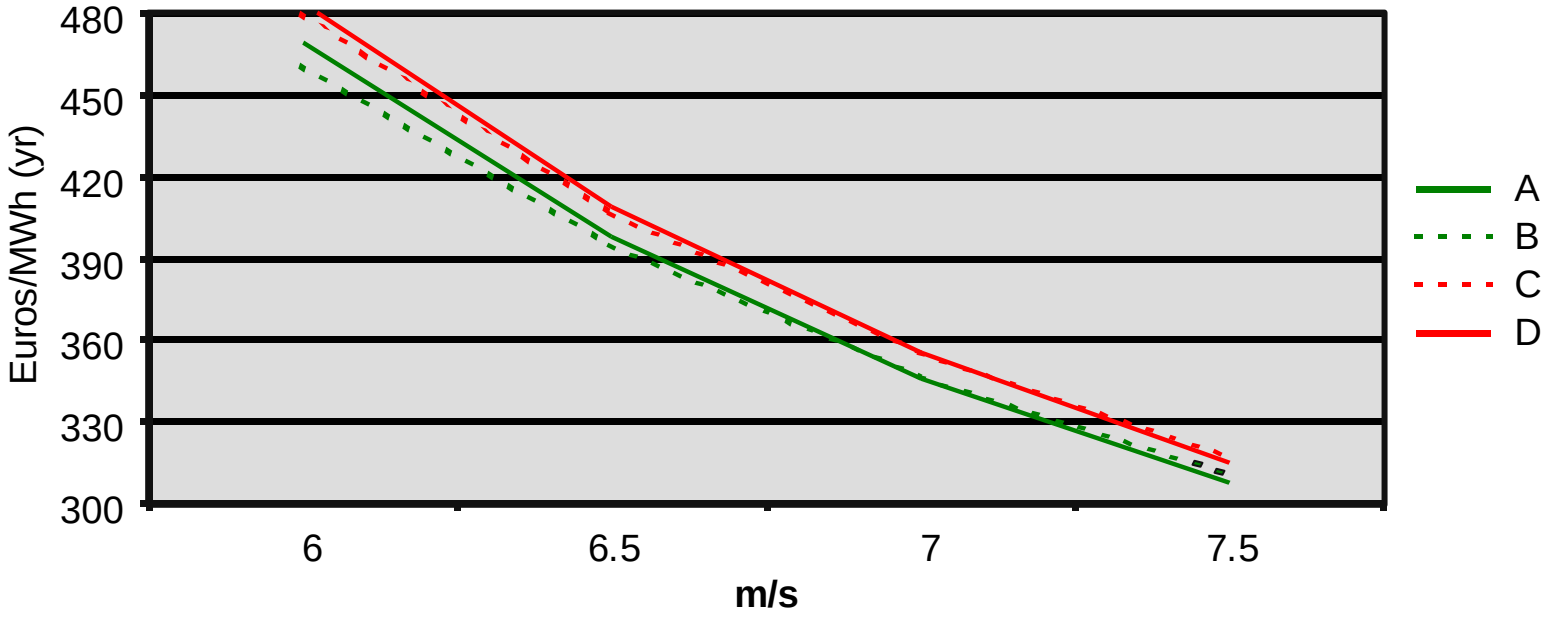
Turbine	Rated power	Hub height (m)	Class	Cost (euros / kW)
A	<1,000 kW	55	high	900
B	<1,000 kW	55	low	975
C	>1,000 kW	60	low	1080
D	>1,000 kW	65	high	935

Basic data

Turbine selection - Energy index comparison

At low wind speeds, low class turbines are better…





…and in some cases, small turbines might be more profitable

Agenda

Wind resources and technical design

Authorisation process

Grid access

Annex: Case - Yerga Wind Farm (La Rioja)

Authorisation Regime

- Generation under the Special Regime is contingent upon previous authorisation from the government authorities, generally the Autonomous Regions, which also set the terms by which the facility will operate under the Regime.

- The Special Regime covers wind facilities with capacity of up to 50 MW.

- Rights
  - connection in parallel with the electrical grid
  - transfer the electrical output to the system and
  - adhere to the economic regime established by regulation.

Regional Regulatory framework

Regional Regulation sets additional conditions to those related to wind energy

Territorial layout	**Classification of areas for wind energy development attending to environmental criteria**
Master Plan	**Design of a comprehensive wind energy plan divided into zones including an industrial development plan.**
Annual planning	**Set up of concrete targets for each financial year.**
Administrative procedure	**Specific rules for wind energy administrative procedures.**

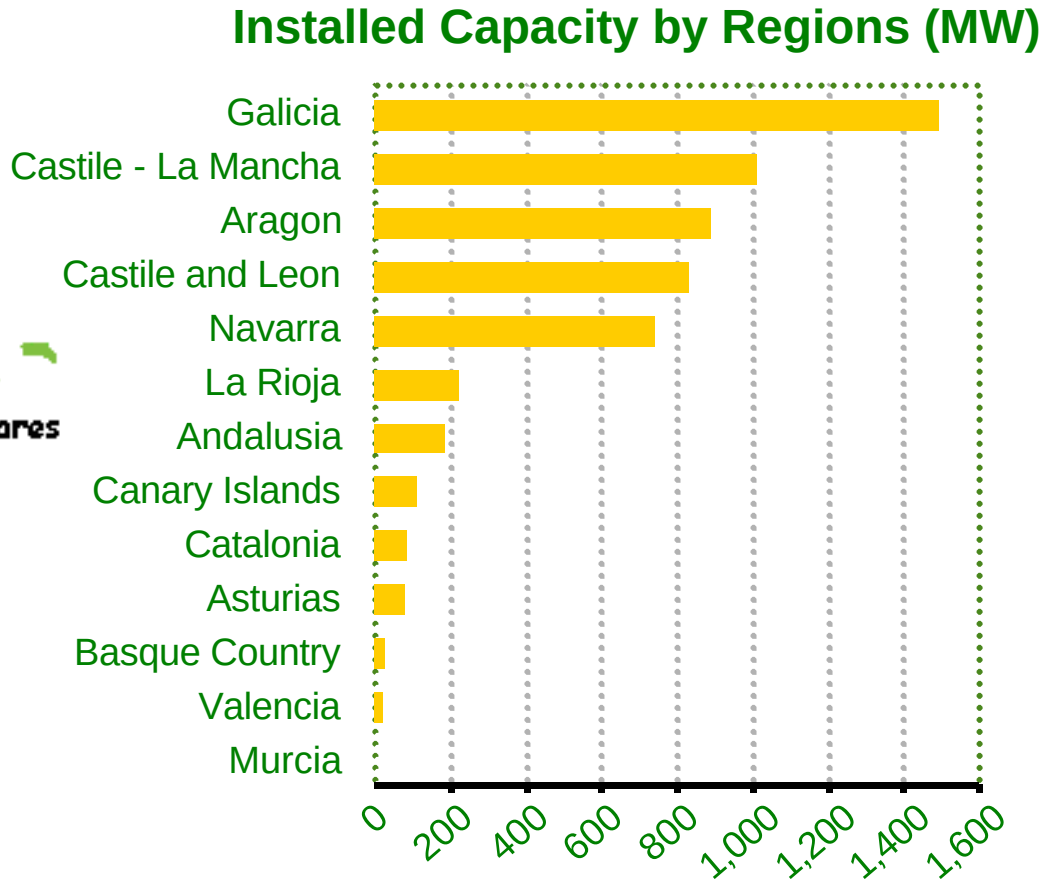
Regional Regulatory framework

Different regulation depending upon regions

	Territorial layout	Master plan	Annual planning	Administrative procedure
Andalusia	■			
Aragon		■		■
Asturias	■			■
Balearic Islands				
Canary Islands				■
Cantabria		■		■
Castile - La Mancha		■		■
Castile and Leon				■
Catalonia	■			■
Extremadura				
Galicia		■	■	■
Madrid				
Murcia				■
Navarra	■	■		■
Basque Country	■			■
La Rioja			■	■
Valencia	■	■		■

