

CHAPTER-3

Hydro-Power Generation

3.1 Power is a critical infrastructure for the socio-economic development of the country. This century would be dependent on the availability of adequate, reliable and quality power at competitive rates. Therefore, the basic responsibility of 'Electricity Industry' is to provide adequate power at economical cost, while ensuring reliability and quality of supply.

3.2 Development of hydro power is essential for the sustainable development of the country and efforts for accelerating the pace of hydro power development shall give an impetus for the economic growth in the new globalised economy. Large untapped hydro-power potential exists in the Himalayas, which can make a substantial contribution to the total power generation in the country. The country has no other option but to tap hydel power in a big way, if it has to avoid energy crisis in the long run.

3.3 Himachal Pradesh is blessed with abundant water resources in its five major rivers i.e. Chenab, Ravi, Beas, Satluj and Yamuna, which emanate from the western Himalayas and flow through the State. These snow fed rivers and their tributaries carry copious discharge all the year round which can be exploited for power generation. All the river basins and its valleys are connected by roads and other communication network.

3.4 Hydro power development process started even before the evolution of the State. A small project of 0.45 MW capacity was got executed by the erstwhile Raja of Chamba State in 1908 which was followed by a small project at Chaba with capacity of 1.75 MW near Shimla in 1912. Another hydro-power project of 48 MW capacity was constructed at Shanan near Jogindernagar in district Mandi during the mid twenties by the then British Government.

3.5 The hydro power potential in the State of Himachal Pradesh has been estimated at 20415 MW, which is one fourth of India's total hydro power potential of about 84044 MW. To exploit this huge potential and to give utmost thrust to the development of hydro-power, State Govt. has framed a four pronged strategy under which projects are to be executed under various management modules i.e. in the State Sector, Joint Sector, Private Sector and the Central Sector agencies.

3.6 Himachal Pradesh has formulated a Hydro Power Policy, 2006 to develop Himachal Pradesh as a "Hydro-Power State" of the country and to provide an affordable, reliable and quality power to the consumers round the clock, throughout the year; create avenues for employment to the residents of Himachal Pradesh in the power projects and at the same time mitigate the social, economic and environmental impact. Salient features of the 'Power Policy' 2006 are given below:-

- To harness and commission hydro power generating capacity by the end of 11th Plan thereby having an operational capacity of about 15,000 MW out of the identified power potential.
- Small Hydro Projects up to 2.00 MW capacity shall be exclusively reserved for the bonafide Himachalies and Co-operative Societies comprising of the bonafide Himachalies. While allotting such projects up to 5.00 MW, preference will be given to the bonafide Himachalies. Not more than 3 Projects shall be allotted for implementation to an IPP.
- To allot the Hydro-electric Projects to the prospective Independent Power Producers (here in after referred to as IPP) for the implementation in private sector on Build, Own, Operate and Transfer (BOOT) basis by inviting Global bids, for the projects of capacity above 5 MW.
- The Bidders would be required to quote a fixed upfront of Rs. 20.00 lakh per Mega Watt capacity of the project and 'Additional Free Power' at a uniform rate in all three time bands of Royalty charges during the operation period of the project to the Government of Himachal Pradesh over and above the royalty charges of 12%,18%,& 30% of the deliverable energy up to 12 years, next 18 years and balance agreement period beyond 30 years from Scheduled Commercial Operation Date/ Synchronization of first generating unit which ever is earlier, in lieu of surrender of the potential site.
- The Govt. of H.P. / HPSEB shall have right of first refusal on sale of such power as remains after meeting commitments of royalty in the shape of Free Power, Additional Free Power and Merchant Sale of Power (as may be determined under the National Hydro Power Policy), on tariff to be determined by the H.P. State Electricity Regulatory Commission.
- The Govt. of Himachal Pradesh reserves the right of equity participation up to 49% on selective basis in the above projects.
- The operation period of the projects shall be forty (40) years from the Scheduled Commercial Operation Date (COD) of the Projects, where after, the Project shall revert to the State Government free of cost and free from all encumbrances on 'as is where is basis' .
- The Company shall have to provide employment to bonafide Himachalies, in respect of all the unskilled/ skilled staff and other non-executives as may be required for execution, operation and maintenance of the project. If it is not possible to recruit 100 % staff from Himachalies for justifiable reasons, only then the company shall maintain not less than 70 % of the total employees/ officers/ executives from bonafide Himachali.

- The Developer shall make a provision of 1.5 % of final cost of the project towards Local Area Development Committee (LACD), the activities of which shall be financed by the project itself.
- In order to protect the aquatic life and the water rights of local inhabitants as well as environment in general, the policy requires release of a minimum flow of 15% immediately downstream of the diversion structure of the project.
- The Govt. of Himachal Pradesh shall absorb the generated power from small Hydro-Electric Projects locally to the maximum possible extent. The Govt. shall also prepare a Transmission Plan for evacuation of power generated by the small Hydro-Electric Projects and other projects up to 25 MW capacity. The Transmission Plan shall be prepared to cater for evacuation of power up to the nearest points of full absorption of the total injected power from various projects and even beyond the inter-connection sub-stations of HPSEB and the cost thereof shall be borne by the Hydro Projects Developers in proportion to the capacities of their projects.

3.7 Of the identified hydel-power potential of only 6418.27 MW has so far been exploited by various agencies. Details of potential assessed and actualised are given below:-

1. Basin-wise Power Exploited : Basin-wise position of potential assessed and exploited is given in the table below :

Table-1
Potential Assessed and Actualised

Sr. No.	Basin	Total Assessed Potential (MW)	Potential Installed (MW)				
			State Sector	Private Sector	Central / Joint Sector	Himurja	Total
1.	Satluj	9866.55	150.25	300.00	2825.00	1.30	3276.55
2.	Beas	4626.90	226.50	102.00	1496.00	42.05	1866.55
3.	Ravi	2345.25	10.25	0.00	1038.00	11.40	1059.65
4.	Chenab	2251.00	0.00	0.00	0.00	0.00	0.00
5.	Yamuna	602.52	79.95	0.00	131.57	4.00	215.52
6.	Other small rivers/rivulets	723.40	0.00	0.00	0.00	0.00	0.00
	Total	20415.62	466.95	402.00	5490.57	58.75	6418.27

