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The Reliability and Operation Test System of Power Grid with Large-scale Renewable Integration

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***Abstract*—This paper proposes a reliability and operation test system named XJTU-ROTS2017, characterized by large-scale renewable power integration and long-distance transmission. The test system has 38 nodes, 65 lines, 12 transformers and 20 generators in three areas, with peak load 10421MW and total installed capacity 16050MW. Electricity mainly transmits from resource-rich area to load area, carrying wind/solar power generation. The determination of component parameters and grid topology is based on design manuals and typical practice. The test system can be conveniently applied to reliability evaluation and operation optimization of composite power system integrating coal /hydro/solar/wind resources. Finally, the extended applications to AC/DC hybrid power system and interconnected power system are discussed.**

***Index Terms*—test system, large-scale renewable energy, reliability, operation, XJTU-ROTS2017.**

I. Introduction

THE worsening situations of energy crisis and environmental pollution pose higher requirements on clean production and renewable energy utilization, promoting the worldwide development of wind and solar energy rapidly[1]. There exist two main trends of renewable energy development, i.e., small-scale distributed generation and large-scale centralized generation. As the most representative country in terms of the centralized renewable generation, China has a number of 10 GW-size wind power and photovoltaic bases, and its transmission lines between resource bases and load centers are often hundreds or thousands of kilometers long[2], as is illustrated in Fig.1. Due to its intermittency and fluctuation, renewable energy has obvious influences on power system planning and operation. Therefore, a test system characterized by large-scale renewable integration and long distance transmission is urgently needed.

The typical test systems of IEEE-Reliability Test Systems, IEEE-RTS24 [3] and IEEE-RTS96 [4], are published in 1979 and 1999, respectively. The two systems are mainly employed for power system reliability evaluation, whose widespread utilization has enormously promoted relevant research. Many of the power system features at that stage are included, such as small generating capacity, high failure rates of generation units and considerable redundancy of transmission systems.

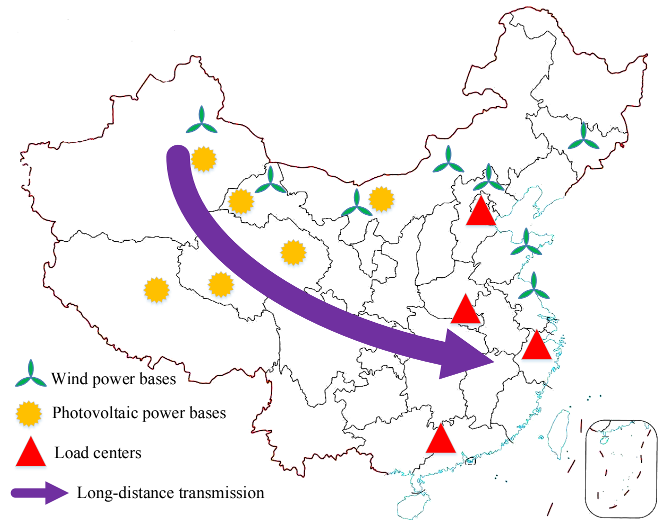

FIG.1. DISTRIBUTION AND CONSUMPTION OF LARGE-SCALE WIND/SOLAR POWER BASES IN CHINA

Furthermore, the TH-TRS was designed in 2000, which has larger generating capacity and highlights system interconnection [5]. But some features of modern power systems need to get reflected more appropriately, such as renewable energy integration. The newest research extends IEEE 118-Bus test system to NREL-118, which reflects features of decentralized integration and consumption of renewable energy, and robust regulation ability brought by high proportion of gas generation [6] in North America. However, the IEEE test systems are based on special power systems, which are far away from the actual situations in China even if modified. The characteristics of the actual power systems in China, such as the typical mode of large-scale integration and long distance transmission of renewable energy, and system inflexibility brought by high proportion of coal-fired generation, are not easy to be embodied by modifying existing IEEE test systems slightly. Hence, a new test system that could cover the actual situations in China and provide a standardized platform for research, is worth investigation.

This paper designs a test system named XJTU-ROTS2017, which illustrates the characteristics of the actual power systems, and works as a typical example for research under the background of high proportion of renewable energy in China . This test system improves the existing test systems, highlights the characteristics of large-scale wind/solar power integration, as well as providing testing examples for operation

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optimization of power systems with renewable integration. Besides, considering the widespread use of test systems in reliability evaluation, reliability data is also incorporated in XJTU-ROTS2017, which offers convenient application to both reliability evaluation and operation optimization.

II. Overall Conditions of XJTU-ROTS2017

A. *Principles of Test System Design*

The design principles of test system XJTU-RPTS2017 are summarized as follows:

1. Compositions of voltage levels

In order to demonstrate high voltage level, large-scale renewable integration and long-distance transmission, the highest voltage level is chosen as 500kV. It should be noted that the highest voltage level is similar to that of main transmission networks worldwide, while higher than that in IEEE-RTS24(238kV). Meanwhile, the voltage level of transmission networks in load area is selected as 220kV. Hence, 500kV voltage level realizes the long distance transmission of large-scale renewable energy resources, while 220kV voltage level satisfies supply and demand needs of resource-rich area and load area in the grid. In addition, the voltage at transformer low voltage side is chosen as 35kV.

2. Power grid structure

The overall power grid structure should represent long-distance power transmission from resource-rich area to load area. The typical structure in practice need to be investigated and incorporated into the test system [7] [8]. Grid structure design follows two basic rules：1) The capacity and number of lines and transformers should be selected according to design rules in practice. 2) The design of the grid topology takes into account N-1 criteria.

B. *System Overview and Generation Composition*

For the convenience, the electric quantities in this paper have both actual values and per unit values. The reference capacity is 100MVA, and the reference voltages for 500kV and 220kV grid are chosen as 525kV and 230kV, respectively.

The general parameters of the XJTU-ROTS2017 is shown in Table I.

Table I
General Parameters of the XJTU-ROTS2017

Nodes	Lines	Transformers	Generators	Loads	Annual Peak Load	Total Installed Capacity
38	65	12	20	30	10421MW	16050MW

Fig.2 shows installed capacity ratio of each type of power units. Among them, the installed capacity of coal-fired power units accounts for 2/3, which is similar to China's power structure dominated by coal-fired generation [9]. It is necessary to point out that the coal-fired generators have relatively high startup and shutdown cost, meanwhile require the minimum output in operation. Consequently, the large ratio of coal-fired thermal power leads to the lack of flexibility in power system operation, which is unfavorable to large-scale renewable energy consumption. In comparison, large-scale renewable integration and system inflexibility brought by high proportion of coal-fired generation in China, are not reflected in IEEE test systems.

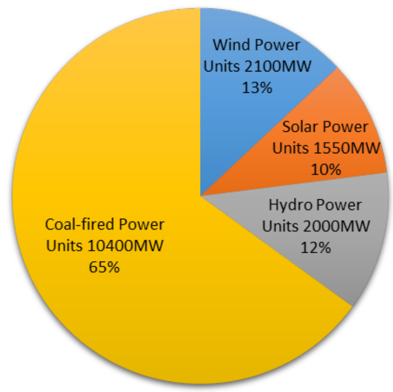

Fig.2. Installed Capacity Ratio of Each Type of Power Units in XJTU-ROTS2017

C. *Test System Grid Topology*

The grid topology of test system is illustrated in Fig.3. It can be divided into resource-rich area (Area A), 500kV area (Area B) and load area (Area C). The connection points of wind/solar/coal-fired/hydro power generation, transmission line lengths (depicted by numbers on the lines) and node voltage level information are also illustrated in Fig.3.

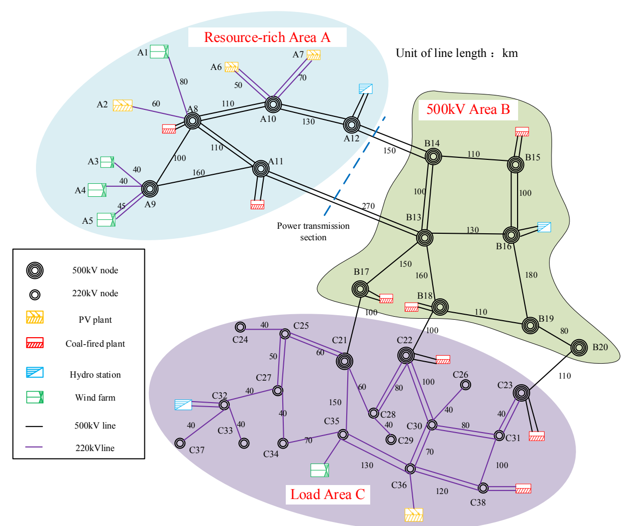

Fig.3. Grid Topology of XJTU-ROTS2017

The numbering for each node is unified. The transformer nodes contain different voltage levels, thus corresponding to multiple buses. To distinguish these buses with the same transformer, this paper uses suffixes like -H, -M, -L, which are responding to the high/medium/low voltage side of the transformer, respectively. For example, C22H stands for the high voltage side of the transformer node C22.

Long-distance transmission of renewable energy is illustrated in the grid topology. The longest line is 270 km, and the longest distance from resource-rich area (Area A) to load area (Area C) reaches up to 700-800 km. Compared with existing test systems, it is more challenging to coordinate renewable generation and consumption in wide range from the view of whole system.

III. Data of Power Generation

A. Data of Renewable Energy Generation

Considering the influence of seasonal variability and short-time intermittency on system operation and reliability evaluation, hourly time series information of renewable output is critical [6].

One typical week data is selected on behalf of each month, and then six types of wind/solar annual output curves are formed, which are directly given in the appendix tables for relevant research. Wind speed data from NREL[10] and illumination intensity data generated by Homer software are transferred to wind/solar power output data under the rated capacity 10MW, respectively.

Wind farms located at A1 adopt 1# wind power data(with most abundant wind resources), wind farms at A3、A4 and A5 employ 2# wind power data, and wind farm at C35 uses 3# wind power data(with least abundant wind resources). Also, the photovoltaic power station at A2 uses 1# solar power data(with most abundant photovoltaic resources), photovoltaic power stations at A6 and A7 apply 2# solar power data, and the photovoltaic power station at C36 adopts 3#solar power data.

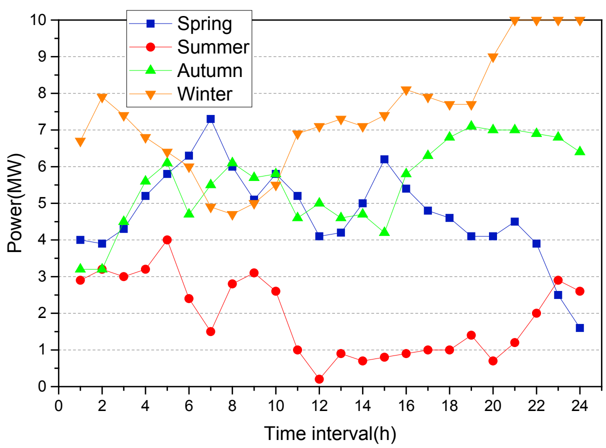

FIG.4. TYPICAL OUTPUT OF 1# WIND POWER IN FOUR SEASONS

Take 1# solar/wind power data as an example, Fig.4 and Fig.5 illustrate the daily output curves of wind and solar power in four seasons in a year, respectively.

Compared with NREL-118, which is characterized by high renewable penetration, the design in this paper highlights China's typical mode of large-scale renewable integration in forms of large renewable power stations. In comparison, typical mode of renewable large-scale integration and long distance transmission of renewable energy, are not evident in IEEE test systems.

Table II gives information about wind/solar power generation. The corresponding power factor of renewable power can be set as some certain value in the calculation, such as 1.0 or 0.98.

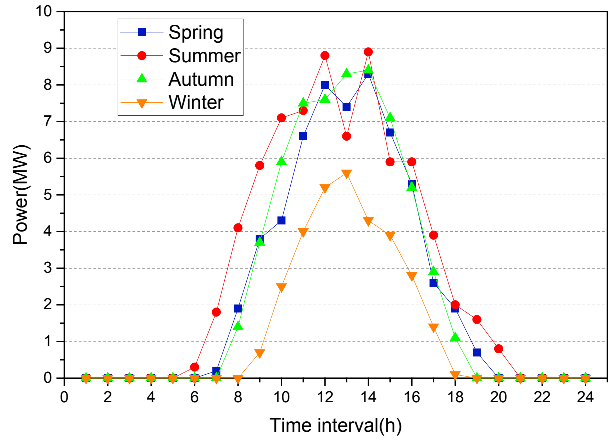

FIG.5. TYPICAL OUTPUT OF 1# SOLAR POWER IN FOUR SEASONS

TABLE II
DATA OF RENEWABLE ENERGY GENERATION

Number	Generation Type	Node	Installed Capacity(MW)
G1	Wind Power	A1	400
G2	Wind Power	A3	400
G3	Wind Power	A4	400
G4	Wind Power	A5	800
G5	Wind Power	C35	100
G6	Photovoltaic Power	A2	500
G7	Photovoltaic Power	A6	500
G8	Photovoltaic Power	A7	500
G9	Photovoltaic Power	C36	50

B. Data of Hydropower Station

Table III gives the basic data of hydro stations, including unit capacity, number of installed units, operating range of reactive power, ramp rate and monthly generation. In this paper, rainy season is from April to September, and dry season is from January to March and from October to December. G10 is a hydropower station capable of long-term regulation (with a large reservoir), and G11 and G12 are the hydropower stations with less regulation ability. Some hydropower station (such as G11) can also be set as a pumped storage power station in the future study.

Table IV gives the reliability data of the hydro power generating units by reference to IEEE-RTS24 [3] and the statistical data of China Electricity Council.

C. Data of Coal-fired Power Plant

Table V gives the data of coal-fired power plants, including unit capacity, number of installed units, operating range of reactive power, minimum output, ramp rate, minimum up time, minimum down time, and start-up and shut-down cost. Considering the current refit of some thermal units, there are some differences between ramp rates. Compared with reliability systems, this test system provides more detailed information.

TABLE III
DATA OF HYDROPOWER PLANTS

Number	Bus Name	Unit Capacity(MW)	Number of Installed Units	Operating Range of Reactive Power (Mvar)	Ramp Rate (MW/min)	Maximum Monthly Generation of Hydropower Station in Rainy Season(GWh)	Maximum Monthly Generation of Hydropower Station in Dry Season (GWh)
G10	A12	200	4	[-50，124]	20	432	216
G11	B16	200	4	[-50，124]	14	400	144
G12	C32	200	2	[-50，124]	14	192	72

TABLE IV
RELIABILITY DATA OF HYDROPOWER GENERATING UNITS

Number	Forced Outage Rate	MTTF(h)	MTTR(h)	Scheduled Maintenance(Weeks/Year)
G10	0.0015	8000	12	4
G11	0.0015	8000	12	4
G12	0.0012	8300	10	4

TABLE V
DATA OF COAL-FIRED POWER PLANTS

Number	Bus Name	Unit Capacity(MW)	Number of Installed Units	Operating Range of Reactive Power (Mvar)	Minimum Output (MW)	Ramp Rate(MW /min)	Minimum Up Time(h)	Minimum Down Time (h)	Start-up and Shut-down Cost(10^4 RMB)
G13	A8H	600	2	[-150，372]	240	6.0	8	5	40
G14	A11	600	4	[-150，372]	240	6.0	8	5	40
G15	B15	600	2	[-150，372]	240	6.0	8	5	40
G16	C22H	200	6	[-50，124]	90	1.5	5	4	15
G17	C23H	200	6	[-50，124]	90	1.5	5	4	15
G18	C38	200	4	[-50，124]	90	1.5	5	4	15
G19	B17	300	4	[-75，186]	130	2.5	6	4	30
G20	B18	300	4	[-75，186]	130	3.0	6	4	30

TABLE VI
RELIABILITY DATA OF COAL-FIRED POWER UNITS

Number	Forced Outage Rate	MTTF(h)	MTTR(h)	Scheduled Maintenance(Weeks/Year)
G13	0.0036	7850	28	6
G14	0.0038	7850	30	6
G15	0.0039	7850	31	6
G16	0.0055	3235	18	4
G17	0.0068	3235	22	4
G18	0.0061	3235	20	4
G19	0.0045	5730	26	5
G20	0.0043	5730	25	5

Table VI gives the reliability data of the coal-fired power generating units also by reference to the statistical data of China Electricity Council.

Table VII gives the unit coal consumption data of coal-fired power units. The calculation formula on the coal consumption of coal-fired unit is $B(P) = aP^2 + bP + c$. The coefficients a, b and c are shown in Table VII, which can be used in much research such as economic dispatch.

It should be noted that all the thermal power plants in this paper are assumed to be coal-fired plants. Actually, gas generation and oil generation can easily be included by replacing part of the coal-fired generation units with gas-fired or oil-fired generation units, whose consumption parameters can be given according to NREL-118 [6].

