Interface of Hydro Projects and Society, Economy and Environment- A Case Study of upcoming Jispa Dam

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Abstract

Himalaya, the youngest mountain range on the Blue Planet, Earth. It is spread across like a sword from Jammu & Kashmir to Arunachal Pradesh up to 2500 kms. Covering an area of about 10% of the Indian land, which is inhabited by 5% of the population deciding the future of 50% Indian. Himalaya is the source of many big rivers like Ganga, Yamuna, Brahmaputra, Indus, Sutlej, Beas, Ravi, Chandra, Bhaga etc. Himachal Pradesh is a part of this mighty Himalayan range which is blessed with many fast flowing perennial rivers, forming many narrow gorges. This mountainous region is having great potential for hydro power generation. Lahaul & Spiti district of Himachal Pradesh is naturally carved with beautiful mountains, glaciers, lakes, meadows and more importantly it's honest and innocent people. It is the largest district of this state with minimum population density and home of the 'Chandrabhaga' river (biggest river in terms of water volume in Himachal Pradesh). One of its tributaries 'Bhaga', originating from Baralacha la is under threat of an upcoming hydro electricity power project at Jispa. Its capacity estimated to be 300 MW and will be working on a 200 meter high dam. Present study is based on the views, emotion, thinking, progress of the people living near the construction of the dam site and reservoir (Jispa, Darcha, Samdo and Gemour). The data was collected by personal interviews and questionnaires for this study.

Keyword: Hydropower, Economic Development, Jispa.

Introduction

The Himalayas, or Himalaya literally, "abode of the snow" is a mountain range in Asia separating the plains of the Indian subcontinent from the Tibetan Plateau. The Himalayan range is home to the planet's highest peaks, including the highest, Mount Everest. The Himalayas include over a hundred mountains exceeding 7,200 metres (23,600 ft) in elevation. The Himalayas have profoundly shaped the cultures of South Asia. Many Himalayan peaks are sacred in both Buddhism and Hinduism. Besides the Greater Himalayas of these high peaks there are parallel lower ranges. The first foothills, reaching about a thousand meters along the northern edge of the plains, are called the Sivalik Hills or Sub-Himalayan Range. Further north is a higher range reaching two to three thousand meters known as the Lower Himalayan or Mahabharat Range.

Himalaya cross six countries: Bhutan, India, Nepal, China, Afghanistan and Pakistan, with the first three countries having sovereignty over most of the range. The Himalayas are bordered on the northwest by the Karakoram and Hindu Kush ranges, on the north by the Tibetan Plateau, and on the south by the Indo-Gangetic Plain. Three of the world's major rivers, the Indus, the Ganges and the Tsangpo-Brahmaputra, all rises near Mount Kailash and cross and encircle the Himalayas. Their combined drainage basin is home to some 600 million people.

The flora and fauna of the Himalayas vary with climate, rainfall, altitude, and soils. The climate ranges from tropical at the base of the mountains to permanent ice and snow at the highest elevations. The amount of yearly rainfall increases from west to east along the southern front of the range. This diversity of altitude, rainfall and soil conditions combined with the very high snow line supports a variety of distinct plant and animal communities. For example the extremes of high altitude (low atmospheric pressure) combined with extreme cold allow extremophile organisms to survive. The higher regions of the Himalayas are snowbound throughout the year, in spite of their proximity to the tropics, and they form the sources of several large perennial rivers, most of which combine into two large river systems:

The western rivers combine into the Indus Basin, of which the Indus River is the largest. The Indus begins in Tibet at the confluence of Sengge and Gar rivers and flows southwest through India and then through Pakistan to the Arabian Sea. It is fed by the Jhelum, the Chenab, the Ravi, the Beas, and the Sutlej rivers, among others. Most of the other Himalayan rivers drain the Ganges-Brahmaputra Basin. Its main rivers are the Ganges, the Brahmaputra and the Yamuna, as well as other tributaries. The Brahmaputra originates as the Yarlung Tsangpo River in western Tibet, and flows east through Tibet and west through the plains of Assam. The Ganges and the Brahmaputra meet in Bangladesh, and drain into the Bay of Bengal through the world's largest delta, the Sunderbans. The easternmost Himalayan rivers feed the Ayeyarwady River, which originates in eastern Tibet and flows south through Myanmar to drain into the Andaman Sea.

