9 Small Hydro Power

Ministry of Non-Conventional Energy Sources is assigned the business of small hydro power (SHP) upto 25 MW station capacity. The Ministry's aim is that out of the total grid interactive power generation capacity that is being installed, 2% should come from small hydro. The SHP programme is essentially private investment driven. Electricity generation from small hydro is becoming increasingly competitive with preferential tariffs and some other concessions. The challenge is to improve reliability, quality and costs. There is need to lower the cost of equipment, increase its reliability and set up projects in areas which give the maximum advantage in terms of capacity utilisation.

9.2 A series of steps have been taken to promote development of SHP in a planned manner and improve reliability & quality of the projects. By giving various physical and financial incentives, investments have been attracted in commercial SHP projects apart from subsidizing State Governments to set up small hydros. Concurrently, efforts are being made to renovate and modernize old SHP projects and complete languishing projects.

Table 9.1 State Wise Identified Small Hydel Sites up to 25 MW Capacity

S.No.	Name of State	Identified Number of Sites	Total Capacity in MW
1	Andhra Pradesh	286	254.63
2	Arunachal Pradesh	492	1059.03
3	Assam	90	148.90
4	Bihar	92	194.02
5	Chhatisgarh	174	179.97
6	Goa	3	2.6
7	Gujarat	290	156.83
8	Haryana	22	30.05
9	Himachal Pradesh	323	1624.78
10	Jammu & Kashmir	201	1207.27
11	Jharkhand	89	170.05
12	Karnataka	230	652.61
13	Kerala	198	466.85
14	Madhya Pradesh	85	336.325
15	Maharashtra	234	599.47
16	Manipur	96	105.63
17	Meghalaya	98	181.50
18	Mizoram	88	190.32
19	Nagaland	86	181.39
20	Orissa	161	156.76
21	Punjab	78	65.26
22	Rajasthan	49	27.26
23	Sikkim	68	202.75
24	Tamil Nadu	147	338.92
25	Tripura	8	9.85
26	Uttar Pradesh	211	267.061
27	Uttaranchal	354	1478.235
28	West Bengal	145	182.62
29	A&N Island	6	6.40
	TOTAL	4,404	10,477.34

Table 9.2 State wise Numbers and Aggregate Capacity of SHP Projects (Upto 25 MW) Installed & Under Implementation (as on 31.12.2005)

Sl. No.	State	Projects Installed		Projects under Implementation	
		Nos.	Capacity (MW)	Nos.	Capacity (MW)
1	Andhra Pradesh	57	178.81	9	13.90
2	Arunachal Pradesh	62	34.30	52	51.42
3	Assam	3	2.11	7	26.00
4	Bihar	5	45.90	9	14.00
5	Chattisgarh	4	11.00	2	8.0
6	Goa	1	0.05	-	-
7	Gujarat	2	7.00	-	-
8	Haryana	5	62.70	-	-
9	Himachal Pradesh	53	119.08	10	52.50
10	J&K	30	109.74	7	7.31
11	Jharkhand	6	4.05	8	34.85
12	Karnataka	53	300.63	22	112.74
13	Kerala	14	84.62	7	57.75
14	Madhya Pradesh	8	41.16	3	24.20
15	Maharashtra	27	207.08	5	25.75
16	Manipur	8	5.45	3	2.75
17	Meghalaya	3	30.71	9	3.28
18	Mizoram	16	14.76	3	15.50
19	Nagaland	8	20.47	6	12.40
20	Orissa	6	7.30	7	40.92
21	Punjab	24	113.40	6	26.35
22	Rajasthan	10	23.85	-	-
23	Sikkim	12	35.60	5	15.20
24	Tamil Nadu	12	77.70	2	7.90
25	Tripura	3	16.01	-	-
26	Uttar Pradesh	8	21.50	1	3.60
27	Uttaranchal	76	75.45	37	23.01
28	West Bengal	20	92.30	7	5.80
29	A&N Islands	1	5.25	-	-
	Total	**537**	**1,747.98**	**227**	**585.13**

Alro Small Hydro (3MW) Power Project in Himachal Pradesh

9.3 Potential

Of the estimated potential of 15,000 MW of Small Hydro in the country, 4,404 sites with an aggregate capacity of 10,477 MW have been identified. The State-wise details of identified SHP sites are given at **Table 9.1**. The Ministry is providing financial support to the States for identification of new potential sites and preparation of a perspective plan for the State for development of small hydro. This activity is important for making a long-term strategy for systematic development of SHP projects. The Ministry provides a financial support up to Rs.30 lakh per State for the overall estimation of its SHP potential, identification of new potential SHP sites and for the preparation of a Perspective Plan.

9.3.2 The Ministry is in the process of augmenting renewable energy resource database and bring it on a GIS platform. Survey of India, Indian Meteorological Department and National Remote Sensing Agency have been contacted to obtain digitized data for the country including topographical maps, land use maps, time series data on precipitation, rainfall etc. A hydrological modeling is proposed to be done using this data which will identify all potential hydro sites in the country including estimated discharged data and power potential. In this direction, digitized maps and DTMs have been ordered from Survey of India. IMD & NRSA have agreed to provide digitized data for the country.

9.4 Progress

At the end of the 9th Plan the total installed capacity of SHP projects upto 25 MW station capacity was 1438.89 MW. A capacity of 80.39 MW was added during 2002-03 84.04 MW during 2003-04 and 102.27 MW during 2004-05. SHP projects with a total capacity of 42.35 MW were commissioned during April-December 2005, taking the total installed capacity to 1748 MW. State-wise details of projects completed and under execution are given at **Table 9.2**. The capacity installed in this sector during the first three years of the 10th Plan accounts for over 2 percent of the total installed power generation capacity in the country.

9.4.2 The Ministry continued its various schemes to support SHP development both in the public as well as private sector. Apart from support to new SHP projects, Central Financial Assistance is also provided for the renovation and modernisation of existing SHP projects and languishing projects in the Government sector. The Ministry also provides financial support for the development and upgradation of watermills for mechanical as well as electricity generation. A special incentive package has been developed for the promotion of the SHP programme in the North-Eastern States, Sikkim, J&K, Himachal Pradesh and Uttaranchal. The schemes under SHP programme were reviewed to rationalise the same and align it with other renewable energy based grid power programmes of the Ministry. It is proposed that parameters such as cost of project, cost of electricity generation, capacity utilisation factor of a project should be the guiding factors to grant CFA for grid interactive power projects. Emphasis is being given on quality of the project by adopting technical standards and reducing cost per MW of the projects. For private sector, subsidy is released to the Financial Institution (FI), after successful commissioning and commencement of commercial generation from the project. The subsidy is given to the FI for the purpose of offsetting it against the term loan provided to the developer.

9.5 SHP Projects

Most capacity addition is now being achieved through private investment. State Nodal Agencies provide assistance for obtaining necessary clearances, in allotment of land and potential sites. 16 States have policies in place for private sector participation. SERCs are now determining preferential tariffs for renewable electricity. The 16 States have offered sites with an aggregate potential of over 2500 MW to the private sector. So far, private sector SHP projects with an aggregate capacity of about 400 MW have been set up mainly in Andhra Pradesh, Karnataka, Himachal