

## Why No Pumped storage Plants in Kerala?!!

We have already talked on Pumped storage scheme and I hope we all are well aware of the fact that we are still running our thermal plants with a lower PLF than it is designed and even unit cost is much higher( around 6- 7 Rs/unit ). So why we still not going for it. I would say we gotta think of some hybrid plants with combination of solar power(already our Prime Minister accorded for GW of solar power in his renewable energy program) too.

Why can't we think of having one at Athirapilly? Will that help us to improve our pricing level? We can't always depend on corridors until the central Govt liberalise Power and water and it should not consider region, language etc. But the people of india and relatively same cost across the states. So here are the points to discuss. Now we are having close to 1200 MW from central, rest we purchas from private producers. So we have to think of adding our capcity. Ironically we are the only state with decline in capcity!!

### (II) SALIENT FEATURES OF SYSTEM CONDITIONS.

INSTALLED CAPACITY DERATED (MW)	APTRANSCO	TELANGANA	KPTCL	KSEB*	TNEB	PONDY	CENTRAL SECTOR	IPP	REGIONAL
Sep-2014	5645	4367	6536	2194	7525	32.5	9310	23071	55560
Sep-2015	6790	4367	6536	2151	7525	32.5	12810	26718	66931
% INCREASE (I)	20.29	0.00	0.00	-1.94	0.00	0.00	37.59	15.81	20.47

\*BDPP Units Derated

So here are the points to discuss.

**Availability Based Tariff (ABT)** is a frequency based pricing mechanism applicable in India for unscheduled electric power transactions. The ABT falls under electricity market mechanisms to charge and regulate power to achieve

short term and long term network stability as well as incentives and disincentives to grid participants against deviations in committed supplies as the case may be.

Some benefits of UI, in addition to those accruing due to ABT, as realized by the more progressive utilities, are as follows:

- Online optimization of generation, particularly hydro: by backing down a station when its generation can be replaced by cheaper energy and maximizing its generation when

there is shortage.

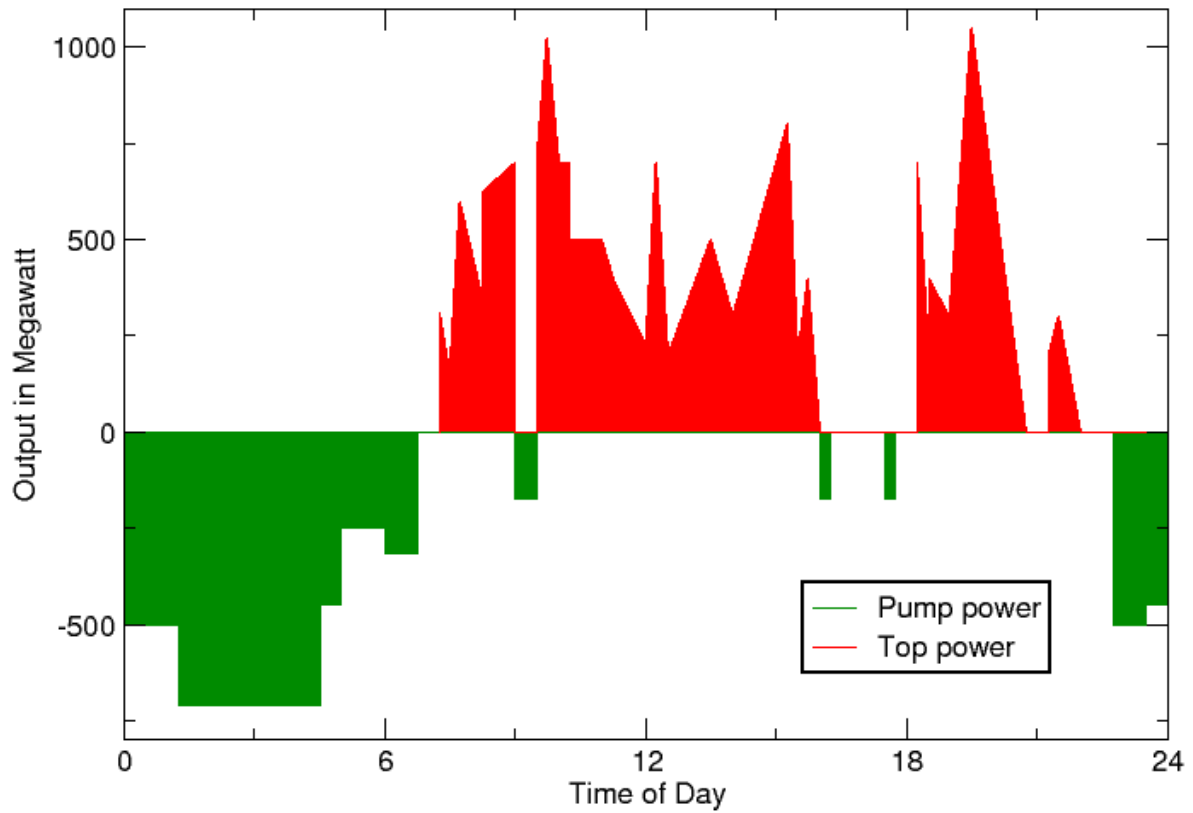
- **Operation of pumped-storage plants (e.g. Kadamparai and Srisailam) to their full potential, enabling higher peak demands to be met.**
- Mutual support in the event of unforeseen outage of generating units, and on special occasions when one or more utilities need to meet extra demand; e.g. Pulse Polio campaign, World Cup match.
- Inter-regional exchange of power on unscheduled basis, to replace costlier energy by cheaper energy, as also to conserve hydro energy for shortage periods.

