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中华人民共和国土地管理行业标准

TD/T XXXX—2022

光伏发电站工程项目用地控制指标

Land quota of photovoltaic power station project

(点击此处添加与国际标准一致性程度的标识)

(报批稿)

XXXX - XX - XX 发布

XXXX - XX - XX 实施

中华人民共和国自然资源部 发布

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前 言

本文件按照GB/T 1.1—2020《标准化工作导则 第1部分：标准化文件的结构和起草规则》的规定起草。

本文件由中华人民共和国自然资源部提出。

本文件由全国自然资源与国土空间规划标准化技术委员会（SAC/TC93）归口。

本文件起草单位：自然资源部自然资源开发利用司、自然资源部国土整治中心、中国国土勘测规划院。

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引 言

为落实建设项目用地标准控制制度，促进土地节约集约利用，指导与规范光伏电站工程项目设计及建设用地，研究制定本文件。

光伏电站工程项目用地控制指标

1 范围

本文件规定了光伏电站工程项目用地的总体指标、光伏方阵用地指标、变电站及运行管理中心用地指标、集电线路用地指标及场内道路用地指标。

本文件适用于使用建设用地和未利用地的新建、改建和扩建地面光伏电站工程项目。

2 规范性引用文件

下列文件中的内容通过文中的规范性引用而构成本文件必不可少的条款。其中，注日期的引用文件，仅该日期对应的版本适用于本文件；不注日期的引用文件，其最新版本（包括所有的修改单）适用于本文件。

GB 50797-2012 光伏电站设计规范

3 术语和定义

下列术语和定义适用于本文件。

3.1

光伏电站 photovoltaic (PV) power station

以光伏发电系统为主，包含各类建（构）筑物及检修、维护、生活等辅助设施在内的发电站。

[来源：GB 50797-2012，术语2.1.6]

3.2

光伏组件 PV module

具有封装及内部联结的、能单独提供直流电输出的、最小不可分割的太阳电池组合装置。又称太阳能电池组件。

[来源：GB 50797-2012，术语2.1.1]

3.3

光伏方阵 PV array

将若干个光伏组件在机械和电气上按一定方式组装在一起并且有固定的支撑结构而构成的直流发电单元。又称光伏阵列。

[来源：GB 50797-2012，术语2.1.4]

3.4

变电站（电力系统的） substation (of a power system)

电力系统的一部分，它集中在一个指定的地方，主要包括输电或配电线路开关及控制设备的终端、建筑物和变压器。通常包括升压设备、变配电设备、控制终端等。

[来源：建标[2010]78号，附录A术语A.6.1]

3.5

跟踪系统 tracking system

通过支架系统的旋转对太阳入射方向进行实时跟踪，从而使光伏方阵受光面接收尽量多的太阳辐照量，以增加发电量的系统。

[来源：GB 50797-2012，术语2.1.9]

3.6

单轴跟踪系统 single-axis tracking system

绕一维轴旋转，使得光伏组件受光面在一维方向尽可能垂直于太阳光的入射角的跟踪系统。

[来源：GB 50797-2012，术语2.1.10]

3.7

双轴跟踪系统 double-axis tracking system

绕二维轴旋转，使得光伏组件受光面始终垂直于太阳光的入射角的跟踪系统。

[来源：GB 50797-2012，术语2.1.11]

3.8

集电线路 collector line

在分散逆变、集中并网的光伏发电系统中，将各个光伏组件串输出的电能，经汇流箱汇流至逆变器，并通过逆变器输出端汇集到发电母线的直流和交流输电线路。

[来源：GB 50797-2012，术语2.1.12]

4 用地原则**4.1 保护耕地原则**

光伏电站工程项目建设，应体现科学、合理的用地原则，在严格保护生态环境的前提下，尽可能利用荒地、未利用地，少占或不占用耕地、林地，并尽量避开特殊保护区域。

4.2 节约用地原则

光伏电站工程项目建设用地，在满足安全运行、方便管理等条件下，综合考虑光能利用、土地集约、工程投资、环境保护等，采用先进工艺和先进技术，优化站区总平面设计，紧凑布局，减少用地面积。

4.3 统筹用地原则

分期建设的光伏电站工程项目建设用地，应统筹规划，合理布局，分期征用。近期建设用地宜尽量集中，远期建设用地宜预留在站区扩建端侧。施工期施工道路尽可能利用既有道路，或与运行期检修道路相结合。

改建、扩建工程项目应尽可能利用原有的场地，减少新占用土地。

5 总体要求

光伏电站工程项目用地指标分为总体指标和各功能区用地分项指标。光伏电站工程项目建设应符合本文件确定的用地总体指标和各功能区用地分项指标。采用总体指标时，光伏电站工程项目总用地规模按照第6章的规定执行；采用分项指标时，光伏电站工程项目用地规模按照第7章、第8章、第9章及第10章的规定执行。

光伏电站工程项目建设在经济技术合理的条件下，优先采用技术先进、发电效率高的光伏组件，鼓励采用本行业中先进的工艺流程和技术，提高光伏组件的效率。

6 光伏电站工程项目用地总体指标**6.1 用地界定**

光伏电站工程项目用地包括光伏方阵、变电站及运行管理中心、集电线路用地和场内道路的用地。

6.2 总体指标

光伏电站工程项目用地总体指标按光伏组件的全面积效率、安装所在地纬度、所在地形区类别、光伏方阵安装排列方式及不同升压等级计算确定。

光伏电站工程项目总用地面积应符合附录A的规定。

6.3 地形区

光伏电站工程项目用地总体指标按 I 类地形区、II 类地形区、III 类地形区分别计算。

a) I 类地形区是指地形无明显起伏，地面自然坡度不大于 3° 的平原地区。
b) II 类地形区是指地形起伏不大，地面自然坡度大于 3° 且不大于 20° ，相对高差在200m以内的微丘地区。

c) III 类地形区是指地形起伏较大，地面自然坡度大于 20° ，相对高差在200m以上的重丘或山岭地区。
各类地形区的光伏发电站工程项目用地总体指标应符合附录A的规定。

光伏电站工程项目处于两个或两个以上地形区时，应根据不同地形区分别计算用地规模，再累计得出总用地面积。项目用地总面积应符合各地形区用地总体指标之和的规定。

6.4 光伏方阵

光伏方阵排列安装的主要形式包括：固定式、平单轴跟踪式、斜单轴跟踪式、双轴跟踪式。
各形式光伏方阵的光伏发电站工程项目总用地面积应符合附录A的规定。

6.5 装机容量

装机容量为10MW的光伏发电站工程项目总用地面积应符合附录A的要求。
其他装机容量的光伏电站工程项目用地总体指标面积计算公式为：

$$S = S_1 \times (P \div 10) \dots\dots\dots (1)$$

式中：

- S ——项目用地总体指标面积，单位为公顷（ha）；
- S_1 ——10MW光伏方阵用地总体指标面积，单位为公顷（ha）；
- P ——实际总装机容量，单位为兆瓦（MW）。

6.6 纬度及发电效率

附录A中未列出发电效率和纬度的光伏电站工程项目，其用地总体指标面积可采用线性插值法进行计算。

a) 不同纬度光伏电站工程项目用地总体指标面积计算公式为：

$$S = A + (B - A) \times (c - a) / b \dots\dots\dots (2)$$

式中：

- S ——项目用地总体指标面积；
- A ——附录A中光伏电站相同发电效率相邻区间低纬度用地面积；
- B ——附录A中光伏电站相同发电效率相邻区间高纬度用地面积；
- a ——附录A中光伏电站相同发电效率相邻区间低纬度的度数数值；
- b ——光伏电站所在纬度相邻区间的差值；
- c ——光伏电站所在地纬度的度数数值。

b) 不同发电效率的光伏发电站工程项目，其用地总体指标面积也可采用线性插值法进行计算。

7 光伏方阵用地指标

7.1 用地界定

光伏方阵用地包括组件用地、逆变器室及箱变用地、方阵场内道路用地等。

7.2 用地指标

不同形式安装的光伏方阵，其用地面积应符合附录B的规定。

附录B中未列出效率和纬度的光伏方阵，其用地指标面积可采用线性插值法和公式法计算。

a) 光伏方阵用地指标面积线性插值法计算方法可参考6.6的方法。

b) 光伏方阵用地指标面积公式法计算公式如下：

$$S_2 = D \times K \dots\dots\dots (3)$$

$$D = (L \times \cos Z) + (L \times \sin Z) \times (0.707 \tan \phi + 0.4338) / (0.707 - 0.4338 \tan \phi) \dots \dots \dots (4)$$

