

**POWER CRISES, CAUSES AND  
MANAGEMENT**

By

**Engr. Riaz Ahsan Baig**



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## 1. BACKGROUND

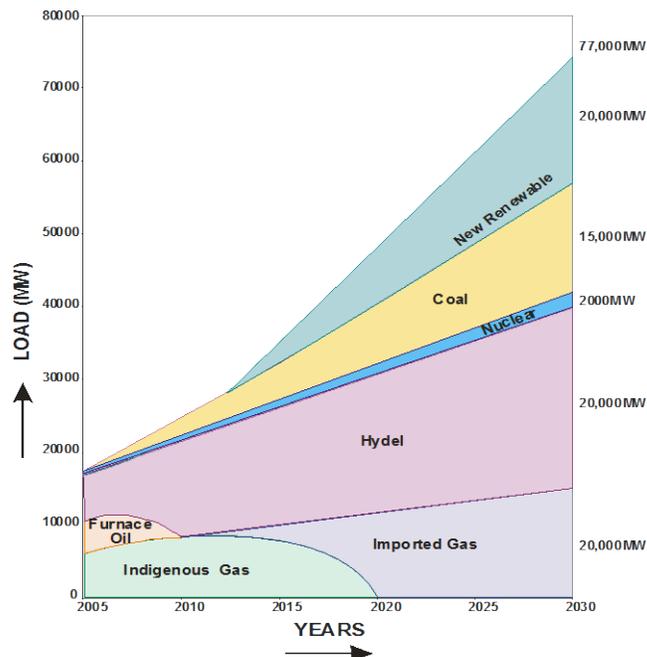
1.1 Today no one can deny that GOP has failed to meet the power requirements, so badly needed for economic growth of the Country halting agriculture and industrial development. Without an efficient energy sector, there can be no development of industries and increase in agriculture output. There seems to be no lack of planning since the power requirements and available indigenous sources were identified well in time but we lacked in implementation of the Projects, the reasons of which shall be discussed in this paper.

## 2. AVAILABILITY OF INDIGENOUS SOURCES AND ITS UTILIZATION

In brief our power growth rate on the average is about 8% per annum and we ought to add at least 2000 to 3000 MW of power every year. To give an idea of load requirement by the year 2030 and probable sharing of indigenous resources are given in Fig-1 taking into account a rational figure of declining growth rate from 8% to 5% per annum as base for total installed capacity is broadened. If we assume a uniform growth rate of 8%, a installed capacity of 124,000 MW is estimated by the year 2030 as shown in Fig-2. We shall be requiring at least additional 60,000 MW of energy over the next 20 years. This will give us an idea to what extent we can meet our power demand from the indigenous resources and the sectors where development is required to meet the shortfall. To achieve the target GOP needs to streamline its policies with consistency and determination, otherwise we will continue to pay huge price by halting wheel of industry and agriculture.

