

EWC Wind Potential Analysis

 **Client:**

Company

Mr Manfred Mustermann

Muster Street 5

12345 Karlsruhe

 **Contractor:**

EWC Weather Consult GmbH

Haid-und-Neu-Straße 7

Germany - 76313 Karlsruhe

■ | Wind Potential Analysis

The EWC Wind Potential Analysis is based on time series which are derived from weather model analyses and -forecasts of the American Global Forecast System (GFS). For the calculation of the time series, wind speed, temperature, humidity and other variables among the model items are interpolated to the required location. Site specific conditions like plant cover are integrated in the individual calculation. For the estimation of orographic effects a verified downscaling method is used.

■ | Input parameters

Location name:	Test station
Coordinates:	53.105844° N / 9.403253° E
Ground level (MSL):	Not specified. 22 m (value was automatically derived from a digital elevation model.)
Displacement height:	20 m
Location is offshore:	No
Period of time:	Jan 15, 2005 to Oct 30, 2008
Analysed heights above ground level:	43 m, 81 m, 103 m, 120 m
Sector size:	30°
Desired timezone for the time series in the CSV file:	Europe/Berlin

■ | Analysis

The data is analysed for every hub height separately.

First the total data set of all wind directions is analysed for each height. For this purpose the percentage frequency of the separate wind speeds is calculated. The classification of the wind speeds starts at 0.5 m/s and takes place in 1 m/s intervals. Wind speeds which are smaller than 0.5 m/s are not considered. The Weibull distribution - which is also drawn in the charts - is calculated on the basis of the Levenberg-Marquardt-Algorithm.

After the analysis of the total data set wind speeds of the separate wind sectors are analysed. Thereby the sector degree shows the degree of the bisector.

Calculation base

Creation date:	May 13, 2009 9:40:44 AM
Version of software:	1.0
Number of data points in the requested period:	10,726
Number of data points without measurement data:	348

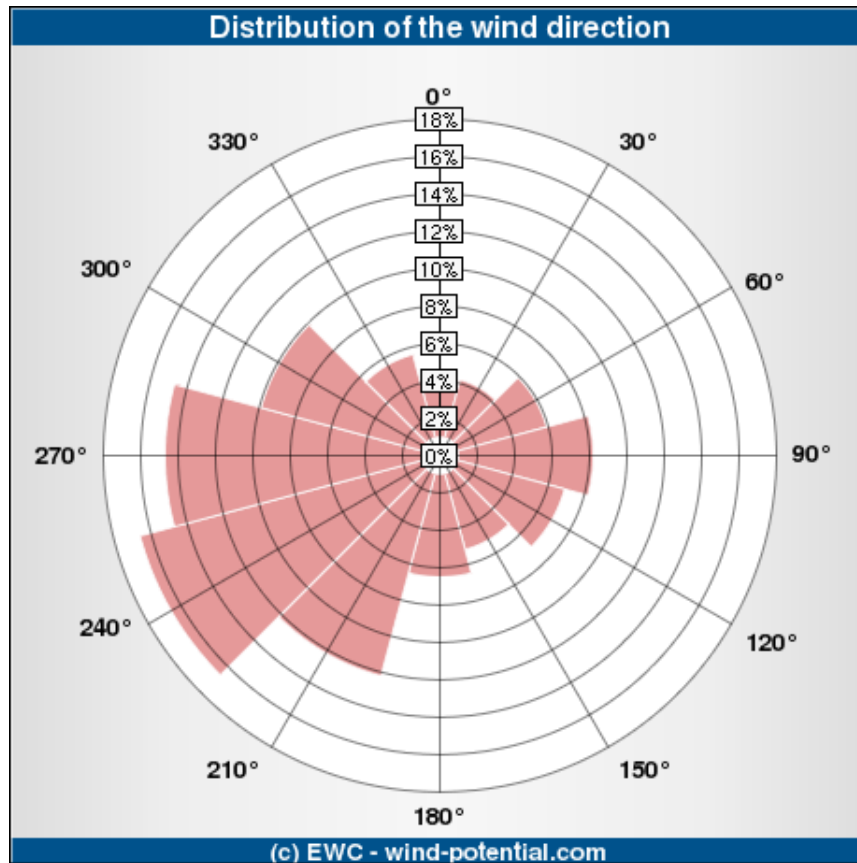
Mean values calculated from the timeseries

Height level above ground	Wind speed	Density
43 m	4.61 m/s	1.236 kg/m ³
81 m	5.75 m/s	1.230 kg/m ³
103 m	6.13 m/s	1.227 kg/m ³
120 m	6.40 m/s	1.224 kg/m ³

Weibull analysis

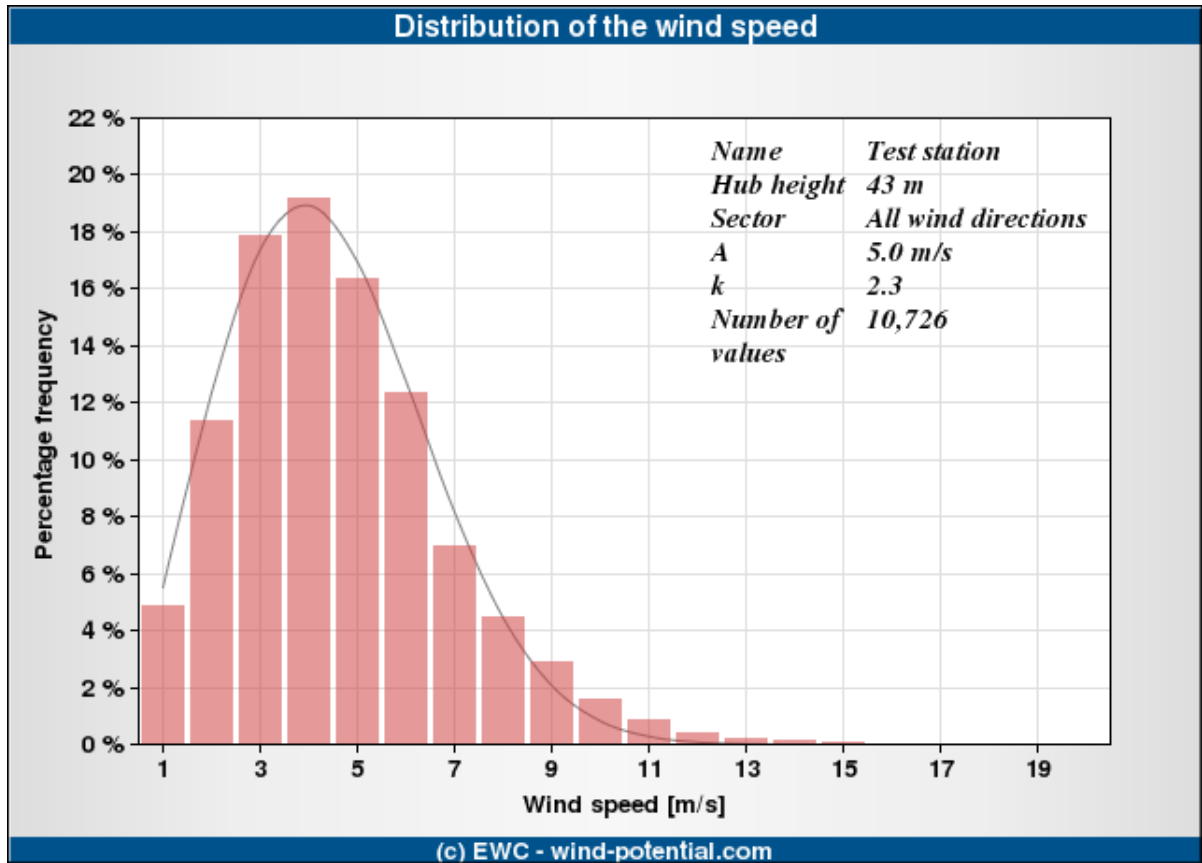
Height level above ground	Scale parameter A	Shape parameter k	Mean wind speed $U_{Weibull}$
43 m	5.00 m/s	2.30	4.43 m/s
81 m	6.29 m/s	2.37	5.58 m/s
103 m	6.74 m/s	2.34	5.97 m/s
120 m	7.07 m/s	2.32	6.26 m/s

