International Journal of Electrical and Electronics Research ISSN 2348-6988 (online)
Vol. 5, Issue 3, pp: (19-23), Month: July - September 2017, Available at: www.researchpublish.com

Selection of Weibull Distribution Function for Different Wind Sites -A Survey

[1]Shivaraj Kumar H. C, [2]Dr. B. G Kumaraswamy, [3]Gourishankar C

[1,3]Asst. Professor EEE SECAB.I.E.T Vijayapura
[2]Professor EEE SJMIT CHITRADURGA

Abstract: **Continuity in the development of the human race ultimately needs sources of renewable or virtually inexhaustible energy such as wind renewable energy resource. The history of wind energy describes a general evolution from the utilization of simple, light equipment's driven by aerodynamic drag forces; to heavy, material-intensive drag equipment's; to a rise in the utilization of light, material-efficient aerodynamic lift equipment's in the modern period. Wind energy is essentially looked at in the area of public policy, economics and managerial perspectives. Due to the increasing penetration of wind energy in the transmission system modern wind turbines are required to take over the control tasks, which were traditionally aligned to conventional power plants, and to contribute to power system stability. The most promising wind turbine concepts for the future market are investigated in the presented work, namely the doubly-fed induction generator wind turbine (DFIG) and the direct driven wind turbine using a permanent magnet excited synchronous generator (PMSG) connected via a full-scale converter.**

Keywords: **permanent magnet excited synchronous generator (PMSG), doubly-fed induction generator wind turbine (DFIG).**

1. LITERATURE SURVEY

[1]Application of renewable energy sources in electric power systems is growing rapidly due to enhanced public concern for adverse environmental impacts and escalation in energy costs and shortage of fossil fuels associated with the use of conventional energy sources throughout the world. Environmental concerns and fuel cost uncertainties associated with the use these energy sources have resulted in rapid growth of wind energy applications in power generating systems. The wind turbine generators are the alternatives for electric power generating systems due to their non exhausted nature and benign environmental effects. Therefore, in this study, author had collected wind data over a period of one year at three different commercial wind forms were analyzed in order to figure out the wind energy potential along the west central part of Karnataka, India. And they suggested to use two parameter Weibull distribution for analysis.

[2]Author Prooved that Modeling of wind speed variation is an essential requirement in the estimation of wind energy potential for a typical site. In this survey he had taken , the average wind from April 2007 to March 2008 in Aimangala at central dry zone part of Karnataka, India have been statistically analyzed to determine wind energy potential for electrical power generation by grouping the seasonal observations.

[3] This paper first provides background information about wind also involve a monitoring program and, at the most advanced power and its resource, including a review of available data, stages, computer simulations of wind flow to determine wind which are obtained from the representative meteorological turbine micro-sitting stations.

[4] This paper try to assess the wind energy potential for hilly terrain of Hamirpur located in the Western Himalayan state of Himachal Pradesh, India. The hourly time series wind speed data for the year 2013 measured at 10 m height has been considered for the analysis. A two parameter (i.e., shape and scale parameter) Weibull distribution model has been proposed.

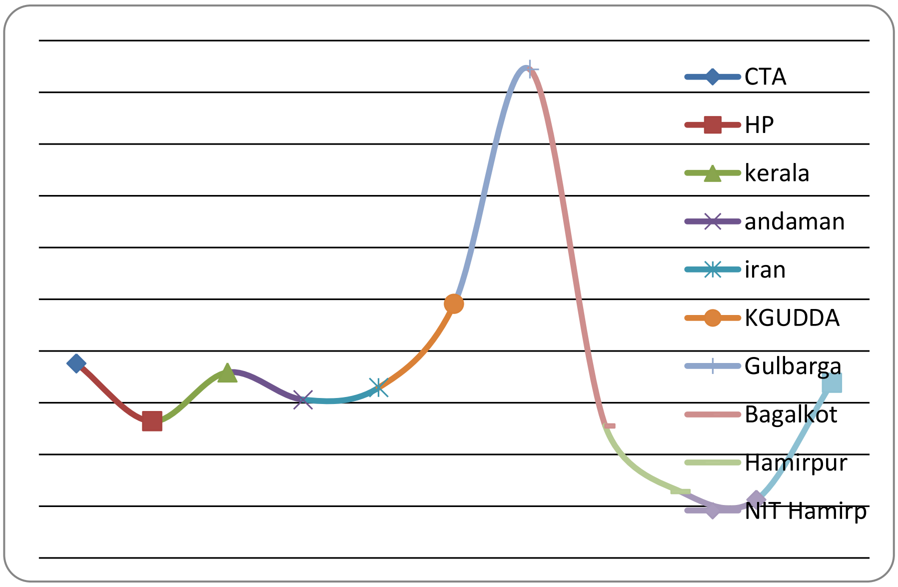
[5]Author had pointed In reliability point of view, to get optimum reliability in power generation, it is better to select a wind turbine generator which is the best suited for a site. The mathematical relationship derived in this paper can be useful to wind power planners and policy makers.

