

THE PRIME MINISTER (SHRI P.V. NARASIMHA RAO): I am just complimenting you because your question has accelerated the receipt of the report. It has been received yesterday and your question is today.

Commercially Viable Non-Conventional Energy Sources

*205. SHRI SUDHIR SAWANT: Will the PRIME MINISTER be pleased to state :

(a) the different types of commercially viable Non-Conventional Energy Sources which have been developed so far;

(b) the excess cost of wind power generating system; and

(c) the projects undertaken during each of the last three years, State-wise?

THE MINISTER OF STATE IN THE MINISTRY OF NON-CONVENTIONAL ENERGY SOURCES AND MINISTER OF STATE IN THE MINISTRY OF AGRICULTURE (SHRI S. KRISHNA KUMAR): (a) to (c) A statement is laid on the Table of the House.

STATEMENT

(a) Various Non-Conventional Energy Systems & Devices, such as, Biogas plants; Improved chulhas; Low temperature solar thermal energy systems for water heating; cooking and other applications; Solar pho-

tovoltaic systems for lighting and small load applications; Wind energy systems for water pumping and power Generation; Bionergy systems and Small hydro power projects have generally become commercially viable, especially for decentralised and remote area applications, where the cost of transmission and distribution of conventional energy may usually be high. As these technologies are new and environment friendly but with initial cost being high for several of the systems, the Government is providing fiscal incentives of financial support in various forms to users as also manufacturers so as to make them commercially competitive. A number of entrepreneurs have already taken up manufacture of various non-conventional energy technologies. The cumulative achievement of installation of various system/devedsd in the country as a whole, is given in Annexure I.

(b) The cost of installation of wind power generating systems is about Rs. 3.50 crores per MW and the cost of generation is Rs. 2.25-2.75 per unit. The costs per unit of wind power generation compares quite favorably with those for new thermal power plants located far away from the coal fields. For captive power generation, in certain area with adequate wind energy potential, it can replace diesel power, which also has high operating costs.

(c) The Statewise details of projects undertaken during the last three years is given in Annueure -II

ANNEXURE-I

Physical Achievements at a Glance

Sl.No.	Programme	Units	Cumulative Achievement Upto Dec., 92
1	2	3	4
1.	Family size biogas plants	Nos.	16,57,830
2.	Community/Institutional Biogas Plants	Nos.	365
3.	Improved Chulhas	Nos.	131,04,415
4.	Solar Thermal Systems	Area in m ²	2,28,581
5.	Solar Cookers	Nos.	2,38,906
6.	Photovoltaic Power Units	kWp	301.9
7.	Photovoltaic Community lights/ TV and community facilities	Nos.	754
8.	Photovoltaic Domestic lighting Systems/Lanterns	Nos.	12,177
9.	Photovoltaic Street Lights	Nos.	29,304

Sl.No.	Programme	Units	Cumulative Achievement Upto Dec., 92
1	2	3	4
10.	Wind Pumps	Nos.	2,983
11.	Wind Battery chargers	Nos.	107
12.	Wind Farms	MW	43.025
13.	Mini-Micro Hydro	MW	87.665
14.	Urjagram Energy Surveys	Nos.	1,626
15.	Urjagram Projects	Nos.	170
16.	Biomass based cogeneration of power	MW	3.0
17.	Biomass Gasifiers/Stirling Engines	KW	1,400
18.	Battery operated vehicles	Nos.	154
19.	Alcohol operated vehicles	Nos.	25

ANNEXURE-II

State Year-Wise Achievements for Last 3 Years: Biogas & Improved Chulha**

Sl.No.	State	Biogas			Improved Chulha		
		1989-90	1990-91	1991-92	1989-90	1990-91	1991-92
1	2	3	4	5	6	7	8
1.	Andhra Pradesh	3111	8653	13777	80,183	1,05,377	1,47,982
2.	Arunachal Pradesh	2	26	37	1,042	2,000	3,018
3.	Assam	1808	1191	986	35,200	40,000	41,386
4.	Bihar	4726	4277	397	1,37,569	87,195	1,63,317
5.	Gujarat	16305	26537	33086	1,07,815	94,937	66,258
6.	Goa	279	215	203	11,200	10,050	11,017
7.	Haryana	2031	1948	1997	83,170	78,556	54,908
8.	Himachal Pradesh	5087	3667	3510	48,699	56,945	46,560
9.	Jammu & Kashmir	115	127	62	47,520	35,010	16,223
10.	Karnataka	7934	6527	8600	1,04,667	1,14,078	1,12,013