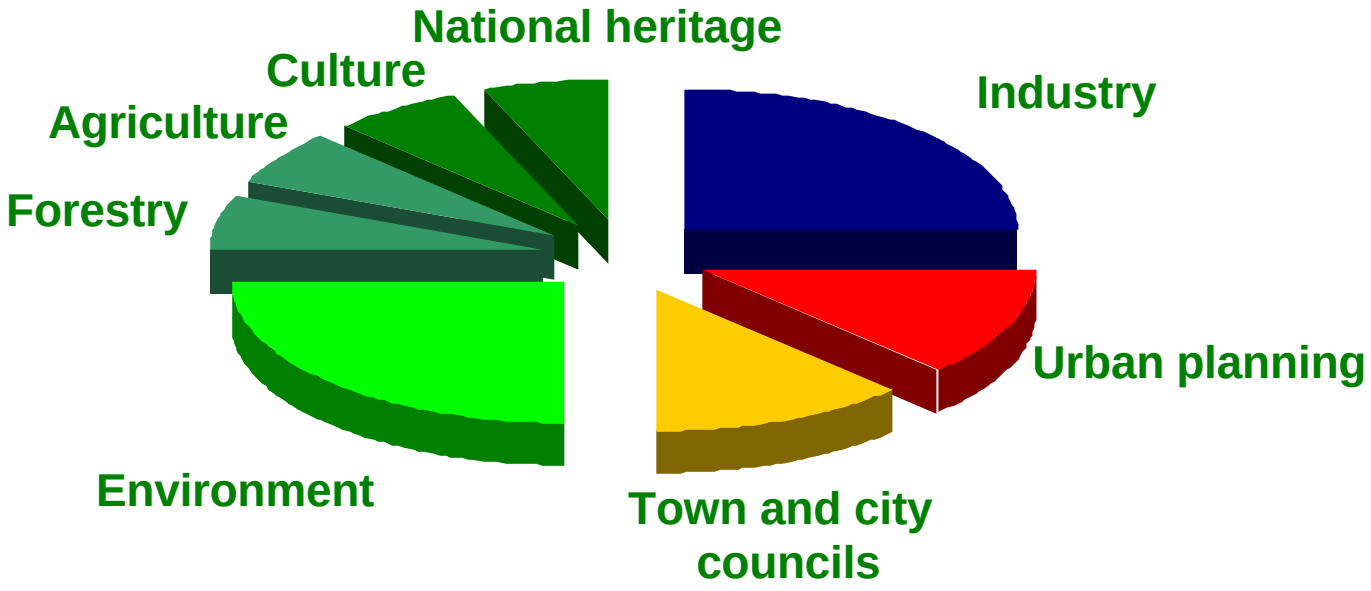
Installed capacity by Regions

Succesful performance of the fastest regions to develop a regulation



Authorisation Procedure
Departments implied

Difficulties in steering all departments implied towards a common objective



Authorisation Procedure: Environmental study

Environmental issues often require corrective measures

Site Selection

- Visual impact on the landscape
- Impact on flora and fauna
- Archaeological, historical and cultural assets

Other impacts

- Noise
- Interference with telecommunications
- Air traffic

Construction

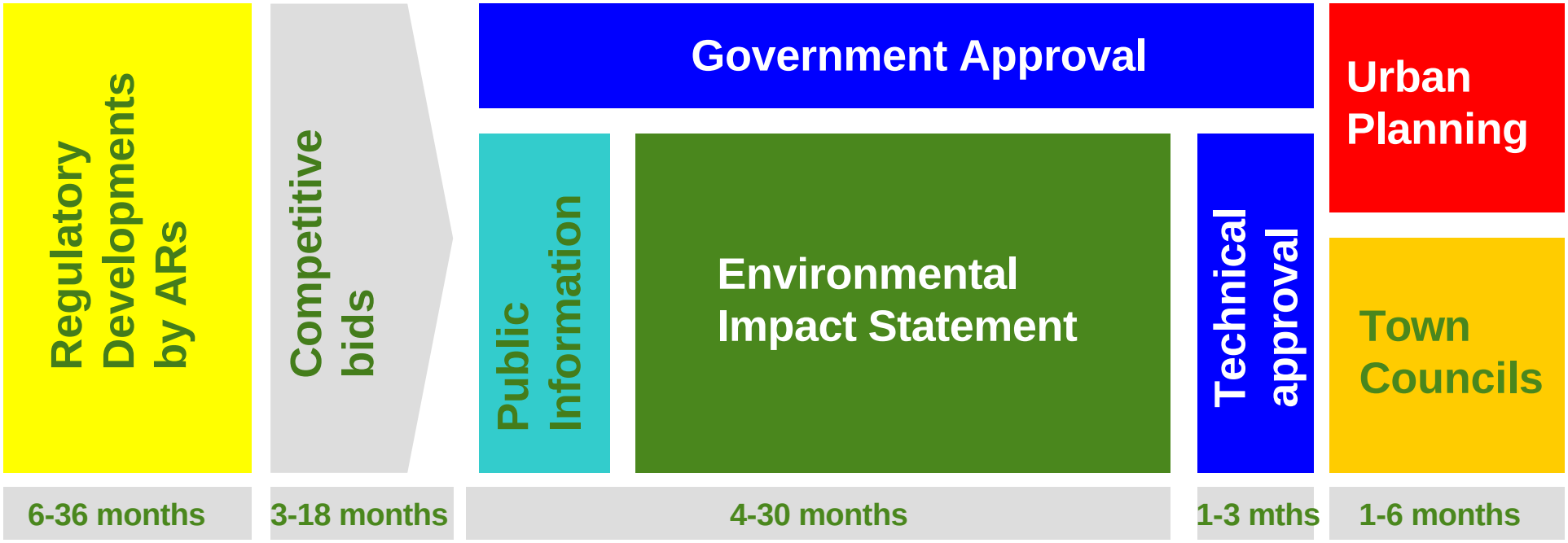
- Access - Road modifications
- Removal

Local benefits

- Property taxes
- Employment opportunities
- Leisure activities

Administrative Procedure: Phases

12 to 36 months required since authorisation is requested until groundbreaking

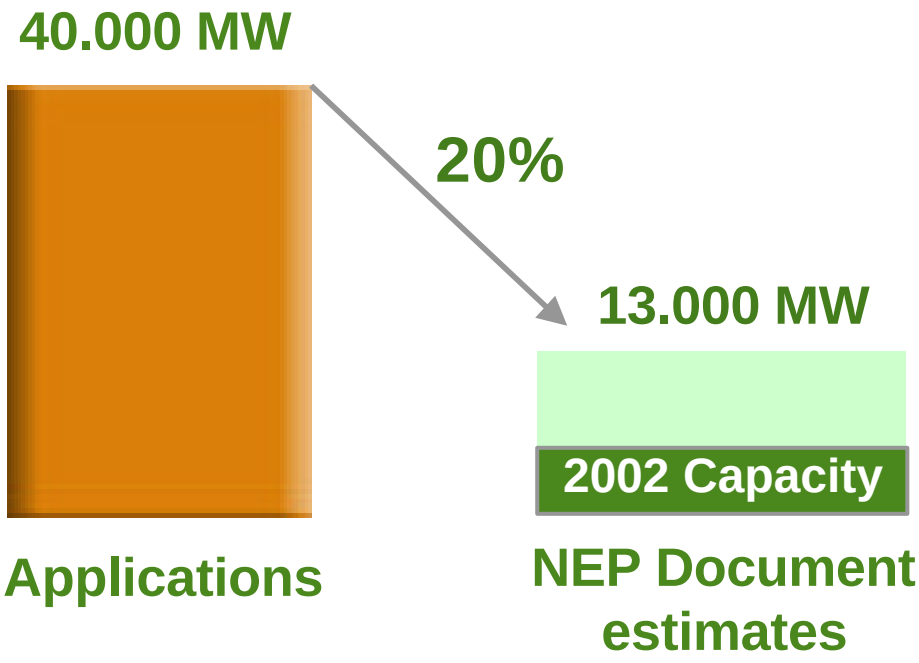


Excluding previous regulatory developments

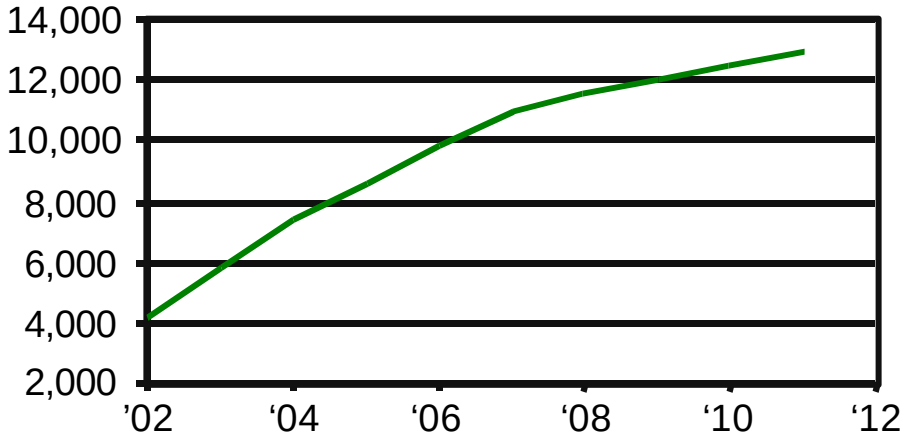
Wind energy developments in Spain

Only 20% of projects under development will be completed by 2011

Total Applications vs capacity estimates



Estimated wind energy Capacity in Spain (MW)



Projects vs NEP document: Deviations

Key differenciation factors: Sites (wind resource,impact and connection)...

Nature of generation business

- Private sector initiative
- Facilities must obtain the “previous administrative authorisation”

Regional indicative planning

- Regionally planned proposed projects nearly 2.5 times those planned on a national scale.
- Some regions with no wind farms at present are planning to to account for 20% of Spain’s total by 2011.

