Chapter 17

Infrastructure

Mountains present a challenge to mankind. Though seen as obstacles to trade, they have been home to remarkable trade activities like the Silk Route in Central Asia, routes built by the Roman Empire across the Alps, and the Incas in the Andes. Hill regions need linkages with surrounding lands because while they remain extremely important for hill residents, open areas for cross-region co-operation, to the mutual benefit of both societies.

Widespread and deep-rooted poverty has been the single biggest challenge for sustainable development of mountain areas in the Himalayas, and India has recorded notable successes in this endeavour. While the hitherto-targeted improvements in agricultural productivity and employment are critical, the rapidly growing labour force in mountain areas cannot be gainfully absorbed by agriculture alone, and substantial efforts are needed to diversify the mountain economy and enhance the living standards of the mountain population.

In order for mountain economies and environments to develop in a sustainable manner, development decisions concerned with their diversification must be based on sound assessment of past experiences, existing constraints, and available opportunities.

The critical issue here is – accessibility. This is both in terms of the local citizens, and for societies outside the region. For residents, infrastructure brings in products and services like energy and raw materials, necessary for survival and economic sustainability. It also brings in the tourist, with possibilities of dramatic rise in societal incomes. For people outside the region, it opens up new markets.

The fundamental role of infrastructure in a hill state like Himachal Pradesh is two fold:

I. To open up the state and improve accessibility, both for the residents and the outside world, including tourists, and

II. To ensure that the demands of energy and communication are put in place concurrently, to cater to sustained economic development, without environmental degradation.

Thomas Kohler *et al.*, have stressed that *"access, communication and energy are key issues in sustainable development of mountain areas. Experience has shown that they are very powerful agents of change, not only, but especially in mountains. Access, communication and energy in mountain regions also involve vital linkages between these regions and adjacent lowlands, centres of population, and industrialised and urbanised areas."*

There is a cruel twist to infrastructure provision in difficult terrains like Himachal Pradesh. While it is more vitally required, it demands higher capital infusion. In a plain area, if there is absence of a road to the district centre, there is possibility of walking to it. In a hill terrain, it would take a day to walk to the next hilltop, where the next district centre may be, and the walk would be through inhospitable terrain.

To overcome these natural obstacles, infrastructure provision ends up demanding a higher cost. The development of modern transport infrastructure, especially of roads and railways is a costly enterprise in general. Costs in mountains are even higher than in lowlands, for both construction and maintenance, due to difficult topography, harsh climate, and the need for protection from hazards, such as avalanches, landslides, and rockfalls, as well as the need to secure road- and railside slopes.

The important sectors of infrastructure in which we propose to concentrate in this chapter are:

1. Energy
2. Transport

In this regard, it is important to distinguish between the infrastructure, which is strictly local in potential, and that which has local and regional/ national implications.

Local Infrastructure

This includes transport and communication sectors which, when laid down, present sunk and fixed costs that permit strictly local exploitation. While a road does connect place A to place B, its immediate use, by its very nature, is restricted. Some cross relationship is always established – for example – if Punjab has no road, it is difficult for road vehicles to enter Himachal Pradesh, but roads in Punjab cannot substitute for roads in Himachal Pradesh. Thus, such fixed infrastructure has a largely local context.

Regional/National Infrastructure

Energy falls in this segment. While local distribution networks serve local needs, but this infrastructure can be "wheeled" out of the state, and be used elsewhere too. Thus, the development of this infrastructure sector in Himachal Pradesh has regional/ national possibilities. While it can bring in energy for deficient regions, it can also bring in income for Himachal Pradesh through sale.

The Electricity Act, 2003 now enacted and duly notified since June 11, 2003, is a promising framework for Himachal Pradesh to exploit its "mobile" infrastructure of electrical power.

The Tenth Plan document clearly notes the crux of infrastructure as "Good infrastructure raises productivity and lowers production costs". Infrastructure is the mother base for all activities. It is from the band of services within this domain that all other developmental activities draw their sustenance. Inadequately envisioned, or poorly delivered, it can stunt growth for decades. (SDR for Punjab, CRRID, 2002).

The Eleventh Finance Commission Report 2000 mentions an infrastructure index, based on social and economic factors. This rates Goa and Punjab as the highest, with an index of 200.57 and 187.578 respectively. Himachal Pradesh is ranked 13th in India, with an index of 95.03, lowest being Arunachal Pradesh with 69.71. What is worrisome is that Himachal Pradesh is only marginally better than Mizoram (82.13), Bihar (81.33), and Orissa (81.00). The Tenth Plan has noted that the index represents infrastructure facilities, and states with better facilities will attract private sector investment decisions and capital flows.

ENERGY

Current Scenario

One of the most vital inputs, energy is the prime mover, literally fuelling the engine of progress and development. It is now clearly recognised that the level of availability of affordable and reliable power supply can be an important determinant of the overall quality of life.

In India, from an installed capacity of only 1300 MW at the time of independence, power generation has now risen to 100000 MW, with consequent increase in transmission and distribution (T&D) systems. Despite this seemingly impressive increase, overall power generation and availability has not grown at the required pace, and the states have been facing constant shortage. The pace of growth has failed to reach target levels in the Ninth Plan, with a capacity addition of only 19015 MW, against a target of 40,245 MW. For the Tenth Plan, the *Working Report on Power* has laid down a target of addition of 46,939 MW, but the Planning Commission has fixed the following targets:

Ongoing Projects	18659 MW
Central Electricity Authority Cleared Projects	9193 MW
New schemes	13258 MW
Total	**41110 MW**

In this context, Himachal Pradesh with a hydro power potential of 20000 MW, can play an important part, with only 20 per cent of the total potential harnessed so far.

Power can be tapped from both renewable and non-renewable resources. Let us examine the availability of the primary sources of energy in Himachal Pradesh.

Renewable	
Hydro-power	Yes
Biogas	Yes, limited
Solar	Yes
Wind	Negligible potential
Geo-thermal	Yes
Tidal	No
Non-renewable	
Coal	No
Oil	No
Gas	No (not economically viable)

Nuclear energy as an energy source is not considered on account of it being ruled out for strategic reasons, and the government has no plans to set up an atomic power plant in the state.

Geo-thermal energy can be an important component. For India, the potential is as under:

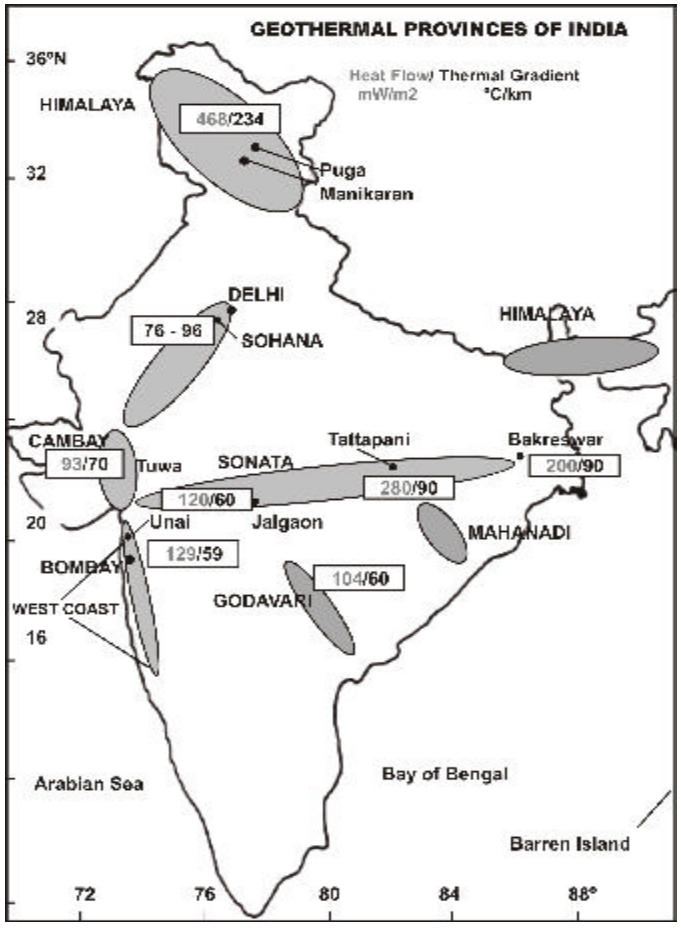
TABLE 17.1

Potential Geothermal Provinces of India

Province	*Surface T°C*	*Reservoir T°C*	*Heat Flow Thermal Gradient*	
Himalaya	>90	260	468	100
Cambay	40-90	150-175	80-93	70
West Coast	46-72	102-137	75-129	47-59
SONATA	60-95	105-217	120-290	60-90
Godavari	50-60	175-215	93-104	60

Source: D. Chandrasekharam, *Geothermal Power Asia 2000*, Indian Institute of Technology, Mumbai, India.

Note: Heat Flow: mW/m²; Thermal Gradient: °C/km.



Source: D. Chandrasekharam, *Geothermal Power Asia 2000*, Indian Institute of Technology, Mumbai, India

Himachal Pradesh has the highest heat flow and highest thermal gradient geothermal basin in India. The first pilot binary 5 kW power plant was successfully operated by the Geological Survey of India at Manikaran, which proved the power producing capability of this province. Scientific data from 500 metre drill-holes estimated reservoir temperatures as high as 260° C. Space heating experiments were also successfully conducted using thermal discharge by the Geological Survey of India.

The non-conventional sources of geo-thermal and solar power have potential for rural and hamlet electrification schemes. However, considering the potential and resource base, HP should concentrate on large hydro power projects, mini-and micro-hydel schemes in conventional power.

The major potential in HP remains in the hydro electric sector, and in our analysis, we concentrate on this mode of generation.

For India, the power generation scenario is shown in Table 17.2:

TABLE 17.2

Power Generation

	Change over previous year April-November					
	Billion Kwh				*% growth*	
	1997-98	*1998-99**	*1998*	*1999*	*1998-99*	*1999-2000@*
Power generation	420.6	448.4	291.6	313.8	6.5	7.5
Hydro-electric	74.5	82.7	58.3	57.2	8.8	1.9
Thermal	336.1	353.7	225.8	248.2	4.6	9.9
Nuclear	10.0	12.0	7.5	8.4	14.1	12.8
Plant load factor of thermal plants (%)	64.7	64.6	62.0	62.1	—	—

Source: *http://www.ficci.com/ficci/econo-upda/power.htm*

Note: *: Provisional @: April-November

It is seen that the major growth in power is being accounted for by the thermal sector on a national level, with 9.9 per cent growth in 1999-2000, over a generation base of 336 billion units in 1997-98.

Himachal Pradesh Becomes Nationally Important in This Context

It is imperative that India must have a cheaper source of electrical power so that the users can cut their "fuel" costs, and Indian products remain globally competitive. It is extremely important for Himachal Pradesh to move

ahead and exploit its hydro potential to the full, because this is internationally recognised as the cheapest source.

TABLE 17.3

Decreasing Cost of Power with Hydro Share Rising

Country	*% Hydro Share*	*Selling Price (cents/Kwh)*
India	**24**	**7**
Sweden	48	2
Canada	62	2
Norway	99	1

Source: Himachal Pradesh State Electricity Board (HPSEB).

The detailed power planning studies carried by Central Electricity Authority (CEA) have suggested that the share of hydro-power in the overall installed generated capacity in the country should be at least about 40 per cent to ensure optimum utilisation of natural and financial resources for electric power generation. In spite of large hydro resources being available in India, its share in the total installed capacity has been declining in successive plans. Hydro-power which was 50 per cent of the total installed capacity in 1962-63, has now declined to 25 per cent. Such a dismal share of hydro – thermal mix is adversely affecting optimal utilisation of natural and financial resources. Thus, accelerated hydro-power generation is an unavoidable proposition when about 75 per cent of the hydro potential of 84,000 MW still remains to be harnessed (*Planning Power Development in India – Emphasis on Hydro Projects*, R.N. Srivastava, *et al.*).

Hydro Power Status in Himachal Pradesh

Only 20 per cent of the total available potential of the hydro power in the state has been harnessed up to now, with another 7060 MW projects under various stages of execution. By 2012, only 55 per cent of the potential would be utilised, if all plans go as per target.