Sl.No.	State	Biogas			Improved Chulha		
		1989-90	1990-91	1991-92	1989-90	1990-91	1991-92
1	2	3	4	5	6	7	8
11.	Kerala	3729	3696	4436	65,784	98,285	77,650
12.	Madhya Pradesh	4384	3684	4135	2,84,381	1,60,023	1,60,066
13.	Maharashtra	50104	50344	51085	1,43,671	1,41,353	1,83,527
14.	Manipur	167	100	116	6,032	6,000	6,362
15.	Meghalaya	60	52	50	NIL	NIL	NIL
16.	Mizoram	106	120	76	2,585	2,500	2,500
17.	Nagaland	-	-	-	-	-	-
18.	Orissa	17184	13022	8386	62,963	92,245	99,890
19.	Punjab	2077	2393	2197	1,41,400	96,800	87,984
20.	Rajasthan	3743	3518	4169	1,72,470	1,76,053	1,92,785
21.	Sikkim	163	175	275	3,379	4,422	4,130

Sl.No.	State	Biogas			Improved Chulha		
		1989-90	1990-91	1991-92	1989-90	1990-91	1991-92
1	2	3	4	5	6	7	8
22.	Tamil Nadu	15044	9566	9184	98,002	1,10,042	1,34,978
23.	Tripura	75	50	110	1,505	1,610	1,617
24.	Uttar Pradesh	13553	17063	12414	2,91,826	2,11,588	2,92,056
25.	West Bengal	10398	9701	7121	55,390	68,879	82,023
26.	Andaman & Nicobar	11	-	-	5-6-	3,000	5,000
27.	Chandigarh	5	1	4	200	Nil	2,016
28.	Dadra & Nagar Haveli	10	10	6	1,025	1,002	1,001
29.	Daman & Diu	-	-	-	Nil	30	Nil
30.	Delh.	35	22	17	25,512	19,048	29,495
31.	Lakshadweep	-	-	-	25,512	19,048	29,495
32.	Pondicherry	21	25	18	1,750	1,510	1,500
33.	Others	-	-	-	1,78,496	1,99,005	-

State/Year-wise Achievements for Last 3 Yers: Solar Thermal

Sl.No	State	Solar Thermal Extension Programme (m2)			Solar cooker (Nos.)		
		1989-90	1990-91	1991-92	1989-90	1990-91	1991-92
1	2	3	4	5	6	7	8
1.	Andhra Pradesh	310	-	292	-	-	507
2.	Arunachal Pradesh	-	-	45	-	-	-
3.	Assam	-	-	150	-	-	-
4.	Bihar	470	674	-	-	-	-
5.	Gujarat	9462	6204	12994	453	2676	2930
6.	Goa	86	60	-	-	-	-
7.	Haryana	-	1608	228	-	-	-
8.	Himachal Pradesh	116	574	755	902	2855	4309
9.	Jammu & Kashmir	814	110	-	-	-	-
10.	Karnataka	3066	2188	3938	-	-	-

Sl.No	State	Solar Thermal Extension Programme (m ²)						Solar cooker (Nos.)	
		1989-90	1990-91	1991-92	1989-90	1990-91	1991-92	1990-91	1991-92
1	2	3	4	5	6	7	8		
11.	Kerala	-	522	246	139	149	-		
12.	Madhya Pradesh	4377	3306	7714	17863	20527	20500		
13.	Maharashtra	1171	9153	7612	717	5656	5811		
14.	Manipur	88	-	312	-	200	-		
15.	Meghalaya	363	425	30	200	132	-		
16.	Mizoram	-	50	-	-	70	-		
17.	Nagaland	100	-	-	-	-	-		
18.	Orissa	-	127	60	11	114	-		
19.	Punjab	1417	503	685	687	2252	2056		
20.	Rajasthan	-	-	300	2500	1700	2052		
21.	Sikkim	46	82	-	-	-	-		

Sl.No	State	Solar Thermal Extension Programme (m2)				Solar cooker (Nos.)				
		1989-90	1990-91	1991-92	1989-90	1990-91	1991-92	1989-90	1990-91	1991-92
1	2	3	4	5	6	7	8			
22.	Tamil Nadu	1276	1473	2837	84	95	132			
23.	Tripura	25	-	-	-	-	-			
24.	Uttar Pradesh	2481	668	5998	1490	2094	7000			
25.	West Bengal	20	168	-	355	200	-			
26.	Andaman & Nicobar	-	10	-	13	10	-			
27.	Chandigarh	242	240	683	-	-	-			
28.	Dadar & Nagar Haveli	-	48	-	-	81	-			
29.	Daman & Diu	-	-	-	-	-	-			
30.	Delhi	2782	3762	3483	3669	2063	2869			
31.	Lakshadweep	-	-	-	-	-	-			
32.	Others	-	-	-	-	.81	-			