Fig-1

DIVISION OF ENERGY RESOURCES FOR PRODUCTION OF POWER BASED ON DECLINING GROWTH RATE OF 8 % TO 5%

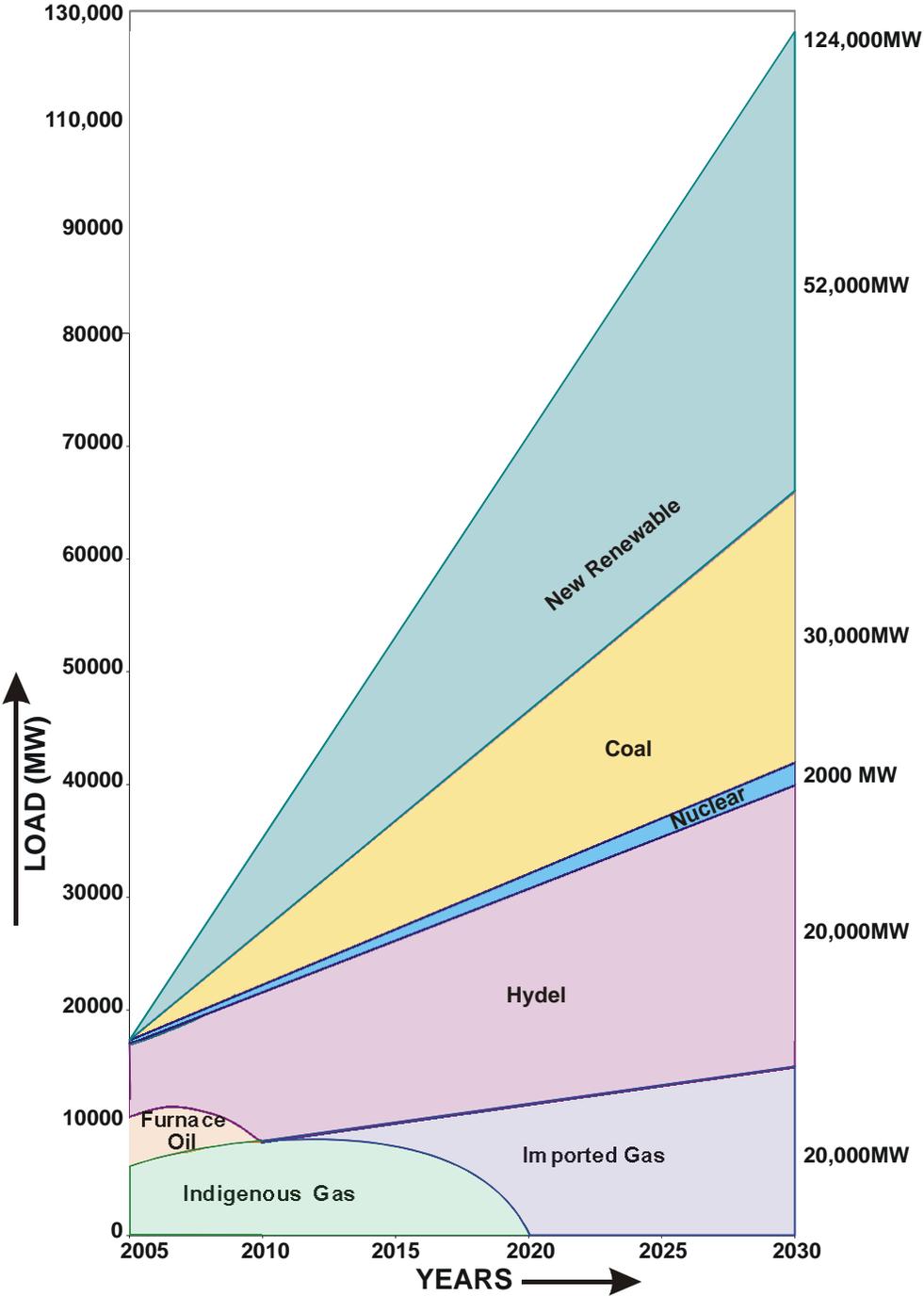


\*Vice President IEEEEP

Fig-2

DIVISION OF ENERGY RESOURCES FOR PRODUCTION OF POWER BASED ON

UNIFORM GROWTH RATE OF 8 %



Herein I will give a brief account of indigenous resources available and possible import of fuels to meet the short fall before discussing reasons for failure and remedies thereof.

## 2.1 Hydropower

2.1.1 Hydropower Development is one of the sector of energy, which Pakistan need to harness at a faster rate. It's a non-polluting renewable sources of water for agriculture and energy. It is pity that over the last sixty years Government of Pakistan has not paid due attention to harness this available potential. Over this period we have just added 6,463 MW of Hydle Generation against 41,000 MW power of estimated hydropower potential available in the country.

Government should realize that without affordable energy sector there can be no progress in the country. Under vision 2025, only 769 MW of power generation is planned to be added by the year 2010, which Projects are also not running according to schedule and have been delayed from 2 to 4 years.

The management has always been based on ad-hocism in absence of an effective system. Over the last one decade no major break through was achieved Inspite of big claims as most of the Projects were confined to pre feasibility or Feasibility Studies.

2.1.2 Unfortunately our technocrats have mixed the priorities of power generation from “big multi-purpose water reservoir dams” with “**run of the river**” generation. The main purpose of former is irrigation and the power generation is its by product while the later is purely used for power generation, and as such their priorities need to be separately identified based on power requirement. We have given priority to Kalabagh, Basha and Akhori Dams, which became hostage to political issues ignoring run of the river hydle generation projects. Power generation from “**run of river**” projects is low cost and its completion schedule is short compared to big water reservoir dams. Based on “**Run of the River**” Hydle Projects, a substantial power generation capacity of about 20,000 MW in northern areas is available, which should be given priority and completed within the next 4-5 years. A brief account of major hydropower generation available on “**run of river**” is as under:

Sr. #	Name	Generation Capacity (MW)
1	Pattan (Indus)	2800
2	Thahkot I & II (Indus)	2500
3	Dasu (Indus)	3700
4	Bunji (Indus)	5400
5	Munda (Swat)	740
6	Suki Kinari (Kunhar)	650
7	Azad Pattan, Karot, Mahl (On Jhelum)	700
8	Naran Patrind (Kunqar)	350
9	Naleem-Jehlum	970
10	Kohala	860
	<b>Total</b>	<b>18670</b>

## 2.2 Thar Coal

2.2.1 The coal reserves of Pakistan are estimated at over 183 billion tons while present rate of excavation is only 3.2 billion tons annually. Due to lack of planning, poor management and inefficient controls, Pakistan reserves could not be exploited. The details of coal reserves are as follows:

- Sindh has a very large coal resource potential outlined in and around Lakhra, Souda Jherruck, Thar and Badin Coal fields. Sindh has measured reserves of 734 million tons, while annual output is 1 million tons.
- Balochistan has a source potential of 194 million tons with measured reserves of 52.5 million tons while average annual production is one million tons only.
- Punjab has a coal reserve of 234 million tons with drill proven reserves of 43 million tons and annual production is 0.45 million tons.
- Proven recoverable resources of coal in Pakistan are 2265 million tons while production is 3.2 million tons annually only against its massive estimated potential of 183 billion tons.

2.2.2 The situation on coal production is not very encouraging. In spite of huge reserves of coal our Government has failed to harness God gifted potential for benefit of its people as coal mining remained at low priority and techniques used are primitive

2.2.3 The vast reserves of coal have failed to benefit Pakistan in any meaningful way particularly as the least inexpensive fuel for generation of electricity. The majority of coal produced in Pakistan is of sub-bituminous quality which has a higher moisture and sulphur content. Although coal requires special technology to be used in power generation yet it will still be cheaper compared to other technologies available at present.

GOP need to streamline its long term policies to use abundant indigenous coal reserves to reduce dependence on imported fuels. GOP has recently signed an MOU with China to mine Thar Coal and to generate 600 MW of electricity, although a small utilization of Thar potential, we can say is a step forward in the right direction.

2.2.4 Recently Prime Minister of Pakistan has constituted the Thar Coal Authority while abolishing all other agencies. This may be step forward for good governess as according to Provincial Government, sources of problem have been the Federal Government bodies that have consistently created hindrances in the way of investment.

### **2.3 Wind**

There is 10,000 MW to 15,000 MW of wind energy potential available in Sindh which Government of Pakistan has failed to harness, due to inefficient, inapt approach to tackle the problems. Over the last one decade dozens of Letter of Intent were issued by PPIB but to no avail, clearly indicating inefficiency of this organization.

Pakistan energy needs are immediate. Best option is exploiting wind energy in short terms because wind projects can be commissioned in two to four years. Wind energy is fastest source of power in the world. Global energy production from wind has risen from 20,000 MW in the year 2001 to 70,000 MW in 2006. China, Germany and USA are the main countries exploiting this indigenous source of energy in their own countries. 20,000 MW of wind turbines have been installed in Germany alone.

Wind energy is fastest growing and most potent source of renewable electricity although its application is limited to corridors where sufficient wind velocity to run the turbines is available.

### **2.4 Solar Energy**

Solar cell energy is emerging as most potent source of renewable energy in the new future, which is available in plenty. This source of energy still requires research and development to reduce its cost and size to acceptable limits.

During the year 2006, 750MW of solar cell systems were installed in Germany alone in remote areas where grid supply was not available. For an average house with required capacity of 4kW, Surface area of 35 Sqm to 40 Sqm, preferably on roof top is required which is on higher side and needs to be reduced through Research and Development. GOP should provide assistance to Engineering Universities for establishing solar cell research Laboratories and students given the assignment to carry out research as a Project or thesis.

The cost of solar cells will be drastically reduced when developed and produced locally. It is estimated that by the year 2020 solar cell will be one of the major source of energy in the World.

### **3. IMPORTATION OF GAS**

Due to limited gas resources in Pakistan importation of gas from the neighboring countries is inevitable to meet the growing demand of energy Gas importation projects envisage about 1500 KM to 2000 KM long pipeline connecting regional gas supply sources such as Turkmenistan, Iran and Qatar to domestic pipeline network bringing in more than 1.5 billion cubic feet of gas per day. The most viable available source is from Iran where sufficient proven gas reserves are available to provide us energy for another 100 years. Importing of gas from Turkmenistan is not safe and reliable while from Qatar it will be more expensive and perhaps not available over a long duration. Government of Pakistan over last one decade has failed to materialize any Project.