2. Projects Commissioned: Executing Agency wise details of the projects commissioned and potential harnessed is as under :-

Table -2
Projects Commissioned and Capacity Installed

Sr. No.	Executing Agency	Capacity Installed
1.	2.	3.
1.	BBMB	2711.00 MW
2.	PSEB	110.00 MW
3.	NHPC	1038.00 MW
4.	UPSEB	131.57 MW
5.	SJVNL	1500.00 MW
6.	HPSEB	466.95 MW
7.	IPPs	402.00 MW
8.	HIMURJA	58.75 MW
	Total	6418.27 MW

3. Sector-wise status of the projects Commissioned : Sector wise Status of the capacity installed is given as under:-

I. State Sector (HPSEB) :

Table -3
Projects and Capacity Installed

Sr. No.	Name of the Project	Installed Capacity
1.	2.	3.
1.	Giri	60.00 MW
2.	Bassi (Uhl-II)	60.00 MW
3.	SVP Bhaba	120.00 MW
4.	Andhra	16.95 MW
5.	Thirot	4.50 MW
6.	Binwa	6.00 MW
7.	Baner	12.00 MW
8.	Gaj	10.50 MW
9.	Ghanvi	22.50 MW
10.	Gumma	3.00 MW
11.	Holi	3.00 MW
12.	Larji	126.00 MW
13.	Khauli	12.00 MW
14.	Mini Micros (7 Nos)	10.50 MW
	Total:	466.95 MW

II. Private Sector

Table-4

Projects and Capacity Installed

Sr. No.	Name of the Project/ District/ Basin	Executing Agency	Installed Capacity
1.	2.	3.	4.
1.	Baspa-II/ Kinnaur/ Satluj	M/s Jai Prakash Hydro Power Limited	300.00 MW
2.	Malana-I/ Kullu/ Beas	M/s Malana Power Company Limited	86.00 MW
3.	Patkari	M/s Patkari Power Pvt. Ltd.	16.00 MW
	Total :		402.00 MW

III. Central Sector/ Joint Sector

Table-5

Projects and Capacity Installed

Sr. No.	Name of the Project	Executing Agency	Installed Capacity
1.	2.	3.	4.
1.	Yamuna Projects (H.P. Share)	Uttarakhand	131.57 MW
2.	Baira suil	NHPC	198.00 MW
3.	Chamera-I	NHPC	540.00 MW
4.	Chamera-II	NHPC	300.00 MW
5.	Shanan Project	PSEB	110.00 MW
6.	Pong Dam	BBMB	396.00 MW
7.	Dehar	BBMB	990.00 MW
8.	Bhakra	BBMB	1325.00 MW
9.	Nathpa Jhakri	SJVNL	1500.00 MW
	Total:		5490.57 MW

IV. Himurja

1.	Himurja Projects	58.75 MW
	Total:	58.75 MW

As mentioned above, State Govt. has adopted a multi-pronged strategy for the exploitation of hydel power in the State. Under this policy, power projects execution and management is done by different executing agencies under State Sector, Central / Joint Sector, Private Sector and Independent Power Producers. For the 11th Plan (2007-2012) it has been planned to add 5969.00 MW capacity to the already exploited potential. Sector wise details of the projects under execution are given in the succeeding paragraphs.

I. State Sector : State sector is comprised of three agencies viz. (a) HPSEB (b) Himachal Power Corporation and (c) Himurja. Executing Agency wise details are given below:-

(a) HPSEB: Himachal Pradesh State Electricity Board is responsible to add 466.95 MW Hydel Power Capacity by commissioning of 13 Major and 7 Mini Hydro Electric Projects. During the course of 11th Plan HPSEB will execute following projects :-

1. UHL Stage-III (100 MW): Uhl Stage-III Hydro Electric Project (100MW) scheme envisages utilization of tail water of Bassi Power House, the discharge of Neri Khad and Rana Khad through two water channels viz. Rana intake to Khuddar reservoir and Neri collection chamber to Khuddar reservoir, one aqueduct, one head race tunnel 8,477 meters long and single penstock trifurcating near the Power House to generate 100MW of power by utilizing design discharge of 41.30 cumecs over a gross head of 299.40 meters through three generating units of 33.3MW each. The project when completed will generate 391.19 MU in 90% dependable year. The Central electricity Authority (CEA) has accorded the techno economic clearance (TEC) to the project for Rs. 431.56 crore based on Sept. 2002 price level. However, the cost of the project is expected to increase and the revised estimate is under preparation. The cost of generation at Bus bar (a house of distribution of power) works out to Rs. 2.35 per unit. The Project is being executed through Beas Valley Power Corporation Ltd. on fast track basis with dedicated funds. For procurement, installation & commissioning of hydro generating equipment LOI (Letter of Intent) on BHEL has been placed on dated 15.2.07. As per the minutes of meeting taken by the Secretary (Power) and Chairperson Central Electricity Authority on dated 19.3.2007 the 1st unit is programmed to be commissioned by Dec., 2010 and 2nd & 3rd units by March, 2011.

2. GHANVI HYDRO ELECTRIC PROJECT STAGE-II (10 MW) : Ghanvi Hydro Electric Project Stage-II (10 MW) is a run of the river scheme on Ghanvi rivulet, a tributary of Satluj river at an estimated cost of Rs. 49.49 crore. The project is located near Jeori township about 150 Km from Shimla. The power house site is near Ghanvi which is about 12 Km from Jeori. This scheme envisages construction of drop type trench weir near village Rungha to divert the water. This diverted water will be conveyed through 1.8 mt size

D-shaped 1440 mt long Head Race Tunnel and one penstock bifurcating near power house to feed two turbines in an underground power house to generate 10 MW of power by utilizing a gross head of 165 mt and designed discharge of 7 cumacs. The annual energy generation in a 75% dependable year is expected to be 41.63 MU.

The project is being executed by the HPSEB. The funds have been arranged from M/s Rural Electrification Corporation who has sanctioned a loan amounting to Rs. 3415.32 Lakh on 1.1.04.