Cumulative Achievements upto 31.3.1992 Solar Photovoltaic Systems**

Sl.No	State/UTs	Street Lights	Domestic Lights	Community TV/Lights	No.of Villages	Water Pumps	SPV Power Plants (KWp)
1	2	3	4	5	6	7	8
1.	Andhra Pradesh	3070	68	3	2725	57	2(12)
2.	Arunahcal Pradesh	296	32	11	35	7	1(2)
3.	Assam	100	33	4	22	-	1(1)
4.	Bihar	351	148	3	-	28	-
5.	Goa	28	68	4	4	-	-
6.	Gujarat	1537	310	51	374	98	3(14)
7.	Haryana	342	2	53	145	9	1(20)
8.	Himachal Pradesh	196	454	9	7	10	-
9.	Jammu & Kashmir	146	537	1	9	-	-
10.	Karnataka	257	-	2	-	-	-
11.	Kerala	274	25	12	84	4	1(2)

Sl.No	State/UTs	Street Lights	Domestic Lights	Community TV/Lights	No. of Villages	Water Pumps	SPV Power Plants (KWp)
1	2	3	4	5	6	7	8
12.	Madhya Pradesh	4665	336	44	965	47	—
13.	Maharashtra	2887	2244	64	1306	70	3 (6.44)
14.	Manipur	323	—	—	.61	2	5 (5.00)
15.	Meghalaya	588	410	—	137	8	1 (2.5)
16.	Mizoram	160	108	1	58	2	—
17.	Nagaland	271	8	3	38	10	1 (6.00)
18.	Orissa	1597	86	61	949	50	4(30.155)
19.	Punjab	20	—	45	44	—	—
20.	Rajasthan	5401	—	50	752	3	1 910.00)
21.	Sikkim	33	16	3	52	2	—
22.	Tamil Nadu	1898	158	19	365	34	—

Sl.No	State/UTs	Street Lights	Domestic Lights	Community TV/Lights	No. of Villages	Water Pumps	SPV Power Plants (KWp)
1	2	3	4	5	6	7	8
23.	Tripura	189	384	127	62	102	9(14.00)
24.	Uttar Pradesh	2881	5499	133	—	170	24(87.18)
25.	West Bengal	638	30	—	—	1	1 (3.00)
26.	Andaman & Nicobar Islands	296	354	2	155	17	3(19.14)
27.	Chandigarh	-	-	-	-	-	-
28.	Dadra & Nagar Haveli	—	—	—	—	—	—
29.	Daman & Diu	—	—	—	—	—	—
30.	Delhi	71	—	—	—	9	1(5.00)
31.	Lakshadweep	134	—	1	11	-	1(5.00)
32.	Pondicherry	-	-	-	-	-	-
	Total	28,699	11,310	706	8,360	740	63(244.4)

I. State/Year-wise Achievements for Last 3 Years: Wind Energy

Sl.No	State	Project s/installed (Capacity MW)				
		1989-90	1990-91	1991-92	1991-92	1991-92
1	2	3	4	5	5	
1.	Tamil Nadu	11.2	4.98			3.45
2.	Gujarat	12.3	-			0.55
3.	Andhra Pradesh	0.55	-			-
4.	Madhya Pradesh	0.50	-			-

II. Cumulative Achievements Upto 31.3.1992: Small Hydel Power and Biomass Gasifiers/Stirling engines**

S.No	State/UTs.	Small Hydro Power Projects			Gasifiers/Stirling Engines Nos.
		No.	Capacity (MW)		
1	2	3	4	5	
1.	Andhra Pradesh	4	3.01	24	
2.	Arunachal Pradesh	25	15.16	—	
3.	Assam	1	2.00	—	
4.	Bihar	-	—	1	
5.	Gujarat	—	—	145	
6.	Haryana	1	0.20	6	
7.	Himachal Pradesh	13	9.17	3	
8.	Jammu & Kashmir	5	2.31	3	
9.	Karnataka	1	0.40	237	
10.	Kerala	2	0.02	4	
11.	Madhya Pradesh	2.	1.20	99	
12.	Maharashtra	3	3.58	265	
13.	Manipur	4	2.60	—	

