



SOLAR PROJECT FEASIBILITY REPORT

Site Name	Ralla Anantapuramu
Mandal	Kambaduru
District	Anantapuramu
Capacity	2400 MW



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Introduction:

The feasibility studies for installation of ultra-mega solar park in Kambaduru mandal of Anantapuramu District, Andhra Pradesh has been carried out. This report explains the preliminary observation in selection of site for installation of large scale solar parks based on topology.

Location:

The proposed solar park details are tabulated below.

SI No	Particulars	Description
1	Project Location	Ralla Anantapuram
2	Mandal / District	Kambaduru / Anantapuramu
3	State	Andhra Pradesh
4	Geographical coordinates	14.393598° 77.281741°
5	Meteorological data source	Meteonorm 7.3
6	Land availability	12000 Acres
9	Land quality	Mostly Barren land and some parts of agricultural land
10	Location access	State Highway connecting Dharmavaram – Kalyanadurg is passing through site.
11	Nearest domestic airport	Puttaparti – 55Km.
12	Nearest International airport	Bangalore, Karnataka – 125 Kms
13	Nearest Ports	Chennai (TN) & Mangalore (KA)
14	Nearest railway station	Dharmavaram – 55 Kms
15	Available APTransco Substations	Existing Borampalli 220/132 KV APTransco Substation – 10 Kms
		Existing Uravakonda 400/220 KV APTransco Substation – 45 Kms

Table 1: Summary of project details.



Ralla Anantapuramu site is located in Kambaduru mandal of the Anantapuramu District with Karnataka state as its border. There are 12 villages falling under Kambaduru Mandal.