■ Distribution of wind direction for all measured heights



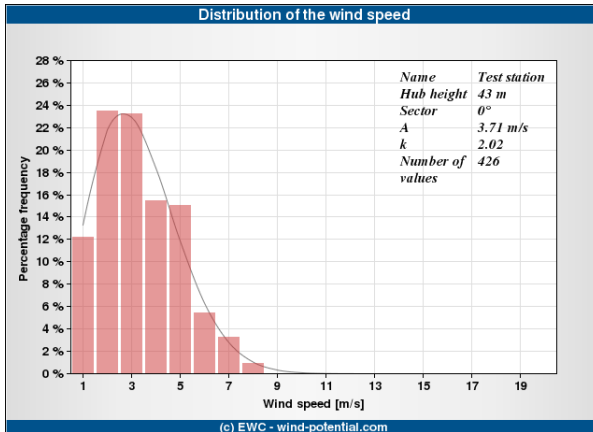
■ Distribution of wind speed

Overall analysis 43 m above ground level

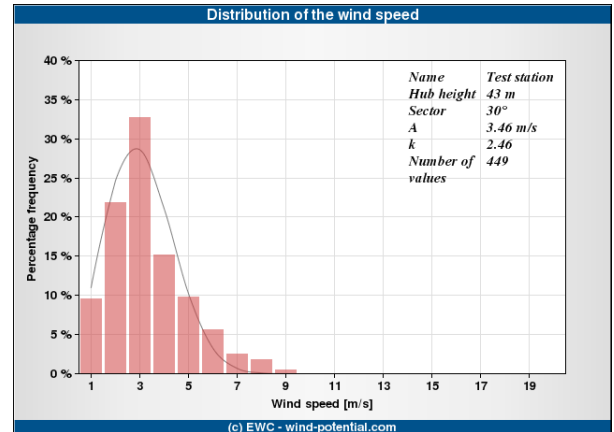


Sectoral Analysis 43 m above ground level

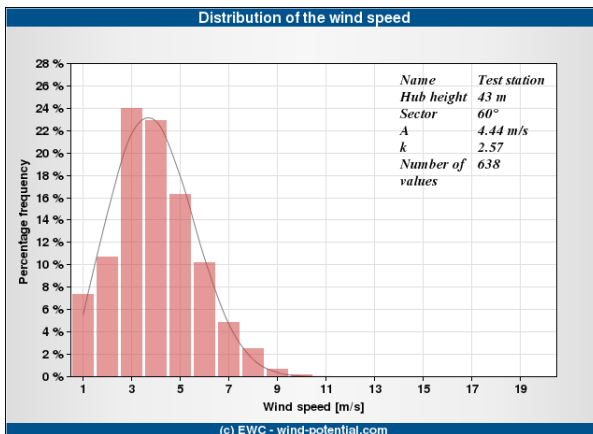
Sector 0°



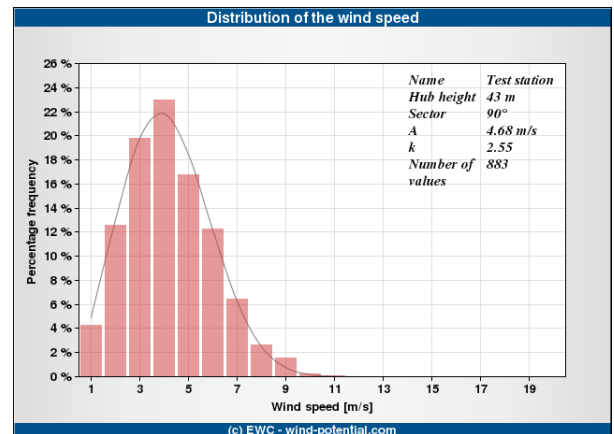
Sector 30°



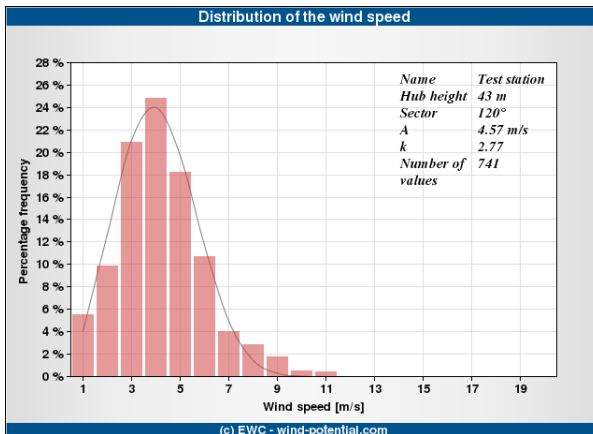
Sector 60°



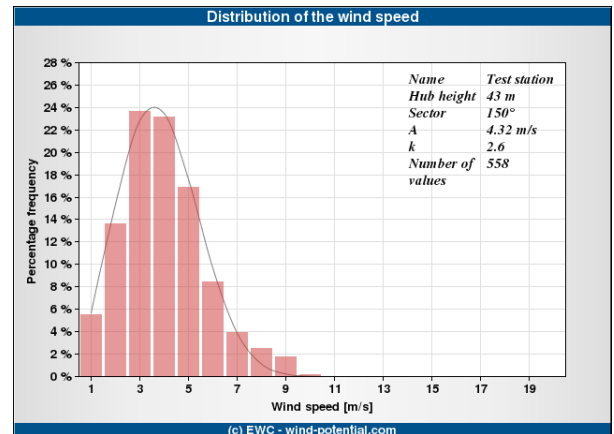
Sector 90°



Sector 120°

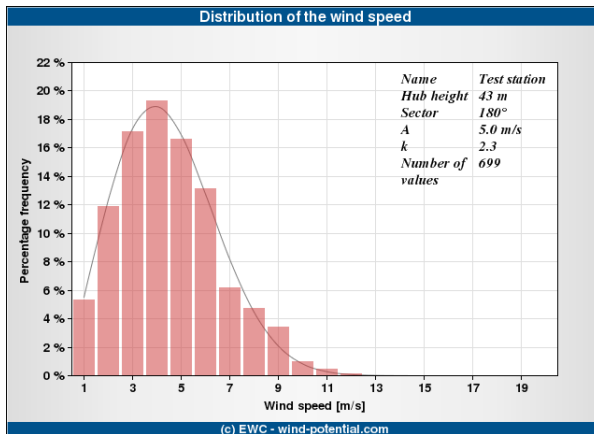


Sector 150°

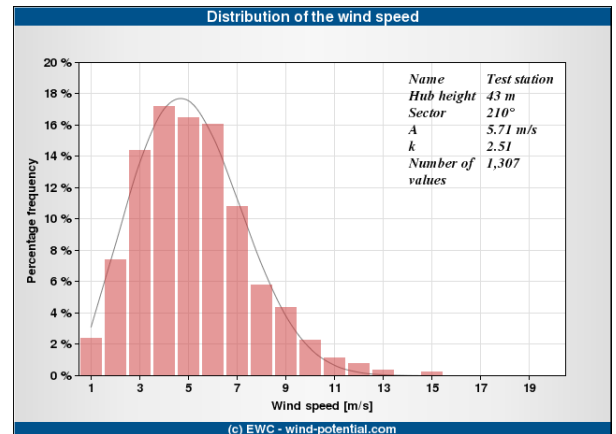


Sectoral Analysis 43 m above ground level

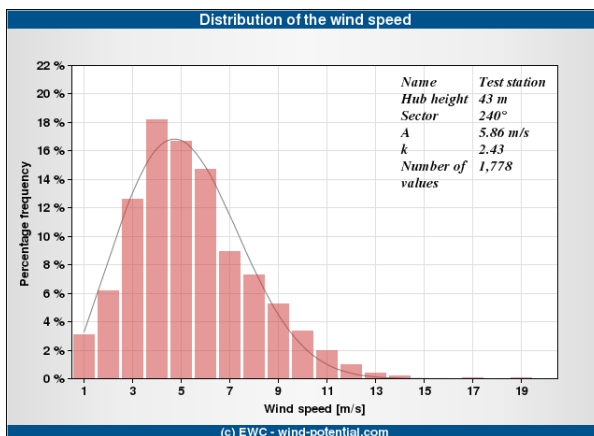
Sector 180°