United States has been supporting import of natural gas from Central Asian States as an alternative to import of gas from Iran as a part of its strategy to isolate Tehran, the future of gas imports from Tajikistan would hang in balance because of security situation in Afghanistan. We as a nation should watch our own interest rather than pleasing foreign agencies

### **4. IMPACT OF FAILURE TO MEET THE POWER DEMAND**

Due to failure to timely implement the Projects to produce electricity from the available indigenous resources over the last one decade, we are today facing unprecedented power shortage stalling business, industry and agriculture output and causing national loss of billions of dollars. As a result all consumers have to bear the continuous rise in electricity tariff for an unlimited period in the foreseeable future due to increase in oil prices. This time bomb is ticking for unparalleled hike in gas and electricity prices and to meet the demand, we have made no attempt to reduce reliance on fuel based thermal electricity rather rented thermal generators are imported to fill the gap whose cost of generation is very high. How this is going to affect cost of industrial production, exports, commercial activities agriculture output, could be any body's guess, resulting in billions of dollars of unimaginable loss.

### **5. FAILURE OF MANAGEMENT**

#### **5.1 Background**

5.1.1 Unfortunately every Project which is in the national interest is sabotaged. PPIB has not delivered although hundreds of investors have shown their interest for investment in Pakistan. This evidently shows inefficiency and anti national approach to resolve the issues. Previously pre-feasibility of Thar Coal was conducted by Shenwa, a state owned Chinese Company. They gave a bid of 5.75 cents per kW but some Government agencies insisted to lower the cost and ultimately negotiations failed and instead invited IFC and US investors, the costs of which are very high and no progress is made for

harnessing Thar Coal reserves so far. Today we are buying power from hired gas generators at a much higher cost shutting down our own power plants due to shortage of gas supply, which in my opinion was a tactic used to accommodate foreign investor for vested interests. Same is the case of Gas Pipeline Project from Iran. To please USA, we have already delayed this Project for more than 2 decades and started looking for other alternatives under his direction which are neither safe nor reliable. Similarly under vested interests, we failed to award a single Windmill Project inspite of interest of several investors. At the end of the day we boost of our achievements by placing 170 million of our country men under misery and distress. We call ourselves Muslims having faith in Quran and Day of Judgment. We sell our conscious and country for sake of our Promotions and higher positions which they usually get under the directions of their Masters.

## 5.2 Causes

5.2.1 The answer to the question "Why We Failed" to meet the requirement can be learnt from examples of failure of Argentina and success of Singapore. In case of Argentina for economic debacle one can fix the blame on the 'poor governance by a series of successive governments coupled with poor national discipline. On the other hand brilliant economic success of Singapore is attributed is to the 'excellent governance" and to the "Superb discipline". It is a fact that poor governance and poor national discipline are the major factors of economic misery of the Third World and unfortunately Pakistan is one of them. In my opinion one of the major factors resulting into poor national discipline and bad governance is **corruption**.

### 5.2.2 Corruption, a major factor for our failure as a state

- i. A European writer on Asia, Tibor Mende says, no other symptom of Pakistan public life has contributed more to demoralization of the 'common man' than corruption. He further adds that illicit practices had reached such proportions that effects would likely wipe out whatever benefits new economic projects might have secured. In this regard Transparency International says 'The continuing high levels of corruption and poverty plaguing many of the under developed World's societies amount to an ongoing humanitarian disaster and slaughter of poor human beings and this calls for more focused and coordinated approach to strengthen institutions for governance.
- ii. With passage of time, the atmosphere conducive to corruption has been building up in the country ever since. One does not need to wait long to find out how the network seems to multiply by leaps and bounds from top to bottom for making personal rapid gains.
- iii. Corruption manifests itself through many modes commonly known as Bribes, Patronage, Kick backs etc. such type of corruption practices are visible but we have another type of corruption which is not known to the general public and I have named it as **latent corruption**. At top levels, corruption has given birth to foreign influence and relation with foreign agencies, which has completely destroyed the country's freedom and economic development. This type of corruption has already penetrated in the blood stream of our top brass bureaucrats, managers and politicians which is very dangerous and is responsible for disarray in our discipline and economic failure, and needs to be controlled with iron hands. Under the influence of foreign power's top brass positions in establishment are filled up, which look for their own interests under direction of foreign agencies and such covenants are signed which are detrimental to country economy's and existence.