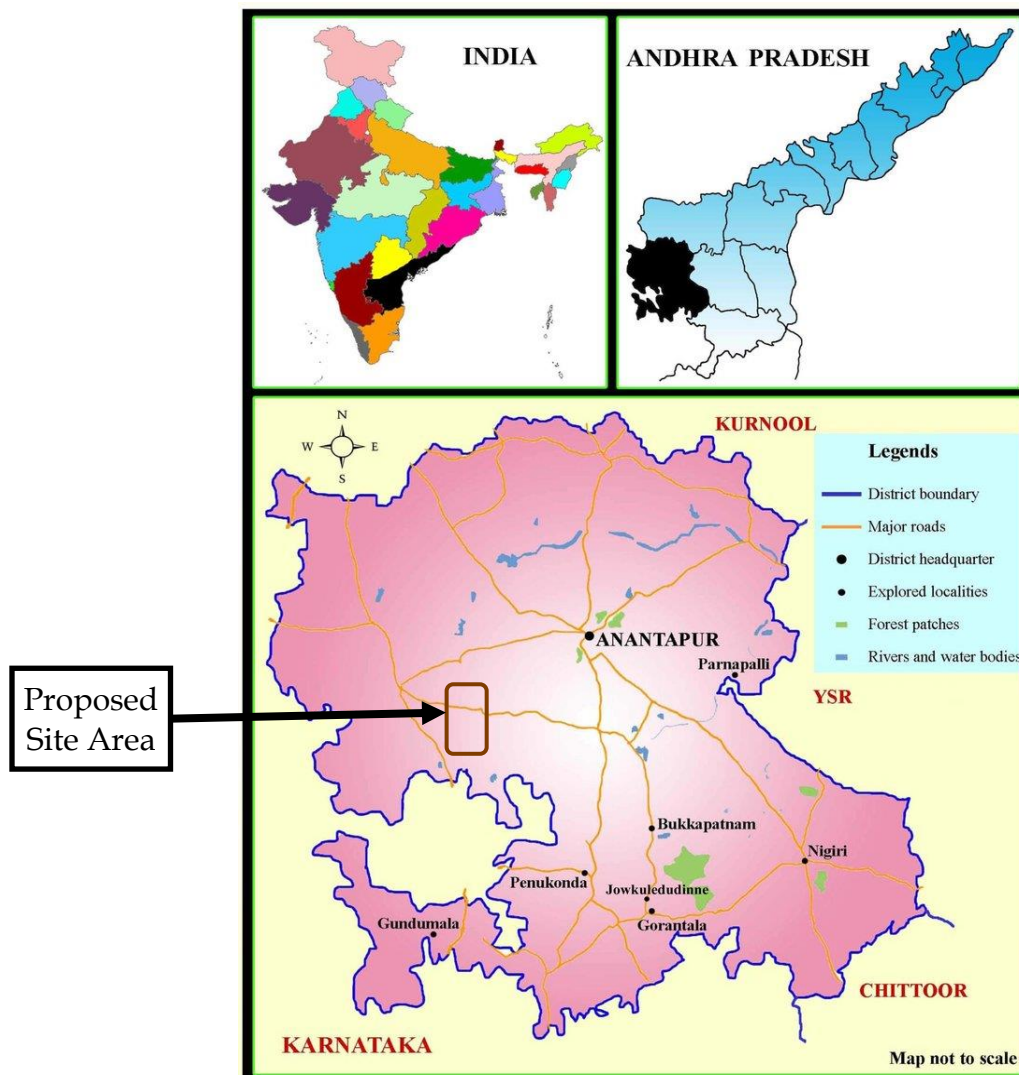


Figure 1: District administration map of Anantapuramu.

Approach and Logistics

State highway 432, from Kalyanadurg - Pavagada in Karnataka is at 4 KM from nearest solar block.

State highway 49 from Kalyanadurgam - Dharmavaram is passing through the site.

Kalyanadurgam town is located at 23 Kms from solar park.

