

**GOVERNMENT OF INDIA  
NON-CONVENTIONAL ENERGY SOURCES  
LOK SABHA**

STARRED QUESTION NO:253  
ANSWERED ON:18.12.2003  
GENERATION OF POWER FROM SOLAR ENERGY  
ALE NARENDRA;RATILAL KALIDAS VARMA

**Will the Minister of NON-CONVENTIONAL ENERGY SOURCES be pleased to state:**

- (a) whether vertical/horizontal panels for generation of power from solar energy are functioning in the country;
- (b) if so, the details thereof,
- (c) the total quantum of power generated through these panels during each of the last three years, State-wise;
- (d) the steps being taken to promote the generation of solar-energy;
- (e) whether the use of solar energy is far less in comparison to the capacity available;
- (f) if so, the reasons therefor;
- (g) whether the Energy Development Agencies have been set up in various States for the purpose;
- (h) if so, the assistance provided to these agencies during the last three years to generate solar energy in their respective States; and
- (i) the achievements made in those States in that regard?

**Answer**

MINISTER OF STATE OF THE MINISTRY OF NON-CONVENTIONAL ENERGY SOURCES (SHRI M. KANNAPPAN)

- (a), (b), (c), (d), (e), (f), (g), (h) &
- (i) : A Statement is laid on the Table of the House.

STATEMENT REFERRED TO IN REPLY TO PARTS (a),(b),(c),(d),(e),(f),(g)(h)&  
(i) OF THE LOK SABHA STARRED QUESTION NO.253 FOR 18.12. 2003 REGARDING GENERATION OF POWER FROM SOLAR ENERGY.

(a) & (b): There are two routes to generate power from solar energy: Solar Photovoltaic (SPV) and Solar Thermal (ST). Under the SPV route, electricity can directly be generated through solar panels (containing devices called solar cells), which are mounted vertically facing South at angles close to the latitude of the location. Further, a provision is made to change this angle of mounting suitable to different seasons, such that maximum solar energy is incident on these panels. Presently, in the country Solar Photovoltaic panels of a total capacity of around 62 MW are generating electricity for various applications. The details of state wise installation of SPV systems are given in Annexure-I. Under the solar thermal route, solar energy is first converted to heat to produce steam which in turn can be used to produce power. A few solar thermal power plants have so far been installed in the country for experimental purpose only. The integrated solar thermal combined cycle power plant of 140 MW capacity at Mathania in Rajasthan will be set up, depending upon techno-economic viability.

(c): The total quantum of power expected to be generated through the SPV systems already installed are given in Annexure-II.

(d) : The following steps have been/are being taken by Ministry of Non-conventional Energy Sources (MNES) for promoting the energy generation from solar energy:

1. Research & Development (R&D) aiming at improving the performance and reliability of solar energy technologies.
2. Technical assistance in the form of specifications, standards, testing and performance evaluation.
3. Partial central financial assistance as direct subsidy, or indirectly as interest subsidy to users in assisting them to install such systems by offsetting a part of their high initial costs.
4. Encouragement for increased industrial production and introducing newer technologies for production by providing soft loans.

5. Support to training programmes, seminars, workshops, business meets for creating awareness, developing manpower and expanding business.

(e) & (f) : Yes, sirs. The use of solar energy is still less compared to its vast potential available in the country. The main reason is that the solar technologies are comparatively new. Only some of the applications have achieved technical and commercial viability. Further R&D and rigorous field trials for increasing the efficiency, performance reliability and decreasing the cost are still required for making them suitable for other applications. It is also required to make more and more people aware of these new technologies and their benefits.

(g)&(h) : In most of the States, the Energy Development Agencies have been set up for the promotion of renewable energy sources. The details of the Central Financial Assistance (CFA) released state wise and year wise for the last three years are given in the Annexure-III.

(i): The achievements made by these states are given in Annexure-IV.

Annexure-I referred to in Parts (a) & (b) of the Lok Sabha Starred Question No. 253 for 18.12.2003

#### STATE - WISE DETAILS OF SOLAR PHOTOVOLTAIC SYSTEMS INSTALLED AS ON 31/3/2003

S.No.	State/UT/others	Solar Home Lan-terns	Street lighting Systems	Power Plants & other systems	Water pumping systems
		Nos	( Nos.)	( kWp)	( Nos.)