TABLE VII
FUEL CONSUMPTION DATA OF COAL-FIRED POWER UNITS

Number	Coefficient of Coal Consumption Per Unit a(t/MW^2·h)	Coefficient of Coal Consumption Per Unit b(t/MW·h)	Coefficient of Coal Consumption Per Unit c(t/h)
G13	0.000017	0.2350	23.0194
G14	0.000017	0.2530	21.0194
G15	0.000017	0.2600	20.0194
G16	0.000092	0.2499	13.6349
G17	0.000091	0.2540	12.9950
G18	0.000092	0.2382	14.2485
G19	0.000160	0.2317	10.1872
G20	0.000150	0.2299	10.6686

IV. Load Data

The data of load at each node in the peak load period is given in Table VIII, where the total peak load reaches up to 10421MW. The distribution laws of hourly load curves follow the load model in IEEE-RTS24[3], which can be obtained by multiplying the peak load by load distribution coefficients. In this way, typical hourly load curves of certain days in four seasons in a year could be generated, as shown in Fig. 6.

TABLE VIII
NODAL LOAD DATA IN PEAK LOAD PERIOD

Number	Bus Name	Peak Load(MW)	Load Type	Power Factor
1	A8H	60	Composite Load	0.90
2	A9H	200	Composite Load	0.90
3	A10H	300	Composite Load	0.90
4	A11	64	Composite Load	0.90
5	B13	1400	Composite Load	0.90
6	B14	1200	Composite Load	0.90
7	B15	614	Composite Load	0.90
8	B16	630	Composite Load	0.90
9	B17	84	Composite Load	0.90
10	B18	390	Composite Load	0.90
11	C21H	320	Composite Load	0.90
12	C22H	284	Composite Load	0.90
13	B19	610	Composite Load	0.90
14	B20	800	Composite Load	0.90
15	C23H	384	Composite Load	0.90
16	C24	110	Rural Power Load	0.85
17	C25	240	Large Industrial Load	0.90
18	C26	96	Rural Power Load	0.85
19	C27	120	Metallurgical Industry Load	0.90
20	C28	340	Large Industrial Load	0.90
21	C29	102	Rural Power Load	0.85
22	C30	150	Large Industrial Load	0.90
23	C31	172	Metallurgical Industry Load	0.90
24	C32	140	Metallurgical Industry Load	0.90
25	C33	96	Rural Power Load	0.85
26	C34	300	Urban Power Load	0.85
27	C35	460	Large Industrial Load	0.90
28	C36	344	Large Industrial Load	0.90
29	C37	145	Urban Power Load	0.85
30	C38	266	Large Industrial Load	0.90

Especially, the detailed load types, including large industrial load, metallurgical industry load, urban power load, rural power load, as well as composite load consisting of various loads, are given in Table VIII, which is fundamental to reliability evaluation and operation optimization with more precision.

In future study, flexible load, such as electric vehicles and energy storage stations, should be taken into consideration. Some research might need data about the Value of Lost Load (VoLL), which can be referenced in [11].

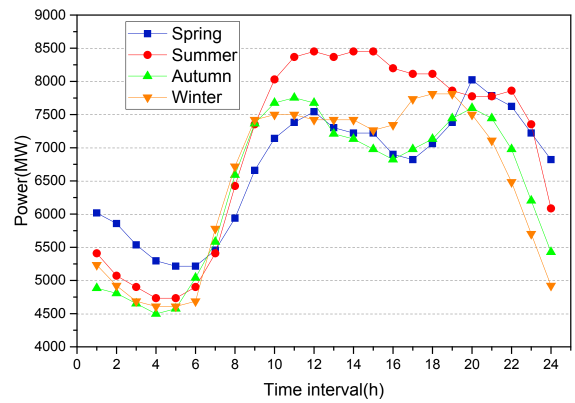

FIG.6. TYPICAL HOURLY LOAD CURVES OF CERTAIN DAYS IN A YEAR

V. Branch Data

A. Data of Transmission Lines

Table IX gives the basic parameters and reliability data of transmission lines. The line element model uses π type equivalent circuit [12], R, X denote line resistance and reactance, $B_{50\%}$ represents half of transmission line grid-to-earth capacitance, and P_{max} indicates the maximum transmission capacity of each line.

The maximum capacity of transmission section, which generally consists of multiple adjacent lines, is also an important factor to consider in power system operation. In this system, the key transmission section, whose maximum capacity is set as 56.82(p.u.), is formed by two double-circuit lines, i.e. A11-B13 and A12-B14 (as shown in Fig. 1).

B. Data of Transformers

The component model of transformer is referred to literature [12]. Table X and Table XI show the transformer data in the test system [7]. There are two sets of three-winding transformers operating in parallel of A8, A9, A10, C21, C22 and C23.

If reactive voltage optimization is required, the transformers can be chosen as OLTC(On Load Tap Changing) transformers, whose taps at high and medium voltage sides are both ±8×1.25%.

C. Data of Reactive Power Compensation

The low-voltage side bus of each transformer is configured with capacitor groups and reactor groups. Table XII shows reactive compensation data of capacitors and reactors in the test system, which is set according to the configurations in actual power systems.

VI. System Applications And Extensions

A. Comprehensive utilization of the test system

In the test system, most settings totally follow the design manuals or actual designs, and typical characteristics of the actual operating conditions are considered. Therefore, the test system is capable of offering a standardized platform to inspect the feasibility and superiority of the theory or method.

It could be utilized for the reliability evaluation of generation system or composite system. It could provide relevant parameters for state sampling and sequential sampling Also, it is applicable to power flow, optimal power flow and economic dispatch.

In addition to reliability evaluation and operation optimization of the power system with renewable energy, the test system data can also be directly applied to other research fields, e.g., unit commitment, reactive power optimization, power market and production simulation.

B. *Extended applications of the test system*

The future adaptability of XJTU-ROTS2017 is also taken into account, which can be extended in the following aspects:

1） *Extension of the unit types*

In this paper, the type of generators can be further extended. Coal-fired generators can be replaced by nuclear/ gas/oil-fired generators or CHP units, photovoltaic stations can be replaced by photothermal power stations, and hydropower stations can be replaced by pumped storage power stations or energy storage power stations. Each node may be connected with different types of generators. For example, it can be connected with a hydro-photovoltaic power station [13].

TABLE IX
BASIC PARAMETERS AND RELIABILITY DATA OF TRANSMISSION LINES

Number	From Bus	To Bus	Length(km)	R(p.u.)	X(p.u.)	$B_{50\%}$ (p.u.)	Permanent Outage Rate(Outages/Year)	Permanent Outage Duration (h)*	P_{max}(p.u.)
L1	A8H	A9H	100	0.000980	0.009905	0.563897	0.0940	6	20.45
L2	A8H	A10H	110	0.001078	0.010895	0.620286	0.1034	6	20.45
L3	A8H	A10H	110	0.001078	0.010895	0.620286	0.1034	6	20.45
L4	A8H	A11	110	0.001078	0.010895	0.620286	0.1034	6	20.45
L5	A8H	A11	110	0.001078	0.010895	0.620286	0.1034	6	20.45
L6	A9H	A11	160	0.001567	0.015848	0.902235	0.1504	6	20.45
L7	A10H	A12	150	0.001088	0.014959	0.853625	0.1410	6	24.34
L8	A10H	A12	150	0.001088	0.014959	0.853625	0.1410	6	24.34
L9	A11	B13	270	0.001959	0.026926	1.536525	0.2138	6	24.34
L10	A11	B13	270	0.001959	0.026926	1.536525	0.2138	6	24.34
L11	A12	B14	150	0.001088	0.014959	0.853625	0.1410	6	24.34
L12	A12	B14	150	0.001088	0.014959	0.853625	0.1410	6	24.34
L13	B13	B14	100	0.000980	0.009905	0.563897	0.0940	6	20.45
L14	B13	B14	100	0.000980	0.009905	0.563897	0.0940	6	20.45
L15	B13	B16	130	0.001273	0.012876	0.733066	0.1222	6	20.45
L16	B13	B17	150	0.001469	0.014857	0.845845	0.1410	6	20.45
L17	B13	B18	160	0.001567	0.015848	0.902235	0.1504	6	20.45
L18	B14	B15	110	0.001078	0.010895	0.620286	0.1034	6	20.45
L19	B15	B16	100	0.000980	0.009905	0.563897	0.0940	6	20.45
L20	B15	B16	100	0.000980	0.009905	0.563897	0.0940	6	20.45
L21	B16	B19	180	0.001763	0.017829	1.015014	0.1692	6	20.45
L22	B17	C21H	100	0.000980	0.009905	0.563897	0.0940	6	20.45
L23	B18	C22H	100	0.000980	0.009905	0.563897	0.0940	6	20.45
L24	B18	B19	110	0.001078	0.010895	0.620286	0.1034	6	20.45
L25	B19	B20	80	0.000784	0.007924	0.451117	0.0752	4	20.45
L26	B20	C23H	110	0.001078	0.010895	0.620286	0.1034	6	20.45
L27	A1	A8M	80	0.001161	0.008703	0.414039	0.0752	4	5.33
L28	A2	A8M	60	0.000871	0.006527	0.310530	0.0564	4	5.33
L29	A3	A9M	40	0.000580	0.004351	0.207020	0.0376	4	5.33
L30	A4	A9M	40	0.000580	0.004351	0.207020	0.0376	4	5.33
L31	A5	A9M	45	0.000653	0.004895	0.232897	0.0423	4	5.33
L32	A5	A9M	45	0.000653	0.004895	0.232897	0.0423	4	5.33
L33	A6	A10M	50	0.000726	0.005439	0.258775	0.0470	4	5.33
L34	A6	A10M	50	0.000726	0.005439	0.258775	0.0470	4	5.33
L35	A7	A10M	70	0.001016	0.007615	0.362285	0.0658	4	5.33
L36	A7	A10M	70	0.001016	0.007615	0.362285	0.0658	4	5.33

Number	From Bus	To Bus	Length(km)	R(p.u.)	X(p.u.)	$B_{50\%}$ (p.u.)	Permanent Outage Rate(Outages/Year)	Permanent Outage Duration (h)*	P_{max}(p.u.)
L37	C25	C24	40	0.000784	0.004418	0.203816	0.0376	4	4.48
L38	C25	C21M	60	0.000871	0.006527	0.310530	0.0564	4	5.33
L39	C25	C21M	60	0.000871	0.006527	0.310530	0.0564	4	5.33
L40	C25	C27	50	0.000980	0.005523	0.254770	0.0470	4	4.48
L41	C25	C27	50	0.000980	0.005523	0.254770	0.0470	4	4.48
L42	C26	C30	40	0.000784	0.004418	0.203816	0.0376	4	4.48
L43	C27	C32	40	0.000784	0.004418	0.203816	0.0376	4	4.48
L44	C27	C34	40	0.000784	0.004418	0.203816	0.0376	4	4.48
L45	C28	C21M	60	0.000871	0.006527	0.310530	0.0564	4	5.33
L46	C28	C22M	80	0.001161	0.008703	0.414039	0.0752	4	5.33
L47	C28	C22M	80	0.001161	0.008703	0.414039	0.0752	4	5.33
L48	C28	C29	40	0.000784	0.004418	0.203816	0.0376	4	4.48
L49	C30	C22M	100	0.001451	0.010879	0.517549	0.0940	6	5.33
L50	C30	C22M	100	0.001451	0.010879	0.517549	0.0940	6	5.33
L51	C30	C36	70	0.001371	0.007732	0.356678	0.0658	4	4.48
L52	C30	C36	70	0.001371	0.007732	0.356678	0.0658	4	4.48
L53	C30	C31	80	0.001567	0.008836	0.407632	0.0752	4	4.48
L54	C30	C31	80	0.001567	0.008836	0.407632	0.0752	4	4.48
L55	C32	C37	40	0.000784	0.004418	0.203816	0.0376	4	4.48
L56	C31	C23M	40	0.000580	0.004351	0.207020	0.0376	4	5.33
L57	C31	C23M	40	0.000580	0.004351	0.207020	0.0376	4	5.33
L58	C31	C38	100	0.001959	0.011045	0.509540	0.0940	6	4.48
L59	C32	C33	40	0.000784	0.004418	0.203816	0.0376	4	4.48
L60	C34	C35	70	0.001371	0.007732	0.356678	0.0658	4	4.48
L61	C35	C21M	150	0.002177	0.016318	0.776324	0.1410	6	5.33
L62	C35	C36	130	0.002547	0.014359	0.662402	0.1222	6	4.48
L63	C35	C36	130	0.002547	0.014359	0.662402	0.1222	6	4.48
L64	C36	C38	120	0.002351	0.013255	0.611448	0.1128	6	4.48
L65	C36	C38	120	0.002351	0.013255	0.611448	0.1128	6	4.48

*The permanent outage duration of lines is estimated according to engineering experience, which will be updated and improved by statistical data in the future.

TABLE X
TRANSFORMER VOLTAGE LEVEL AND CAPACITY

Number	High Voltage Bus	Medium Voltage Bus	Low Voltage Bus	High/Medium/Low Rated Voltage (kV)	Capacity (MVA)	Permanent Outage Rate(Outages/Year)	Permanent Outage Duration (h)**
T1	A8H	A8M	A8L	525/230/35kV	750	0.00136	12
T2	A8H	A8M	A8L	525/230/35kV	750	0.00136	12
T3	A9H	A9M	A9L	525/230/35kV	750	0.00136	12
T4	A9H	A9M	A9L	525/230/35kV	750	0.00136	12
T5	A10H	A10M	A10L	525/230/35kV	750	0.00176	12
T6	A10H	A10M	A10L	525/230/35kV	750	0.00176	12
T7	C21H	C21M	C21L	525/230/35kV	750	0.00182	10
T8	C21H	C21M	C21L	525/230/35kV	750	0.00182	10
T9	C22H	C22M	C22L	525/230/35kV	750	0.00182	10
T10	C22H	C22M	C22L	525/230/35kV	750	0.00182	10
T11	C23H	C23M	C23L	525/230/35kV	750	0.00182	10
T12	C23H	C23M	C23L	525/230/35kV	750	0.00182	10

** The permanent outage rates of transformers are estimated based on engineering experience, which will be updated and improved by statistical data in the future.

TABLE XI
TRANSFORMER IMPEDANCE PARAMETERS

Number	*R1*(p.u.)	*X1*(p.u.)	*R2*(p.u.)	*X2*(p.u.)	*R3*(p.u.)	*X3*(p.u.)
T1~T6	0.000106	0.017527	0.000058	-0.001530	0.000420	0.044073
T7~T12	0.000090	0.020473	0.000079	-0.001830	0.000524	0.047500

TABLE XII
DATA OF CAPACITORS/REACTORS

Bus Name	Voltage Level	Compensating Capacitor(Mvar)	Compensating Reactor(Mvar)
A8L	35kV	4×60	4×60
A9L	35kV	4×60	4×60
A10L	35kV	4×60	4×60
C21L	35kV	4×60	4×60
C22L	35kV	4×60	4×60
C23L	35kV	4×60	4×60

2） *Expansion of AC system to AC/DC hybrid system*

The system has reserved expansion interfaces for DC lines, as illustrated in Fig.7. In the grid topology, the nodes A8 and B19 are prepared for future DC points. A point-to-point DC line could be built between power center and load center, thus expanding the system to an AC-DC hybrid system.

3） *Expansion of single system to multiple interconnected systems*

In the grid topology, the nodes (such as B16 and B20) are reserved for future system expansion, which helps to realize power exchange between XJTU-ROTS2017 and external systems. By connecting the reserved nodes to the corresponding extern nodes, the system proposed in this paper can be connected to other typical test systems like IEEE-RTS24、IEEE-RTS96、IEEE 30-bus test system, and IEEE 118-bus test system, thus forming a more complicated test system.

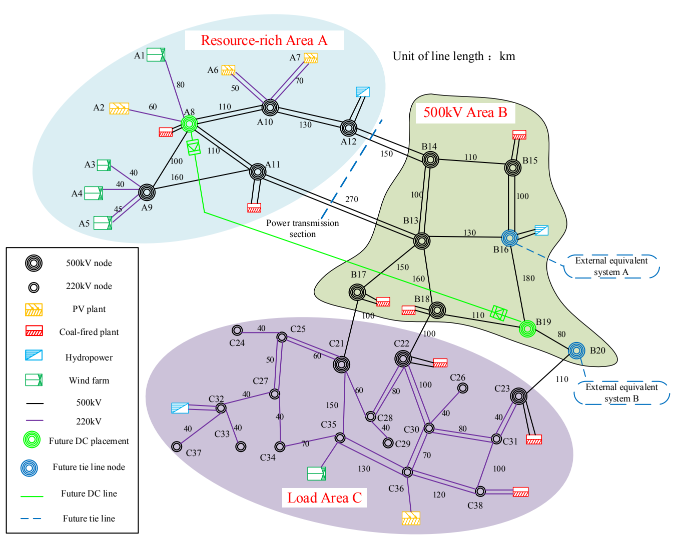

FIG.7. EXTENDED APPLICATIONS OF XJTU-ROTS2017

VII. CONCLUSIONS

In this paper, a test system named XJTU-ROTS2017 is well designed as a test example for reliability and operation research. In Particular, the test system is characterized in that

1) It demonstrates large-scale renewable integration.

2) It highlights long-distance transmission.