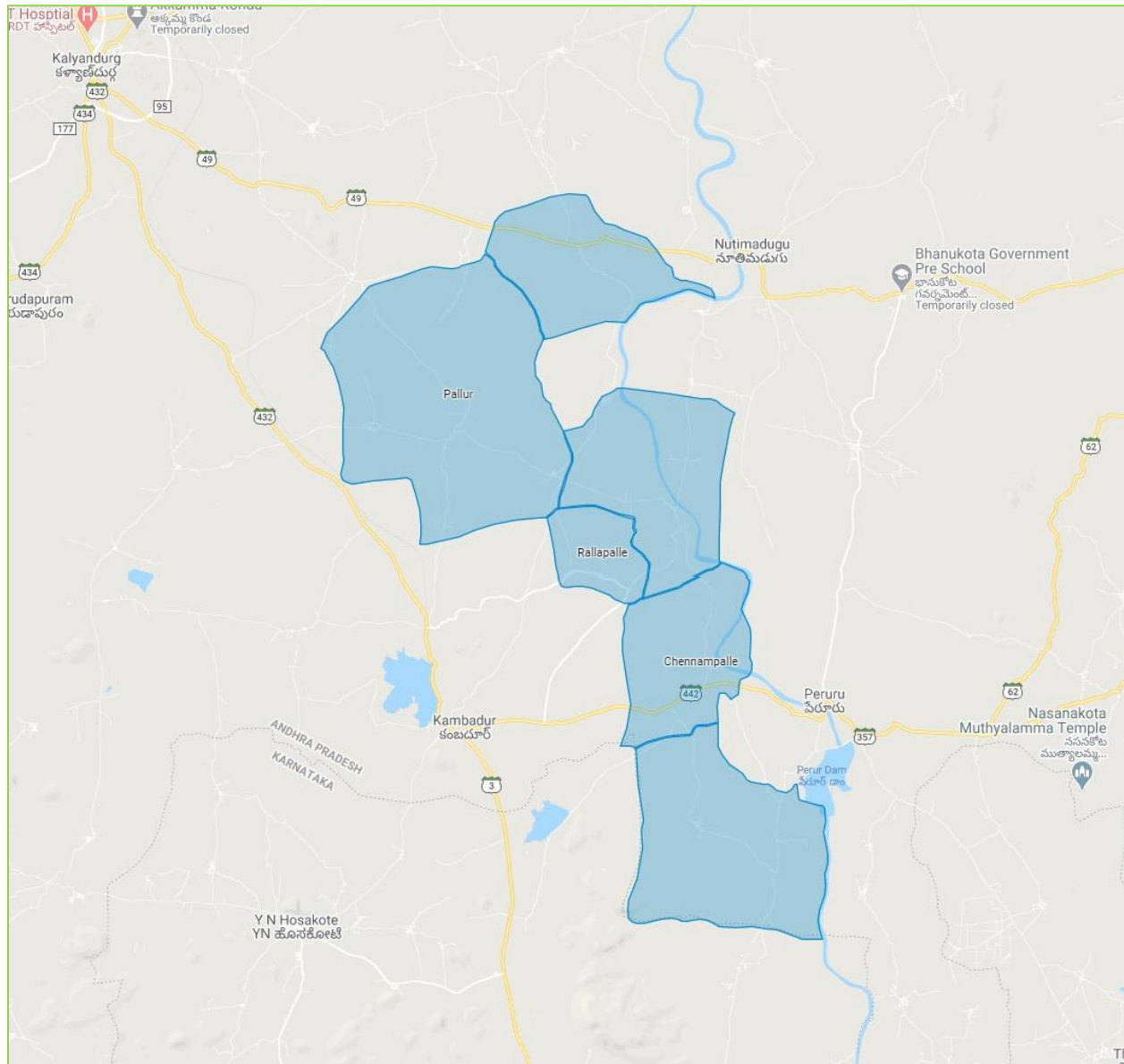


Figure 2: Satellite image of Ralla Anantapuram site

The proposed site is spread across single stretch of 06 villages in Kambaduru mandal of Anantapuramu district in Andhra Pradesh. Boundary corodinates of the site is given in annexure.

Satellite image showing the above village boundaries is given in figure below:

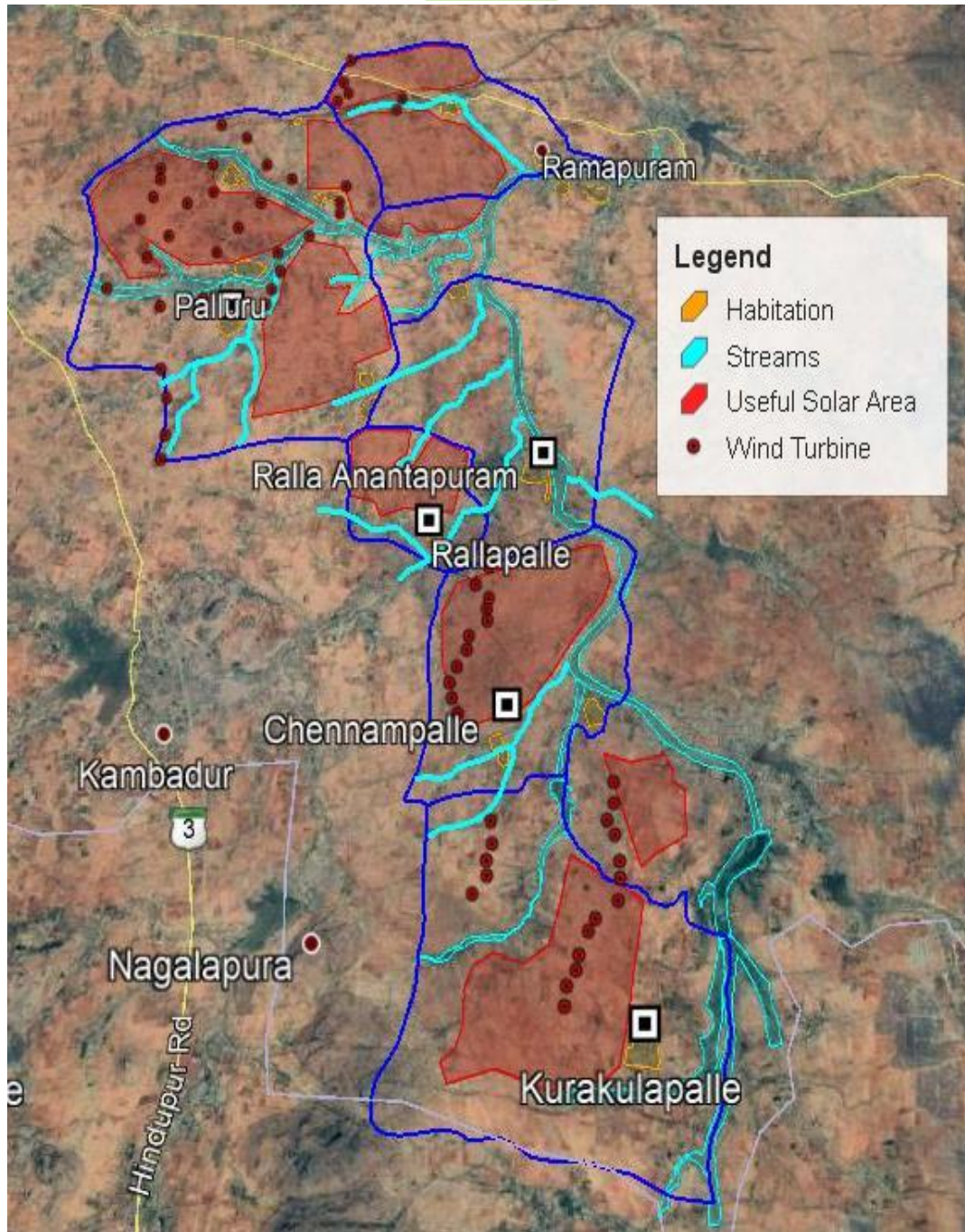


Figure 3: Satellite image of Ralla Anantapuram site

The total land availability in the above mentioned villages is around 45,085 Acres which includes open land, habitations, wind farms, streams, roads, ponds, and hills. Table below shows the complete extent of land available at each village including habitation, forest land, open lands, hills, wind turbines, rivers, and streams.

SI No	Village Name	Assigned	Government	Private	Grand Total
1	Ramapuram	2240	757	2904	5901
2	Palluru	4356	1840	10137	16333
3	Ralla Anantapuramu	2911	1216	3388	7515
4	Rallapalli	17	281	1953	2250
5	Chennampalli	2024	1111	2353	5489
6	Kurakulapalli	1976	2058	3563	7596
Grand Total		13525	7262	24298	45085

Table 2: Summary of extent of land at villages.

Topographical analysis has been done considering the 5 meter contour interval and drainage network of the above mentioned villages and found that out of 45,000 acres available, **about 12,000 Acres of land will be useful for solar park** after leaving village habitations, streams, rivers, wind turbines, forest land, streams, ponds and hills. Andhra Pradesh, particularly Anantapuramu region is blessed with huge wind potential and about 90% of the state renewable energy is installed in Anantapuramu District. While selecting the solar project area, ample care is taken by eliminating the wind turbine area considering the shadow effect.

However, the exact village wise land extent and land classifications for the project can be known by detailed survey and digital mapping.

Water Source

Penna river is passing adjacent to the site and there is Perur storage reservoir with capacity of 1.81 TMC. Water required for solar park operations can be drawn from this reservoir.

However, detailed hydrological studies must be carried out to explore additional water sources.

Topology:

From the contour drawing it is understood that land available in the above said villages are mostly plain with streams and Karnataka state boundary towards south side.