Applications are not reviewed

- Incomplete measurements.
- Draft proposals lack detail.
- Unanticipated complaints.
- Electrical connections not available.

and facility design (efficiency and environmental restoration)

Agenda

Wind resources and technical design

Authorisation process

Grid access

Annex: Case - Yerga Wind Farm (La Rioja)

Connection to the Grid: Regulatory framework

Technical contract for access with network owner required

Connection capacity

- Application for access capacity to the system operator and transmission grid manager.
- Processed in two months and valid for six.

Connection terms

- Application for terms of connection made to the transmission or distribution company that owns the grid connection point.
- Processed in one month.

Access rights to the grid can only be denied by capacity constraints due to safety, reliability or quality of supply

Connection to the grid: Investments

The projects and their execution shall be supervised by the transmission manager

Regulation for connection facilities to the transmission or distribution grid and the resulting improvements made to overcome access restrictions:

Ownership

- Owned by Developers of the generating facilities.
- In the event a line opening is needed, the improvements shall be deemed to be part of the grid and shall be owned by the grid owner.
- Costs will be borne by the generator, who shall be entitled to recover part of the cost over five years should a third party make use of these facilities.

Losses

- The developer shall bear any losses up to the connection point.

Connection capacity

Less time is required for wind farms development than to adapt the electrical grid

- **2002-2011 Transmission Grid Development Doc. (Sept. 2002): Maximum wind capacity of 13,000 MW in order to guarantee security of supply.**
- **13,000 MW implies doubling wind energy's contribution to Spain's gross generating capacity during this period (from 8% to 16%).**
- **Binding Networks Planning Document estimates 2.72 billion euros investments to upgrade the grid from 2002 to 2011.**

Agenda

Wind resources and technical design

Authorisation process

Grid access

Annex: Case - Yerga Wind Farm (La Rioja)

Wind measurement: Certainty on Wind resource and on site quality

Measurement campaign

- From December 1995
- Six towers measuring at 20/40/55 m and one at 80 m
- Long term checking with data starting in1991

Wind data

Figures on pages 6 and 11 correspond to this data

- Mean wind speed: 7.3 m/s
- Max wind speed averaged 10 m: 34.6 m/s
- Scale parameter: 7.0 m/s
- Shape parameter: 1.97 m/s
- Turbulence intensity: 11%
- Slope parameter for turbulence: 1.27
- Air density: 1.112 kg/m3

Annex: Case - Yerga I and II

Project design: Annual energy output over expected

Turbines

- Yerga I: 24.4 MW
  - 37 units G47 (Gamesa) 660 kW
- Yerga II: 30.6 MW
  - 22 units G58 (Gamesa) 850 kW (low class)
  - 14 units G52 (Gamesa) 850 kW (high class)
- Hub height 55 m. Total 55 MW

Equivalent hours

- On average, both wind farms 2,360 h.
- Yerga I (from Feb 00) real production 9% over expected
- Yerga II (from Mar 02) real production 3% over expected

Authorisation process: Faster when Regional Regulation available

Yerga I

- Authorisation request: September 1996
  - Stand-by until Regional Regulation approved in July 1998
  - Included in Regional Energy Planning for 1999
- Authorisation request renewed: December 1998
- Authorised: April 1999
- Local permissions: June 1999
- Start-up: January 2000

Yerga II

- Included in Regional Energy Planning for 2001
- Authorisation request: December 2000
- Authorised: July 2001
- Local permissions: August 2001
- Start-up: February 2002

Systems to Incentivise Renewable Energies

Gonzalo Sáenz de Miera

Responsible for Regulation and Perspective

IBERDROLA

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Financial support systems for wind energy

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Motivations and results

Energy and environmental advantages of wind energy...

Motivations

- Security of Supply
- Environmental Protection

Results and objectives

Kyoto Protocol
- 5.2% reduction in emissions 1990- 2010
- Basic wind energy

EU Renewables Directive
- 22% of electricity to be renewable by 2010

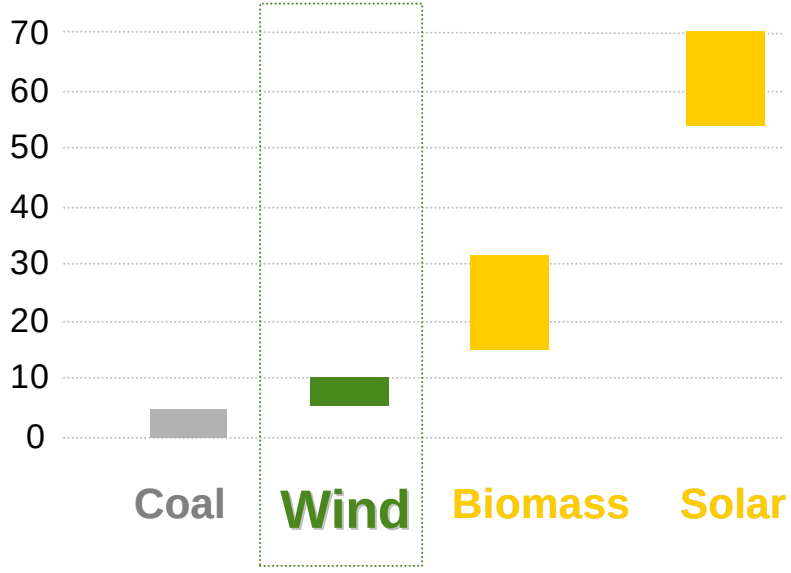
National Plans: Spain
- 12% renewable energy in 2010
- 13,000 MW from wind energy in 2011

...have led to significant development objectives

Objectives and costs

Cost of wind energy exceeds that of conventional sources

Generation costs (€c/kWh)



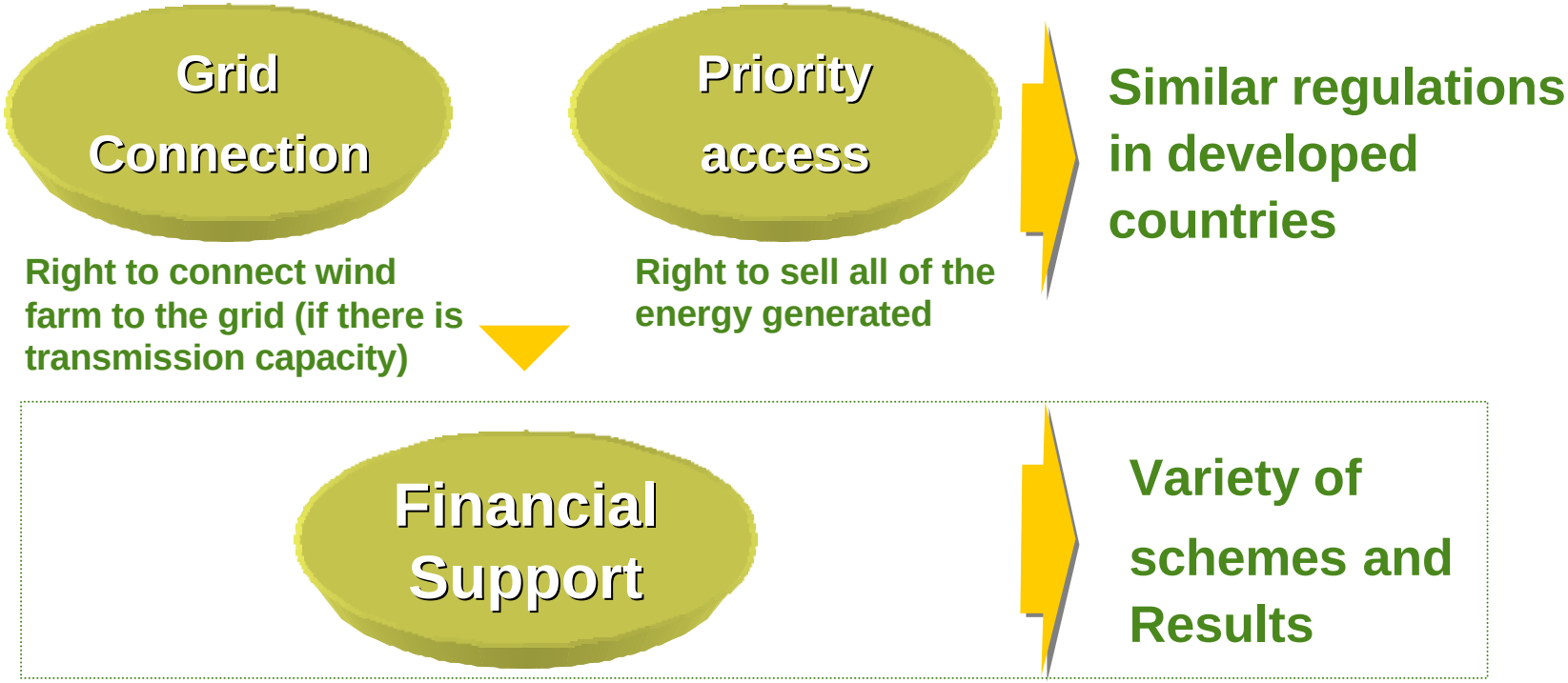
Requirements

- Technological development
- Support systems that ensure a return on investment

...Support systems are needed to meeet targets

Support systems

Three types of support are required...



