SYMBOLS USED

Symbols

U	Wind speed (m/s) at height h
u_r	Wind speed (m/s) at height h_r
H	Desired level height (m)
h_r	Reference level height (m)
P	Power-law exponent
C	Scale parameter of Weibull distribution
K	Shape parameter of Weibull distribution
F	Theoretical cumulative distribution function
F_n	Empirical distribution function
T	Period of hours
P	Wind power (W)
V	Wind velocity (m/s)
A	Swept area of wind turbine blades (m^2)
E	Annual wind energy potential (Joule)

Greek letters

Γ	Gamma function
A	Shape parameter of Gamma distribution
B	Rate parameter of Gamma distribution
μ	Location parameter of Lognormal distribution
Σ	Scale parameter of Lognormal distribution
P	Air density (kgm^{-3})
$\mu^{/}$	Mean of the cube of the wind speed (m^3s^{-3})

Abbreviations

BHU	Banaras Hindu University
AHP	Analytical Hierarchy Process
VIKOR	VIseKriterijumska Optimizacija I Kompromisno Resenje
CDF	Cumulative density function
pdf	Probability density function
CGI	Computer generate imagery
CSV	Comma Separate Values
GHG	Green house gases
ECDF	Empirical cumulative density function
ECMWF	European Centre for Medium-Range Weather Forecasts
GIS	Geographic Information System
GMT	Greenwich Mean Time
LBNL	Lawrence Berkley National Laboratory
LIDAR	Light Detection and Ranging
LST	Local Standard Time
MNRE	Ministry of New and Renewable Energy
NCAR	National Centre for Atmospheric Research
NCEP	National Centres for Environmental Prediction
NREL	National Renewable Energy Laboratory
Pdf	Probability density function
P-P	Probability-Probability
Q-Q	Quantile-Quantile
SAR	Synthetic aperture radar
SODAR	Sonic Detection and Ranging

GW	Giga-watt
MW	Megawatt
kW	Kilowatt
GA	Genetic Algorithm

Indices

Y	Planning year
H	Operating hour

Parameters

S^G	Wind turbine size
C^G	Cost of wind turbine
σ^G	Number of wind turbine installed
Y	Planning year
L	Operating life of wind turbine
H	Total number of hours in a year
D	Discount rate
τ	Operation and maintenance cost per unit
λ	Per unit cost of power purchased from the grid
δ	Per unit cost of power supplied to the grid
$P^G_{y,h}$	Total power generation in y year for h hour
$P^D_{y,h}$	Load demand in y year for h hour
$P^P_{y,h}$	Power purchased from the grid in y year for h hour
$P^S_{y,h}$	Surplus power supplied to grid in y year for h hour
$\sigma^{G\max}$	Maximum number of wind turbines
$P^{G\max}_{y,h}$	Total power generation capacity limit in y year for h hour
$P^{D\max}_{y,h}$	Maximum load demand in y year for h hour

Decision variables

σ^{G}	Number of wind turbines
$P^{G}_{y,h}$	Power generated in y year for h hour
$P^{D}_{y,h}$	Load demand in y year for h hour