

## GLOBAL STATUS OF WIND POWER

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It is surely an honour to be here and do a presentation on wind energy nearly 20 years ago when I a sales Manager from Vestas sold the first wind turbine to Turkey. I am really proud to see this fine equipment still working as many others of the world first wind turbine generators.

Wind power today is a success story supplying electricity to millions of people employing tens of thousands of people and generating billions of kwh. The pace of change and progress has been rapid for such a young industry.

The benefits of the wind power are compelling; environmental protection, economic growth job creation, diversity of supply, rapid deployment , technology transfer and innovation. Wind Power is the most advanced and commercially available of renew energy technologies . A totally natural ressource which provides power which is both pollution free and inexhaustible In recent years it has been the fastest growing energy source.

Today wind power provides the Danish society with 15 per cent of the electricity consumption and similar figures are to be seen on the German federal States of Schleswig Holstein and Lower Saxony.

There are a tremendous growth in the installation of wind power in the European continent especially in Germany, Spain and Denmark and with the new reinstated power Tax credit the US market will pick up again . In the developing part of the World we have and will see development in China, and India and new emerging market are on the rim of coming development.

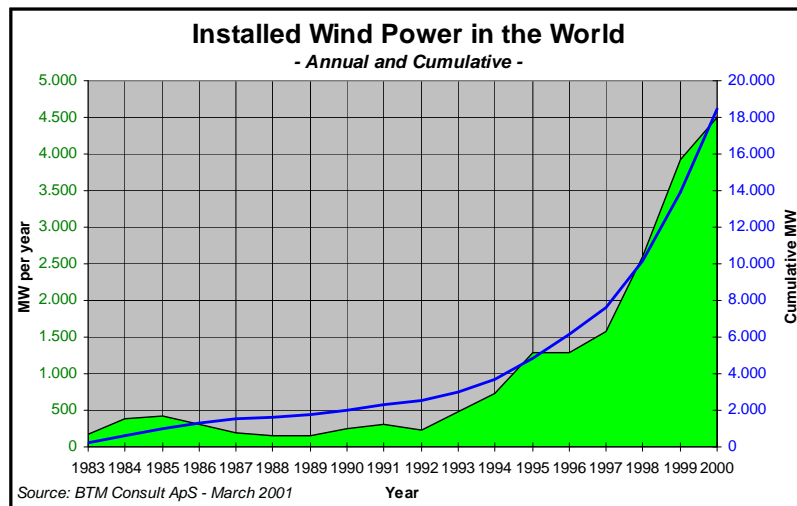
A number of scientific assessment brought together has shown that there are extreme large and very well spread wind resources through the continents to sustain 53,000 terawatt hours of electricity - this is among four times bigger than the worlds entire electricity consumption in 1998. There is no limiting factors that the eventual goal of having 10 per cent of the worlds electricity consumption covered by wind energy by the year 2020 if the political will is there.

The electricity grid is there to accept the wind power and in Denmark there are plans for wind to account for as much as 50 per cent of the electricity by year 2030. On the current expectation wind power installation is expected to grow at an annual rate of 20 per cent per year (past experience show higher growth rates in the wind industry ) in the coming 4 - 5 years this will result in a total installed capacity of wind power by end 2005 of 57.000 MW.

### World Market Growth rates 1994-2000

Year :	Installed MW	Increase %	Cumulative MW	Increase %:
1994	730		3.488	
1995	1.290	77%	4.778	37%
1996	1.292	0,2%	6.070	27%
1997	1.568	21%	7.636	26%
1998	2.597	66%	10.153	33%
1999	3.922	51%	13.932	37%
2000	4.495	15%	18.449	32%
<b>Average growth - 5 years</b>		<b>28%</b>		<b>31%</b>

Source: BTM Consult ApS - March 2001



### Installed capacity in 1999 and 2000 (Global)

	Installed MW 1999	Accu. MW 1999	Installed MW 2000	Accu. MW 2000	% of installed MW 2000
Total America	548	2.667	180	2.847	4,0%
Total Europe	3.192	9.737	3.893	13.630	86,6%
Total Asia	115	1.376	330	1.728	7,3%
Total OECD-Asia	13	50	21	70	0,5%
Total Africa	55	64	73	137	1,6%
Total other continents and areas:	0	37	0,3	37	0,0%
<b>Annual MW installed capacity</b>	3.922		4.495		
<b>Cumulative MW installed in the world</b>		13.932		18.449	

Source: BTM Consult ApS - March 2001

**Installed capacity in 1999 and 2000 (America)**

	Installed MW 1999	Accu. MW 1999	Installed MW 2000	Accu. MW 2000
Argentina	1	15	1,2	16
Brazil	3	22	0,2	22
Canada	43	126	13	139
Costa Rica	24	51	0	51
Mexico	0	2	0	2
USA	477	2.445	165	2.610
The Americans	1	7	0	7
<b>Total America</b>	<b>548</b>	<b>2.667</b>	<b>180</b>	<b>2.847</b>

Source: BTM Consult ApS - March 2001

**Installed capacity in 1999 and 2000 (Europe)**

	Installed MW 1999	Accu. MW 1999	Installed MW 2000	Accu. MW 2000
Austria	9	34	35	69
Belgium	1	11	8	19
Denmark	325	1.738	603	2.341
Finland	21	39	0	39
France	4	25	38	63
Germany	1.568	4.442	1.665	6.107
Greece	103	158	116	274
Ireland (Rep.)	10	74	49	122
Italy	80	277	147	424
Luxembourg	1	6	0	6
Netherlands	54	433	40	473
Norway	4	13	0	13
Portugal	10	61	50	111
Spain	932	1.812	1.024	2.836
Sweden	44	220	45	265
Switzerland	0	3	0	3
Turkey	0	9	10	19
UK	24	362	63	425
Other European countries: Czech Rep. / Poland / Slovak Rep. / East European countries.	2	20,9	0,8	21,6
<b>Total Europe</b>	<b>3.192</b>	<b>9.737</b>	<b>3.893</b>	<b>13.630</b>

Source: BTM Consult ApS - March 2001

**Installed capacity in 1999 and 2000 (Asia)**

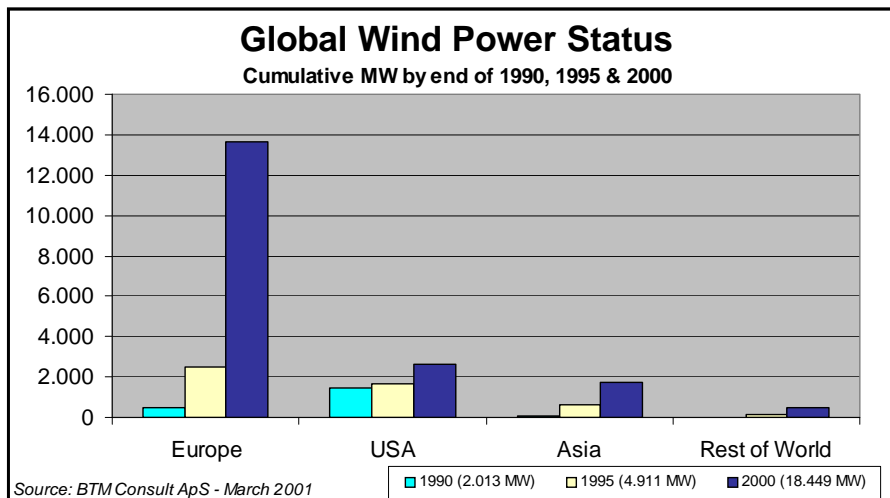
	Installed MW 1999	Accu. MW 1999	Installed MW 2000	Accu. MW 2000
P.R. China	25	262	84	352
India	43	1.035	169	1.220
Japan	38	68	74	142
Rest of Asian : Korea Malaysia /Indonesia /Philippines / Taiwan /Thailand/ Vietnam etc.	9	11	3,3	15
<b>Total Asia</b>	<b>115</b>	<b>1.376</b>	<b>330</b>	<b>1.728</b>

Source: BTM Consult ApS - March 2001

### Installed capacity in 1999 and 2000 (Rest of World)

	Installed MW 1999	Accu. MW 1999	Installed MW 2000	Accu. MW 2000
Australia	0	9	21	30
New Zealand	11	35	0	35
Pacific Islands	2	5	0	5
<b>Total OECD-Asia</b>	<b>13</b>	<b>50</b>	<b>21</b>	<b>70</b>
Egypt	30	36	33	69
Morocco	14	14	40	54
Tunisia	11	11	0	11
Other Africa Including: Ethiopia, Libya, Algeria, Cape Verde, etc.	0	4	0	4
<b>Total Africa</b>	<b>55</b>	<b>64</b>	<b>73</b>	<b>137</b>
Middle East including: Jordan/ Syria/ Israel /Saudi Arabia/Iran Araq. (excl. Egypt)	0	18	0	18
Former Soviet Union: FSU - countries	0	19,3	0,3	19,5
<b>Total other continents and areas:</b>	<b>0</b>	<b>37,2</b>	<b>0,3</b>	<b>37,5</b>

Source: BTM Consult ApS - March 2001



### Average size WTG (kW) installed each year

Year	China	Denmark	Germany	India	Spain	Sweden	UK	USA
1995	326	493	473	208	297	448	534	327
1996	400	531	530	301	420	459	562	511
1997	472	560	623	279	422	550	514	707
1998	636	687	783	283	504	590	615	723
1999	610	750	919	283	589	775	617	720
2000	600	931	1.101	401	648	802	795	686

Source: BTM Consult ApS - March 2001

## Average size WTG (kW) of cumulative installation

Year	China	Denmark	Germany	India	Spain	Sweden	UK	USA
1995	147	148	310	199	177	311	360	118
1996	209	181	358	222	258	345	398	120
1997	281	235	402	228	323	364	425	125
1998	362	271	465	233	367	412	442	132
1999	441	303	562	232	455	453	450	153
2000	479	366	646	258	510	489	484	161

Source: BTM Consult ApS - March 2001

## Number of WTG units world-wide (Global)

Country/Region	Total units until end of 1994	Net increase per year						Total by end of 2000
		1995	1996	1997	1998	1999	2000	
Total America	16.329	66	-78	-158	416	-177	261	16.659
Total Europe	8.488	1.800	2.013	2.343	2.733	4.389	4.624	26.390
Total Asia	1.279	1.837	917	594	33	438	650	5.748
Rest of World	70	25	20	35	1	134	156	441
<b>Total units</b>	<b>26.166</b>	<b>3.728</b>	<b>2.872</b>	<b>2.814</b>	<b>3.183</b>	<b>4.784</b>	<b>5.691</b>	<b>49.238</b>
<b>Cumulative</b>	<b>26.166</b>	<b>29.894</b>	<b>32.766</b>	<b>35.580</b>	<b>38.763</b>	<b>43.547</b>	<b>49.238</b>	

Installed capacity by the end of 2000: 18.449 MW

Average size WTG in the world : 375 kW/WTG

Source: BTM Consult ApS - March 2001

## Number of WTG units world-wide (America)

Country/Region	Total units until end of 1994	Net increase per year						Total by end of 2000
		1995	1996	1997	1998	1999	2000	
USA	16.226	47	-140	-198	297	-276	241	16.197
Canada	59	3	1	5	76	57	17	210
Rest of America	44	16	61	35	43	42	3	244
<b>Sum total</b>	<b>16.329</b>	<b>66</b>	<b>-78</b>	<b>-158</b>	<b>416</b>	<b>-177</b>	<b>261</b>	<b>16.659</b>

Source: BTM Consult ApS - March 2001

## Number of WTG units world-wide (Europe)

Country/Region	Total units until end of 1994	Net increase per year						Total by end of 2000
		1995	1996	1997	1998	1999	2000	
Austria	3	3	26	25	9	13	36	115
Denmark	3.701	199	386	509	452	487	656	6.390
Germany	2.617	1.038	726	812	983	1.732	1.552	9.460
Greece	144	2	2	0	74	174	181	577
Ireland (Rep.)	21	0	0	75	15	15	72	190
Italy	86	2	105	65	160	142	218	778
Netherlands	718	262	124	39	74	91	49	1.357
Portugal	30	0	19	40	25	14	60	188
Spain	500	145	324	645	783	1.583	1.580	5.560
Sweden	94	65	145	30	92	59	56	541
UK	460	75	130	84	16	39	75	879
Rest of Europe	114	9	26	19	50	40	89	347
<b>Sum total</b>	<b>8.488</b>	<b>1.800</b>	<b>2.013</b>	<b>2.343</b>	<b>2.733</b>	<b>4.389</b>	<b>4.624</b>	<b>26.390</b>