式中：

S_2 ——光伏方阵用地指标面积，单位为公顷（ha）；

D ——光伏方阵间距，单位为米（m）；

K ——光伏方阵横向长度，单位为米（m）；

L ——光伏方阵纵向宽度，单位为米（m）；

Z ——光伏方阵倾角，单位为弧度（Rad）；

ϕ ——光伏方阵所在地纬度，单位为度（°）。

采用跟踪式安装排列的光伏方阵，其用地指标面积按阴影最长时间点计算南北向和东西向光伏方阵的最大占地面积。

7.3 指标调整

光伏方阵用地受地形、地貌等因素影响较大的，其用地指标按表1的调整系数进行调整。

表1 光伏方阵用地地形调整系数表

调整内容	I类地形区	II类地形区	III类地形区
调整系数 ^a	1.0~1.1	1.1~1.3	1.3~1.6
^a 表中XX（下限值）~XX（上限值），表示含上限，不含下限。			

8 变电站及运行管理中心用地指标

8.1 用地界定

变电站及运行管理中心用地包括变电站用地和生活服务设施用地。

a) 变电站建设用地包括生产建筑用地和辅助生产建筑用地。生产建筑用地包括升压设备、变配电设备、变电站控制室（升压设备控制、变配电设备控制、其他设备控制）用地；辅助生产建筑用地包括光伏发电站中控室、计算机室、站用配电室、电工实验室、通信室、库房、办公室、会议室、停车场等设施用地。

b) 生活服务设施用地包括职工宿舍、食堂、活动中心等设施用地。

变电站及运行管理中心用地面积按围墙外1m的外轮廓尺寸计算。

8.2 用地指标

变电站及运行管理中心用地指标应符合表2的规定。

表2 变电站及运行管理中心用地指标表

并网电压等级 kV	10	35/66	110	220	330
用地指标 m ²	1500	9690	15850	18550	35430

8.3 指标调整

位于III类地形区时，变电站及运行管理中心用地指标面积根据站址的地形、地质条件，按工程设计用地面积计算。

为填方场地时，变电站及运行管理中心用地指标面积按工程设计用地面积计算。

外围设置防洪及排水设施时，变电站及运行管理中心用地指标面积按相应构筑物外边线的轮廓尺寸计算。

9 集电线路用地指标

9.1 用地界定

集电线路用地是指光伏发电站项目区内集电线路建设用地。

9.2 用地指标

采用直埋电缆敷设方式时,集电线路用地面积与光伏方阵用地已合并,用地指标面积不再另行计算。采用架空线路架设时,集电线路用地指标面积按杆塔基础轮廓尺寸计算。

a) 杆塔采用水泥杆时,集电线路用地指标面积应符合表3的规定。

表3 水泥杆用地指标表

单位为平方米每基

水泥杆形式	单(双)回路用地指标
直线杆	4
带拉线门型杆	12

b) 杆塔采用钢管杆时,集电线路用地指标面积按杆塔基础外轮廓尺寸计算。

c) 杆塔采用铁塔时,集电线路用地指标面积应符合表4的规定。终端塔杆,其用地指标面积按转角为 $60^\circ \sim 90^\circ$ 的数值计算。

表4 铁塔杆用地指标表

单位为平方米每基

转角	$0^\circ \sim 20^\circ$	$20^\circ \sim 40^\circ$	$40^\circ \sim 60^\circ$	$60^\circ \sim 90^\circ$
单回路(平原)	24	26	28	29
单回路(山区、沼泽)	36	37	38	41
双回路(平原)	28	29	36	44
双回路(山区、沼泽)	41	46	55	62

9.3 指标调整

经常受台风和凝冻影响地区的架空线路,集电线路用地指标面积应乘以系数1.1。

光伏发电站工程通信线路应随电缆线路或架空线路一同敷(架)设,其用地面积不再另行计算。

10 场内道路用地指标

10.1 用地界定

场内道路用地是指保证项目生产运营的光伏发电站场区内部运行道路用地。

10.2 用地指标

场内道路宽度不宜超过4m。场内道路用地指标面积按道路宽度乘以道路长度进行计算。

10.3 指标调整

进场路(场外部分)和通往场外道路(场内部分)的用地面积,应符合国家现行的有关公路建设的用地指标规定。

场外供电线路、有线通信线路、排水、沟渠及其他设施的用地面积,按相关标准并结合实际情况计算用地面积。

附 录 A
(规范性)
10MW 光伏电站工程项目用地总体指标

表A.1 I类地形区固定式 10MW 光伏电站工程项目用地总体指标

单位为公顷

纬度°	效率%	10KV	35KV/66KV	110KV	220KV	330KV
18	14	12.592	13.427	14.055	14.331	16.053
	16	11.037	11.872	12.501	12.776	14.498
	18	9.828	10.663	11.291	11.567	13.288
	20	8.860	9.695	10.324	10.599	12.321
	22	8.069	8.904	9.532	9.808	11.529
	24	7.409	8.244	8.873	9.148	10.870
	26	6.851	7.686	8.314	8.590	10.312
	28	6.372	7.208	7.836	8.111	9.833
20	30	5.958	6.793	7.421	7.697	9.419
	14	13.130	13.966	14.594	14.870	16.591
	16	11.508	12.344	12.972	13.247	14.969
	18	10.247	11.082	11.710	11.986	13.707
	20	9.237	10.073	10.701	10.976	12.698
	22	8.411	9.247	9.875	10.150	11.872
	24	7.723	8.559	9.187	9.462	11.184
	26	7.141	7.976	8.605	8.880	10.602
25	28	6.642	7.477	8.105	8.381	10.103
	30	6.209	7.045	7.673	7.948	9.670
	14	14.792	15.627	16.256	16.531	18.253
	16	12.962	13.798	14.426	14.701	16.423
	18	11.539	12.374	13.003	13.278	15.000
	20	10.400	11.236	11.864	12.139	13.861
	22	9.469	10.304	10.932	11.208	12.930
	24	8.692	9.528	10.156	10.432	12.153
30	26	8.036	8.871	9.499	9.775	11.496
	28	7.473	8.308	8.936	9.212	10.933
	30	6.985	7.820	8.448	8.724	10.445
	14	17.089	17.925	18.553	18.828	20.550
	16	14.972	15.808	16.436	16.711	18.433
	18	13.326	14.161	14.789	15.065	16.787
	20	12.008	12.844	13.472	13.748	15.469
	22	10.931	11.766	12.394	12.670	14.392
35	24	10.033	10.868	11.496	11.772	13.493
	26	9.273	10.108	10.736	11.012	12.733
	28	8.621	9.457	10.085	10.360	12.082
	30	8.057	8.892	9.520	9.796	11.517
	14	20.425	21.260	21.889	22.164	23.886
	16	17.891	18.726	19.355	19.630	21.352
	18	15.920	16.755	17.384	17.659	19.381
	20	14.343	15.179	15.807	16.082	17.804
35	22	13.053	13.889	14.517	14.792	16.514
	24	11.978	12.814	13.442	13.717	15.439
	26	11.069	11.904	12.532	12.808	14.530

表A.1 I类地形区固定式10MW光伏电站工程项目用地总体指标（续）

单位为公顷

纬度°	效率%	10KV	35KV/66KV	110KV	220KV	330KV
35	28	10.289	11.124	11.753	12.028	13.750
	30	9.613	10.449	11.077	11.352	13.074
40	14	25.638	26.474	27.102	27.377	29.099
	16	22.453	23.288	23.916	24.192	25.913
	18	19.975	20.810	21.439	21.714	23.436
	20	17.993	18.828	19.456	19.732	21.454
	22	16.371	17.206	17.835	18.110	19.832
	24	15.019	15.855	16.483	16.758	18.480
	26	13.876	14.711	15.340	15.615	17.337
	28	12.896	13.731	14.359	14.635	16.356
45	30	12.046	12.881	13.510	13.785	15.507
	14	34.816	35.652	36.280	36.555	38.277
	16	30.483	31.319	31.947	32.222	33.944
	18	27.113	27.949	28.577	28.852	30.574
	20	24.417	25.253	25.881	26.156	27.878
	22	22.211	23.047	23.675	23.951	25.672
	24	20.373	21.209	21.837	22.112	23.834
	26	18.818	19.653	20.282	20.557	22.279
50	28	17.485	18.320	18.948	19.224	20.945
	30	16.329	17.165	17.793	18.068	19.790
	14	54.977	55.813	56.441	56.717	58.438
	16	48.124	48.960	49.588	49.863	51.585
	18	42.794	43.630	44.258	44.533	46.255
	20	38.530	39.365	39.994	40.269	41.991
	22	35.041	35.877	36.505	36.780	38.502
	24	32.134	32.969	33.598	33.873	35.595
50	26	29.674	30.509	31.138	31.413	33.135
	28	27.565	28.401	29.029	29.304	31.026
	30	25.738	26.573	27.201	27.477	29.199