TABLE 17.4

Hydro Power in Himachal Pradesh: The Current Status

Total Identified Potential	**20376 MW**
Harnessed so far	3942 MW
Under execution	7060 MW
For which Draft Project Report ready	815 MW
For which Investigations are in progress	2008 MW
For which Investigations yet to be taken up	6551 MW

Source: *www.hpseb.com*

Harnessed

Name of Project	*River/Khad*	*Estimated Installed Capacity (MW)*
Yamuna Basin		
Andhra	Andhra	16.95
Giri	Giri	60.00
Yamuna Projects	Share from HP Catchment	131.57
Gumma SHP	Gumma Khad	3.00
Satluj Basin		
Rongtong	Rongtong	2.00
Rukti	Rukti	1.50
SVP Bhaba	Bhaba	120.00
Nogli Stage – I	Nogli	2.50
Chaba	Nauti	1.75
Bhakra Dam	Satluj	1200.00
Ghanvi	Ghanvi Khad	22.0
Beas Basin		
Beas Satluj Link	Beas	990.00
Uhl Stage – I	Uhl	110.00
Uhl Stage – II	Uhl	60.00
Binwa	Binwa	6.00
Baner	Baner	12.00
Gaj	Gaj	10.50
Pong Dam	Beas	360.00
Malana	Beas	86.00
Ravi Basin		
Gharola	Gharola	0.05
Bhuri Singh P/House		0.45
Baira Suil	Baira & Suil	198.00
Chamera Stage – I	Ravi	540.00
Sal-II	Ravi	2.00
Chenab Basin		
Sissu	Sissu	0.10
Billing	Billing	0.20
Shansha	Shansha	0.20
Thirot	Thirot	4.50
Killar	Mahal	0.30
Total		**3942.07**

Under Execution

Name of Project	*Estimated Installed Capacity (MW)*
Yamuna Basin	
Sainj	5.50
Dhamwari Sunda	70.00
Renuka Dam	40.00
Satluj Basin	
Bhaba Aug. P/House	3.00
Nathpa Jhakri	1500.00
Baspa Stage – II	300.00
Karchham Wangtoo	1000.00
Kol Dam	800.00
Keshang Stage – I	66.00
Beas Basin	
Larji	126.00
Khauli	12.00
Parbati Stage – II	2051.00
Neogal	15.00
Allian Dhugan	192.00
Patkari	16.00
Fozal	6.00

Contd. ...

Contd. ...

Name of Project	*Estimated Installed Capacity (MW)*
Uhl Stage – III	100.00
Ravi Basin	
Holi	3.00
Chamera Stage – II	300.00
Chamera Stage – II	231.00
Budhil	70.00
Bharmour	45.00
Harsar	60.00
Kugti	45.00
Mini Micro (up to 3MW)	101.59
Total	**7059.14**

Draft Project Report Ready

Name of Project	*River/Khad*	*Estimated Installed Capacity (MW)*
Yamuna Basin		
Shalvi	Pabbar River	7.00
Swara Kuddu	Pabbar River	144.00
Satluj Basin		
Keshang	Keshang Khad	160.00
Ravi Basin		
Kutehar	Ravi	260.00
Hibra	Ravi	231.00
Siul	Siul Nallah	13.00
Total		815 MW

Investigation Under Progress

Name of Project	*River/Khad*	*Estimated Installed Capacity (MW)*
Yamuna Basin		
Tangnu Romani	Pabbar River	44.00
Chirgaon Majhgaon	Pabbar River	46.00
Paudital Lassa	Pabbar River	36.00
Satluj Basin		
Thopan Powari	Satluj River	400.00
Shongtong Karcham	Satluj River	225.00
Jangi Thopan	Satluj River	300.00
Sorang	Sorang Khad	100.00
Tidong	Tidong Khad	100.00
Baspa-I	Satluj River	210.00
Beas Basin		
Sainj	Sainj Nallah	100.00
Tirthan	Tirthan Nallah	25.00
Dhaulasidh	Beas River	80.00
Ravi Basin		
Bajoli Holi	Ravi River	200.00
Saikhoti	Baira Nallah	17.00
Chamba	Ravi River	125.00
Total		**2008 MW**

Current Availability in Himachal Pradesh

There are three ways in which HPSEB makes power available in the state:

i. Own generation

ii. Free power from central, joint, and private sector plants

iii. Purchase from other generators

HIMACHAL PRADESH STATE ELECTRICITY BOARD (HPSEB)

Installed Capacity

The current installed capacity of HPSEB from various schemes is 326 MW from its 20 stations of capacities ranging from 120 MW (SVP Bhabha) to 0.05 MW (Gharola). At 60 per cent load factor, this should be able to produce about 1700 million units per year. However, the target for generation from these stations was fixed at 1458 million units, but this has 'not been achieved since 1998-99 (representing a load factor of 50 per cent only).

TABLE 17.5

Generation by HPSEB in Million Units

Year	*HPSEB Total (in Million kwh)*	*Decline*
1998-99	1480.82	
1999-00	1198.26	282.57
2000-01	1150.20	330.57
2001-02	1146.12	334.70

Source: Himachal Pradesh State Electricity Board.

The Board has given the reasons for this shortfall as unfavourable monsoons/snowfalls, and a continuingly declining water flow.

Ongoing Projects

HPSEB proposes to add another 284 MW from projects presently under implementation. The status is shown in Table 17.6:

TABLE 17.6

HPSEB's Proposed Ongoing Projects and Capacity (in MW)

Name of the Project	*Capacity (in MW)*	*Name of the Basin*	*Likely Date of Commissioning*
Bhaba Aug. P/H	3	Satluj	2001-2
Larji	126	Beas	2003-4
Holi	3	Ravi	2001-2
Khauli	12	Beas	2002-3
UHL – III	100	Beas	2005-6
Renuka	40	Yamuna	2007-8
Total	**284**		

Source: Himachal Pradesh State Electricity Board.

By 2008, another 284 MW capacity will be added to the existing 326 MW through these schemes.

Proposed HPSEB Projects

HPSEB has also proposed to put up further projects as shown in Table 17.7:

TABLE 17.7

HPSEB's Proposed Projects and Capacity in MW

No.	*Name of Project*	*Installed Capacity*	*Proposed Developer*	*Expected Year of Completion*
1.	Kashang	160 MW	HPSEB	Phase - I 2005-06 Phase - II 2006-07
2.	Siul	13 MW	HPSEB/MNES	2004-05
3.	Sorang	100 MW	HPSEB	2009-10
4.	Tidong	100 MW	HPSEB	2010-11
5.	Kerang	16/15 MW	HP+SEB/MNES	2004-5
6.	Ganvi - II	8 MW	HPSEB/MNES	2004-05
7.	Barahl	9 MW	HPSEB/MNES	2004-05
8.	Thirthan	25 MW	HPSEB	2005-06
9.	Shalvi	7 MW	HPSEB/MNES	2004-05
	Total	**438 MW**		

Source: Himachal State Electricity Board.

By 2011-2012, HPSEB proposes to add another 438 MW to the 326 MW already installed, and 284 MW under implementation, and have a total installed capacity of 1048 MW. Though current efficiency levels are stagnating at around 40 per cent, if we assume the targeted levels of 50 per cent load factor, this will give about 4300 million units of HPSEB generated power by 2012.

Central Sector

Name of Project	*Capacity (MW)*	*Status*	*Proposed Developer*	*Expected Year of Completion*
Kuther	260	DPR Ready	Central Sector	2007-08
Hibra	231	DPR Ready	Central Sector	2006-07
Rampur	400-600	DPR Ready	NJPC	2006-07
Thopan Powari	400	DPR Ready	Central Sector	2011-12
Bajouli – Holi	200	DPR Ready	Central Sector	2011-12
Chamba	125	Inv. in progress	Central Sector	2008-09
Karcham Shongtong	225	Inv. in progress	Central Sector	2011-12
Gypsa Dam	240	Inv. in progress	Central Sector	2010-11
Total	**2081**			

IPP Sector

Name of Project	*Installed Capacity (MW)*	*Expected Year of Completion*
Sawara-Kuddu	144	2008-09
Saini	100	2006-07
Malana – II	100	2006-07
Dhaula-Sidh	80	2006-07
Chirgaon-Majhgaon	46	2005-06
Paudital-Lassa	36	2005-06
Tangnu-Romai	44	2005-06
Saikothi	17	2005-06
Lambadug	15	2004-05
Baragaon	10.5	2004-05
Total	**592.5**	

Considering the totality of projects under execution, and those for which DPR is ready or investigations are in an advanced stage, the total planned capacity addition in MW is as under:

	Short Term (2001-07)	*Medium Term (2007-12)*	*Total By End of 2001-12*
Under State Sector	522	200	722
Under Central/Joint Sector	3260	3472	6732
Under Private Sector	1245	1336	2581
Total	**5027**	**5008**	**10035**

There have been some good developments in 2003, auguring well for the overall scenario:

- Malana H.E.P 86 MW was commissioned by IPP in a record time.
- Out of the lists drawn, recently Himachal Pradesh Government has allocated Rampur HEP (400-600 MW) to NJPC and Hibra HEP (231 MW) to NHPC.
- Policy of incentives/disincentives shall now be applicable on Central Agencies also, to ensure efficiency irrespective of ownership pattern.
- It is very welcome that HP is also proposing to take some projects as Joint Venture with neighbouring States.
- Gujarat Government has also shown keen interest in Hydro-Power Development in the Pradesh.
- GoI has been requested to permit increasing the capacity from 100 MW to 300 MW for allotment through MoU route, leading to further speed in decision making.

A major development is the likely scenario of "unbundling" being contemplated by HPSEB, which has proposed projects for execution through HPSEB, but

with provision of following goods and services from Private Agencies as consortium/JV partner:

- Overall project management
- Engineering
- Supply of equipment
- Construction Management
- Project financing

Free Power as Royalty

Himachal Pradesh gets free power as royalty from central, joint, and private sector projects set up in the state. This is a part of the original agreement, which lays down that:

The project developer will be required to provide free energy from the project to the Government of Himachal Pradesh in lieu of right of use of potential site. The free power will be levied at 12 per cent of the deliverable energy of the project for the period starting from the date of synchronisations of the first generating unit and extending up to 12 years from the date of commercial operation of the project. For the balance agreement period of 28 years, the royalty in shape of free power will be charged at 18 per cent of the deliverable energy.

Himachal Pradesh Industrial Development Board has estimated the flow of free power to Himachal Pradesh as shown in Table 17.8:

TABLE 17.8

Tentative Year-wise Detail of the Estimated Free Power Available to the Government of Himachal Pradesh from Various Hydro-Electric Projects

No.	*Description*	*2001-02*	*2002-03*	*2003-04*	*2004-05*	*2005-06*	*2006-07*	*2007-08*	*2008-09*	*2009-10*	*2010-11*	*2011-12*
1.	Private Sector projects											
	(i) Projects executed/under development	40	15	120	32	2	30	34	6	334	408	0
	(ii) Projects for which bids are under evaluation	0	0	0	0	0	0	0	3	60	439	346
	Sub Total (MU)	**40**	**15**	**120**	**32**	**2**	**30**	**34**	**9**	**394**	**847**	**346**
2.	Central PSU Projects											
	(i) Projects executed/under development	290	0	0	35	117	0	90	421	545	84	252
	(ii) Projects for which bids are under evaluation	0	0	0	0	0	0	0	110	286	0	135
	Sub Total (MU)	**290**	**0**	**0**	**35**	**117**	**0**	**90**	**531**	**831**	**84**	**387**
3.	Joint Sector Projects											
	(i) Projects executed/under development	70	0	200	604	0	0	0	0	0	0	0
	Total: 1+2+3 (MU)	**400**	**15**	**320**	**671**	**119**	**30**	**124**	**540**	**1225**	**931**	**733**
4.	Year-wise free power (MU)	400	415	735	1406	1525	1555	1679	2219	3444	4375	5108
5.	T&D losses (%)	19.346	17.636	15.355	13.662	13.099	12.539	12.539	12.539	12.539	12.539	12.539
6.	Units of T&D losses (MU)	77.38	73.19	112.86	192.09	199.76	194.98	210.53	278.24	431.84	548.58	640.49
7.	Energy available for sale (MU)	322.62	341.81	622.14	1213.91	1325.24	1360.02	1468.47	1940.76	3012.00	3826.42	4467.51
8.	Average Sale Rate in paise per unit	229.909	249.433	267.79	287.024	307.598	328.742	345.179	362.438	380.56	399.583	419.587
9.	Expected Revenue at current prices (Rs. in crore)	74.12	85.26	116.6	348.42	407.64	447.1	506.89	703.41	1146.32	1528.97	1874.51

No.	*Description*	*2012-13*	*2013-14*	*2014-15*	*2015-16*	*2016-17*	*2017-18*	*2018-19*	*2019-20*	*2020-21*	*2021-22*
1.	Private Sector Projects										
	(i) Projects executed/under development	0	19	0	0	0	0	14	0	26	320
	(ii) Projects for which bids are under evaluation	346	346	346	346	346	346	346	346	346	447
	Sub Total (MU)	**346**	**365**	**346**	**346**	**346**	**346**	**360**	**346**	**372**	**767**
2.	Central PSU Projects										
	(i) Projects executed/under development	0	0	0	0	0	0	0	0	0	0
	(ii) Projects for which bids are under evaluation	0	0	0	0	0	0	0	0	0	0
	Sub Total (MU)	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
3.	Joint Sector Projects										
	(i) Projects executed/under development	0	0	0	0	0	0	0	0	0	0
	Total: 1+2+3 (MU)	**346**	**365**	**346**	**346**	**346**	**346**	**360**	**346**	**372**	**767**
4.	Year-wise free power (MU)	5454	5819	6165	6511	6857	7203	7563	7909	8281	9048
5.	T&D losses (%)	12.539	12.539	12.539	12.539	12.539	12.539	12.539	12.539	12.539	12.539
6.	Units of T&D losses (MU)	683.88	729.64	773.03	816.41	859.8	903.18	948.32	991.71	1038.35	1134.53
7.	Energy available for sale (MU)	4770.12	5089.36	5391.97	5694.59	5997.2	6299.82	6614.68	6917.29	7242.65	7913.47
8.	Average Sale Rate in paise per unit	440.545	462.572	485.700	509.985	585.484	562.258	590.371	619.89	650.884	683.43
9.	Expected Revenue at current prices (Rs. in crore)	2101.45	2354.19	2618.88	2904.15	3511.27	3542.12	3905.11	4287.96	4714.12	5408.30

Thus, in 2001-2002, Himachal Pradesh expects to receive 322 million units of free power, going up to 4467 units by 2011-2012, and finally up to 7913 million units by 2021-22. T&D losses have been kept at an ambitious level of about 12 per cent, as against about 20 per cent now.