3. BHABA AUGMENTATION POWER HOUSE (4.50 MW): The scheme with enhanced capacity from 3.00 MW to 4.50 MW is located in District Kinnaur. It envisaged trench weir across Shango Khad a tributary of Bhaba Khad about 3.00 Km upstream of confluence of Shango Khad with Bhaba Khad near village Curchoo, desilting tank 30x10x3 size, 2.1m D-shaped 4682 m length Head race Tunnel, under ground Forebay 26x6x6.2 m size Penstock 800 mm internal dia 450 m long. Tail race tunnel 2.1x2.1 m size 90m long and Surface Power House with installed capacity 4.50 MW near intake of Bhaba Hydro Electric Project (HEP) having 2 Nos. turbine pelton wheel horizontal axis, with 2.25 MW capacity each. This project on completion is expected to generated 26.63 MW in 75% dependable year. The funds required for completing the balance works have been arranged from the Power finance Corporation (PFC) . A loan of Rs. 11.00 crore has been sanctioned by M/s PFC. The international competitive bidding (ICB) tender for pre-qualification in respect of electro-mechanical works has been floated and opened on 26.10.06. The project is schedule to be completed during 2010-11.

4. KHAULI HYDRO ELECTRIC PROJECT (HEP) STAGE-II (6.60 MW): Khauli Hydro Electric Project (HEP) Stage-II (6.60 MW) has been contemplated as a power generation development on Khauli Khad a tributary of Gaj Khad in Kangra district of Himachal Pradesh. It is an immediate downstream development of Khauli-I Hydro Electric Project (HEP) (12 MW) which has already been commissioned. It envisages utilization of tail water of Khauli-I Hydro Electric Project (HEP) through a gross head of 263.30 m for generation of 6.60 MW of power in surface Power House on left bank of Khauli Khad near village Rihlu at a distance of about 6 Km from Shahpur.

This project is a very attractive scheme from all aspects and merits. The Detailed Project Report (DPR) of this scheme has been prepared by the HPSEB for a total cost of Rs. 42.74 crore (Price level December, 2005). The techno economic clearance of this project has already been issued by the HPSEB.

(b) Himachal Pradesh Power Corporation Limited (HPCL): To boost the Hydel Power generation, H.P. Govt. has set up the HP Power Corporation Limited to take up major power projects for execution under the State Sector. Two Special Purpose Vehicles i.e. Pabber Valley Power Corporation (PVPCL) and Kinnar Kailash Power Corporation Limited (KKPCL) have also been merged into this new utility.

H.P. Power Corporation Ltd. became fully functional in 2008-09 and has been assigned 7 Hydro Electric Power Projects for construction with a total capacity of 998 MW. The work will start on the main components in 5 projects within 2009-10. These five projects are Sawra Kuddu Hydro Electric Project 111 MW, Kashang Hydro Electric Project 195 MW, Sainj Hydro Electric Project 100 MW & Shongtong-Karcham Hydro Electric Project 402 MW and Renukaji Dam Project 40 MW. The State Government has already provided equity of Rs. 321.03 Crore till now and is budgeting for equity contribution of Rs. 290.50 Crore for 2009-10, 30% of the project cost will be met through equity contribution whereas remaining 70% of the project cost will come through loan. Loan of US \$ 800 million has been sanctioned by the Asian Development Bank for 4 projects i.e. Sawra Kuddu Hydro Electric Project 111 MW, Kashang Hydro Electric Project 195 MW, Sainj Hydro Electric Project 100 MW & Shongtong Karcham Hydro Electric Project 402 MW.

Renukaji Dam Project is to be funded by Govt. of India to the extent of 90% of the project cost and 10% will be paid by the other beneficiary states. H. P. Govt. will have to pay for only the power component. Therefore, funding of this project is also tied up. After commissioning, these five projects will produce 3581.06 Million units of power annually which will give a revenue of Rs.1790.53 crore at an average sale rate of Rs.5 per unit.

Status of these projects (as on 15th December,2008) is given as under :-

1. Sawra Kuddu HEP (111 MW)

PROGRESS

1. Land Acquisition:

a) Private Land (46.4791ha)

- 32.2805 ha. land acquired and mutation is in progress.
- Notification under Section-IV issued for 10.8248 ha. land.
- Case for 1.9075 ha land with HP Govt. for issuing notification under section-IV.
- Case for 1.4463 ha land with DC Shimla for issuing inescapability certificate.

b) Forest Land (53.9043ha)

- 53.21 ha. land diverted.
- Case for 0.6943 ha land cleared by Hon'ble Supreme Court of India and pending with MOEF.
- Land acquisition/ diversion to be completed by 2008-09.

2. Investigation and Site Selection:

- Survey, investigation and site selection completed.
- Additional geological explorations as suggested by GSI are in progress.
- Drilling of one No. bore hole completed and work on remaining 4 Nos. bore holes is in progress.
- Report regarding rock properties of underground Power House location received and under study.

3. Statutory Clearance:

- All statutory clearances obtained.
- Consent to establish received on 04.10.08.
- Compliance of conditions laid in Forest and Environment Clearance is in progress.

4. Infrastructure Work:

- All approach roads to various project components completed.
- Office complex, transit camp, residential colony and explosive magazine at Rohru stand completed.
- Construction of Prefab buildings at Hatkoti and Chauri is in progress & likely to be completed by Dec., 08.
- Tendering/Awarding of permanent buildings for office, Rest house and residential accommodation at Hatkoti and Chauri is in progress.

5. Relief & Rehabilitation:

- Project affected families and Panchayats identified.
- R&R Plan devised and being implemented.
- R&R officer posted at site for R&R plan implementation.
- 4 candidates of Project Affected Families nominated for training in ITIs out of which 2 have joined.

6. Major Works:

Package-I (Diversion structure, Intake & Desalting Chambers):

- Preparation of Bidding Documents is under finalization and subsequently the same will be sent to ADB for approval.

Package-II (HRT):

HRT work awarded on : 18.06.07.

Adit II (224.92m) & III (247m) : Completed.

Adit-I (300.87m) : 197 m excavated.

Adit-IV (149.28m) : 5 m (const. of portal is in progress.)

HRT excavation from 4 faces under progress.

Total length including Adits: 11231.65 HRT + 922.12 Adit = 12153.77 m

Excavation up to 30.11.08. 817 m HRT + 673.98 m Adit = 1490.98 m

Balance = 10662.79 m

Package-III (Power House Complex):

- Progress up to 30.11.08
- Main Access Tunnel (172 m) : 155 m Excavated.
- Cable Tunnel (250 m) : 181 m Excavated.
- Price Bids opened on : 01.11.08.
- Financial Bids evaluation report submitted to ADB for review & approval on : 21.11.08.
- Financial Bids evaluation report submitted to ADB for review & approval on : 10.12.08
- Work is likely to be awarded by : 31.12.08.