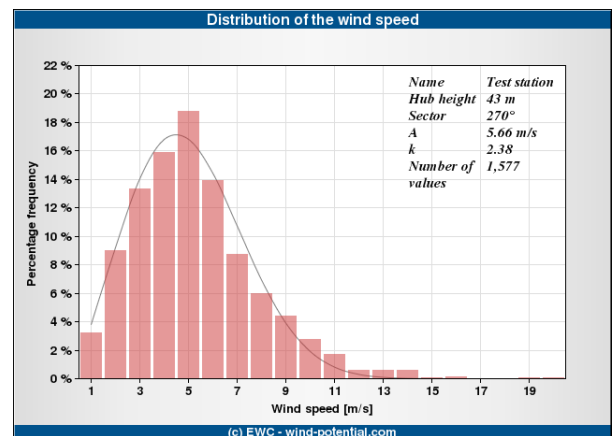
Sector 210°



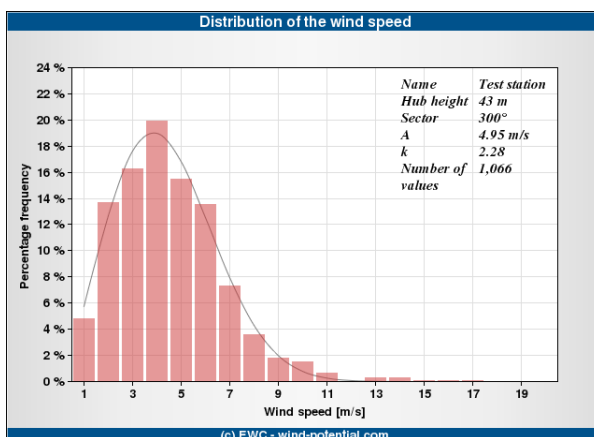
Sector 240°



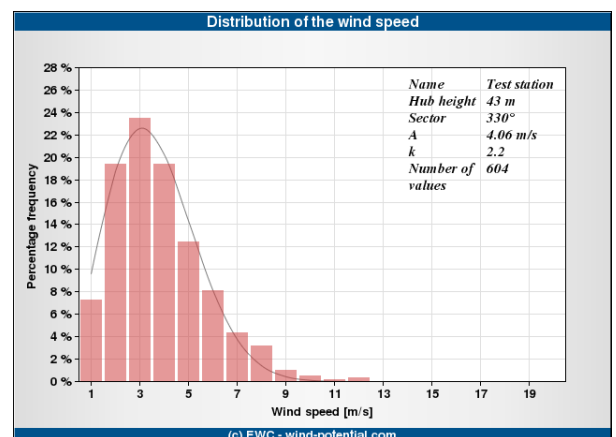
Sector 270°



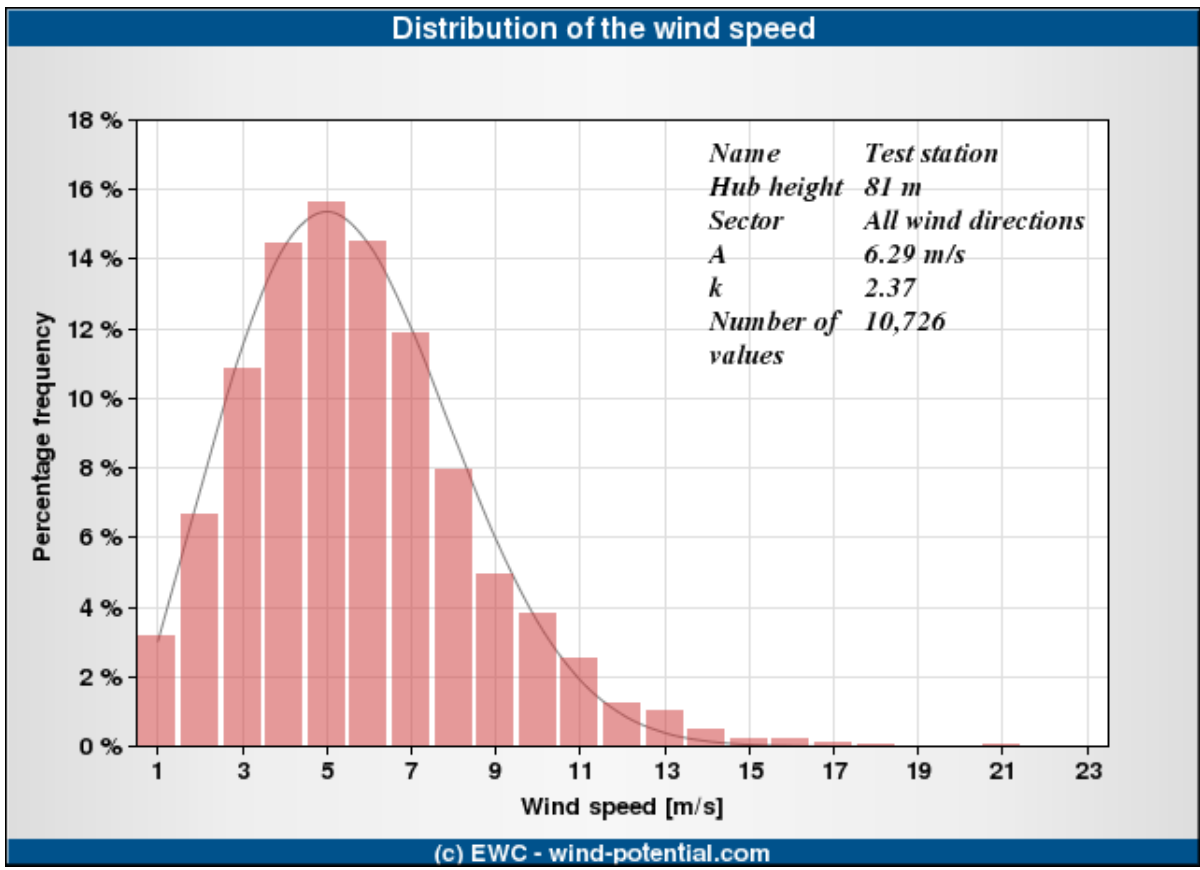
Sector 300°



Sector 330°

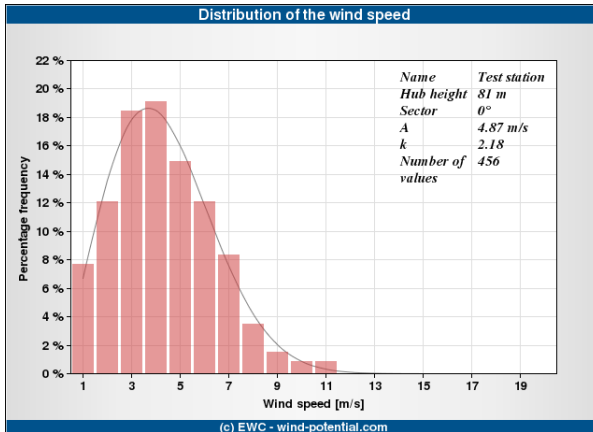


Overall analysis 81 m above ground level

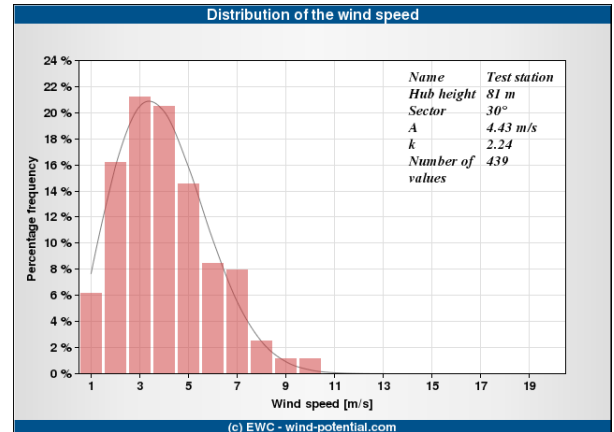


Sectoral Analysis 81 m above ground level

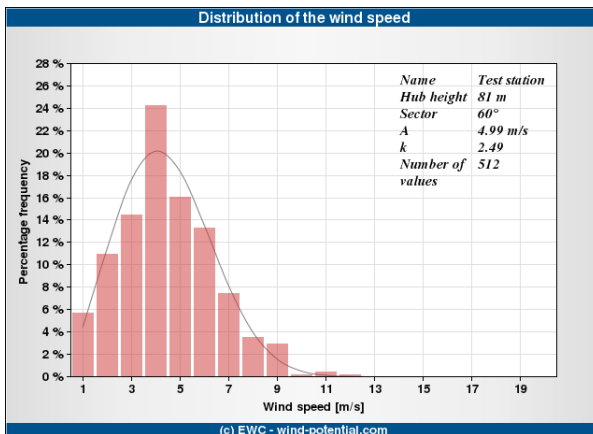
Sector 0°



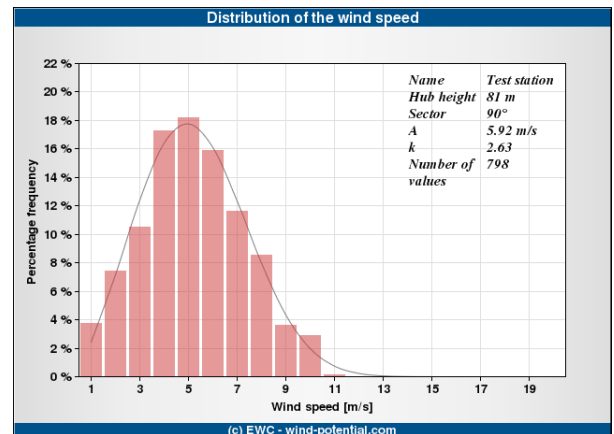
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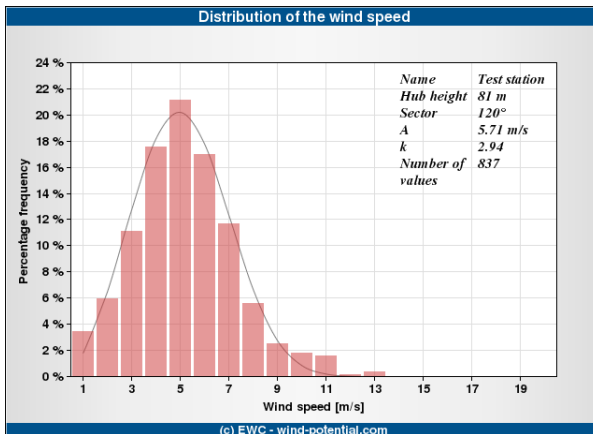
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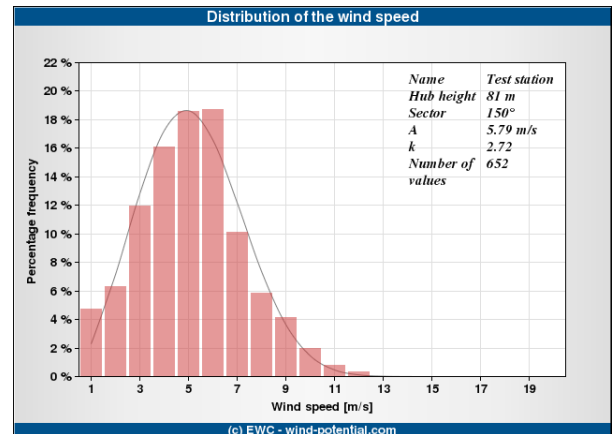
Sector 90°