### What is availability?

Availability, for the purpose of the ABT Order means the readiness of the generating station to deliver ex-bus output expressed as a percentage of its related ex-bus output capability as per rated capacity. **Electricity is a commodity whose cost of storing is more than its production cost.** That is why demand for grid connected solar roared.

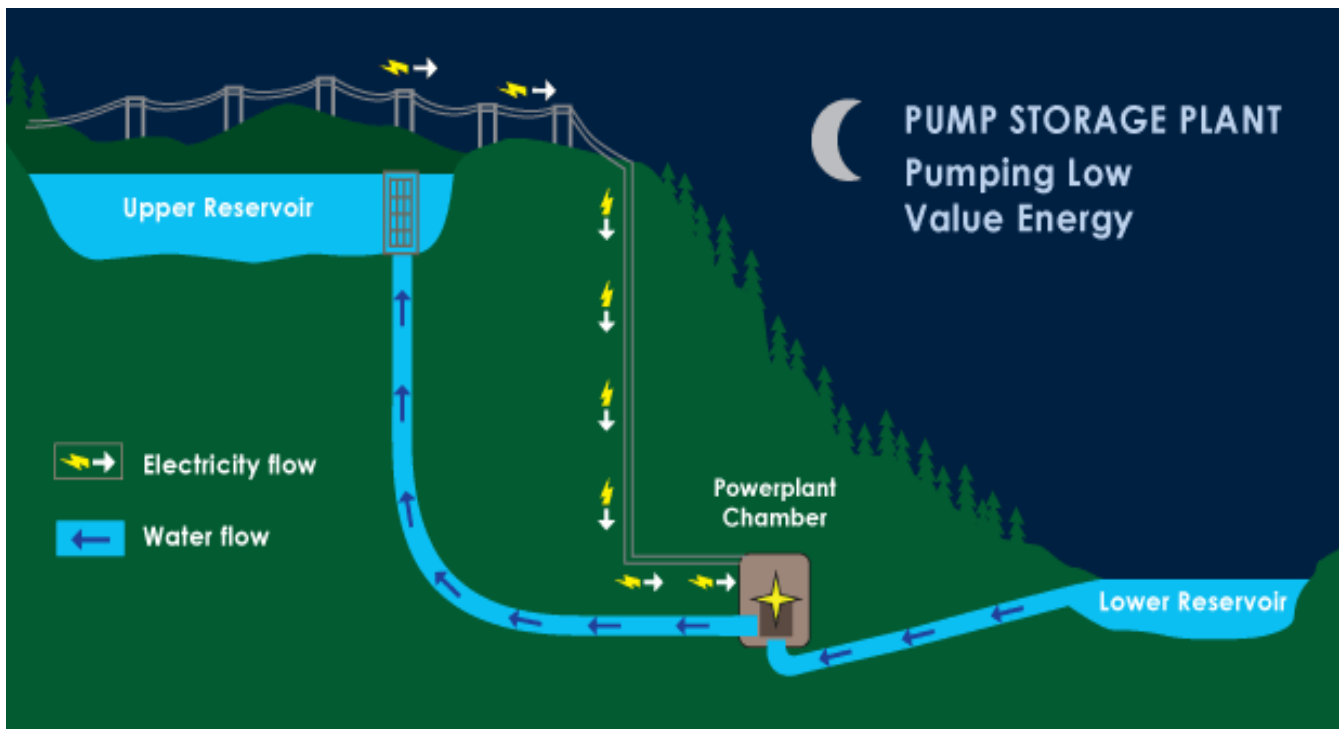
The most economical method for electricity generation, transmission and distribution is just in time production where the availability and reliability of the entire system shall be very high to meet the **unpredictable** electricity demand on minute to minute basis. So we know Hydro is the best in this (Frequency Droop) and can respond to this changes very quickly. *How about Asynchronous Pumping??* That's we are discussing here

