

# Prospects of Multi-Stages Hydro Power Plant in-India

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**Abstract--Now these days India is suffering from more energy crises due to more industrialization. So, India has to search the other option of energy to avoid the energy crises. There hydro power is already exist option to reduce the energy crises and should capacity increase of large hydro power plant because hydro power is new important only next to the thermal power. The power plant is simple in concept and self-contained in operation. Its reliability is generation that of the power source. To convert the single stage hydro power plant into multi-stage hydro power plant is more suitable option to increase the capacity of large hydro power plants.**

## 1. INTRODUCTION

Power is a very important structure of the overall progress of a nation. It is the tool to copy the financial growth of a country [1]. India mostly depends on thermal power [2]. There is a need to promote the renewable energy[3]. There has been therefore, an ever-increasing need for more power generation recently in all the countries of the world.

In a true international view of the power demand, it can be said with faith that all the countries of the world are now actually facing energy emergency and are busy expressing methods and devices to explore the various possibilities of energy generation for satisfying the growth demand[4]. As such, it is observable that there has to be a fresh judgement of energy producing resources and formulation of programmes for the operation of plans with maximum efficiency[5].

### 1.1 Classification of hydro power plants

Table-1.2 Classification of hydro power plants

Source-MM Deshmukh

Hydro Power Plant	Capacity
Pico	5 kW
Micro	5kW-100 kW
Mini	100kW-2 MW
Small	2-25 MW
Medium	25- 100 MW
Large	Above 100 MW

### 1.2 Source of energy in India

India is mostly depend on thermal power 59% and then at renewable 29% (12% solar and wind + 17% hydro)

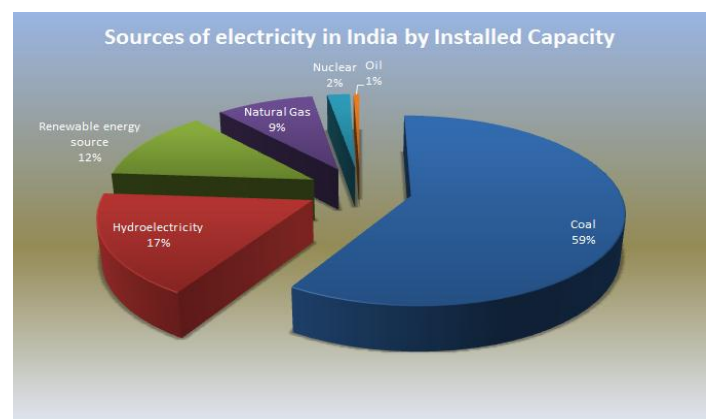


Fig. Source of energy (source-MOP 2012)

1.3 Types of hydro schemes

- (a) Single Stage hydro Schemes
- (b) Multi-Stages hydro Schemes

(a). Single Stage hydro Schemes

In this scheme makes only one reservoir and one power house. Examples are Indira Sagar hydro project, Omkareswar hydro project shown in fig. (a).

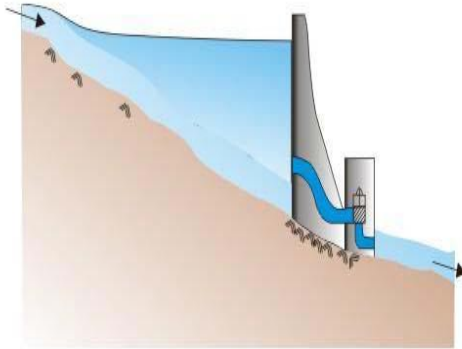


Fig- (a) Single Stage hydro schemes

(b). Multi-Stages Hydro schemes

A series of hydro power plants developed at same water passage with some gap (not greater than 2km). In multi-stages hydro schemes makes two or more reservoir and at every reservoir make a power house. First reservoir make large compare with other reservoirs shown in fig (b).

Examples-Tehri Dam(UK),Bhakra Dam (Punjab) Chamera Dam, (Himachal Pradesh) etc.