Contour map of the proposed site is given below:

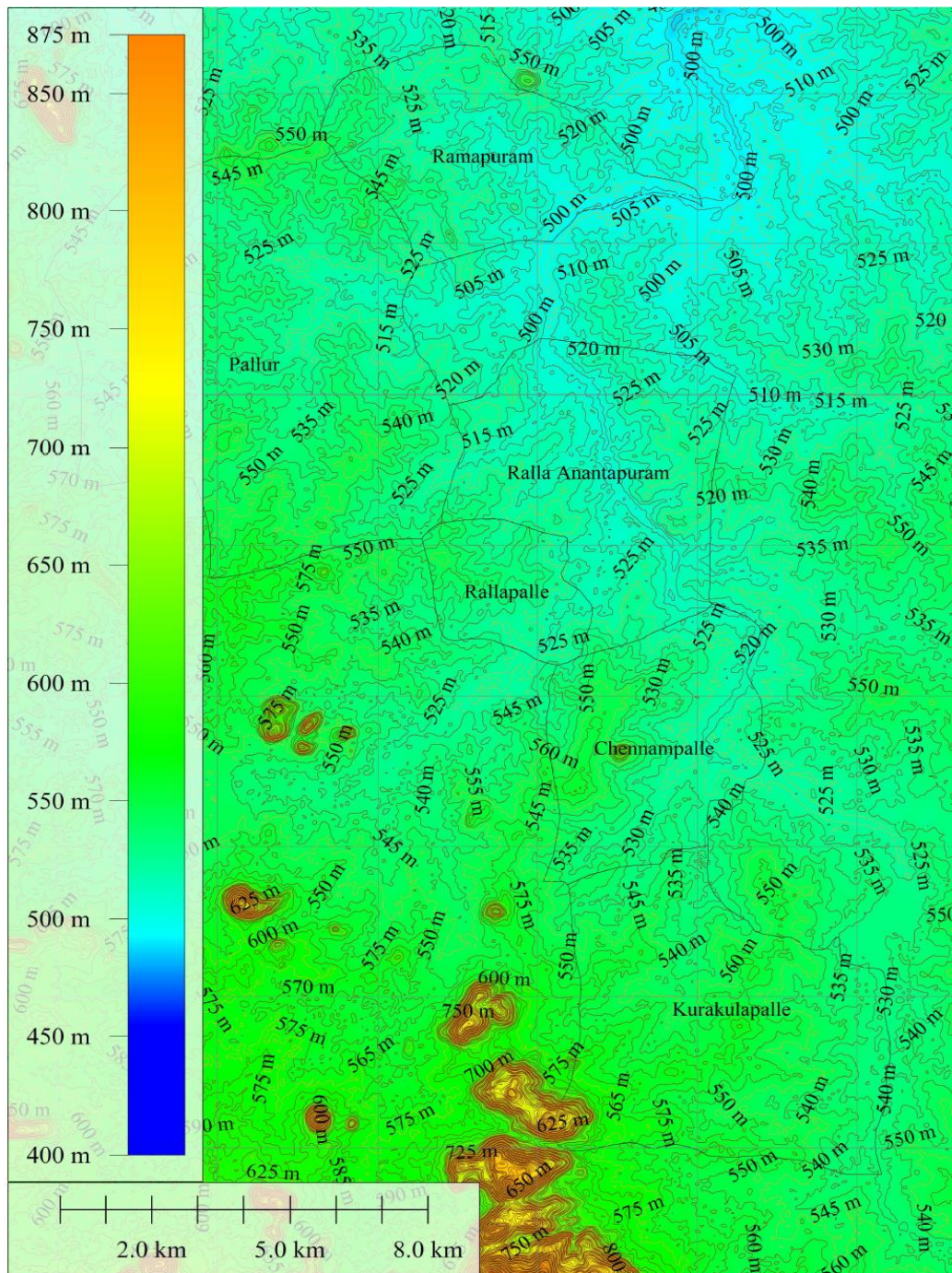


Figure 4: Contour map of Ralla Anantapuramu site



Figure below shows the useful area of the proposed solar park leaving the village habitations, wind turbines and streams.