Package-IV (E&M Equipment):

- Bids opened on : 29.08.08.
- Techno Commercial Bids processed and submitted to ADB for acceptance.
- Work is likely to be awarded by : 31.12.08.

2. Renuka Dam HEP (40MW)

PROGRESS

1. Land Acquisition:

a) Private Land (1323.00 ha.):

- As per revised land requirement the total private land requirement is 1323 hectares out of which 1065 hectares will be acquired through permanent land acquisition process and remaining 258 hectares on lease basis. The notification under section IV for 124 ha. have been issued by Govt. of H.P. Meeting of negotiation committee constituted by Govt. of H.P. for negotiation of rates of the land to be acquired was held on 25-11-08 with Project Affected people. Following rates have been finalized by the negotiation committee and have been made public. The land owners have been insisted to sell their land to HPPCL at these rates:
 - Barren Land Rs.50,000/Bigha
 - Cultivated Land(Non Irrigated) Rs.1.5lacs/Bigha
 - Cultivated Land(Irrigated) Rs.2.5lacs/Bigha

b) Forest Land (790.00 Ha.):

- The case of diversion of forest land now 790(560 {permanent} + 230 {on lease}) hectares was submitted to DFO Renuka Ji on 25-09-08. Forest department has raised observations which are being attended to and case will be resubmitted by 31-12-08.

c) Govt. land (126.00 Ha.):

- After reconciling the land area, now revised land case for 126 hectare is under progress to be submitted to DC Sirmaur by 31-12-08.

2. Investigation and site selection:

- Topographical survey (80 % work completed).
- Geological investigation and Geophysical survey of dam area in progress.
- 3 Nos. drifts completed.
- Drilling of 3 Nos. boreholes (57 % completed) in progress.
- Work for drilling 3 Nos. boreholes in spillway area awarded on 20.11.08.
- Dumping sites identified.
- Quarry sites identified & material testing in progress.
- Geological investigations are likely to be completed by mid Jan., 09.
- Magazines transfer case taken up with concerned authorities.

3. Statutory Clearances:

a) Environment Clearance:

- HPSEP & PCB conducted Public Hearing on 21.10.08. and has sent the case to MoEF on 27.10.08. listed for clearance on 15.12.08.

b) TEC:

- Hydrology & Revised cost estimate (Rs.2676.04 Crore at Sep., 08 price level) part submitted to CWC/ CEA on 03.11.08. and 01.11.08 respectively for approval.

4. Infrastructure Works:

- All project roads planned.
- Preparation of estimates for residential/ non residential buildings and colony roads is in progress.
- Some buildings are likely to be constructed by the end of December, 2009.
- Matter taken up with HPSEB for the supply of Construction power.

5. R&R:

- R&R plan submitted to DC Sirmour for onward transmission to Secretary (Revenue) for approval.
- Identification of land for resettlement colonies and for re- location of marginal farmers is going on.
- R&R offices have been opened at site.
- All 9 sponsored candidates of Project Affected Families have joined in various ITIs.
- Work for carrying out Social Impact Assessment & Base line survey awarded to Forest Research Institute, Dehradun.
- 1st installment of Rs. 1 crore has been released to DC, Sirmour towards LADA.

6. Major works:

The bidding documents for selection of EPC contractor for execution of project are under preparation. Offers are being invited through Expression of Interest (EoI) for engaging Individual Consultant (Rock fill dam expert). Major works are scheduled to be awarded by the end of June., 2009.

3. Sainj HEP (100 MW)

PROGRESS

1. Land Acquisition:

a) Private Land (8.77 ha.) :

- Reassessment of fruit and non-fruit bearing trees has been completed.
- All the requisite data required for section VIII has been sent to LAO. LAO staff is visiting the site during the second week of Dec., 08 for verification as required for section-VII of Land Acquisition Act.

b) Forest Land (47.90 ha.):

- Case has been submitted to Regional office MoEF Chandigarh and to AIG (Forests) MoEF, New Delhi on 21.10.08. & 22.10.08 respectively.
- Land acquisition/ diversion is likely to be completed by 31.03.09.

Investigation and site selection:

- Topographical survey completed. Discrepancies, if any, will be sorted out during forthcoming visit of SOI team scheduled for Dec., 08.
- Drilling of 13 Nos. bore holes and excavation of 1 No. drift completed.
- Nos. drifts excavated more than 50 m in length.
- Dumping & quarry sites identified and preparation of estimates for protection work is underway, which will be taken up after transfer of forest land.
- Work for establishment of new discharge sites at Barrage & outfall of Tailrace has been awarded.

2. Statutory Clearances:

a) Environment Clearance:

- Copies of EIA/ EMP reports sent to members of Environmental Appraisal Committee on 21.10.08.
- Presentation made on 20.11.08. in the meeting of Environmental Appraisal Committee.
- Some observations raised which are being attended to and to be discussed during the next meeting of committee.

b) TEC

- Chapter on hydrology submitted on 07.11.08 in CEA.
- Replies to other observations raised by CEA/ CWC on DPR are under preparation.

3. Infrastructure Works:

- Preparation of estimates for construction of roads are in progress, however, work can only be started after the diversion of Forest land.
- General Arrangement Drawings for 5 Nos. bridges have been received and sent to design office for approval on 17.11.08.
- Estimates for 2 Nos. prefabricated quarters stand sanctioned on 29.11.08. Estimates for one Site cum Transit Camp at Ropa stands sanctioned.
- For construction of field hostel, site survey is completed and case for architectural drawings is under process with empanelled Architects.
- Magazine transfer case taken up with concerned authorities.
- Estimates for construction power has been framed by Sr. Executive Engineer, Elect. Division, HPSEB, Kullu and further sent to Chief Engineer, Elect. Central Zone, Mandi.

4. Relief & Rehabilitation:

- R & R plan submitted to HP Govt. for approval by DC, Kullu on 21.10.08.
- Out of 2 Nos candidates nominated amongst Project Affected Families for training in ITI, 1 no has joined the course.