1	ANDHRA PRADESH	27707	1161	3648	296.66	603
2	AR.PRADESH	4937	750	738	17.10	1
3	ASSAM	541	2787	98	7.50	45
4	BIHAR	28275	679	490	0.00	128
5	CHATTISGARH	3192	3612	1237	76.65	5
6	GOA	443	51	69	1.72	15
7	GUJARAT	31603	2552	1764	24.90	43
8	HARYANA	32727	9666	612	24.20	268
9	HIMACHAL PRADESH	20697	11948	1494	1.50	6
10	JAMMU & KASHMIR	9202	25317	389	40.00	18
11	JHARKHAND	16374	102	135	0.00	6
12	KARNATAKA	7334	6135	1009	48.91	339
13	KERALA	39681	18679	1090	69.74	737
14	MADHYA PRADESH	8564	159	5714	361.40	78
15	MAHARASHTRA	8683	721	3388	191.40	189
16	MANIPUR	3883	650	370	11.00	12
17	MEGHALAYA	4875	540	593	42.00	5
18	MIZORAM	5812	1645	315	0.00	37
19	NAGALAND	95	143	271	6.00	
20	ORISSA	8484	2937	5665	36.52	4
21	PUNJAB	14495	2870	1766	346.00	1533
22	RAJASTHAN	4716	34864	6473	75.80	268
23	SIKKIM	845	465	132	0.00	
24	TAMILNADU	12818	471	2272	237.00	760
25	TRIPURA	20805	2238	760	24.57	10
26	UTTAR PRADESH	52815	50938	550	454.20	234
27	UTTARANCHAL	27027	37854	250	80.03	10
28	WEST BENGAL	3662	26890	1461	525.00	48
29	A & N ISLANDS	796	405	358	217.00	5
30	CHANDIGARH	1675	275	0	0.00	12
31	DNH	-	0	0	0.00	1
32	D&D	-	0	0	0.00	
33	DELHI	4753	0	301	15.00	86
34	LAKSHADWEEP	8455	0	0	735.00	
35	PONDICHERY	637	13	62	0.00	21
36	NGOs (AIWC, SWRC, WRST) & PSUs	3295	0	0.00		

Annexure-II

Annexure-I referred to in Part (c) of the Lok Sabha Starred Question No. 253 for 18.12.2003

STATE - WISE QUANTUM OF ELECTRICITY LIKELY TO BE GENERATED THROUGH THE SPV PANELS INSTALLED UNDER VARIOUS SYSTEMS DURING 2000-01, 2001-02 AND 2002-03

(In million kWhs)

S.No. STATE/UT 2000-01 2001-02 2002-03

1	Andhra Pradesh	1.47	1.58	2.12
2	Arunachal Pradesh	0.2	0.19	0.22
3	Assam	0.17	0.18	0.25
4	Bihar	0.89	0.90	0.98
5	Chhatisgarh	-	0.01	0.51
6	Goa	0.03	0.03	0.34
7	Gujarat	0.50	0.78	0.91
8	Haryana	0.70	0.84	1.5
9	Himachal Pradesh	0.74	0.91	1.5
10	Jammu & Kashmir	0.71	0.80	1.8
11.	Jharkhand	-	-	0.27
12	Karnataka	0.45	0.59	1.11
13	Kerala	1.49	1.71	2.92
14	Madhya Pradesh	0.96	0.93	1.38
15	Maharashtra	0.64	0.67	1.07
16	Manipur	0.13	0.13	0.17
17	Meghalaya	0.18	0.19	0.23
18	Mizoram	0.22	0.21	0.26
19	Nagaland	0.04	0.05	0.06
20	Orissa	0.79	0.82	0.96
21	Punjab	0.65	2.08	3.16
22	Rajasthan	1.99	2.38	3.31
23	Sikkim	0.03	0.03	0.05
24	Tamilnadu	1.17	1.40	1.84
25	Tripura	0.26	0.38	0.57
26	Uttar Pradesh	4.63	3.32	4.9
27	Uttaranchal	-	2.07	2.83
28	West Bengal	1.03	1.54	3.45
29	A & N Islands	0.30	0.30	0.31
30	Chandigarh	0.03	0.03	0.058
31	Delhi	0.21	0.23	0.24
32	Lakshadweep Islands	0.36	0.46	1.22
33	Pondicherry	0.03	0.03	0.04

Annexure-III referred to in Parts (g) & (h) of the Lok Sabha Starred Question No. 253 for 18.12.2003

STATE - WISE RELEASE OF FUNDS FOR SOLAR ENERGY PROGRAMMES DURING 2000-01, 2001-02 and 2002-03

S.No. STATE/UT Funds Released

(Rs. in lakhs)

2000-01 2001-02 2002-03

1	Andhra Pradesh	69.20	286.67	348.77
2	Arunachal Pradesh	18.53	3.53	151.69
3	Assam	55.14	1.26	89.50
4	Bihar	6.20	0.33	4.00
5	Chhattisgarh	197.00	249.70	629.17
6	Delhi	14.11	0.76	17.88