The total availability of power in HP in 2001-02 is as under:

Own current generation	1146 million units
Free power	322 million units
Total	1468 million units

The total availability of power in Himachal Pradesh (load factor realistically at 50 per cent) in 2011-12 is likely to be as under:

Own generation	4300 million units (1000 MW)
Free power	4467 million units (1050 MW)
Total	8767 million units (2050 MW)

Demand Scenario

Himachal Pradesh achieved 100 per cent electrification of villages by 1988, and is now almost through with connecting all hamlets too. Even so, it has a low per capita consumption of electricity amongst the northern states, excluding J&K.

TABLE 17.9

Annual Per Capita Consumption of Electricity by States 1999-2000

(KWH)

State	*1980-81*	*1989-90*	*1997-97*	*1999-00*
Haryana	209.5	367.4	508.3	530.8
J&K	74.8	176.4	223.7	267.9
Punjab	303.6	620.5	789.9	921.1
Chandigarh	309.0	686.2	794.4	823.8
Delhi	403.8	673.6	589.7	653.2
Himachal Pradesh	**66.4**	**191.9**	**278.5**	**339.1**

Source: Statistical Abstract quoted in *Tenth Plan* papers, Planning Commission, New Delhi

Sector-wise break-up of consumers is as under:

(MUs)

Consumer Category	*Share (in per cent)*
Agriculture	1
Domestic	28
Commercial	8
Government irrigation and water schemes	9
Small industrial power	2
Medium industrial power	3
Large industrial power	44
Street lighting	–
Bulk	6
Total	**100**

If we look at other parameters, we find that against a growth rate of 5.6 per cent and 6.5 per cent during the Eight and Ninth Plan periods, Himachal Pradesh recorded a growth rate of 6.7 per cent during 1993-94 to 1998-99 (Central Statistical Organisation).

If we examine the percentage share change in net SDP from 1987-88 to 1999-2000, we find that while the primary sector has decreased by 24.96, the secondary and tertiary sectors have considerably increased by 48.23 and 11.81 respectively.

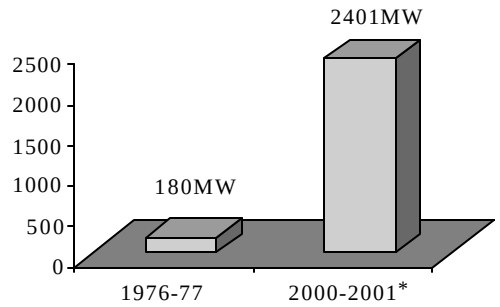
The percentage change in employment share too has declined for the primary sector by 20.03, increased for the secondary sector by 4.29 in the secondary, and by 76.71 for the tertiary sector.

Percentage of population below the poverty line has declined from 28.44 in 1993-94, to 7.63 in 1999-2000.

The CAGR of urban population at three per cent is twice that of the rural population at 1.5 per cent, and the urban population already accounts for about 10 per cent at present.

These trends give a clear indication that the per capita consumption of electricity will rise in HP in the future. This will also be assisted by the state's programme for encouraging horticulture, agro-processing, and tourism. The secondary and tertiary sector developments in these thrust areas will be power hungry, whether it is the refrigeration needs of partly-processed fruits, or lighting and heating needs of tourist hubs.

According to HPSEB, the status of connected load is as shown in the diagram below:



Note: * Up to March 2001

According to HPSEB, the demand is in the region of 3500 million units. In MW, HPSEB estimates the requirement at 600 MW, and growing to about 900 MW by 2015. In the light of a rise in per capita consumption taking place, and the factors brought out

above, this appears to be an underestimate. In fact, the connected load has already exceeded 2500 MW now, and it is reasonable to presume that about one-third of the connected load can be seen as demand.

The power requirement, if the development of Himachal Pradesh is not to be fettered, should be realistically seen to be in the region of about 800 MW today, and rising to about 1500 MW by 2012. This is based on an achieved annual SDP growth rate of 6.7 per cent, large shifts from primary to secondary and tertiary sector, and growing urbanisation.

Demand Forecast: 16th Electric Power Survey (EPS) Report

The demand forecast as per 16th EPS report is as under:

Total Consumption (MUs)	*T&D Losses (MUs)*	*Total Requirement (MUs)*	*Peak Load (MW)*
2325	787	3113	610
2542	856	3399	662
2737	918	3656	708
2920	973	3894	750
3118	1034	4153	795

A comparison of this study's forecast appears to be in consonance with the expected forecast of the 16th EPS report, which estimates current demand to be about 800 MW.

Is Himachal Pradesh Power Surplus?

In today's scenario, Himachal Pradesh is buying power from outside for its need of about 3500 million units. It is not power surplus today.

If all its schemes under implementation and under consideration come on steam by 2011-2012, then it will be self-sufficient in power by that time. This will be a world class state, with clean and reliable power ensured for advanced agro processing and tourism industries.

From 2012 onwards, Himachal Pradesh will start to have a sizeable trade in power through the national grid, when the last tranche of projects are undertaken to move towards a full tapping of the hydro resource.

This study would like to recommend a word of caution on the optimism being expressed at using power as a commodity for sale since it is felt that it needs to be used in the service of HP's own development first. The forecast of sale right now, if implemented, would be at the cost of the state's own development. While farmers, processors, and tourists would be clamouring for power (and dependent services – water, cable cars, ropeways, etc), it might be wheeled out of the state. Himachal Pradesh's power will facilitate as an infrastructure in some other regions, while its own citizens' growth will suffer.

Himachal Pradesh power policy should clearly lay down a single cut/shortage scenario as a serious event. A tourist may never come back, and prevent ten others from coming in, if he had to leave his hotel without a hot bath. A 15-minute power outage may cause irreparable loss to the state, because it seeks to enter in the future the difficult area of hospitality, where reputations are lost quickly.

Financial Status of HPSEB

As a commercial organisation, HPSEB is in the doldrums (Table 17.10).

TABLE 17.10

Profit and Loss Account, HPSEB

(Rs. in crore)

Sr. No.	*Year*	*Total Receipt*	*Total Expenditure*	*Total Profit (+) or Loss (-)*	*Rate of Return*
1.	1997-1998	448.54	419.09	+29.45	5.31%
2.	1998-1999	499.48	505.75	-6.27	0.98%
3.	1999-2000	587.58	693.80	-106.22	0.37%
4.	2000-2001	660.84	697.72	-36.88	5.10%
5.	2001-2002	670.48	777.04	-106.56	11.29%

Source: *Annual Account of HP State Electricity Board, 1997-2002.*

TABLE 17.11

Revenue, Expenditure, Profit and Loss per kWh

(in Rs.)

Sr. No.	*Year (Units sold excluding wheeling in bracket)*	*Revenue per kWh*	*Expenditure per kWh*	*Profit/Loss per kWh*
1.	1997-1998 (2668 MU)	1.68	1.57	0.09
2.	1998-1999 (2797 MU)	1.79	1.81	-0.02
3.	1999-2000 (2864 MU)	2.05	2.42	-0.37
4.	2000-2001 (2821 MU)	2.34	2.47	-0.13
5.	2001-2002 (2881 MU)	2.33	2.70	-0.37

Source: *Annual Account of HP State Electricity Board, 1997-2002.*

Thus, since 1998-99, HPSEB has entered a financial downturn. It is now even entering the beginnings of a debt trap, where its interest payments have doubled in five years to Rs 80 crore, and it is breaking open reserves to pay back loans.

TABLE 17.12

Statement of Fund Flow

(Rs. in crore)

Year	Source					Application					
	Internal Resource of Loans	*Reserves & Others*	*Govt. Loans*	*Loans from Financial Institutions*	*Total*	*Expenditure on Works*	*Other Investment*	*Repayment of Loans*	*Payment of Interest (Net)*	*Net change in Working Capital*	*Total*
1997-1998	90.80	55.70	60.70	163.30	370.50	170.90	60.20	38.30	41.90	58.20	370.50
1998-1999	58.30	79.50	88.90	118.10	344.80	212.50	359.10	41.80	43.00	-311.60	344.80
1999-2000	-31.70	75.10	4.20	404.30	451.90	230.00	-329.8	527.50	51.10	-26.90	451.90
2000-2001	50.20	109.50	2.50	244.70	406.90	314.80	52.50	31.30	63.40	-55.10	406.90
2001-2002	3.69	68.30	-	539.16	611.15	297.00	43.80	325.55	78.40	-133.60	611.15

Source: *Annual Account of HP State Electricity Board, 1997-2002.*

Experience of State Governments in Power Reforms, and Lessons

Faced with a deteoriating condition of the SEBs in India, a Common Minimum National Action Plan was drawn up in 1996, with input from Chief Ministers of the states, that called for:

(i) setting up of Central and State Regulatory Commissions;

(ii) Rationalisation of Retail Tariffs,

(iii) unbundling of the SEBs into more manageable entities with defined functions;

(iv) private sector participation in distribution.

We will examine the case of the pioneer – Andhra Pradesh – and events in two neighbouring states of Haryana and Punjab.

Key stakeholders:

- Government – officials and political parties, both in treasury and opposition benches
- Andhra Pradesh State Electricity Board (APSEB) – over 74,000 employees
- Farmers — the largest user group but dispersed in rural areas
- Households — also important consumers and concentrated in urban areas
- Industry – significantly affected by energy cuts; largest firms may pursue alternative sources

The following steps were taken to address the stakeholders:

Attempt at Information Dissemination

Andhra Pradesh government appointed a high-level committee in 1996 that included two former chairmen of the APSEB. This report was generally considered impartial and professional. Also in 1996, the APSEB began circulating bulletins in English and the local language, Telugu, about the urgent problems in the power sector and the need to address them quickly. The bulletins highlighted the growing gap between supply and demand, the increasing price of generating power and the rising deficits. Later bulletins discussed metering and billing, explaining commercial losses and theft of energy. An inexpensive, pocket-size explanation of the key issues in the power sector and the case for reform was circulated all over the state, reflecting a government commitment to disseminate information on a massive state-wide scale.

Given low literacy rates, particularly in rural areas, additional steps were taken to use audio-visual medium. Several films were produced and aired on the cable network throughout the state. One of the movies used the theme of match-making discussions of an APSEB engineer who, while informing the prospective in-laws about his job, is asked questions about the power sector situation and reforms. In the films, a variety of participants from diverse social and professional backgrounds participated in the discussion and explored the merits of reform.

The government issued two White Papers on the state's finances and the financial condition of the APSEB. These were debated in the state legislative assembly. A discussion of the power sector figured prominently in three successive episodes of the "Dial your C.M.", a weekly televised programme launched by the Chief Minister's office.

Building Support Among Electricity Board Employees

Rank-and-file as well as mid-level engineers and professionals had strong concerns about the impact of

reforms on job security and conditions of employment even though, in this case, overstaffing at the aggregate level was not an issue. The government offered assurances to workers and entered into negotiations over revised terms and conditions. A sub-committee for staff matters, which included union representatives, was formed. In late 1997, all but one of the unions representing APSEB employees signed new agreements defining terms and conditions of service, protection of jobs and retrenchment due to restructuring. Compensation levels are negotiated through a separate mechanism with the labour unions. One important union, however, still continued to oppose the reforms and went on strike in April 1998.

Reaching Out to Potential Opponents

The government convened a meeting of all political parties and laid out its proposal to restructure APSEB as the first step in reforming the power sector. The opposition boycotted the meeting and the smaller parties present rejected the government plan. In the months that followed, opposition parties launched their own outreach efforts, contradicting government pro-reform arguments and undermining public support. Failure to secure their support or dent their opposition did create significant problems during implementation.

Soliciting Input on Draft Government Proposals

The commission set up had recommended that the government:

(i) divide APSEB into three separate entities along functional lines (power generation, distribution, and transmission);

(ii) revise the regulatory framework, including rules for tariff-setting and policies for overall sector development;

(iii) take steps to facilitate private sector investment in power generation and distribution. The government endorsed these objectives and stressed the importance of separating the management, regulatory, and policy functions.

APSEB's role, they believed, should be limited to management but given more operational autonomy to meet its obligations. The government should limit its role to policy-making and keep an arm's length from regulatory functions.

After receiving the recommendations of the high-level commission, the AP government issued its Policy Statement in February 1997 that outlined the proposed reforms and initiated a dialogue with diverse groups of stakeholders, including industrialists, agriculturists, non-governmental organisations and journalists. A large open meeting with about 250 representatives of NGOs was held, in which senior government officials, and donor agencies participated.

In April 1998, after fourteen months of public debate on its initial Policy Statement and resolution of key APSEB concerns, the state cabinet moved forward with legislation approving the AP Electricity Reform Act of 1998. It was passed by the Legislative Assembly two weeks later and approved by the President in October 1998.