表A.2 I类地形区平单轴跟踪式10MW光伏电站工程项目用地总体指标

单位为公顷

纬度°	效率%	10KV	35KV/66KV	110KV	220KV	330KV
18	14	15.640	16.475	17.104	17.379	19.101
	16	13.704	14.540	15.168	15.443	17.165
	18	12.199	13.034	13.662	13.938	15.659
	20	10.994	11.829	12.458	12.733	14.455
	22	10.008	10.844	11.472	11.748	13.469
	24	9.187	10.023	10.651	10.926	12.648
	26	8.492	9.328	9.956	10.231	11.953
	28	7.897	8.732	9.360	9.636	11.357
20	30	7.380	8.216	8.844	9.119	10.841
	14	16.021	16.856	17.484	17.760	19.482
	16	14.037	14.873	15.501	15.776	17.498
	18	12.495	13.330	13.958	14.234	15.955
	20	11.260	12.096	12.724	13.000	14.721
	22	10.251	11.086	11.714	11.990	13.712
	24	9.409	10.245	10.873	11.148	12.870
	26	8.697	9.533	10.161	10.436	12.158
25	28	8.087	8.922	9.551	9.826	11.548
	30	7.558	8.393	9.022	9.297	11.019
	14	17.195	18.030	18.658	18.934	20.656
	16	15.064	15.900	16.528	16.804	18.525
	18	13.408	14.243	14.871	15.147	16.868
	20	12.082	12.918	13.546	13.821	15.543
	22	10.998	11.833	12.461	12.737	14.459
	24	10.094	10.929	11.558	11.833	13.555
30	26	9.329	10.165	10.793	11.068	12.790
	28	8.674	9.509	10.138	10.413	12.135
	30	8.106	8.941	9.569	9.845	11.567
	14	18.818	19.653	20.281	20.557	22.278
	16	16.485	17.320	17.948	18.224	19.945
	18	14.670	15.505	16.134	16.409	18.131
	20	13.218	14.054	14.682	14.957	16.679
	22	12.030	12.866	13.494	13.770	15.491
35	24	11.041	11.876	12.504	12.780	14.502
	26	10.203	11.039	11.667	11.942	13.664
	28	9.485	10.321	10.949	11.224	12.946
	30	8.863	9.699	10.327	10.602	12.324
	14	21.174	22.009	22.638	22.913	24.635
	16	18.546	19.382	20.010	20.285	22.007
	18	16.503	17.338	17.966	18.242	19.964
	20	14.868	15.703	16.331	16.607	18.329
40	22	13.530	14.365	14.994	15.269	16.991
	24	12.415	13.251	13.879	14.154	15.876
	26	11.472	12.307	12.936	13.211	14.933
	28	10.663	11.499	12.127	12.403	14.124
	30	9.963	10.798	11.426	11.702	13.424
	14	24.856	25.692	26.320	26.595	28.317
	16	21.768	22.604	23.232	23.508	25.229
	18	19.367	20.202	20.830	21.106	22.828
40	20	17.445	18.281	18.909	19.184	20.906
	22	15.873	16.709	17.337	17.612	19.334
40	24	14.563	15.399	16.027	16.302	18.024

表A.2 I类地形区平单轴跟踪式10MW光伏电站工程项目用地总体指标（续）

单位为公顷

纬度°	效率%	10KV	35KV/66KV	110KV	220KV	330KV
40	26	13.455	14.290	14.919	15.194	16.916
	28	12.505	13.340	13.968	14.244	15.966
	30	11.681	12.517	13.145	13.420	15.142
45	14	31.338	32.174	32.802	33.077	34.799
	16	27.440	28.275	28.904	29.179	30.901
	18	24.408	25.244	25.872	26.147	27.869
	20	21.983	22.818	23.446	23.722	25.444
	22	19.998	20.834	21.462	21.737	23.459
	24	18.344	19.180	19.808	20.083	21.805
	26	16.945	17.780	18.409	18.684	20.406
	28	15.746	16.581	17.209	17.485	19.206
50	30	14.706	15.541	16.170	16.445	18.167
	14	45.572	46.407	47.036	47.311	49.033
	16	39.895	40.730	41.358	41.634	43.356
	18	35.479	36.314	36.943	37.218	38.940
	20	31.946	32.782	33.410	33.685	35.407
	22	29.056	29.891	30.520	30.795	32.517
	24	26.647	27.483	28.111	28.387	30.108
	26	24.609	25.445	26.073	26.348	28.070
	28	22.863	23.698	24.326	24.602	26.323
30	21.349	22.184	22.812	23.088	24.809	

表A.3 | Ⅰ类地形区斜单轴跟踪式 10MW 光伏电站工程项目用地总体指标

单位为公顷

纬度°	效率%	10KV	35KV/66KV	110KV	220KV	330KV
18	14	19.109	19.944	20.572	20.848	22.570
	16	16.739	17.575	18.203	18.478	20.200
	18	14.896	15.732	16.360	16.635	18.357
	20	13.422	14.257	14.886	15.161	16.883
	22	12.216	13.051	13.679	13.955	15.677
	24	11.211	12.046	12.674	12.950	14.671
	26	10.360	11.195	11.824	12.099	13.821
	28	9.631	10.466	11.095	11.370	13.092
20	30	8.999	9.834	10.463	10.738	12.460
	14	20.205	21.040	21.669	21.944	23.666
	16	17.698	18.534	19.162	19.438	21.159
	18	15.749	16.584	17.213	17.488	19.210
	20	14.189	15.025	15.653	15.928	17.650
	22	12.913	13.749	14.377	14.652	16.374
	24	11.850	12.685	13.314	13.589	15.311
	26	10.950	11.786	12.414	12.689	14.411
25	28	10.179	11.014	11.643	11.918	13.640
	30	9.511	10.346	10.974	11.250	12.971
	14	23.724	24.560	25.188	25.463	27.185
	16	20.778	21.613	22.241	22.517	24.239
	18	18.486	19.322	19.950	20.225	21.947
	20	16.653	17.488	18.117	18.392	20.114
	22	15.153	15.988	16.617	16.892	18.614
	24	13.903	14.738	15.367	15.642	17.364
30	26	12.845	13.681	14.309	14.584	16.306
	28	11.939	12.774	13.402	13.678	15.399
	30	11.153	11.988	12.617	12.892	14.614
	14	28.906	29.741	30.370	30.645	32.367
	16	25.312	26.147	26.776	27.051	28.773
	18	22.516	23.352	23.980	24.256	25.977
	20	20.280	21.115	21.744	22.019	23.741
	22	18.450	19.286	19.914	20.189	21.911
35	24	16.926	17.761	18.389	18.665	20.386
	26	15.635	16.471	17.099	17.374	19.096
	28	14.529	15.365	15.993	16.269	17.990
	30	13.571	14.406	15.035	15.310	17.032
	14	37.009	37.845	38.473	38.748	40.470
	16	32.402	33.238	33.866	34.141	35.863
	18	28.819	29.654	30.283	30.558	32.280
	20	25.952	26.788	27.416	27.692	29.413
40	22	23.607	24.442	25.071	25.346	27.068
	24	21.653	22.488	23.116	23.392	25.113
	26	19.999	20.834	21.462	21.738	23.460
	28	18.581	19.417	20.045	20.320	22.042
	30	17.353	18.188	18.816	19.092	20.813
	14	50.856	51.691	52.320	52.595	54.317
	16	44.518	45.353	45.982	46.257	47.979
	18	39.589	40.424	41.052	41.328	43.049
40	20	35.645	36.480	37.109	37.384	39.106
	22	32.418	33.254	33.882	34.158	35.879
	24	29.730	30.565	31.193	31.469	33.191

表A.3 I类地形区斜单轴跟踪式10MW光伏电站工程项目用地总体指标（续）

单位为公顷

纬度°	效率%	10KV	35KV/66KV	110KV	220KV	330KV
40	26	27.455	28.290	28.918	29.194	30.915
	28	25.504	26.340	26.968	27.244	28.965
	30	23.814	24.650	25.278	25.553	27.275
45	14	78.042	78.877	79.506	79.781	81.503
	16	68.306	69.141	69.769	70.045	71.767
	18	60.733	61.569	62.197	62.472	64.194
	20	54.675	55.511	56.139	56.414	58.136
	22	49.719	50.554	51.182	51.458	53.179
	24	45.588	46.424	47.052	47.327	49.049
	26	42.093	42.929	43.557	43.832	45.554
	28	39.097	39.933	40.561	40.837	42.558
	30	36.501	37.336	37.965	38.240	39.962
50	14	102.153	102.988	103.617	103.892	105.614
	16	102.153	102.988	103.617	103.892	105.614
	18	102.153	102.988	103.617	103.892	105.614
	20	102.153	102.988	103.617	103.892	105.614
	22	93.239	94.075	94.703	94.979	96.700
	24	85.482	86.318	86.946	87.221	88.943
	26	78.918	79.754	80.382	80.658	82.379
	28	73.292	74.128	74.756	75.031	76.753
	30	68.416	69.252	69.880	70.155	71.877