3) It reflects china's power supply structure, which is dominated by coal-fired generation.

4) It could be applied to both reliability evaluation and operation optimization.

Furthermore, the proposed test system has good adaptability in designing more complex systems, like AC/DC hybrid power systems and interconnected power systems.

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It is really a great challenge to design a complete and practical test system. Sincerely thanks to Dr. Fu Xu for his valuable suggestions. His planning and design working experience helps the work proceed smoothly. Besides, thanks to Tianhui Zhao and Minghui Zhu, who also contribute some calculation verification to this work. For further information on the calculation results of reliability and operation, as well as the newest data involved in this paper, please visit the website http://gr.xjtu.edu.cn/web/jxwang/xjtu-rots .

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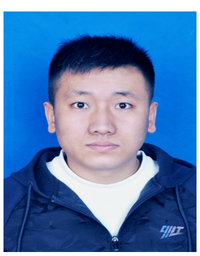

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APPENDIX

TABLE A.I POWER OUTPUT OF 1#WIND FARM (MW)(10MW INSTALLED CAPACITY)

Week	Day	1h	2h	3h	4h	5h	6h	7h	8h	9h	10h	11h	12h	13h	14h	15h	16h	17h	18h	19h	20h	21h	22h	23h	24h
1	1	2.9	2.1	3.3	3.1	0.0	0.0	0.0	0.0	0.0	1.3	1.8	1.2	0.4	0.0	0.0	0.0	0.3	3.7	3.9	4.0	4.5	5.2	4.6	3.5
1	2	3.8	4.2	3.7	3.2	3.4	2.0	2.1	0.8	1.4	0.0	0.0	2.5	2.5	2.9	2.6	0.9	3.6	3.7	4.4	4.9	5.2	6.8	7.8	8.5
1	3	8.7	8.1	8.2	7.2	6.8	5.6	4.8	3.9	3.1	2.7	2.3	2.3	1.5	1.8	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1	4	0.7	1.8	0.8	0.0	0.8	0.3	0.2	0.3	0.8	1.4	1.3	0.5	0.9	2.6	2.4	1.8	3.4	3.1	3.2	4.8	5.1	5.2	5.3	5.5
1	5	6.7	7.9	7.4	6.8	6.4	6.0	4.9	4.7	5.0	5.5	6.9	7.1	7.3	7.1	7.4	8.1	7.9	7.7	7.7	9.0	10.0	10.0	10.0	10.0
1	6	10.0	10.0	9.8	9.9	9.6	8.4	8.0	8.4	8.9	9.6	9.8	9.2	8.1	7.6	6.7	6.8	8.9	9.1	9.6	10.0	9.7	8.8	8.6	8.3
1	7	7.8	7.2	7.5	7.0	7.8	7.4	6.7	6.6	5.2	4.1	2.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	1	0.0	0.9	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	1.7	3.4	2.8	4.4	3.9	3.1	2.4	1.1	0.2	0.2	0.5	0.9
2	3	1.8	2.1	2.6	3.0	3.4	3.0	3.4	3.5	3.5	3.9	2.9	2.0	2.8	4.1	2.2	1.1	1.8	2.9	3.2	1.7	1.5	0.0	0.0	0.0
2	4	0.0	0.0	0.0	0.0	0.5	2.4	4.0	5.5	3.7	3.7	5.7	6.0	4.8	2.5	2.9	3.8	4.2	5.4	3.7	3.7	3.3	3.1	3.3	4.2
2	5	4.6	4.4	5.8	7.0	7.3	6.7	4.8	2.8	3.2	4.6	4.3	4.8	5.7	4.6	3.8	3.2	5.0	5.8	5.1	4.6	4.1	3.8	3.4	3.9
2	6	4.8	4.9	5.2	4.4	3.8	2.7	3.5	3.3	3.0	2.5	2.7	2.5	2.3	1.6	1.5	1.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	7	0.0	0.0	0.0	0.0	0.8	2.5	5.2	6.7	7.6	6.8	7.2	6.3	7.6	8.5	9.8	10.0	10.0	10.0	10.0	10.0	10.0	10.0	8.8	7.6
3	1	0.0	0.1	0.0	0.0	0.0	0.6	0.0	0.0	2.6	3.6	0.5	0.0	0.4	1.2	2.0	0.3	0.0	0.0	0.0	0.0	0.5	1.7	2.8	2.2
3	2	2.5	4.3	3.4	3.4	2.6	2.5	3.3	3.9	4.0	3.7	4.2	3.8	4.3	4.9	4.1	3.6	4.5	4.4	3.6	3.4	3.0	3.3	3.9	4.0
3	3	3.5	3.8	5.8	4.8	3.6	2.4	2.7	2.6	2.8	3.1	3.2	2.6	2.1	1.8	1.5	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3	4	0.0	0.5	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	2.4	1.9	0.1	0.3	0.0	0.0	0.0	0.0	0.0	0.0
3	5	0.0	1.4	0.2	0.0	1.7	3.9	3.7	2.7	2.5	2.5	2.5	4.2	4.3	3.5	3.0	3.2	2.9	2.6	2.0	1.8	1.6	2.1	2.8	1.7
3	6	0.4	0.0	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.7	1.0	1.9	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3	7	0.0	1.3	3.3	4.5	5.3	6.2	7.5	8.0	8.6	9.7	9.4	8.2	7.0	7.3	8.4	8.7	9.0	8.5	8.5	9.9	10.0	10.0	10.0	10.0
4	1	3.2	4.6	5.9	7.0	7.4	7.1	6.9	7.5	7.0	6.8	6.5	5.6	5.3	4.8	4.9	4.6	6.1	5.8	7.3	7.4	7.6	7.5	5.4	4.6
4	2	5.1	5.1	6.1	6.0	4.7	5.3	5.8	4.0	3.3	2.5	3.2	2.6	1.1	0.0	1.3	1.2	0.0	0.0	0.0	0.0	0.0	0.8	1.0	0.0
4	3	0.2	1.4	3.0	2.5	1.0	0.0	0.1	0.3	0.6	0.0	0.0	0.0	0.7	3.3	3.8	3.7	3.0	2.1	2.4	2.4	2.4	2.6	2.8	2.7
4	4	2.3	0.9	0.0	0.0	1.4	3.0	3.3	2.6	2.8	2.9	2.8	2.4	2.1	2.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4	5	0.0	0.0	0.7	2.9	4.4	5.0	4.2	3.7	3.7	4.1	5.3	4.7	4.4	3.8	3.9	4.9	5.8	6.0	6.2	6.6	6.2	5.3	4.8	4.6
4	6	4.0	3.9	4.3	5.2	5.8	6.3	7.3	6.0	5.1	5.8	5.2	4.1	4.2	5.0	6.2	5.4	4.8	4.6	4.1	4.1	4.5	3.9	2.5	1.6
4	7	2.2	3.0	0.3	0.0	0.0	0.0	0.0	0.0	1.7	2.1	1.6	0.9	0.0	0.0	0.2	2.4	2.5	1.5	1.1	1.4	2.1	1.9	3.1	0.0
5	1	1.2	1.8	3.7	5.0	4.0	1.9	4.8	4.6	3.4	4.0	2.6	2.2	1.8	2.0	0.0	0.0	0.0	2.5	4.8	5.7	3.3	3.3	2.0	0.3
5	2	4.0	5.5	1.6	0.1	0.2	0.6	0.0	0.0	1.2	1.7	1.3	1.2	1.4	0.6	0.0	0.0	0.0	0.0	0.0	1.7	4.1	3.3	1.3	3.2
5	3	3.5	4.2	2.4	0.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.7	1.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.9	1.8
5	4	2.6	3.2	5.0	5.7	6.6	8.1	8.8	9.4	5.4	6.3	7.3	5.3	3.6	3.0	5.2	7.9	7.7	7.4	8.2	9.5	9.4	9.0	8.5	8.1
5	5	7.5	7.6	6.8	4.6	2.8	3.3	3.0	1.7	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8	1.0	1.9	3.4	3.9
5	6	4.6	5.4	6.3	7.3	8.5	9.0	9.9	9.9	10.0	10.0	10.0	8.5	6.1	3.6	4.7	5.6	3.8	4.9	5.0	8.1	9.4	8.5	6.9	6.0
5	7	5.2	4.0	2.4	1.0	0.2	0.0	0.1	0.9	1.4	1.5	1.6	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.7	0.0	0.0	0.0
6	1	9.6	10.0	10.0	9.5	8.7	7.7	7.6	8.7	8.1	8.1	8.9	8.3	8.6	9.2	8.8	10.0	7.8	9.8	7.7	7.1	6.1	9.6	7.3	7.1
6	2	7.3	9.0	8.6	6.5	5.0	3.7	2.9	2.2	1.2	0.0	0.0	0.0	0.1	0.8	0.1	0.8	1.3	0.7	0.3	0.2	0.0	0.0	0.0	1.6
6	3	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6	4	0.0	0.4	0.9	1.2	2.7	2.7	3.5	4.0	4.9	4.1	3.5	4.0	3.2	2.2	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.1
6	5	0.0	0.0	0.0	2.6	3.3	5.0	4.9	5.1	5.0	4.0	4.3	4.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.9	0.0
6	6	0.2	2.3	0.8	0.3	0.0	0.0	1.6	2.4	1.4	1.7	1.6	2.2	2.4	1.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6	7	0.0	1.7	3.0	3.1	3.4	4.1	4.7	4.3	5.2	6.2	5.8	5.1	4.6	2.7	3.9	5.8	6.8	8.0	8.4	8.0	8.5	9.6	10.0	1.3
7	1	0.0	0.0	0.0	0.4	2.4	3.9	5.0	5.1	3.9	3.5	0.0	0.0	2.6	2.2	1.7	1.0	0.0	1.5	2.1	2.0	1.7	1.3	1.4	1.0
7	2	1.9	3.4	3.4	4.1	3.9	5.2	2.8	3.0	4.0	4.1	3.7	2.8	2.4	1.4	2.0	2.4	1.8	0.6	0.2	0.1	0.6	1.0	2.4	2.9
7	3	3.3	2.9	3.6	4.4	5.2	4.7	5.0	2.9	3.6	3.6	2.2	0.0	0.0	3.2	1.8	1.0	1.2	1.7	0.3	0.0	0.5	2.1	3.0	4.1
7	4	4.0	4.7	3.9	2.6	1.7	1.9	1.0	0.0	0.0	1.9	2.9	3.0	2.4	0.5	0.6	1.7	3.1	4.1	3.5	3.9	4.5	4.1	4.7	3.2
7	5	2.9	3.2	3.0	3.2	4.0	2.4	1.5	2.8	3.1	2.6	1.0	0.2	0.9	0.7	0.8	0.9	1.0	1.0	1.4	0.7	1.2	2.0	2.9	2.6
7	6	3.1	4.3	3.1	3.2	1.7	0.8	1.7	2.0	2.7	2.7	1.8	0.4	0.0	0.0	0.0	0.0	0.3	0.5	0.0	0.0	0.0	0.0	0.0	0.0
7	7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
8	1	0.0	1.0	0.4	2.4	4.6	3.9	3.9	4.8	4.3	3.4	3.6	1.9	0.0	0.0	0.0	2.1	0.0	0.0	0.0	0.0	0.1	0.5	0.9	0.3
8	2	1.1	1.9	1.8	0.6	0.0	0.0	0.0	1.5	2.0	1.4	1.7	1.2	0.0	0.0	0.0	0.0	0.0	0.0	3.1	2.1	1.8	1.0	0.3	2.4
8	3	4.4	5.2	2.7	1.4	0.0	0.0	0.0	2.5	2.5	0.9	1.9	0.8	1.3	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
8	4	0.4	0.4	2.2	2.5	2.3	3.3	3.8	2.9	3.0	4.1	3.9	3.2	3.2	1.0	0.5	0.0	0.0	0.0	1.2	2.3	1.7	0.6	2.1	2.7
8	5	1.6	1.7	1.9	0.0	0.0	2.5	4.0	3.9	1.7	0.0	0.0	0.0	0.0	1.7	0.0	0.0	0.0	0.0	0.0	0.3	0.7	0.7	0.7	0.6
8	6	1.0	1.0	1.7	2.6	3.2	3.0	3.8	4.0	4.2	4.4	3.7	4.0	3.6	3.1	3.1	2.7	4.1	4.8	3.7	3.3	3.2	2.4	5.7	7.9
8	7	5.6	4.6	6.2	7.1	7.0	6.5	6.5	6.9	6.8	6.3	5.5	4.2	4.2	3.7	1.0	1.0	0.0	0.0	0.0	0.0	0.0	1.0	2.9	4.7
9	1	3.3	4.6	4.8	5.3	5.8	6.0	6.1	3.3	3.5	3.2	2.4	1.0	0.9	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	1.3
9	2	0.9	0.3	1.5	1.8	2.2	2.6	2.6	3.8	4.4	4.2	4.4	4.0	3.1	2.2	1.4	1.2	0.7	0.3	1.1	1.7	2.4	3.0	3.7	3.8
9	3	3.8	3.6	8.6	10.0	10.0	5.9	7.2	6.8	9.3	8.6	4.9	2.9	0.7	1.0	2.4	3.1	3.5	4.3	3.7	4.3	4.7	4.2	3.4	2.7
9	4	2.3	1.3	0.0	0.9	1.6	0.0	0.0	0.5	2.6	3.0	3.9	2.0	1.4	0.9	0.0	0.0	0.0	0.0	0.0	0.0	3.6	0.0	1.2	2.6
9	5	4.7	6.0	6.0	7.7	1.7	3.5	0.1	0.0	0.0	0.0	0.3	0.0	0.0	0.5	1.4	1.3	0.0	0.0	0.4	0.9	1.0	0.8	0.6	0.0
9	6	0.0	0.0	1.4	2.2	2.0	2.1	4.6	3.3	4.1	4.8	5.4	6.4	6.0	4.0	4.7	2.2	0.7	0.5	0.8	1.7	3.6	4.7	6.5	7.1
9	7	5.3	3.5	1.7	2.8	6.1	5.4	6.2	6.4	7.3	8.1	8.5	8.0	7.3	6.7	8.5	8.3	7.6	7.6	7.9	6.9	6.8	7.0	7.1	6.7
10	1	0.0	1.0	2.5	2.9	5.2	1.1	1.0	0.7	0.7	0.6	0.7	0.1	0.0	0.0	1.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
10	2	0.0	4.8	5.1	2.7	8.1	10.0	9.4	8.8	8.7	9.1	9.0	8.0	7.1	7.7	7.3	7.0	7.4	8.0	8.3	8.1	8.4	9.0	8.4	7.9
10	3	7.1	5.6	3.9	3.4	4.6	4.7	5.2	5.0	5.0	4.7	6.3	6.1	5.0	4.2	5.9	5.1	4.1	2.7	1.3	1.5	1.4	1.8	2.4	2.9
10	4	3.2	3.2	4.5	5.6	6.1	4.7	5.5	6.1	5.7	5.8	4.6	5.0	4.6	4.7	4.2	5.8	6.3	6.8	7.1	7.0	7.0	6.9	6.8	6.4
10	5	5.5	4.5	4.2	3.6	3.4	2.7	1.5	0.5	0.0	0.0	0.0	0.0	0.0	0.0	1.0	3.3	1.9	0.9	1.4	1.4	1.6	2.3	3.4	3.9
10	6	4.0	4.8	5.6	7.3	9.0	9.6	9.7	9.9	9.3	8.5	7.4	7.2	6.7	5.6	5.2	4.6	2.9	0.2	0.0	0.0	0.0	0.0	0.3	0.7
10	7	0.0	0.0	2.1	1.3	1.8	2.3	2.2	2.7	1.6	0.0	0.0	0.0	0.0	0.0	0.0	1.2	3.5	0.6	0.1	0.2	0.0	1.0	2.5	2.1
11	1	0.3	0.6	3.9	5.5	4.9	4.6	5.6	4.6	4.2	4.0	2.9	3.8	3.9	3.8	4.7	4.2	3.0	2.6	2.0	1.8	2.2	1.9	1.5	1.3
11	2	1.0	0.0	1.2	1.5	2.1	1.4	2.0	1.8	2.0	1.6	1.7	1.5	1.6	1.5	0.9	0.8	1.5	2.0	3.0	3.4	2.1	1.6	1.8	1.2
11	3	1.0	0.2	0.0	0.0	0.0	0.0	0.7	2.1	2.8	4.0	4.7	5.6	6.3	5.7	6.7	7.1	6.5	6.0	5.1	4.6	3.7	3.6	4.2	4.3
11	4	4.5	3.6	4.3	6.7	7.9	8.1	8.0	8.5	7.6	7.0	6.0	4.9	4.8	4.8	6.6	7.0	5.2	3.6	3.7	3.7	3.0	3.9	4.5	5.5
11	5	6.2	6.7	8.4	8.8	7.8	7.4	7.3	6.9	6.9	6.7	5.9	5.8	6.2	6.6	7.6	8.0	8.0	7.2	7.0	8.3	8.6	8.5	7.7	7.3
11	6	7.7	8.2	7.4	8.1	9.3	8.6	8.3	8.6	8.1	8.3	8.6	8.5	8.4	8.8	7.4	7.6	7.6	6.7	7.0	7.9	7.4	6.8	7.2	6.1
11	7	5.9	5.6	5.5	5.9	5.9	6.1	6.5	6.7	7.3	7.8	8.3	8.0	7.9	6.7	7.8	7.1	7.6	9.1	9.4	10.0	10.0	10.0	10.0	10.0
12	1	7.4	7.3	7.3	7.2	7.1	6.7	7.1	6.6	6.9	7.4	7.0	6.4	6.1	6.1	6.0	4.8	4.5	3.5	2.0	1.7	1.4	1.0	1.4	2.0
12	2	2.2	4.4	4.8	4.1	3.7	5.6	5.6	4.9	3.7	2.7	1.8	1.1	0.5	0.0	0.0	0.0	0.0	0.0	0.0	1.0	1.2	1.4	2.7	4.3
12	3	6.5	7.6	7.0	6.3	3.7	0.7	0.0	0.0	0.0	0.0	0.0	2.8	3.1	3.1	2.9	2.2	3.2	3.3	2.0	2.7	4.0	5.9	6.9	8.2
12	4	7.8	8.3	7.2	6.5	7.9	7.9	7.8	8.2	8.5	8.8	8.7	7.6	6.1	5.0	5.3	6.6	7.3	7.8	9.3	10.0	10.0	10.0	10.0	10.0
12	5	10.0	10.0	10.0	8.8	10.0	10.0	9.4	8.5	7.7	7.5	6.8	3.7	2.6	1.4	0.0	0.6	0.0	0.0	0.0	0.2	1.2	2.5	2.8	2.4
12	6	2.2	3.0	3.0	3.4	3.4	4.1	4.6	5.3	5.8	6.4	5.7	5.7	5.4	5.3	6.1	6.1	6.2	5.6	5.7	6.5	5.9	5.8	6.1	5.6
12	7	5.9	6.3	5.3	4.0	4.7	4.3	3.3	3.1	3.2	2.1	1.5	0.7	0.6	0.0	0.0	0.0	0.0	0.0	0.8	0.3	0.5	0.0	0.0	0.6