Source: BTM Consult ApS - March 2001

**Number of WTG units world-wide (Asia + ROW)**

Country/Region	Total units until end of 1994	Net increase per year						Total by end of 2000
		1995	1996	1997	1998	1999	2000	
P.R. China	142	23	90	142	33	164	140	734
India	1.090	1.800	810	430	-30	205	420	4.725
Japan	41	13	16	19	30	56	85	260
Rest of Asia	6	1	1	3	0	13	5	29
<b>Sum total</b>	<b>1.279</b>	<b>1.837</b>	<b>917</b>	<b>594</b>	<b>33</b>	<b>438</b>	<b>650</b>	<b>5.748</b>
Rest of World	70	25	20	35	1	134	156	441

Source: BTM Consult ApS - March 2001

**The 10 largest markets in 2000 (Annual MW)**

Country	1998	1999	2000	Share %
Germany	793	1568	1.665	37,0%
Spain	368	932	1.024	22,8%
Denmark	310	325	603	13,4%
India	82	43	169	3,7%
USA	577	477	165	3,7%
Italy	94	80	147	3,3%
Greece	26	103	116	2,6%
China	54	25	84	1,9%
Japan	10,7	38	74	1,6%
UK	10	24	63	1,4%
<b>Total</b>	<b>2.325</b>	<b>3.615</b>	<b>4.110</b>	
Percent of World	89,5%	92,2%	91,4%	

Source: BTM Consult ApS - March 2001

**The 10 largest markets by end of 2000 (cumulative MW)**

Country	1998	1999	2000	Share %
Germany	2.874	4.442	6.107	33,1%
Spain	880	1.812	2.836	15,4%
USA	2.141	2.445	2.610	14,1%
Denmark	1.420	1.738	2.341	12,7%
India	992	1.035	1.220	6,6%
Netherlands	379	433	473	2,6%
UK	338	362	425	2,3%
Italy	197	277	424	2,3%
R. P. China	200	262	352	1,9%
Greece	55	158	274	1,5%
<b>Total</b>	<b>9.476</b>	<b>12.964</b>	<b>17.062</b>	
Percent of World	93,3%	93,1%	92,5%	

Source: BTM Consult ApS - March 2001

**Growth rates in the Top-10 markets**

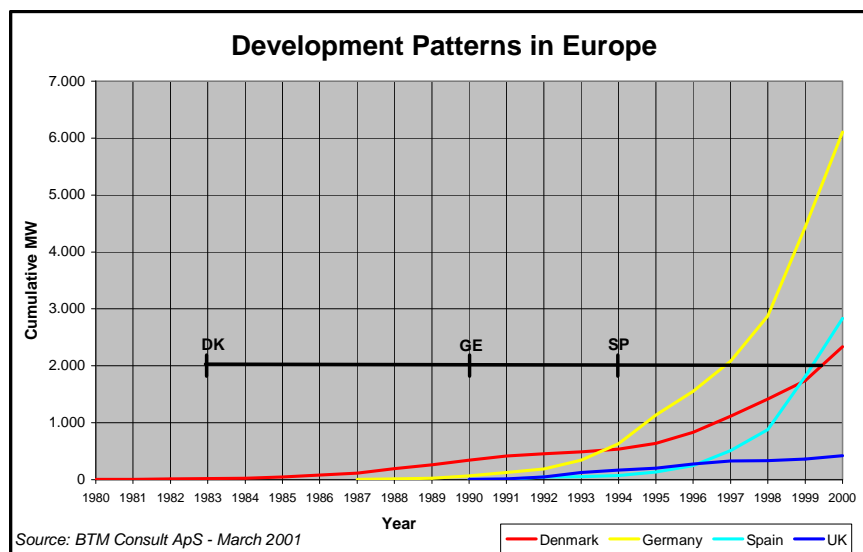
Country	Accu. end 1997	Accu. end 1998	Accu. end 1999	Accu. end 2000	Growth rate 1999-2000 %	3 years average %
Germany	2.081	2.874	4.442	6.107	37,5%	43,2%
Spain	512	880	1.812	2.836	56,5%	76,9%
USA	1.611	2.141	2.445	2.610	6,8%	17,5%
Denmark	1.116	1.420	1.738	2.341	34,7%	28,0%
India	940	992	1.035	1.220	17,8%	9,1%
Netherlands	329	379	433	473	9,2%	12,9%
UK	328	338	362	425	17,4%	9,0%
Italy	103	197	277	424	53,0%	60,3%
R. P. China	146	200	262	352	34,4%	34,0%
Greece	29	55	158	274	73,4%	111,4%
<b>Total "Ten"</b>	<b>7.195</b>	<b>9.476</b>	<b>12.964</b>	<b>17.062</b>	<b>31,6%</b>	<b>33,4%</b>

Source: BTM Consult ApS - March 2001

## Commercial MW-class WTGs

Technical Spec.: Name/types:	Capacity kW	Rotor diam. m	Control Features	Comments
Bonus 1MW	1000/200	54.2	Active Stall (C)	2-speed CombiStall
Bonus 1.3MW	1300/260	62	Active Stall (C)	2-speed CombiStall
Bonus 2MW	2000	70-77	Active Stall (C)	2-speed CombiStall
DeWind 1MW	1000	62	Pitch (V)	
DeWind 1.25MW	1250	62	Pitch (V)	
Enercon E 66, 1.5 MW	1500	66	Pitch (V)	Multipoled generator
ENERCON E-70	1800	70	Pitch (V)	Multipoled generator
Fuhrländer MD77	1500	77	Pitch (V)	
NEG Micon NM 1500C	1500	64	Stall (C)	
NEG Micon NM 2000	2000	72	Active Stall (C)	
Nordex N54	1000	54	Stall (C)	2-speed switchable poles
Nordex N60/N62	1300	60/62	Stall (C)	2-speed switchable poles
NORDEX 2.5 MW	2500	80	Pitch (V)	
ENRON TW 1.5	1500	65-70.5	Pitch (V)	IGBT-Inverter
ENRON	2000	80	Pitch (V)	IGBT-Inverter
VESTAS V66	1750 2000	66 66	Pitch (V)	Variable Frequency Control System
VESTAS V80	2000 2.5-3.0 MW	80 80	Pitch (V)	Variable Frequency Control System

Source: BTM Consult ApS - March 2001



## Installed MW class WTGs - 1997 to 2000

Year:	Until 1997	1998	1999	2000
Installed capacity during the year MW	153	417	1,076	1,779
Number of turbines installed during the year	128	332	802	1,293
Share of the World Market in % (ref. MW)	9.7%	16%	27.4%	39.6%

Source: BTM Consult ApS - March 2001

### The Top-10 list of suppliers 2000

	Accu. MW 1999	Sold MW 2000	Share 2000 %	Accu. MW 2000	Share accu. %
VESTAS (DK)	2.530	805	17,9%	3.335	18,1%
GAMESA (ES)	853	623	13,9%	1.476	8,0%
ENERCON (GE)	1.553	617	13,7%	2.170	11,8%
NEG MICON (DK)	3.034	601	13,4%	3.636	19,7%
BONUS (DK)	1.197	516	11,5%	1.713	9,3%
NORDEX (GE/DK)	638	375	8,3%	1.013	5,5%
ENRON (US)	1.153	270	6,0%	1.423	7,7%
ECOTECNIA (ES)	136	174	3,9%	309	1,7%
SUZLON (Ind)	0	103	2,3%	103	0,6%
DEWIND (GE)	86	94	2,1%	179	1,0%
Others	3.288	371	8,3%	3.659	19,8%
<b>Total</b>	<b>14.469</b>	<b>4.548</b>	<b>101%</b>	<b>19.017</b>	<b>103%</b>

Source: BTM Consult ApS - March 2001

### Top-10 manufacturers share of sold MW

	1996	1997	1998	1999	2000
<b>Top-10 market share</b>	88,5%	92,7%	91,4%	92,6%	91,8%
<b>Other manufacturers</b>	11,5%	7,3%	8,4%	7,4%	8,2%

Source: BTM Consult ApS - March 2001

### Market shares in 1998, 1999 and 2000

	Sold MW 1998	Share 1998 %	Sold MW 1999	Share 1999 %	Sold MW 2000	Share 2000 %
VESTAS (DK)	385	14,8%	652	16,6%	805	17,9%
GAMESA (ES)	171	6,6%	494	12,6%	623	13,9%
ENERCON (GE)	334	12,8%	488	12,5%	617	13,7%
NEG MICON (DK)	527	20,3%	761	19,4%	601	13,4%
BONUS (DK)	149	5,7%	338	8,6%	516	11,5%
NORDEX (GE/DK)	131	5,0%	306	7,8%	375	8,3%
ENRON (US)	350	13,5%	360	9,2%	270	6,0%
ECOTECNIA (ES)	47	1,8%	59	1,5%	174	3,9%
SUZLON (Ind)	0	0,0%	0	0,0%	103	2,3%
DEWIND (GE)	21	0,8%	58	1,5%	94	2,1%
MADE (ES)	105	4,0%	218	5,6%	85	1,9%
MITSUBISHI (JP)	38	1,5%	40	1,0%	64	1,4%
DESARROLLOS (ES)	27	1,0%	47	1,2%	27	0,6%
TACKE (GE)	61	2,4%	-	-	-	-
WIND WORLD (DK)	74	2,8%	-	-	-	-
Others	113	4,3%	211	5,4%	195	4,3%
<b>Total</b>	<b>2.530</b>	<b>97%</b>	<b>4.033</b>	<b>103%</b>	<b>4.548</b>	<b>101%</b>

Source: BTM Consult ApS - March 2001



### Export ranking of manufacturers in 2000

	Total sale 2000 MW	Domestic 2000 MW	Export 2000 MW	Export share %
VESTAS (DK)	805	112	692	86,0%
NEG MICON (DK)	601	243	358	59,5%
BONUS (DK)	516	191	325	63,0%
NORDEX (GE/DK)	375	62	313	83,5%
ENRON (US)	270	0	270	100%
ENERCON (GE)	617	457	160	25,9%
mitsubishi (JP)	64	3	61	96%
GAMESA (ES)	623	609	14	2%
MADE (ES)	85	76	9	11%
ECOTECNIA (ES)	174	174	0	0%
SULZON (Ind)	103	103	0	0%
DEWIND (GE)	94	94	0	0%
DESARROLLOS (ES)	27	27	0	0%
<b>Total</b>	<b>4.353</b>	<b>2.150</b>	<b>2.203</b>	<b>50,6%</b>

Source: BTM Consult ApS - March 2001

### Average export shares for Top-10 manufacturers

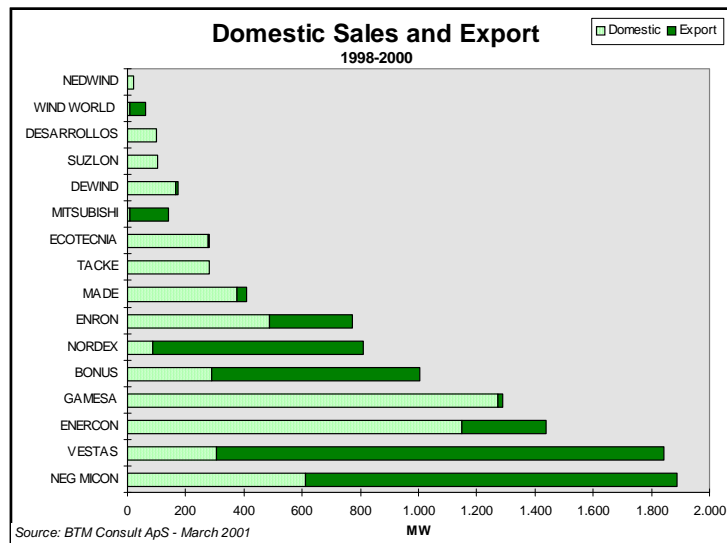
	1996	1997	1998	1999	2000
Domestic sales (MW)	568	779	1.344	1.978	2.045
Export sales (MW)	505	666	1.073	1.757	2.132
<b>SUM</b>	<b>1.073</b>	<b>1.445</b>	<b>2.417</b>	<b>3.735</b>	<b>4.177</b>
Export share (%)	47,1%	46,1%	44,4%	47,0%	51,0%