Key aspect: Selection of the right financial support model

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Financial support systems

Regulatory framework

- 2001 Renewables Directive frees national governments to establish schemes
- In 2006, the European Commission may propose a single scheme with a 7-year transition period for its implementation

Types of schemes

	Direct	Indirect
Basic	• Premiums • Green certificates	• Emissions market
Additional	• Energy labelling • CDMs & CI (Kyoto)	

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The move to wind energy

Financial support systems for wind energy

- **Basic systems**
- Additional systems
- Indirect systems

The situation in Spain

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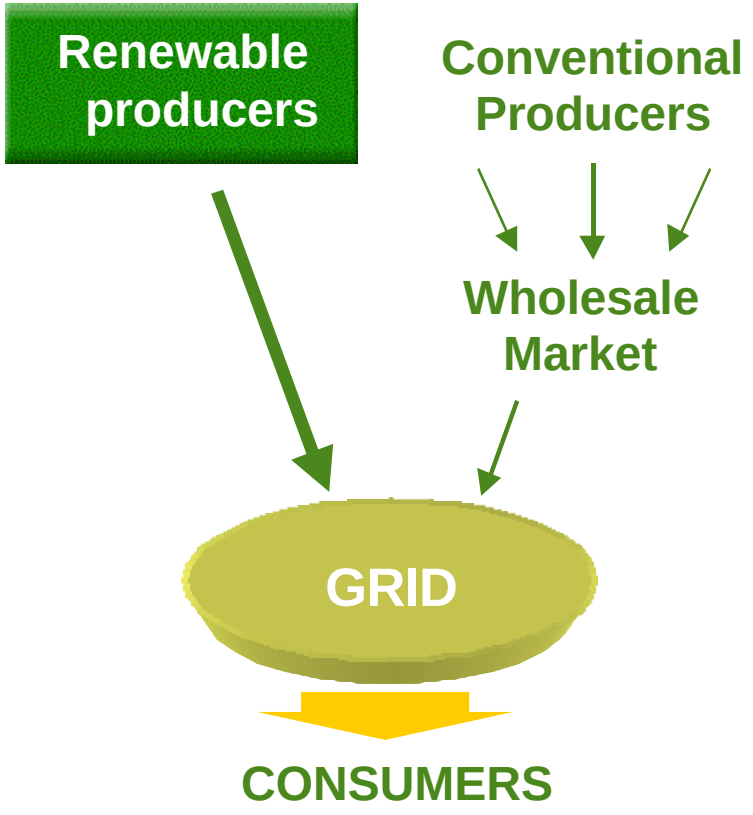
Premium schemes

Right to sell all energy produced at a regulated price for a period of time.

Scheme



Key Variables

Price

- Fixed: Germany, France, Spain
- Pool price + premium: Spain
- Fixed or depending on the number of hours the wind farm operates

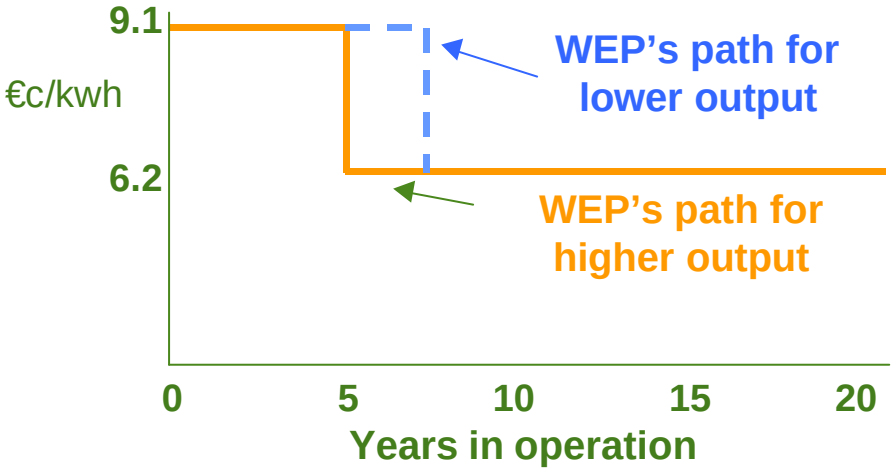
Time for collecting the premium

- Defined: 20 years (Germany); 15 years (France)
- Undefined: (Spain, Portugal)

Premium schemes: German example

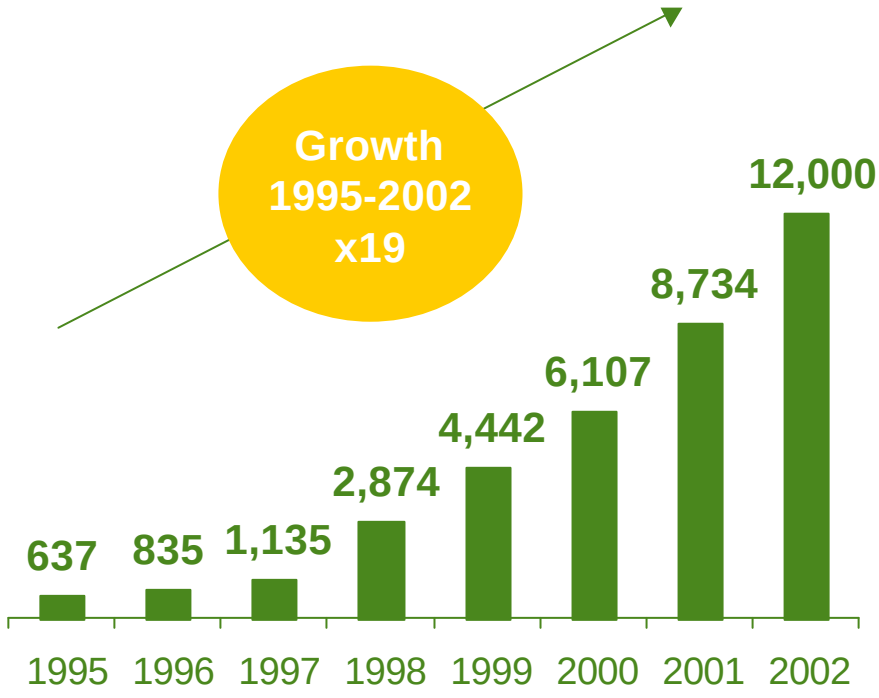
Increase in capacity due to predictable and stable returns

Wind energy tariff chart



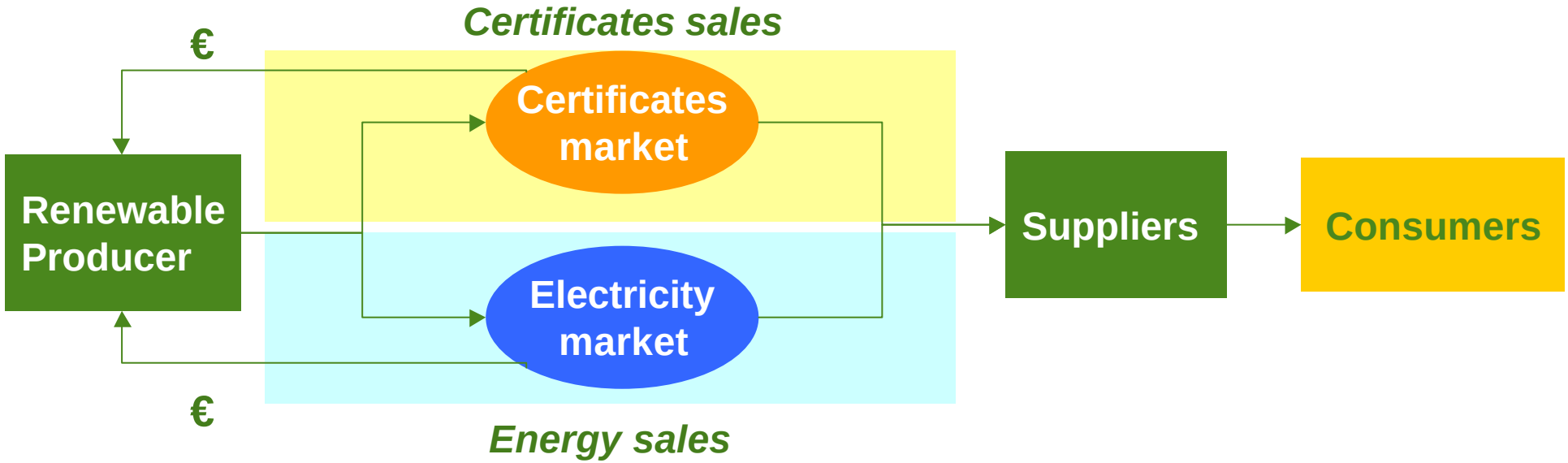
- Renewable Energy Act of 2000
- Defined premiums for the first 20 years of operation
  - *€ 9.1 cts first 5 years*
  - *€ 6.2 cts minimum for next 15 years*
- First period extended for less productive facilities

Installed wind energy capacity (MW)



Negotiable green certificates

Two revenue streams: Energy and Certificates



- The regulator issues green certificates to producers for the energy produced.
- The regulator imposes a renewable quota on the suppliers and sets fines for non-compliance.
- Suppliers buy the certificates to meet their quota.
- Two markets are established, one for Certificates and one for Electricity.