S.No	State/UTs.	Small Hydro Power Projects			Gasifiers/Stirling Engines Nos.
		No.	Capacity (MW)		
1	2	3	4	5	
14.	Meghalaya	1	1.51	—	—
15.	Mizoram	5	2.40	—	—
16.	Nagaland	4	2.32	—	—
17.	Orissa	—	—	15	—
18.	Punjab	4	2.32	—	—
19.	Rajasthan	4	3.30	6	—
20.	Sikkim	6	6.90	—	—
21.	Tamil Nadu	—	—	42	—
22.	Tripura	2	1.01	—	—
23.	Uttar Pradesh	35	20.27	34	—
24.	West Bengal	5	7.46	—	—
25.	Others	—	—	106	—
		125	35.89	1000	

** Figures are being firmed up for some States.

SHRI SUDHIR SAWANT: Mr. Speaker, Sir, the thrust of the energy policy should be provide the basic energy needs for the last man in every village. In spite of massive electrification, still, this facility is not available to a lot of people. Even if a village is electrified, a major portion of the village remains out of the energy picture because many villages in India are far spread out, especially in the Konkan, North East and Ladakh regions. Therefore, the implementation of non-conventional energy sources and utilising them must be complementary to the traditional conventional sources. My question is this: What action is being taken to ensure that non-conventional energy sources are implemented and utilised in conjunction and in integration with conventional sources so that the last man in every village gets his basic energy needs?

SHRI S. KRISHAAN KUMAR: Sir, the Government of India's thrust for the development of non-conventional energy needs?

SHRI S. KRISHNA KUMAR: Sir, the Government of India's thrust for the development of non-conventional energy sources started in the year 1992 with the creation of a Department, which was upgraded to a fullfleged Ministry in the year 1992.

The rationale for this thrust, for the development of non-conventional energy sources is well-known. Our fossil fuels are finite. We had to suffer due to the outgo of a large chunk of foreign exchange for the import of petroleum. On the other hand, we have unlimited sources of conventional energy especially solar energy which is available in each of the six lakh villages of the country.

So, the decentralised production and utilisation of power especially in the rural areas where electricity has not reached or is unlikely to reach, in the near future the environmental friendliness of the technology, all this point to the necessity for devel-

oping the sources of energy as a significant energy source of the future.

The concern expressed by the hon. Member is not so important or relevant because, as of now we produce in the non-conventional sector only one-third of one per cent of the total conventional energy already produced in the country, consisting of 70,000 MW capacity of power if you calculate the coal consumption, it is 228 million tonnes and in regard to petroleum products, it is 56.7 million tonnes. When all this is put together, we produce only one-third of one per cent of the total conventional energy. Our idea is to bring up the non-conventional sector, bring it to the centre stage of the energy mix and energy policy. During the Eight and Ninth Plans, we are trying our level best to active many times the progress which has been achieved in the past.

SHRI SUDHIR SAWANT: My thrust is basically because the cost of providing electricity to many of the households in rural India where villages are spared out is quite prohibitive. The cost of production is quite prohibitive. My thrust is on those village in India where electricity cannot be provided in a cost effective manner. Thus I call for a process of integration, specially of the Rural Electrification Corporation. Because we do not know what these public sector corporations, for example NHPC and NTPC, are doing in the field of non-conventional energy.

My question is, to cater for the needs of the rural masses who cannot be provided with electricity even when there is a provision, because of prohibitive cost, what action is being taken by the Rural Electrification Corporation and other Corporations in this regard to develop the non-conventional energy source like mini hydro power plants.

SHRI S. KRISHNA KUMAR: It is pre-

cisely based on this concern that this Ministry has charted out a programme for the development of non-conventional sources of energy. The main thrust will be the production, distribution and use of energy in the rural areas especially the unelectrified villages. As far as Rural Electrification Corporation is concerned, their charter is to electrify our rural areas in the villages, They deal not only with conventional energy, but also with non-conventional energy. Our Department works in close cooperation with the Rural Electrification Corporation. That Corporation itself has installed many non-conventional devices including solar energy in the Villages. This cooperation will increase. We are giving thrust to the solar energy, the wind energy programme small hydro programme, and the solar photo voltaic programme as the main thrust not to speak of the biogas development and the biomes development for augmenting the rural energy available to our people in the villages.