Implementing Reforms and the Proposed Tariff Hike

Budget preparations for the coming year quickly confronted the government with the need to define the subsidies and estimated tariff increases required for operations of the power sector. The decision whether to approve a tariff hike and the form it would take fell to the newly-created and little-known APERC. Their first step was to prepare a "philosophy paper" on tariff policy. Their second step was to open up the process for debate and discussion. APERC officials organised large public meetings with key stakeholders in three of the largest cities in November 1999.

The nature of the meetings, however, did not lead to a constructive exchange of views on the problems and how to resolve them. Instead, an unwieldy total of over 300 interested participants gathered in each city. Farmers, in particular, dominated the discussions, drowning out other voices and flatly opposing a tariff increase. The gap in understanding here was particularly large since the philosophy paper itself had identified unmetered agricultural consumption as a significant problem to be addressed and, in later discussions, small-scale businesses would effectively argue that they were, in fact, subsidising agricultural users.

Despite the consultation process, there was wide-spread opposition to the reforms process, and all stake-holders did not feel fully addressed.

These experiences were seen reflected in violence in the neighbouring states of Haryana and Punjab.

In Haryana, police and electricity officials were held in custody by mobs for weeks, and the state highways were closed in the Jind district, protesting against the reforms process. Similarly, in Punjab, an agitation against the reforms process has been an almost continuous activity, and successive governments of

different political parties have not been able to satisfactorily resolve the issue.

Lessons

Other than the major issues of participation and communication, some additional important issues that need addressing are:

- One fundamental fact of the reforms process is – higher tariff after implementation.

(Tariff in Rs/unit)

Type	*Pre-Reform*	*Post-Reform*
	Haryana	
Domestic	2.14	3.06
Industry LT	3.19	3.92
Industry HT	3.34	4.07
	Andhra Pradesh	
Domestic <81 units	0.80	1.45
<201 units	1.65	3.90
<401 units	2.90	5.00
>401 units	3.40	5.20

While governments and experts see the opposition as being to the reforms process, paying consumers are only protesting tariff hikes, and the erstwhile free riders are protesting any payment at all. One problem has been an across the board attempt to charge cost plus tariffs, where the consumer is being asked to pay for inefficiencies also.

- Rather, Government must assist SERCs in laying down a long term programme of tariffs, by demonstrating a resolve of bringing in efficiency, lowering cost in the long run, and transferring the advantage to the consumers. For example, unreliable power supply forces farmers to use diesel pumpsets, where the cost per unit is in the region of Rs 10/-. If we calculate the total energy cost to farmers per acre of land, and demonstrate that even with higher tariffs his total energy cost will be less, he will accept the reforms process.
- Governments must give due respect to the statutory institutions of the power sector, and treat the sector as a techno-commercial issue. SERCs must work as independent institutions, and there should be no treading on their domain. In AP, when the government talked of tariff increases before the awards were announced by the APERC, the public perceived it to be a government decision and reacted unfavourably. Government response towards SERC domain should be the same as to sub judice cases and this will build up respect for professional conduct of SERCs and related bodies.
- Government must accept SERC award as a stakeholder only. In case they wish to step in to subsidise certain sectors, provision should be made in the budgets, in accordance with Electricity Act requirements. Unless there is a very good reason to do so, appeals against SERC orders to High Courts will compromise the reforms process at the inception stage itself.
- Public consultations must not be held within a "free expectation" model, but confined to seeking solutions to structured questions. This exercise ensures that stakeholders arrive for consultations with a clearer mental framework, and targeted decisions can be arrived at.

Status of Power Reforms in HP

The following steps have been taken:

- HPERC has been set up and a single member body has commenced work since 6 January, 2001.
- HP has achieved 100 per cent metering, billing, and collection
- HP has entered into a MoU with Ministry of Power, Government of India on 31 March, 2001, laying down specific milestones to be achieved:
  - Creation of independent centres for generation, transmission, and distribution of electricity
  - Reduce surplus staff
  - Reduce CPSU outstanding to two months billing, and securitise earlier outstandings.
  - Implement energy audit at 11 kV distribution feeders and LT sides.
  - Introduce computerised billing for urban customers, and all customers with connected load of 100 kW and above.
  - File Tariff Petition before HPERC by 30 April, 2001
  - Pay subsidy from its own budget, if required.

The basic step of unbundling generation, transmission, and distribution now needs to be taken in HP. These have been declared as separate profit centres from April 1, 2003, and it needs to be taken further as three separate corporate entities.

The Ministry of Power, and Energy Watch has compiled the following comparative status of reforms of the power sector by various states in India:

Milestones	Northen Region								Western Region				
	Delhi	*Haryana*	*H.P*	*J & K*	*Punjab*	*Rajasthan*	*U.P*	*Uttranchal*	*Chattishgarh*	*Gujarat*	*Goa*	*M.P*	*Mahatashtra*
SERC Constituted	☺ 99-00	☺ 8/98	☺ 1/01		☺ 3/99	☺ 99-00	☺ 9/98	☺ 1/02	☺ 01-02	☺ 11/98	☺ 4/02	☺ 8/98	☺ 99-00
Operationalisation of SERC	☺	☺	☺		☺	☺	☺	☺		☺		☺	☺
Last Tarrif Order Issued	☺ 5/01	☺ 12/00	☺ 01/02		☺ 10/02	☺ 3/01	☺ 10/02			☺ 10/00		☺ 9/01	☺ 5/00
Signing of MoU	☺ 3/03	☺ 2/01	☺ 3/01	☺ 4/02	☺ 3/01	☺ 3/01	☺ 2/00	☺ 3/01	☺ 1/01	☺ 1/01	☺ 10/01	☺ 10/02	☺ 3/01
Signing of MoA	☺ 3/03	☺ 12/02	☺ 12/02	☺ 2/03	☺ 8/02	☺ 7/02	☺ 9/02	☺ 12/02	☺ 10/02	☺ 6/02	☺ 11/02	☺ 9/02	☺ 6/02
Signing of TPA		☺ 07/02	☺ 10/02	☺ 7/02	☺ 7/02	☺ 11/02	☺ 7/02	☺ 9/02	☺ 7/02	☺ 6/02	☺ 7/02	☺ 7/02	☺ 3/03
Reform Bill Enactment	☺ 2000	☺ 1998		☺		☺ 2000	☺ 1999	☺ 01/02				☺ 2000	
Unbundling/ Corporatisation	☺ 7/02	☺ 8/99				☺ 7/00	☺ 1/00	☺ 2001				☺ 2002	
Privatisation of Distribution	☺ 7/02												
11 KV for 100% Metering	☺	☺	93%	☺	99%	45%	☺	96%	63%	☺	☺	91%	85%
100% Consumer Metering	☺	☺	☺	40%	85%	90%	59%	87%	65%	93%	95%	63%	86%

	Southern Region				Eastern Region			
	A.P	*Karnataka*	*Kerala*	*Tamil Nadu*	*Bihar*	*Jharkhand*	*Orissa*	*West Bengal*
SERC Constituted	☺ 7/99	☺ 9/00	☺ 11/02	☺ 3/99	☺ 4/02	☺ 8/02	☺ 5/96	☺ 1/99
Operationalisation of SERC	☺	☺		☺			☺	☺
Last Tarrif Order Issued	☺ 6/00	☺ 2002		☺ 3/03			☺ 4/97	☺ 2001
Signing of MoU	☺ 3/01	☺ 2/00	☺ 8/01	☺ 1/02	☺ 9/01	☺ 4/01	☺ 6/01	☺ 5/01
Signing of MoA	☺ 5/02	☺ 5/02	☺ 10/02	☺ 7/02	☺ 12/02	☺ 11/02	☺ 3/03	☺ 7/02
Signing of TPA	☺ 7/02	☺ 6/02	☺ 8/02	☺ 6/02	☺ 11/02		☺ 9/02	☺ 7/02
Reform Bill Enactment	☺ 1999	☺ 1999					☺ 1996	
Unbundling/Corporatisation	☺ 02/99	☺ 08/99					☺ 4/96	☺
Privatisation of Distribution							☺ 98	
11 KV for 100% Metering	☺	☺	☺	☺	39%		27%	93%
100% Consumer Metering	85%	☺	☺	☺	89%		90%	94%

	North Eastern Region							
	A.P	*Assam*	*Meghalaya*	*Mizoram*	*Manipur*	*Nagaland*	*Tripura*	*Sikkim*
SERC Constituted	☺ 2/99	☺ 8/01						
Operationalisation of SERC		☺						
Last Tarrif Order Issued								
Signing of MoU	☺ 7/02	☺ 3/01	☺ 11/02	☺ 7/02		☺ 9/02		☺ 12/02
Signing of MoA	☺ 7/02	☺ 7/02	☺ 11/02	☺ 7/02		☺ 9/02		☺ 12/02
Signing of TPA		☺ 7/02	☺ 2/03			☺ 8/02		☺ 11/02
Reform Bill Enactment								
Unbundling/Corporatisation								
Privatisation of Distribution								
11 KV for 100% Metering	19%	34%	30%	79%	21%	34%	☺	24%
100% Consumer Metering	54%	86%	64%	47%	82%	73%	81%	28%

Note: ☺ shows achieved.

It can be seen that power reform process is ahead in western and southern regions, followed by the north. It is lagging most in north east, and with exception of Orissa, in the eastern region also. It is also worth noting that other than Orissa and Delhi, no state has gone in for privatisation of distribution.

Himachal Pradesh has taken some fundamental steps like constitution of SERC, metering of 11 kV lines and customers, and signing of MoU with Government of India. It has however, lagged in putting in place a legal framework for implementing the next phase of reform, which will take it into the area of unbundling generation, transmission and distribution, and finally into hiving off distribution altogether.

What is Wrong with HPSEB?

Consider: As a 100 per cent hydro supplier, Himachal Pradesh must have a cost of electricity comparable to Norway, at one cent (47 paise) per unit, but is actually selling at around five to six cents per unit, almost at thermal price. This inflated cost is also raising the cost of industrial and agro-production in Himachal Pradesh. In reality, if it is to attract industry, then it should be in a position to cover the additional cost of transport of raw material and finished products, through a hugely cheaper power tariff. And this is not happening. And the irony is, HPSEB is still making a loss on every unit sold.

- There are inefficiencies in the generation process. At 70 per cent load factor, 326 MW should produce nearly 1900 million units per year. Against a target of 1480, HPSEB manages only about 1150. This is raising the cost per unit, since in hydro power, fixed costs play an important role, with no fuel cost involved. Thus, improvement of generation efficiency is vital.
- The Planning Commission has specified an indicative norm of 7.8 employees per 1000 customers, whereas HPSEB has 17.
- T&D losses are higher than 20 per cent.

Suggestions

- Himachal Pradesh is ripe for taking power reforms to a logical final step of unbundling and privatisation of distribution.
  - It is a hydro state, with capability to provide power at reasonable rates. If it can move simultaneously on increasing generation efficiency, HP can minimise post-reform tariff hikes.
  - Only 2 per cent of its consumers are in the agriculture sector, thus minimising the stakeholder group that has traditionally caused maximum opposition to power reform.
  - Consumers in the agro-processing and tourism industries will want clean, reliable power in the future, and they are willing to pay, as it increases their own profits.
- Nowadays, it is almost fashionable to talk of privatisation. This is causing a misplaced thrust, because we actually need to talk of efficiency. There are no conclusive studies to establish an ownership pattern as being the determinant of an organisation's business success or failure. HPSEB was making profits till 1998, and was hit hard by the rise in wages by the Pay Commission. Analysis has also revealed inefficiencies both in generation and distribution, and if these are addressed, HPSEB can function well as a generator, and as Himachal Pradesh's State Transmission Utility (STU), both functions performed as separate companies.
- Though now established as separate profit centres, Generation, Transmission and Distribution should be corporatised as separate entities. With respect to the Act, the following must be taken cognizance by Himachal Pradesh immediately:
  - The SERC has now an expanded statutory role to play. The Commission needs to be staffed and provided for to equip it to discharge its obligations under the Act, otherwise either decisions will be delayed, or be sub-optimal.
  - Prepare a Consultation paper for seeking the Central Government notifications on a national Policy for permitting stand-alone systems, especially those based on renewable and non-conventional sources (Section 4 of the Act).
  - Prepare a Consultation paper for seeking the Central Government notifications on a national Policy on rural electrification, and purchase and management of local distribution by PRIs, NGOs, users' associations etc (Section 5).
  - HP should note that as per Section 7, as long as technical standards are adhered to, any company can enter generation. However, as per Section 8, Hydro Electric Projects will need CEA approvals. As per Section 8(1), this is applicable for HEP schemes having capital expenditures beyond a certain sum. HP government should immediately begin consultations so that mini/

micro hydel schemes are kept out of CEA purview, to facilitate quicker decision-making. Presently, projects upto 25 MW are out of CEA purview, and handled by the MNES, but in accordance with Section 8(1), a capital expenditure criterion needs to be established.

- It is felt that rather than focus on a potentially contentious issue of reducing "manpower", we should attempt to reduce "manpower cost", which is the essence of the issue. On the generation side, the inefficiencies highlighted, where stations are working at only 40 per cent load factor, need to be examined, and the load factor brought up to 60-70 per cent, through Renovation & Modernisation. This increased efficiency will reduce the per unit generation cost.
- Distribution operations break even must be reached immediately, and there should be involvement of PRIs/ULBs in this process. It is essential that the power sector reform be made a people's issue, to be achieved through people's participation, and not be seen as a legal/bureaucratic *diktat***.** If peoples' participation is not ensured, the reform process will cause alienation.