[6] Suggested improved cuckoo search algorithm (CSA) is proposed to overcome problem that it is difficult to estimate the parameters of Weibull mixtures accurately.

[7] This paper analyses the performance of a 7.2 MW wind farm having 12 turbines of Enercon E-40/6.44 model each having a rated capacity of 600kW situated at Harsnath hill near Sikar town of Rajasthan, India. And he got to know that turbine T7 produced maximum energy while T12 produced Minimum energy.

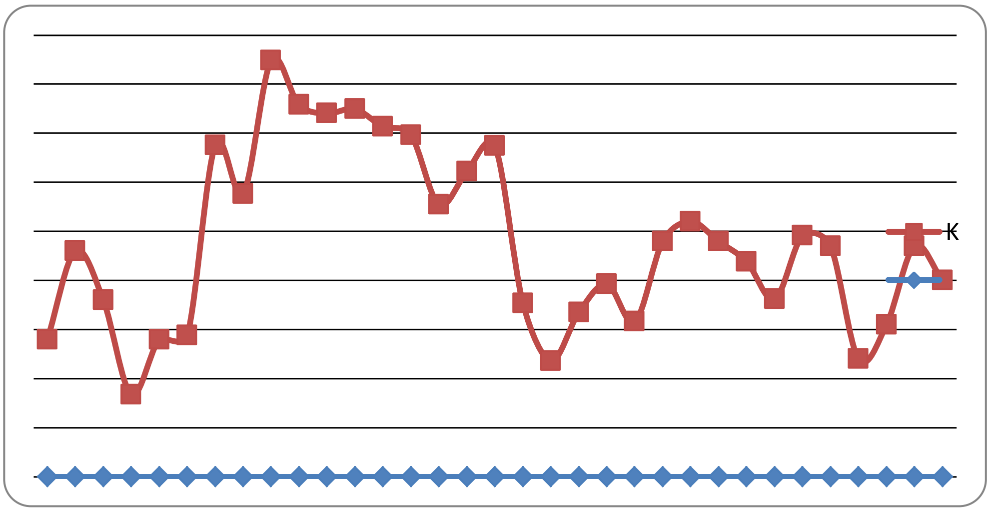
2. GRAPHS AND STATISTICS

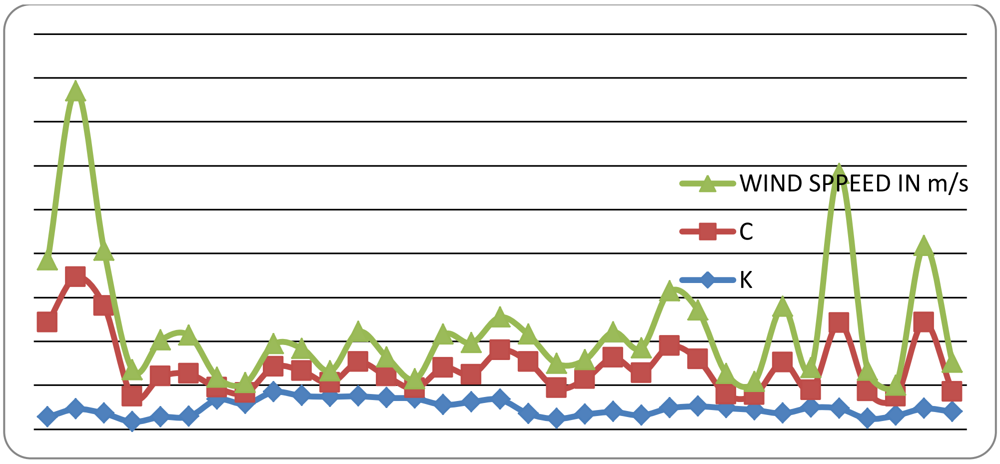
Sl. No	State	C
1	CTA	7.51
2	HP	5.27
3	kerala	7.1633
4	andaman	6.11
5	iran	6.57
6	KGUDDA	9.80504
7	Gulbarga	18.88
8	Bagalkot	5.1
9	Hamirpur	2.55
10	NIT Hamirp	2.24
11	AP	6.7576

