MULTI-CRITERIA ANALYSIS FOR PLANNING RENEWABLE ENERGY (MapRE)

Attribute table descriptions for shape files and pdf maps

Blue highlighted cells indicate attributes that are specific to wind zones, orange highlighted cells indicate attributes specific to solar CSP zones, and yellow highlighted cells indicate attributes specific to solar PV. All other attributes are common between technologies.

For details on methods and calculations, please see Deshmukh R, Wu GC, Callaway D, Phadke A (2019) "Geospatial and techno-economic analysis of wind and solar resources in India", *Renewable Energy*.

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ATTRIBUTE NAME	FIELD NAME SHP FILE (Projects)	DESCRIPTION
zone_identification	zone_id	This is the unique alphabetical identifier for the zones. Zones are labeled on the map using this identifier. Projects are subsets of zones.
Electricity generation attributes:		Estimated annual average electricity generation in MWh for the following:
A) Electricity_generation_discounted_MWhPerYr	Elect_Gen	**Solar PV**, assuming a 75% land use discount factor.
B) Electricity_generation_discounted_chosenTurbine_MWhPerYr	Elect_Gen	**Wind** using the optimally selected IEC turbine class, assuming a 75% land use discount factor.

C) Electricity_generation_discounted_6hrsStorage_MWhPerYr	Elect_Gen_6h	**Solar CSP** with 6 hours of storage, assuming a 75% land use discount factor.
Potential installed capacity attributes:		Potential capacity (MW) that could be installed within a zone for the following:
installedCapacity_MW	InstalledCap	**Solar PV or wind**, assuming a 75% land use discount factor.
installedCapacity_6hrsStorage_MW	InstalledCap	**Solar CSP** with 6 hours of storage, assuming a 75% land use discount factor.
Area	Area	Total area of the project in units of square kilometers
Land_use_factor_MWperkm2	LUF_MWpkm2	Land use factor assumption for a technology in MW per square kilometers
Levelized cost of electricity (LCOE) of non-generation components attributes:		Average levelized cost of electricity (in USD/MWh) for the non-generation components of the following
A) LCOE_substation_USDperMWh	LCOEsub	**Solar PV**, estimated using distance to the nearest substation, if available.
B) LCOE_road_USDperMWh	LCOEroad	**Solar PV**, estimated using distance to the nearest road.
C) LCOE_substation_chosenTurbine_USDperMWh	LCOEsub	**Wind** using the optimally selected IEC turbine, estimated using nearest substation.
D) LCOE_road_chosenTurbine_USDperMWh	LCOEroad	**Wind** using the optimally selected IEC turbine, estimated using nearest road.
E) LCOE_substation_6hrsStorage_USDperMWh	LCOEsub	**Solar CSP** with 6 hours of storage, estimated using nearest substation.
F) LCOE_road_6hrsStorage_USDperMWh	LCOEroad	**Solar CSP** with 6 hours of storage, estimated using nearest road.
Levelized cost of electricity (LCOE) of generation component attributes:		Average levelized cost of electricity (in USD/MWh) for generation component of the following technologies (values were estimated using the location's capacity factor and efficiencies specific to the technology):
A) LCOE_generation_USDperMWh	LCOEgen	**Solar PV**
B) LCOE_generation_chosenTurbine_USDperMWh	LCOEgen	**Wind** using the optimally selected IEC turbine class.

E) LCOE_generation_6hrsStorage_USDperMWh	LCOEgen_6h	**Solar CSP** with 6 hours of storage.
Total levelized cost of electricity (LCOE) attributes:		Average total levelized cost of electricity estimated by summing the individual component LCOEs for generation, transmission line or substation (values are only available if data could be procured), and road for the following:
A) LCOE_generation_substation_USDperMWh	LCOEgenSub	**Solar PV**, generation plus substation costs.
B) LCOE_total_substation_USDperMWh	LCOEtotSub	**Solar PV**, generation plus substation plus road costs.
C) LCOE_generation_substation_chosenTurbine_USDperMWh	LCOEgenSub	**Wind** using the optimally selected IEC turbine class, generation plus substation costs
E) LCOE_total_generation_substation_road_chosenTurbine_USDperMWh	LCOEtotSub	**Wind** using the optimally selected IEC turbine class, generation plus substation plus road costs
H) LCOE_generation_substation_6hrsStorage_USDperMWh	LCOEgenSub	**Solar CSP** with 6 hours of storage, generation plus substation costs
J) LCOE_total_generation_substation_road_6hrsStorage_USDperMWh	LCOEotSub	**Solar CSP** with 6 hours of storage, generation plus substation plus road costs
mean_HumanFootprint_Score_0to100	HumanFprint	Mean human footprint metric (0 – least human impact; 100 – most human impact)
colocation_score	coloc	Score for the suitability of the solar or wind potential project area for the other renewable energy technology. For example, the attribute table of a solar PV or CSP project would have a colocation score of 1 if the project overlapped with wind potential and vice versa. A score of 1 indicates no overlap.
mean_resourceQuality_mPerS	RQ	Mean resource quality in terms of average annual wind speed of the project in units of meters per second.
mean_resourceQuality_kWhPerm2Day	RQ	Mean solar resource quality of the project in units of annual average kWh per m2 per day.
Baseline_Water_Stress	BWS	Baseline Water Stress from World Resources Institute

Baseline_Water_Stress_score	BWS_score	Baseline Water Stress score ranging from 0 to 5, 5 being "extreme stress".
Capacity factor attributes:		Mean capacity factor of the zone for the following (values range from 0 to 1):
A) mean_capacityFactor	CF	**Solar PV**
B) mean_capacityFactor_chosenTurbine	CF_chosen	**Wind using the optimally selected IEC turbine class.**
E) mean_capacityFactor_6hrsStorage	CF_6h	**Solar CSP** with 6 hours of storage.
Distance attributes:		Distance to the nearest following locations (in units of kilometers):
B) distance_nearest_substation_km	NEAR_Sub	Substation
C) distance_nearest_road_km	NEAR_Road	Road
G) distance_nearest_majorCity_km	NEAR_Load	Major city or load center.
H) distance_nearest_waterSource_km	NEAR_water	Surface water (lake or river) source.