  Experience shows that post-reform, there is a rise in power price, with withdrawal of subsidies. It takes time for the efficiencies to establish, and there is potential for a public outcry in the interim.
- It should also be kept in mind that HP is a seasonal power producer. In summer, the dams are full, and it sells power, but in winter it needs more power, which it buys back at a higher price. This pattern will continue in the future, and within the framework of the Electricity Act, it is in the interest of the state to enter into long term understanding with its neighbours of J&K, Panjab, Haryana, and the heavy consuming centre of Delhi. It is also a good market situation that its neighbours need more power in the summer, both for domestic and agricultural use, and HP has surpluses at the time. On the other hand, power situation in the plains is easier in winter, and HP will need to augment its own resources then.
- HP should not enter into any PPAs with IPPs. Such agreements will defeat the very purpose of power sector reform of bringing efficiency and lowering costs, and shift the entire risk onto HPSEB. If there is only an attempt to shift risk rather than decrease it, there may be a situation when the IPPs may even work to oppose power sector reform, armed as they are with guarantees, and counter-guarantees (Power Sector Reform and Regulation: The Road Ahead, Sebastian Morris, India Infrastructure Report 2001).

Target dates for adding additional capacity through state, central, joint, and IPP programme appear to be very ambitious. It appears slippages will occur, and the state needs to have a re-look to lay down a revised realistic forecast.

Proposed Model

- Start an initiative to begin people's participation in the reform process. Engage GOs and NGOs in an exercise of dialogue with the people, and SERC can co-ordinate such an exercise. It must be precisely planned, and executed with clear blessings from the highest level. The aim is to build up a consensus for the reforms process by ensuring good quality and assured supply of power at reasonable prices.
- Involve HPSEB employees in the reform-related decision-making process. Employees must be told that they will not be forced to quit their jobs.
- Incorporate a power generation utility consisting of HPSEB's generation wing. Evolve procedures to decentralise decision-making to this generator, while retaining general policy initiative through the Board level, by retaining majority equity capital share. If possible, disinvest through employee stock option plans and public issue to Himachal Pradesh residents, further broad basing the success factor. Build in procedures to ensure efficiency, with minimum PLF achievement at 60-70 per cent. *Do not* offer employee incentives for generation, otherwise plants may refuse to back off when asked, raising grid frequency to dangerous levels. Rather, build in disincentive for not producing according to target. The disincentive will not apply when generator is asked to back off by Regional Transmission Centre.
- Incorporate a power transmission utility, as envisaged under the Electricity Act 2003. Begin talks with CEA, Power Grid, and neighbouring states for establishing and participating in the Regional Transmission Centre/s, and enter into agreements for power sale/purchase with them. Evaluate possibility of multilateral assistance from national and international bodies for strengthening the state's transmission backbone.

The plan should envisage setting up a transmission backbone for handling the anticipated demand for year 2020.

- Handover local distribution to *panchayats*, *zilla parishads* and urban local bodies. The transmission company will handover power at the local sub-stations, in a metered quantity. The following methodology can be considered:
- Power is metered into the local sub-station, and effectively handed over to the local body. The locally available distribution infrastructure is brought on to the books of the local body, which becomes a franchisee for distribution, and allowed to charge commission for collection of user charges, to cover distribution and administrative costs. The local body will have to be assured that technical hand holding will be done when needed.
- Employees of HPSEB can be offered VRS proposal, linked with a choice of a village/town in which they would like to be associated with the local body in maintenance of distribution infrastructure, distribution of electricity, and collection of user charges. After VRS, they will be working with the local body for a fixed lump-sum on a contractual basis. Considering the "harvesting" absenteeism in linesmen and other staff, if the scheme is worked out thoughtfully, it is likely to succeed.
- Implement rigorous training to local bodies, and the HPSEB staff involved to take on the new role.
- Involve private sector in upgrading distribution systems wherever necessary. Funds for this will come from the user charges for higher loads, etc., and can be collated at a level sufficiently large enough to offer economies of scale.
- The entire package should be worked out in a financially secure manner, with no subsidy input from the government.
- Continue cap on any new recruitment in HPSEB, and strictly implement the same. Special VRS offers should be linked to the distribution scheme as mentioned earlier. Re-deployment of staff will be required in accordance with new corporatised structure.

Current Status of Memorandum of Understanding

Himachal Pradesh has moved on the milestones to be achieved as per the MoU signed with Government of India.

The status of metering is as under:

H V Substation	*Total No. of Feeders*	*No. of Meters Installed*	*Percentage Metering*
33 KV	128	101	78.9
22 KV	114	80	70.17
15 KV	6	1	16.16
11 KV	597	542	90.78
2.2KV	6	6	100.00
DTRs	14600	13222	90.56

- 100 per cent metering of consumers has been achieved.
- Energy Accounting has been started at Circle level, and while 70 per cent of the feeders have being taken up for accounting, 43 per cent are currently under energy audit.

The state position of metering and audit is as under:

	2000-01	*2001-02*	*2002-03*
Input Energy (MU)	2898.793	3104.79	3332.031
Metered Energy (MU)	2206.066	2332.231	2518.909
Billed Energy (MU)	2206.066	2332.231	2518.909
Realised Energy (MU)	2084.723	2120.328	2236.268
Revenue realised (Rs. in crore)	489.3	504.61	541.5

There is still a large gap between input and metering, and metering and realisation.

Supply and sale price per unit is as under:

	2000-01	*2001-02*	*2002-03*
Average cost of Supply (in Paise/Unit)	247	270	266
Average revenue realised (in Paise/Unit)	234	233	250

The differential of 16 paise per unit is proposed to be bridged by the following strategy upto 2005-2006:

	2002-03	*2005-06*
Increase in generation (MU)	1277	2052
Reduction in T&D Loss		
a) Overall	19.35%	13%
b) Within the State	25%	20%
Increase in Revenue (Rs. in crore)	800	2003
Increase in Tariff		16%

With these initiatives, a tentative profit and loss account by 2005-2006 is proposed as under, with economic surplus generation:

(in Rs. crores)

Description	*2001-02*	*2002-03*	*2003-04*	*2004-05*	*2005-06*
Revenue Income	671	800	1030	1759	2004
Expenses	699	757	1083	1634	1756
Net Income before Interest	(-)28	(+)43	(-)53	(+)125	(+)248
Total Interest	138	180	207	247	286
Less IDC Capitalized	60	85	110	120	135
Net Income before income tax	(-)106	(-)52	(-)150	(-2)	(+)97
Asset Base	944	1145	1250	1980	2105
Percentage rate of return	(-)11.29	(-)4.56	(-)12	(-)0.11	(+)4.64

It is assumed that there will be:

- Increase in generation capacity 90%
- Demand Increase 20%
- Reduction in T&D losses 6%
- Increase in Tariff 16%
- Improvement in Billing & Collection efficiency 15%

The proposed business plan makes the right assumptions, and is in consonance with the recommendations made in this study. However, some imperatives must not be lost sight of:

- The interest burden on HPSEB is rising at an alarming rate, and a detailed study of interest liabilities in the long run needs to be assessed.
- Stakeholder participation through the above mentioned recommendations must not be lost sight of.

A long term tariff plan must be finalised, with the consumers clear that short term tariff increases will be balanced out in the long run by greater efficiency.

OTHER INITIATIVES

Fluorescent Lighting

In the domestic lighting sector, people still use incandescent lighting. It would be desirable to impose a higher slab of local taxation such that the incandescent bulb becomes an expensive proposition. At the same time, taxes on fluorescent lighting should be brought down to encourage its use, and it should also be mandated that only electronic ballasts (chokes) are used. This should be coupled with a public awareness programme, and a targeted drive to wipe out incandescent bulbs within a two-year period.

This step is likely to reduce the total lighting load by a margin of 50 per cent.

Energy Saving Equipment

It should be mandated by law that for day to day appliances like fans, pumps, food processors (“mixies”), agricultural motors etc., BIS certification is a must. The market is full of cheap, but power guzzling appliances. They actually cost the buyer much more in its total life-cycle cost, in the form of heavy running charges, and place a great strain on the power system of the state.

An awareness campaign should be conducted for this, and manufacturers asked to seek BIS certification for their products. The energy consumption of the product should be compulsorily mentioned prominently for consumer guidance, and surprise checks of products in the shops conducted to ensure that the product answers its laid down specifications. This should be achieved in a total target time of two years.

Village Broadband Connectivity through HPSEB

In Himachal Pradesh, the cost of digging through rocky terrain to bring telecom connectivity is a costly proposition. While optical fibre cables (OFC) are being laid along national and state highways, the last-mile connectivity to villages and hamlets can be done through HPSEB LT line poles.

While this will lower last-mile telecom costs considerably, it can also help the PRIs run both power, and telecom distribution circuits from the panchayat office.

TRANSPORT

A reading of the Himachal Pradesh Annual Plans, Economic Surveys, and the State Five Year Plans gives an impression of the state’s belief that a discussion of the road projects suffices as a Transport Plan.

There is a passing mention of an inter-modal vision, and in fact, it is misspelt as “inter model” at some places. The concept of inter-modal also appears to be restricted to a vision of roads connected to lifts or rope-ways, and there is no treatment of inter-modalism as a logistics issue, either in passenger or goods movement. The official website of Himachal (*www.himachal.nic.in*) does not even mention transport as a subject area, but chooses to discuss it under Public Works, focusing on road construction and maintenance activity.

It is felt that a proper analysis of this sector is not being attempted – *Economic Survey 2003* mentions that

"Road Transport is the mainstay of economic activity in the Pradesh as other means of transport namely ….Taxis…..are negligible." Taxis *do* form an important component of road transport in the state for tourist movements, and its consideration as negligible shows a blind spot, and a rather cursory treatment of a vital subject.

"Road Transport" has also been made synonymous with "HRTC" (Himachal Road Transport Corporation), and other than road construction, this remains the only organised transport activity that finds serious mention. It has not been possible to find a cogent Transport Policy of Himachal Pradesh, and whenever it has been attempted, it has again shown a road-HRTC bias. As late as March 2001, when the then Transport Minister spoke of a "Transport Policy", he exhibited the same bias in declaring that "The Himachal Pradesh Government has decided to strongly implement *transport policy* in order to provide better transport facilities to passengers travelling in the Himachal Road Transport Corporation buses in and outside the state" (*The Tribune*, 23 March, 2001, italics added).

The importance of transport for Himachal Pradesh cannot be overstated enough, since it addresses the core issue of accessibility for the people. There is a specific agenda for the infrastructure sector and the transport sub-sector to address, in the context of Himachal Pradesh's development plans. Important issues to consider are:

i. Hydro-power envisages large, medium and mini/ micro schemes to be set up in the near future. This will need millions of tonnes of cement, steel, and machinery to be moved to project sites.

ii. Himachal Pradesh has a policy to give a thrust to horticulture and agro-processing. The raw and processed stock will need quick movements from farms to godowns, from cold storages to processing stations, and finally towards national and international markets.

iii. The other major thrust area of tourism needs assured and safe transport network. It needs structuring for a tourist-friendly system, with enquiries, itinerary planning and reservations, and uniform fare systems.

iv. The network should facilitate day-to-day life of Himachal Pradesh residents, and have an effective linkage with a disaster management plan. This is especially important for a state situated in a seismically active area.

Roads

Considering the geography of Himachal Pradesh, roads are an important component. There are National Highways, Border Roads, State Highways, and other arterial and rural roads.

At Independence, Himachal Pradesh started with nearly no roads, but has done well to build an estimated 27,737 km of motorable roads by 31 December 2002. During 2002-2003, data upto September 2002 also shows good progress.

TABLE 17.13

Road Building Progress During 2002-2003

Item	*Unit*	*Target for 2002-2003*	*Achievement Up to September, 2002*
Motorable	Kms.	550	342
Cross-drainage	Kms.	650	376
Metalling & Tarring	Kms.	650	608
Jeepable	Kms.	20	25
Bridges	No.	30	19
Villages connected	No.	50	12

Source: *Himachal Pradesh Economic Survey 2003.*

However, the achievements are less than the requirements. The Eighth Five Year Plan for Himachal Pradesh laid down the target in this regard as 26,373 km, to achieve a road density of 473.5 km/thousand sq. km, as against the existence of 16883 km and 303.3 km/thousand sq. km, in March 1990.

The Ninth Five Year Plan for Himachal Pradesh raised the requirement to 30,495 km, and a road density of 547.8 km/thousand sq. km, as against achievement of 19,310 km, and a road density of 346.8 km/thousand sq. km, by March 1996.

Thus, the State Plans could not achieve their targets. In fact, the targets specified in the Eighth State Plan, could be achieved only by the beginning of the Tenth Plan.

Comparison of the road density of Himachal on a national scale shows that the state is below the all-India average, and placed at the 20th rank. However, this comparison would not be fruitful, since the data would take into account geographically dissimilar states. If we compare Himachal Pradesh with the hill states of J&K, Uttaranchal, Arunachal Pradesh,

Mizoram, and Sikkim, then Himachal Pradesh is the best.

In this context, as the leader in road development in hill states, Himachal Pradesh has done well, but in comparison to its own targets and needs, the state needs to get its act together.