5. Major Works:

The bidding documents for selection of EPC contractor for execution of project are being prepared in consultation with Individual Consultant appointed by HPPCL, Draft bidding documents (except Technical Specifications) likely to be ready by 31st Dec., 2008.

4. Shongtong Karcham HEP (402 MW)

PROGRESS

1. Land Acquisition:

i) Private land (21 ha):

- NOC from concerned Panchayats for 14 ha. land in process.
- Case for 7 ha. land sent to HP Govt. on 24.10.08. for section-IV notification.

ii) Forest land (68 ha):

- The case sent back by CF Rampur to DFO Reckong Peo with some observations & the observations are being attended to.

2. Investigation & Site Selection:

- Detailed topographical survey completed.
- Additional Geological explorations as required by CEA are in progress.
- Drilling of one No. borehole on HRT alignment completed.
- Work of drilling one No. bore hole at Surge shaft location awarded.
- Power-House drift completed.
- Tendering/ award of work of remaining one No. bore hole and a drift along desanding chamber is in process.
- Design Engineers, Consultant & Geology expert, GSI, conducted joint site visit during 2nd week of Nov., 08.
- Quarry site identified.
- Identification of new dumping sites is in progress.

3. Statutory Clearances:

- EIA/ EMP studies by WAPCOS in progress and shall be completed by 31.12.08.
- Environmental clearance to be obtained by 31.03.2009.
- Observations raised by CEA/ CWC on DPR are being attended to, and reply relating to hydrological aspects stands submitted.
- DPR is likely to be resubmitted in CEA/CWC by March,09.

4. Infrastructure Works:

- Planning for residential/ non residential buildings under progress.
- Survey work for project roads completed and estimates under preparation.
- Construction power requirement has been worked out and case is being pursued with HPSEB.

5. R&R:

- Copy of R&R plan sent to DC Kinnaur for onward transmission to Secretary (Revenue) for approval.
- 3 Nos candidates among PAF were nominated for training at ITIs and have joined on scheduled date.

6. Major Works:

The Expression of Interest (EOI) for short listing of engaging consulting firm for preparation of bidding documents, calling of bids, evaluation for selection of EPC contractor opened on 10th Nov., 2008. Evaluation of offers for short listing of firms is in progress as per ADB guidelines. Works are likely to be awarded by June, 2009.

5. (A) Integrated Kashang Stage-I HEP (65 MW)

PROGRESS

1. Land Acquisition:

a) Private Land (15.4863 ha):

- 11.826 ha land acquired.
- Case for approval of award for remaining land 3.6603 ha is with H.P. Govt.

b) Forest Land (18.7412 ha):

Total land required has been diverted.

2. Investigation & Site Selection:

- Field work for Topographical Survey as required by Design cell & GSI, completed and plotting by SOI in progress.
- Control points confirmed.
- Geological investigation completed.
- Drilling of 2 Nos. bore holes along the central line of weir axis completed.
- Drilling of 2 Nos. bore holes on the alignment of HRT completed.
- Excavation of exploratory drift along the centre line of Transformer Hall is in progress.
- Tendering/ award for exploratory drift along the centre line of Intermediate adit to Pressure Shaft is in process.
- Dumping area acquired.
- Case for obtaining license for quarry site at Akpa on lease bases is in process with Mining Department of HP for finalization.

3. Statutory Clearances:

- Environment and Forest Clearances have already been obtained.
- TEC has been accorded by HPSEB on 31.07.2008.

4. Infrastructure Works:

- Approach road from NH-22 to Powerhouse site completed.
- Construction work of approach roads to weir site is in progress.
- 65% work of 4 stories office building at R/Peo completed.
- Building for bachelor accommodation hired & 21 sets allotted.
- Residential/ Non residential buildings are scheduled to be completed by Dec., 2009.
- Case for reconnection of power supply is being pursued with HPSEB.

5. Relief & Rehabilitation:

- R&R Plan for Kashang Stage-I approved.
- R&R officers posted at site for implementation of R&R plan.
- 5 Nos candidates among PAF were nominated for training at ITI out of which only 3 have joined.

6. Main Works:

- Main Access Tunnel has been excavated.
- Bench for Pot head yard developed.

Package – I (Civil & Hydro mechanical work)

- Global tender published on 26.03.08., clarification in TBER submitted to ADB on 18.11.08. and approved by ADB on 08.12.08.
- Price bids to be opened after approval of Technical bids from ADB.
- Work is likely to be awarded by the end of January., 09.

Package-II (*Electro Mechanical works*) for stage-I & III

TBER submitted to ADB. E & M package is to be awarded.

5. (B) Integrated Kashang HEP Stage-II &III (130 MW)

Progress

1. Land Acquisition:

a) Private Land (3.3493 ha):

- Case under process in LAO office for section-IV notification.

b) Forest Land (17.6857 ha):

- Case submitted to CF Rampur on 04.11.08.
- Land acquisition/ diversion likely to be completed by 31.03.09.

2. Investigation & Site Selection:

- Survey work as per requirement of GSI and Design unit completed.
- Confirmation of control points is in progress.
- Drilling of 2 Nos. bore holes along the centre line at underground Desanding basins completed.
- Quarry site of Stage-I will be used for Stage II & III also.
- Dumping sites identified and land diversion case is under process.
- Reports on Petro-graphic analysis of pre-monsoon samples of sediments received.

3. Statutory Clearances:

a) Environment Clearance:

EIA/ EMP reports received, and submitted to HPSEP & PCB.

b) TEC:

- Chapter on Power Studies of Integrated Kashang HEP submitted in CEA on 06.10.08.
- Observations of CEA/ CWC on the DPR of Integrated Kashang HEP being attended to and likely to be submitted by: 31.12.08.

4. Infrastructure Works:

The work for the construction of approach roads to different project sites will be taken in hand after acquisition of private land and diversion of forest land.

5. Relief & Rehabilitation:

- R&R Plan has been approved.
- Preparation underway for R&R plan implementation.

6. Main Works:

Major work to be taken up after obtaining all statutory clearances.

- (c) **Himurja** : Apart from above, 304.00 MW power capacity addition is expected with the commissioning of Mini/ Micro hydel projects undertaken for execution by Himurja by the end of 11th Plan.

