Research methodology

A sequence of actions are going to be taken up to gather data from primary and secondary sources. The major activities are explained below:

a) To identify the project details of Kullu district from various sources (primary and Secondary Sources) – Tentatively there are 100+ projects.

b) To segregate the projects in different time zone (1994-96, 1996-98, 1998-2000, 2001-2003 …..) and project location w.r.t various nalla/khads/rivers of Kullu where 30 projects are commissioned so far and more than 20 projects are under implementation.

c) A set of Questionnaire is scheduled to be forwarded to various Project heads (IPP). As Kullu is the main hub we are expecting to get at least 15-20 samples for research evaluation through statistical sampling purpose.

d) The data input received from Questionnaire, Direct Interaction, Nodal Agency input, District power dispatch centre, LADA (Local Area Development Agency), State Pollution and Fishery Department will be authenticated and final data will be processed for evaluation purpose.

Sources of Data Collection:

Tools Used for data collection and process through statistical method

All the three tools structured questionnaires, interviews and the observation will be used to complete the study. Besides that this research will incorporate the assessment of information input from various sources small group meetings, focus group discussions, Educated people from locality (Teachers, College Principals, State Officials) to get an idea from the ground reality.

Stake holders
1. IPP (Independent Power Producer i.e Majority Stake Holders)
2. State Agency (HIMURJA, LADA, Gram Panchyate, Local State officials, State Administrative officers, Development Commissioners etc)
3. EPC contractors (Projects under construction phase)
4. Local VIP (MLA, MP)
5. Financial Institution/ Banks/
6. Local ITI/ College/ University staff
7. Electricity Board Officials / District Load dispatch Centre
8. Others if any
Sample Selection criteria

Purposive sampling method will be adopted while selecting the site stations

- Total samples 60 projects + (under different stages of implementation out of which sampling will be done on the following mode
- 15 commissioned projects
- 20 projects under construction
- 20 projects under new allotment and under statutory clearances (total 26 clearances are required)
- Personal interaction with local people (MLA, MP, District Officials, Local)

Designing the questionnaire

The structured questionnaire will go through the pretesting stage, some respondent will be contacted personally and appraise them with the objectives and the utility of the information. On getting the feedback from the various groups of respondents the questionnaires will be revised accordingly. The objectives of the pretesting will be to ascertain whether the question asked could be easy and correctly understood by the respondents, to identify the right type persons to be approached for providing the information to assess the time taken to fill the questionnaires.

Analysis of data

The use of exact method of analysis will depend upon the nature and extent of data collected from different sources. For the analysis of data some statistical tools will be applied. This Analysis will consider various aspects and approaches like significant relevance between project technical parameters, innovation impact in project completion time and cost value, social intervention and allied issues.
**Scope and Limitation:**

In the Small Hydro Sector, India has a potential of 15000 MW in various small hydro sites which are identified by various survey, hydrology study at various gauze stations in various catchment area which may be snow fed or rainfed area and also hilly hydro terrain. In kullu valley maximum water resource lies in the snow fed area. The rainfall inflow increases the hydrology in rainy season and summer hot days snow fed water has become attractive proposition of small hydro power situation in Kullu, Rotang, Manali Cluster. Out of national potential Himachal alone has got a potential over 2500 MW and kullu has a share of approx. 750 MW or so. We are not considering the medium sized hydro projects which are implemented by Himachal Pradesh Power Development Corporation, NHPC, Parbati Power Projects which are more than 25 MW capacity (As per Central Govt Policy small hydro projects under Ministry of Renewable Energy will remain in the range of 3-25 MW. Beyond this limit, the projects are governed by Ministry of Power Policy and will not be allowed for Capital Subsidy).

In one side State Nodal Agency (HIMURJA) is trying to push small hydro program through IPP Route (Independent Power Producer) which takes individual responsibility of setting up the power plant by following the prescribed procedure starting from survey, investigation assessment, Basic cost estimation, PFR/DPR (Pre Feasibility Report/Detailed Project Report), construction activity immediately after formal signing the IA (Implementation Agreement), Loan Syndication, Fund Disbursement and commissioning of the project in using state power evacuation transmission facility as per policy guidelines or through open access mode/wheeling mode. These process is really painful and it requires a lot of patience in clearing the case file for land, forest clearance if any, land compensation, regulatory clearances of irrigation, fishery clearance, industry license and blasting permission which requires a lot of patience and perseverance which a trained IPP may sustain. During execution of power plants at various sites several bottlenecks are found on social issue, access problem, environment safeguard which are carefully tackled as per the policy guidelines and disbursement conditionality of the bank.
The responsibility of handling of these critical issues are taken up by IPP alone as he/she is the main stake holder of the project. In one side he has to play a dual role of Investor, protector of nature and environmental protector, wild life and forest and return the loan as per agreement signed with the loan agency.