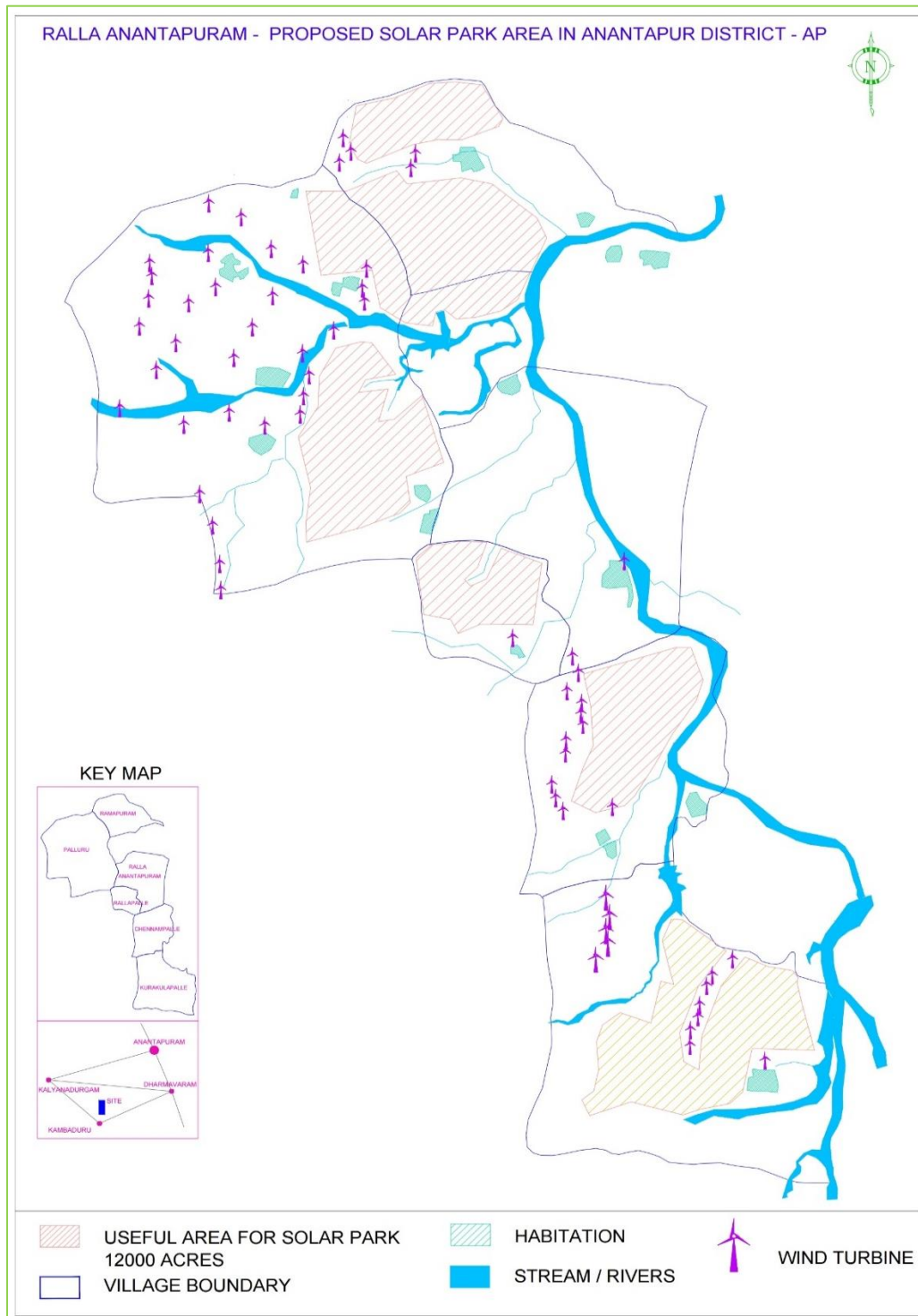


Figure 5: Useful area for solar project

Energy Estimates:

For the proposed Ultra Mega solar park area, annual energy production has been estimated using PVsyst 7.0.5 simulation software for multi-crystalline PV modules and irradiation data from Meteonorm 7.3. The table below shows the simulation results of Annual energy production.