表A.4 I类地形区双轴跟踪式10MW光伏电站工程项目用地总体指标

单位为公顷

纬度°	效率%	10KV	35KV/66KV	110KV	220KV	330KV
18	14	20.815	21.651	22.279	22.554	24.276
	16	18.233	19.068	19.696	19.972	21.693
	18	16.224	17.059	17.687	17.963	19.685
	20	14.617	15.452	16.080	16.356	18.077
	22	13.302	14.137	14.765	15.041	16.763
	24	12.206	13.041	13.670	13.945	15.667
	26	11.279	12.114	12.743	13.018	14.740
	28	10.484	11.320	11.948	12.223	13.945
20	30	9.795	10.631	11.259	11.535	13.256
	14	22.010	22.846	23.474	23.749	25.471
	16	19.278	20.113	20.742	21.017	22.739
	18	17.153	17.988	18.617	18.892	20.614
	20	15.453	16.288	16.917	17.192	18.914
	22	14.062	14.897	15.526	15.801	17.523
	24	12.903	13.738	14.367	14.642	16.364
	26	11.922	12.758	13.386	13.661	15.383
25	28	11.082	11.917	12.545	12.821	14.542
	30	10.353	11.188	11.817	12.092	13.814
	14	25.846	26.682	27.310	27.585	29.307
	16	22.635	23.470	24.098	24.374	26.095
	18	20.137	20.972	21.600	21.876	23.597
	20	18.138	18.974	19.602	19.877	21.599
	22	16.503	17.339	17.967	18.242	19.964
	24	15.141	15.976	16.604	16.880	18.602
30	26	13.988	14.823	15.452	15.727	17.449
	28	13.000	13.835	14.463	14.739	16.460
	30	12.143	12.979	13.607	13.882	15.604
	14	31.495	32.330	32.958	33.234	34.955
	16	27.577	28.412	29.041	29.316	31.038
	18	24.530	25.365	25.993	26.269	27.991
	20	22.092	22.927	23.556	23.831	25.553
	22	20.098	20.933	21.561	21.837	23.558
35	24	18.436	19.271	19.899	20.175	21.896
	26	17.029	17.865	18.493	18.768	20.490
	28	15.824	16.659	17.287	17.563	19.285
	30	14.779	15.614	16.243	16.518	18.240
	14	40.327	41.163	41.791	42.067	43.788
	16	35.306	36.141	36.769	37.045	38.767
	18	31.400	32.235	32.863	33.139	34.861
	20	28.275	29.110	29.739	30.014	31.736
40	22	25.719	26.554	27.182	27.458	29.179
	24	23.588	24.423	25.052	25.327	27.049
	26	21.785	22.621	23.249	23.524	25.246
	28	20.240	21.076	21.704	21.979	23.701
	30	18.901	19.736	20.365	20.640	22.362
	14	55.420	56.256	56.884	57.160	58.881
40	16	48.512	49.347	49.976	50.251	51.973
	18	43.139	43.974	44.603	44.878	46.600
	20	38.840	39.676	40.304	40.579	42.301
	22	35.323	36.159	36.787	37.062	38.784
	24	32.392	33.228	33.856	34.131	35.853

表A.4 I类地形区双轴跟踪式10MW光伏电站工程项目用地总体指标（续）

单位为公顷

纬度°	效率%	10KV	35KV/66KV	110KV	220KV	330KV
40	26	29.912	30.748	31.376	31.652	33.373
	28	27.787	28.622	29.250	29.526	31.248
	30	25.944	26.780	27.408	27.684	29.405
45	14	85.054	85.889	86.518	86.793	88.515
	16	74.441	75.277	75.905	76.180	77.902
	18	66.187	67.022	67.651	67.926	69.648
	20	59.584	60.419	61.047	61.323	63.045
	22	54.181	55.016	55.645	55.920	57.642
	24	49.679	50.514	51.142	51.418	53.139
	26	45.869	46.704	47.333	47.608	49.330
	28	42.603	43.439	44.067	44.343	46.064
	30	39.773	40.609	41.237	41.513	43.234
50	14	102.153	102.988	103.617	103.892	105.614
	16	102.153	102.988	103.617	103.892	105.614
	18	102.153	102.988	103.617	103.892	105.614
	20	102.153	102.988	103.617	103.892	105.614
	22	101.620	102.455	103.083	103.359	105.081
	24	93.164	94.000	94.628	94.903	96.625
	26	86.010	86.845	87.473	87.749	89.470
	28	79.877	80.712	81.341	81.616	83.338
	30	74.562	75.397	76.026	76.301	78.023

表A.5 II类地形区固定式10MW光伏电站工程项目用地总体指标

单位为公顷

纬度°	效率%	10KV	35KV/66KV	110KV	220KV	330KV
18	14	16.323	17.159	17.787	18.062	19.784
	16	14.302	15.137	15.766	16.041	17.763
	18	12.730	13.565	14.194	14.469	16.191
	20	11.472	12.308	12.936	13.211	14.933
	22	10.443	11.279	11.907	12.182	13.904
	24	9.586	10.421	11.049	11.325	13.047
	26	8.860	9.695	10.324	10.599	12.321
	28	8.238	9.074	9.702	9.977	11.699
20	30	7.699	8.535	9.163	9.438	11.160
	14	17.024	17.859	18.487	18.763	20.485
	16	14.915	15.750	16.379	16.654	18.376
	18	13.275	14.110	14.738	15.014	16.736
	20	11.962	12.798	13.426	13.702	15.423
	22	10.889	11.724	12.353	12.628	14.350
	24	9.994	10.830	11.458	11.733	13.455
	26	9.237	10.073	10.701	10.976	12.698
25	28	8.588	9.424	10.052	10.327	12.049
	30	8.026	8.861	9.490	9.765	11.487
	14	19.184	20.019	20.647	20.923	22.645
	16	16.805	17.640	18.269	18.544	20.266
	18	14.955	15.790	16.418	16.694	18.416
	20	13.475	14.310	14.938	15.214	16.935
	22	12.263	13.099	13.727	14.003	15.724
	24	11.254	12.090	12.718	12.993	14.715
30	26	10.400	11.236	11.864	12.139	13.861
	28	9.668	10.504	11.132	11.407	13.129
	30	9.034	9.869	10.498	10.773	12.495
	14	22.170	23.006	23.634	23.909	25.631
	16	19.418	20.253	20.882	21.157	22.879
	18	17.278	18.113	18.741	19.017	20.738
	20	15.565	16.400	17.029	17.304	19.026
	22	14.164	14.999	15.628	15.903	17.625
35	24	12.996	13.832	14.460	14.736	16.457
	26	12.008	12.844	13.472	13.748	15.469
	28	11.162	11.997	12.625	12.901	14.622
	30	10.428	11.263	11.891	12.167	13.889
	14	26.507	27.342	27.970	28.246	29.967
	16	23.212	24.048	24.676	24.951	26.673
	18	20.650	21.486	22.114	22.389	24.111
	20	18.600	19.436	20.064	20.340	22.061
40	22	16.923	17.759	18.387	18.663	20.384
	24	15.526	16.361	16.990	17.265	18.987
	26	14.343	15.179	15.807	16.082	17.804
	28	13.330	14.165	14.793	15.069	16.791
	30	12.451	13.287	13.915	14.190	15.912
	14	33.284	34.119	34.748	35.023	36.745
	16	29.142	29.978	30.606	30.882	32.603
	18	25.921	26.757	27.385	27.661	29.382
40	20	23.345	24.180	24.808	25.084	26.805
	22	21.236	22.072	22.700	22.975	24.697
40	24	19.479	20.315	20.943	21.218	22.940

表A.5 II类地形区固定式10MW光伏电站工程项目用地总体指标（续）

单位为公顷

纬度°	效率%	10KV	35KV/66KV	110KV	220KV	330KV
40	26	17.993	18.828	19.456	19.732	21.454
	28	16.718	17.554	18.182	18.458	20.179
	30	15.614	16.449	17.078	17.353	19.075
45	14	45.215	46.051	46.679	46.954	48.676
	16	39.582	40.418	41.046	41.322	43.043
	18	35.201	36.037	36.665	36.940	38.662
	20	31.697	32.532	33.160	33.436	35.157
	22	28.829	29.664	30.293	30.568	32.290
	24	26.439	27.275	27.903	28.178	29.900
	26	24.417	25.253	25.881	26.156	27.878
	28	22.684	23.519	24.148	24.423	26.145
	30	21.182	22.017	22.646	22.921	24.643
50	14	71.425	72.260	72.888	73.164	74.886
	16	62.516	63.351	63.980	64.255	65.977
	18	55.587	56.422	57.050	57.326	59.047
	20	50.043	50.879	51.507	51.782	53.504
	22	45.508	46.343	46.971	47.247	48.969
	24	41.728	42.564	43.192	43.467	45.189
	26	38.530	39.365	39.994	40.269	41.991
	28	35.789	36.624	37.253	37.528	39.250
	30	33.413	34.249	34.877	35.152	36.874