The Himalayas have a profound effect on the climate of the Indian subcontinent and the Tibetan plateau. They prevent frigid, dry Arctic winds blowing south into the subcontinent, which keeps South Asia much warmer than corresponding temperate regions in the other continents. It also forms a barrier for the monsoon winds, keeping them from traveling northwards, and causing heavy rainfall in the Terai region. The Himalayas are also believed to play an important part in the formation of Central Asian deserts, such as the Taklamakan and Gobi.

In India Longitudinally, the Himalaya is divided into Greater Himalaya, the Himadri and Central Himalaya. The western Himalaya is further subdivided into four regions: North Kashmir Himalaya, South Kashmir Himalaya, Himachal Himalaya, Kumaun Himalaya from west to east. The western part of eastern Himalaya includes Sikkim Himalaya, Darjeeling Himalaya and Bhutan Himalaya. The Assam Himalaya embraces remaining portion of the Eastern Himalaya.

Himachal is situated in the heart of Western Himalaya and known as Dev Bhumi. The territory of Himachal is wholly mountainous with altitude ranging between 350 to 7000 meters above the sea level. Physiographically the territory can be divided into three zones, outer Himalaya or the Shivalik, inner Himalaya or the mid mountains and the Grater Himalaya or the Alpine Zone. The southern consists of low hills of the Shivalik. It is known to ancient geographer to Mainak Parvat. Dhauladhar or the White Mountain Range is the most majestic and striking feature of Himachal mountains cape. It is the part of Inner Himalaya with Pir Panjal Mountains. Two important rivers are originates from inner Himalaya. Great Himalaya range run the eastern boundary and is cut across by the defile of the river Sutlej. There are such famous passes across this range, such as Kangla (5548m), Bara Lacha pass (4512m), Pin Parbati (4802m) etc.

Hydroelectricity in Himachal

Himachal Pradesh is extremely rich in its hydel resources. The state is having about twenty five percent of the national potential in this aspect. It has been estimated that about 21,244 MW of hydel power can be generated in the state by the construction of various hydel projects on the five perennial river basins no matter they are major, medium or small. Himachal is the home to many Himalayan rivers which have huge potential for the production of Hydroelectricity. The capacity of Sutlej has been estimated as 9443.5 MW, Beas 4586 MW, Ravi 2319 MW, Chenab 3032.30 MW and Yamuna with 603.52 MW. There is also 750 MW of Small Hydro Projects. Out of total hydel potential of the state, 6037 MW (approximately) is harnessed so far, out of which only 7.6% is under the control of Himachal Pradesh Government while the rest is exploited by the Central Government.

Hydro Electricity projects set up and under implementation in Himachal Pradesh.

Sutlej Area		Beas Area	
Name of the Project	**Capacity in MW**	**Name of the Project**	**Capacity in MW**
Rong tong	2	Aline Dughan	192
Kiling Lara	40	Malana	86
Lara Project	60	Parvati I II III	2051
Mani Nadang	70	Largi	126
Lari Sumte	104	Beas Sutlej Link	990
Sumte Kathang	130	Uhal I	110
Chango Yangthang	140	Uhal II	60
Yangthang	400	Uhal III	100
Pooh	340	Nughal	15
Spilo	300	Binwa	6
Jangi Thopan	480	Baner	12
Shontong Karcham	402	Kholli	12
Thopan Powari	400	Gaj	10.5
Karcham	1000	Pong Dam	360
Baspa I	210	Patkari	16
Baspa II	210	Sainj	100
Rukti	1.5	Fozal	6
Bhaba	4.5	Baragaon	10.5
SVP Bhaba	120	Daulasiddh	80
Nathpa Jakri	1500	Lamba Dug	15
Ghanvi I	22.5	Malana II	100
Ghanvi II	8	Tirthan	18
Rampur	402	Ghropa	85
Nogli	2.5	Godda Gosan	25
Chaba	1.75	Total	4586
Sorang	60		
Kol Dam	800	Ravi Total	2379
Bhakra Dam	1200		
Kashang I	66		
Kashang II	60		
Kashang III	132		
Tindog I	100		
Tindog II	90		
Ropa	60		
Baharari	10		
Luri	425		
Other	485		
Total	9443.75		