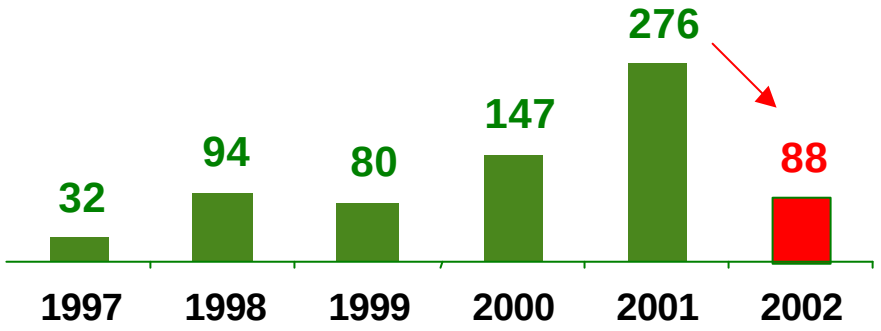
Green certificates: Italian example*

Certificates System: Reduction in capacity additions

Basic factors

- Scheme implemented in ‘02 following the “Bersani” Legislative Decree 79/99
- 2% renewable quota for generators
  - own production
  - or purchase of certificates
- Replaces the former premiums scheme

Additional Ins. Capacity ‘97-’02 (MW)



- Excess demand (3.3 TWh vs 1.2 TWh). High prices.
- Market manager issued certificates to offset the imbalance and set a reference price

→

- Prices continue to be basically regulated
- Price uncertainty and regulator’s discretion

→

Not attractive for investors

Situation in the European Union

93% of total EU capacity under premium systems

Inst. Cap. MW	In 2002	Ac. Dec 2002	Premiums	Negotiable Certificates
Germany	+3,248	12,001	✓	
Spain	+1,495	4,830	✓	
Denmark	+333	2,889	✓	
Netherlands	+203	686		✓
Italy	+88	785		✓
UK	+67	552		✓
Portugal	+67	194	✓	
France	+62	147	✓	
Sweden	+48	328		✓
Austria	+44	139		✓
Greece	+30	302	✓	
Belgium	+15	46	✓	✓

PREMIUMS Successful model

No successful system based on certificates

Reasons for the PREMIUM model's SUCCESS

Premiums are successful: Effectiveness and efficiency

	PREMIUMS	CERTIFICATES
APPLICATION	**SIMPLE** Definition of premiums	**COMPLICATED** Annual quota, emission certificates, market intervention
ATTRACTIVENESS FOR INVESTORS	**HIGH** Certain and predictable	**LOW** Uncertain with market and certificate price risks
EFFICIENCY	**HIGH** When premiums are adjusted and based on hours of operation	**THEORETICAL** Ends up requiring regulatory intervention, which reduces efficiency
EFFECTIVENESS	**HIGH** Generate profit. Experience.	**LOW** Not a very attractive investment

No successful system based on certificates

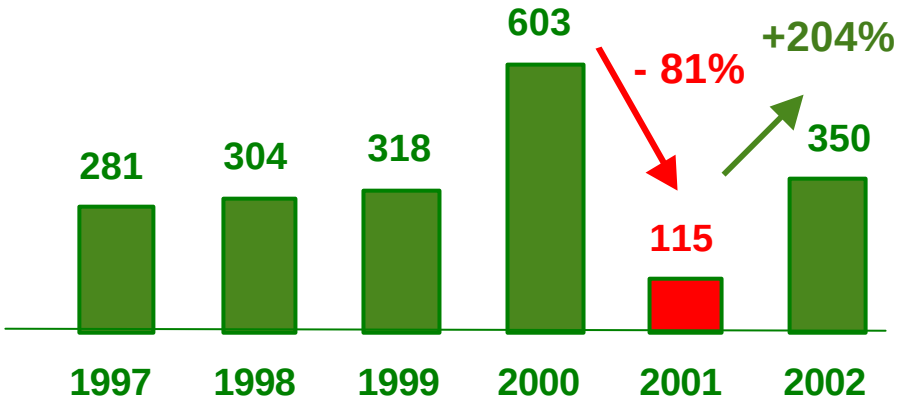
Significant facts and TRENDS

Clear trend towards the use of PREMIUMS schemes

DENMARK

- CERTIFICATES scheme announced in 2001
- Returned to PREMIUMS scheme in 2002 due to low investor interest

Denmark - Renewables Installed Capacity (MW)



HOLLAND

- Wind Energy: has just modified its certificate system to introduce PREMIUMS for national wind energy

AUSTRIA

- Mini-hydro: Having had a certificates scheme since 2002, Austria has just instituted premiums due to very poor results obtained.

Agenda

The move to wind energy

Financial support systems for wind energy

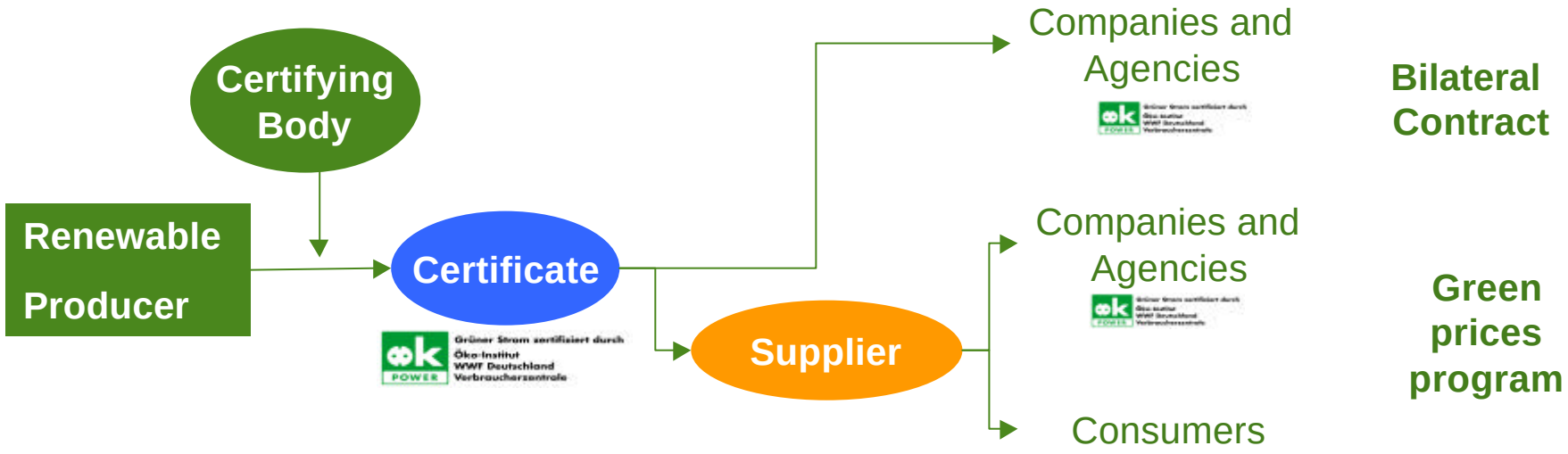
- Basic systems
- **Additional systems**
- Indirect systems

The situation in Spain

Conclusions

Labelled electricity programs

Supply of green energy for an additional premium



- A certifying party labels the energy.
  - This label may be used on products or services produced with a minimum % of green energy.
- Under a bilateral contract or through sellers' green price programs.
- The premium received is reinvested: Green energy consumers support the construction of new renewable energy plants.
- In EU, only implemented successfully in Holland, and to a lesser extent in Germany