Source: BTM Consult ApS - March 2001

### Average export share for the past 3 years

	Total sale 1998 MW	Total sale 1999 MW	Total sale 2000 MW	Sum 3 years MW	Export 3 years MW	Average Export share
VESTAS (DK)	385	652	805	1.842	1.537	83,4%
NEG MICON (DK)	527	761	601	1.889	1.278	67,7%
BONUS (DK)	149	338	516	1.003	714	71,2%
NORDEX (GE/DK)	131	306	375	812	726	89,4%
ENERCON (GE)	334	488	617	1.439	292	20,3%
ENRON (US)	350	154	270	773	266	36,9%
MITSUBISHI (JP)	38	40	64	142	134	94,4%
LAGERWEY (NL)	13	14	36	63	63	100,0%
WIND WORLD (DK)	61	-	-	61	51	83,8%
MADE (ES)	105	218	85	408	33	8,1%
GAMESA (ES)	171	494	623	1.287	14	1,1%
DEWIND (GE)	21	58	94	173	6	3,4%
ECOTECNIA (ES)	47	59	174	279	3	1,0%
TACKE (GE)	74	207	-	281	0	0,0%
SUZLON (Ind)	0	0	103	103	0	0,0%
DESARROLLOS (ES)	27	47	27	101	0	0,0%
NEDWIND (NL)	20	-	-	20	0	0,0%
WINDMASTER (B)	8	0	-	8	0	0,0%
<b>Total</b>	<b>2.458</b>	<b>3.836</b>	<b>4.389</b>	<b>10.683</b>	<b>5.136</b>	<b>48,1%</b>

Source: BTM Consult ApS - March 2001



### Segmentation of product sizes in the 2000 market

Product (Size range)	Number of units	Installed Capacity MW	Market share (ref. MW)	Average WTG size (kW)	Comment to current trends
"Small WTGs" <500 kW	311	84	1,8%	270 kW	Fast decreasing
"Main stream" 500-999 kW	4.087	2.685	59,0%	657 kW	Slightly decreasing
"MW-class" 1MW & up	1.293	1.779	39,1%	1376 kW	Increasing
<b>Total</b>	<b>5.691</b>	<b>4.548</b>	<b>100%</b>	<b>799 kW</b>	

Source: BTM Consult ApS - March 2001

### Leading suppliers to the three product segments - 2000

	Small turbines WTGs < 500 kW	Main Stream WTGs: 500-999 kW	MW-Class WTGs: 1MW & up
<b>Position:</b>	<b>Company Name</b>		
1	Desarrollos, ES	Gamesa, ES	Bonus, DK
2	Lagerwey, NL	Vestas, DK	Enercon, GE
3	Enercon, GE	NEG Micon, DK	ENRON, US

Source: BTM Consult ApS - March 2001

### Leading suppliers to the "MW-class" - 2000

Position	Company	Total MW supplied in 2000	Share of the MW segment
1	BONUS Energy, DK	392	22,0%
2	ENERCON, GE	369	20,7%
3	ENRON, US	252	14,2%
4	VESTAS Wind System, DK	237	13,3%
5	NORDEX-Borsig, GE/DK	207	11,6%
6	NEG MICON, DK	175	9,8%
Others		147	8,3%
<b>Total installed MW:</b>		<b>1.779</b>	<b>100%</b>

Source: BTM Consult ApS - March 2001

## Forecast for wind power development 2001-2005 (Global)

	Cumulative installed capacity (MW) by end of in 2000	Installed capacity (MW) in 2000	Forecast 2001-2005						Installed capacity between 2001-2005	Cumulative installed capacity (MW) by end of 2005
			2000	2000	2001	2002	2003	2004		
<b>Total America</b>	<b>2.847</b>	<b>180</b>	<b>1.440</b>	<b>950</b>	<b>1.200</b>	<b>1.100</b>	<b>1.200</b>	<b>5.890</b>	<b>8.737</b>	
<b>Total Europe</b>	<b>13.630</b>	<b>3.693</b>	<b>3.750</b>	<b>4.835</b>	<b>5.310</b>	<b>6.000</b>	<b>7.050</b>	<b>26.945</b>	<b>40.575</b>	
<b>Total Asia</b>	<b>1.728</b>	<b>330</b>	<b>360</b>	<b>530</b>	<b>680</b>	<b>830</b>	<b>1.080</b>	<b>3.480</b>	<b>5.208</b>	
<b>Total other continents and areas:</b>	<b>244</b>	<b>83</b>	<b>120</b>	<b>270</b>	<b>425</b>	<b>550</b>	<b>800</b>	<b>2.165</b>	<b>2.409</b>	
<b>Total MW new capacity every year:</b>		<b>4.495</b>	5.670	6.585	7.615	8.480	10.130	<b>38.480</b>	<b>56.929</b>	
<b>Accu. capacity (MW)</b>	<b>18.449</b>		<b>24.119</b>	<b>30.704</b>	<b>38.319</b>	<b>46.799</b>	<b>56.929</b>			

Source: BTM Consult ApS - March 2001

## Forecast for wind power development 2001-2005 (America)

	Cumulative installed capacity (MW) by end of in 2000	Installed capacity (MW) in 2000	Forecast 2001-2005						Installed capacity between 2001-2005	Cumulative installed capacity (MW) by end of 2005
			2000	2000	2001	2002	2003	2004		
Canada	139	13	40	75	100	150	200	565	704	
USA	2.610	165	1.350	800	1.000	800	800	4.750	7.360	
The Americans	98	1	50	75	100	150	200	575	673	
<b>Total America</b>	<b>2.847</b>	<b>180</b>	<b>1.440</b>	<b>950</b>	<b>1.200</b>	<b>1.100</b>	<b>1.200</b>	<b>5.890</b>	<b>8.737</b>	

Source: BTM Consult ApS - March 2001

## Forecast for wind power development 2001-2005 (Asia)

	Cumulative installed capacity (MW) by end of in 2000	Installed capacity (MW) in 2000	Forecast 2001-2005						Installed capacity between 2001-2005	Cumulative installed capacity (MW) by end of 2005
			2000	2000	2001	2002	2003	2004		
P.R. China	352	84	100	150	250	300	400	1.200	1.552	
India	1.220	169	150	250	300	400	500	1.600	2.820	
Japan	142	74	80	100	100	100	150	530	672	
Other Asian countries: Korea / Malaysia/ Indonesia/ Philippines/ Taiwan/ Thailand / Vietnam etc.	15	3	30	30	30	30	30	150	165	
<b>Total Asia</b>	<b>1.728</b>	<b>330</b>	<b>360</b>	<b>530</b>	<b>680</b>	<b>830</b>	<b>1.080</b>	<b>3.480</b>	<b>5.208</b>	

Source: BTM Consult ApS - March 2001

## Forecast for wind power development 2001-2005 (Europe)

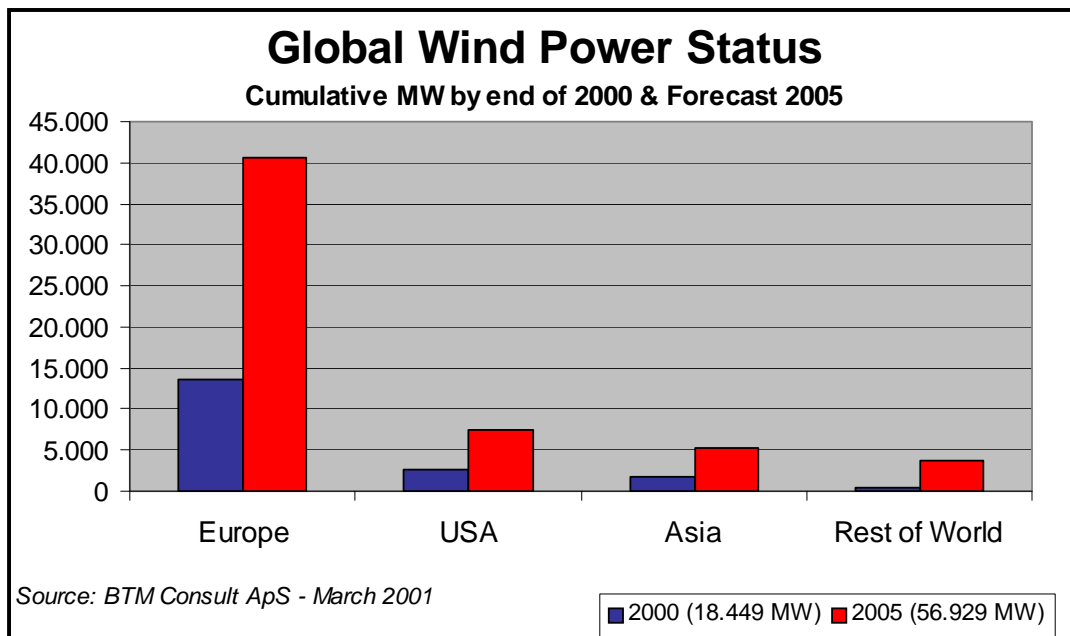
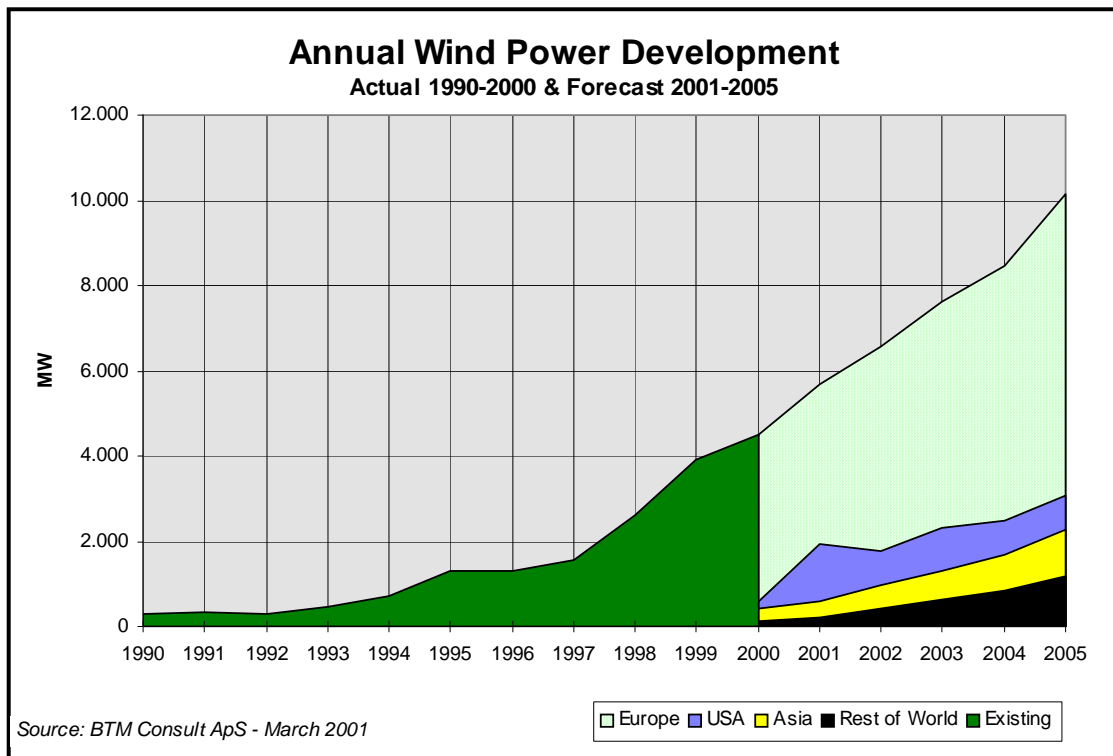
	Cumulative installed capacity (MW) by end of in 2000	Installed capacity (MW) in 2000	Forecast 2001-2005					Installed capacity between 2001-2005	Cumulative installed capacity (MW) by end of 2005
	2000	2000	2001	2002	2003	2004	2005	Sum	Accu.
Austria	69	35	15	20	40	50	50	175	244
Belgium	19	8	10	60	60	20	20	170	189
Denmark	2.341	603	220	300	400	150	400	1.470	3.811
Finland	39	0	10	20	50	50	50	180	219
France	63	38	75	300	400	600	600	1.975	2.038
Germany	6.107	1.665	1.450	1.450	1.200	1.400	2.000	7.500	13.607
Greece	274	116	100	120	150	150	150	670	944
Ireland (Rep.)	122	49	25	40	150	200	100	515	637
Italy	424	147	170	250	300	300	300	1.320	1.744
Netherlands	473	40	65	150	200	200	200	815	1.288
Norway	13	0	20	150	200	250	300	920	933
Portugal	111	50	30	30	40	50	50	200	311
Spain	2.836	1.024	1.400	1.500	1.500	1.800	1.800	8.000	10.836
Sweden	265	45	40	75	150	150	300	715	980
Switzerland	3	0	10	20	20	30	30	110	113
Turkey	19	10	20	50	100	100	200	470	489
UK	425	63	50	250	300	400	400	1.400	1.825
Other European countries: Czech Rep./ Poland/ Slovak Rep. / other East European countries.	28	1	40	50	50	100	100	340	368
<b>Total Europe</b>	<b>13.630</b>	<b>3.693</b>	<b>3.750</b>	<b>4.835</b>	<b>5.310</b>	<b>6.000</b>	<b>7.050</b>	<b>26.945</b>	<b>40.575</b>