TABLE A .II POWER OUTPUT OF 2#WIND FARM (MW)(10MW INSTALLED CAPACITY)

Week	Day	1h	2h	3h	4h	5h	6h	7h	8h	9h	10h	11h	12h	13h	14h	15h	16h	17h	18h	19h	20h	21h	22h	23h	24h
1	1	0.1	0.0	1.4	2.6	3.6	4.3	6.0	6.0	5.9	5.6	4.7	3.5	2.9	1.6	2.9	2.4	3.6	2.1	3.1	3.1	2.6	3.6	3.4	3.8
1	2	4.2	4.2	3.7	3.2	5.2	4.1	3.8	3.8	4.0	3.6	3.2	2.4	2.1	1.9	2.2	1.4	1.7	1.7	0.6	0.0	0.0	0.0	0.0	0.0
1	3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.4	2.0	3.2	3.6	3.8	3.9	3.2	4.6	4.1	3.2	2.4	2.0	2.0	2.8
1	4	3.2	1.3	0.0	0.0	1.3	3.3	3.6	4.7	6.5	4.9	5.9	5.3	5.7	6.8	7.5	7.0	5.9	5.9	5.3	5.2	5.6	5.2	4.7	5.1
1	5	5.2	4.8	5.2	4.8	5.0	5.6	4.7	4.2	3.9	3.8	3.5	2.9	2.9	3.3	2.9	3.3	1.5	1.6	2.4	1.6	2.2	3.2	2.8	2.8
1	6	2.3	1.6	1.4	1.2	0.3	0.0	0.0	0.0	0.0	0.0	1.5	2.6	2.8	2.1	1.8	3.9	4.6	5.9	5.5	5.2	5.0	4.2	4.6	4.9
1	7	6.2	7.4	7.8	6.5	4.9	3.6	3.5	3.9	3.5	2.1	1.5	0.6	1.6	3.7	3.7	1.6	0.9	0.0	0.0	0.0	0.0	0.2	1.0	1.1
2	1	0.0	1.7	2.4	0.5	2.6	4.8	5.9	7.4	7.4	7.4	6.3	5.2	5.1	4.7	2.8	3.2	2.2	1.6	1.4	1.6	0.2	0.0	0.0	1.0
2	2	3.3	3.8	3.0	3.3	4.3	4.7	4.7	4.4	5.0	4.5	3.8	1.1	0.8	1.0	2.4	1.8	2.8	3.7	2.7	1.7	1.1	1.7	2.4	3.7
2	3	3.7	3.9	5.3	6.4	6.5	6.6	6.2	6.8	7.3	7.2	6.6	6.2	5.8	5.5	5.6	4.4	4.8	5.7	4.7	4.7	4.0	3.8	3.9	4.4
2	4	4.9	5.0	5.2	4.3	4.1	5.8	5.0	3.4	3.6	3.4	3.8	4.2	4.4	4.4	3.6	3.0	2.5	2.0	1.5	0.8	1.0	1.2	1.3	1.7
2	5	2.1	2.0	1.8	0.7	0.4	1.1	1.8	1.8	1.2	1.2	1.1	1.5	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	6	0.5	1.9	3.3	3.0	3.3	3.7	2.8	1.8	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.9	0.9	0.0	0.0	0.0	0.0	0.0	0.0
2	7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3	1	4.0	5.9	5.3	4.8	5.5	6.1	6.7	6.3	6.6	7.0	6.3	5.2	4.3	3.2	5.1	6.1	4.6	2.0	1.2	0.2	0.0	0.0	0.0	3.8
3	2	3.3	2.9	2.5	4.3	4.3	6.9	8.1	8.2	8.7	9.1	9.2	9.6	9.7	10.0	8.1	6.5	6.3	5.7	5.3	5.2	4.5	4.0	3.4	2.6
3	3	2.3	2.2	1.3	1.8	1.8	1.2	0.6	1.3	1.3	0.4	0.2	0.5	0.3	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3	4	0.0	0.0	0.2	1.0	1.8	1.7	3.3	2.8	2.6	3.4	3.2	3.9	4.0	2.5	3.0	2.9	3.1	4.0	5.0	5.2	5.5	6.0	6.3	6.3
3	5	6.4	6.2	7.3	7.0	6.7	6.1	5.8	5.8	6.0	4.8	4.5	3.8	3.3	2.1	1.3	0.6	0.0	0.0	0.0	0.2	2.1	1.1	1.9	6.4
3	6	7.7	7.6	5.2	4.7	3.9	3.2	3.1	4.3	5.1	4.6	4.0	3.2	3.0	2.7	1.9	1.4	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3	7	0.0	0.0	0.1	2.0	2.3	2.7	2.6	3.1	3.9	4.2	4.8	5.3	5.4	4.6	4.4	5.1	5.7	6.5	6.6	8.3	7.8	8.2	7.6	7.7
4	1	9.5	9.0	7.5	7.1	5.5	5.3	3.7	3.2	2.2	1.7	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.7	1.9	2.7	3.0	3.9
4	2	3.7	3.4	3.7	4.5	4.4	5.6	5.7	5.1	5.2	4.4	4.5	6.5	4.5	1.4	2.0	1.5	0.2	0.0	0.2	0.3	0.0	1.7	3.4	4.4
4	3	5.0	5.6	5.2	6.4	5.2	9.6	8.1	9.3	9.6	8.8	9.0	7.2	7.2	7.4	5.9	5.3	4.1	4.0	5.1	5.1	4.9	4.3	3.4	2.7
4	4	2.9	2.7	1.7	1.9	2.1	2.0	1.1	0.0	0.0	0.5	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4	5	1.0	2.3	2.5	3.6	4.5	4.6	4.9	5.1	5.4	5.5	6.0	5.6	4.5	1.9	4.0	4.1	3.5	2.9	3.5	2.8	3.5	4.0	4.0	3.8
4	6	4.1	3.8	4.8	4.7	3.3	3.9	4.6	4.1	3.7	3.5	3.9	3.8	3.6	3.1	4.4	4.0	5.5	5.0	2.2	6.0	4.8	3.0	3.3	5.6
4	7	8.2	9.9	9.7	7.2	10.0	10.0	8.6	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	7.0	5.9	5.3	5.4	5.9	5.5	3.7
5	1	3.4	3.8	4.7	5.2	4.8	3.9	2.9	2.8	2.6	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.3	3.6	4.2	4.8	5.5
5	2	4.9	2.4	1.2	1.3	0.0	0.9	2.1	2.6	3.9	3.9	3.2	2.1	0.3	0.0	0.0	0.0	0.0	0.0	1.5	3.0	4.9	5.8	6.0	5.9
5	3	7.3	7.6	5.0	5.5	7.8	8.8	5.9	4.4	2.9	4.1	5.9	5.4	3.4	2.9	3.2	3.9	6.2	6.5	7.0	7.5	6.4	6.2	5.9	6.3
5	4	6.7	6.6	5.7	4.6	4.3	3.9	3.4	3.7	4.3	3.6	3.7	3.4	3.8	3.2	2.6	2.6	3.5	3.2	3.6	3.3	3.3	3.5	3.4	2.8
5	5	2.5	2.3	2.1	1.4	1.5	0.9	1.4	1.5	1.8	1.8	2.0	2.4	2.4	2.0	2.0	1.9	2.0	2.0	2.0	1.4	1.0	0.2	0.0	0.0
5	6	0.0	0.0	0.0	0.0	0.0	0.9	1.2	3.8	5.1	4.6	4.7	4.2	3.6	3.6	2.9	3.1	1.7	1.3	1.9	2.1	1.3	0.9	2.0	2.0
5	7	2.5	1.9	0.2	4.3	3.9	3.0	4.0	4.2	4.0	3.8	3.8	3.6	3.2	2.6	2.0	2.9	3.4	4.5	5.7	6.0	6.1	6.1	5.7	6.0
6	1	0.9	2.2	3.9	5.5	1.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.7	0.0	0.0	0.0	0.8	0.7	0.8	0.6	0.3	0.1	0.0
6	2	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.5	2.3	5.4	5.9	7.4	5.3	3.4	1.1	0.0	2.4	1.8	1.4	0.2	0.0	0.5	1.3	1.1
6	3	0.8	0.6	1.2	2.4	3.2	3.7	2.7	3.2	2.7	3.6	3.0	2.7	3.6	1.9	1.3	7.8	4.0	3.6	2.1	2.2	2.9	3.0	2.3	3.1
6	4	4.4	5.0	6.4	6.7	7.0	6.3	5.4	5.9	3.2	2.0	0.6	2.9	3.8	0.6	0.0	1.0	2.1	2.2	0.9	0.0	1.4	5.1	2.8	2.7
6	5	0.6	0.0	0.0	0.0	5.8	6.5	6.2	5.9	5.5	4.7	5.1	5.6	5.4	4.6	4.2	4.2	4.0	3.3	3.6	4.5	5.5	7.0	8.7	8.1
6	6	6.0	6.7	1.6	0.9	0.0	0.0	0.0	3.0	5.1	4.8	2.4	3.5	4.0	2.7	3.1	4.4	5.2	5.6	6.0	6.0	6.5	7.6	8.1	7.8
6	7	7.1	5.7	5.8	5.1	5.3	3.8	2.9	2.0	1.3	0.8	0.8	1.4	0.8	1.6	0.0	0.0	0.0	0.0	0.0	0.2	0.5	1.0	1.7	2.2
7	1	4.8	3.9	6.3	6.6	5.9	4.3	3.7	4.2	1.9	1.9	6.0	6.3	0.0	1.3	1.9	2.7	3.3	2.1	3.6	3.4	3.7	4.0	4.9	3.8
7	2	2.7	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.6
7	3	3.6	6.2	4.5	1.6	0.0	1.8	3.3	3.8	3.5	3.4	2.7	1.3	0.2	0.0	0.4	2.6	2.5	2.8	2.3	4.2	3.5	4.5	3.7	3.6
7	4	2.3	2.3	3.3	3.4	2.9	3.8	4.1	4.6	4.0	4.9	5.4	3.1	0.7	0.0	0.1	0.0	0.0	0.5	0.8	2.4	2.1	1.2	1.1	2.0
7	5	1.7	1.1	0.3	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.2	0.0	0.0
7	6	0.0	1.2	2.2	4.2	3.4	5.2	6.5	4.5	2.7	2.3	3.7	3.5	2.0	0.0	0.0	0.0	0.0	0.1	0.0	0.1	0.9	0.9	1.2	1.4
7	7	2.6	5.0	6.8	8.5	7.8	6.6	6.2	5.7	5.9	6.6	5.9	5.4	5.2	5.8	5.2	5.2	5.3	5.3	5.7	6.1	6.1	6.0	6.2	7.4
8	1	8.8	4.2	7.8	0.0	2.9	3.5	5.0	4.9	6.3	5.8	0.0	2.4	2.2	0.0	0.0	0.5	0.7	0.3	1.5	0.0	0.0	0.7	0.1	2.1
8	2	2.7	3.7	4.4	5.3	2.1	0.0	2.1	2.5	2.3	2.6	1.8	1.6	0.1	0.0	0.7	1.2	1.3	1.0	0.1	0.0	0.0	0.5	1.3	1.8
8	3	2.1	2.4	3.4	2.9	0.7	0.0	0.0	0.0	0.0	0.0	0.2	0.2	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0
8	4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	2.3	3.9	1.4	2.4	3.0	0.6	0.0	0.2	2.9	4.1	4.6	4.9	5.3	6.9	6.8	6.7
8	5	6.9	7.3	8.5	8.5	7.4	7.2	7.0	5.6	3.8	10.0	9.2	6.0	4.0	1.0	0.7	1.7	3.1	3.3	4.7	4.6	3.9	3.3	3.0	2.3
8	6	2.6	4.3	5.3	2.8	3.2	4.3	2.5	0.0	4.9	4.7	0.3	2.8	2.9	2.2	2.7	4.9	3.0	3.1	3.1	2.9	2.7	2.5	3.1	3.7
8	7	2.9	2.4	2.5	2.2	2.4	1.6	0.1	0.0	0.0	0.1	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
9	1	3.5	2.6	6.7	8.4	7.9	6.5	5.5	4.3	4.6	4.5	4.1	3.2	3.3	2.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.7	2.2
9	2	2.2	2.3	1.9	3.0	0.0	0.0	0.0	1.4	0.9	0.0	0.5	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
9	3	0.0	0.0	3.5	3.1	3.6	1.6	1.2	0.0	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.5	0.0
9	4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	2.0	2.5	2.3	1.9	1.0
9	5	1.2	0.0	0.0	0.2	0.0	1.7	0.0	0.5	0.0	0.3	0.0	0.0	0.0	1.8	0.0	0.0	0.1	0.6	1.2	1.0	0.4	0.9	2.0	1.6
9	6	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.7	2.4	2.9	0.0	0.0	0.0
9	7	0.0	0.3	0.8	0.9	0.4	0.9	2.9	3.5	2.3	3.7	5.3	5.8	5.1	2.8	1.7	0.6	0.9	1.0	1.2	2.0	1.6	0.9	0.4	0.0
10	1	0.4	0.0	0.1	1.5	0.6	2.0	3.4	3.7	3.3	3.6	3.9	4.7	5.1	6.6	5.0	4.2	4.2	4.3	3.6	3.2	3.6	3.6	3.0	1.8
10	2	0.0	0.0	0.0	0.8	1.6	0.5	1.1	1.5	3.8	4.7	3.7	2.6	0.9	0.0	0.0	0.6	0.4	0.5	1.0	0.9	0.5	0.3	0.9	0.4
10	3	0.5	1.6	3.3	5.1	5.4	5.7	4.2	4.6	6.5	5.5	6.2	5.8	4.2	3.8	3.3	0.1	0.0	0.0	1.8	1.7	0.0	0.7	1.1	2.4
10	4	5.1	5.8	6.4	6.8	5.1	5.7	6.2	4.9	5.7	5.3	5.3	4.3	3.9	2.9	3.7	2.8	3.1	3.4	2.6	1.4	1.2	1.4	0.7	0.0
10	5	0.5	0.9	0.3	0.4	0.0	0.0	0.0	0.0	0.0	0.5	1.9	0.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.9	1.5
10	6	3.0	4.6	5.6	5.3	4.6	5.3	5.9	5.4	5.9	6.0	5.9	6.4	6.7	6.6	5.1	6.4	6.6	6.1	6.6	7.5	8.0	8.0	6.9	7.6
10	7	8.1	8.3	8.4	8.4	8.5	8.1	8.2	8.0	8.3	8.6	8.6	8.6	8.4	7.8	8.6	9.6	9.2	9.4	9.7	9.5	9.5	10.0	10.0	10.0
11	1	2.9	2.3	3.6	3.9	5.6	5.7	4.8	4.2	3.3	2.0	1.9	2.8	3.7	3.6	4.4	3.8	3.8	3.9	4.6	4.8	4.7	4.7	4.8	5.1
11	2	5.8	5.7	5.4	4.0	3.2	3.4	4.4	4.9	5.4	4.9	4.6	4.7	4.5	4.9	3.9	4.3	3.8	3.9	3.8	3.2	2.8	2.3	1.9	1.4
11	3	1.0	0.6	0.9	1.1	0.9	1.4	1.8	2.2	1.1	0.0	0.0	0.0	0.0	0.0	0.0	0.3	2.3	1.8	2.4	3.4	4.5	5.3	4.1	3.9
11	4	5.0	5.6	5.8	5.3	4.4	4.6	5.3	4.0	3.7	2.7	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
11	5	0.0	0.0	0.0	0.0	0.0	1.5	2.3	3.9	4.2	3.7	1.8	0.5	0.7	1.8	0.9	1.8	0.9	0.9	0.9	1.6	2.2	2.9	2.8	2.9
11	6	4.3	5.4	5.4	6.4	5.6	5.3	5.3	5.5	5.3	4.2	1.1	0.2	1.0	2.4	3.1	2.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
11	7	0.0	0.0	0.0	0.0	0.0	0.1	0.9	1.1	1.1	1.3	2.4	2.5	2.0	1.9	2.1	2.2	0.3	0.0	0.9	0.5	0.5	1.9	2.4	3.2
12	1	0.0	0.0	0.2	0.0	0.1	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.2	2.4	2.0	0.8	0.4	0.4	1.1	3.2
12	2	4.2	4.2	2.1	0.0	1.4	5.2	4.8	4.1	3.1	3.7	3.2	5.9	7.0	7.7	7.5	6.8	6.1	5.8	5.2	4.8	4.6	4.5	5.0	5.2
12	3	4.9	4.4	4.7	4.6	4.6	5.2	4.9	4.5	3.5	3.4	3.4	3.1	3.1	2.7	3.2	3.0	2.6	1.4	1.4	1.2	0.4	0.0	0.4	0.5
12	4	1.4	2.3	4.5	4.9	5.5	5.7	7.2	7.1	6.7	7.2	7.2	6.5	6.1	6.2	7.1	7.0	6.9	6.4	6.0	5.6	5.1	4.8	3.9	3.3
12	5	2.5	2.0	0.8	0.0	0.0	0.0	1.5	3.3	5.1	4.4	3.9	5.2	6.0	5.7	6.5	6.6	6.1	5.5	3.9	4.2	5.3	6.3	6.9	7.1
12	6	5.8	5.2	7.6	8.3	5.8	5.6	5.6	5.2	5.3	4.7	4.8	5.2	4.1	2.4	2.6	2.7	3.0	3.4	4.1	5.8	6.7	7.4	8.2	8.9
12	7	8.9	8.7	8.8	9.2	8.2	8.2	7.8	7.7	7.1	6.1	4.6	3.2	1.6	0.3	2.0	1.6	0.8	0.2	0.0	0.0	0.0	0.0	0.0	1.3