Sector 120°

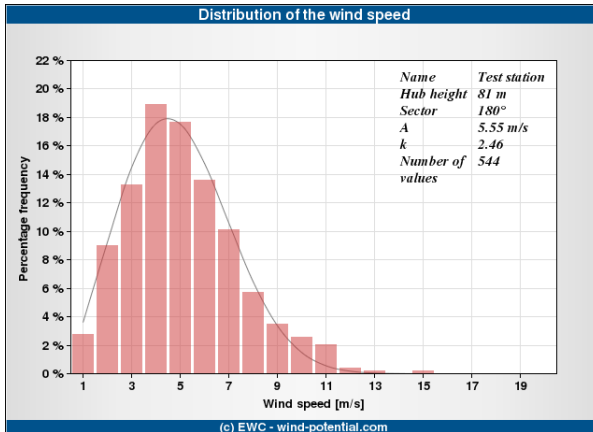


Sector 150°

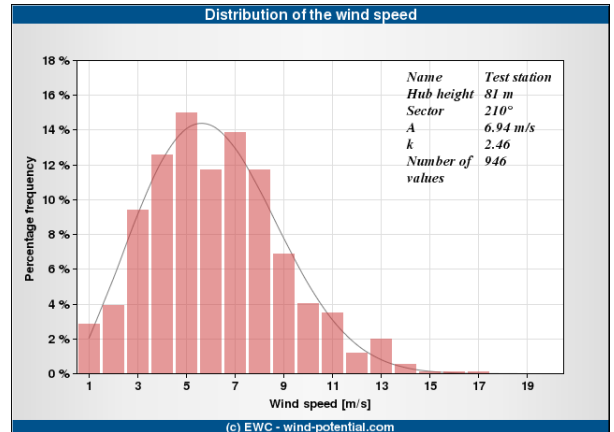


Sectoral Analysis 81 m above ground level

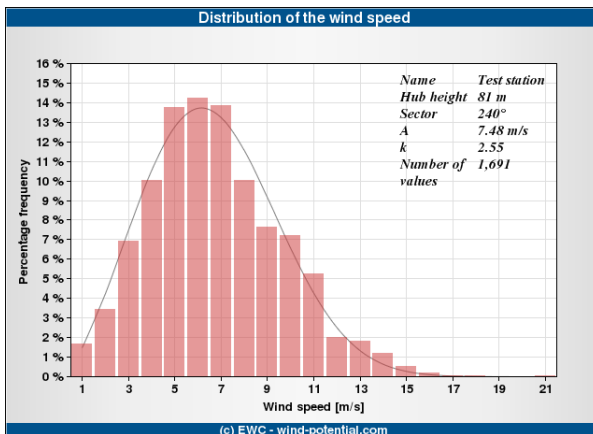
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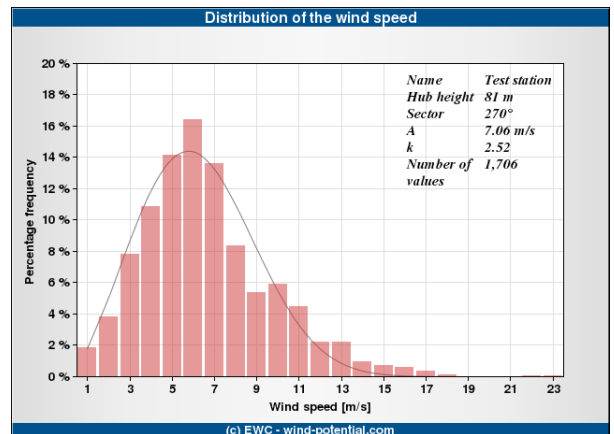
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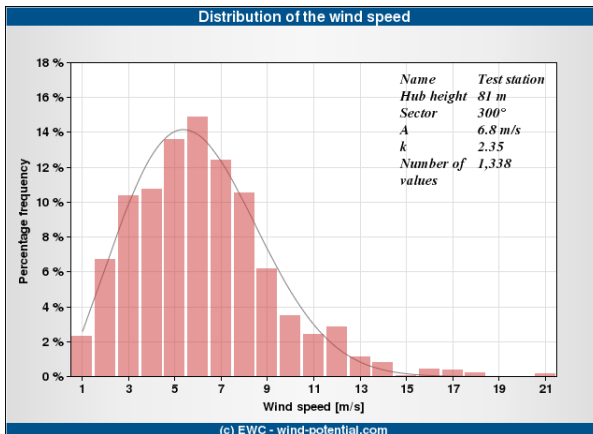
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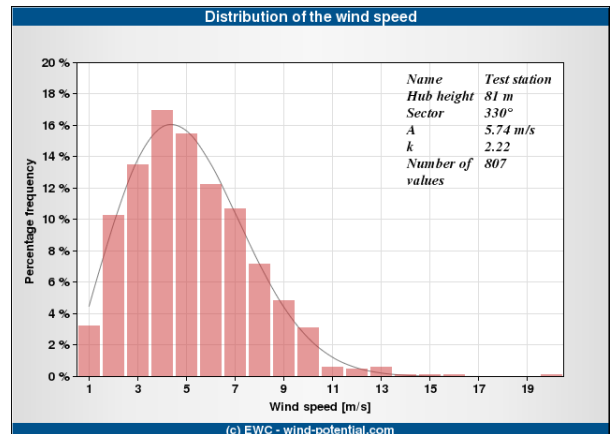
Sector 270°