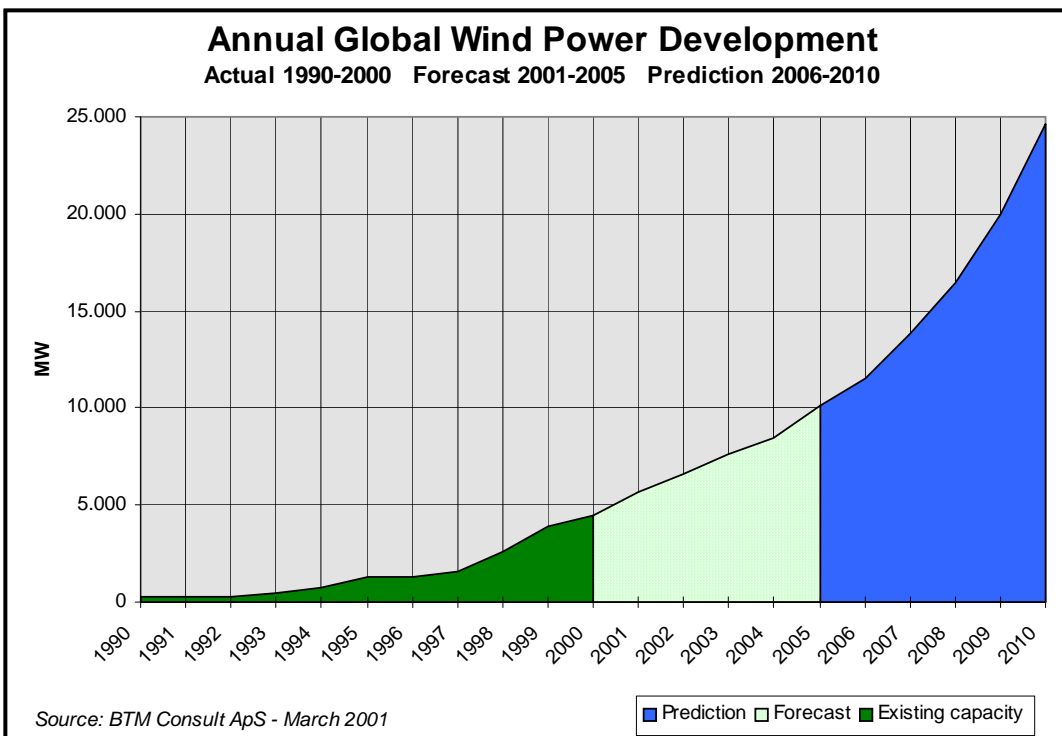
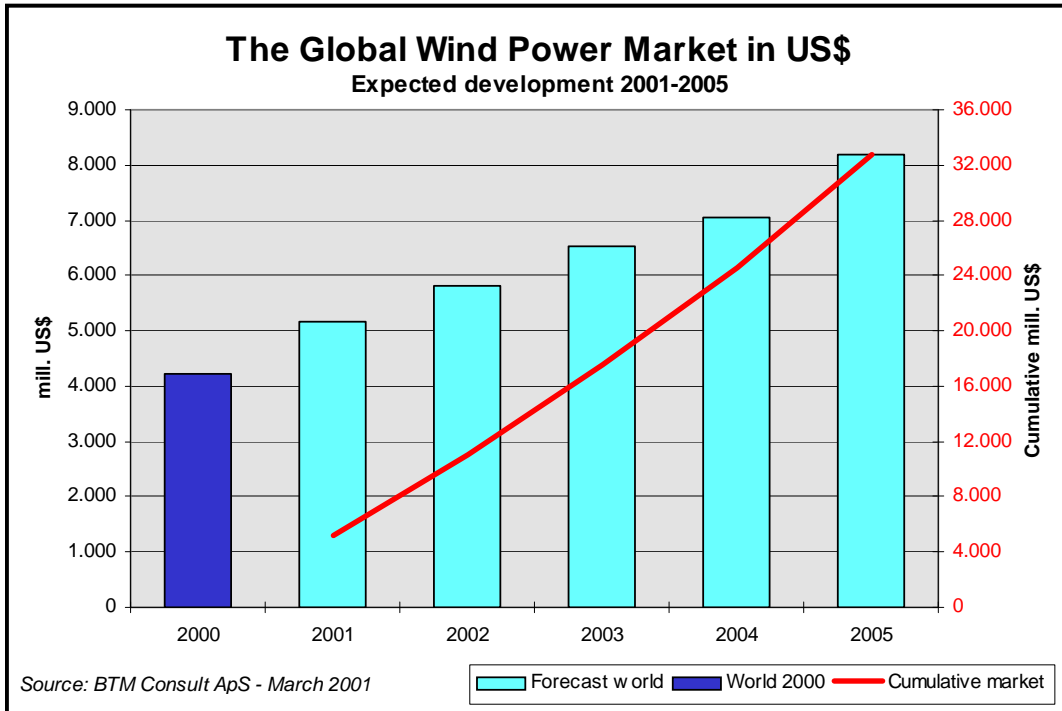
Source: BTM Consult ApS - March 2001

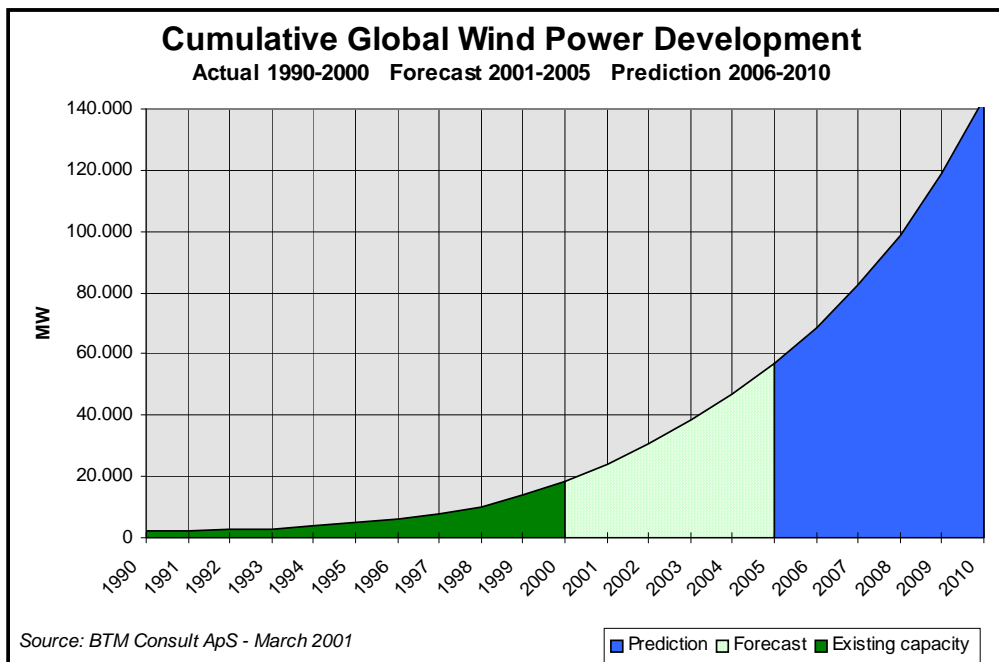
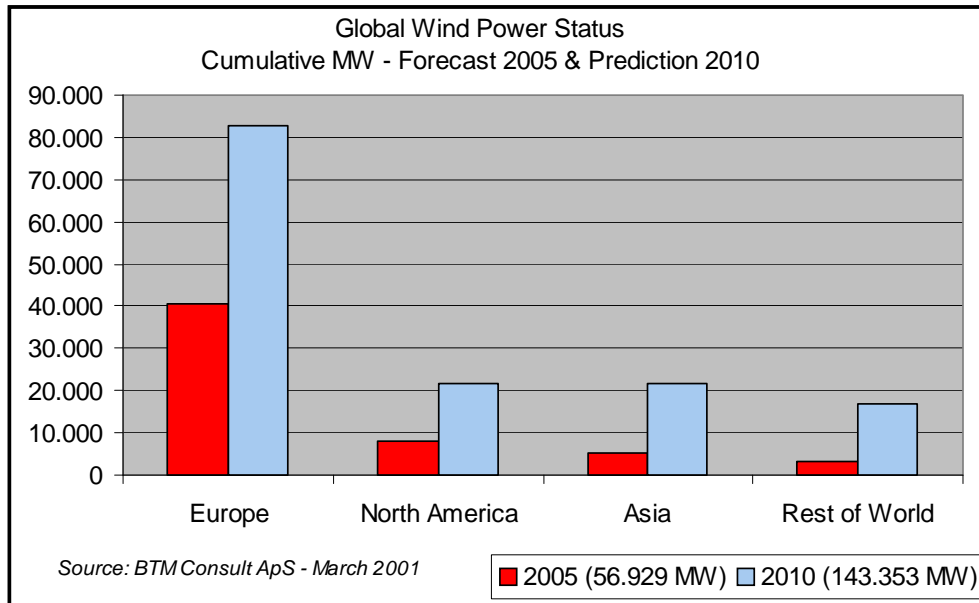
## Forecast for wind power development 2001-2005 (RoW)

	Cumulative installed capacity (MW) by end of in 2000	Installed capacity (MW) in 2000	Forecast 2001-2005					Installed capacity between 2001-2005	Cumulative installed capacity (MW) by end of 2005
	2000	2000	2001	2002	2003	2004	2005	Sum	Accu.
Australia & New Zealand	65	21	50	75	125	125	150	525	590
North Africa - including: Egypt/ Ethiopia/ Libya /Tunisia /Algeria / Cape Verde/ Morocco.	137	73	30	75	150	200	300	755	892
Middle East - including: Jordan/ Syria/ Israel/ Saudi Arabia/ Iran/ Iraq. (excl Egypt)	18	0	10	40	50	75	100	275	293
Former Soviet Union: FSU-countries	20	0	10	30	50	100	200	390	410
Rest of the world	5	0	20	50	50	50	50	220	225
<b>Total other continents and areas:</b>	<b>244</b>	<b>93</b>	<b>120</b>	<b>270</b>	<b>425</b>	<b>550</b>	<b>800</b>	<b>2.165</b>	<b>2.409</b>

