

New Danish Wind energy index calculation

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From December 2003 the main Danish Wind energy index is calculated in a new way. The basic method is the same as previous; The monthly energy production from a number of WTGs is compared to the same WTGs expected long term average monthly production based on longer production period. The relation:

Formula: Index = Actual monthly production/long term monthly average production

The new from December 2003 is:

- Number of WTGs used in calculation is expanded from a few hundreds to around 2.500 WTGs
- Source for production data is the new Utility based data for all Danish WTGs, published by the Danish Energy Agency at www.ens.dk (former based on WTG owner voluntary reporting)
- There are new zones borders for local indexes, 8 local regions in total.
- A comprehensive analyze of all mechanisms related to wind index calculation has been performed, e.g. comparison of smaller versus larger WTG's performance at different wind conditions
- Wind measurements from high measurement masts supplement the calculation and gives hourly and directional divided index for geographic spots
- The new calculation method is financed by sponsors, where the following at present are sponsoring: Bonus, Vestas, NEG-Micon representing the manufactures while DV, E2 and Elsam represent the WTG owners
- EMD now take care of the calculation where it former was the Magazine "Naturlig Energi" (DK "version" of WindPower Monthly).

A few important technical information's to the index:

The long term level of a wind index shall be 100%. But for defining the long term period, there are no unique definitions. Metrological long term periods are normally 30 years. But we have not yet a 30 year period with wind index calculation – and for sure not based on the same data source – and so it will never be when the source are WTG production. So we need to modify now and then.

The DK Index started in 1979 based on 1976-78 = 100%. This was a reasonable level, while it remained close to 100% in a number of years. But in 1990 the average 1979-89 was 105% and the level was adjusted. The data for download at www.vindstat.dk is corrected with the 5% down from 79-89.

By establishment of the new index, there have been several sources involved in establishment of the long term reference. Most important is 22 years of high quality

measurements at Sprogø, a small island just in the middle of Denmark. These data are extremely free due to sea in all directions in minimum 10 km and a measure height of 78 m. Mainly based on these (but also more sources and analyses), it is stated that the 1998 (which was very normal both regionally and directionally), should be a 104% year, where the former index said 101%. So the reference is adjusted 3% down when calculation the index from December 2003. BUT, the previous data are NOT adjusted for this in the downloadable data, see summary below:

Average of Vindindeks	måned												Grand Total
år	1	2	3	4	5	6	7	8	9	10	11	12	
1979	87	129	152	95	89	48	138	30	102	150	117	173	109,2
1980	54	75	167	75	44	54	34	112	71	99	147	153	90,4
1981	123	123	153	70	109	77	67	74	50	105	183	65	99,9
1982	83	54	121	103	99	44	40	66	87	73	179	129	89,8
1983	262	82	130	81	58	64	90	57	123	171	91	98	108,9
1984	250	104	111	53	57	131	88	41	65	138	185	104	110,6
1985	137	56	79	112	66	41	66	73	103	75	110	125	86,9
1986	159	94	100	88	112	55	65	74	130	99	160	156	107,7
1987	156	95	96	86	84	72	107	65	85	107	66	125	95,3
1988	116	163	95	89	86	42	74	90	114	114	115	187	107,1
1989	172	200	136	99	95	40	87	92	57	113	86	105	106,8
1990	199	215	206	101	56	46	93	67	92	107	69	131	115,2
1991	133	127	98	95	99	79	63	71	87	95	121	137	100,4
1992	150	127	130	100	82	60	71	96	71	81	139	106	101,1
1993	213	105	114	90	74	87	99	75	99	64	93	148	105,1
1994	165	112	180	94	69	122	32	67	98	101	131	141	109,3
1995	138	185	178	100	65	63	58	52	81	82	84	54	95,0
1996	97	123	92	49	84	68	80	65	58	82	118	63	81,6
1997	52	202	128	131	77	68	41	22	107	97	85	87	91,4
1998	101	177	111	75	69	81	99	91	70	168	60	107	100,8
1999	118	105	85	102	73	52	45	43	62	106	98	142	85,9
2000	156	163	126	56	64	88	55	65	90	98	103	81	95,4
2001	71	110	84	69	72	66	46	69	67	114	117	80	80,4
2002	137	185	133	66	69	104	66	48	52	103	78	102	95,3
2003	141	46	85	113	65	92	49	74	71	80	92	134	86,8
2004	86												85,9
Grand Total	136,8	126,3	123,6	87,7	76,7	69,8	70,1	67,2	83,7	104,9	113,1	117,3	98,2

From 1979 to 2004 (Jan) the Grand Total average is 98,2% - adjusting up with 3% before December 2003 will give approximately 101% - due to that we based on many different analyses believe that the NE-index in especially in 1989-91 and 2002-2003 is too high due to calculation inaccuracies, the long term average of 101% seems to be the right level.