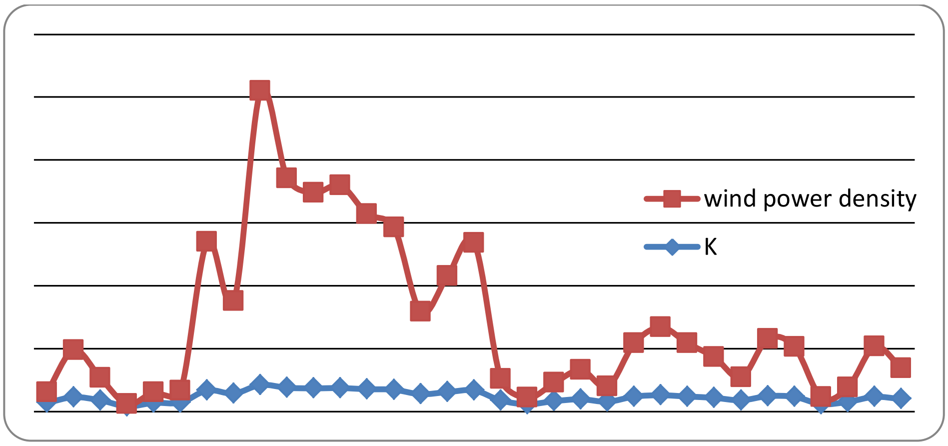


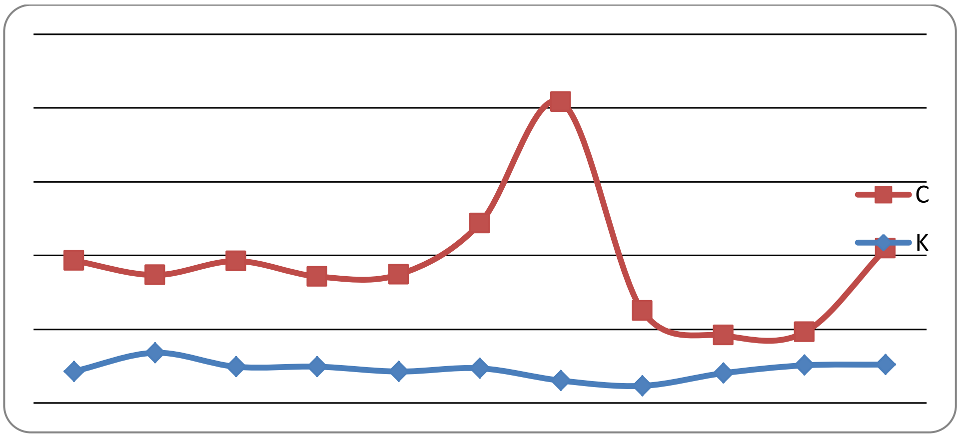
selection of weibull distribution factor for various country						
SL.NO	COUNTRY	K	C	WIND SPPEED IN m/s	wind power density	
1	KOLAGHAT	1.4	10.7	7.1	219.2204875	K
2	KOLAGHAT	2.3	15	21.2	5835.9784	
3	SOUTH AFRICA	1.8	12.2	6.3	153.1537875	C
4	IRAN AND SARVAN	0.84	2.84	3.05	17.37823281	
5	IRAN AND SARVAN	1.4	4.57	4.164	44.2219873	
6	IRAN AND SARVAN	1.44	4.85	4.4	52.1752	
7	ADIGRAT(ETHIPIA)	3.3785	1.3186	1.183	1.014052236	
8	ADWA(ETHIPIA)	2.884	1.2496	1.114	0.846762596	

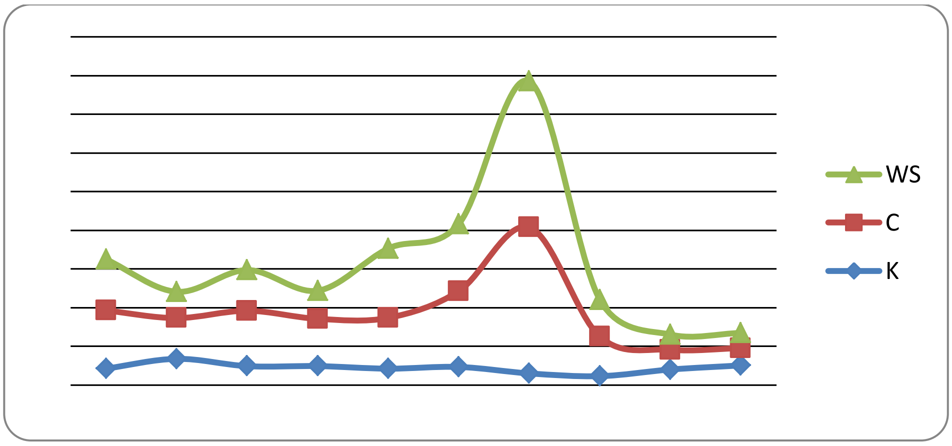
9	ATSBI(ETHIPIA)	4.2404	2.8506	2.589	10.62924076	
10	CHERCHER(ETHIPIA)	3.7884	2.8306	2.557	10.2399604	
11	MAYCHEW(ETHIPIA)	3.7031	1.5416	1.387	1.634313907	
12	MEKELE(ETHIPIA)	3.7456	3.867	3.488	25.99175004	
13	SENKETA(ETHIPIA)	3.5675	2.4272	2.184	6.380636371	
14	SHIRE(ETHIPIA)	3.4787	1.1625	1.044	0.696959575	
15	PAKISTAN	2.7732	4.219	3.77	32.81936271	
16	Nigeria	3.11	3.09	3.62	29.0557309	
17	INDONESIA	3.37	5.61	3.77	32.81936271	
18	BAM	1.769	5.894	3.108	18.38861937	
19	BARDSIR	1.181	3.475	2.817	13.69199191	
20	ARZUIYEH	1.675	3.99	2.216	6.665233389	
21	RAFSANZAN	1.964	6.136	2.942	15.59674954	
22	SHAHRBABAK	1.58	4.803	2.838	14.00049099	
23	JORDAN	2.4	7.03	6.26	150.2550553	
24	ANDRAPRADESH	2.602007	5.34	5.59	106.9895884	
25	BURSA	2.3978	1.5314	2.3947	8.411228586	
26	SAKARYA	2.1921	1.7049	1.5048	2.087096072	
27	BALUCHESTAN	1.81	5.77	6.34	156.0895637	
28	NAK	2.4592	1.9833	2.5	9.5703125	
29	RAJASTHAN	2.3477	9.7378	17	3009.2125	
30	CIDE	1.1998	3.0656	2.4208	8.689260654	
31	KEBAN	1.5504	2.1556	1.2793	1.28239936	
32	KAPPADGUDDA(IND)	2.3505	9.8054	8.6892	401.8328833	
33	BANGLADESH	2	2.25	3.32	22.4140504	
		2.045728	4.61107			