Source: BTM Consult ApS - March 2001





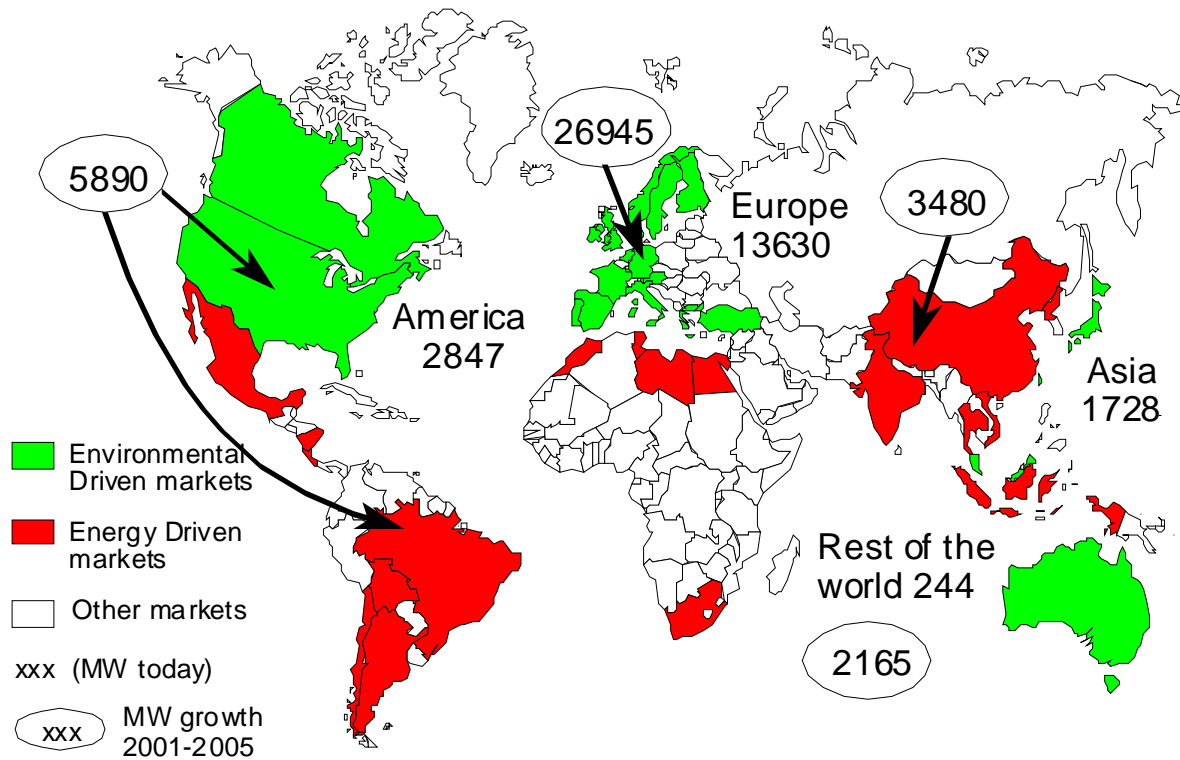


#### Segment distribution of installed capacity in 1995-2000

Market segments	% of world market					
	1995	1996	1997	1998	1999	2000
Dispersed development, single WTGs and small wind farms up to 5 MW	75	70	60	45	42	46
Commercial and Utility owned wind farms > 5 MW up to 100 MW	24	28	40	54	57	53
Other Niche markets i.e offshore	1	1	1	1	1	1

Source: BTM Consult ApS - March 2001

### Status 2000 and forecast 2001-2005



### Electricity from Wind Power

Country/Region	Cumulative MW - end 2000	Est. average Full load hours	Est. average Capacity Factor	Est. electricity production in 2001 TWh
Germany *)	6.107	1.882	21%	11,493
Spain	2.832	2.100	24%	5,947
USA	2.610	2.000	23%	5,220
Denmark	2.341	2.250	26%	5,267
India	1.222	1.800	20%	2,100
The Netherlands	473	2.100	24%	0,993
United Kingdom	425	2.880	32%	1,224
Italy	424	2.000	23%	0,848
P.R. China	352	2.100	24%	0,739
Greece	274	2.500	29%	0,685
Sweden	265	2.100	24%	0,556
Rest of World	1.108	2.000	23%	2,216
<b>Total</b>	<b>18.433</b>	<b>(avg. 2023)</b>	<b>(avg. 23%)</b>	<b>37,288</b>

Source: BTM Consult ApS - March 2001



## Growth of Wind Power in a World Wide Generation Context

Generation Year	Wind Power 1)		Annual Growth % of TWh	All Electricity Generation Capacity 2)		Annual Growth % of TWh
	Capacity GW	Energy TWh		Capacity GW	Energy TWh	
1996	6.07	12.23	-	(3,159)	(13,613)	(IEA '00)
1997	7.64	15.39	25.8%	3,221	13,949	2.8%
1998	10.15	21.25	38.1%	3,298	14,340	2.8%
1999	13.93	28.18	32.6%	3,377	14,741	2.8%
<b>2000</b>	<b>18.43</b>	<b>37.3</b>	<b>32.0%</b>	<b>3,458</b>	<b>15,153</b>	<b>2.8%</b>
2010 (est.)	145.0	355.68		4,386	19,989	
<b>Average Annual growth 1996 through 2010</b>			<b>27.2%</b>			<b>2.8 %</b>

Source: BTM Consult ApS - March 2001

1) World Market Update, BTM-C (Chapter 2 & 4)

2) IEA World Energy Outlook 2000 - General Projection

## Wind Power Generation's share of the World-Wide Generation

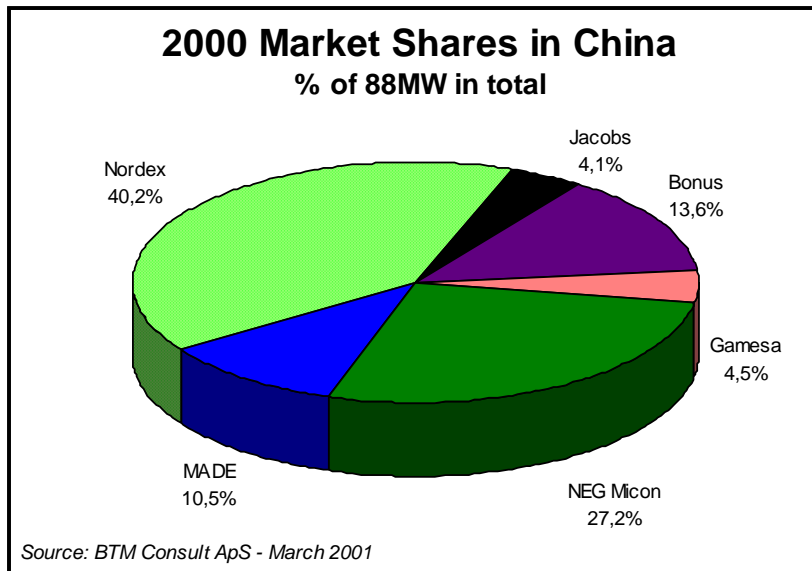
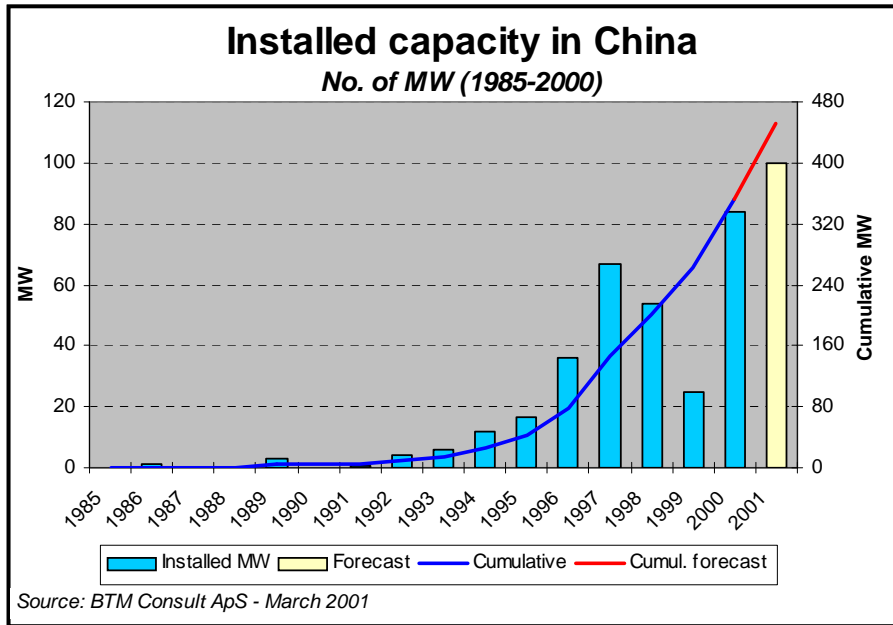
Generation Technology Year:	Electricity gen. by Wind Power (BTM-C) TWh	Electricity from all gen. technologies (incl. Wind) IEA TWh	Wind Power's share of the worlds Electricity Generation: %
1996	12.23	13,613	0.08%
1997	15.39	13,949	0.11%
1998	21.25	14,340	0.15%
1999	28.18	14,741	0.19%
<b>2000</b>	<b>37.30</b>	<b>15,153</b>	<b>0.25%</b>
2010 (est.)	355.68	19,989	1.78 %

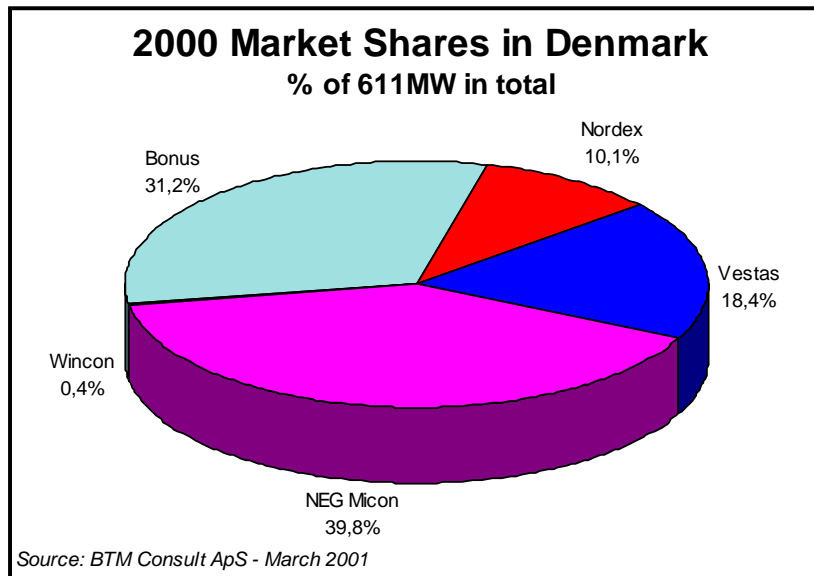
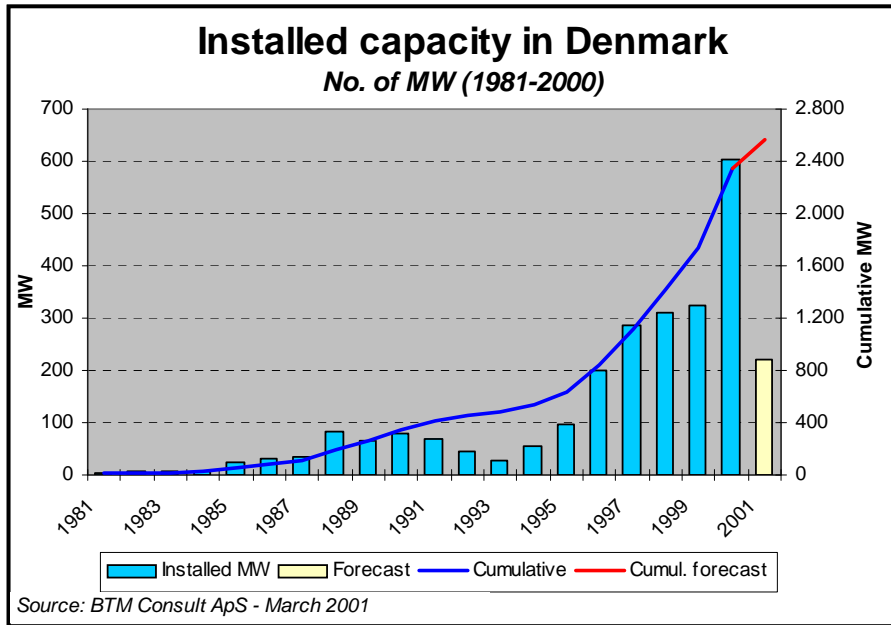
Source: BTM Consult ApS - March 2001 ; World Figures: IEA World Energy Outlook 2000