Yamuna Area		Chandrabhaga Area	
Name of the Project	Capacity in MW	Name of the Project	Capacity in MW
Rupi	39	Chattro	140
Tangui Rumai	44	Koksar/ Munsha	150
Dhamwadi Sundra	70	Telig	81
Aadhra	16.95	Sissu	0.1
Chirgaon- Mhajgaon	46	Gyappaa Dam	240
Shalvi	7	Gondala	270
Ranuka Dam	40	Biling	0.2
Giri	60	Tandi	150
Yamuna Project	131.57	Thirot	4.5
Sawara Kuddu	110	Badrang Tinger	180
Pidital Lassa	36	Patam	60
Gumma	3	Tingate	81
		Miyar	90
		Seli	150
		Riyoli	715
		Sachkhaas	210
		Kilar	0.3
		Dugar	360
		Rashil	150.2
Total	603.52	Total	3032.30

Source – HP GK 2014, Sarla Publication.

Jispa Dam

Jispa is a village in Lahaul and Spiti district at an elevation of 3,200 m or 10,500 ft with a population of around 350 people in Himachal Pradesh. It is located 20 km north of Keylong and 7 km south of Darcha, along the Manali-Leh Highway on the right bank of Bhaga River. There are approximately 20 to villages between Jispa and Keylong. The village has a helipad, a post office, and a monastery. Travellers often stop for the night here. Development of Hydroelectric projects has thrown up a number of important challenges, the world over and particularly in Indian context.

Background and Current Status of the Project

Out Of the five major river basins in Himachal, the Chenab basin is the least exploited basin for Hydro Electricity generation. The Chenab is a glacial river which originates from Bara Lacha pass in Lahaul division of Lahaul Spiti district. The water flow towards south forms Chandra River and the water flow towards north forms the Bhaga River and both rivers confluence at Tandi forms Chenab. In Himachal it's basin is spread over a distance of 126 kms and flows through the Jammu region of Jammu and Kashmir into the plains of the Punjab, Pakistan. In Himachal Chenab basin has total hydro power generation potential of 3032.3 MW. The Jispa dam is coming up along the Manali-Leh on national highway 21. The river is a tributary of Chandra Bhaga/Chenab river. The dam is proposed to be located downstream of the confluence point of the Jankar and Milang streams and the river Bhaga. The Jispa dam is a 200 meter high rock fill dam at an altitude of 3245 meters from sea level and is envisaged to be primarily a water storage scheme to regulate downstream flow of the river and to generate 300 MW of electricity.

The project when initially conceptualized was a 170 MW, runoff- the river hydro electricity project under the Himachal Pradesh State Electricity Board (HPSEB). But in August 2008 the Central Government declared it a'National Water Resource' project and modified it from a mere hydro electric project to a water storage project with hydro electric generation. As the project received the status of a 'National' Project, the State Government of HP allotted the Jispa dam project to Himachal Pradesh Power Corporation Limited (HPPCL).

The Project pre-feasibility proposal for Jispa dam, for consideration of Scoping and Terms of Reference (ToR), was put up by HPPCL in 43rd Meeting of Expert Appraisal Committee(EAC) of the Ministry of Environment held on 12th and 13th November, 2010.

Important Features about Jispa Dam Project

Particulars	**Dam near Jispa village and power house at Stingri village**	**3.2 kms upstream of Jispa village and power house at Stingri Village**
Height of the Dam	200 meters	200 meters
Capacity	300 MW	300 MW
HRT	11.75 kms	14.96 kms
Storage capacity	1 MAF	0.7 MAF
Total land required	1635 hectares	1322.95 hectares
Submergence Area	1500 hectares	1220 hectares
Submerged villages	5	4
No. of displaced families	131	74

(Source: Pre feasibility report and EAC meeting minutes)

Issues

(A) Impact on Local Economy and life

Villages like 12 village Balijim, Chikka, Darcha I and II, Dogma, Limkyun, Makseen, Nama, Ranglyo, Rarik, Sumdu, Yoche will be completely/partially submerged by the project, displacing more than 270 families. Around 10 villages will be affected by the drying up the source of water due to 18 Kms long tunnel to divert the river from the construction of Dam. These are Jispa, Kaimur, Kalong, Kwang, Kwaing, Khangsan, Rangrik, Sitrangri and Sorng. Lahaul is very rich in agriculture production and if river will be submerged into tunnel it will affect the economy of the area.