TABLE A.III POWER OUTPUT OF 3#WIND FARM (MW)(10MW INSTALLED CAPACITY)

Week	Day	1h	2h	3h	4h	5h	6h	7h	8h	9h	10h	11h	12h	13h	14h	15h	16h	17h	18h	19h	20h	21h	22h	23h	24h
1	1	3.5	2.8	2.7	1.7	2.2	2.0	1.3	0.5	0.5	1.4	1.0	0.4	0.0	0.0	0.0	0.1	1.6	0.7	0.5	1.5	2.3	2.9	4.2	5.1
1	2	4.9	4.2	3.7	3.2	3.7	3.6	4.9	5.1	4.0	3.8	4.1	4.6	4.9	5.2	5.7	6.5	5.9	5.7	6.0	7.9	6.8	8.1	8.4	8.6
1	3	6.6	6.0	4.8	4.4	3.5	4.4	3.2	3.7	2.0	0.9	0.9	0.8	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1	4	0.0	0.0	0.0	0.0	0.0	1.5	1.4	1.7	2.3	3.0	3.2	3.7	2.6	1.6	2.5	2.1	1.3	2.5	3.3	3.6	4.1	4.2	4.7	4.6
1	5	4.8	5.4	5.2	6.3	5.6	4.4	3.6	3.7	3.4	2.9	3.7	3.3	2.9	2.4	4.2	4.5	4.6	4.1	3.3	3.3	3.5	3.1	3.4	3.9
1	6	4.2	3.9	4.8	4.2	2.3	1.1	1.0	2.2	3.0	1.8	1.1	1.1	1.2	1.4	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.7	0.0	0.2
1	7	1.0	2.2	3.2	3.1	4.3	5.8	5.6	5.4	5.6	5.4	5.3	5.1	4.0	3.4	2.8	1.6	2.2	3.0	2.3	1.8	2.3	2.1	2.9	2.5
2	1	0.0	0.0	0.3	0.7	3.0	3.8	2.7	2.7	3.7	4.3	4.6	5.8	5.8	5.2	6.1	6.5	7.4	6.8	5.0	3.9	6.7	5.8	5.0	4.6
2	2	3.2	1.5	1.0	0.4	0.3	0.7	1.0	0.7	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.9
2	3	1.4	1.4	1.4	1.1	1.5	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.9	1.1	0.0	0.0	1.8	0.5	0.8	1.2	1.7
2	4	0.9	0.0	0.0	0.0	0.0	0.0	0.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.0	1.6	2.7	2.8	2.4	3.1	3.6	4.4	4.4
2	5	4.5	5.0	6.6	7.8	7.3	7.5	8.1	7.1	5.6	5.5	6.1	6.5	6.2	6.4	7.6	8.8	6.6	7.5	6.8	5.6	7.3	7.2	6.6	5.9
2	6	5.7	5.6	4.1	4.5	7.8	6.7	6.5	6.3	5.5	5.8	6.4	6.1	5.2	4.5	4.9	6.3	7.1	6.2	5.7	5.7	5.4	5.2	4.8	4.5
2	7	3.8	3.1	2.3	2.5	1.9	1.8	2.4	2.9	1.6	0.5	0.6	0.5	0.5	0.4	0.1	0.0	0.0	0.0	0.7	2.4	2.3	2.0	1.5	1.2
3	1	0.0	0.0	0.0	0.0	0.0	0.0	0.3	1.0	1.3	2.4	2.8	2.7	2.0	1.2	0.5	0.9	1.3	1.8	1.2	0.2	0.6	1.2	1.3	1.6
3	2	2.2	2.7	2.0	2.4	2.1	1.8	1.9	0.9	0.0	0.8	0.6	0.2	0.0	0.0	0.4	0.1	0.0	0.0	0.8	1.1	1.2	0.1	0.0	2.0
3	3	2.3	3.2	4.0	3.4	3.2	2.2	1.5	0.6	0.7	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.7	0.5	0.0	0.0	0.0	0.0	0.1
3	4	1.4	2.8	2.2	1.0	0.5	1.6	2.1	1.4	1.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3	5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.4	0.9	0.0
3	7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	1.9
4	1	7.8	4.9	6.8	7.7	8.8	9.0	7.0	5.6	5.3	5.0	4.8	4.4	4.0	4.0	2.8	2.8	2.9	2.3	1.3	0.6	0.6	0.0	0.0	0.0
4	2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	1.8	2.2	2.5	3.1	3.3	4.2	3.9	4.4	5.4	4.1	2.7	0.0	4.3
4	3	4.0	4.5	4.2	5.1	5.7	7.1	3.7	2.4	4.4	5.4	4.5	3.9	3.6	3.8	5.2	8.1	7.6	10.0	10.0	10.0	9.8	8.8	8.6	7.3
4	4	6.9	8.1	7.5	5.5	2.9	2.5	2.6	1.9	3.1	4.0	4.2	4.6	3.7	1.9	3.7	4.7	5.9	5.8	6.3	7.1	8.0	7.8	7.4	7.8
4	5	6.4	3.4	1.6	1.6	1.0	1.1	0.8	0.6	0.4	0.0	0.1	0.2	1.4	2.5	1.6	0.2	0.0	0.5	1.1	1.4	1.7	1.2	1.9	2.0
4	6	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.3	2.3	3.2	4.6	3.6	2.8	1.6	1.7	1.8	2.5	3.1	3.2	2.8	3.3
4	7	3.8	4.6	2.7	2.1	2.4	1.6	2.5	0.0	1.1	0.6	0.0	2.6	2.6	2.8	2.1	4.0	3.0	0.6	0.0	0.2	0.5	0.9	2.4	1.1
5	1	7.0	6.9	7.0	7.9	5.1	4.6	4.1	3.9	4.1	3.5	3.2	4.2	4.1	3.7	3.9	4.3	4.0	4.3	3.9	2.6	3.1	3.4	3.2	3.2
5	2	1.7	1.1	3.3	3.5	3.2	2.8	2.6	2.8	2.6	2.6	1.9	0.7	0.3	0.2	0.0	0.0	0.0	0.3	3.6	3.5	2.5	2.6	2.6	1.9
5	3	1.8	1.6	1.0	1.7	1.2	0.7	0.0	0.0	0.5	0.9	2.0	0.9	0.2	0.0	0.5	0.0	2.2	2.7	1.7	1.8	0.7	0.4	0.7	2.3
5	4	1.3	3.4	4.4	3.7	4.1	2.7	3.3	2.2	0.3	1.6	2.7	2.1	1.2	0.0	0.5	2.8	4.2	4.4	4.0	3.2	3.0	2.5	1.9	1.5
5	5	0.5	0.0	0.4	0.7	0.6	1.8	2.8	2.8	2.6	2.5	2.1	1.9	1.8	0.1	0.2	1.7	2.6	3.1	2.2	2.8	3.9	3.6	3.2	3.2
5	6	2.8	1.6	0.6	1.3	2.9	2.4	1.4	0.2	0.8	0.7	0.5	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5	7	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.8	1.2	2.8	3.2	3.0	2.7	1.9	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6	1	0.0	1.5	0.0	0.0	0.0	0.0	1.3	2.7	2.1	2.1	2.0	1.1	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2
6	2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.2	2.2	2.9	2.0	2.1	1.8	0.0	0.0	0.0	0.0	0.0	0.0	0.7	4.2	0.0	0.0	0.0
6	3	0.0	2.1	2.4	3.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	1.0	1.0	0.0	0.0	0.0	0.0	2.5
6	4	0.0	0.0	0.0	3.6	3.3	0.4	1.2	1.6	1.6	1.8	1.9	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.5	0.0	0.9
6	5	1.4	1.1	1.6	1.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6	6	0.0	0.0	0.0	0.0	0.2	1.7	1.0	1.3	2.1	1.8	2.1	2.4	2.9	1.2	0.0	0.0	0.0	1.0	0.3	0.0	3.0	3.7	3.7	4.0
6	7	3.7	2.5	4.1	4.4	4.3	4.5	4.2	3.3	4.4	2.9	1.6	0.5	0.0	0.0	0.0	0.0	0.0	2.6	3.1	2.9	3.8	3.5	4.1	4.0
7	1	0.0	0.0	0.0	0.8	2.7	3.0	2.8	4.2	3.9	4.5	4.1	3.5	2.2	1.2	2.3	2.3	2.9	4.6	6.1	9.7	10.0	10.0	10.0	10.0
7	2	9.3	8.7	7.6	4.4	0.0	0.0	1.5	1.1	3.2	2.2	3.0	2.8	1.5	0.4	0.0	0.0	0.6	1.5	1.6	0.6	0.2	1.8	0.0	0.3
7	3	0.0	0.0	0.0	0.5	1.5	2.6	1.8	1.6	2.2	2.7	2.1	2.3	0.8	0.0	0.0	0.0	1.2	0.0	4.6	0.0	0.0	0.1	0.0	0.5
7	4	0.0	0.0	0.0	0.0	0.1	1.7	0.4	2.1	1.0	1.7	1.1	0.0	0.0	0.0	1.8	3.2	3.2	2.5	2.4	4.2	5.4	4.1	2.5	1.4
7	5	2.0	1.9	2.9	4.2	4.8	1.9	1.0	0.5	0.5	0.4	0.0	1.6	1.3	0.0	0.0	0.0	0.0	0.2	1.7	2.9	2.7	1.7	1.0	1.0
7	6	0.9	1.6	1.1	1.5	2.0	1.7	0.0	1.7	1.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7	7	1.0	2.3	2.6	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
8	1	2.9	2.9	3.7	4.8	4.9	4.8	4.1	4.5	4.4	4.4	4.4	4.6	3.8	2.4	1.5	1.0	1.4	1.2	1.6	2.7	3.3	3.0	3.3	3.9
8	2	3.6	2.6	4.4	4.7	2.0	4.7	4.3	3.9	4.3	4.5	4.6	4.6	3.7	2.9	3.6	4.5	4.9	4.2	4.9	6.0	6.8	7.1	6.6	6.9
8	3	7.1	6.9	3.8	3.6	0.0	0.0	0.0	0.0	0.0	1.4	0.5	1.5	0.6	0.0	0.0	0.0	0.0	0.0	0.0	2.0	2.9	1.2	1.2	1.0
8	4	1.6	2.4	2.7	3.3	2.1	1.2	1.5	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	2.1	2.0	1.8	1.7	1.7	1.3
8	5	1.3	1.4	2.3	2.9	3.3	2.4	1.0	2.0	4.0	4.0	3.4	2.7	2.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.0
8	6	0.0	0.7	2.5	4.6	4.9	4.4	4.3	3.8	3.7	4.2	4.6	4.5	3.0	1.3	0.0	0.0	1.2	0.8	0.4	1.1	0.2	0.0	0.0	0.0
8	7	0.0	0.0	0.0	0.0	0.0	0.0	0.6	2.5	2.4	2.8	3.2	1.9	0.1	0.0	0.0	0.0	0.0	0.5	2.1	2.4	2.4	2.3	2.6	2.0
9	1	5.8	5.5	5.5	5.1	4.4	4.8	3.8	3.3	3.4	4.1	4.0	3.3	2.8	1.4	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.7	0.7	2.1
9	2	3.1	5.0	5.0	5.5	3.1	1.5	2.1	1.5	2.2	3.5	2.9	2.2	1.8	0.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
9	3	1.6	1.7	4.8	2.7	0.9	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
9	4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.9	0.0	0.0	0.6	0.9	0.0	0.0	0.0	0.0	0.0	0.0
9	5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.2	0.3	0.0	0.0	0.0
9	6	0.0	0.0	0.5	0.3	0.2	1.7	2.0	1.7	1.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.9	0.9	1.3	0.0	0.0	0.0
9	7	0.0	0.0	0.2	2.7	2.0	2.4	2.4	3.6	0.8	1.9	1.1	1.3	1.2	1.0	0.0	0.0	0.0	0.0	0.0	0.1	0.8	0.0	0.0	0.0
10	1	2.9	0.3	0.0	0.8	4.0	2.2	2.2	2.8	2.1	0.9	0.3	0.0	0.0	0.0	0.0	0.0	0.4	0.6	0.5	0.0	0.0	0.0	0.0	0.0
10	2	0.0	0.2	2.2	4.4	6.0	5.9	5.4	5.1	4.4	0.0	2.3	2.7	2.8	7.8	7.4	10.0	8.2	6.6	5.4	3.3	2.0	1.8	2.3	3.9
10	3	4.9	4.5	4.8	5.8	6.1	4.3	1.4	0.0	0.0	2.2	1.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	1.0
10	4	2.0	4.2	4.6	4.8	7.6	8.8	9.0	10.0	7.3	5.5	6.2	2.3	0.2	0.0	0.0	0.0	2.2	3.3	2.3	1.7	2.8	0.0	0.0	0.0
10	5	0.0	3.5	4.9	3.6	3.7	2.2	1.5	1.4	1.2	1.8	2.0	2.3	1.7	1.5	0.6	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
10	6	1.3	1.8	1.5	0.0	0.4	1.3	0.3	0.2	1.1	0.2	1.8	2.5	2.8	3.8	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
10	7	0.0	0.0	0.1	0.6	0.0	0.0	0.0	2.7	3.9	3.5	4.1	4.8	3.7	1.4	0.8	0.5	0.0	0.0	0.0	0.0	0.0	0.3	0.6	0.4
11	1	2.5	1.4	2.1	2.0	0.6	0.1	0.3	0.1	0.0	0.2	0.4	0.1	0.0	0.0	0.3	1.1	1.8	1.8	2.3	2.4	1.7	0.9	0.8	0.8
11	2	1.5	1.9	2.6	3.6	3.6	5.1	5.1	4.7	4.1	4.0	4.4	4.6	4.3	3.2	4.5	5.5	5.6	6.2	5.9	4.9	5.4	5.3	4.5	4.5
11	3	4.0	2.9	3.4	2.9	2.8	2.9	2.1	2.4	2.3	2.0	2.1	2.3	1.9	1.4	1.7	2.8	3.7	2.5	2.2	2.7	2.1	1.7	1.3	1.2
11	4	0.0	0.0	0.0	0.2	2.0	1.7	1.7	1.6	1.8	1.7	2.6	2.7	3.0	3.3	3.4	3.4	3.6	4.2	3.8	3.5	3.4	3.6	4.1	4.2
11	5	2.9	2.0	2.4	3.0	3.2	3.5	3.7	3.1	2.7	2.5	2.8	2.7	1.9	1.2	1.6	1.4	0.6	0.0	0.2	0.0	0.0	0.4	0.9	1.6
11	6	1.7	1.3	2.5	2.8	3.7	3.5	3.2	3.0	2.8	3.3	2.9	2.9	2.7	2.4	1.8	0.6	1.6	0.7	0.2	0.0	1.3	0.8	0.9	1.8
11	7	2.3	2.2	2.6	2.0	2.4	2.0	2.0	1.8	2.6	2.3	2.2	2.6	1.6	0.1	2.2	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
12	1	0.0	1.5	0.7	1.6	0.8	2.4	3.7	4.2	6.4	6.5	8.4	8.2	8.1	8.4	6.5	2.7	1.4	2.3	3.9	4.5	5.6	6.1	7.3	10.0
12	2	6.1	4.1	5.8	8.1	7.1	6.8	5.8	4.8	4.4	3.9	3.2	2.5	1.6	1.0	2.5	4.0	4.5	4.2	4.5	4.0	3.8	3.4	3.6	5.1
12	3	4.3	3.1	3.8	5.3	5.4	4.9	4.5	3.6	3.4	3.2	2.8	2.4	2.5	3.4	4.0	4.3	4.5	2.8	3.3	3.6	3.4	3.2	3.2	3.3
12	4	3.0	2.2	2.3	2.9	2.5	2.4	1.1	2.2	1.5	2.2	2.1	2.8	2.4	1.8	4.8	5.6	6.1	6.8	6.2	8.0	7.1	6.7	7.8	7.8
12	5	7.1	5.8	6.4	5.5	3.6	3.3	3.1	3.4	3.2	3.2	2.9	2.3	1.3	0.0	0.0	0.0	0.0	0.0	0.4	1.0	2.1	3.0	3.5	4.3
12	6	4.9	5.3	5.9	6.8	8.0	8.2	7.5	6.9	5.8	4.6	4.9	5.4	4.3	3.4	4.2	3.6	2.8	2.9	2.6	3.4	4.0	4.6	4.7	4.3
12	7	4.0	4.0	4.3	4.6	4.9	4.6	5.0	4.8	3.9	3.5	3.2	3.3	3.7	4.6	3.6	5.4	6.5	7.1	6.0	5.6	5.6	5.1	5.1	4.3