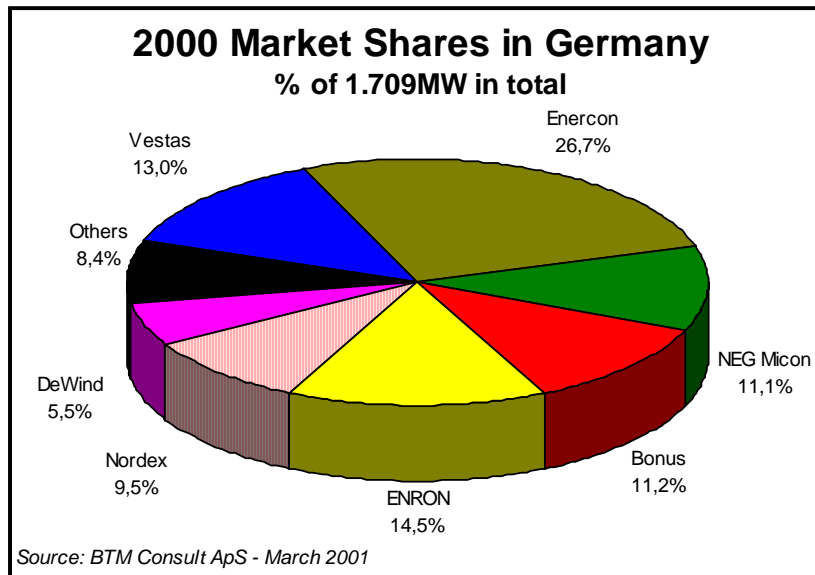
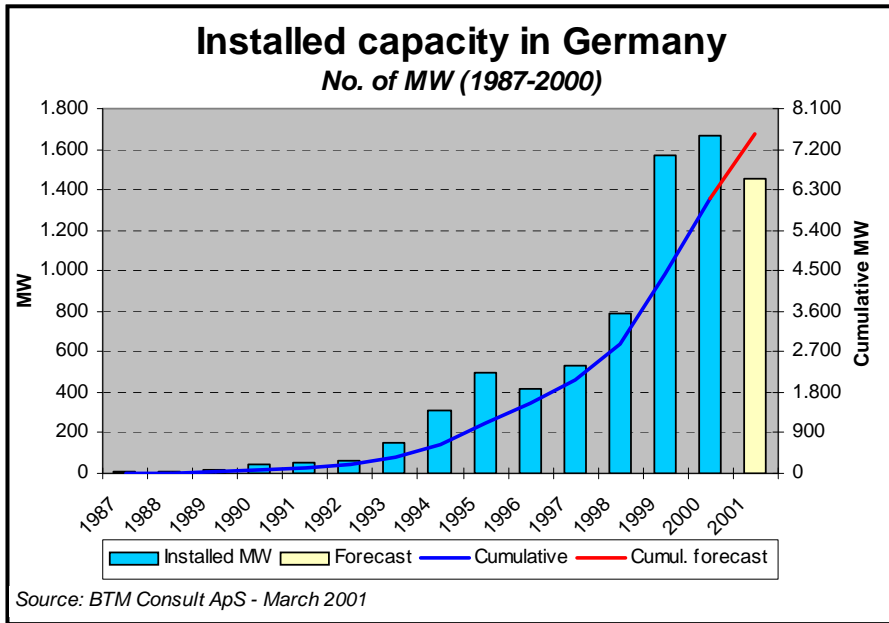
## Feed in tariffs for wind electricity in selected countries

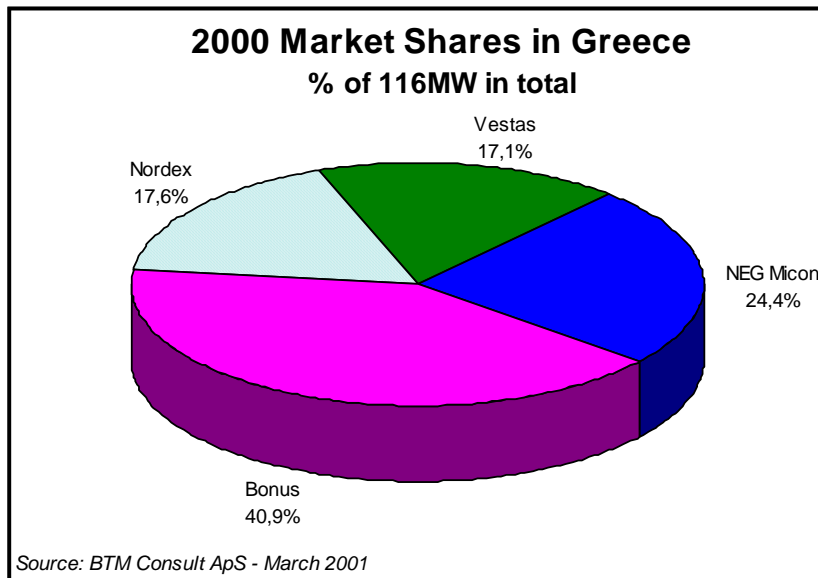
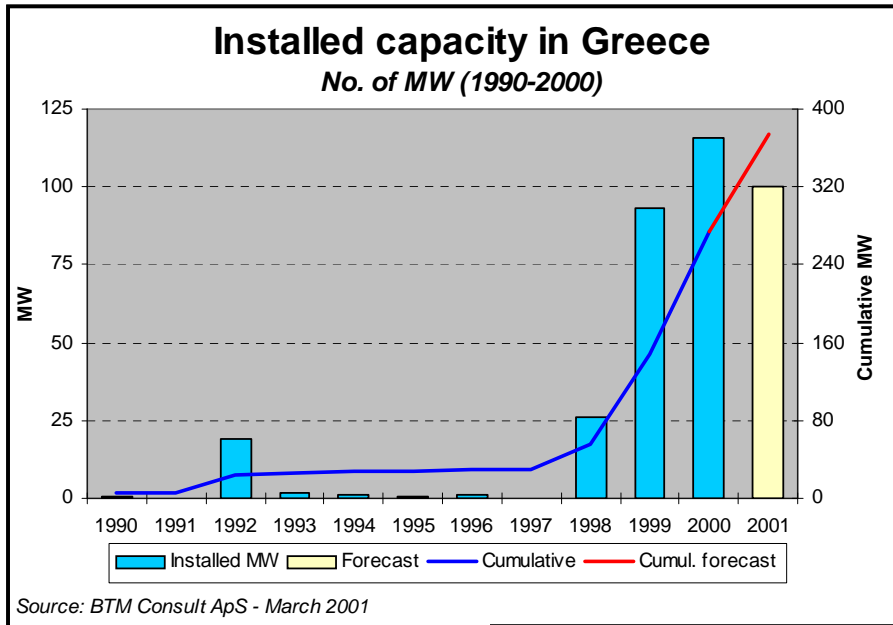
Country	Rate per kWh		Comments
	local currency	Euro-cent	
Belgium	BEF 3,10	<b>7,68</b>	
Denmark	DKK 0,43	<b>5,76</b>	Rates in a transition period. Green Certificate market in consideration.
France	FRF 0,55	<b>9,86</b>	Rates for the initial 5 years thereafter level from FRF 0.21-0.55/kWh depending on productivity.
Germany	DEM 0,178	<b>9,10</b>	Feed in law of March 1, 2000 regulates the tariff.
Greece	GRD 24,96	<b>7,32</b>	Stated figure for the islands. Mainland tariff at GDR 19.4 per kWh. Invest grants of up to 40 per cent available
Ireland	IEP 0,037	<b>4,70</b>	
Italy	ITL 110,0	<b>5,70</b>	Green certificate market in process expected price 110 ITL
Japan	JPY 11,50	<b>10,25</b>	17 years contract available. 35% investment grants are available for private and 50% for public developers.
Netherlands	NLG 0,17	<b>7,71</b>	
Spain	ESP 10,42	<b>6,27</b>	Incentive of ESP 4,79 EPS per kWh is included in the 10,42 ESP
Sweden	SEK 0,42	<b>4,64</b>	15% grants available
UK	GBP 0,031	<b>4,86</b>	
USA	USD 0,04	<b>4,28</b>	PTC available at \$0.017/kWh till end 2001

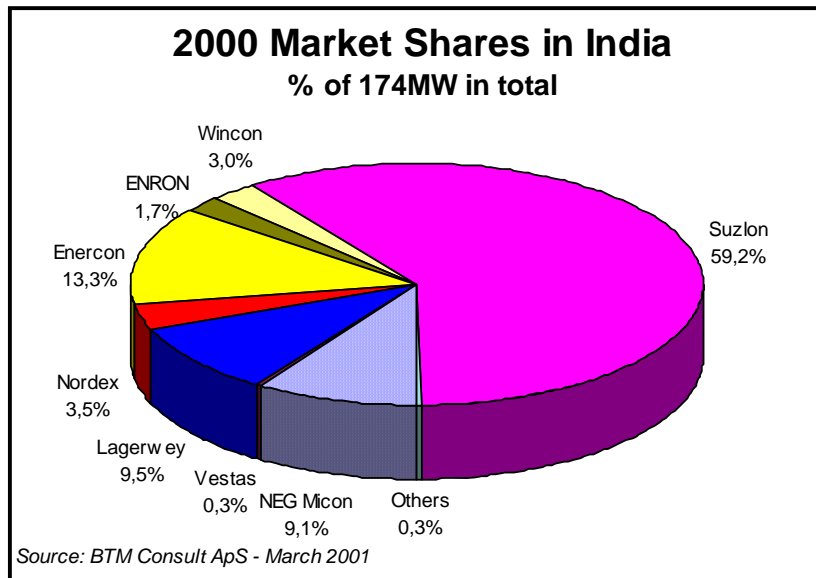
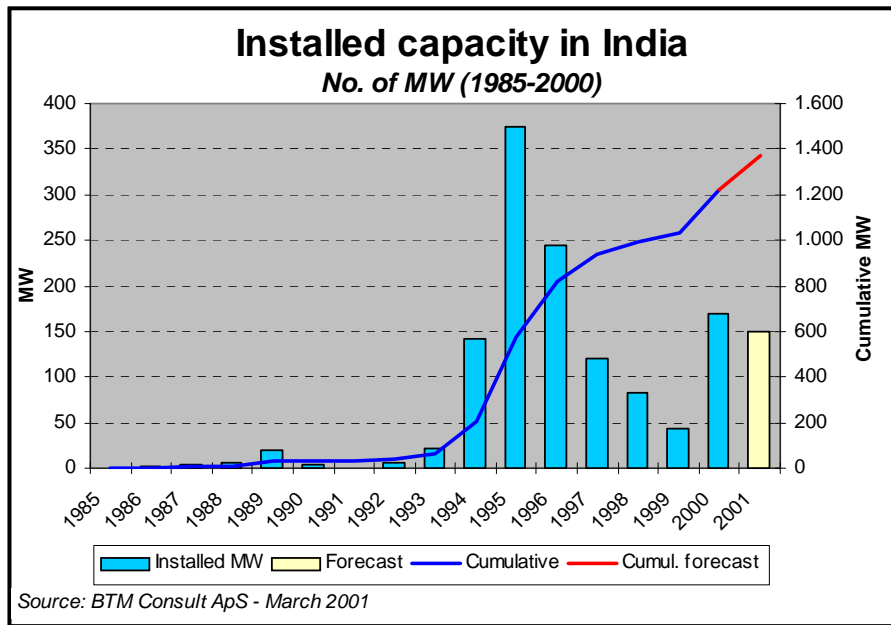
Source: BTM Consult ApS - March 2001