[*Translation*]

SHRI MOHAMMAD ALI ASHRAF FATMI: Solar energy occupies prominent place in all the non-conventional energy sources in the world. In India, whatever efforts have been made in this sector are inadequate. I was going through a reply to an other question in which it has been stated that collaboration has been reached with Denmark. I would like to know from the Government whether it does have a master plan for traffic light, domestic electricity and minor irrigation in the country and if so, whether any steps are being taken to make funds available to States as assistance?

[*English*]

SHRI S.KRISHAN KUMAR: The solar energy development programme is one of the main components of our masterplan for the development of non-conventional energy sources. The hon. Prime Minister has

directly given leadership and inspiration for the programme. The main thrust of the solar programme will be under two heads. Under Photo Voltaic Technology we have already formulated a plan for energising 50,000 agricultural pumpsets in the villages through solar energy in the next four years. The first thousand pumpsets are to be installed in the financial year 1993-94.

In addition, there are massive programmes contemplated for solar lanterns based on PV technology as also electrification of villages through village power plant, again based on Photo Voltaic Technology.

Similarly through the solar thermal routes we have a programme for heating water applications for domestic housing as well as industrial housing, solar cookers and so on. These programme will be funded by the augmented budgeted allocation which has been made available to us this year. The allocation has been doubled in the recent budget. Rs.800 crore will be available in the 8th Plan for the renewable energy sector.

In addition, we have already negotiated a 150 million dollar loan from the World Bank and a 50 million dollar loan from Danida. These external assistance sources have promised that they will augment the loan facility, if we are able to implement the programme successfully. So, we are charting out a master plan; and we are going to achieve a rate of growth for the non-conventional sector which is at least ten times more than what has been the rate of achievement in the past.

SHRI SWARUP UPADHYAY: There are many places in the North-Eastern region, particularly in the hilly region, where there are high velocity winds. Has the Government located such areas and does the Government propose to start tapping the energy from such areas where there are high velocity winds?

SHRI S. KRISHAN KUMAR: For the development of wind energy in the country, the potential is estimated at 8000 MW for the country as a whole, as per the current estimates. About 98 wind monitoring stations have already been established in the country, covering 19 of the 22 States and the Union Territories. 53 wind monitoring stations have already firmed up the viable capacity available; and this is more than 2500 MWs. 600 MWs have been identified in Tamilnadu; 900 MWs in Southern Andhra Pradesh and about 1000 MWs in the coastal regions Gujarat. Wind mapping is going on in all the States and regions including the North-Eastern region. The approach of the Government is to pur up demonstration projects directly with the government help wherever private entrepreneurs are not available. But the major thrust for a bigger programme is going to be attracting private entrepreneurs into the non-conventional energy fields for which a large number of incentives have already been announced the depreciation allowance, reduction in customs and excise duties, tax holiday, for instance, for the north-East for generation of power, etc. Than, we have had discussions with the North-Estren Council and a master plan is being prepared for the development of non-conventional energy sources which is specific to the requirements of the North Estern region.

SHRI RAM KAPSE: Sir, we are inserted in non-conventional energy schemes and devices specifically because it is useful for remote areas and it is environment friendly. The Minister has said that 'the projects have generally become commercially biable'. I would like to know the areas where it is not commercially viable.

Another query will be abut the incentives given and the figures shown in Annexure I. They are giving financial assistance to the manufacturers and the users as well. The number as we get from Annexure I is like

this: For the Community/institutional biogas plants programme, the cumulative achievement upto December 1992 is given as 865; battery operated vehicles is 154; and alcohol operated vehicles is 25. I would like to know as to what are the reasons for such a small number in these fields.

SHRI S. KRISHAN KUMAR: The energy generation efforts in the non-conventional sector which have already been established as viable are in the areas of wind power, small hydro-power, solar photovoltaic, solar thermal, biomass based cogeneration and biomass grassfires. We have, as has been listed out, about 22 major programmes. For five or six programmes, the viability has been established. Other programmes are at various stages of development. In some of these programmes, such as the one which the hon. Member has mentioned, the cost, as of now is a little high.

This is due to the technological gap, due to lack of market and lack of sufficient production base, and so on. Some of these things will take time because in the world itself, these technologies have not yet been established and commercialised. So, this is an ongoing process.

Updating of Voters List

*206. **SHRI ATAL BIHARI VAJPAYEE:**
SHRI SHANKERSINH VAGHELA:

Will the PRIME MINISTER be pleased to state:

(a) whether the Election Commission had directed the Eastern States, including West Bengal, to update the list of voters excluding those who were residing in India illegally;

(b) if so, the details thereof;

(c) the extent to which these orders