(B) Fragile and sensitive zone

The region where dam is going to construct is a part of Cold Desert at an altitude of more than 3100 meters. This area is falls in the Seismic Zone –IV and highly fragile mountain prone to avalanche in a difficult terrain. Population density here is just 2 persons per sq Kms. It will be highly dangerous to construct a 200 meter high dam with a reservoir spread over 1220 ha. It can be a cause of the natural disaster similar to Kedarnath in June, 2013. There will be huge pressure of the water reservoir on the land of Jispa.

(C) Impact on biodiversity

Due to little pressure of natural resources there are good forests of Birch and Juniper. Because of being mountainous and snowy terrain growth is very slow. It is also the home of Snow Leopard, Snow Fox, Snow Crow, Himalayan Ibex and many others. Dam will change their life because it will limit the grazing and hunting area for them. Animals came down during the moths of Snow to feed them but if dam will be there than they will get less area and they will move from here. It will be the great loss for this area.

(D) Impact on the society of the area.

Lahaul & Spiti is the largest district of Himachal with an area of 13835 Sq Kms. This is cold desert region of Trans Himalayan Range. It will be very difficult to rehabilitate more than 100 families due to this project because in Lahaul it's very difficult to find the land for agriculture or to make home. Labour for Dam construction will also change the demographic profile of the area. It will have long lasting adverse effect on the pure culture of Lahaul. Social relation will be affected because there will be more people to work on project then the entire population of Lahaul & Spiti. There will be change in the living pattern of people. Crime like Thief, Smuggling, crime against women and other will be increased, which are presently around 0 % in this area.

The area falls under Schedule V of the Constitution of India and enjoys a special status in terms of prevention of land alienation, ethnic and cultural identity etc. Before planning a project like Jispa dam it is the responsibility of project proponents to take the consent of local community.

(E) Rehabilitation and Resettlement

Rehabilitation and Resettlement (R&R) of Project Affected People (PAP) is another major issue affecting the smooth execution of Hydroelectric projects. People from Bakhra Dam, Kol Dam, Nathpa Jakri project are still struggling for their rights. Innocent people are using by the corporate and past shows that after dam there are no one to help. Same happened at the time of cloud burst in Miyar Valley of Lahul in 2013 where 90 MW dam is going to constructed by Private Company.

Opportunities

(A) Small Hydro Electric Power (SHP)

Small Hydro Electric Power (SHP) is one of the earliest known renewable energy resources being used in India and elsewhere in the world in various forms like water wheels for grinding, water lifting wheels etc. India has installed its first Hydro Electric power project of 135 KW in the year 1897 in Darjeeling. In India Small Hydro electric power has installation capacity up to 25 MW. It is future classified as under

(a) Micro Hydro - Station installed capacity up to 100 KW.

(b) Mini Hydro - Station installed capacity from 101 KW. To 2000 KW.

(c) Small Hydro - Station installed capacity from 2001 KW. To 25000 KW.

15000 MW potential has been estimated all India through 503 sites. In Himachal Pradesh a potential of approximately 2268MW is estimated to be Small Hydro electric power sector.

(B) Solar Energy

Being tropical nation India has great potential for generation of Solar Energy. It is predicted that Thar Desert could earn the distinction of being biggest solar power house by 2020.

(C)Wind Energy

India has vast wind energy potential and wind farms have emerged as a viable option with the advancement in wind technology. Asia's largest wind farm cluster of 150MW is located at Muppandal in Tamil Nadu another wind farm of 28 MW is located at Lama in Gujarat and 25 MW at Jaisalmer.

(D) Geothermal Energy

In India there are about 340 hot spring localities are identified. A 5kw geothermal power plant has been commissioned at Manikaran in Kullu district of Himachal Pradesh. A potential of 4-5 MW geothermal power has been estimated in Puga valley of Ladkah.

(E) Tidal Energy

India is estimated to possess 9000-10000 MW of Tidal Energy potential. The Gulf of Khumbhat is best suite with 7000 MW Potential. This is followed by Gulf of Kutch with 1000 MW and Sunderban by 900 MW.

(F) Wave Energy

Wave Energy potential in India is estimated at about 70000MW. A wave energy plant of 150 kw has been installed at Vizhingam near Trivandrum. Another 1MW wave energy plant is being set up in the Andaman and Nicobar Island.