TABLE A.IV POWER OUTPUT OF 1#PV STATION (MW)(10MW INSTALLED CAPACITY)

Week	Day	1h	2h	3h	4h	5h	6h	7h	8h	9h	10h	11h	12h	13h	14h	15h	16h	17h	18h	19h	20h	21h	22h	23h	24h
1	1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	1.6	3.2	3.0	3.1	4.0	2.7	1.7	0.8	0.1	0.0	0.0	0.0	0.0	0.0	0.0
1	2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.7	1.3	1.7	3.1	3.9	1.9	2.3	1.2	0.1	0.0	0.0	0.0	0.0	0.0	0.0
1	3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	1.8	2.5	4.3	3.3	2.5	2.0	1.6	1.2	0.1	0.0	0.0	0.0	0.0	0.0	0.0
1	4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.7	2.5	4.0	5.2	5.6	4.3	3.9	2.8	1.4	0.1	0.0	0.0	0.0	0.0	0.0	0.0
1	5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	2.2	4.1	5.6	5.7	4.3	3.9	3.1	1.4	0.1	0.0	0.0	0.0	0.0	0.0	0.0
1	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	2.0	4.0	4.6	4.0	4.0	3.3	2.1	1.3	0.1	0.0	0.0	0.0	0.0	0.0	0.0
1	7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	2.3	4.0	4.9	5.0	4.4	3.6	3.2	1.3	0.2	0.0	0.0	0.0	0.0	0.0	0.0
2	1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.7	2.5	4.6	5.6	4.7	4.9	5.0	4.0	2.7	0.6	0.0	0.0	0.0	0.0	0.0	0.0
2	2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	3.1	4.5	6.5	6.5	6.2	5.7	4.0	2.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0
2	3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	2.0	2.1	3.3	2.1	3.6	3.6	4.3	2.6	1.0	0.0	0.0	0.0	0.0	0.0	0.0
2	4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	2.2	3.9	4.5	5.8	5.6	5.7	2.2	1.2	0.5	0.0	0.0	0.0	0.0	0.0	0.0
2	5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.3	3.3	5.3	6.2	6.2	6.0	5.2	4.2	2.0	0.7	0.0	0.0	0.0	0.0	0.0	0.0
2	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.2	3.3	4.7	5.7	6.3	7.6	6.4	4.8	2.4	0.8	0.0	0.0	0.0	0.0	0.0	0.0
2	7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.3	3.3	5.4	6.4	6.3	6.3	5.5	3.6	1.7	0.6	0.0	0.0	0.0	0.0	0.0	0.0
3	1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	1.5	3.4	5.3	3.3	5.0	5.3	4.6	1.9	1.8	1.5	0.1	0.0	0.0	0.0	0.0	0.0
3	2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	2.2	3.1	5.0	7.2	8.3	7.6	6.5	5.5	2.9	1.1	0.2	0.0	0.0	0.0	0.0	0.0
3	3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	2.1	3.6	2.5	2.7	2.5	2.2	4.0	4.8	3.6	1.9	0.2	0.0	0.0	0.0	0.0	0.0
3	4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.9	1.3	2.1	1.7	2.3	2.9	4.5	3.7	1.8	1.9	0.3	0.0	0.0	0.0	0.0	0.0
3	5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.3	1.3	1.2	1.1	2.4	1.8	0.8	0.6	1.1	1.0	0.1	0.0	0.0	0.0	0.0	0.0
3	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	2.5	4.9	5.9	6.5	6.4	5.8	5.1	4.1	2.4	0.8	0.1	0.0	0.0	0.0	0.0	0.0
3	7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	2.3	3.3	4.6	3.9	4.4	5.2	5.0	3.0	2.4	1.4	0.2	0.0	0.0	0.0	0.0	0.0
4	1	0.0	0.0	0.0	0.0	0.0	0.0	0.2	2.0	4.1	5.7	5.0	6.8	7.3	6.6	6.0	5.2	3.9	1.8	0.7	0.0	0.0	0.0	0.0	0.0
4	2	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.4	2.6	3.0	2.6	6.0	3.8	5.7	3.0	2.5	1.5	1.1	0.4	0.0	0.0	0.0	0.0	0.0
4	3	0.0	0.0	0.0	0.0	0.0	0.0	0.2	1.5	3.9	5.4	6.2	8.4	8.4	5.8	5.3	5.0	3.4	1.7	0.7	0.0	0.0	0.0	0.0	0.0
4	4	0.0	0.0	0.0	0.0	0.0	0.0	0.2	1.9	3.8	4.3	6.6	8.0	7.4	8.3	6.7	5.3	2.6	1.9	0.7	0.0	0.0	0.0	0.0	0.0
4	5	0.0	0.0	0.0	0.0	0.0	0.0	0.2	1.8	3.8	4.3	2.5	7.5	7.1	4.9	6.0	3.8	3.1	2.1	1.1	0.0	0.0	0.0	0.0	0.0
4	6	0.0	0.0	0.0	0.0	0.0	0.0	0.4	2.5	4.7	5.3	6.6	7.9	7.2	8.8	7.9	7.0	4.4	2.2	0.9	0.0	0.0	0.0	0.0	0.0
4	7	0.0	0.0	0.0	0.0	0.0	0.0	0.2	1.1	1.7	2.4	0.6	4.0	7.4	6.3	4.5	3.8	1.9	2.3	1.0	0.0	0.0	0.0	0.0	0.0
5	1	0.0	0.0	0.0	0.0	0.0	0.0	1.6	3.8	6.0	7.2	9.0	9.2	10.0	10.0	9.2	7.3	5.3	4.1	1.3	0.2	0.0	0.0	0.0	0.0
5	2	0.0	0.0	0.0	0.0	0.0	0.0	1.3	3.6	5.6	7.3	8.2	10.0	10.0	9.4	7.9	5.0	3.4	3.4	1.1	0.2	0.0	0.0	0.0	0.0
5	3	0.0	0.0	0.0	0.0	0.0	0.0	1.1	3.1	5.7	7.7	9.4	9.7	10.0	7.8	7.3	7.0	4.8	3.3	1.5	0.2	0.0	0.0	0.0	0.0
5	4	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.8	1.1	0.5	0.6	0.9	3.3	1.6	1.5	1.3	2.0	0.4	1.6	0.2	0.0	0.0	0.0	0.0
5	5	0.0	0.0	0.0	0.0	0.0	0.0	1.2	2.9	3.8	7.1	7.2	7.0	6.9	8.9	8.7	6.3	4.7	3.6	1.8	0.2	0.0	0.0	0.0	0.0
5	6	0.0	0.0	0.0	0.0	0.0	0.0	1.3	3.4	4.9	6.2	7.8	9.5	8.8	9.9	6.2	6.4	5.1	3.3	1.3	0.3	0.0	0.0	0.0	0.0
5	7	0.0	0.0	0.0	0.0	0.0	0.1	1.7	3.8	6.1	6.1	7.0	6.9	9.3	8.2	8.2	7.7	5.9	3.8	1.6	0.3	0.0	0.0	0.0	0.0
6	1	0.0	0.0	0.0	0.0	0.0	0.3	1.7	3.2	6.2	6.8	8.8	10.0	10.0	9.5	8.8	8.9	7.0	4.7	1.9	0.6	0.0	0.0	0.0	0.0
6	2	0.0	0.0	0.0	0.0	0.0	0.2	1.0	2.7	4.0	3.8	7.9	6.5	5.9	8.1	8.4	7.3	6.9	4.7	2.0	0.4	0.0	0.0	0.0	0.0
6	3	0.0	0.0	0.0	0.0	0.0	0.1	0.5	0.2	0.1	0.6	1.0	0.3	0.9	1.0	0.5	0.5	0.7	0.5	1.4	0.6	0.0	0.0	0.0	0.0
6	4	0.0	0.0	0.0	0.0	0.0	0.2	1.7	1.9	1.6	0.9	2.9	8.5	8.6	7.4	4.8	4.5	4.3	1.4	2.4	0.5	0.0	0.0	0.0	0.0
6	5	0.0	0.0	0.0	0.0	0.0	0.2	0.8	2.9	3.2	5.0	6.9	7.1	9.8	10.0	7.5	5.9	4.9	3.9	2.2	0.4	0.0	0.0	0.0	0.0
6	6	0.0	0.0	0.0	0.0	0.0	0.4	2.3	4.7	6.3	8.4	9.3	8.4	9.4	10.0	9.0	8.2	5.3	3.4	2.1	0.7	0.0	0.0	0.0	0.0
6	7	0.0	0.0	0.0	0.0	0.0	0.4	1.7	4.2	6.1	8.7	9.2	10.0	10.0	10.0	9.6	8.9	6.6	4.2	1.8	0.7	0.0	0.0	0.0	0.0
7	1	0.0	0.0	0.0	0.0	0.0	0.2	1.5	2.8	4.0	4.7	4.2	6.7	5.6	4.9	2.6	3.7	4.1	3.4	2.7	1.1	0.0	0.0	0.0	0.0
7	2	0.0	0.0	0.0	0.0	0.0	0.3	1.9	3.1	4.7	6.5	9.8	10.0	8.5	7.8	8.4	6.1	3.6	1.7	1.1	0.6	0.0	0.0	0.0	0.0
7	3	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.6	1.0	1.4	1.7	0.7	1.0	0.3	0.6	0.5	0.9	1.2	2.2	0.8	0.0	0.0	0.0	0.0
7	4	0.0	0.0	0.0	0.0	0.0	0.3	1.8	4.1	5.8	7.1	7.3	8.8	6.6	8.9	5.9	5.9	3.9	2.0	1.6	0.8	0.0	0.0	0.0	0.0
7	5	0.0	0.0	0.0	0.0	0.0	0.1	0.8	1.2	3.9	3.3	5.0	5.8	7.4	7.3	7.5	2.4	0.9	0.7	2.2	0.9	0.0	0.0	0.0	0.0
7	6	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.8	0.8	1.3	2.1	1.0	2.0	2.5	1.8	1.8	0.8	0.5	2.2	0.8	0.0	0.0	0.0	0.0
7	7	0.0	0.0	0.0	0.0	0.0	0.2	1.7	3.8	4.7	6.0	6.2	8.2	10.0	8.9	8.4	7.1	5.1	2.3	1.7	0.7	0.0	0.0	0.0	0.0
8	1	0.0	0.0	0.0	0.0	0.0	0.0	0.9	2.9	3.6	4.6	3.1	5.7	6.0	7.2	5.9	4.7	2.4	1.5	2.1	0.6	0.0	0.0	0.0	0.0
8	2	0.0	0.0	0.0	0.0	0.0	0.0	0.9	1.4	3.0	5.6	7.8	9.2	8.4	7.5	4.6	5.9	4.7	2.2	2.2	0.7	0.0	0.0	0.0	0.0
8	3	0.0	0.0	0.0	0.0	0.0	0.0	1.3	3.3	5.5	6.3	7.5	8.0	10.0	9.4	8.0	6.0	4.6	3.9	1.8	0.5	0.0	0.0	0.0	0.0
8	4	0.0	0.0	0.0	0.0	0.0	0.0	1.0	2.5	4.2	5.7	7.1	8.2	9.7	8.6	7.5	4.9	4.1	3.4	1.8	0.4	0.0	0.0	0.0	0.0
8	5	0.0	0.0	0.0	0.0	0.0	0.0	0.3	2.6	3.0	3.2	3.5	3.3	2.9	4.1	5.2	2.3	1.3	0.4	0.9	0.2	0.0	0.0	0.0	0.0
8	6	0.0	0.0	0.0	0.0	0.0	0.0	0.3	1.4	1.2	1.5	2.4	3.7	2.7	2.6	2.1	1.9	1.6	1.4	1.9	0.6	0.0	0.0	0.0	0.0
8	7	0.0	0.0	0.0	0.0	0.0	0.0	1.1	2.9	5.3	6.8	8.8	9.5	8.7	8.8	7.1	7.3	5.4	3.0	1.6	0.3	0.0	0.0	0.0	0.0
9	1	0.0	0.0	0.0	0.0	0.0	0.0	0.1	1.2	2.1	1.8	2.1	3.0	1.9	2.0	2.5	2.5	2.6	2.1	0.8	0.0	0.0	0.0	0.0	0.0
9	2	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.9	1.9	3.2	3.8	2.7	4.2	3.9	3.5	4.9	2.4	1.8	0.8	0.0	0.0	0.0	0.0	0.0
9	3	0.0	0.0	0.0	0.0	0.0	0.0	0.2	1.3	3.4	4.6	7.3	8.4	9.5	10.0	8.4	5.3	3.4	1.8	0.6	0.0	0.0	0.0	0.0	0.0
9	4	0.0	0.0	0.0	0.0	0.0	0.0	0.2	1.2	1.8	3.4	4.1	4.5	5.1	2.7	5.9	4.2	3.1	1.6	0.4	0.0	0.0	0.0	0.0	0.0
9	5	0.0	0.0	0.0	0.0	0.0	0.0	0.3	1.3	3.0	3.9	2.6	4.2	5.0	5.0	4.0	3.6	3.6	2.2	1.0	0.0	0.0	0.0	0.0	0.0
9	6	0.0	0.0	0.0	0.0	0.0	0.0	0.3	2.1	4.2	7.1	7.6	8.9	10.0	9.3	7.5	6.5	4.3	2.1	0.8	0.0	0.0	0.0	0.0	0.0
9	7	0.0	0.0	0.0	0.0	0.0	0.0	0.4	2.0	4.3	5.6	8.1	8.7	6.9	7.2	7.3	5.4	3.4	1.4	0.8	0.0	0.0	0.0	0.0	0.0
10	1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.7	4.2	5.5	7.4	8.3	7.4	5.5	4.6	5.8	3.1	1.1	0.1	0.0	0.0	0.0	0.0	0.0
10	2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.6	3.6	6.2	8.0	8.3	8.5	8.8	7.1	6.0	3.8	1.2	0.1	0.0	0.0	0.0	0.0	0.0
10	3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.4	3.6	5.1	6.5	8.0	8.8	6.6	6.5	4.0	2.8	1.2	0.1	0.0	0.0	0.0	0.0	0.0
10	4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.4	3.7	5.9	7.5	7.6	8.3	8.4	7.1	5.2	2.9	1.1	0.0	0.0	0.0	0.0	0.0	0.0
10	5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	1.4	1.2	4.1	5.7	5.6	7.7	5.0	4.0	1.1	0.8	0.0	0.0	0.0	0.0	0.0	0.0
10	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.2	3.3	4.2	4.0	4.7	6.2	6.1	5.8	4.2	1.6	1.0	0.0	0.0	0.0	0.0	0.0	0.0
10	7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.4	3.9	5.6	6.2	6.9	7.7	7.9	6.4	5.0	2.9	0.9	0.0	0.0	0.0	0.0	0.0	0.0
11	1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	2.0	3.1	4.7	5.5	6.8	6.3	5.0	3.4	1.7	0.3	0.0	0.0	0.0	0.0	0.0	0.0
11	2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	1.2	1.9	0.6	0.8	1.4	1.0	1.7	2.3	2.2	0.4	0.0	0.0	0.0	0.0	0.0	0.0
11	3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.8	1.5	4.1	6.5	5.4	4.0	3.2	2.5	0.6	0.1	0.0	0.0	0.0	0.0	0.0	0.0
11	4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	1.5	2.6	2.7	4.6	3.1	4.0	3.6	3.5	1.1	0.3	0.0	0.0	0.0	0.0	0.0	0.0
11	5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	2.2	3.8	5.8	6.4	7.1	7.0	5.5	3.1	1.6	0.2	0.0	0.0	0.0	0.0	0.0	0.0
11	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	1.6	3.7	5.1	6.3	4.2	4.9	4.0	0.8	0.5	0.1	0.0	0.0	0.0	0.0	0.0	0.0
11	7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	2.3	3.3	4.0	3.0	2.0	3.7	2.1	1.6	1.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0
12	1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	1.1	2.5	2.0	3.9	2.7	2.6	1.0	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0
12	2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8	1.3	2.2	2.5	2.7	3.4	1.0	2.0	1.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
12	3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.9	2.0	1.1	3.0	4.5	4.4	2.7	2.3	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0
12	4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.8	1.4	3.1	2.5	1.2	0.6	1.8	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
12	5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.9	2.5	2.6	4.1	3.9	1.9	2.1	2.2	1.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0
12	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	2.0	1.7	0.7	1.6	0.5	0.6	0.8	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0
12	7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.3	0.3	0.6	0.1	0.3	0.5	0.2	0.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0