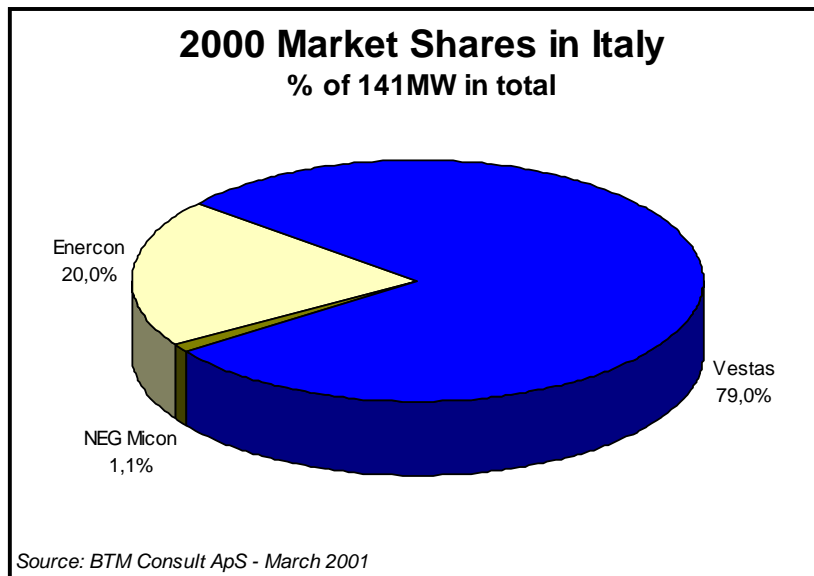
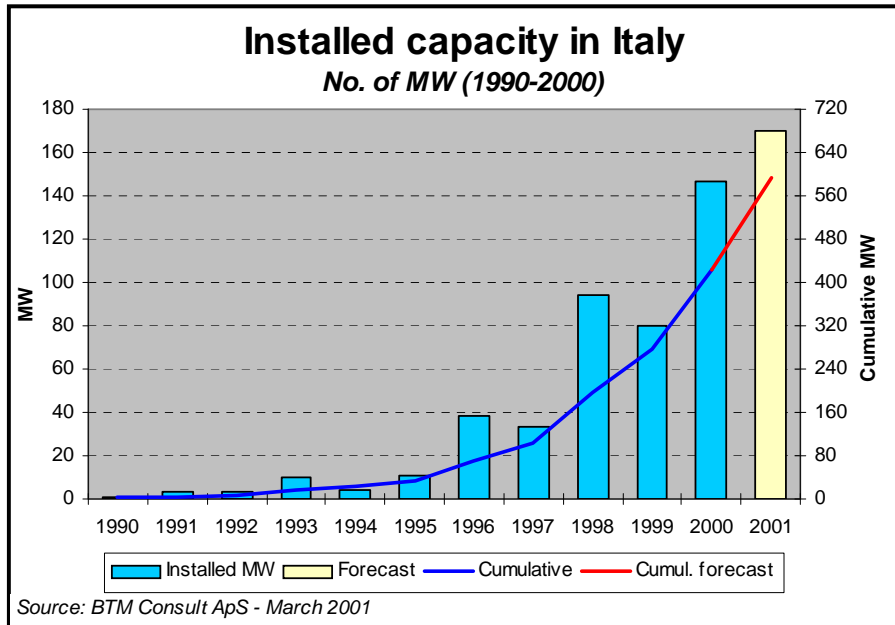


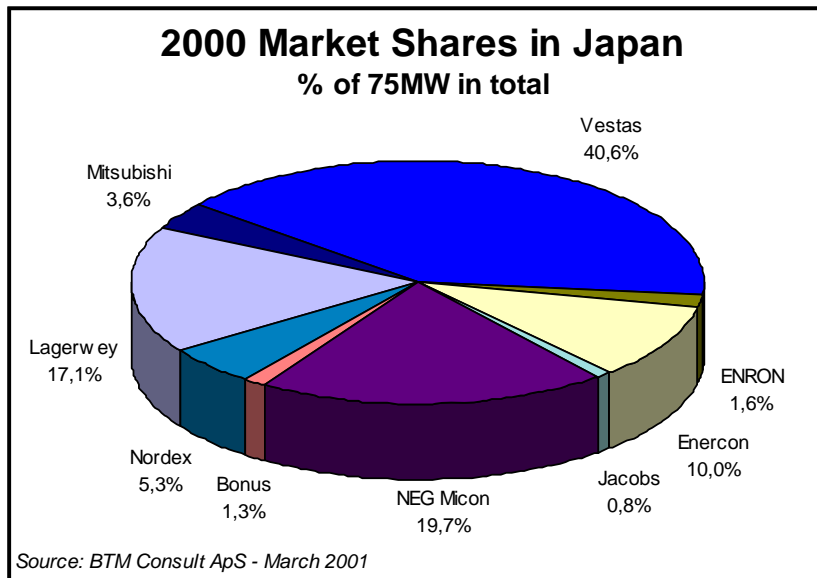
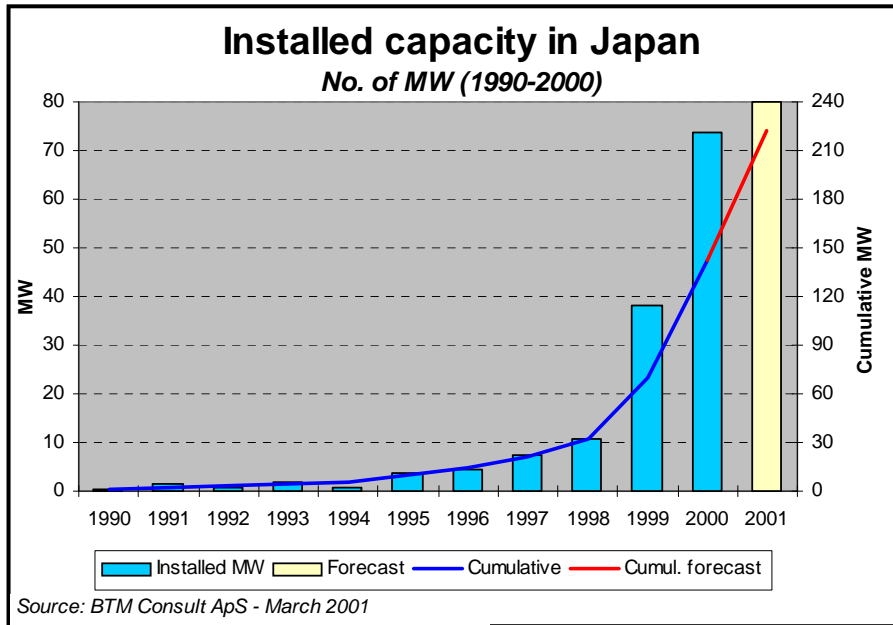




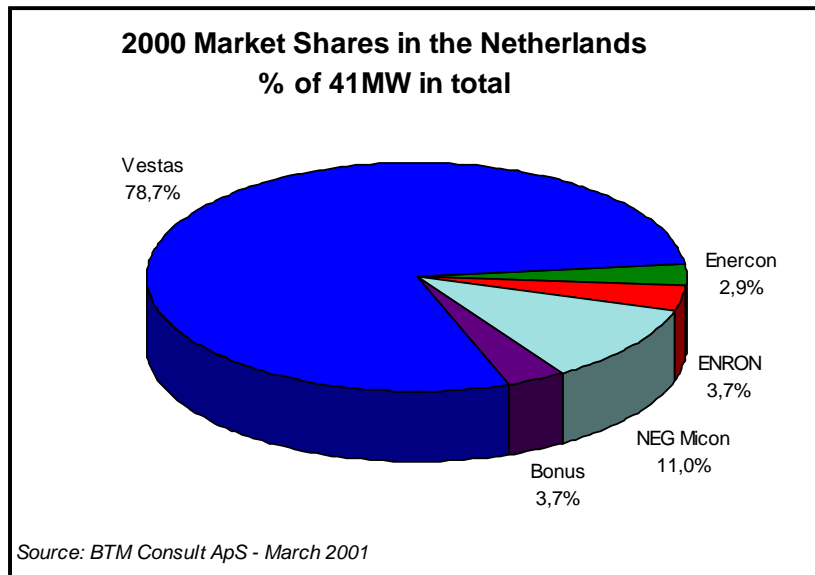
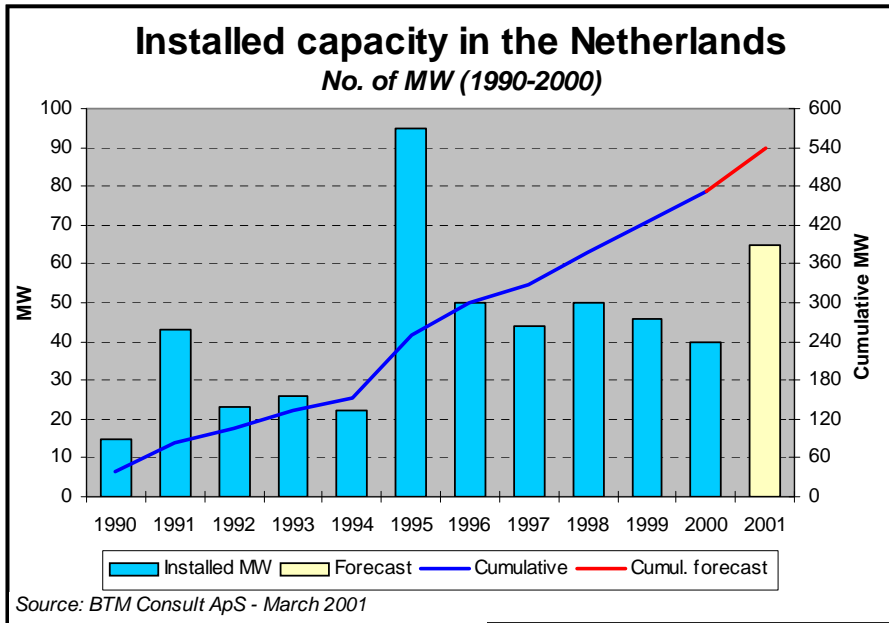


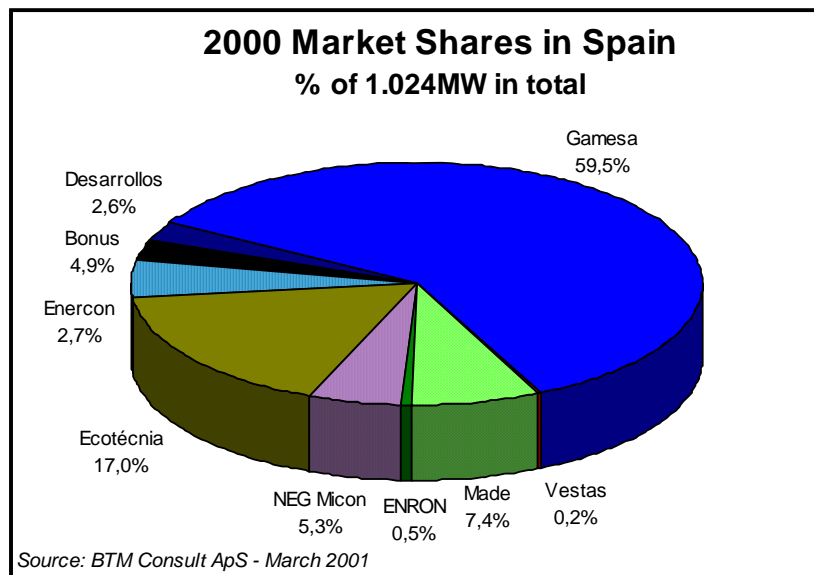
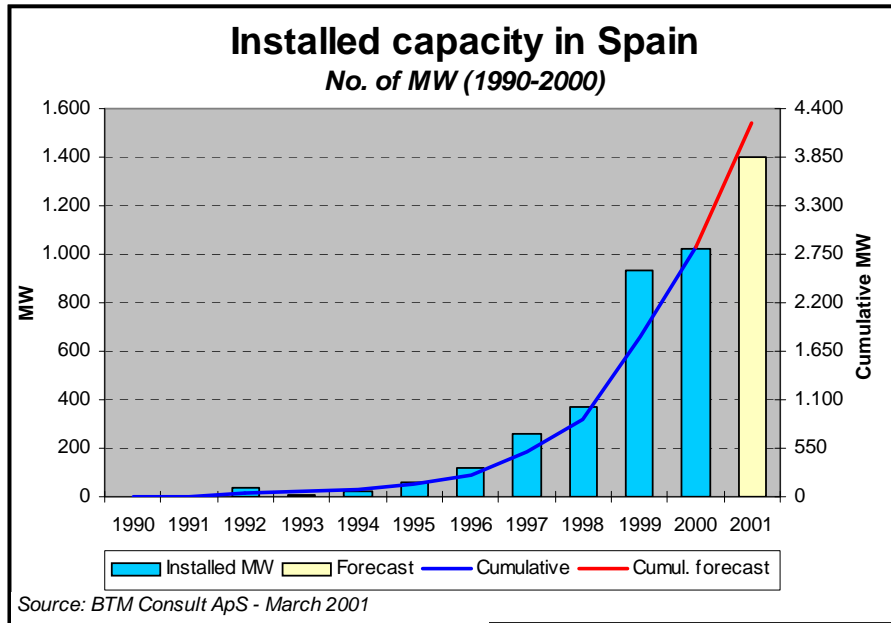