Initially UNDP/IREDA /World Bank assisted projects have been given to various states but few states like Himachal, Uttrakhand, Karnataka, has reaped the facility to access the low cost fund. Now state Administration and State Distribution wing are more familiar to deal the project components thereby initial implementation time frame of 5-6 years are now reduced to 3 years from PPA signing or Financial closure. Now every year on an average 3-5 projects (financed by other commercial banks like PNB, Canara Bank, IOB, SBI) are taking active interest. Earlier only one bank IREDA was leading the race to set the track. Now many DFI (Development Finance Institutions like IFC, IREDA, REC, PFC) are financing in syndicated mode to leverage fund flow risk and collective approach.

For research purpose we are concentrating on various aspects of project covenants out of which some are tangible to collect date from various sources and some are hidden like cultural impact. In order to quantify same we are going to take up the sampling mode on some qualitative measure to get impact factor leading to innovation in design, modification, avoidance of full fledged construction damage for hydro conduit and hydro mechanical/Electro mechanical modification to enhance project sustainability.

**Significance of the study and Utility**

The current researcher was involved in small hydro implementation program under World Bank Funding Assistance through MNRE/IREDA (Indian Renewable Energy Development Agency –A Central PSU for Funding) during 1994-2008. From IREDA around 26 projects have been sanctioned by IREDA for UNDP/GEF / World Bank-I/World Bank-II and rest of India around 30 Projects for a total capacity addition of 600 MW in the range of (150 KW-
1000KW, 1-3 MW, 3-5 MW, 5-25 MW range). The success rate of Himachal Pradesh is pretty high in compared to other states in spite of various infrastructure difficulties due to hilly terrain. It is found that the interest of IPP developer and State Administration and State Nodal Agency facilitation activity has played a crucial success factors to outside state players (IPP) to come and invest in a Hilly state.

It is a matter of great pride that Himachal Pradesh is one of the rare State who never defaults in the Electricity Bill Payment to the IPP. This reputation brought IPP developers from Tamil Nadu, Andhra Pradesh, West Bengal, Maharashtra, Gujarat, Delhi, Haryana and many more from outside India via NRI route. The trend has continued to gather momentum in the formation of cluster development. Now this track is again rejuvenated by a new group of young entrepreneurs from Himachal who are interested to invest in small power projects below 2 MW range under Self Project identified category. The trained project manpower from various locations are taking active part in project execution stage which creates job employment to local people/ITI/Diploma Holders.

The pro-active state policy, clear cut streamlined procedure, Set Guidelines, Facility providers, speedy clearances, active support from local authority has ignited a holistic business environment in the local area. Now the construction activity is going on throughout the year barring some days during snow fall. The construction material for short time requirement is not hindering the project construction activity. In one side bigger size project allocation (3-25 MW Range) are getting attention of General IPP Developer, Corporate Entity having sound financial health and another side medium sized hydro projects (above 25 MW) are getting shape in a parallel mode. These two flow has acted comfortably to create ecosystem of small hydro cluster in last 15 years or so. Now from Govt side, Big Pvt sector Entity are taking up medium size projects (25-100 MW or so) which is a good sign for state exchequer for transporting power to nearby states like Delhi, Haryana, Punjab who are reeling under constant power crisis.
The success story of Kullu Small Hydro Cluster as well as State performance in continuous innovation to nurture this green sector is an exemplary track to other states. It is to note that the population density of Kullu is around 3,50,000 (in 1200 dispersed villages) with a total installed capacity of 250 MW depicts a energy richness of this hill state.
**Research Plan of action:**

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<thead>
<tr>
<th>Sl no</th>
<th>Tasks</th>
<th>Work Plan</th>
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<tbody>
<tr>
<td>1</td>
<td>Writing of Introduction</td>
<td>3 months</td>
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<tr>
<td>2</td>
<td>Writing on Literature Review</td>
<td>3 months</td>
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<tr>
<td>3</td>
<td>Research Methodology</td>
<td>One month</td>
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<td>4</td>
<td>Data Collection in the Field including Questionnaire Format, Sending to various IPP, Mail/Speed post, Interaction, Scheduling etc</td>
<td>6 months</td>
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<td>5</td>
<td>Tabulation Coding in SPSS : Analysis of Data</td>
<td>4 months</td>
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<tr>
<td>6</td>
<td>Writing on presentation and Analysis, Cleaning of Data</td>
<td>3 months</td>
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<td>7</td>
<td>Discussion, Major Finding, Suggestion, Modification</td>
<td>3 months</td>
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<tr>
<td>8</td>
<td>Writing of Executive Summary, Writing Index</td>
<td>30 days</td>
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<td>9</td>
<td>Draft Thesis Submission</td>
<td>30 days</td>
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<td></td>
<td><strong>Total Time Span</strong></td>
<td>27 months ( Rounded)</td>
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**Coverage of the study**

We are going to take up Kullu hydro cluster deliberately on the simple reason that it is the greatest small hydro cluster in India. Currently 30+ projects are under implementation which may add total cumulative capacity addition over 600 MW in next 5 years time.