TABLE A. V POWER OUTPUT OF 2#PV STATION (MW)(10MW INSTALLED CAPACITY)

Week	Day	1h	2h	3h	4h	5h	6h	7h	8h	9h	10h	11h	12h	13h	14h	15h	16h	17h	18h	19h	20h	21h	22h	23h	24h
1	1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.8	1.3	1.7	3.1	3.7	1.8	2.0	0.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1	2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	2.0	2.6	4.4	3.2	2.4	1.8	1.5	0.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1	3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	2.8	4.1	5.2	5.5	4.1	3.6	2.5	1.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1	4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8	2.5	4.2	5.7	5.6	4.2	3.6	2.8	1.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1	5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8	2.2	4.1	4.6	3.9	3.8	3.1	1.9	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8	2.6	4.2	4.9	4.9	4.2	3.4	2.8	1.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0
1	7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.9	2.7	4.8	5.6	4.6	4.7	4.7	3.7	2.3	0.4	0.0	0.0	0.0	0.0	0.0	0.0
2	1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	1.3	3.4	4.7	6.5	6.4	6.0	5.4	3.6	1.7	0.3	0.0	0.0	0.0	0.0	0.0	0.0
2	2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	1.3	2.2	2.1	3.3	2.1	3.4	3.4	4.0	2.3	0.6	0.0	0.0	0.0	0.0	0.0	0.0
2	3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	1.3	2.3	4.1	4.5	5.7	5.4	5.4	2.0	1.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0
2	4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	1.7	3.6	5.5	6.2	6.1	5.8	4.9	3.8	1.7	0.4	0.0	0.0	0.0	0.0	0.0	0.0
2	5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	1.5	3.5	4.8	5.7	6.2	7.4	6.0	4.4	2.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0
2	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	1.6	3.6	5.6	6.5	6.2	6.0	5.2	3.3	1.5	0.4	0.0	0.0	0.0	0.0	0.0	0.0
2	7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	1.7	3.6	5.4	3.3	4.9	5.1	4.3	1.7	1.6	1.2	0.0	0.0	0.0	0.0	0.0	0.0
3	1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	2.5	3.3	5.1	7.2	8.2	7.3	6.1	5.1	2.6	0.9	0.1	0.0	0.0	0.0	0.0	0.0
3	2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	2.4	3.8	2.6	2.7	2.4	2.1	3.8	4.5	3.2	1.5	0.1	0.0	0.0	0.0	0.0	0.0
3	3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	1.0	1.4	2.1	1.7	2.3	2.8	4.3	3.4	1.6	1.5	0.1	0.0	0.0	0.0	0.0	0.0
3	4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.3	1.4	1.2	1.1	2.4	1.8	0.8	0.6	1.0	0.8	0.1	0.0	0.0	0.0	0.0	0.0
3	5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8	2.8	5.2	6.1	6.5	6.3	5.7	4.9	3.9	2.1	0.7	0.0	0.0	0.0	0.0	0.0	0.0
3	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.7	2.6	3.4	4.7	3.9	4.3	5.0	4.8	2.8	2.1	1.1	0.1	0.0	0.0	0.0	0.0	0.0
3	7	0.0	0.0	0.0	0.0	0.0	0.0	0.3	2.4	4.4	5.9	5.1	6.8	7.1	6.4	5.7	4.8	3.6	1.5	0.5	0.0	0.0	0.0	0.0	0.0
4	1	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.4	2.8	3.1	2.6	6.0	3.7	5.5	2.8	2.3	1.4	1.0	0.3	0.0	0.0	0.0	0.0	0.0
4	2	0.0	0.0	0.0	0.0	0.0	0.0	0.4	1.8	4.1	5.5	6.3	8.4	8.3	5.6	5.0	4.7	3.1	1.5	0.4	0.0	0.0	0.0	0.0	0.0
4	3	0.0	0.0	0.0	0.0	0.0	0.0	0.4	2.3	4.1	4.4	6.7	8.0	7.2	8.0	6.4	4.9	2.4	1.7	0.4	0.0	0.0	0.0	0.0	0.0
4	4	0.0	0.0	0.0	0.0	0.0	0.0	0.4	2.1	4.0	4.4	2.6	7.4	7.0	4.8	5.8	3.5	2.8	1.8	0.7	0.0	0.0	0.0	0.0	0.0
4	5	0.0	0.0	0.0	0.0	0.0	0.0	0.6	2.9	5.0	5.4	6.7	7.8	7.1	8.5	7.5	6.5	4.0	1.9	0.6	0.0	0.0	0.0	0.0	0.0
4	6	0.0	0.0	0.0	0.0	0.0	0.0	0.3	1.3	1.8	2.5	0.6	3.9	7.3	6.1	4.3	3.6	1.7	2.0	0.7	0.0	0.0	0.0	0.0	0.0
4	7	0.0	0.0	0.0	0.0	0.0	0.1	2.0	4.2	6.3	7.3	9.1	9.1	10.0	9.7	8.8	6.8	4.9	3.6	1.0	0.1	0.0	0.0	0.0	0.0
5	1	0.0	0.0	0.0	0.0	0.0	0.1	1.7	3.9	5.9	7.4	8.3	10.0	9.8	9.1	7.5	4.7	3.2	3.1	0.9	0.1	0.0	0.0	0.0	0.0
5	2	0.0	0.0	0.0	0.0	0.0	0.1	1.3	3.4	5.9	7.8	9.4	9.6	10.0	7.5	7.0	6.6	4.5	2.9	1.2	0.1	0.0	0.0	0.0	0.0
5	3	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.9	1.1	0.5	0.6	0.9	3.2	1.6	1.4	1.2	1.9	0.4	1.3	0.1	0.0	0.0	0.0	0.0
5	4	0.0	0.0	0.0	0.0	0.0	0.1	1.5	3.2	3.9	7.2	7.2	6.9	6.7	8.6	8.4	6.0	4.3	3.2	1.4	0.1	0.0	0.0	0.0	0.0
5	5	0.0	0.0	0.0	0.0	0.0	0.1	1.6	3.7	5.2	6.3	7.8	9.4	8.6	9.6	5.9	6.0	4.7	2.9	1.0	0.1	0.0	0.0	0.0	0.0
5	6	0.0	0.0	0.0	0.0	0.0	0.2	2.1	4.1	6.3	6.2	7.0	6.9	9.1	8.0	7.9	7.3	5.4	3.4	1.3	0.1	0.0	0.0	0.0	0.0
5	7	0.0	0.0	0.0	0.0	0.0	0.6	2.0	3.4	6.4	6.9	8.9	10.0	10.0	9.2	8.4	8.4	6.6	4.3	1.6	0.4	0.0	0.0	0.0	0.0
6	1	0.0	0.0	0.0	0.0	0.0	0.3	1.2	2.8	4.2	3.8	7.9	6.4	5.8	7.9	8.1	6.9	6.4	4.3	1.7	0.2	0.0	0.0	0.0	0.0
6	2	0.0	0.0	0.0	0.0	0.0	0.2	0.6	0.2	0.1	0.6	1.0	0.3	0.9	1.0	0.5	0.4	0.7	0.5	1.2	0.4	0.0	0.0	0.0	0.0
6	3	0.0	0.0	0.0	0.0	0.0	0.3	2.0	2.0	1.7	0.9	2.9	8.4	8.4	7.1	4.7	4.2	4.0	1.3	2.1	0.3	0.0	0.0	0.0	0.0
6	4	0.0	0.0	0.0	0.0	0.0	0.4	0.9	3.1	3.4	5.0	7.0	7.0	9.6	9.7	7.2	5.6	4.6	3.5	1.9	0.3	0.0	0.0	0.0	0.0
6	5	0.0	0.0	0.0	0.0	0.0	0.6	2.7	5.1	6.6	8.5	9.3	8.3	9.2	10.0	8.6	7.7	4.9	3.1	1.8	0.4	0.0	0.0	0.0	0.0
6	6	0.0	0.0	0.0	0.0	0.0	0.6	1.9	4.5	6.4	8.8	9.2	10.0	10.0	10.0	9.2	8.5	6.2	3.8	1.5	0.5	0.0	0.0	0.0	0.0
6	7	0.0	0.0	0.0	0.0	0.0	0.4	1.8	3.0	4.1	4.8	4.2	6.6	5.5	4.8	2.5	3.5	3.8	3.1	2.3	0.7	0.0	0.0	0.0	0.0
7	1	0.0	0.0	0.0	0.0	0.0	0.5	2.2	3.4	4.9	6.6	9.8	10.0	8.3	7.6	8.0	5.8	3.4	1.5	1.0	0.4	0.0	0.0	0.0	0.0
7	2	0.0	0.0	0.0	0.0	0.0	0.1	0.3	0.6	1.0	1.4	1.7	0.7	1.0	0.3	0.5	0.4	0.8	1.1	1.9	0.6	0.0	0.0	0.0	0.0
7	3	0.0	0.0	0.0	0.0	0.0	0.5	2.1	4.4	6.0	7.2	7.4	8.7	6.5	8.7	5.6	5.6	3.6	1.8	1.4	0.5	0.0	0.0	0.0	0.0
7	4	0.0	0.0	0.0	0.0	0.0	0.2	1.0	1.3	4.0	3.3	5.0	5.8	7.2	7.1	7.2	2.3	0.9	0.6	1.9	0.6	0.0	0.0	0.0	0.0
7	5	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.9	0.8	1.3	2.1	1.0	1.9	2.4	1.7	1.7	0.7	0.5	1.9	0.5	0.0	0.0	0.0	0.0
7	6	0.0	0.0	0.0	0.0	0.0	0.3	2.0	4.1	4.9	6.1	6.2	8.1	10.0	8.7	8.0	6.8	4.8	2.1	1.5	0.5	0.0	0.0	0.0	0.0
7	7	0.0	0.0	0.0	0.0	0.0	0.1	1.1	3.1	3.7	4.7	3.1	5.6	5.9	7.0	5.6	4.4	2.2	1.4	1.7	0.4	0.0	0.0	0.0	0.0
8	1	0.0	0.0	0.0	0.0	0.0	0.1	1.1	1.5	3.2	5.8	7.8	9.2	8.3	7.3	4.4	5.6	4.4	2.0	1.9	0.4	0.0	0.0	0.0	0.0
8	2	0.0	0.0	0.0	0.0	0.0	0.1	1.7	3.6	5.7	6.5	7.6	8.0	10.0	9.2	7.6	5.7	4.2	3.5	1.5	0.3	0.0	0.0	0.0	0.0
8	3	0.0	0.0	0.0	0.0	0.0	0.1	1.3	2.8	4.4	5.8	7.1	8.1	9.5	8.3	7.2	4.6	3.8	3.0	1.5	0.3	0.0	0.0	0.0	0.0
8	4	0.0	0.0	0.0	0.0	0.0	0.0	0.4	2.9	3.2	3.3	3.5	3.3	2.8	4.0	5.0	2.2	1.2	0.3	0.7	0.1	0.0	0.0	0.0	0.0
8	5	0.0	0.0	0.0	0.0	0.0	0.0	0.4	1.5	1.2	1.5	2.4	3.7	2.7	2.5	2.0	1.8	1.5	1.2	1.6	0.3	0.0	0.0	0.0	0.0
8	6	0.0	0.0	0.0	0.0	0.0	0.1	1.5	3.2	5.6	7.0	8.8	9.4	8.6	8.5	6.8	6.9	5.0	2.7	1.3	0.2	0.0	0.0	0.0	0.0
8	7	0.0	0.0	0.0	0.0	0.0	0.0	0.2	1.4	2.2	1.9	2.1	3.0	1.8	2.0	2.4	2.4	2.4	1.8	0.6	0.0	0.0	0.0	0.0	0.0
9	1	0.0	0.0	0.0	0.0	0.0	0.0	0.4	1.1	2.0	3.3	3.9	2.7	4.2	3.7	3.4	4.6	2.2	1.6	0.5	0.0	0.0	0.0	0.0	0.0
9	2	0.0	0.0	0.0	0.0	0.0	0.0	0.4	1.5	3.6	4.8	7.4	8.4	9.4	9.7	8.0	5.0	3.1	1.5	0.4	0.0	0.0	0.0	0.0	0.0
9	3	0.0	0.0	0.0	0.0	0.0	0.0	0.3	1.3	1.9	3.5	4.1	4.4	5.0	2.7	5.7	4.0	2.8	1.4	0.3	0.0	0.0	0.0	0.0	0.0
9	4	0.0	0.0	0.0	0.0	0.0	0.0	0.6	1.5	3.1	4.1	2.6	4.2	4.9	4.8	3.8	3.4	3.3	1.9	0.7	0.0	0.0	0.0	0.0	0.0
9	5	0.0	0.0	0.0	0.0	0.0	0.0	0.6	2.4	4.5	7.3	7.7	8.8	10.0	9.0	7.1	6.1	4.0	1.8	0.5	0.0	0.0	0.0	0.0	0.0
9	6	0.0	0.0	0.0	0.0	0.0	0.0	0.7	2.3	4.6	5.7	8.2	8.6	6.8	7.0	6.9	5.0	3.1	1.2	0.5	0.0	0.0	0.0	0.0	0.0
9	7	0.0	0.0	0.0	0.0	0.0	0.0	0.1	2.1	4.5	5.7	7.5	8.3	7.2	5.3	4.4	5.4	2.7	0.8	0.0	0.0	0.0	0.0	0.0	0.0
10	1	0.0	0.0	0.0	0.0	0.0	0.0	0.2	2.0	3.9	6.4	8.1	8.2	8.3	8.5	6.7	5.5	3.4	0.9	0.0	0.0	0.0	0.0	0.0	0.0
10	2	0.0	0.0	0.0	0.0	0.0	0.0	0.2	1.7	3.9	5.3	6.6	8.0	8.6	6.4	6.1	3.7	2.5	0.9	0.0	0.0	0.0	0.0	0.0	0.0
10	3	0.0	0.0	0.0	0.0	0.0	0.0	0.1	1.8	4.0	6.1	7.6	7.6	8.2	8.1	6.7	4.8	2.5	0.8	0.0	0.0	0.0	0.0	0.0	0.0
10	4	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.8	1.5	1.3	4.2	5.6	5.5	7.4	4.8	3.7	0.9	0.6	0.0	0.0	0.0	0.0	0.0	0.0
10	5	0.0	0.0	0.0	0.0	0.0	0.0	0.1	1.5	3.6	4.3	4.1	4.7	6.1	5.9	5.5	3.9	1.4	0.7	0.0	0.0	0.0	0.0	0.0	0.0
10	6	0.0	0.0	0.0	0.0	0.0	0.0	0.1	1.8	4.2	5.8	6.3	6.9	7.5	7.6	6.0	4.6	2.5	0.6	0.0	0.0	0.0	0.0	0.0	0.0
10	7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	2.3	3.3	4.8	5.4	6.7	6.0	4.7	3.0	1.3	0.1	0.0	0.0	0.0	0.0	0.0	0.0
11	1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	1.4	2.0	0.6	0.8	1.4	0.9	1.6	2.1	1.8	0.2	0.0	0.0	0.0	0.0	0.0	0.0
11	2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.9	1.6	4.1	6.5	5.3	3.9	3.0	2.3	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0
11	3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	1.7	2.7	2.7	4.5	3.0	3.8	3.3	3.1	0.9	0.1	0.0	0.0	0.0	0.0	0.0	0.0
11	4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.7	2.5	4.0	5.9	6.4	7.0	6.7	5.1	2.7	1.3	0.1	0.0	0.0	0.0	0.0	0.0	0.0
11	5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	1.9	3.9	5.2	6.3	4.1	4.7	3.7	0.7	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0
11	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	2.7	3.5	4.1	3.0	2.0	3.5	2.0	1.4	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0
11	7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.4	1.2	2.6	2.0	3.8	2.6	2.4	0.9	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0
12	1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	1.4	2.2	2.5	2.6	3.2	0.9	1.7	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0
12	2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	1.2	2.2	1.2	3.0	4.4	4.2	2.5	2.0	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0
12	3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.9	1.4	3.1	2.4	1.1	0.5	1.6	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0
12	4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	1.2	2.7	2.7	4.1	3.9	1.8	2.0	1.9	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
12	5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	2.1	1.7	0.7	1.6	0.5	0.6	0.7	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0
12	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.3	0.3	0.6	0.1	0.3	0.5	0.2	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0
12	7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.3	0.3	0.6	0.1	0.4	0.5	0.2	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0