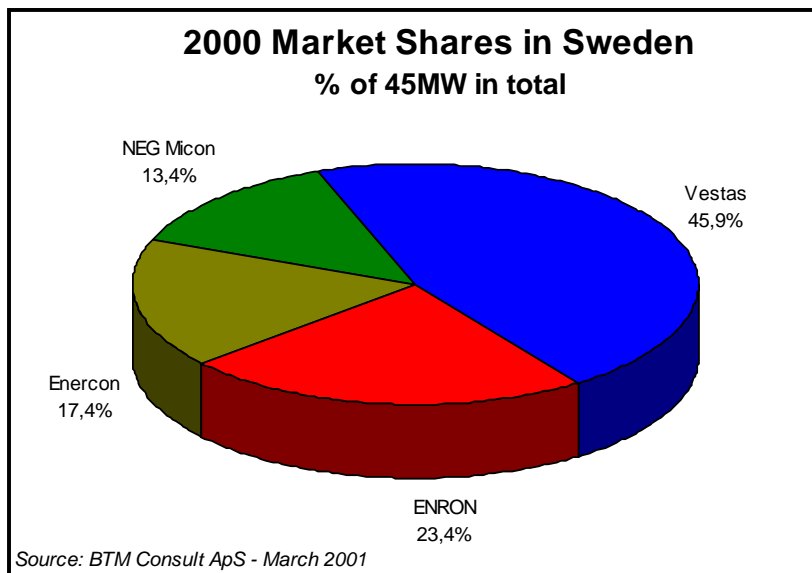
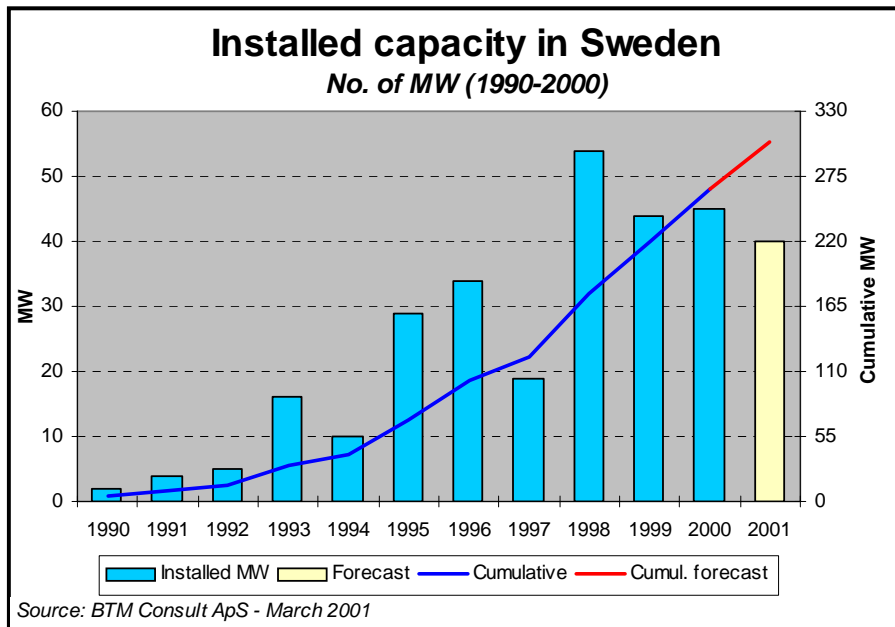


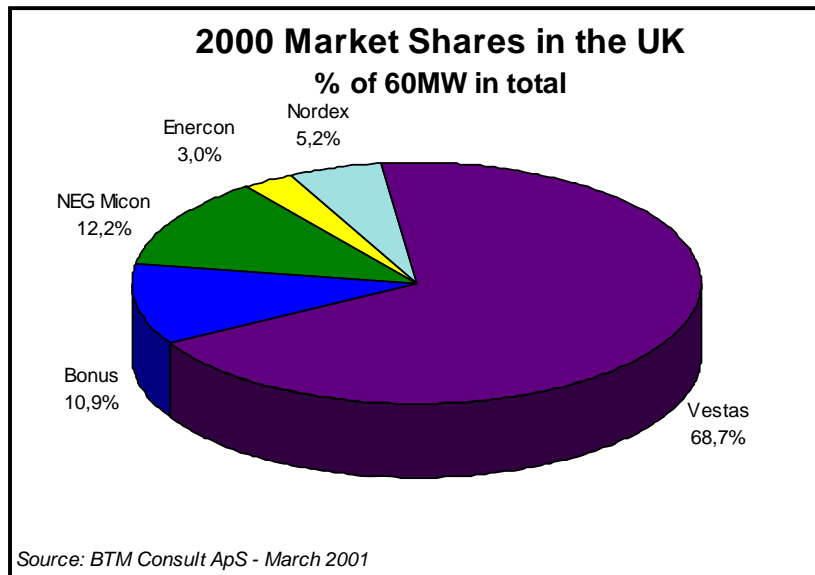
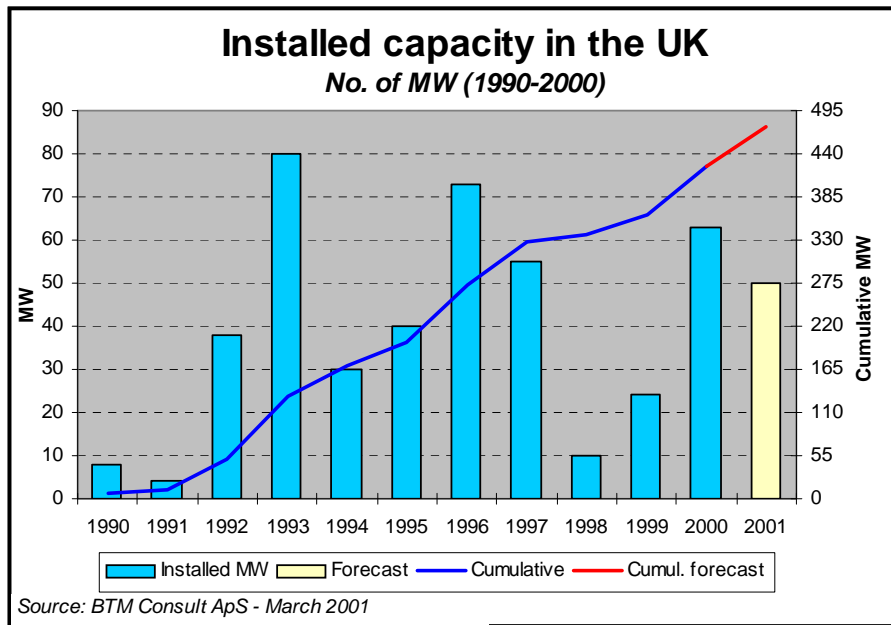


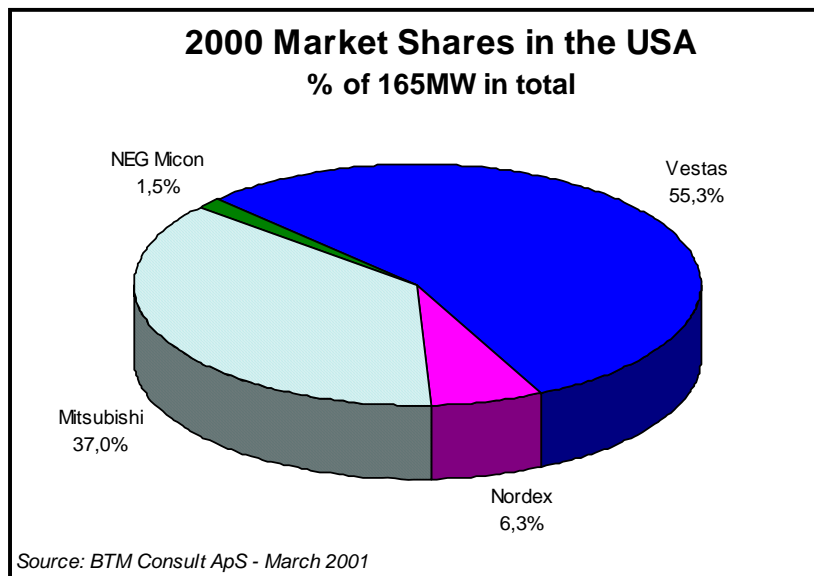
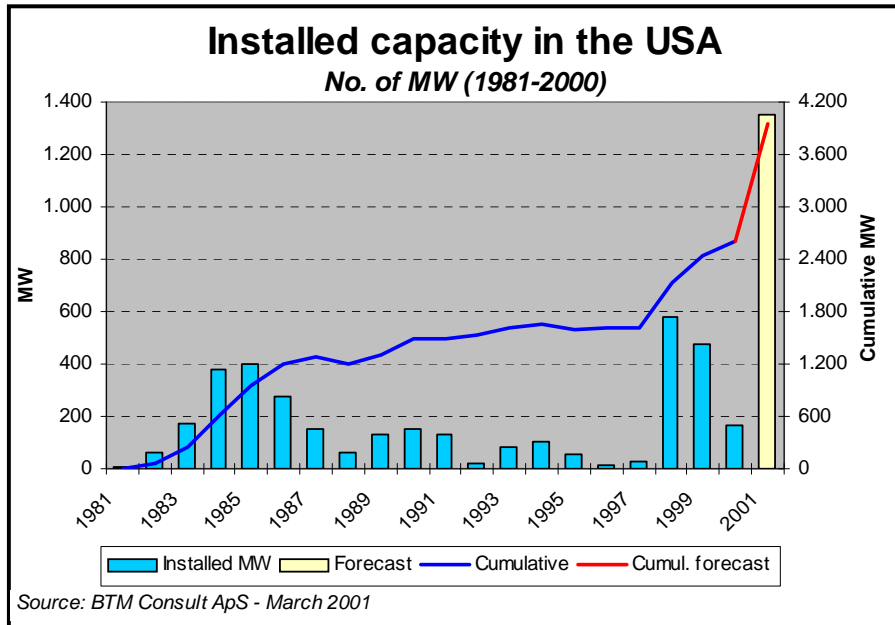












## **ABOUT THE WRITER**

Per Krogsgaard is economist of education and has been working in the wind business since 1979. Per Krogsgaard was in the period 1979 through 1986 the sales director of the Vestas Energy A/S. Since 1986 has been the 50 % owner and partner in the Danish Consultant company BTM Consult ApS. In the period 1989-1997 *Management, administration* and service and maintenance of a 18.72 MW wind farm in California, USA. *President* of BTM Consult Corporation, Palm Springs - California, USA. BTM Consult ApS is known for the annual World Market Update Report giving the status and forecast for the wind energy development in the world

Other tasks, short term assignments and awards:

1985-1987 Member of the Board of directors in the German Wind Energy Association.

1985 Awards: Export Marketing man of the year in Denmark.

1992- Member of the Board of Directors in Tændpibe Windfarm I/S a 2.67 MW wind farm located at the West Coast of Jutland.

Made several presentations of Wind Power Development at conferences in the United States, Japan, Sweden and Germany.