Major Road Schemes

Pradhan Mantri Gram Sadak Yojana (PMGSY)

PMGSY was launched by the Government of India in 2000-01 with the primary objective of providing connectivity by all weather roads to all habitations with a population of 500 persons (250 persons for the Himachal Pradesh) and above by the end of Tenth Plan Period (2007). It replaced the erstwhile Basic Minimum Services (BMS) programme. In Himachal Pradesh, the Public Works Department is implementing this *Yojana* through its Programme Implementation Units (PIUs), which are mostly headed by Superintending Engineers, except for tribal areas where these are headed by Executive Engineers.

The funds under this *Yojana* are being released every year by the Ministry of Rural Development, Government of India, for execution of eligible road works, recommended by the respective states.

For implementation of project proposals under PMGSY 2002-03, the Government of India specifically directed all the states to ensure inclusion of only such villages under this *Yojana*, which have not been so far connected with any road, including fair weather roads. Further, Himachal Pradesh was told to prepare a shelf of road projects, costing about Rs.250 crore under PMGSY 2002-03. Accordingly, all the MPs/ MLAs/*Zilla Pradhans* made available their lists of priority road works, which they proposed to include under PMGSY 2002-03. The details received were examined by the State Level Standing Committee on PMGSY during its meeting held on 7 January 2003 and a shelf of 452 roads were finalised covering all 75 Blocks of the state, costing Rs. 251 crores, for providing connectivity to 583 villages, each having a population of 250 and above, and 286 smaller villages falling *en route*. It is pertinent to mention that under PMGSY 2000-01 and 2001-02, except for one road belonging to *Chopal* Block, the surfaces of all the approved roads were to be metalled/ tarred. However, in February 2002, a policy decision was taken that the surface of PMGSY roads would not be metalled/tarred in all such areas of the state, where connectivity is quite poor, which get lot of snowfall or where traffic intensity is quite low. It was decided that in all such areas, the roads would be provided with cross-drainage works and essential soling, so that these could function as all weather roads. Accordingly, while finalising proposals under PMGSY 2002-03, the State Level Standing Committee decided that the roads pertaining to Kangra, Hamirpur, Una and Bilaspur districts and to a part of Nalagarh Block of Solan district, be metalled/tarred and in other areas, this need not be done.

Status of Projects under PMGSY

The following final sanction was conveyed for these projects below:

District			*Pavement*		*CD Works*			
	Total No. of Packages	*Total No. of Roads*	*Length [in Kms]*	*Sanctioned Cost (Rs. in Lakh)*	*No. of CD Works*	*Sanctioned Cost (Rs. in Lakh)*	*Other Works (Cost Rs. in Lakh)*	*Total Cost (Rs. in Lakh)*
Bilaspur	7	16	62.88	657.67	101	117.09	41.98	816.74
Chamba	11	28	136.18	1315.49	255	199.57	69.47	1584.53
Hamirpur	13	34	110.43	1343.07	204	432.44	36.01	1811.52
Kangra	19	105	356.15	3329.42	558	441.23	200.22	3970.87
Kinnaur	6	10	41.55	586.55	80	99.87	4.30	690.72
Kullu	7	15	76.52	869.85	149	126.87	44.52	1041.24
Lahaul and Spiti	2	5	23.30	257.51	45	59.17	44.05	360.73
Mandi	16	49	221.97	1974.08	530	456.86	235.98	2666.92
Shimla	16	36	158.58	1826.65	372	328.67	56.35	2211.67
Sirmaur	8	22	70.53	925.06	149	184.65	47.86	1157.57
Solan	10	25	97.58	1087.60	227	168.23	103.25	1359.08
Una	9	28	113.39	896.14	144	157.53	168.15	1221.82
Total	**124**	**373**	**1469.06**	**15069.09**	**2814**	**2772.18**	**1052.14**	**18893.41**

District	*Value of Proposals (Rs. in Lakh)*	*No. of Roadworks*	*No. of Roadworks Completed (upto Oct. 2003)*	*Per cent Roadworks Completed*	*Expenditure upto Oct. 2003 (Rs. in Lakh)*
Bilaspur	816.74	16	10	62.50	660.89
Chamba	1584.53	28	15	53.57	1128.44
Hamirpur	1811.52	34	14	41.18	1377.01
Kangra	3970.87	105	69	65.71	3283.14
Kinnaur	690.72	10	3	30.00	414.78
Kullu	1041.24	15	5	33.33	557.68
Lahaul and Spiti	360.73	5	3	60.00	205.35
Mandi	2666.92	49	24	48.98	1933.98
Shimla	2211.67	36	21	58.33	1508.37
Sirmaur	1157.57	22	9	40.91	833.00
Solan	1359.08	25	10	40.00	952.47
Una	1221.82	28	22	78.57	1011.80
Total	**18893.41**	**373**	**205**	**54.9598**	**13866.91**

In the 12 districts, a total of 373 roads comprising 1469.06 kilometers for Rs 150.69 crore, 2814 cross drainage (CD) projects at a cost of Rs 27.72 crore, and other works costing Rs 10.52 crore, were sanctioned for HP under PMSGY.

The current status upto October 2003 is as tabulated in the table above.

Thus, 205 out of the 373 have been completed to record a progress of 56 per cent physical completion, and out of the total sanction of Rs. 188.93 crore, Rs. 138.66 crore have been spent.

The progress of works is thus good, considering that the monsoon months with conventionally slow progress have passed, and there is likely to be faster progress in the remaining part of the year.

The quality of work done as assessed by the National Quality Monitor shows the following data:

District	*Block*	*Inspection Date*	*Road Name*	*Grade*
Bilaspur	Bilaspur Sadar	22-04-2002	NH.21 at R.D 125/0 Kothipura to Noa.	Good
-do-	Gehrwin	22-04-2002	Baroha to Dahad road.	Very Good
-do-	Gehrwin	05-08-2002	Baroha to Dahad road.	Good
-do-	Gehrwin	22-04-2002	Chhad Sandyar road.	Very Good
Hamirpur	Bijhri	22-04-2002	Panjot Bagwara road.	Good
-do-	Bijhri	22-04-2002	Samirpur to Khansan	Good
-do-	Hamirpur	22-04-2002	Marial to Miharpura.	Good
-do-	Tihra Sujanpur	22-04-2002	Thalotu to Kuthrin road.	Good

Out of the eight projects inspected, two were judged as Very Good, and the remaining as Good. It is a presumption that the inspections were meaningful, since seven inspections over the districts of Bilaspur and Hamirpur are shown as having been conducted on the same day.

Areas of Concern

- A total of 747 habitations are proposed to be covered under these sanctioned projects, still leaving 10585 habitations unconnected.
- There is a wide variation in cost per kilometer of the road projects executed, ranging from Rs. 7.68 lakh per km (Una) to Rs. 13.95 lakh per km (Solan). The State government is advised to get this investigated through an independent agency.
- The quality of the roads for a tourism destination cannot be anything but perfect. The government should examine the specifications, and ensure that the specified quality is maintained, with constant monitoring right through the construction phase.

NABARD

In 1995-96, the Government of India created the Rural Infrastructure Development Fund (RIDF) with NABARD, which is a subsidiary of the Reserve Bank of India, for providing loan funds to state governments for creating durable assets in rural areas of the country. During the first year the emphasis was on agriculture, horticulture and minor and medium irrigation sectors.

From 1996-97 onwards, the road-and-bridge sector was also included in this scheme, when two road projects of Lal Dhank-Paonta-Rajban-Rohru-Sungri and Sidhpur-Sungri-Dharanghati-Sarahan-Jeori roads, were proposed for loan assistance.

Starting with RIDF-I, Himachal Pradesh is now in RIDF for 2002-2003. Up to February 2003, 298 schemes costing to Rs. 523 crore with Rs. 500 crore as NABARD loan and Rs. 23 crore as the state share have been sanctioned. Total expenditure for all tranches up to February 2003 is Rs. 286 crore only.

The progress of works in NABARD roads needs speeding up.

Central Road Fund

The Central Road Fund (CRF) is a non-lapsable fund. The Central Government determines accruals and allocation of funds to various states under CRF. Central Government allocates the funds, out of the entitled allocation to various states and gives administrative approvals to the proposals of the state governments. After the accord of administrative approvals to proposals by this Ministry, the project estimates for the proposals are approved technically and financially by the state government and works are executed by them. The quality control and proper utilisation of funds is the responsibility of the state government. One-third of the accrual was released initially in November 2000. Thereafter, funds are released based on utilisation of funds by the states. Most of the states have not fully utilised the funds released to them. State governments are being pursued at various levels, including at that of Chief Minister, for expediting completion of works and utilisation of funds.

The status of use of these funds is as below:

Thus, as per the report of the Ministry of Road Transport and Highways, the CRF utilisation by HP is only one-third of the total availability, reflecting a need to watch progress in this area.

(in Rs. Crore)

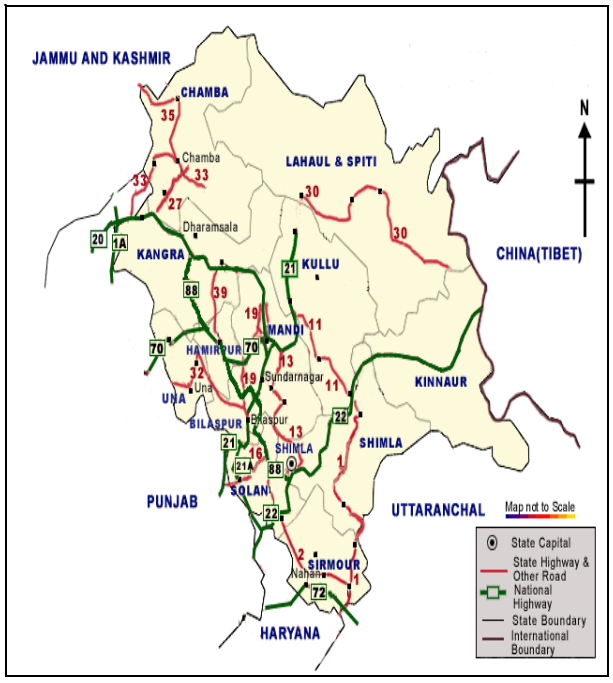
Sr. No	*Name of the State/UT*	*CRF Accruals for the year 2001-2002*	*Total Accruals Out of CRF from 2000-2001 to 2002-2003*	*Total Funds Released out of CRF*	*Balance (col. 4-5)*	*%age of Utilisation/ Release to the Accruals*
(1)	(2)	(3)	(4)	(5)	(6)	(7)
1.	Andhra Pradesh	162.49	243.94	125.969	117.9718	52
2.	Arunachal Pradesh	21.93	32.79	7.4200	25.3708	23
3.	Assam	29.81	45.21	24.8300	20.3808	55
4.	Bihar	51.81	85.71	16.1100	69.6008	19
5.	Chhattisgarh	45.59	62.87	37.4500	25.4208	60
6.	Goa	7.73	11.82	1.3100	10.5108	11
7.	Gujarat	137.92	206.05	79.7900	126.2608	39
8.	Haryana	63.45	99.20	31.4100	67.7908	32
9.	Himachal Pradesh	20.70	31.45	10.7044	20.7464	34
10.	Jammu & Kashmir	60.57	91.62	21.2502	70.3706	23
11.	Jharkhand	36.07	47.32	6.0700	41.2508	13
12.	Karnataka	113.00	171.13	50.0100	121.1208	29
13.	Kerala	53.83	81.54	9.2300	72.3108	11
14.	Madhya Pradesh	124.42	191.01	50.8205	140.1903	27
15.	Maharashtra	211.98	313.39	68.3500	245.0408	22
16.	Manipur	6.50	9.74	2.2200	7.5208	23
17.	Meghalaya	8.81	13.10	5.7385	7.3623	44
18.	Mizoram	5.92	8.88	7.9200	0.9608	89
19.	Nagaland	4.97	7.44	3.3700	4.0700	45
20.	Orissa	57.71	87.53	9.7000	77.8308	11
21.	Punjab	84.15	124.58	35.7300	88.8508	29
22.	Rajasthan	151.66	228.37	84.4400	143.9308	37
23.	Sikkim	2.19	3.29	0.7400	2.5500	22
24.	Tamil Nadu	133.46	200.68	82.3400	118.3408	41
25.	Tripura	3.80	5.73	2.0770	3.6530	36
26.	Uttaranchal	21.78	29.37	8.2000	21.1708	28
27.	Uttar Pradesh	176.46	272.89	30.5568	242.3340	11
28.	West Bengal	72.00	108.88	32.5605	76.3203	30

National Highways in Himachal Pradesh

(The 1235 km of National Highways in Himachal Pradesh, as shown below)