表A.6 II类地形区平单轴跟踪式10MW光伏电站工程项目用地总体指标

单位为公顷

纬度°	效率%	10KV	35KV/66KV	110KV	220KV	330KV
18	14	20.286	21.122	21.750	22.025	23.747
	16	17.770	18.605	19.233	19.509	21.230
	18	15.812	16.648	17.276	17.551	19.273
	20	14.246	15.082	15.710	15.985	17.707
	22	12.965	13.800	14.429	14.704	16.426
	24	11.897	12.733	13.361	13.636	15.358
	26	10.994	11.829	12.458	12.733	14.455
	28	10.220	11.055	11.683	11.959	13.680
20	14	20.781	21.616	22.245	22.520	24.242
	16	18.203	19.038	19.666	19.942	21.663
	18	16.197	17.032	17.661	17.936	19.658
	20	14.593	15.428	16.056	16.332	18.054
	22	13.280	14.115	14.744	15.019	16.741
	24	12.186	13.021	13.650	13.925	15.647
	26	11.260	12.096	12.724	13.000	14.721
	28	10.467	11.302	11.931	12.206	13.928
25	14	22.307	23.143	23.771	24.046	25.768
	16	19.538	20.373	21.002	21.277	22.999
	18	17.384	18.219	18.848	19.123	20.845
	20	15.661	16.496	17.125	17.400	19.122
	22	14.251	15.086	15.715	15.990	17.712
	24	13.076	13.912	14.540	14.815	16.537
	26	12.082	12.918	13.546	13.821	15.543
	28	11.230	12.065	12.694	12.969	14.691
30	14	24.417	25.252	25.881	26.156	27.878
	16	21.384	22.219	22.848	23.123	24.845
	18	19.025	19.860	20.489	20.764	22.486
	20	17.138	17.973	18.602	18.877	20.599
	22	15.594	16.429	17.057	17.333	19.055
	24	14.307	15.142	15.771	16.046	17.768
	26	13.218	14.054	14.682	14.957	16.679
	28	12.285	13.120	13.749	14.024	15.746
35	14	27.480	28.316	28.944	29.219	30.941
	16	24.064	24.900	25.528	25.803	27.525
	18	21.408	22.243	22.871	23.147	24.868
	20	19.282	20.117	20.746	21.021	22.743
	22	17.543	18.378	19.007	19.282	21.004
	24	16.094	16.929	17.558	17.833	19.555
	26	14.868	15.703	16.331	16.607	18.329
	28	13.817	14.652	15.280	15.556	17.277
40	14	32.267	33.103	33.731	34.006	35.728
	16	28.253	29.088	29.717	29.992	31.714
	18	25.131	25.966	26.595	26.870	28.592
	20	22.633	23.468	24.097	24.372	26.094
	22	20.589	21.425	22.053	22.329	24.050
	24	18.886	19.722	20.350	20.625	22.347

表A.6 II类地形区平单轴跟踪式10MW光伏电站工程项目用地总体指标（续）

单位为公顷

纬度°	效率%	10KV	35KV/66KV	110KV	220KV	330KV
40	26	17.445	18.281	18.909	19.184	20.906
	28	16.210	17.046	17.674	17.949	19.671
	30	15.140	15.975	16.603	16.879	18.601
45	14	40.694	41.529	42.158	42.433	44.155
	16	35.626	36.462	37.090	37.365	39.087
	18	31.685	32.520	33.148	33.424	35.146
	20	28.532	29.367	29.995	30.271	31.992
	22	25.952	26.787	27.415	27.691	29.413
	24	23.802	24.637	25.266	25.541	27.263
	26	21.983	22.818	23.446	23.722	25.444
	28	20.423	21.259	21.887	22.163	23.884
50	30	19.072	19.907	20.536	20.811	22.533
	14	59.198	60.033	60.661	60.937	62.659
	16	51.817	52.653	53.281	53.556	55.278
	18	46.077	46.912	47.540	47.816	49.538
	20	41.484	42.320	42.948	43.223	44.945
	22	37.727	38.562	39.191	39.466	41.188
	24	34.596	35.431	36.059	36.335	38.057
	26	31.946	32.782	33.410	33.685	35.407
	28	29.675	30.511	31.139	31.414	33.136
30	27.707	28.543	29.171	29.446	31.168	

表A.7 II类地形区斜单轴跟踪式10MW光伏电站工程项目用地总体指标

单位为公顷

纬度°	效率%	10KV	35KV/66KV	110KV	220KV	330KV
18	14	24.795	25.631	26.259	26.535	28.256
	16	21.715	22.551	23.179	23.454	25.176
	18	19.319	20.155	20.783	21.058	22.780
	20	17.403	18.238	18.866	19.142	20.864
	22	15.835	16.670	17.298	17.574	19.295
	24	14.528	15.363	15.991	16.267	17.989
	26	13.422	14.257	14.886	15.161	16.883
	28	12.474	13.310	13.938	14.213	15.935
20	30	11.653	12.488	13.117	13.392	15.114
	14	26.221	27.056	27.684	27.960	29.681
	16	22.962	23.797	24.426	24.701	26.423
	18	20.428	21.263	21.891	22.167	23.889
	20	18.400	19.236	19.864	20.139	21.861
	22	16.741	17.577	18.205	18.481	20.202
	24	15.359	16.194	16.823	17.098	18.820
	26	14.189	15.025	15.653	15.928	17.650
25	28	13.187	14.022	14.650	14.926	16.648
	30	12.318	13.153	13.782	14.057	15.779
	14	30.796	31.631	32.259	32.535	34.256
	16	26.965	27.801	28.429	28.704	30.426
	18	23.986	24.821	25.450	25.725	27.447
	20	21.603	22.438	23.066	23.342	25.064
	22	19.653	20.488	21.116	21.392	23.114
	24	18.028	18.863	19.492	19.767	21.489
30	26	16.653	17.488	18.117	18.392	20.114
	28	15.474	16.310	16.938	17.213	18.935
	30	14.453	15.288	15.917	16.192	17.914
	14	37.532	38.367	38.996	39.271	40.993
	16	32.859	33.695	34.323	34.599	36.320
	18	29.225	30.061	30.689	30.965	32.686
	20	26.318	27.154	27.782	28.057	29.779
	22	23.940	24.775	25.403	25.679	27.400
35	24	21.957	22.793	23.421	23.696	25.418
	26	20.280	21.115	21.744	22.019	23.741
	28	18.842	19.678	20.306	20.582	22.303
	30	17.596	18.432	19.060	19.336	21.057
	14	48.066	48.902	49.530	49.805	51.527
	16	42.077	42.912	43.541	43.816	45.538
	18	37.419	38.254	38.883	39.158	40.880
	20	33.692	34.528	35.156	35.431	37.153
40	22	30.643	31.479	32.107	32.382	34.104
	24	28.102	28.938	29.566	29.842	31.563
	26	25.952	26.788	27.416	27.692	29.413
	28	24.110	24.945	25.573	25.849	27.570
	30	22.513	23.348	23.976	24.252	25.973
	14	66.067	66.902	67.530	67.806	69.528
	16	57.827	58.663	59.291	59.567	61.288
	18	51.419	52.255	52.883	53.158	54.880
40	20	46.293	47.128	47.756	48.032	49.753
	22	42.098	42.933	43.562	43.837	45.559
	24	38.603	39.438	40.066	40.342	42.063

表A.7 II类地形区斜单轴跟踪式10MW光伏电站工程项目用地总体指标（续）

单位为公顷

纬度°	效率%	10KV	35KV/66KV	110KV	220KV	330KV
40	26	35.645	36.480	37.109	37.384	39.106
	28	33.110	33.945	34.574	34.849	36.571
	30	30.913	31.748	32.376	32.652	34.374
45	14	101.408	102.244	102.872	103.148	104.869
	16	88.752	89.587	90.215	90.491	92.212
	18	78.907	79.743	80.371	80.646	82.368
	20	71.032	71.867	72.496	72.771	74.493
	22	64.588	65.424	66.052	66.327	68.049
	24	59.219	60.054	60.682	60.958	62.680
	26	54.675	55.511	56.139	56.414	58.136
	28	50.781	51.616	52.244	52.520	54.242
	30	47.406	48.241	48.869	49.145	50.866
50	14	132.753	133.588	134.217	134.492	136.214
	16	132.753	133.588	134.217	134.492	136.214
	18	132.753	133.588	134.217	134.492	136.214
	20	132.753	133.588	134.217	134.492	136.214
	22	121.165	122.001	122.629	122.904	124.626
	24	111.081	111.916	112.545	112.820	114.542
	26	102.548	103.383	104.012	104.287	106.009
	28	95.234	96.069	96.698	96.973	98.695
	30	88.895	89.731	90.359	90.634	92.356