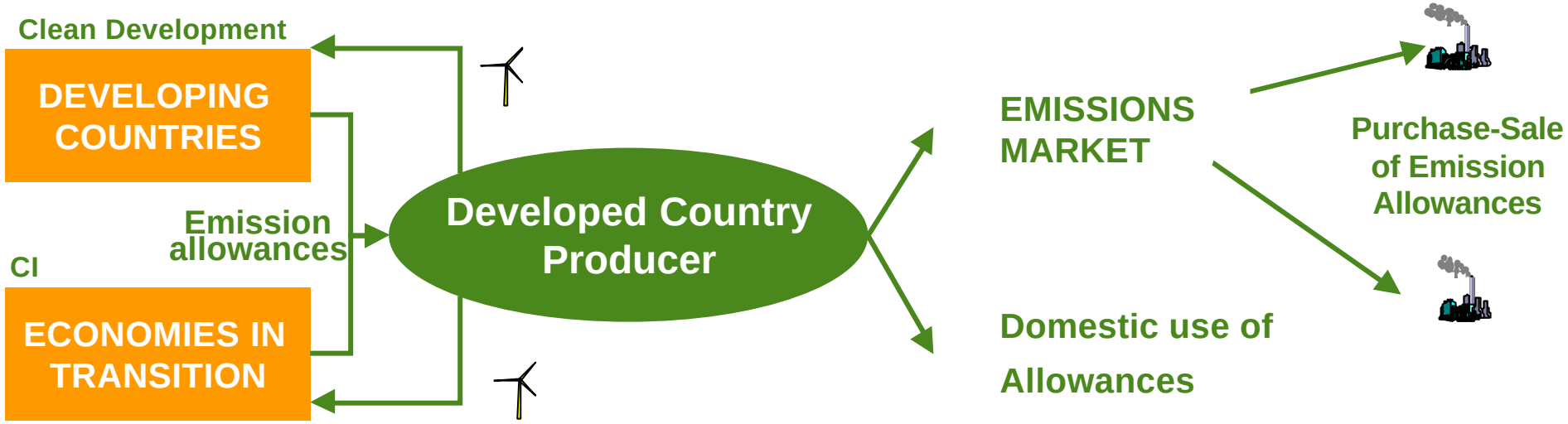
Examples of labelled electricity

Effective only if matched with favourable tax policies

	GERMANY	HOLLAND
Basic support policies	PREMIUMS	Green Certificates
Green energy sold in 2002	690 GWh (2% of renewable output and 0.14% of the total)	2,500 GWh (5% of electrical output)
No. of users in 2002	325,000	1,500,000
Green products	Large hydro (existing) Renewable co-generation (50-8-%) 100% Renewable, max. 75% hydro	Wind energy - Imported mini-hydro and wind energy Imported large hydro
Additional price	+5% to 40%	+3% to +10%
Motivating factor	ENVIRONMENTAL AWARENESS	FAVOURABLE ENERGY TAX TREATMENT Eco-levy & tax exempt green Energy

Interesting for gaining and retaining liberalised customers

Clean Development and CI Mechanisms



- Mechanisms formulated in Kyoto for developed countries to achieve reduced emissions objectives and to transfer technology to underdeveloped countries
- Allowances granted for renewable projects of developed countries in developing countries
- Allowances may be traded in the EU emissions market (2005) or Kyoto (2008)

Reduced effectiveness as support mechanism for wind energy

- Lack of clear and stable regulation
- Limited economic impact (less than 1% in IRR)
- Only interesting in countries with highly polluting generation parks

Agenda

The move to wind energy

Financial support systems for wind energy

- Basic systems
- Additional systems
- **Indirect systems**

The situation in Spain

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Impact on renewables (1)

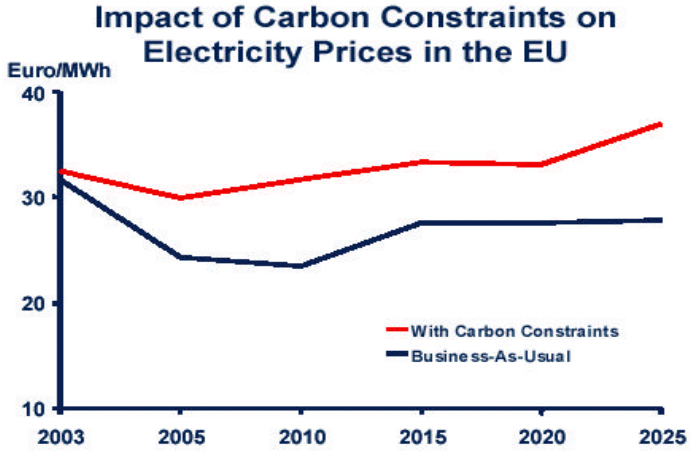
EU CO2 market (2005): Electricity sector included (penalties)

Impact on electricity sector

- **Increase in generating costs of CO2 based technologies**

  At a price of 25 euros per tonne of CO2:
  - **Coal**: 1000g CO2/kWh **+ € 0.025 cts/kWh**
  - **CCGT**: 300g CO2/kWh + **€ 0.0075 cts /kWh**

- **Increase in price of electricity***



* Source McKinsey report

Impact on Renewables

Short term

- **DOES NOT AFFECT PREMIUMS (which are set as a function of costs).**
- **Under schemes of a pool + premium return, the premium declines while maintaining the total return.**

Medium to long-term

- **Improves the ability of wind energy to compete with conventional energy sources.**

Impact in Spain

A larger incentive for supporting wind energy

Emissions market impact

- Spain is the furthest country from meeting its Kyoto objectives
    - 32% increase in 2001 vs 15% target in 2010.
- Meeting the objectives could require buying emission allowances from other countries
    - flow of funds from the sectors affected, (inc electricity generation).
- Spain's wind energy provides a way to avoid these purchases.

The government's position

The government will provide incentives to support wind energy:

- Avoiding flows to foreign countries to purchase allowances
- Avoiding real emissions in Spain

Medium-term scenarios

Wind energy scenario, largely advantageous

	Emissions scenario	Wind energy scenario
Scenario/policy	Produce carbon and buy emission allowances	Produce wind energy
Additional cost 1MWh	1000 kg CO2=€25	€ 26 (current premium)
Destiny of extra cost (charged to tariffs)	Abroad	Domestic
Emissions	1 tonne CO2 per MWh	None
Additional effects	• Health cost associated with emissions • Supports a declining industry • Greater energy dependece (imported carbon)	• Social-economic development (direct, indirect or induced creation of new jobs) • Energy diversification with renewable domestic energy • Supports a growing industry

Assumptions:

- Need for new electrical generation
- Spain's electrical sector does not comply with Kyoto
- 25 euros per tonne of CO2

Agenda

The move to wind energy

Financial support systems for wind energy

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Wind energy support framework in Spain

Basic factors

- **Guarantee to buy all of the output**
- **Priority access to the grid**
- **Premiums scheme**

Premiums scheme

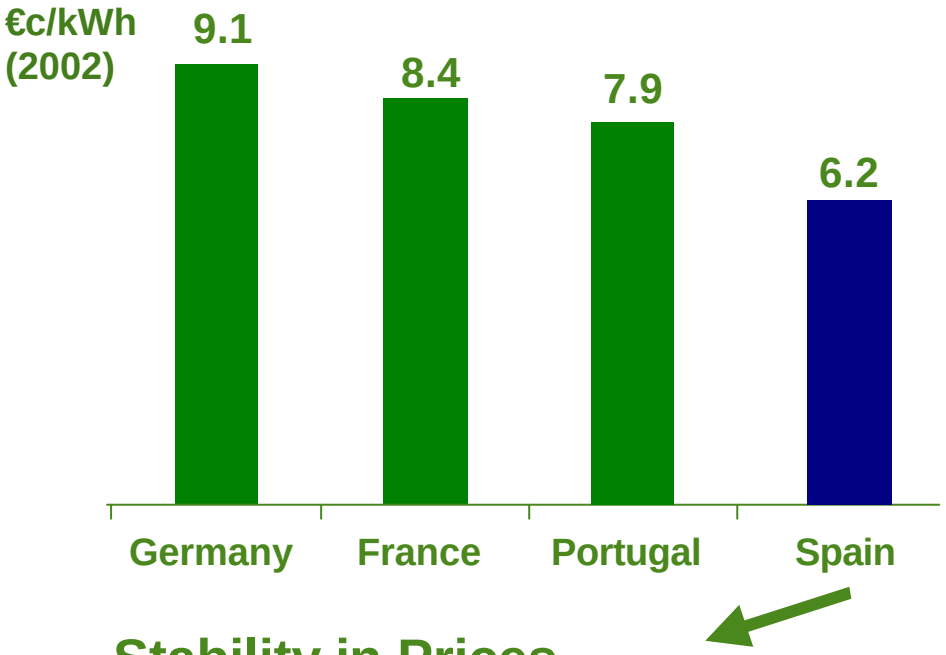
- **Special Regime for Renewables -- Law 54/1997 and RD 2818/98**
- **Premiums must provide a REASONABLE ROI -- Law 54/1997**
- **Renewable Prices between 80%-90% of the average electricity tariff (total system costs/demand) Act 54/1997**

Wind energy prices

- **Two pricing options:**
  - **Fixed price:** more stable
  - **Pool + Premiums**: greater risk and return