Name of National Highway	*NH No.*	*Name of Circle*	*Name of Division*	*Length in Division (in Kms)*
Jallandhar-Pathankot-Jammu-Srinagar Road	1-A	NH Circle HPPWD Shahpur	NH Division Jogindernagar	10.000
Pathnkot-Chakki-Mandi Road	20	NH Circle HPPWD Shahpur	NH Division Jogindernagar	197.000
Chandigarh-Mandi-Manali Road	21	NH Circle HPPWD Shahpur	NH Division Pandoh	151.250
Ambala-Kalka-Shimla-Wangtoo-Kaurik Road	22	NH Circle HPPWD Narkanda	NH Division Solan NH Division Rampur	130.450 160.000
Jallandhar-Hoshiarpur-Mubarikpur-Amb-Nadaun-Hamirpur T/Devi Dharampur-Kotla Mandi Road	70	1st Circle HPPWD Mandi	Dharampur Division	38.000
		1st Circle HPPWD Mandi	Mandi Division No. II	40.530
		1st Circle HPPWD Mandi	Sarkaghat Division	21.865
		8th Circle HPPWD Hamirpur	Touni Devi Division	22.000
		8th Circle HPPWD Hamirpur	Hamirpur Division	33.265
		9th Circle HPPWD Nurpur	Dehra Gopipur Division	17.050
		15th Circle HPPWD Una	Bharwain Division	32.420
Pinjore-Nalagarh Swarghat Road	21-A	3rd Circle HPPWD Solan	Nalagarh Division	48.875
Shimla-Barahampukhar-Ghagus Hamirpur-Nadaun-Ranital Kangra(Mataur) Road	88	3rd Circle HPPWD Solan	Arki Division	35.600
		4th Circle HPPWD Shimla	Shimla Division No. II	25.000
		5th Circle HPPWD Palampur	Kangra Division	21.300
		8th Circle HPPWD Hamirpur	Hamirpur Division	31.000
		8th Circle HPPWD Hamirpur	Barsar Division	10.000
		8th Circle HPPWD Hamirpur	Touni Devi Division	10.000
		9th Circle HPPWD Nurpur	Dehra Gopipur Division	29.700
		10th Circle HPPWD Bilaspur	Bilaspur Division No. I	16.000
		10th Circle HPPWD Bilaspur	Bilaspur Division No. II	18.400
		10th Circle HPPWD Bilaspur	Ghumarwin Division	27.000
Ambala-Naraingarh-Kala Amb-Paunta-Dehradun Haridwar Road	72	12th Circle HPPWD Nahan	Nahan Division	14.000
		12th Circle HPPWD Nahan	Paonta Division	43.000
Chandigarh-Mandi- Manali Road	21	10th Circle HPPWD Bilaspur	Bilaspur Division No. I	29.750
		10th Circle HPPWD Bilaspur	Bilaspur Division No. II	45.000

MAJOR ROADS OF HIMACHAL PRADESH



Inadequacies in Road Network

Less All-weather Roads

The total road length was 27,737 km in the state as on 31 December 2002. However, following major issues emerge:

The total road length mentioned is only a count of the total road *formation* in the state. Only 45 per cent of this road formation is metalled and tarred, the remaining being bare road surface.

Thus, less than 50 per cent of the roads are all-weather roads. This is a startling data for a state which seeks to move quickly on the tourism front. This is not restricted only to remote areas, but is seen all over the state.

Poor Village Connection

There are 16807 inhabited villages in Himachal Pradesh. At the end of 2002, less than 50 per cent of them were connected by roads, as shown in Table 17.15:

TABLE 17.14

District-wise Fair Weather and All Weather Roads

District	*Fair Weather Road*	*All Weather Road*
Bilaspur	504.464	717.942
Chamba	520.681	708.471
Hamirpur	573.865	1120.119
Kangra	1828.711	2404.187
Kinnaur	330.619	197.544
Kullu	895.686	420.266
Lahaul and Spiti	584.509	162.705
Mandi	2095.331	1546.721
Shimla	2446.757	1015.701
Sirmaur	802.584	1039.624
Solan	1324.123	856.116
Una	445.798	957.285

Source: Himachal Pradesh PWD Department Records.

TABLE 17.15

Villages Connected with Roads

Villages connected	*As on 31 March*			
	1999	*2000*	*2001*	*2002*
Villages with population more than 1500	184	184	185	186
1000-1500	223	224	224	224
500-1000	839	843	847	849
200-500	2517	2551	2575	2588
Below 200	3973	4001	4036	4063
Total	**7736**	**7803**	**7867**	**7910**

Source: *Himachal Pradesh Economic Survey 2003.*

Poor Road Quality

The road quality is not up to the mark, causing unsafe conditions, slowing down transport throughout, and raising maintenance costs. The Ministry of Surface Transport, Central Road Research Institute, and the Indian Road Congress have laid down and circulated a number of technical specifications to be observed in road construction, including bridges and drainage practices.

It is usual to see the road surface assuming a wave form at curves. This is the result of over-tarring, used to hide a thin formation of the road.

Poor compacting and drainage design also cause the roads to disintegrate quickly under water flows, as a result of rain.

Environmental Consideration Disregarded

Road design and construction in hills must be undertaken with environment preservation in mind. The parameters of concern are:

- Geological disturbance
- Land degradation and soil erosion
- Interruption in natural drainage system
- Siltation of river basin
- Aesthetic degradation

These issues are not being strictly implemented at road construction sites, thus causing immense air pollution.

As Kachroo and Sinha have brought out, construction of road will involve cutting of the natural inclination of terrain slopes, which may induce landslides during the rainy season. By the removal of vegetation, etc., the exposure of the sloping surface will become prone to erosion by water and may lead to the formation the deep gullies. The disposal of excavated rock mass from road construction, if allowed to slide down the slopes into stream beds will cause huge damage to the down-slope vegetation including forests, pastures and agricultural lands. The sliding of debris may cause widespread destruction of valuable agricultural lands, which are at lower altitudes. This will have an adverse impact on the growth of the vegetation causing imbalance of the ecosystem.

Road Design Keeping in Mind Multi-modalism

Road design should ensure that the national and state highways can handle container trucks with at least 20 foot containers. The gradients and turning radii need to be planned to conform to these requirements. Lay-by areas should be planned for container stuffing and de-stuffing operations.

Recommendations

The following facts emerge:

- While the progress in HP is not tardy, its own need to move on the tourism area needs a quicker build-up of the road sector.
- The need to broad-base its tourism appeal to all-season all-district fronts brings forth the requirement to open up the interiors. For this, rural roads are a must.
- The proportion of all-weather and metalled roads needs to go up.
- National and State highways need to be capable of handling multi-modal container vehicles.

It is necessary to put in place an institutional arrangement to manage the road sector on a professional footing.

Experience of NHAI in NHDP was commenced on the Build-Operate-Transfer model, using toll collection as a basis. However, experience has made it clear that the "tolls" model can succeed in very limited area, and the experience of earlier projects like the Coimbatore bye-pass have given clear indications (G. Raghuram & Geeta Kheskhani). A significant new factor in the BOT programme is the induction of annuities. Instead of, or in conjunction with concessions, the developer is paid an annuity over a fixed period, subject to a certification of the availability of the facilities to the users, as per specifications. This certification is done through an independent engineer, who examines the project in accordance with required specifications, and certifies their availability to the users. This has rightly shifted the emphasis from a mere "build" to "build and maintain" paradigm. The real bane of Indian road sector is the abysmal post-construction maintenance; in addition project developers use materials that pass short term technical testing, but prone to long term maintenance flaws. (The India Infrastructure Sector in India, 2001-02, India Infrastructure Report, 2003, Anupam B. Rastogi)

The annuity principle is ensuring that since payments are made on the basis of continued maintenance of standards, the developer must ensure relevant specifications right from the start.

HP has commenced its private participation in roads exercise by identifying six interstate barriers on which widening, four-laning, computerisation and commercial development will be undertaken on a public-private partnership basis. ILFS has prepared a concept note for structuring the bidding process and attracting private investment which is being finalised. These barriers include Parwanoo, Kala Amb, Mehatpur, Swarghat.

This should be carried further in involving private sector in a clear endeavour to maintain state highways and rural roads to specifications. These roads should be contracted out for maintenance to private agencies, for at least ten year periods, to allow the entrepreneur to effectively recover his investments. The payments should be on the basis of the annuity principle, with linkage to the continued availability of a well-maintained road. At present, construction and one time maintenance contracts allow payments on the basis of work executed, but is not linked to the quality of construction, and long term maintenance. As a result HP PWD is continuously on an exercise of departmental and private road repairs, with highways becoming one long joining of such repaired patches.

Roads – both for new construction and for maintenance of existing ones - in HP, should be thus contracted out over a longer length of chainage, and for a longer period of time, which allows entrepreneurs to develop their business models, linked to annuities, subject to satisfactory maintenance. Road development and maintenance can also be taken up by investors in the tourism business, who may need a right of way to open up their proposed properties to better communication.

Enact Road Fund Act

Recognising the need for mobilising greater non-budgetary resources for development and maintenance of the PWD road network, regulatory and institutional initiatives were undertaken for generating more user charges and mobilising greater private sector involvement in road projects, The Kerala Road Fund was constituted under the Kerala Road Fund Act 2001 which became law on November 23, 2001. The purpose of the Road Fund is to finance.

- routine recurrent and periodic maintenance of PWD roads.
- development of existing road network system including upgrading of any road maintained by the PWD.
- construction of new roads wherever necessary.
- such road safety projects as are found essential for safe and smooth traffic.
- research related to maintenance and development of roads.
- any cost-sharing, donor-funded project intended for all or any of the purposes mentioned above.

The Road Fund shall consist of:

a) all moneys received from the Central Road Fund established under the Central Road Fund Act, 2000.

b) the contribution made by the Government.

c) all fees, fines and other amount collected by the Government as per the provisions of the Kerala Highway Protection Act, 1999.

d) all payments made by the concessionaire as per the concession agreement.

e) all amount standing to the credit of the Bridges Fund established under Section 12 of the Kerala Tolls Act, 1976.

f) the user fees collected by the Government agency or the statutory body under the Kerala Road Fund Act.

g) grants or loans or advances made by the Government of India or any institution.

h) grants or loans or advances made by the Government.

i) all returns on investments made by the Road Fund Board directly or through a Government agency or statutory body.

j) any amount borrowed by the Road Fund Board.

k) any other amount authorised for credit to the Fund under the provisions of Road Fund Act or rules made thereunder or any other law for the time being in force.

The Fund is headed by the CM, with cabinet ministers of finance, PWD, and transport, along with officials and experts from transport and finance areas.

The Government shall contribute to the Fund every year an amount equal to ten per cent of the tax collected by them in the previous year under the provisions of the Kerala Motor Vehicles Taxation Act, 1976, and the said amount shall be charged on the Consolidated Fund of the State.

It is recommended that HP should also enact and create an institutional mechanism for the Road Fund, and place the road sector on a professional basis.

It is also recommended to make the PWD into a separate profit centre, with grants linked to specific maintenance and construction projects. The works of PWD will also be subject to an audit by an independent engineer, to bring transparency and professionalism into its working. After sufficient experience of working as an independent profit centre, PWD department could be corporatised as HP Construction Limited.

Note on Himachal Road Transport Corporation (HRTC)

On the advent of independence, Himachal was formed as a "C" class state. Consequent to nationalisation of passenger and goods service, Himachal Government Transport came into existence in July 1949 and continued to function as such till 1 October 1974. During 1958, a Corporation was floated jointly by the Governments of Punjab and Himachal and the Railways under the Road Transport Corporation Act., 1950 with a name and style as "Mandi-Kullu Road Transport Corporation", basically to operate on the joint routes in Punjab and Himachal. With the re-organisation of Punjab in 1966, certain hilly areas of the state were merged in Himachal and the operational areas of Mandi-Kullu Road Transport Corporation came entirely within expanded Himachal. This Corporation also continued to function as such till October 1, 1974. On October 2, 1974, Himachal Government Transport was merged with Mandi-Kullu Road Transport Corporation and was renamed Himachal Road Transport Corporation, under the Road Transport Corporation Act, 1950.

An operational snapshot of HRTC operations can be seen as in Table 17.16.

TABLE 17.16

Operational Snapshot of Himachal Road Transport Corporation

Indices	*1974*	*2001*	*2003*
Routes	379	1733	1784
Buses	733	1728	1711
Coverage (in lakh km)	303.29	1409.41	1423.06
Fuel consumption (km/litre)	2.90	3.54	3.56
Fleet Utilisation	79%	98%	98%
Accident/lakh km	0.17	0.12	0.13
Accidents/year	52	169	
Km/bus/day	113	223	221

Besides its operation in the entire Himachal Pradesh, including the tribal districts of the State, HRTC operates its buses in the neighboring states of Punjab, Haryana, Rajasthan, Uttar Pradesh, Jammu & Kashmir, Union Territories of Chandigarh and Delhi. Its buses cross through the three highest mountain passes of Bara-Lacha, Kunjam and Rohtang.

Operations indices reveal a good picture on the transport production front. While the number of buses increased 2.5 times, routes went up five times, and total kilometerage increased 4.5 times.

This is reflected in km per bus per day, which has doubled from 113 km per day in 1974, to 221 in 2003.

Fuel consumption data have also improved, and the average consumption is reasonable for hill haulage.

The safety factor, however, remains an area of concern. HRTC has not given any data of fatalities, but its accident rate in terms of accidents per lakh kms shows that the absolute number of accidents has

tripled from 52 accidents per year in 1974 to 169 in 2001. Bus-holding has gone up less than three times, indicating a higher per bus accident rate. These issues need close examination.