表A.8 II类地形区双轴跟踪式10MW光伏电站工程项目用地总体指标

单位为公顷

纬度°	效率%	10KV	35KV/66KV	110KV	220KV	330KV
18	14	27.014	27.849	28.478	28.753	30.475
	16	23.656	24.492	25.120	25.395	27.117
	18	21.045	21.880	22.509	22.784	24.506
	20	18.956	19.791	20.419	20.695	22.417
	22	17.246	18.082	18.710	18.985	20.707
	24	15.822	16.657	17.286	17.561	19.283
	26	14.617	15.452	16.080	16.356	18.077
	28	13.583	14.419	15.047	15.323	17.044
20	30	12.688	13.524	14.152	14.427	16.149
	14	28.567	29.403	30.031	30.306	32.028
	16	25.016	25.851	26.479	26.755	28.476
	18	22.253	23.088	23.717	23.992	25.714
	20	20.043	20.878	21.507	21.782	23.504
	22	18.235	19.070	19.699	19.974	21.696
	24	16.728	17.563	18.192	18.467	20.189
	26	15.453	16.288	16.917	17.192	18.914
25	28	14.360	15.196	15.824	16.099	17.821
	30	13.413	14.248	14.877	15.152	16.874
	14	33.554	34.390	35.018	35.293	37.015
	16	29.379	30.214	30.843	31.118	32.840
	18	26.132	26.967	27.595	27.871	29.593
	20	23.534	24.369	24.998	25.273	26.995
	22	21.408	22.244	22.872	23.147	24.869
	24	19.637	20.472	21.101	21.376	23.098
30	26	18.138	18.974	19.602	19.877	21.599
	28	16.854	17.689	18.317	18.593	20.314
	30	15.740	16.576	17.204	17.479	19.201
	14	40.897	41.732	42.361	42.636	44.358
	16	35.804	36.639	37.268	37.543	39.265
	18	31.843	32.678	33.306	33.582	35.304
	20	28.674	29.509	30.137	30.413	32.135
	22	26.081	26.916	27.545	27.820	29.542
35	24	23.920	24.756	25.384	25.659	27.381
	26	22.092	22.927	23.556	23.831	25.553
	28	20.525	21.360	21.989	22.264	23.986
	30	19.167	20.002	20.631	20.906	22.628
	14	52.380	53.215	53.843	54.119	55.841
	16	45.851	46.687	47.315	47.591	49.312
	18	40.774	41.609	42.238	42.513	44.235
	20	36.712	37.547	38.175	38.451	40.173
40	22	33.388	34.224	34.852	35.127	36.849
	24	30.619	31.454	32.082	32.358	34.079
	26	28.275	29.110	29.739	30.014	31.736
	28	26.266	27.102	27.730	28.005	29.727
	30	24.526	25.361	25.989	26.265	27.986
	14	72.001	72.836	73.464	73.740	75.462
	16	63.020	63.855	64.483	64.759	66.481
	18	56.035	56.870	57.498	57.774	59.495
40	20	50.446	51.282	51.910	52.186	53.907
	22	45.874	46.710	47.338	47.613	49.335
	24	42.064	42.900	43.528	43.803	45.525

表A.8 II类地形区双轴跟踪式10MW光伏电站工程项目用地总体指标（续）

单位为公顷

纬度°	效率%	10KV	35KV/66KV	110KV	220KV	330KV
40	26	38.840	39.676	40.304	40.579	42.301
	28	36.077	36.912	37.541	37.816	39.538
	30	33.682	34.517	35.146	35.421	37.143
45	14	110.524	111.360	111.988	112.263	113.985
	16	96.728	97.563	98.192	98.467	100.189
	18	85.997	86.833	87.461	87.736	89.458
	20	77.413	78.248	78.877	79.152	80.874
	22	70.389	71.225	71.853	72.128	73.850
	24	64.536	65.372	66.000	66.275	67.997
	26	59.584	60.419	61.047	61.323	63.045
	28	55.339	56.174	56.802	57.078	58.799
50	30	51.660	52.495	53.123	53.399	55.120
	14	132.753	133.588	134.217	134.492	136.214
	16	132.753	133.588	134.217	134.492	136.214
	18	132.753	133.588	134.217	134.492	136.214
	20	132.753	133.588	134.217	134.492	136.214
	22	132.060	132.895	133.524	133.799	135.521
	24	121.068	121.903	122.531	122.807	124.528
	26	111.766	112.602	113.230	113.506	115.227
	28	103.794	104.629	105.258	105.533	107.255
30	96.885	97.720	98.348	98.624	100.346	

表A.9 Ⅲ类地形区固定式10MW光伏电站工程项目用地总体指标

单位为公顷

纬度°	效率%	10KV	35KV/66KV	110KV	220KV	330KV
18	14	20.055	20.890	21.519	21.794	23.516
	16	17.567	18.403	19.031	19.306	21.028
	18	15.632	16.468	17.096	17.371	19.093
	20	14.084	14.920	15.548	15.823	17.545
	22	12.818	13.653	14.282	14.557	16.279
	24	11.762	12.598	13.226	13.502	15.223
	26	10.869	11.705	12.333	12.608	14.330
	28	10.104	10.939	11.568	11.843	13.565
20	30	9.441	10.276	10.904	11.180	12.901
	14	20.917	21.752	22.381	22.656	24.378
	16	18.321	19.157	19.785	20.061	21.782
	18	16.303	17.138	17.766	18.042	19.764
	20	14.688	15.523	16.151	16.427	18.149
	22	13.366	14.202	14.830	15.106	16.827
	24	12.265	13.101	13.729	14.004	15.726
	26	11.334	12.169	12.797	13.073	14.794
25	28	10.535	11.370	11.999	12.274	13.996
	30	9.843	10.678	11.307	11.582	13.304
	14	23.575	24.411	25.039	25.315	27.036
	16	20.648	21.483	22.111	22.387	24.109
	18	18.370	19.206	19.834	20.110	21.831
	20	16.549	17.384	18.012	18.288	20.010
	22	15.058	15.894	16.522	16.797	18.519
	24	13.816	14.651	15.280	15.555	17.277
30	26	12.765	13.600	14.229	14.504	16.226
	28	11.864	12.700	13.328	13.603	15.325
	30	11.083	11.919	12.547	12.823	14.544
	14	27.251	28.087	28.715	28.990	30.712
	16	23.864	24.699	25.328	25.603	27.325
	18	21.229	22.065	22.693	22.968	24.690
	20	19.122	19.957	20.585	20.861	22.583
	22	17.397	18.233	18.861	19.136	20.858
35	24	15.960	16.796	17.424	17.699	19.421
	26	14.744	15.580	16.208	16.483	18.205
	28	13.702	14.537	15.166	15.441	17.163
	30	12.799	13.634	14.263	14.538	16.260
	14	32.588	33.424	34.052	34.327	36.049
	16	28.534	29.369	29.997	30.273	31.995
	18	25.380	26.216	26.844	27.119	28.841
	20	22.858	23.693	24.321	24.597	26.318
40	22	20.794	21.629	22.257	22.533	24.254
	24	19.074	19.909	20.537	20.813	22.534
	26	17.618	18.453	19.082	19.357	21.079
	28	16.371	17.206	17.834	18.110	19.831
	30	15.289	16.125	16.753	17.029	18.750
	14	40.929	41.765	42.393	42.668	44.390
	16	35.832	36.668	37.296	37.571	39.293
	18	31.868	32.703	33.332	33.607	35.329
40	20	28.696	29.532	30.160	30.436	32.157
	22	26.102	26.937	27.565	27.841	29.562
40	24	23.939	24.775	25.403	25.678	27.400

表A.9 III类地形区固定式10MW光伏电站工程项目用地总体指标（续）

单位为公顷

纬度°	效率%	10KV	35KV/66KV	110KV	220KV	330KV
40	26	22.110	22.945	23.573	23.849	25.570
	28	20.541	21.377	22.005	22.280	24.002
	30	19.182	20.017	20.646	20.921	22.643
45	14	55.614	56.450	57.078	57.353	59.075
	16	48.682	49.517	50.145	50.421	52.142
	18	43.289	44.125	44.753	45.029	46.750
	20	38.976	39.811	40.440	40.715	42.437
	22	35.446	36.282	36.910	37.186	38.907
	24	32.505	33.341	33.969	34.244	35.966
	26	30.017	30.852	31.480	31.756	33.478
	28	27.884	28.719	29.347	29.623	31.344
	30	26.035	26.870	27.499	27.774	29.496
50	14	87.872	88.707	89.336	89.611	91.333
	16	76.907	77.743	78.371	78.646	80.368
	18	68.379	69.214	69.843	70.118	71.840
	20	61.556	62.392	63.020	63.295	65.017
	22	55.974	56.810	57.438	57.713	59.435
	24	51.322	52.158	52.786	53.062	54.783
	26	47.386	48.222	48.850	49.125	50.847
	28	44.013	44.848	45.476	45.752	47.473
	30	41.089	41.924	42.552	42.828	44.549