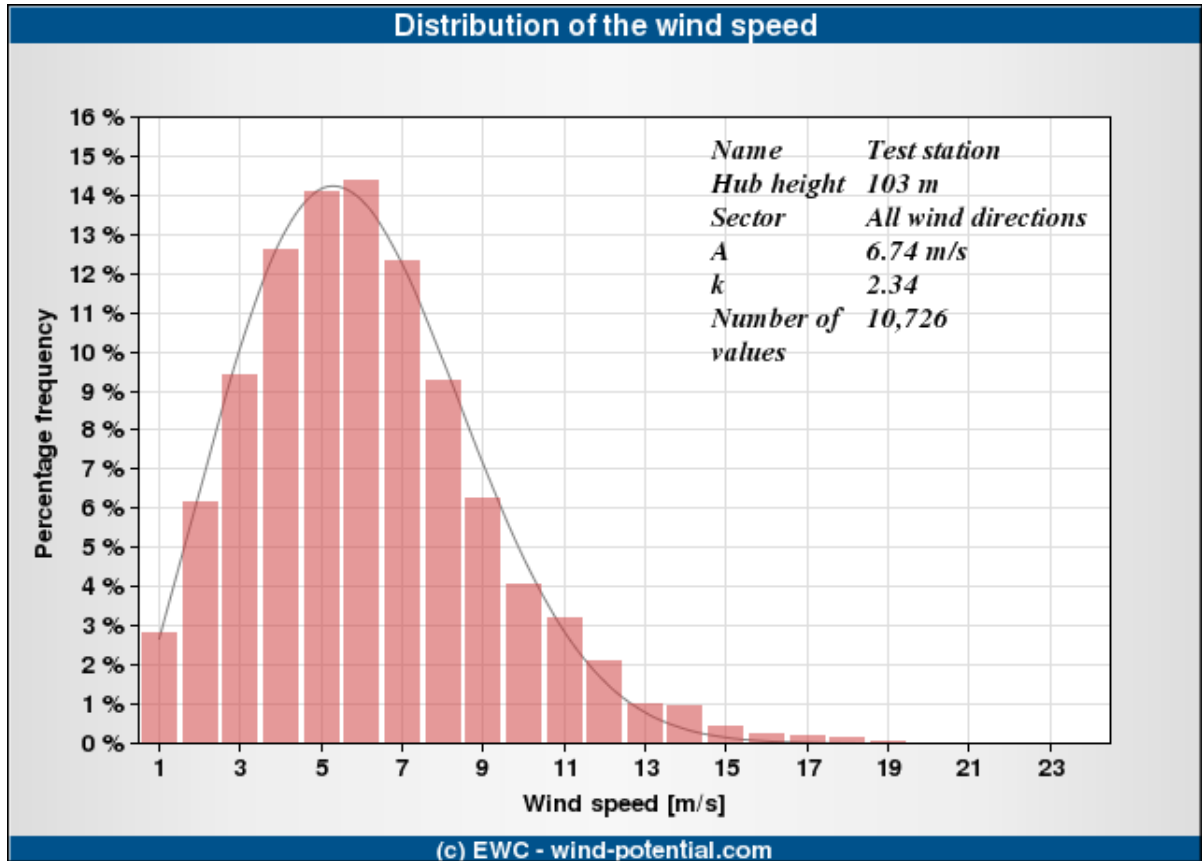
Sector 300°



Sector 330°

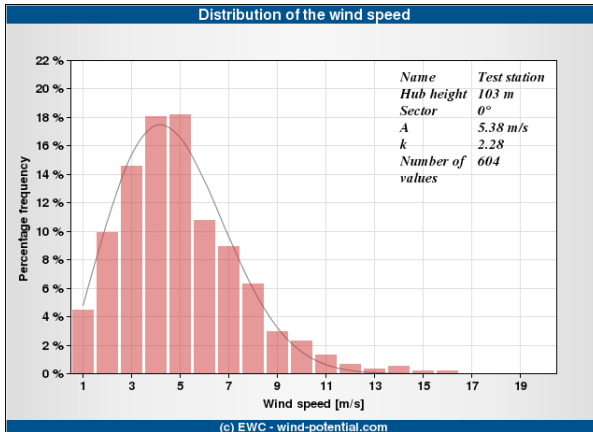


Overall analysis 103 m above ground level

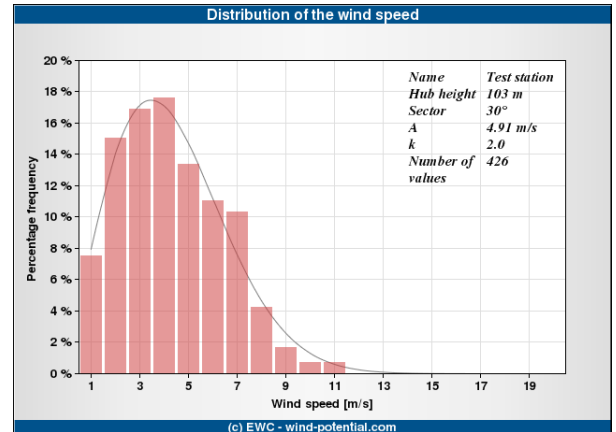


Sectoral Analysis 103 m above ground level

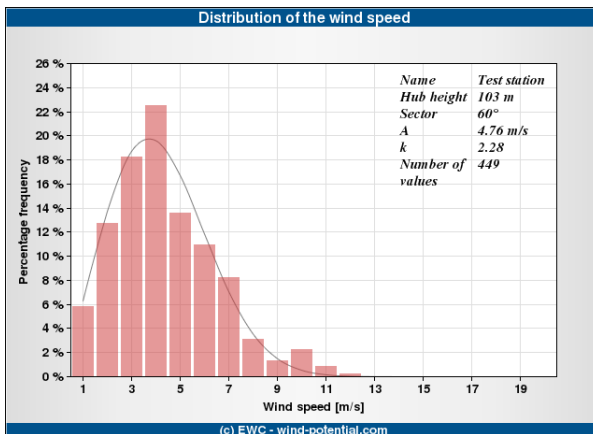
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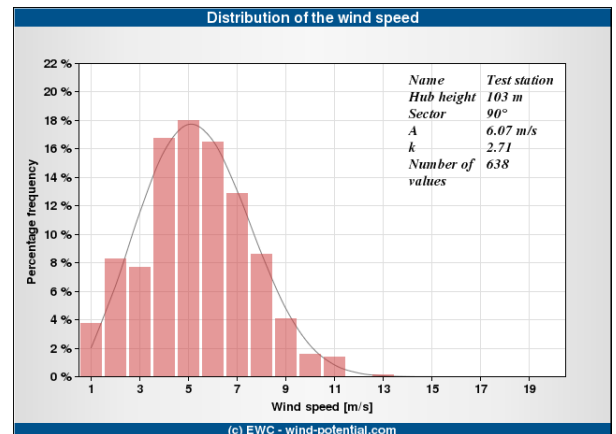
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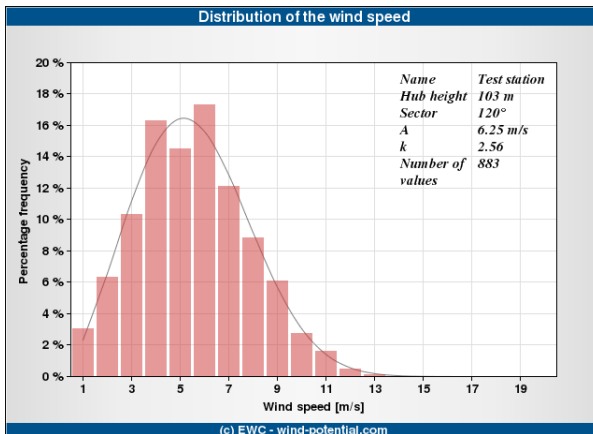
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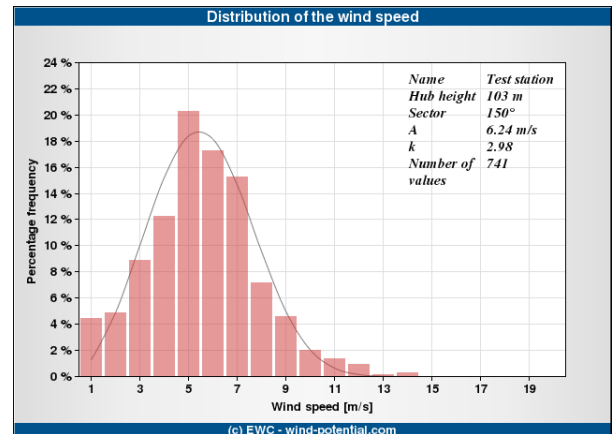
Sector 90°