Price trends and results

Spanish and EU wind energy prices

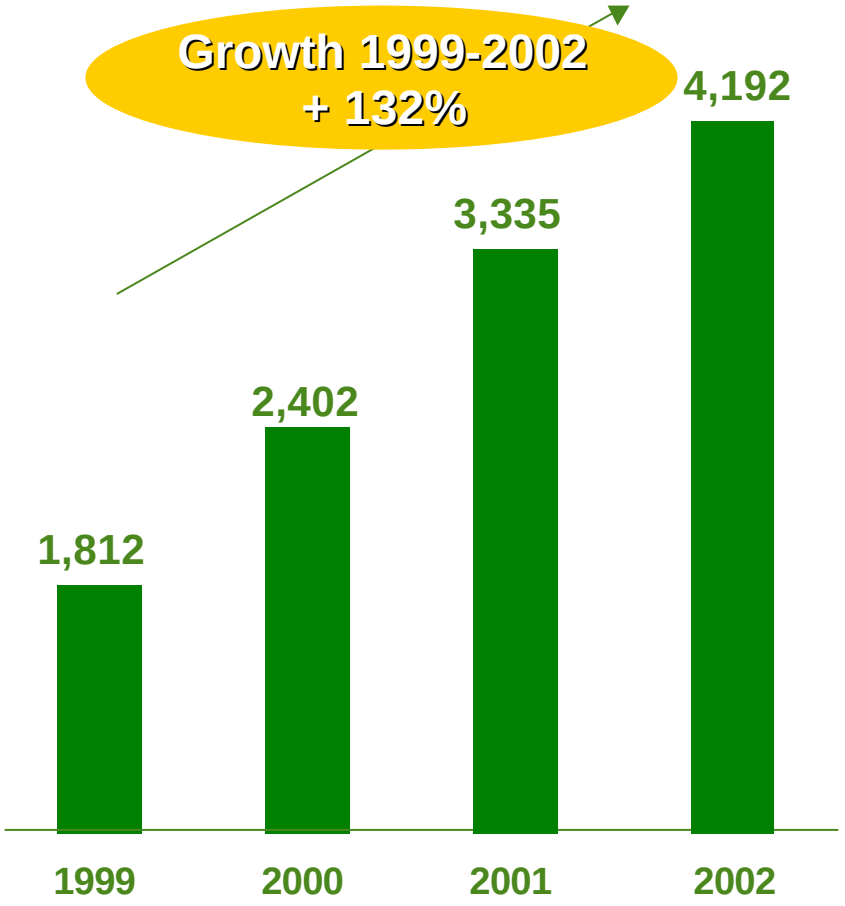


Stability in Prices

	2000	2001	2002	2003
Fixed Price	6.26	6.26	6.28	6.21
Total	6.79	6.74	7.47	
Pool Price	3.91	3.86	4.57	
Premium	2.88	2.88	2.90	2.66

Result

Installed Capacity 1999-2002 (MW)



Current situation

Current situation

An Effective System

- *5,000 MW by 2003*

System´s Efficiency could be improved

- *This is essential to meet OBJECTIVES of 13,000 MW from wind energy by 2011)*

Technical problems must be solved

- *Potential barrier for development in the medium term*

Government

Spain's Ministry of Economy has announced the approval of a new, more EFFICIENT and PREDICTABLE premiums scheme

The challenge

Effective

Efficient

Attractive for investors

Incentivising

- **Improvement in Quality**
- **Technical Solutions**

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Conclusions

Premiums vs Certificates

Clear trend to the use of premiums : the only efficient schemes

Labelling

Limited effectiveness as a support system

but growing commercial interest

Emissions market:

Favourable for wind power through cost internalisation

Does not affect premiums and boosts competitiveness

Spain´s premium System

Effective and with improving outlook

Renewable Energies Conference

11th July 2003

IBERDROLA

ANNEXES

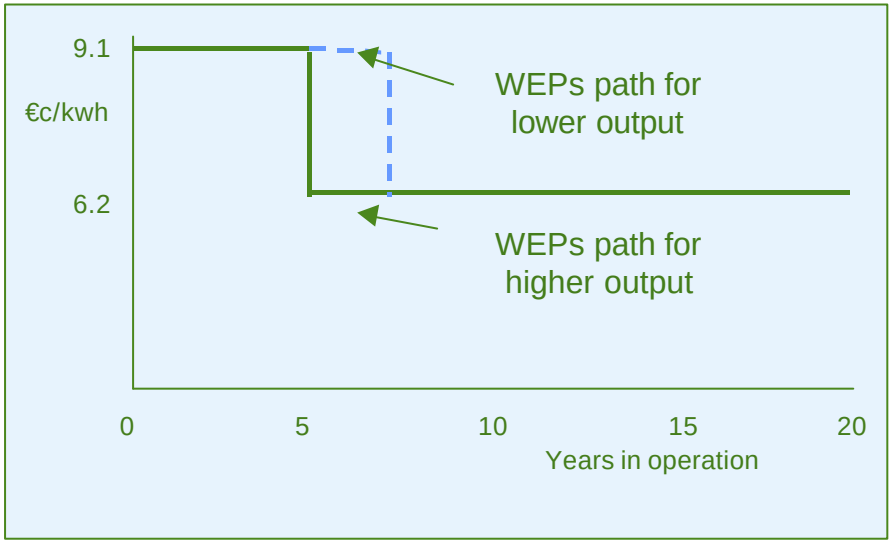
Contents

Medium-term objectives

- **Kyoto Protocol:**
  - 5.2% less emissions in 2010 than in 1990 for developed countries
  - Wind energy is a fundamental tool towards meeting goal
- **European Union:**
  - 12% of gross energy consumption and 22% of renewable energy consumption in 2010 (2001 Renewables Directive)
  - 65,000 MW from wind energy (1997 Renewables White Paper)
- **Spain:**
  - 12% of gross energy consumption will be renewable in 2010 (1997 Electrical Sector Act)
  - 13,000 MW from wind energy in 2011 (2002 Energy Planning Document)

Premiums: Germany (1)

Wind energy tariff chart



Two-fold guarantee of a stable rate of return with fixed prices for the entire life of the wind farm and a known price trend into the future

Basic elements of the scheme

The 1991 legislation passed to support renewable energy was replaced by a new law in April 2000, the Renewable Energy Act.

Over the first 5 years, the minimum tariff is 9.1€ c/kWh

- If total output does not reach 150% of the benchmark, the period will be extended 2 months for each 0.75% that its output remains below 150% of the BENCHMARK.

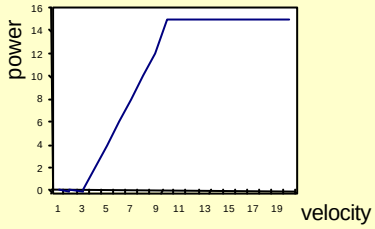
In the following years, a minimum compensation of 6.2 €c/kWh is guaranteed.

For new facilities, the benchmark tariffs are updated annually with a 4.5% reduction starting in January 2002

- Fosters the competitiveness of new facilities.

Premiums: Germany (2)

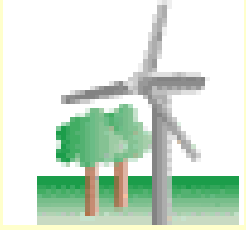
P-V Curve



Each wind turbine must have its own P-V curve, which is the ratio of the wind speed to the power output, independently of the rotor height of.

- According to Fördergesellschaft Windenergie's e. V specifications.

Reference site



The reference site is defined by a Rayleigh distribution with an average annual wind speed of 5.5 m/s at a height of 30 meters and a logarithmic height profile and roughness length of 0.1 meters.

Green certificates: Italy

Italy has not been able to adopt a certificates scheme that works

The Bersani decree fixed the mandatory quota for electrical output through renewable sources for producers and importers.
- A market was created to trade green certificates.

The year 2002 was the first in which the quota was enforced.
- An excess demand over supply required that the grid manager (Gestore della Reta) had to issue certificates to cover nearly 2/3 of demand.

The Gestore fixed the price of its certificates, and thus the level of market prices.
➜ The incentive price continues to be basically regulated.

Description of how it functioned in 2002

Supply

- The supply is furnished by those plants with IAFR certification and which have begun operations on 1 April 1999.
- 12,000 certificates (1.2 TW/h)

Remuneration mechanism

The grid manager had to issue certificates to rectify the imbalance.

The certificates issued used to be supported by the output of the plants adhering to the CIP-6 system and operational since 1 April 1999

➜ The grid manager fixed the benchmark price at 8.418 €c/kWh

Demand

- In 2002, demand equalled 2% of the electricity produced or imported from conventional sources

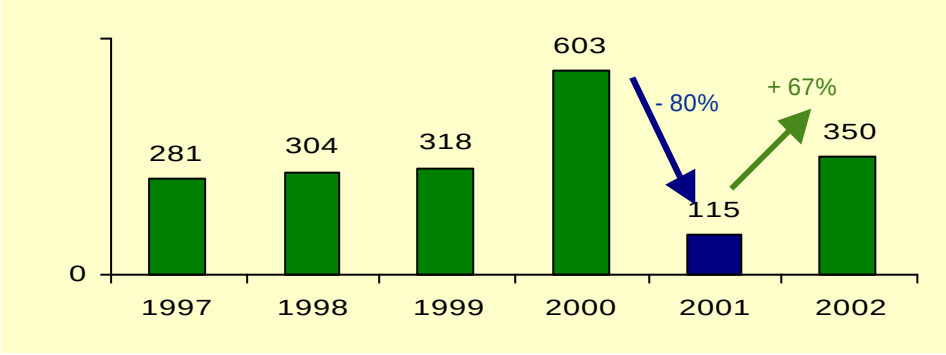
➜ 33,000 certificates (3.3 TW/h)