II. Private Sector : Under Private sector 15 projects are under execution and it is expected to add 1738.00 MW additional power capacity by the commissioning of these projects by the end of 11th Plan.

1. NEOGAL HYDEL PROJECT (15 MW):

Neogal Hydro Electric Project (HEP) has been contemplated as a power generation development on Neogal a tributary of Beas in District Kangra of Himachal Pradesh. The project has been allotted to M/s Om Power Corporation Ltd. New Delhi. The estimate cost of this project is Rs. 61.74 crore. The annual generation of this project will be 82 MU. The MOU for execution of the project was signed between the HP Govt. and M/s. Om Power Corporation, New Delhi on 28.8.93. The Implementation Agreement signed with the company on 4.7.98 stands terminated on 27.11.04 due to failure of the company to achieve the financial closure and start construction work on the project within the time limit extended by the Govt. in its cabinet meeting held on 31.5.04.

The Govt. vide letter dated 19.10.2005 conveyed the decision of the Council of Ministers to revise the I.A signed on 4.7.98 by signing Supplementary Agreement. The Govt. of HP signed the 4th supplementary Implementation Agreement on 27.1.2006 with the Company. The Company has signed Power Purchase Agreement on 27.10.2006 with HPSEB on the lines of PPA signed with M/s Patikari Power Pvt Ltd. in respect of Patikari HEP (16MW). Now the construction work of Project is under progress. The company has completed 12.2 Km road , Traffic Tunnel –70 mtr, Adits –236 mtr. , HRT-215mtr, Transmission line – 12 km. The project is slated for commissioning in 2010-11.

2. ALLAIN DUHANGAN HYDEL PROJECT (192 MW):

Allian Duhangan Hydel Project (HEP) has been contemplated as a power generation development on Allian Duhangan a tributary of Beas in District Kullu of Himachal Pradesh . The project has been allotted to M/s Allian Duhangan Power Corporation Ltd. Prini Manali. The estimate cost of this project is Rs. 922.36 crore. The annual generation of this project will be 678 MU. The MOU for execution of the project was signed between the HP Govt. and M/s. Rajasthan

Spinning and Weaving Mills Ltd., New Delhi on 28.8.93 & Implementation Agreement signed on 22.2.2001. The CEA has accorded TEC on 20.8.2002. The Company was required to start the construction work of the project within 36 months of the I.A. i.e. 22.2.2004 after achieving the financial closure. The Company failed to achieve financial closure and start the construction work by the due date. The Govt. vide letter dated 4.8.04 have asked the company to start the construction work on the project within 6 months i.e. by 5.2.2005 after getting the tripartite agreement signed. The GoHP signed Quadripartite Agreement on 5.11.05 between the Govt. of H.P., M/s Rajasthan Spinning & Weaving Mills Ltd., M/s MPCL and the Generating Company M/s AD Hydro Power Ltd. As per the progress report ending September,2008, the following works have been completed. Excavation of Power House main Cavern, TRT, Transformer Cavern, Pressure shaft Adit 1, Adit 2, other infrastructural works, concreting of Power House. Transformer Cavern, Allain Barrage, Concreting of intermediate reservoir, Head regulator are in progress. The project is scheduled for commissioning during 2009-10.

3. KARCHAM-WANGTOO HYDEL PROJECT (1000 MW):

Karcham-Wangtoo Hydel Project (HEP) has been contemplated as a power generation development on Satluj river in District Kinnaur of Himachal Pradesh. The project has been allotted to M/s Karcham Hydro Corporation Ltd. New Delhi. The estimated cost of project is Rs. 5910 Crore. Annual generation of this project is 4560 MU. The MOU for execution of the Project has been signed between the HP Govt. and M/s. Jai Parkash Industries Ltd., New Delhi on 28.8.93. The Implementation Agreement was signed between Govt. of HP and M/s. Jai Parkash Industries Ltd on 18.11.99 followed by a Tripartite Agreement between the Govt. of HP, M/s. Jai Parkash Industries Ltd and M/S Jaypee Karchham Hydro Corporation Ltd., on 30-12-2002. As per the Progress Report ending September,2008 the company has completed river diversion. The excavation in progress for the following components. Intake tunnel, MAT, Power House, Desilting tank, Surge gallery, Diversion tunnel Upstream Cofferdam, Main Dam spillways and HRT, Surge chamber. The project is scheduled for commissioning in 2011-12.

4. Malana-II (100 MW):

Malance-II Hydro Electric Project (HEP) has been contemplated as a Power generation development on Malana a tributary of Beas in Kullu District. of Himachal Pradesh. The Project has been allotted to M/s Everest Power Pvt. Ltd. New Delhi. The estimated cost of the Project is Rs. 633.47 Crore. The annual generation of this project will be 428 MU. The MOU & IA signed with the company on 27.5.2002 & 14.1.2003 respectively. The company M/s Everest Power Pvt.Ltd., submitted the modified contents of DPR during Jan., 2002 on the basis of observations raised by HPSEB on examination of DPR. The company has obtained TEC on 15.10.2004. However, in an arbitration case titled M/s. MPCL v/s State of H.P. & another, the Arbitrate Tribunal has passed an order that “M/s. Everest Power Pvt. Ltd.” shall be at liberty to take the steps for getting the required

clearances from the authorities concerned including DPR but the actual construction work on the Project shall not start except with the permission of the “Arbitration Tribunal. The stay imposed by the Hon’ble Arbitral Tribunal vide order dated. 06.08.03 on construction work of the project in the case titled M/s MPCL V/s State of HP and others, was vacated vide order passed by the Hon’ble Arbitral Tribunal on 28.5.05, allowing the Company to go ahead with the construction on the Project. As per the Progress Report for ending September 2008 .The company has completed work on Main ACCESS Tunnel, TRTI & Manifold-1,11, Bus duct, Transformer Cavern, Adit- 1 to Adit -6, Pressure Shaft and Diversion Channel. The work on power House company (Machine Hall), Head Race Tunnel, Pressure Shaft (Vertical), Concrete dam excavation, Dam drift and surges shaft is in progress. The company has achieved various mile stones with in the time schedule. The Project is slated for commissioning in 2009-10.