Sector 120°

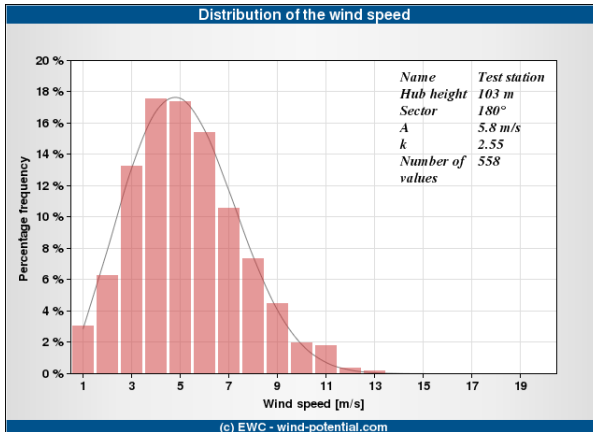


Sector 150°

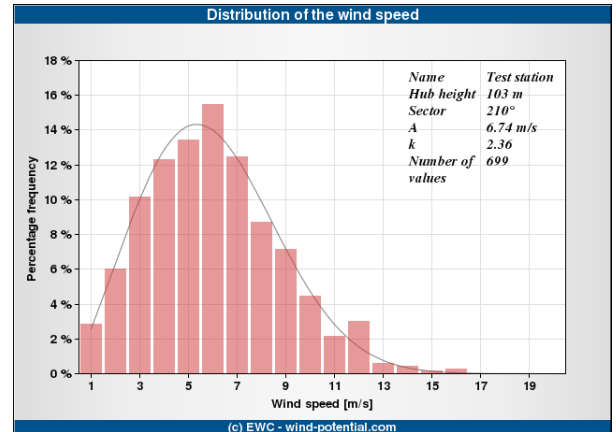


Sectoral Analysis 103 m above ground level

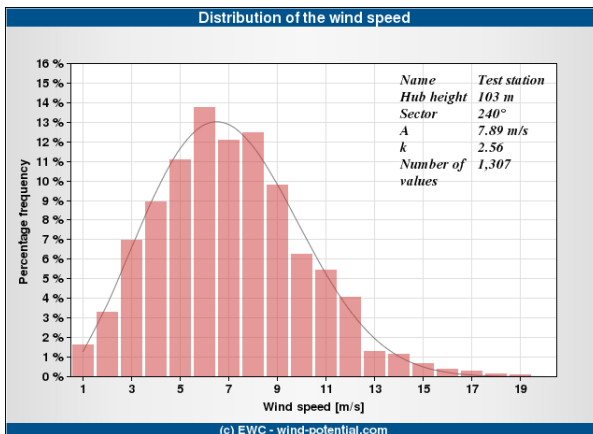
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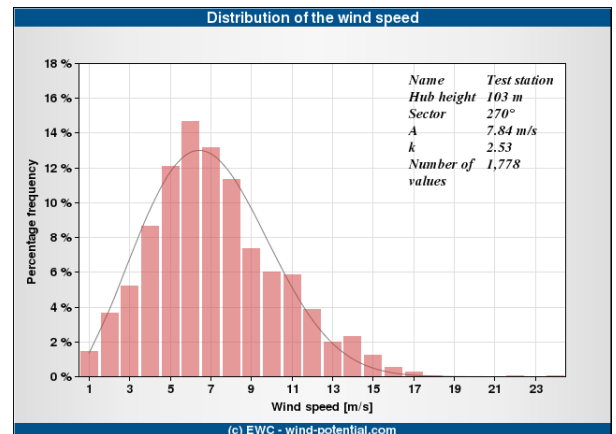
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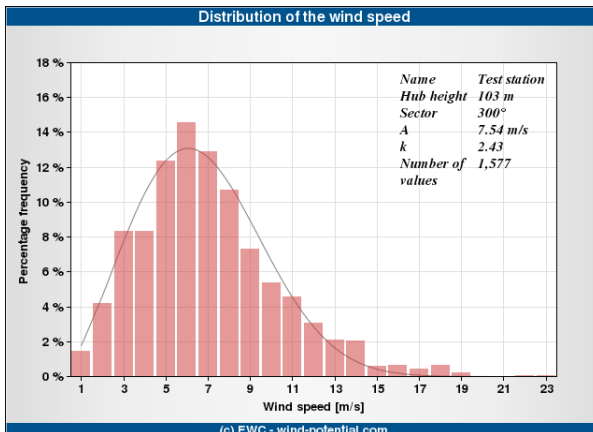
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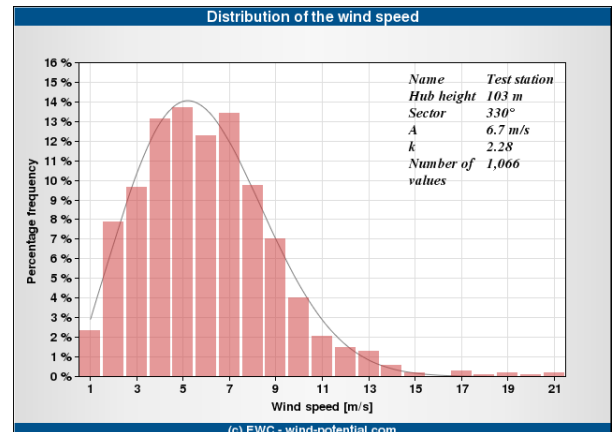
Sector 270°