- 35 operators had to buy certificates

Source: Market manager (www.mercatoelettrico.org), GRTN (www.grtn.it) and BCG

Premiums vs. certificates: Denmark

Installed MW



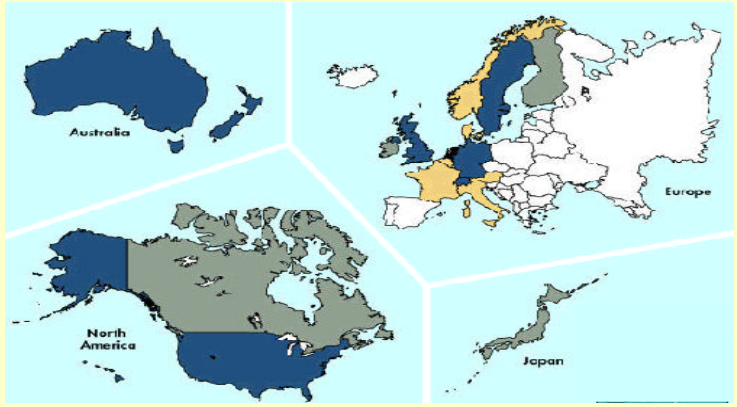
Regulatory modification of the Danish scheme
Denmark has built the world's most mature wind generation market that remunerates renewable energy based on tariffs. ~ 12% of the country's renewable energy is from wind In March 1999, the Parliament passed a law that fully liberalised the electrical system •Renewable energy began to be rewarded through a green certificates mechanism. Strong opposition to the new market has indefinitely postponed the implementation of the new regulations. •Now there is a transition period marked by high uncertainty.

Denmark has two sources of uncertainty, the transitory nature of the program and the implementation of a green certificates scheme with uncertain prices.

Source: BTM Consulting, Reuters analysis and BCG

Labelled electricity worldwide

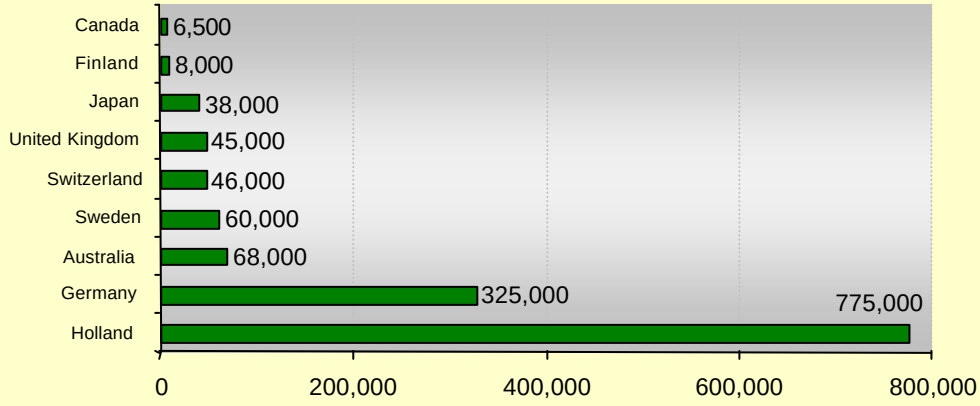
Countries with green electricity programs



State of development:

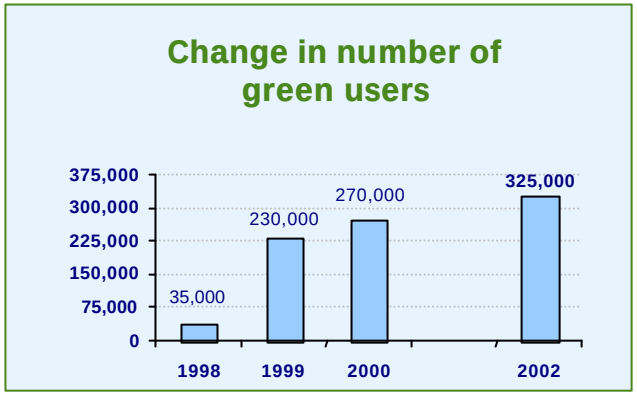
- High
- Moderate
- Average
- Emerging
- Low

There are 2,500,000 green electricity consumers (1,000,000 in the USA)



Green electricity programs in Germany

- **Green electricity programs since 1999**
- **Policies that support renewable energy:**
  - Basic mechanism: *Premiums scheme*
  - Additional mechanisms: ***Green electricity programs***



No. Green users (2002): 325,000
↓
0.4% of consumers

Green energy sold (2001): 690 GWh
↓
2% of the renewable output,
0.14% of total output

Green product options:

➔ Large hydro power, existing plants

➔ 20-50% co-generation and 50-80% renewable mix

➔ 100% renewable, maximum 75% hydro

⇔

Final cost of green electricity for the end user is 5% - 40% higher

Green electricity programs in Holland (1)

- **Green price systems since 1995**
- **Policies that support renewable energy:**
  - Basic system: *Negotiable Green Certificates*
  - Additional mechanisms: ***Green electricity programs*** , tax incentives

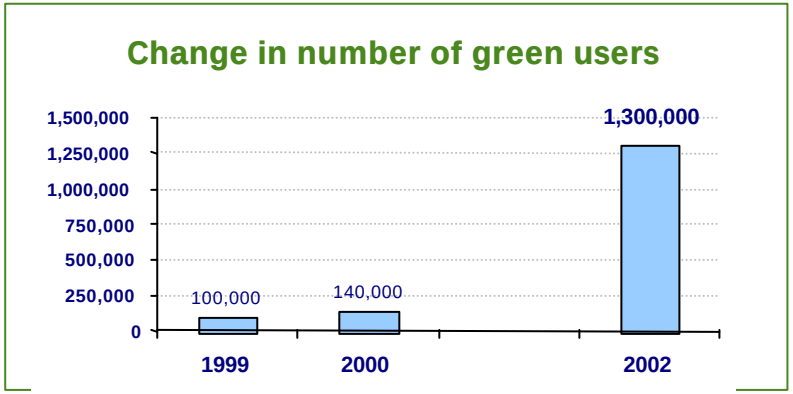
No. of green users (2002): 1,300,000

19 % of households consume green energy

Green energy production (2002): 2,500 GWh

5 % of total electric power output

Output < consumption ➔ **IMPORT**



Green electricity programs in Holland (2)

Green product options:	**Additional cost**	**Imported**
➔ Wind energy	5 - 10 %	0%
➔ Mini-hydro, biomass residue and wind	-3% to 10 %	< 25%
➔ Large hydro	0 - 5 %	> 50%

- **Other support programs**

➔ **Eco-levy on conventional energies since 1997 (growing)**

5.83 €c/kWh for the first 10,000 kWh/year consumed, 1.94 €c/kWh for 10,000 – 50,000 kWh per year and 0.59 €c/kWh for 50,000-10,000,000. Over 10,000,000 kWh exempt.

➔ **Tax exemptions** for consuming green energy since 1998

➔ **Government purchases:**

- Four ministries supply their energy needs with green electricity

- The government's plan provides for 50% of electrical consumption for the public sector coming from clean sources from 2002 to 2004

RECS (Renewable Energy Certificate System)

- **Private initiative subsidised by EU**
- **Emission scheme and sale of energy origin certificates**
- **Created in 2001 and became operational in 2003. Now covers 80 companies in 18 countries**
- **22.5 million 1 MWh certificates have been issued, but only a small share has been sold**

- **Created with the idea of becoming a platform for the international trading of negotiable green certificates**
- **Has become a system that guarantees the origin of energy in the actual context of the sector's growing transparency (disclosure)**

The EUGENE scheme

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CDM – Vara Blanca example (Costa Rica)

Environmental and financial impact

- Wind energy capacity: 9.6 MW
- Total investment: US$ 18,733,916
- Emissions prevented: 327,000 T CO2
- Estimated allowances price: US$ 3 / T CO2
- Income from sale of allowances = US$ 980,000 (5% ROI)

Determining factors

- Basic rule: Do not count on CDM revenue when taking a decision to carry out a project. It should be regarded as possible additional income.
- Only lucrative in countries with polluting facilities
- Return on CDMs: 1% IRR

EU emissions market

Emissions covered	• **CO_2 emissions initially** – In the future other greenhouse gasses may be included.
Facilities covered	• **2005-2007: Fossil fuel power plants (>20 MW), refineries, coking plants, cement plants, paper mills, sand, glass and ceramic works factories.** – 5,000 facilities are covered in Europe. – Possibility of temporarily excluding some facilities.
Operating basis	• **Non-transferable emission allowances allocated to each wind farm.** • **Transferable emission allowances based on MT of CO_2 equivalents.** – Once a year, each facility will have to present the number of allowances equal to the amount of CO_2 emitted.
Penalties	• **A fine will be imposed on emissions over the allowances submitted.** – €40 /metric tonne CO_2 from 2005-2007. €100 /metric tonne CO_2 starting in 2008.

Position of EU countries with respect to Kyoto objectives