Month	GlobHor kWh/m ²	DiffHor kWh/m ²	T_Amb °C	EArray MWh	E_Grid MWh	PR Ratio	CUF %
January	165.00	46.63	24.37	18907.00	18684.00	0.805	25.95%
February	163.40	55.54	27.13	17654.00	17450.00	0.799	25.97%
March	193.10	68.90	30.23	19373.00	19147.00	0.785	25.74%
April	195.00	80.67	31.59	18440.00	18218.00	0.781	25.30%
May	196.20	80.86	31.24	17858.00	16287.00	0.725	21.89%
June	157.50	87.63	28.21	14412.00	14234.00	0.799	19.77%
July	152.10	84.08	27.65	14100.00	12979.00	0.747	17.44%
August	150.20	81.02	26.94	14339.00	12613.00	0.715	16.95%
September	150.80	78.90	26.67	15016.00	14831.00	0.804	20.60%
October	154.50	68.38	26.41	16216.00	16013.00	0.804	21.52%
November	146.20	56.38	24.26	16356.00	16155.00	0.813	22.44%
December	153.70	53.89	23.36	17944.00	17731.00	0.818	23.83%
P50 Results	1977.70	842.88	27.34	200615.00	194342.00	0.783	22.28%

Table 3: Annual Energy Generation Estimates of Ralla Anantapuramu site

The annual CUF for typical 100 MW block of solar park at P90 is estimated at 21.71% per year with the annual generation of 1,89,678 MWh which is matching with the generation results of existing solar parks in the state of Andhra Pradesh.

Conclusion:

From the initial study, it is found that the proposed site at Ralla Anantapuramu is best fit for setting up the Ultra Mega Solar Park.

Annexure

BOUNDARY COORDINATES OF RALLA ANANTAPURAMU SITE

Block	Easting	Northing	Zone
I	94029	1604786	43P
	94372	1602797	43P
	95530	1602916	43P
	95717	1602031	43P
	96285	1601676	43P
	96896	1601596	43P
	96980	1601934	43P
	97174	1601978	43P
	97440	1601762	43P
	97869	1601802	43P
	98446	1601952	43P
	98828	1602221	43P
	99488	1603681	43P
	99268	1604153	43P
	98244	1604959	43P
	97543	1605102	43P
	96323	1604957	43P
	96085	1605273	43P
	94954	1604789	43P
	94029	1604786	43P
II	94707	1601078	43P
	94335	1600411	43P
	94306	1599689	43P
	93854	1598981	43P
	93994	1598370	43P
	94138	1597776	43P
	94030	1596953	43P
	94040	1596484	43P
	95315	1596838	43P
	95343	1596855	43P
	96156	1597172	43P

Block	Easting	Northing	Zone	
II	96395	1597419	43P	
	96302	1598045	43P	
	97152	1598368	43P	
	96664	1599960	43P	
	96030	1599392	43P	
	95674	1599336	43P	
	95897	1600110	43P	
	95225	1600027	43P	
	95378	1600325	43P	
	96066	1600455	43P	
	95525	1601197	43P	
	95285	1601225	43P	
	94707	1601078	43P	
	III			
		102424	1593995	43P
		100324	1593370	43P
100487		1592599	43P	
100543		1591674	43P	
100305		1591133	43P	
100046		1590365	43P	
100594		1590092	43P	
101253		1590255	43P	
101504		1590511	43P	
101515		1590539	43P	
101531		1590566	43P	
101909		1591174	43P	
101920		1591189	43P	
102327		1591931	43P	
102847		1592696	43P	
102883		1592751	43P	
103032		1593225	43P	
102760		1593990	43P	
102424		1593995	43P	