7	Goa	0.50	0.00	0.00
8	Gujarat	310.71	87.43	306.06
9	Haryana	255.35	233.44	523.44
10	Himachal Pradesh	131.25	135.44	120.91
11	Jammu & Kashmir	75.25	772.06	715.83
12	Jharkhand	- 3.41	133.98	
13	Karnataka	78.54	115.15	125.45
14	Kerala	323.61	851.10	38.82
15	Madhya Pradesh	0.80	34.53	112.25
16	Maharashtra	46.28	46.09	29.12
17	Manipur	2.40	44.75	738.23
18	Meghalaya	58.00	9.68	340.92
19	Mizoram	165.55	19.95	57.33
20	Nagaland	8.68	0.00	0.80
21	Orissa	34.02	65.00	0.00
22	Punjab	57.36	650.56	1043.57
23	Rajasthan	187.61	592.25	667.98
24	Sikkim	2.59	36.92	20.90
25	Tamilnadu	75.66	55.50	73.75
26	Tripura	110.87	205.80	399.09
27	Uttar Pradesh	616.41	794.62	747.50
28	Uttaranchal	208.60	261.37	587.19
29	West Bengal	359.73	793.44	688.04
30	A & N Islands	10.15	66.00	88.93
31	Chandigarh	0.80	13.94	12.71
32	Lakshadweep Islands	257.00	572.49	392.00
33	Pondicherry	- 3.78	14.94	

Annexure-IV referred to in Part  
(i) of the Lok Sabha Starred Question No. 253 for 18.12.2003

STATEWISE CUMMULATIVE SALE ON SOLAR COOKERS & STATUS OF  
ADITYA SHOPS ESTABLISHED TILL 31.3.2003

S.No. Name of State/UT Box Concentrating cookers steam Aditya  
Cooker cooking shop  
Dish Community system  
Type

1.	Andhra Pradesh	11985	100	4	2	1
2.	Assam	80	0	0	0	1
3.	Bihar	450	25	0	0	0
4.	Jharkhand	280	0	0	0	0
5.	Gujarat	70410	50	21	0	0
6.	Haryana	20615	50	1	1	1
7.	Himachal Pradesh	27280	0	0	0	1
8.	Karnataka	250	0	3	1	1
9.	Madhya Pradesh	141600	16	2	0	1
10.	Chattisgarh	37000	50	0	0	0
11.	Maharashtra	56635	100	4	0	1
12.	Orissa	3170	0	0	0	2
13.	Punjab	22050	0	0	0	1
14.	Rajasthan	36600	1	3	1	2
15.	Tamil Nadu	1355	1	5	1	1
16.	Uttar Pradesh	45310	75	0	0	6
17.	Uttranchal	7090	0	0	0	1
18.	Delhi	27990	0	0	0	1
19.	Jammu & Kashmir	345	21	2	0	1
20.	Kerala	195	0	0	0	3
21.	West Bangal	7930	24	5	0	4
22.	Chandigarh	1525	2	2	0	0

23. Arunachal Pradesh	530	0	0	0	1
24. Goa	1500	0	0	0	0
25. Andaman & Nicobar	60	0	0	0	0
26. Lakshadweep	0	0	0	0	0
27. Pondicherry	90	0	0	0	1
28. Manipur	365	0	0	0	1
27. Meghalaya	1165	0	0	0	0
28. Nagaland	0	0	0	0	0
29. Dadar & Nagar Havali	80	0	0	0	0
30. Mizoram	110	0	0	0	1
31. Tripura	80	0	0	0	1
32. Sikkim	20	0	0	0	1
33. Daman & Diu	0	0	0	0	0
34. AIWC (NGO)	385	15	0	0	0
35. SDA (NGO)	0	50	0	0	0
36. Direct sale by manufacturers	16300	-	-	-	-

TOTAL 5,41,000 580 52 6 35  
(approx.)

Annexure-IV referred to in Part  
(i) of the Lok Sabha Starred Question No. 253 for 18.12.2003

STATE - WISE CUMULATIVE INSTALLATION OF SPV SYSTEMS AS ON 31/3/2003

S.No	State/UT/others	Solar Home Lanterns ighting Nos. Systems	Street lighting systems	Home Plants & other	Power Street systems	Water pumping
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28 WEST BENGAL	3662	26890	1461	525.00	48
29 A & N ISLANDS	796	405	358	217.00	5
30 CHANDIGARH	1675	275	0	0.00	12
31 DNH	-	0	0	0.00	1
32 D&D	-	0	0	0.00	
33 DELHI	4753	0	301	15.00	86
34 LAKSHADWEEP	8455	0	0	735.00	
35 PONDICHERRY	637	13	62	0.00	21
36 NGOs (AIWC, SWRC, WRST) & PSUs	3295	0	0	0.00	