- iv. Pakistan has a history of external dependency, which has traditionally allowed foreign forces to dictate their agenda to Pakistani leadership. Our establishment is fully under influence of loan giving agencies which force our leaders to accept country's financial dependency. Our leadership is told if foreign multinational aid donors influenced by foreign powers, do not provide financial assistance, we are likely to be doomed and national security will be at stake and our financial rating will be down graded. Generally the political and financial dependence in foreign powers is due to personal concerns and benefits rather than national interest. So the political parties, civil and military bureaucracies and clergy are divided into groups to look for their personal interests, to please the foreign powers. Under this system our top brass tries to please the foreign powers by adopting their dictated policies to get maximum personal benefits at the cost of nation. Any nation, which allows foreign forces to intervene, so willingly as we are doing today, cannot produce sustainable development resulting in bad governance, poor performance and greater socio-political instability.

## 6. REMEDIES

6.1 Before recommending any remedies we need to improve our economic conditions without which foreign investment for development of energy sector can not be attracted.

6.2 Due to changing political situation and war on terrorism, economic conditions of our country have deteriorated. Our foreign exchange reserves have fallen from US\$ 16 billion to less than 9 billion and Pak Currency has slided from Rs. 61 to Rs. 78 to a dollar over the last eight months. Hundi System is in force and dollars in market are freely available for transfer to foreign countries with total lack of control over the worsening situation. Any vision to address to economic issues in the near future by the present government is totally missing. By all means, we call the present situation, a worst example of bad governance and financial controls. In spite of all this one fails to understand how such a sound economy which was built over the last one decade has dwindled in few months when new Government has not taken any mega projects. It seems that it was again a hand picked of economists who were beating trumpet on the advice of some international financial agencies and economy was never on a sound footing.

To improve economic health of the country GOP must move fast and take measure to control flight of wealth to foreign countries, and improve balance of payments by exporting more and restricting imports. It will not be out of place to mention here that China even today is supporting its industry by giving 20% incentive at cost of all value added export products.

- 6.3 In addition GOP need to change the priorities of Projects. According to our understanding Projects with shorter implementation period and easier to construct should be taken up first. Under Hydel Projects Pattan, Thakot and Dasu should be given priority. In my opinion Basha is not a priority Project. Its cost along with approach highway will be more than US\$15 billion spread over a period of 10 to 12 years. In its place Kala Bagh Dam and Akhori Dam should be given priority which can be constructed in half the time and cost. As stated earlier we have plenty of indigenous resources, which must be exploited for healthy development of economy without further waiting in addition to gas importation from Iran. Following are the priority Power Projects, which may be taken up in the near future:

Type of Energy	Available Power Potential	Implementation Period
1. Wind Mills	10,000 MW	3 – 5 years

2. Hydle Projects on Run of River – Phase-I: Thakot, Pattan, Dasu & Bunji etc. – Phase-II: Other Hydle Projects on “Run of the River”	10,000 MW 10,000 MW	6 – 7 years 7 – 15 years
3. Thar Coal Phase-I Thar Coal Phase-II	5,000 MW 50,000 MW	5 years 5 – 15 years
4. Import of Gas from Iran	10,000 MW	7 years

6.4 The broader question, however, “how to cope with corruption which has engulfed every phase of life in Pakistan” is still to be answered. In my opinion we need to change the culture of corruption by punishing bureaucrats, technocrats and economists who are responsible for creating this situation of power crises and dwindling economy. Justice should prevail at every door step.

## 7. RECOMMENDATIONS

7.1 As stated above Government of Pakistan needs to review its priority for Water and Power Projects. Projects with shorter implementation periods, lower cost and easier to construct Must be taken up first. Following are the recommendations:

### i Wind Mills

All the available potential should be exploited within next 3 to 5 years of time instead of 15 years plan as presently envisaged.

### ii Hydle Power Project

#### a) Run of River Projects

Hydle Power Projects on Run of rivers which includes Dasu, Thakot, Pathan, Bunji etc should be given top priority and commissioned by the year 2015. Dasu with a generation capacity of 4000MW is nearest to the load centers and should be completed first followed by others power projects in sequence.

#### b) Water Reservoir Projects

Construction of Kala Bagh Dam and Akhori Dam should be given priority being low cost and having shorter period of Construction compared to Basha Dam.

### iii Coal

Indigenous Coal Power Project instead of Power Projects based on Imported Coal should be given priority.