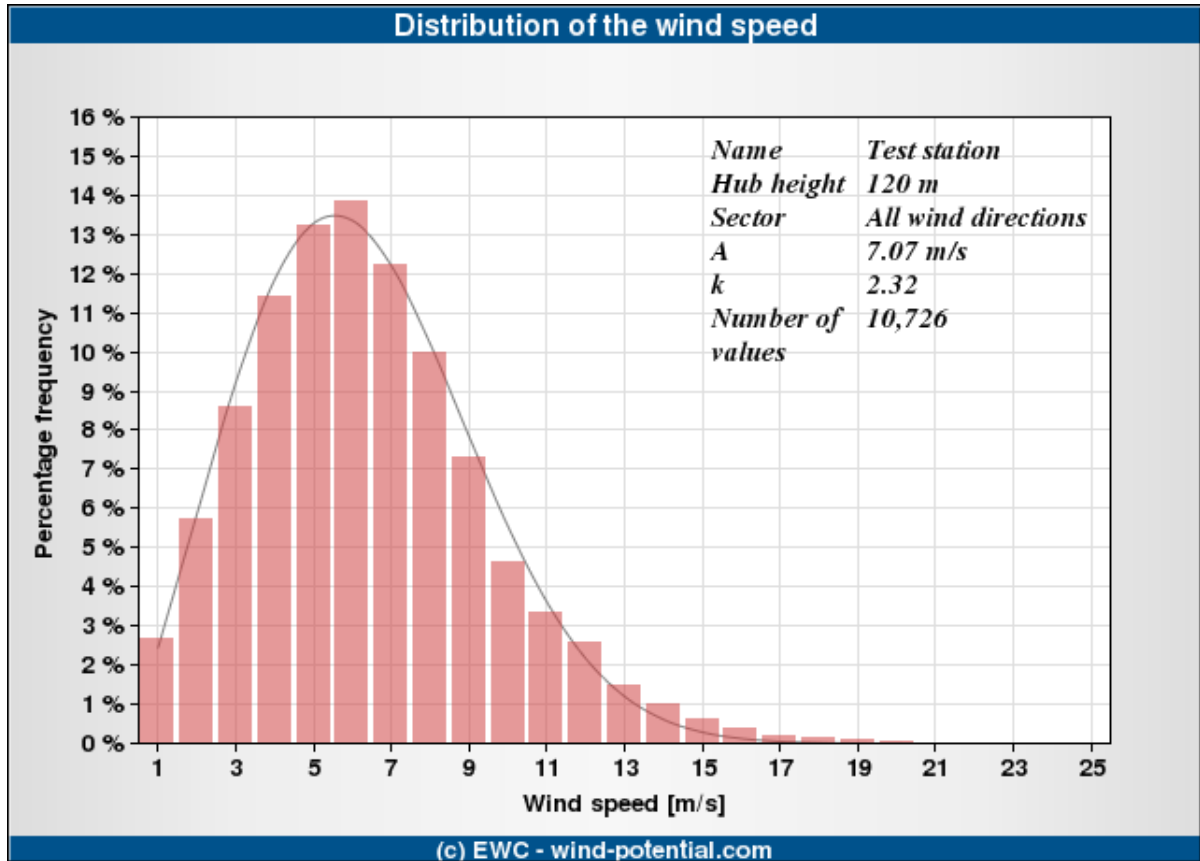
Sector 300°



Sector 330°

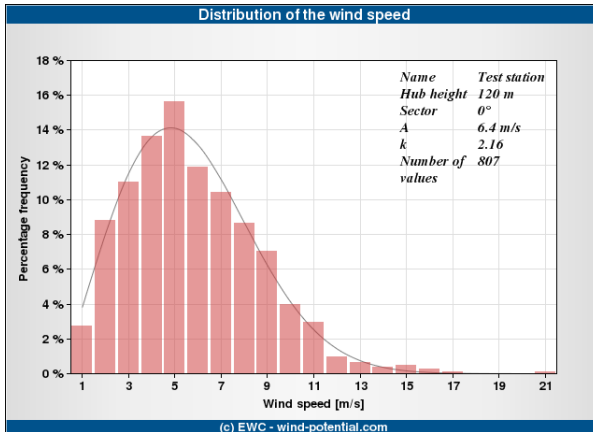


Overall analysis 120 m above ground level

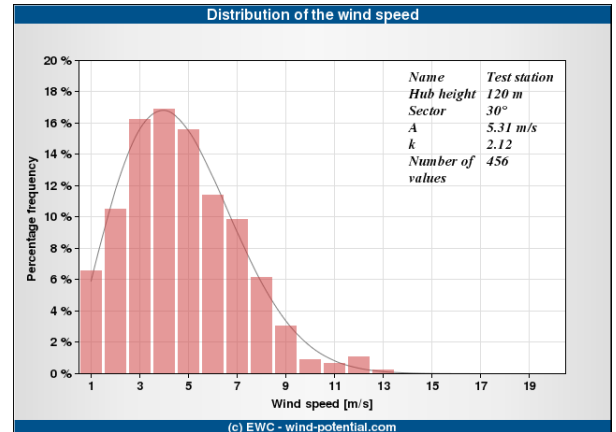


Sectoral Analysis 120 m above ground level

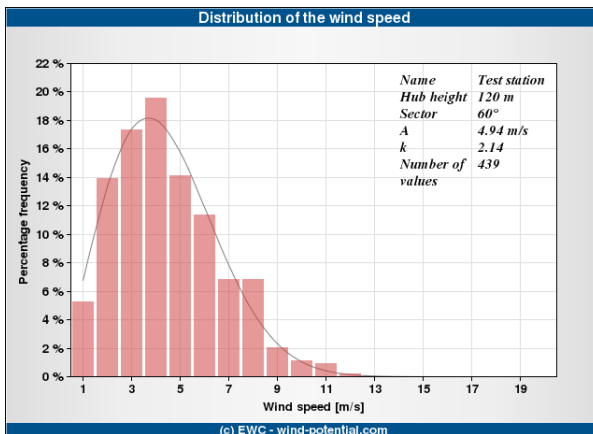
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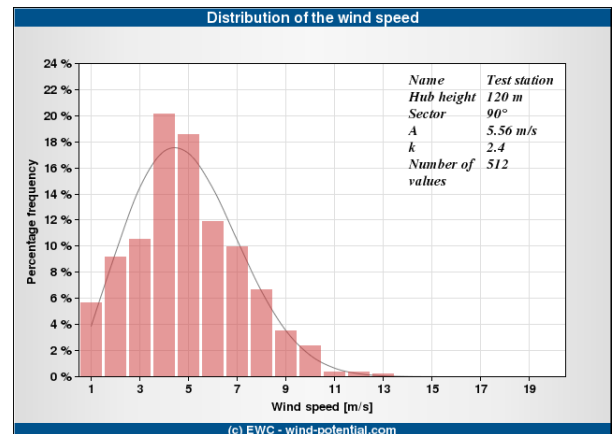
Sector 30°



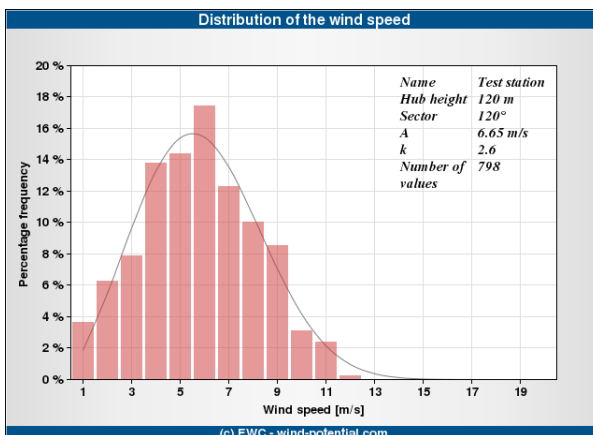
Sector 60°