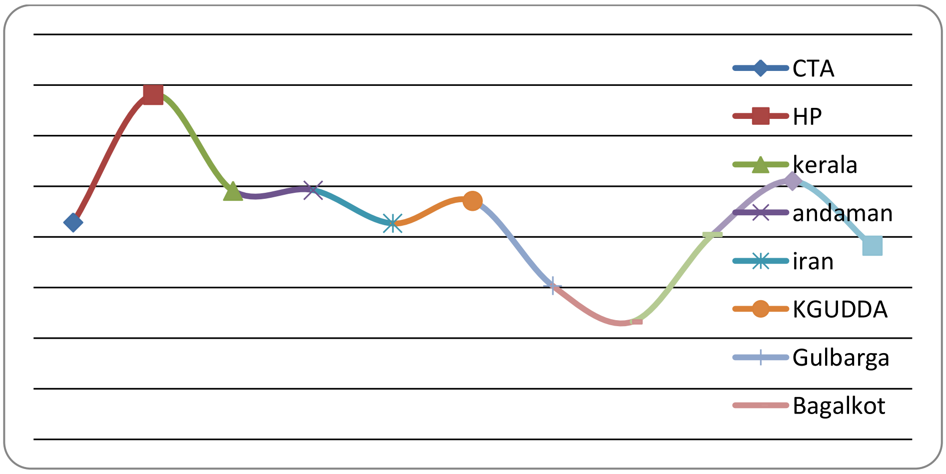





wind power density
K


C
K


WS
C
K


CTA
HP
kerala
andaman
iran
KGUDDA
Gulbarga
Bagalkot

3. CONCLUSION

From the graph it can be seen that the average value of K & C should be 2-2.5 and 7-7.5 for different wind farms

REFERENCES

[1] B. G. Kumaraswamy, "A Statistical Analysis of Wind Speed Data in West Central Part of Karnataka Based on Weibull Distribution Function," 2009 IEEE Electrical Power & Energy Conference .

[2] B. G. Kumaraswamy, "Analysis of seasonal Wind Speed and Wind Power Density Distribution in Aimangala Wind form At Chitradurga Karnataka using two Parameter Weibull Distribution Function" 978-1-4577-1002-5/11/$26.00 ©2011 IEEE

[3] *Ali. Mohamed. Elmabruk,* "Estimation of Wind Energy in Libya" The fifth International Renewable Energy Congress IREC □2014

[4] K. S. R. Murthy ," Vertical Extrapolation of Weibull Parameters and Wind Energy Potential Estimation of Himachal Pradesh, India" IEEE INDICON 2015 1570201511.

[5] Rajeevan .A.K," Identification of Reliability of Wind Power Generation and its Mathematical Modeling" International Conference on Microelectronics, Communication and Renewable Energy (ICMiCR-2013).

[6] Kuo Chi," Parameter Estimation of Weibull Mixtures Based on Improved Cuckoo Search Algorithm". 2016 Prognostics and System Health Management Conference (PHM-Chengdu)

[7] Rajendra Kumar," Performance Analysis of a 7.2 MW Wind Farm at Sikar in Rajasthan". 2016 International Conference on Emerging Technological Trends [ICETT])