### iv Gas

Gas Pipeline Project from Iran instead of Turkmenistan, which is neither safe nor reliable is the only solution to meet the energy gap.

## 7.2 Short Term Measures

i. Under short term measures, we have no alternative except to fill the gap by adding thermal power generation based on furnace oil. To have healthy competition and competitive prices, it is proposed that WAPDA/PEPCO and IPP’s should share this generation capacity equally.

- ii. GOP has adopted policy to hire generators on rental basis instead of installing own Thermal Power Generation, which is going to increase cost of Electricity tremendously, affecting cost of industrial production, exports, commercial activities and agriculture output. We need this additional thermal generation on permanent basis to meet with the short fall of generation to fill the gap of hydle generation during lean water season. GOP needs to correct its policy by installing its own thermal power generation rather than hiring generators on rent.
- iii. Power conservation and reduction in losses is another important area which GOP should give priority, by encouraging use of more energy savers, installation of capacitors on distribution feeders to improve power factor, and rehabilitation of distribution feeders to reduce line losses. In addition 70% of energy can be saved if buildings are properly insulated for transfer of heat and cold from outside. GOP needs to formulate policy for construction of buildings which should be mandatory for all agencies responsible for planning, design and construction of buildings.
- iv. To further reduce expansive generation on Furnace oil , GOP may also consider to switch over street lighting to solar power system if viable.

### ANNEXURE-I

#### STATUS OF HYDROPOWER PROJECTS UNDER CONSIDERATION

#### 1. Projects in pipeline at this time (Magnitude of projects and required investment, brief description, expected period of commissioning).

##### 1.1 Public Sector Hydropower Projects;

##### A. Under Construction:

Sr. No.	Name of Project	Capacity (Mw)	PC-I Cost (Rs. In Million)	Expected Commissioning Date
1.	Pehur	12	753	Feb 2009
2.	Khan Khwar	72	5363	Sep 2009
3.	Jinnah	96	13597	Feb 2010
4.	Allai Khwar	121	8578	Sep 2010
5.	Duber Khwar	121	8578	Oct 2010
6.	Gomal Zam Dam Multipurpose	17.4	62553	Oct 2010
7.	Kurram Tangi Dam Multipurpose	83	17205	Sep 2011
8.	Neelum Jhelum	969	84502	Jun 2015
	<b>TOTAL</b>	<b>1500.4</b>		

##### B. Ready for Implementation:

Sr. No	Name of Project	Capacity
1.	Golen Gol	106 MW
2.	Basha/Diamer Multipurpose Dam	4500 MW
	<b>TOTAL</b>	<b>4606 MW</b>

##### C. Under Studies: (Major Projects)

Sr. No	Name of Project	Capacity
1.	Dasu	4000 MW
2.	Keyal Khwar	130 MW
3.	Spat Gah	545 MW
4.	Palas Valley	386 MW
5.	Bunji	5400 MW
6.	Kohala	1100 MW
7.	Akhori Multipurpose Dam	600 MW
8.	Munda Multipurpose Dam	748 MW
	<b>TOTAL</b>	<b>12909 MW</b>

## 2 Private Sector Hydropower Projects

### A. At Tariff Negotiation Stage

Sr. No.	Name of Project	**	Capacity (Mw)	Estimated Cost (US\$ in Million)	Tentative Commercial Operation Date (COD)
1.	Matiltan	1996	84	160	Dec 2012
2.	Kotli	2003	100	178	Jan 2012
3.	Rajdhani	2002	132	171	Sep 2012
4.	New Bong Escape	2006	84	160	Dec 2011
5.	Gulpur	2006	100	200	Nov 2011
6.	Patrind	2007	150	241	Jan 2013
7.	Suki Kinari	2008	840	1139	Apr 2016
	<b>TOTAL:</b>		<b>1490</b>		

\*\* Feasibility completion year

None of the above project has so far achieved the financial closure although the LOIs for New Bong Escape HPP, Rajdehani HPP and Matiltan HPP were issued under 12995 Power Policy

### B. Under Studies:

Sr. No	Name of Project	Capacity
1.	Gabral-Kalam	101 MW
2.	Asrit-Kedam	209 MW
3.	Kalam-Asrit	197 MW
4.	Madyan	148 MW
5.	Azad Pattan	222 MW
6.	Karot	240 MW
7.	Sehra	65 MW
8.	Sharmai	115 MW
9.	Chakothi Hattian	139 MW
10.	Kaigh	548 MW
	<b>TOTAL</b>	<b>1984 MW</b>