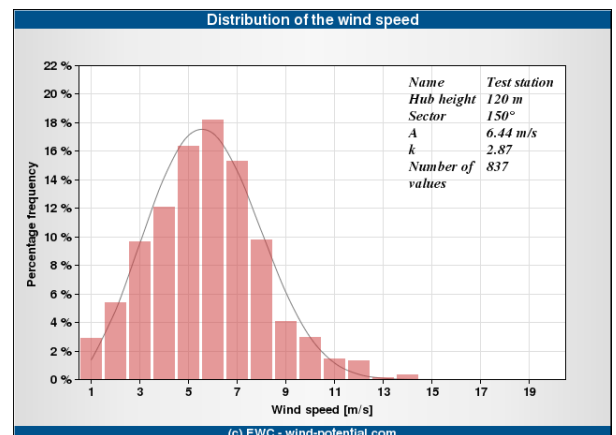
Sector 90°



Sector 120°

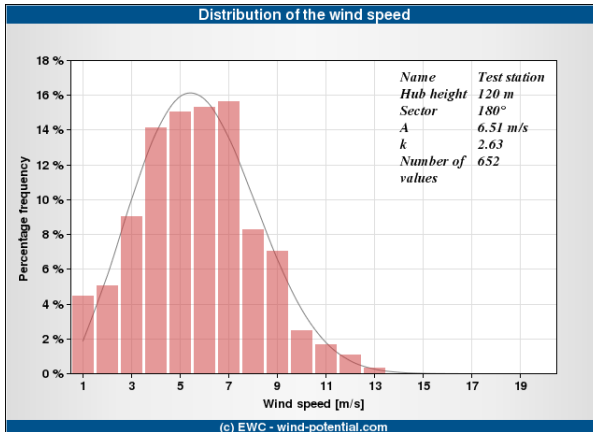


Sector 150°

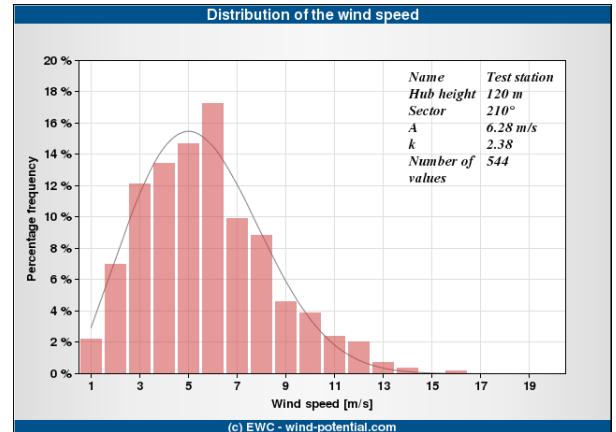


Sectoral Analysis 120 m above ground level

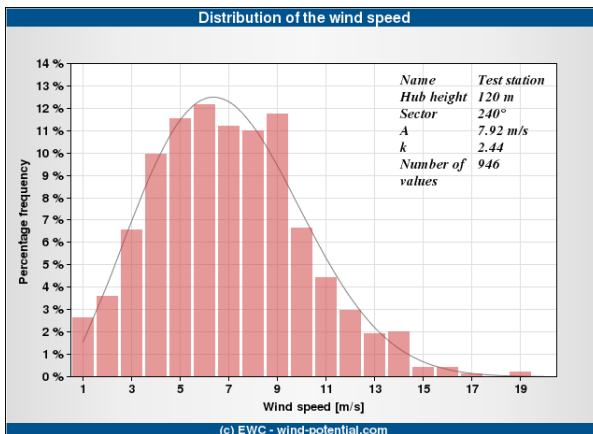
Sector 180°



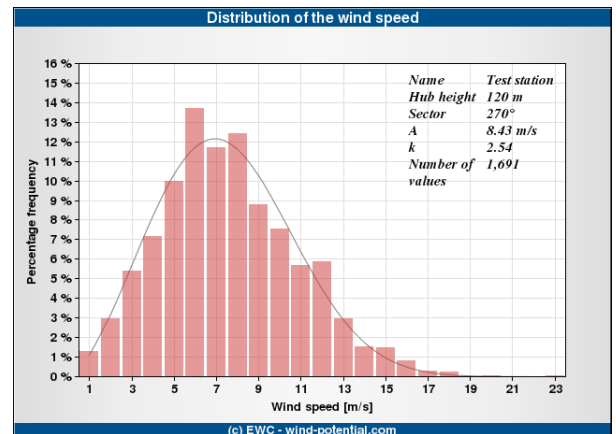
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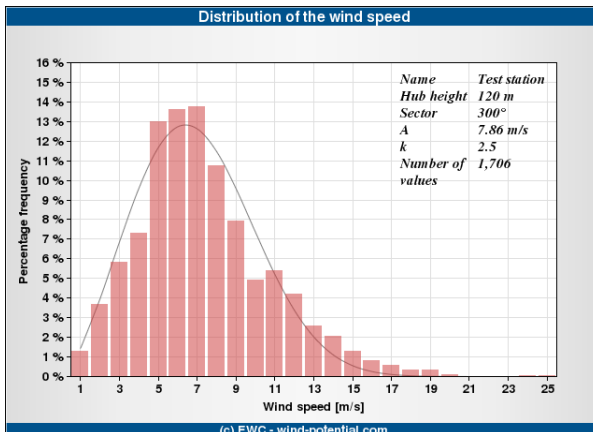
Sector 240°



Sector 270°



Sector 300°



Sector 330°