Staff Efficiency

Since the inception of Himachal Road Transport Corporation, the staff from Mandi-Kullu Transport was absorbed in HRTC. During 2000-2001 the staff strength in HRTC was 9084. The Corporation has fixed the norm for staff of each category. The details are as under:

TABLE 17.17

Category-wise Norms for Staff

Sr. No.	*Description*	*Staff per Bus*
1.	Drivers	1.40
2.	Conductors	1.45
3.	Inspectors	0.18
4.	Administration	0.75
5.	Workshop	1.60
6.	Store	0.18
7.	Others	0.24
	Total	**5.80**

This means that that are three operations and frontline staff (driver + conductor + inspector) per bus, and an equal number of support staff in the workshops and offices. This teeth (frontline) to tail (support) ratio of 1:1 is unacceptable in any production situation.

It is the equivalent of 1 office staff (administration + store) and 2 others (workshop + others), a total of three staff permanently on each bus!

The trend of increase in number of buses and staff for the last ten years is shown in Table 17.18. This clearly shows that bus-to-staff ratio has remained constant for more than a decade.

Transport technology has improved over time. The vehicles have higher fuel averages, longer service intervals, are safer, and afford better ride quality, while increasing available engine power. All these translate into lower operation and maintenance costs. These should have a direct impact on the number of staff required to run and maintain a bus. These efficiencies have not been translated within the organisation, and the improvements in technology have not been exploited.

TABLE 17.18

Year-wise Number of Buses and Staff Strength

Financial Year	*Number of Buses*	*Staff Strength*	*Ratio*
1988-1989	1379	7530	5.46
1989-1990	1503	7986	5.31
1990-1991	1525	8256	5.41
1991-1992	1606	8643	5.38
1992-1993	1614	8659	5.36
1993-1994	1598	8561	5.35
1994-1995	1670	8647	5.17
1995-1996	1666	8810	5.28
1996-1997	1711	8917	5.21
1997-1998	1742	9270	5.32
1998-1999	1777	9229	5.19
1999-2000	1734	9282	5.35
2000-2001	1728	9084	5.26
2001-2002	1747	8964	5.13
2002-2003	1711	8494	4.96

Financial Results

The operational income of HRTC during 2002-2003 was Rs. 201.53 crore. By allowing free/concessional facilities, the corporation is suffering financial loss to the extent of Rs.40.57 crore yearly (as per HRTC reports). In addition to this, the corporation is also operating uneconomical routes in public interest. HRTC provides free and concessional travel facilities as under:

Free Travelling Facility

The Corporation provides free travelling facility to the following categories:

- Handicapped (35,844 persons)
- Press correspondents/MLAs/MPs/Ex-MLAs/Ex-MPs and social workers
- War widows and gallantry award winners - keeping in view the services rendered by the defence personnel for the nation, free travel facility to these two categories is only a mark of honour.
- Padam Shree awardees.
- Freedom fighters.

Concessional Facilities

The Corporation provides concessional travelling facility to the following categories:

TABLE 17.19

Losses Sustained on Account of Providing Cencessional/Free Travelling Facilities by HRTC

(Rs in lakh)

Sr. No.	*Category*	*1995-96*		*1996-97*		*1997-98*		*1998-99*		*1999-00*	
		Nos.	*Amount*	*Nos.*	*Amount*	*Nos.*	*Amount*	*Nos.*	*Amount*	*Nos.*	*Amount*
1	Students	137088	1275.0	150000	1400.0	157500	1700.00	184000	2040.00	228800	2448.0
2	Employees	28179	152.00	31300	170.00	32850	205.00	39420	305.00	47304	366.00
3	Freedom Fighters	2520	18.00	2800	20.00	2940	24.00	3528	29.00	4233	34.00
4	War Widows	680	03.00	750	04.00	790	05.00	948	06.00	1137	07.00
5	Physical Handicapped	8620	24.00	9500	26.00	10000	31.00	12000	37.00	14400	44.00
6	Press Correspondents	135	02.00	150	03.00	160	04.00	192	05.00	230	06.00
7	Police, MP, MLAs & Others	14147	502.00	15700	550.00	17470	615.00	20964	706.00	14788	807.00
	TOTAL	191369	1976.0	210200	2173.0	221710	2584.00	261052	3128.00	310892	3712.0

Source: Himachal Road Transport Corporation, *Annual Accounts*

- Students of Government Schools/Colleges pay 10 single fares a month, and those of Public Schools, who are provided earmarked buses, pay 30 single fares a month.
- Employees: state government employees from place of residence to offices against payment of 30 single fare a month.
- Police officials/jail wardens: Presently, police personnel upto the rank of Inspector and jail wardens travel free within and outside the state, on payment of Rs. 50 a month, deducted from the salary and deposited in the government treasury.

An independent study of the level of subsidies prevalent in HRTC under the subject of Social Accounting found that the level of subsidy enjoyed by target groups under orders of the government amounted to Rs. 37.12 crore in 1999-2000. The claim by HRTC of the current level at Rs. 40 crore therefore seems reasonable.

The losses for 2002-2003 are Rs. 23.36 crore, and projected to be Rs 28.03 crore in 2003-2004 by HRTC.

The data from Table 17.19 read with the profit and loss statement (Table 17.20) make it clear that if HRTC was not forced to provide subsidised travel, there was a possibility of it breaking even.

It was surprising to note that while Himachal Pradesh deducts Rs. 50 from the salary of each police and jail staff for free travel by HRTC, this is not given to HRTC, but deposited in the government treasury!

TABLE 17.20

Profit and loss position of HRTC (1979-80 to 1999-2000)

(Rs. in Million)

Year	*Total Receipts*	*Total Expenditure*	*Profit/Loss*
1979-80	143.14	138.61	+4.53
1983-84	254.24	296.13	-41.89
1987-88	493.72	498.69	-4.97
1991-92	708.66	924.42	-215.76
1995-96	1239.36	1367.82	-128.46
1999-00	1741.12	2226.51	-485.39
2000-01	2038.29	2385.90	-347.61
2001-02	2217.29	2505.83	-288.54
2002-03	2370.67	2669.31	-298.63

Recommendations for HRTC

It is always easy to tell the government that "it has no business in business", but HRTC is not poorly run. It is in a financial fix because of government policies, and if Himachal Pradesh reorients HRTC on business lines, it can do well. The pattern of ownership is a decision that the government can take as it deems fit, but HRTC can be turned around with the following measures:

- Start an aggressive technical training programme, particularly for drivers and workshop staff. This will improve safety and bring down maintenance and operations costs.
- Conduct radical BPR to reassess the staff requirement in the maintenance and

administrative staff. In view of improvements in technology and induction of information technology, current levels of one support staff for every operations staff in unacceptable. Clerical staff can be re-deployed against vacancies in other government departments.

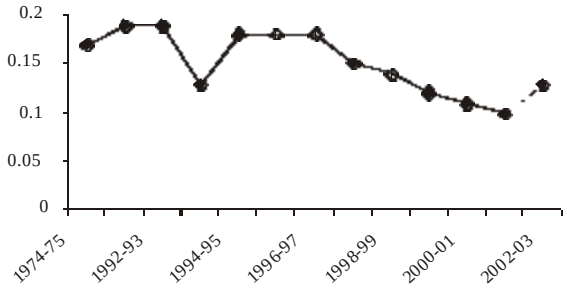
- Safety, better amenities, and punctuality are needed to lift occupancy ratios. CAG has noted in 2001 that "the actual occupancy ratio was 67 per cent, 57 per cent and 59 per cent against the breakeven occupancy ratio of 73 per cent, 76 per cent and 69 per cent during the period 1998-99, 1999-2000 and 2000-01 respectively." Occupancy decreased because of large-scale privatisation, which affected the traffic potential of the corporation on profit earning routes, while the corporation could not withdraw buses from uneconomical routes. There is a need to rationalise the route permits in accordance with traffic needs.
- HRTC has started a number of initiatives for better service and cost reduction. These include computerised and networked advance ticketing, group discount, return ticket incentives, smart cards, etc. These should be vigorously pursued to enhance efficiency.
- Either remove subsidies, or compensate HRTC for the same, in accordance with the Transport Corporation Act.
- The tariff policy of HRTC is not clear, and the fare has not undergone any revision since 1999. The State government should take steps to lay down a clear tariff policy, which would apply to both HRTC and private operators.

Response from HP to these Recommendations

Road Safety Factor

Data has been quoted in support to emphasise that "accident rate" has dropped. However, the data is as under:

Accident Rate Per Lakh Kms



Source: HRTC

The data shows that the rate has decreased slowly since 1997-98, but risen sharply in 2002-2003, and hovered at an average of about 0.15. This needs as serious analysis.

However, HRTC should adopt the additional norm of "fatality per lakh kilometers" also, to arrive at the real passenger impact of safety improvement. Further, HRTC should introduce a mandatory breathalyzer test at duty sign-on, by both driver and conductor, with surprise checks on run.

Staff Ratio

As against the actual per bus staff of 5.40 in 90s, the norm has been fixed at 5.80. HRTC has said the ratio of support staff per bus is 0.75, but as per the data sent by them, it is still 1 per bus (administrative 0.65 + Store 0.16 + Others 0.19). Meaningful steps need to be taken to bring down the staff cost.

Railways

In all its plan papers, Himachal Pradesh has given up on railway as a transport medium. It mentions the existing railway lines in passing, and then moves on to its familiar fixation with Road-HRTC.

The following traffic surveys were done in Himachal Pradesh in the last five years by the Railways:

Surveys Done During Last Five Years in Himachal Pradesh

Sr. No	*Name of Survey*	*Month/year of Report Submission*	*Length in Km*	*Project Cost (in Rs crore)*	*Rate of Return*
1	Kalka-Kamli new line	11/1997	5.35	25	-26.00
2	Hoshiarpur-Una	3/2000	40.5044.50	143156	-24.55-23.14
3	Pathankot-Jogindernagar – Gauge Conversion & BG line from Jogindernagar to Bhanupalli	3/2001	352.13	3566	-27.48
4	Una-Jaijon-Doaba	3/2002	40.14	269	-46.84

EXISTING RAIL NETWORK OF HIMACHAL PRADESH

Status of New Line Works

- After commissioning of Nangaldam–Una section, work on the Nangal Dam-Talwara new line was frozen by the Railway Board. Work was defrozen in 1997-98 and is in progress in one block section, i.e., for Una-Himachal to Chuararu Takarala (17 km), with a targeted date of completion of December 2003. The original estimate of cost was Rs 210 crore, but the expenditure upto Chuararu Takarala is likely to be Rs 68 crore, and the estimates will need revision.
- Kalka-Parwanoo new line (4 km). Work was sanctioned in 1999 at a cost of Rs 37 crore. There has been no progress in this project, because of the prohibitive cost of land. Himachal Pradesh government has now suggested that the line be taken to Tipra village, where the land cost is likely to be less. Fresh survey work has been taken up.

Passenger Railway

Himachal Pradesh is home to two of India's five heritage hill railway networks, the Kalka-Shimla line (96 km) and the Pathankot-Jogindernagar line (113 km).

Kalka-Shimla completed its century in November 2003. The Railways claim that while they spend Rs. 14 crore in maintaining the section, earnings are only Rs.7 crore, and that they run the line primarily as a tourist attraction, and as a heritage value.

Pathankot–Jogindernagar also passes through some of the most breathtaking rail journey views in the world, and its vast tourist potential remains under-utilised.

Himachal Pradesh government should approach Northern Railways to enter into joint tourist promotion packages, especially for attracting foreign tourists for steam tourism. The heritage tourist is willing to pay, provided the package is right. Steam engines are available both for the narrow and the metre guage sections, and time-tabled services should be announced for the same.

Goods Movement

This is a critical area in which Railways can help. Essentially there are two streams of traffic to cater to:

- High value or special-purpose container traffic: In the container segment will fall high value industrial produce, and agro-processing industry produce.
- Medium or low-value bulk traffic: This constitutes raw materials for Himachal Pradesh's cement plants, and movement of finished produce. It will also cater to increased fertilizer requirements for horticulture. It can be a major facilitator in the movement of bulk cement and steel, to as far away as economically possible, for Himachal Pradesh's medium and large hydro projects under construction, and under planning.
- Special Purpose Vehicles (SPVs) should be thought of, with investments from Railways, HP Govt, and the private sector, to develop a railway network that is capable of moving millions of tonnes of bulk raw materials required for hydro projects. When this work is over, the lines will be put to alternate passenger usage, but the business model should break-even with the targetted goods movement only, with extended passenger use as earning additional revenues for the SPV.

Containerisation

HP needs to encourage containerisation of the state. In consultation with Container Corporation of India, nodal points for establishing Container Freight Stations should be set up. To encourage direct shipping of agro-products to international markets, possibility of setting up an ICD should be explored.

Air Transport, Ropeways, Cable Cars

With Himachal Pradesh's vision of a high growth curve, it must be accepted that alternative means of transport must be developed, so that they can take the pressure off the roads. Otherwise, tourists will simply

not be able to reach, and goods delivery schedules will go haywire.

The possibility of using ropeways, with abundant power supplies predicted in the future, must be evaluated as a serious option for point-to-point movement of horticulture produce like apples.

Onward air linkages to the existing airports at Jubbar Hatti, Bhuntar, and Kangra by helicopters must also be evaluated. They cannot be a serious option for the average tourist, but the helicopters at Vaishno Devi and Kedarnath are booked in advance, and giving good returns. Circuits where paying tourists are available can be planned for this. Cable cars are also a great attraction, and HP needs to weave all these modes into a plan to encourage private participation in these sectors.

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