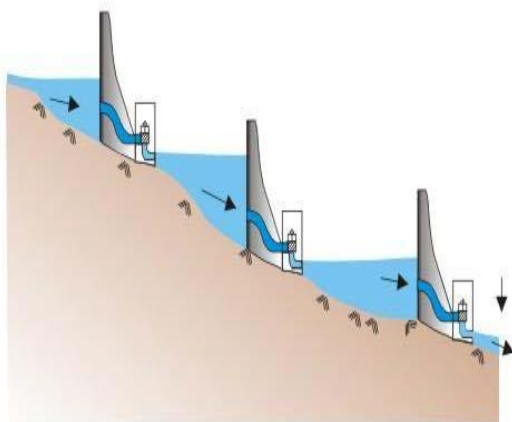


Fig.-(b).Three Stage hydro schemes

2. CAPACITY ANALYSIS

Capacity with single stage and with multi stages of hydro power plants which are already multi stages. There is a table, in which capacity comparison of power plants is given “If they are single stage” and now are multi stages

Let X= Installed Capacity MW [Plant is multi-stages]

Y= Capacity [If Plant was single stage] MW

= [No. of units x highest capacity] MW

Z= Capacity improved with multistage (%) = (X-Y)/Y x 100 %

Table-Multistage hydro power plant in India

Source- MNRE India.

Hydro Project	Stages	X	Y	Z
Tehri Dam, UK	Three	2400	1000	140
Bhakra Dam, PB	Two	1325	785	68
Chamera Dam, HP	Two	1071	540	98
Uri-hydro project, J&K	Two	720*	480	50
Parbati Project, HP	Two	1320	800	65
Srisaillam Dam, AP	Two	1670	900	85
Sharavathi Dam, Karnatka	Three	1469	1035	42
Kalinadi Dam, Karnatka	Five	1240	750	65
Nagarjuna Sagar, AP	Three	965	705	36
Konya Dam, MH	Four	1960	1000	96
Sardar Sarovar Dam, GJ	Two	1450	1200	20
Hirakund Dam, Odisha	Four	347.5	112	209
Teesta Low Dam, WB	Two	292*	160	82
Total		16229	9468	71

\*under construction

Capacity improved

$$= \frac{[Capacity\ with\ multi\ stage - capacity\ with\ single\ stage]}{Capacity\ with\ single\ stage} \times 100$$

$$Capacity\ improved = \frac{[16229 - 9468]}{9468} \times 100 = 71.40\%$$

### 3. RESULTS

So from above result we can find the average new capacity of single stage hydro power plants when they will convert into multi-stage hydro power plant.

Let  $X$  = Installed Capacity MW [Plant is single stages]

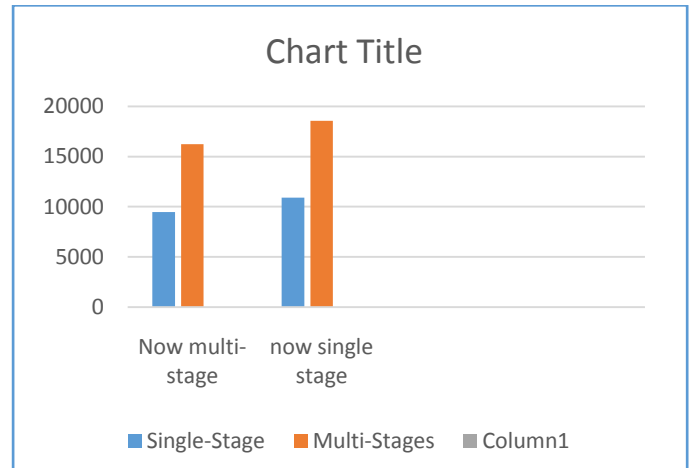
$Y$  = Capacity [If Plant will multi-single stage] MW

$$Y = (1 + 0.71) \times X$$

Table-Single stage large hydro power plant in INDIA

Source- MNRE India.

Hydro Project	Stage	X	Y
AD hydro, HP	Single	192	329
Nathpa Jakri, HP	Single	1500	2571
Karcham, HP	Single	1000	1714
Dehar, HP	Single	990	1542
Salal, J&K	Single	690	1182
Pong, HP	Single	396	678
Dulhasti, J&K	Single	390	668
Baspa-II, HP	Single	300	514
Bairasuil, HP	Single	180	308
Sewa, J&K	Single	120	205
Idukki, Kerla	Single	780	1336
Methur, TN	Single	240	411
Indira Sagar, MP	Single	1000	1714
Omkareshwar, MP	Single	520	891
Bargi, MP	Single	105	179
Teesta-V, Sikkim	Single	510	874
Lower Subansiri, AP	Single	2000	3428
Total		10913	18441



If all large hydro power schemes will convert into multi-stages hydro schemes then capacity of hydro power of India will increase with 71.40%.

### 4. CONCLUSION

Our country is suffering from energy crises, so energy generation should increase to avoid this crises of energy. There is an idea, if we convert the single stage hydro power plants into multistage hydro power plants, then we can increase the capacity of country of electricity generation.

### 5. REFERENCES

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