TABLE A.VI POWER OUTPUT OF 3#PV STATION (MW)(10MW INSTALLED CAPACITY)

Week	Day	1h	2h	3h	4h	5h	6h	7h	8h	9h	10h	11h	12h	13h	14h	15h	16h	17h	18h	19h	20h	21h	22h	23h	24h
1	1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	1.2	1.9	2.8	2.3	2.2	2.5	1.5	0.7	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1	2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.4	0.8	1.1	1.4	2.2	2.4	1.1	1.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1	3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	1.0	2.1	2.2	3.3	2.3	1.6	1.1	0.7	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1	4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	1.8	2.8	3.4	3.9	3.8	2.7	2.2	1.2	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1	5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.7	1.4	2.5	3.5	4.2	3.9	2.7	2.2	1.4	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	1.5	2.2	3.4	3.4	2.8	2.5	1.9	1.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1	7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	1.4	2.6	3.4	3.7	3.4	2.7	2.0	1.4	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	1.2	2.5	3.8	4.1	3.2	3.0	2.8	1.9	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.7	1.8	3.1	3.7	4.6	4.3	3.8	3.2	1.9	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.7	1.8	2.1	1.7	2.4	1.4	2.2	2.0	2.0	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.7	1.8	2.2	3.2	3.3	3.9	3.4	3.1	1.0	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	2.2	3.2	4.3	4.4	4.1	3.6	2.9	2.0	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8	2.0	3.2	3.7	4.1	4.1	4.5	3.5	2.3	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8	2.1	3.2	4.3	4.6	4.1	3.8	3.1	1.7	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3	1	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.7	1.7	3.0	4.0	2.4	3.3	3.2	2.5	0.9	0.7	0.2	0.0	0.0	0.0	0.0	0.0	0.0
3	2	0.0	0.0	0.0	0.0	0.0	0.0	0.2	1.2	2.5	2.7	3.8	4.9	5.3	4.5	3.6	2.7	1.1	0.2	0.0	0.0	0.0	0.0	0.0	0.0
3	3	0.0	0.0	0.0	0.0	0.0	0.0	0.2	1.2	2.4	3.1	1.9	1.9	1.6	1.4	2.2	2.3	1.4	0.3	0.0	0.0	0.0	0.0	0.0	0.0
3	4	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.6	1.0	1.1	1.6	1.2	1.5	1.7	2.5	1.8	0.7	0.3	0.0	0.0	0.0	0.0	0.0	0.0
3	5	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.7	0.3	1.1	0.9	0.8	1.6	1.1	0.4	0.3	0.4	0.2	0.0	0.0	0.0	0.0	0.0	0.0
3	6	0.0	0.0	0.0	0.0	0.0	0.0	0.4	1.4	2.7	4.1	4.5	4.5	4.1	3.5	2.8	2.0	0.9	0.1	0.0	0.0	0.0	0.0	0.0	0.0
3	7	0.0	0.0	0.0	0.0	0.0	0.0	0.3	1.2	2.5	2.8	3.5	2.7	2.8	3.1	2.8	1.5	0.9	0.2	0.0	0.0	0.0	0.0	0.0	0.0
4	1	0.0	0.0	0.0	0.0	0.0	0.0	0.9	2.4	3.6	4.3	3.5	4.4	4.4	3.8	3.2	2.5	1.5	0.4	0.0	0.0	0.0	0.0	0.0	0.0
4	2	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.4	2.2	2.3	1.8	3.9	2.3	3.3	1.6	1.2	0.6	0.3	0.0	0.0	0.0	0.0	0.0	0.0
4	3	0.0	0.0	0.0	0.0	0.0	0.1	0.9	1.8	3.3	4.0	4.3	5.4	5.1	3.3	2.8	2.4	1.3	0.4	0.0	0.0	0.0	0.0	0.0	0.0
4	4	0.0	0.0	0.0	0.0	0.0	0.1	0.9	2.2	3.3	3.2	4.6	5.2	4.5	4.7	3.6	2.5	1.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0
4	5	0.0	0.0	0.0	0.0	0.0	0.1	0.9	2.0	3.2	3.3	1.8	4.9	4.4	2.8	3.2	1.8	1.2	0.5	0.0	0.0	0.0	0.0	0.0	0.0
4	6	0.0	0.0	0.0	0.0	0.0	0.1	1.3	2.8	3.9	3.9	4.5	5.1	4.4	5.0	4.2	3.3	1.7	0.5	0.0	0.0	0.0	0.0	0.0	0.0
4	7	0.0	0.0	0.0	0.0	0.0	0.0	0.6	1.2	1.5	1.8	0.4	2.6	4.5	3.6	2.4	1.8	0.8	0.6	0.0	0.0	0.0	0.0	0.0	0.0
5	1	0.0	0.0	0.0	0.0	0.0	0.6	2.1	3.4	4.7	5.1	6.0	5.8	6.3	5.6	4.8	3.5	2.1	1.2	0.1	0.0	0.0	0.0	0.0	0.0
5	2	0.0	0.0	0.0	0.0	0.0	0.5	1.8	3.2	4.3	5.1	5.5	6.5	6.0	5.3	4.1	2.4	1.4	1.0	0.1	0.0	0.0	0.0	0.0	0.0
5	3	0.0	0.0	0.0	0.0	0.0	0.4	1.4	2.8	4.4	5.4	6.2	6.1	6.4	4.4	3.8	3.3	2.0	1.0	0.1	0.0	0.0	0.0	0.0	0.0
5	4	0.0	0.0	0.0	0.0	0.0	0.1	0.6	0.7	0.8	0.4	0.4	0.5	1.9	0.9	0.8	0.6	0.8	0.1	0.1	0.0	0.0	0.0	0.0	0.0
5	5	0.0	0.0	0.0	0.0	0.0	0.4	1.5	2.6	2.9	5.0	4.8	4.4	4.1	5.0	4.6	3.0	1.9	1.1	0.1	0.0	0.0	0.0	0.0	0.0
5	6	0.0	0.0	0.0	0.0	0.0	0.3	1.6	3.0	3.8	4.4	5.2	5.9	5.3	5.6	3.3	3.0	2.1	1.0	0.1	0.0	0.0	0.0	0.0	0.0
5	7	0.0	0.0	0.0	0.0	0.0	0.6	2.1	3.3	4.6	4.3	4.6	4.3	5.5	4.6	4.3	3.7	2.4	1.1	0.1	0.0	0.0	0.0	0.0	0.0
6	1	0.0	0.0	0.0	0.0	0.0	0.8	1.7	2.6	4.5	4.6	5.7	6.2	6.1	5.3	4.6	4.3	3.0	1.5	0.3	0.0	0.0	0.0	0.0	0.0
6	2	0.0	0.0	0.0	0.0	0.0	0.4	1.0	2.2	3.0	2.6	5.2	4.0	3.5	4.5	4.4	3.5	2.9	1.6	0.3	0.0	0.0	0.0	0.0	0.0
6	3	0.0	0.0	0.0	0.0	0.0	0.3	0.5	0.1	0.1	0.4	0.7	0.2	0.5	0.5	0.3	0.2	0.3	0.2	0.2	0.0	0.0	0.0	0.0	0.0
6	4	0.0	0.0	0.0	0.0	0.0	0.4	1.7	1.5	1.2	0.6	1.9	5.2	5.1	4.1	2.5	2.1	1.8	0.5	0.3	0.0	0.0	0.0	0.0	0.0
6	5	0.0	0.0	0.0	0.0	0.0	0.5	0.8	2.3	2.4	3.4	4.5	4.4	5.8	5.6	3.9	2.8	2.1	1.3	0.3	0.0	0.0	0.0	0.0	0.0
6	6	0.0	0.0	0.0	0.0	0.0	0.9	2.3	3.8	4.6	5.7	6.0	5.2	5.5	5.8	4.7	3.9	2.2	1.1	0.3	0.0	0.0	0.0	0.0	0.0
6	7	0.0	0.0	0.0	0.0	0.0	0.9	1.6	3.4	4.5	5.9	6.0	6.3	6.5	5.8	5.0	4.3	2.8	1.4	0.3	0.0	0.0	0.0	0.0	0.0
7	1	0.0	0.0	0.0	0.0	0.0	0.6	1.5	2.3	2.9	3.2	2.7	4.1	3.3	2.8	1.3	1.8	1.8	1.2	0.5	0.0	0.0	0.0	0.0	0.0
7	2	0.0	0.0	0.0	0.0	0.0	0.8	1.9	2.5	3.4	4.4	6.3	6.6	5.0	4.4	4.4	2.9	1.5	0.6	0.2	0.0	0.0	0.0	0.0	0.0
7	3	0.0	0.0	0.0	0.0	0.0	0.1	0.3	0.5	0.7	1.0	1.1	0.5	0.6	0.2	0.3	0.2	0.4	0.4	0.4	0.0	0.0	0.0	0.0	0.0
7	4	0.0	0.0	0.0	0.0	0.0	0.8	1.8	3.3	4.2	4.9	4.8	5.4	3.9	5.0	3.1	2.9	1.6	0.7	0.3	0.0	0.0	0.0	0.0	0.0
7	5	0.0	0.0	0.0	0.0	0.0	0.3	0.8	1.0	2.9	2.2	3.3	3.6	4.4	4.1	3.9	1.2	0.4	0.2	0.4	0.0	0.0	0.0	0.0	0.0
7	6	0.0	0.0	0.0	0.0	0.0	0.1	0.4	0.7	0.6	0.9	1.4	0.6	1.2	1.4	0.9	0.9	0.3	0.2	0.4	0.0	0.0	0.0	0.0	0.0
7	7	0.0	0.0	0.0	0.0	0.0	0.5	1.8	3.1	3.5	4.1	4.1	5.1	6.1	5.0	4.4	3.4	2.2	0.8	0.3	0.0	0.0	0.0	0.0	0.0
8	1	0.0	0.0	0.0	0.0	0.0	0.4	1.1	2.5	2.7	3.2	2.1	3.6	3.6	4.0	3.1	2.3	1.0	0.5	0.3	0.0	0.0	0.0	0.0	0.0
8	2	0.0	0.0	0.0	0.0	0.0	0.3	1.1	1.2	2.3	4.0	5.1	5.8	5.0	4.2	2.4	2.8	2.0	0.7	0.3	0.0	0.0	0.0	0.0	0.0
8	3	0.0	0.0	0.0	0.0	0.0	0.3	1.8	2.9	4.2	4.4	5.0	5.0	6.0	5.3	4.2	2.9	1.9	1.3	0.2	0.0	0.0	0.0	0.0	0.0
8	4	0.0	0.0	0.0	0.0	0.0	0.3	1.4	2.2	3.2	4.0	4.7	5.1	5.8	4.8	4.0	2.4	1.7	1.1	0.2	0.0	0.0	0.0	0.0	0.0
8	5	0.0	0.0	0.0	0.0	0.0	0.1	0.4	2.3	2.3	2.3	2.3	2.1	1.7	2.3	2.7	1.1	0.6	0.1	0.1	0.0	0.0	0.0	0.0	0.0
8	6	0.0	0.0	0.0	0.0	0.0	0.2	0.5	1.2	0.9	1.0	1.6	2.3	1.6	1.5	1.1	0.9	0.7	0.4	0.2	0.0	0.0	0.0	0.0	0.0
8	7	0.0	0.0	0.0	0.0	0.0	0.3	1.6	2.6	4.1	4.8	5.8	5.9	5.2	4.9	3.8	3.5	2.2	1.0	0.2	0.0	0.0	0.0	0.0	0.0
9	1	0.0	0.0	0.0	0.0	0.0	0.1	0.4	1.2	1.8	1.4	1.5	2.0	1.1	1.2	1.3	1.2	1.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0
9	2	0.0	0.0	0.0	0.0	0.0	0.1	0.6	1.0	1.6	2.4	2.7	1.8	2.6	2.2	1.9	2.3	1.0	0.4	0.0	0.0	0.0	0.0	0.0	0.0
9	3	0.0	0.0	0.0	0.0	0.0	0.1	0.7	1.4	2.8	3.4	5.0	5.4	5.8	5.7	4.4	2.5	1.3	0.4	0.0	0.0	0.0	0.0	0.0	0.0
9	4	0.0	0.0	0.0	0.0	0.0	0.1	0.6	1.3	1.5	2.5	2.8	2.9	3.1	1.6	3.1	2.0	1.2	0.4	0.0	0.0	0.0	0.0	0.0	0.0
9	5	0.0	0.0	0.0	0.0	0.0	0.1	1.0	1.4	2.5	3.0	1.8	2.7	3.1	2.9	2.1	1.7	1.4	0.5	0.0	0.0	0.0	0.0	0.0	0.0
9	6	0.0	0.0	0.0	0.0	0.0	0.1	1.1	2.2	3.5	5.3	5.2	5.7	6.3	5.3	3.9	3.0	1.7	0.5	0.0	0.0	0.0	0.0	0.0	0.0
9	7	0.0	0.0	0.0	0.0	0.0	0.1	1.4	2.2	3.6	4.2	5.5	5.6	4.2	4.1	3.8	2.5	1.3	0.3	0.0	0.0	0.0	0.0	0.0	0.0
10	1	0.0	0.0	0.0	0.0	0.0	0.0	0.8	2.5	3.9	4.4	5.3	5.5	4.6	3.2	2.4	2.7	1.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0
10	2	0.0	0.0	0.0	0.0	0.0	0.0	0.9	2.4	3.4	4.9	5.7	5.5	5.3	5.0	3.7	2.7	1.3	0.1	0.0	0.0	0.0	0.0	0.0	0.0
10	3	0.0	0.0	0.0	0.0	0.0	0.0	0.9	2.1	3.4	4.1	4.7	5.3	5.4	3.8	3.4	1.8	0.9	0.1	0.0	0.0	0.0	0.0	0.0	0.0
10	4	0.0	0.0	0.0	0.0	0.0	0.0	0.8	2.2	3.5	4.7	5.4	5.1	5.2	4.9	3.7	2.4	0.9	0.1	0.0	0.0	0.0	0.0	0.0	0.0
10	5	0.0	0.0	0.0	0.0	0.0	0.0	0.4	1.0	1.4	1.0	3.0	3.9	3.6	4.4	2.7	1.8	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0
10	6	0.0	0.0	0.0	0.0	0.0	0.0	0.8	1.9	3.2	3.4	3.0	3.2	3.9	3.6	3.1	1.9	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0
10	7	0.0	0.0	0.0	0.0	0.0	0.0	0.8	2.3	3.7	4.5	4.5	4.6	4.8	4.6	3.4	2.3	0.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0
11	1	0.0	0.0	0.0	0.0	0.0	0.0	0.3	1.2	2.3	2.7	3.5	3.7	4.3	3.7	2.6	1.4	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0
11	2	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.7	1.4	1.7	0.5	0.6	0.9	0.6	0.9	1.0	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0
11	3	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.9	1.0	1.4	3.2	4.5	3.5	2.4	1.7	1.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
11	4	0.0	0.0	0.0	0.0	0.0	0.0	0.2	1.1	1.8	2.3	2.1	3.2	2.0	2.4	1.8	1.4	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
11	5	0.0	0.0	0.0	0.0	0.0	0.0	0.3	1.6	2.6	3.4	4.4	4.4	4.5	4.1	2.9	1.3	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0
11	6	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.8	2.0	3.3	3.9	4.4	2.8	2.9	2.1	0.3	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
11	7	0.0	0.0	0.0	0.0	0.0	0.0	0.3	1.6	2.8	3.0	3.2	2.2	1.3	2.2	1.1	0.7	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
12	1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.5	1.2	2.1	1.5	2.6	1.6	1.3	0.4	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
12	2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	1.4	1.4	1.8	1.9	1.8	2.0	0.5	0.8	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
12	3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.7	1.7	2.1	1.0	2.2	3.0	2.7	1.5	0.9	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
12	4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.6	0.9	1.2	2.3	1.6	0.7	0.3	0.7	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
12	5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.9	1.7	2.6	2.2	3.0	2.7	1.2	1.2	0.9	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
12	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.7	2.0	1.3	0.5	1.1	0.3	0.3	0.3	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
12	7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.2	0.3	0.2	0.4	0.1	0.2	0.3	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0