表A.10 III类地形区平单轴跟踪式10MW光伏电站工程项目用地总体指标

单位为公顷

纬度°	效率%	10KV	35KV/66KV	110KV	220KV	330KV
18	14	24.932	25.768	26.396	26.671	28.393
	16	21.835	22.670	23.299	23.574	25.296
	18	19.426	20.261	20.890	21.165	22.887
	20	17.499	18.334	18.962	19.238	20.959
	22	15.922	16.757	17.385	17.661	19.383
	24	14.608	15.443	16.071	16.347	18.068
	26	13.496	14.331	14.959	15.235	16.957
	28	12.543	13.378	14.006	14.282	16.004
20	30	11.717	12.552	13.180	13.456	15.178
	14	25.541	26.377	27.005	27.281	29.002
	16	22.368	23.203	23.832	24.107	25.829
	18	19.900	20.735	21.363	21.639	23.360
	20	17.925	18.760	19.389	19.664	21.386
	22	16.309	17.145	17.773	18.048	19.770
	24	14.963	15.798	16.427	16.702	18.424
	26	13.824	14.659	15.287	15.563	17.285
25	28	12.847	13.683	14.311	14.586	16.308
	30	12.001	12.836	13.465	13.740	15.462
	14	27.420	28.255	28.883	29.159	30.880
	16	24.011	24.847	25.475	25.750	27.472
	18	21.360	22.196	22.824	23.099	24.821
	20	19.240	20.075	20.703	20.979	22.701
	22	17.504	18.340	18.968	19.244	20.965
	24	16.059	16.894	17.522	17.798	19.519
30	26	14.835	15.670	16.299	16.574	18.296
	28	13.786	14.622	15.250	15.525	17.247
	30	12.877	13.713	14.341	14.617	16.338
	14	30.016	30.852	31.480	31.756	33.477
	16	26.283	27.119	27.747	28.023	29.744
	18	23.380	24.215	24.844	25.119	26.841
	20	21.057	21.893	22.521	22.796	24.518
	22	19.157	19.992	20.621	20.896	22.618
35	24	17.573	18.409	19.037	19.312	21.034
	26	16.233	17.069	17.697	17.972	19.694
	28	15.085	15.920	16.548	16.824	18.546
	30	14.089	14.925	15.553	15.828	17.550
	14	33.787	34.622	35.250	35.526	37.247
	16	29.582	30.418	31.046	31.321	33.043
	18	26.312	27.148	27.776	28.052	29.773
	20	23.696	24.532	25.160	25.436	27.157
40	22	21.556	22.392	23.020	23.295	25.017
	24	19.773	20.608	21.236	21.512	23.233
	26	18.263	19.099	19.727	20.002	21.724
	28	16.970	17.805	18.433	18.709	20.431
	30	15.849	16.684	17.312	17.588	19.310
	14	39.678	40.514	41.142	41.418	43.139
	16	34.738	35.573	36.201	36.477	38.199
	18	30.895	31.730	32.359	32.634	34.356
40	20	27.821	28.656	29.284	29.560	31.282
	22	25.306	26.141	26.769	27.045	28.766
40	24	23.209	24.045	24.673	24.949	26.670

表A.10 III类地形区平单轴跟踪式10MW光伏电站工程项目用地总体指标（续）

单位为公顷

纬度°	效率%	10KV	35KV/66KV	110KV	220KV	330KV
40	26	21.436	22.271	22.900	23.175	24.897
	28	19.916	20.751	21.379	21.655	23.377
	30	18.598	19.434	20.062	20.337	22.059
45	14	50.049	50.885	51.513	51.788	53.510
	16	43.812	44.648	45.276	45.551	47.273
	18	38.961	39.797	40.425	40.700	42.422
	20	35.080	35.916	36.544	36.820	38.541
	22	31.905	32.741	33.369	33.644	35.366
	24	29.259	30.095	30.723	30.998	32.720
	26	27.020	27.856	28.484	28.759	30.481
	28	25.101	25.937	26.565	26.840	28.562
	30	23.438	24.273	24.902	25.177	26.899
50	14	72.823	73.659	74.287	74.563	76.284
	16	63.740	64.575	65.203	65.479	67.200
	18	56.674	57.510	58.138	58.414	60.135
	20	51.022	51.858	52.486	52.761	54.483
	22	46.398	47.233	47.862	48.137	49.859
	24	42.544	43.379	44.008	44.283	46.005
	26	39.283	40.119	40.747	41.022	42.744
	28	36.488	37.324	37.952	38.227	39.949
	30	34.066	34.901	35.530	35.805	37.527

表A.11 III类地形区斜单轴跟踪式10MW光伏电站工程项目用地总体指标

单位为公顷

纬度°	效率%	10KV	35KV/66KV	110KV	220KV	330KV
18	14	30.482	31.318	31.946	32.221	33.943
	16	26.691	27.526	28.155	28.430	30.152
	18	23.742	24.578	25.206	25.481	27.203
	20	21.383	22.219	22.847	23.123	24.844
	22	19.453	20.289	20.917	21.192	22.914
	24	17.845	18.680	19.309	19.584	21.306
	26	16.484	17.319	17.948	18.223	19.945
	28	15.318	16.153	16.781	17.057	18.778
20	14	32.236	33.071	33.700	33.975	35.697
	16	28.226	29.061	29.689	29.965	31.687
	18	25.107	25.942	26.570	26.846	28.567
	20	22.611	23.447	24.075	24.350	26.072
	22	20.570	21.405	22.033	22.309	24.030
	24	18.868	19.704	20.332	20.607	22.329
	26	17.429	18.264	18.892	19.168	20.889
	28	16.195	17.030	17.658	17.934	19.655
25	14	37.867	38.702	39.331	39.606	41.328
	16	33.153	33.988	34.616	34.892	36.614
	18	29.486	30.321	30.950	31.225	32.947
	20	26.553	27.388	28.016	28.292	30.014
	22	24.153	24.988	25.616	25.892	27.614
	24	22.153	22.988	23.616	23.892	25.614
	26	20.460	21.296	21.924	22.200	23.921
	28	19.010	19.845	20.474	20.749	22.471
30	14	46.158	46.993	47.621	47.897	49.619
	16	40.407	41.243	41.871	42.146	43.868
	18	35.934	36.770	37.398	37.674	39.395
	20	32.356	33.192	33.820	34.095	35.817
	22	29.429	30.264	30.892	31.168	32.890
	24	26.989	27.824	28.453	28.728	30.450
	26	24.925	25.760	26.388	26.664	28.386
	28	23.155	23.991	24.619	24.894	26.616
35	14	59.123	59.959	60.587	60.862	62.584
	16	51.752	52.587	53.216	53.491	55.213
	18	46.019	46.854	47.482	47.758	49.480
	20	41.432	42.267	42.896	43.171	44.893
	22	37.679	38.515	39.143	39.419	41.140
	24	34.552	35.388	36.016	36.291	38.013
	26	31.906	32.742	33.370	33.645	35.367
	28	29.638	30.473	31.102	31.377	33.099
40	14	81.278	82.113	82.741	83.017	84.738
	16	71.137	71.972	72.601	72.876	74.598
	18	63.250	64.085	64.714	64.989	66.711
	20	56.940	57.776	58.404	58.679	60.401
	22	51.778	52.613	53.241	53.517	55.239
	24	47.476	48.311	48.939	49.215	50.936

表A.11 III类地形区斜单轴跟踪式10MW光伏电站工程项目用地总体指标（续）

单位为公顷

纬度°	效率%	10KV	35KV/66KV	110KV	220KV	330KV
40	26	43.835	44.671	45.299	45.575	47.296
	28	40.715	41.551	42.179	42.454	44.176
	30	38.011	38.846	39.475	39.750	41.472
45	14	124.775	125.610	126.239	126.514	128.236
	16	109.197	110.033	110.661	110.936	112.658
	18	97.081	97.917	98.545	98.820	100.542
	20	87.388	88.224	88.852	89.128	90.849
	22	79.458	80.293	80.922	81.197	82.919
	24	72.849	73.685	74.313	74.588	76.310
	26	67.257	68.093	68.721	68.996	70.718
	28	62.464	63.299	63.928	64.203	65.925
50	30	58.310	59.145	59.774	60.049	61.771
	14	163.353	164.188	164.817	165.092	166.814
	16	163.353	164.188	164.817	165.092	166.814
	18	163.353	164.188	164.817	165.092	166.814
	20	163.353	164.188	164.817	165.092	166.814
	22	149.091	149.927	150.555	150.830	152.552
	24	136.680	137.515	138.143	138.419	140.141
	26	126.178	127.013	127.641	127.917	129.639
	28	117.176	118.011	118.640	118.915	120.637
30	109.374	110.210	110.838	111.113	112.835	