Review of Literature

The ultimate objective of the United Nations Framework Convention on Climate Change (UNFCCC) is to achieve stabilization of greenhouse gas (GHG) concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system. To strengthen the commitments of industrialized countries (Annex-I) under the Convention, the Parties adopted Kyoto Protocol (KP) in 1997, which commits Annex-I Parties to reduce their emissions of GHG to an average of approximately 5.2% below 1990 levels over the period 2008–2012. KP provides for quantified emission limitations and reduction commitments for the developed countries and mechanisms to facilitate compliance with these targets, reporting and review and it lists six GHGs-carbon dioxides (CO_2), methane (CH_4), nitrous oxide, hydro fluorocarbons, per fluorocarbons and sulphur hexafluoride. In order for countries to achieve their targets where it is most economical to do so, the KP developed flexible mechanisms (Zhang, 2001). Besides Emissions Trading and Joint Implementation, the clean development mechanism (CDM) is the only flexible mechanism that involves developing countries (Philibert, 2000). It has been developed as a unique mechanism for increasing financial flows to developing countries for promoting clean technologies that not only reduce GHG emissions but also contribute towards the sustainable development of the country (Diakoulaki et al., 2007; Muller, 2007; Resnier et al., 2007). Consequently, new and renewable sources of energy have emerged as a viable option to achieve the goal of sustainable development (Dincer, 2000; Silveira, 2005; Lund, 2007). Many countries across the world have begun taking the necessary steps to move towards an ecologically sustainable development path (Dunn, 2002; Robinson, 2004)). As per the updates of Renewable Global Status Report 2006 (REN21) the overall, renewable power capacity expanded to 182 GW, up from 160 GW in 2004, excluding large hydro power. The renewable power capacity in developing countries grew from 70 to 80 GW, with China (small hydro) and India (wind) leading the increase (Jagadeesh, 2001; Li, 2002; Hicks, 2004). India's renewable power capacity exceeded Japan's for the first time. The developing-country share thus remained constant compared with 2004, at 44%. Including large hydro power, renewable power capacity reached 930 GW in 2005. Large hydro power increased by an estimated 12–14 GW in 2005, led by China (7 GW added), Brazil (2.4 GW added), and India (over 1.3 GW added). Small hydro increased by 5 GW to total 66 GW worldwide, with 38.5 GW existing in China alone as the boom in small hydro investment there continued. According to International Energy Agency (IEA) projections, the world hydropower production will grow by an average 2%/year.

Over three-quarters of the increase in hydropower production is expected in developing countries as there are few low-cost hydroelectric resources left to exploit in Organization for Economic Co-operation and Development (OECD) countries, but there are still opportunities for adding capacity in the developing world (IEA, 2007). Therefore, hydropower is expected to increase in absolute quantities over the next two decades, and its economic potential world-wide remains important however, its development remains largely dependent on resolving public concerns about the environmental and social consequences of building new facilities—particularly large dams (OECD/IEA, 2003). Small hydro power (SHP) projects could be of interest under the CDM because they directly displace green house gas emissions while contributing to sustainable rural development, if developed correctly. An attempt has been made to estimate the CDM potential of SHP projects in India. The preliminary estimates indicate that, there is a vast theoretical potential of CO2 mitigation by the use of SHP projects in India. On the basis of available literature, the gross potential of SHP projects is more than 15 GW. The annual CER potential of technically feasible SHP projects in India could theoretically reach 24 million tons. Under more realistic assumptions about diffusion of SHP projects based on past experiences with the government-run programmes, annual CER volumes could reach 13–24 million by 2020. CDM could help to achieve the maximum utilization potential of SHP projects more rapidly as compared with the current diffusion trend if supportive policies are introduced. Water flow is a "master variable" (sensu Power et al. 1995) that governs the fundamental nature of streams and rivers (Poff et al. 1997,Hart and Finelli 1999), so it should come as no surprise that the modification of flow caused by dams alters the structure and function of river ecosystems. Much has been learned during the last several decades about the adverse effects of dams on the physical, chemical, and biological characteristics of rivers (Ward and Stanford 1979, Petts 1984,Poff et al. 1997, Poff and Hart 2002). Increasing concerns about these impacts, together with related social and economic forces, have led to a growing call for the restoration of rivers by removing dams (AR/FE/TU 1999, Pejchar and Warner 2001). Some useful insights regarding the sequence and rate of these responses can potentially be gained from Petts (1984), who examined various time scales at which different physical, chemical, and biological characteristics responded to the construction of dams.