5. Tangnu Romai Stage-I & II (44MW + 6 MW):

Tangnu Romai Hydro Electric Project (HEP) has been contemplated a Power generation development on Tangnu Romai a tributary of Yamuna river in district Shimla of Himachal Pradesh. The Project has been allotted to M/s P.C. P International Ltd.. The estimated cost of the Project is Rs. 239.73. Crore. The annual generation of this project will be 211.05 MU. The MOU was signed with the company on 5.7.2002. An Implementation Agreement for the Project has been signed with M/s Tangnu Romai Power Generation Ltd, on 28.7.2006 as per the provision of Power Policy. Later on the Company submitted two separate DPRs the revised two separate proposals for Stage-I & II having installed capacities of 44MW & 6 MW, respectively. The Govt. on considering the request of the Company, signed two separate I.As with the Company. The proposal comprising two schemes of installed capacities 44MW at Rupin Nallah & 6 MW at Supin Nallah., have been found Techno-economically viable by HPSEB on 30.11.2007 The Company is in progress of obtaining MOEF clearances and diversion of forest land and Environmental clearances and other Statutory/ Non Statutory clearances from the respect departments The Project is slated for commissioning for 44MW in 2012-13 and for 6 MW in 2011-12.

6. Lambadug(25 MW) HEP:

Lambadug Hydro Electric Project (HEP) has been contemplated a Power generation development on Lambadug a tributary of Beas river in district Mandi of Himachal Pradesh. The Project has been allotted to M/s Himachal Consortium Power Projects Pvt. Ltd.. The estimated cost of the Project is Rs. 149.81. Crore. The annual generation of this project will be 92.56 MU. The MOU was signed with M/s Himachal Consortium on 14.6.2002. The DPR submitted by the company on 10.2.04 has been Techno-economically Cleared by HPSEB on 17.12.2004. In view of the decision taken by the Govt. to sign the Ist Supplementary Implementation Agreement with the Company, in line with the Hydro Power Policy-2006 of the State, the draft Supplementary I.A. prepared was sent to the Govt. vide letter dated 6.9.06. The Project was situated in the Dhauladhar Wild Life Sanctuary and no construction activity can be taken without the permission of

Hon'ble Supreme Court .The Hon'ble Supreme Court in its order dated 27.3.2007 allowed the construction of the Project .Subsequently National Board of Wild Life (NBWL) has allowed the diversion of forest land in its order dated 1.10.2007 .The process for obtaining statutory /non statutory clearances was started after 1.10.2007 by the company. The Project is slated for commissioning in Jan 2013.

7. Budhil Hydro Electric project (HEP)(70 MW):

Budhil Hydro Electric project (HEP)(70MW) has been contemplated as a Power generation development on Budhil Khad a tributary of the Ravi river in Chamba District of Himachal Pradesh. The project has been allotted to M/s Lanco Green power Pvt. Ltd. New delhi. The estimated cost of the project is Rs. 418.80 crore. Annual generation of this project will be 313.33 MU. The Memorandum of Understanding (MoU) has been signed on 23.9.04. The H.P.Govt. signed the Implementation Agreement(I.A) with the company on 22.11.2005. The project is slated for commissioning in 2011-12

8. SORANG HYDRO ELECTRIC PROJECT (HEP)(100 MW):

Sorang Hydro Electric Project (HEP)(100 MW) has been contemplated a power generation development on Sorang a tributary on Sarluj River in Kinnaur District of himachal Pradesh. The project has been allotted to M/s Himachal Sorang Power Pvt. Ltd. The estimated cost of the project is Rs. 586 crores and annual generation of this project will be 524 MU. The Memorandum oa Understanding (MoU) and Implementation Agreement (I.A) have been signed on 23.9.2004 and 28.1.2006 respectively. The Detailed Project Report (DPR) submitted by the company on 13.5.2005 for an enhanced capacity of 100MW, has been techno-economically cleared on 09-06.06 by HPSEB, for an estimated cost of Rs. 586 crores. The Govt. has signed the Implementation Agreement (I.A) with the company on 28.1.2006. Construction of infrastructure works and excavation of power House is underway. The project is slated for commissioning in 2011-12.

9. Fozal Hydro Electric Project HEP (9 MW):

Fozal Hydro Electric Project HEP (100 MW) has been contemplated as a power generation development on Fozal, a tributary of the Beas River in Kullu Distt. of Himachal Pradesh. The project has been allotted to M/s Fozal Power Pvt. Ltd., New Delhi. The estimated cost of the project is Rs. 49.17 Crores. The annual generation of this project will be 46.37 MU. The Memorandum of Understanding (MOU) and Implementation Agreement (IA) have been signed on 21.6.2000 and 13.4.2006 respectively. The company is in the process of obtaining necessary clearances for the project. The project is slated for commissioning in 2010-11.

10. Paudital Lassa Hydro Electric Project HEP (24 MW):

Paudital Lassa Hydro Electric Project HEP (24 MW) has been contemplated as a power generation development on Pabbar, a tributary of River Yumna in Kullu Distt. of Himachal Pradesh. The project has been allotted to M/s Shree Lay

Lakshami Power Co. Ltd., Gunter (AP). The estimated cost of the project is Rs. 107.40 Crores. The annual generation of this project will be 137 MU. The Memorandum of Understanding (MOU) and Implementation Agreement (IA) have been signed on 6.6.2002 and 26.10.2006 respectively. The company is in the process of obtaining necessary clearances for the project. The project is slated for commissioning in 2011-12.

11. Baragaon Hydro Electric Project HEP (24 MW):

Baragaon Hydro Electric Project HEP (24 MW) has been contemplated as a power generation development on Sanjoin, a tributary of River Beas in Kullu Distt. of Himachal Pradesh. The project has been allotted to M/s Kanchanjunga Power Pvt. Ltd., F-34, Sector, Noida (UP). The estimated cost of the project is Rs. 168.09 Crores. The annual generation of this project will be 103.26 MU. The Memorandum of Understanding (MOU) and Implementation Agreement (IA) have been signed on 6.6.2002 and 25.11.2006 respectively. The Supplementary Implementation Agreement (SIA) has been signed on 12.1.2009. The company is in the process of obtaining necessary clearances for the project. The project is slated for commissioning in 2011-12.