表A.12 Ⅲ类地形区双轴跟踪式 10MW 光伏电站工程项目用地总体指标

单位为公顷

纬度°	效率%	10KV	35KV/66KV	110KV	220KV	330KV
18	14	33.213	34.048	34.676	34.952	36.674
	16	29.080	29.916	30.544	30.819	32.541
	18	25.866	26.701	27.330	27.605	29.327
	20	23.295	24.130	24.758	25.034	26.756
	22	21.191	22.026	22.655	22.930	24.652
	24	19.438	20.273	20.902	21.177	22.899
	26	17.954	18.790	19.418	19.693	21.415
	28	16.683	17.518	18.147	18.422	20.144
20	14	35.124	35.960	36.588	36.864	38.585
	16	30.753	31.588	32.217	32.492	34.214
	18	27.353	28.188	28.817	29.092	30.814
	20	24.633	25.468	26.097	26.372	28.094
	22	22.408	23.243	23.871	24.147	25.868
	24	20.553	21.388	22.017	22.292	24.014
	26	18.984	19.819	20.447	20.723	22.445
	28	17.639	18.474	19.102	19.378	21.100
25	14	41.262	42.098	42.726	43.001	44.723
	16	36.124	36.959	37.587	37.863	39.584
	18	32.127	32.962	33.591	33.866	35.588
	20	28.929	29.765	30.393	30.669	32.390
	22	26.313	27.149	27.777	28.052	29.774
	24	24.133	24.969	25.597	25.872	27.594
	26	22.289	23.124	23.752	24.028	25.750
	28	20.708	21.543	22.171	22.447	24.168
30	14	50.299	51.135	51.763	52.039	53.760
	16	44.031	44.867	45.495	45.770	47.492
	18	39.156	39.991	40.619	40.895	42.617
	20	35.256	36.091	36.719	36.995	38.716
	22	32.064	32.900	33.528	33.803	35.525
	24	29.405	30.240	30.869	31.144	32.866
	26	27.155	27.990	28.619	28.894	30.616
	28	25.226	26.062	26.690	26.965	28.687
35	14	64.432	65.268	65.896	66.171	67.893
	16	56.397	57.233	57.861	58.136	59.858
	18	50.148	50.983	51.612	51.887	53.609
	20	45.148	45.984	46.612	46.887	48.609
	22	41.058	41.893	42.522	42.797	44.519
	24	37.649	38.485	39.113	39.388	41.110
	26	34.765	35.600	36.229	36.504	38.226
	28	32.293	33.128	33.756	34.032	35.753
40	14	88.581	89.416	90.045	90.320	92.042
	16	77.527	78.363	78.991	79.267	80.988
	18	68.930	69.766	70.394	70.669	72.391
	20	62.053	62.888	63.516	63.792	65.513
	22	56.425	57.261	57.889	58.164	59.886
	24	51.736	52.571	53.200	53.475	55.197

表A.12 III类地形区双轴跟踪式10MW光伏电站工程项目用地总体指标（续）

单位为公顷

纬度°	效率%	10KV	35KV/66KV	110KV	220KV	330KV
40	26	47.768	48.603	49.232	49.507	51.229
	28	44.367	45.202	45.831	46.106	47.828
	30	41.419	42.255	42.883	43.158	44.880
45	14	135.995	136.830	137.458	137.734	139.455
	16	119.014	119.850	120.478	120.753	122.475
	18	105.808	106.643	107.271	107.547	109.268
	20	95.242	96.077	96.706	96.981	98.703
	22	86.598	87.433	88.061	88.337	90.058
	24	79.394	80.229	80.858	81.133	82.855
	26	73.298	74.134	74.762	75.038	76.759
	28	68.074	68.909	69.537	69.813	71.535
	30	63.546	64.381	65.009	65.285	67.007
50	14	163.353	164.188	164.817	165.092	166.814
	16	163.353	164.188	164.817	165.092	166.814
	18	163.353	164.188	164.817	165.092	166.814
	20	163.353	164.188	164.817	165.092	166.814
	22	162.500	163.335	163.964	164.239	165.961
	24	148.971	149.806	150.435	150.710	152.432
	26	137.523	138.359	138.987	139.263	140.984
	28	127.711	128.547	129.175	129.450	131.172
	30	119.207	120.043	120.671	120.946	122.668

附录 B
(规范性)
光伏方阵用地指标

表 B.1 固定式光伏方阵用地指标表

单位为每10兆瓦公顷

纬度°	效率%								
	14	16	18	20	22	24	26	28	30
18	12.195	10.670	9.485	8.536	7.760	7.114	6.566	6.097	5.691
20	12.723	11.133	9.896	8.906	8.096	7.422	6.851	6.362	5.937
25	14.352	12.558	11.163	10.046	9.133	8.372	7.728	7.176	6.698
30	16.604	14.529	12.914	11.623	10.566	9.686	8.941	8.302	7.749
35	19.874	17.390	15.458	13.912	12.647	11.593	10.702	9.937	9.275
40	24.986	21.862	19.433	17.490	15.900	14.575	13.454	12.493	11.660
45	33.984	29.736	26.432	23.789	21.626	19.824	18.299	16.992	15.859
50	53.749	47.031	41.805	37.625	34.204	31.354	28.942	26.875	25.083

表 B.2 平单轴跟踪式光伏方阵用地指标表

单位为每10兆瓦公顷

纬度°	效率%								
	14	16	18	20	22	24	26	28	30
18	15.183	13.285	11.809	10.628	9.662	8.857	8.176	7.592	7.086
20	15.557	13.612	12.100	10.890	9.900	9.075	8.377	7.778	7.260
25	16.707	14.619	12.995	11.695	10.632	9.746	8.996	8.354	7.797
30	18.299	16.011	14.232	12.809	11.645	10.674	9.853	9.149	8.539
35	20.609	18.033	16.029	14.426	13.115	12.022	11.097	10.304	9.617
40	24.219	21.192	18.837	16.953	15.412	14.128	13.041	12.110	11.302
45	30.574	26.752	23.780	21.402	19.456	17.835	16.463	15.287	14.268
50	44.528	38.962	34.633	31.170	28.336	25.975	23.977	22.264	20.780

表 B.3 斜单轴跟踪式光伏方阵用地指标表

单位为每10兆瓦公顷

纬度°	效率%								
	14	16	18	20	22	24	26	28	30
18	18.584	16.261	14.454	13.009	11.826	10.841	10.007	9.292	8.673
20	19.659	17.201	15.290	13.761	12.510	11.468	10.585	9.829	9.174
25	23.109	20.220	17.974	16.176	14.706	13.480	12.443	11.554	10.784
30	28.189	24.666	21.925	19.732	17.939	16.444	15.179	14.095	13.155
35	36.134	31.617	28.104	25.294	22.994	21.078	19.457	18.067	16.862
40	49.709	43.495	38.662	34.796	31.633	28.997	26.766	24.854	23.197
45	76.362	66.816	59.392	53.453	48.594	44.544	41.118	38.181	35.635
50	100.00	100.00	100.00	100.00	91.261	83.656	77.221	71.705	66.925

表 B.4 双轴跟踪式光伏方阵用地指标表

单位为每10兆瓦公顷

纬度°	效率%								
	14	16	18	20	22	24	26	28	30
18	20.257	17.725	15.756	14.180	12.891	11.817	10.908	10.129	9.453
20	21.429	18.750	16.667	15.000	13.636	12.500	11.538	10.714	10.000
25	25.189	22.041	19.592	17.633	16.030	14.694	13.564	12.595	11.755
30	30.727	26.886	23.899	21.509	19.554	17.924	16.545	15.363	14.339
35	39.387	34.463	30.634	27.571	25.064	22.976	21.208	19.693	18.380
40	54.184	47.411	42.143	37.929	34.481	31.607	29.176	27.092	25.286
45	83.236	72.832	64.739	58.265	52.969	48.554	44.820	41.618	38.844
50	100.00	100.00	100.00	100.00	99.477	91.187	84.173	78.161	72.950

参 考 文 献

- [1] GB 50794-2012 光伏电站施工规范
 - [2] GB 50795-2012 光伏发电工程施工组织设计规范
 - [3] GB 50796-2012 光伏发电工程验收规范
 - [4] 建标[2010]78号 电力工程项目建设用地指标（火电厂、核电厂、变电站和换流站）
 - [5] 建标[2011]124号 公路工程项目建设用地指标
-