A central challenge in applying this approach is to determine the type and magnitude of impacts caused by an existing dam. For example, dams vary greatly in size, operation, and watershed setting, and this potentially creates large differences in their ecological impacts (Poff and Hart 2002). Unfortunately, ecologists have not yet studied a wide enough range of dam types to make accurate predictions about the effects of such variation on the structure and function of river ecosystems. Most studies have focused on the ecological effects of large storage dams, which clearly have major impacts on rivers (Ward and Stanford 1979, Petts 1984, Collier et al. 1996). In India, MNRE is responsible for small and mini hydro projects up to 3 MW station capacities since 1989 whereas Ministry of Power (MOP, 2007) is responsible for the development of large hydro power projects. The subject of small hydro between 3 and 25 MW has been assigned to MNRE w.e.f. 29 November 1999. There has been a continuous increase in the installed capacity of hydro power stations in India, which presently is 34,681 MW (http://powermin.nic.in); however, the share of hydro power has been reduced to only 25% in the total installed for power generation from 51% in 1963. In order to maintain the balance between hydro power and thermal power, MOP has announced a policy for accelerated development of hydro power in the country in which development of SHP at an accelerated pace is one of the important tasks (MNRE, 2007). The potential of SHP projects (up to 25 MW) is estimated at 15,000 MW, not all of which might be technically feasible and economically viable. Technically feasible potential of identified sites, which are around 5403 in number, is placed at around 15000 MW SHP in India.

Research Methodology and Findings

Present study is based on the interview conducted at Jispa, Gamour, Darcha, Sumdo and some other places nearby. Total number of respondents were 102 include 67 persons from going to be affected families. Present finding are based on the views collected by personal visits to responses. Only primary data is used for this study. There were total 20 questions based on the economic status of the people near about the upcoming Jispa Dam site. There were questions based on the emotional, historical, economical, architectural, environmental and political issues.

Findings

According to the data collected from this area out of 102 people only 37 were in government job rest were engaged in other activities like agriculture, taxi driving or any other private job. All 102 people said that they are doing agricultural business other than their regular or private job. It is clear that the area where dam is going to be constructed is suitable for agriculture. Most of the people of this area said that their annual income is in between Rs. 50001 to Rs. 150000. If we will take the average income of this area is around Rs. 90000 per person than it is already more than our per capital income on national and state level. So as according to government and dam authority what they are saying that there is a need of economical development in these areas is not appropriately suitable. Most of the people are associated with the business of tourism or their close relatives are associated. As Jispa providing the suitable space for night halt on the way to Leh, so most of the local people are associated with this and this place should be protected.

According to the locals there are many historical and religious places there around the dam site. These are Gamaur monastery, Jispa Monestry, Lok Jyoti Bodh Vihar etc. So if there will be dam that all these sits will be merged under water. On the issue of Sensitivity of the area respondents said that this area lies in clod desert zone, which is the home to Snow Leopard, Snow Fox, Snow Crow, Ibex etc. Dam will have really bad effects on the life of these creatures. On the issue of that had these listen any Power project related to National Importance all respondents replied that they hadn't listened about it? It means that most of the people of this area do not know about all these things. They know about it by the Panchyat Meetings and through News Paper. Most of the people were agree that on the bases on National Importance project they are going to be exploited. They said that no one either from government side or from Dam construction company side told them (local) about the reservoir of 1220 ha. All respondents were agreed that government can do anything with them.

Most of the respondents said that they are in huge dilemma with the issue of this dam. They said that they are not constructing their housed and planting new tree like apple and apricots. They are not thinking any kind of business expansion. They said that we are filling very scary if there will be more people than our population to work on dam site. There is a question on the issue of crime with the arrival of outside labour or worker. On the issue of employment with the construction of dam all respondents said that it is an illusion only. They are already working on their paddies of doing job. They don't want any kind of this type of things. All people were agree on this issue that these type of big hydro project will be discarded form this highly sensitive Himalayan region and there will be a policy of eco friendly power generation.

Conclusion

Electric Power is the biggest necessity in today's industrialised world. Himalayan region and its perennial rivers are the best source of hydro power generation. This region has the great potential to supply this essential industrial lifeblood for loge time. Today due to the construction of bid hydro power projects are the cause of worry. Large numbers of people are displacing and there are huge environmental losses and hazards with the construction of big Dams. So instead of these giants if authority will focus of Small Hydro Projects and other alternates like Tidal Energy, wave energy, solar energy, wind energy, geo thermal energy etc., it will be beneficial for all society and nature.

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