12. Baner-II Hydro Electric Project HEP (6 MW):

Baner-II Hydro Electric Project HEP (6 MW) has been contemplated as a power generation development on Baner, a tributary of River Beas in Kangra Distt. of Himachal Pradesh. The project has been allotted to M/s Prodigy Hydro Power (P) Ltd., Jalandhar. The estimated cost of the project is Rs. 30.36 Crores. The Memorandum of Understanding (MOU) and Implementation Agreement (IA) have been signed on 29.5.2000 and 1.10.2001 respectively. The Supplementary Implementation Agreement (SIA) has been signed on 9.8.2007. The company is in the process of obtaining necessary clearances for the project. The project is slated for commissioning 2010-11.

13. Raura Hydro Electric Project HEP (8 MW):

Raura Hydro Electric Project HEP (6 MW) has been contemplated as a power generation development on Raura, a tributary of River Satluj in Kinnaur Distt. of Himachal Pradesh. The project has been allotted to M/s. DLI Power (India) Pvt. Ltd., Pune. The estimated cost of the project is Rs. 42.03 Crores. The Memorandum of Understanding (MOU) and Implementation Agreement (IA) have been signed on 4.2.1996 and 24.3.2008 respectively. The company is in the process of obtaining necessary clearances for the project. The project is slated for commissioning in 2011-12.

14. Sai Kothi Hydro Electric Project HEP (15 MW):

Sai Kothi Hydro Electric Project HEP (15 MW) has been contemplated as a power generation development on Baira, a tributary of River Ravi in Chamba Distt. of Himachal Pradesh. The project has been allotted to M/s Venture Energy &

Technologies Ltd., New Delhi. The estimated cost of the project is Rs. 83.17 Crores. The annual generation of this project will be 74.19 MU. The Memorandum of Understanding (MOU) and Implementation Agreement (IA) have been signed on June, 2002 and 16.7.2007 respectively. The company is in the process of obtaining necessary clearances for the project. The project is slated for commissioning 2011-12.

III. Joint / Central Sector : By the end of 11th Plan, joint/ central sector is expected to add 2803 MW additional power capacity. Joint/ Central Sector projects are being executed by three Corporation (i) National Thermal Power Corporation (NTPC) (ii) National Hydro-electric Power Corporation (NHPC) and (iii) Satluj Jal Vidhyut Nigam Limited (SJVN Ltd.). Status of the projects under execution is given below:-

1. Koldam Hydro Electric Project (HEP) (800 MW):

Koldam Hydro Electric Project (HEP) (800 MW) has been contemplated as a power generation development on the Satluj river in Bilaspur Distt. of Himachal Pradesh. The project has been allotted to National Thermal Power Corporation Ltd., New Delhi. The estimated cost of the project is Rs. 4527.15 crore. Annual generation of this project will be Rs. 3338.61 M.U.

The infrastructural activities of the project have been completed. The contracts for all major packages have already been awarded and the construction work is in full swing.

2. Parbati-II Hydro Electric Project (HEP) (800 MW):

Parbati-II Hydro Electric Project (HEP) (800 MW) has been contemplated as a power generation development on Beas River in Kullu Distt. of Himachal Pradesh. The project has been allotted to National Hydro-electric Power Corporation (NHPC) Ltd., Faridabad. Annual generation of this Project will be 3109 M.U.

The contracts of main packages i.e. Dam works, Trench Weir and Feeder Tunnel, Power house, Surge Shaft, Jiwa Nallah works and hydro mechanical equipment have been awarded to five companies who have taken up / started the work at different locations/project components and the construction work is in full swing. The infrastructural development works i.e. c/o residential and non-residential buildings, approach roads and bridges etc. have almost been completed. Likely date of completion is 2009-10.

3. Parbati-III Hydro Electric Project (HEP) (520 MW)

Parbati-III Hydro Electric Project (HEP) (520 MW) has been contemplated as a power generation development on Beas river in Kullu Distt. of Himachal Pradesh. The project has been allotted to National Hydro-electric Power Corporation (NHPC) Ltd., Faridabad. Estimated cost of the project is Rs. 2228.41 crore. Annual generation of this Project will be 1977 M.U.

The necessary clearances of the project have been obtained or are at advanced stage of completion. The process for pre-qualification of the bidders on international competitive bidding basis for main project components, has been completed and tender packages for civil and electro-mechanical works, stand approved the infrastructure works on the project and land acquisition, are in progress. All additional investigations as suggested by Central Electricity Authority (CEA) while according techno economic clearance (TEC) stand completed. Likely date of completion is 2010-11.

4. Chamera-III Hydro Electric Project (HEP) (231 MW):

Chamera-III Hydro Electric Project (HEP) (231 MW) has been contemplated as a power generation development on Ravi river in Chamba Distt. of Himachal Pradesh. The project has been allotted to National Hydro-electric Power Corporation (NHPC) Ltd., Faridabad. The Implementation Agreement (I.A.) signed on 5.7.01. The estimated cost of the project is Rs. 1364.01 crore. Annual generation of this project will be 1104 M.U.

The land acquisition for the project is in progress. Provisional clearances for diversion of 96.145 hectare forest land has been accorded by Ministry of Environment & Forestry (MOEF) on 8/15.6.04. Cat Plan sent to Ministry of Environment & Forestry (MOEF) by the Govt. of Himachal Pradesh. Environmental clearance accorded by Ministry of Environment & Forestry (MOEF) on 10.3.2005. Site development works for power house and dam site, infrastructural works construction of project roads and bridges are in progress. Likely date of completion is 2010-11.

5. Rampur Hydro Electric Project (HEP) (412 MW):

The proposed Rampur Hydro Electric Project (HEP) (412 MW) envisages utilization of tail waters of Nathpa Jhakri Hydro Electric Project (HEP) (1500 MW). The diversion site of project is proposed at Jhakhri and Power House proposed on right bank of Satluj near Bael village (opposite to Duttnagar village on NH-22). The tail water of Nathpa Jhakri Power House is proposed to be carried through +15 Km long Head Race Tunnel, Surge shaft, and three No. Penstock to surface power House to feed 3 No. turbines to generate 412 MW power. The power from this project shall be fed into northern grid.

HPSEB has carried out detailed survey and investigation on this project. This project has been allotted to the Satluj Jal Vidhyut Nigam Ltd. (SJVN Ltd.) for execution. The orders for civil and hydro mechanical works have been placed on 1.2.2007. The execution of the project is in full swing.