- 1. Pumped storage:** Here we use the Generator/Motor in Motoring mode for off peak hours(11PM To 6 AM and 11 AM to 5 PM) and this pumped water head in to valuable peak demand. **So we make use of cheaper power available in the grid during off peak or we will improve the utilization of thermal power plants of our own and there by increase the operational efficiency and peak demands( Most of these years these plants were underutilized since we can not stop and start the steam turbine after 5 hours of working and so on)**

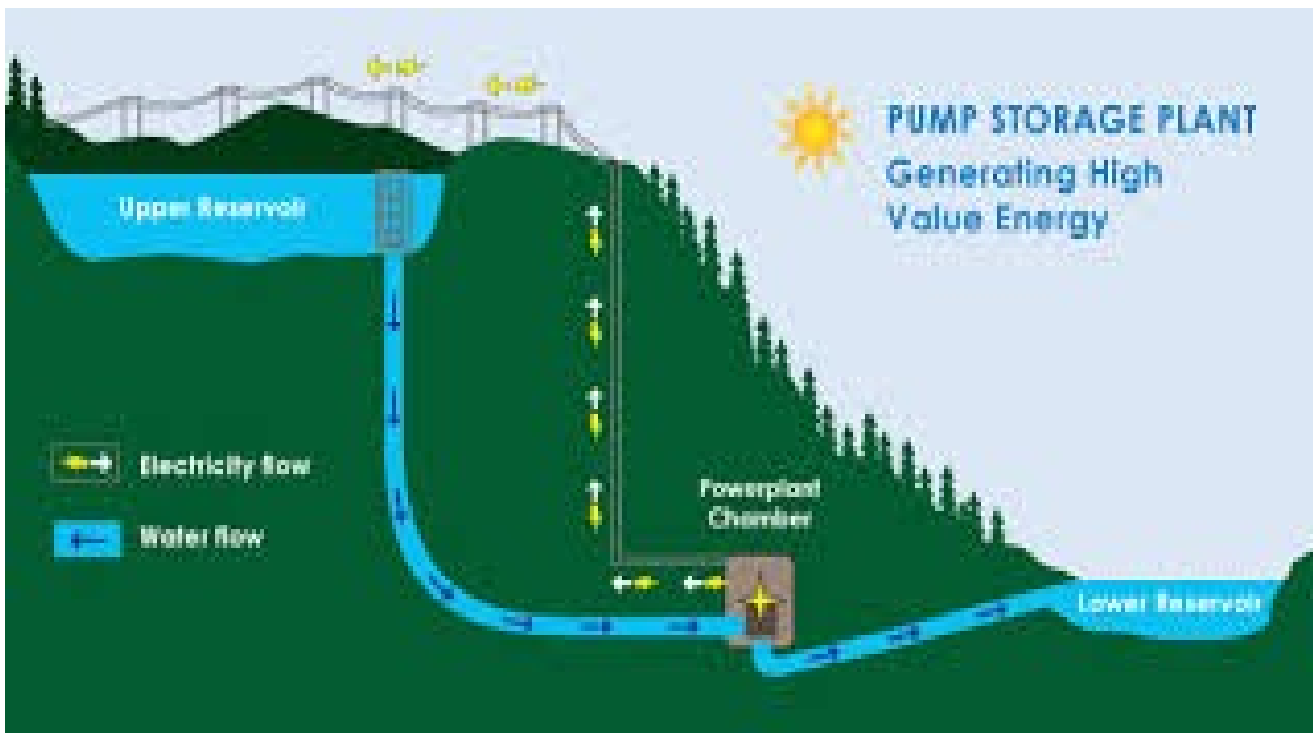


Power distribution, over a day, of a pumped-storage hydroelectricity facility. Green represents power consumed in pumping; red is power generated.

**Pumping mode when availability is more.**



**Generating mode when demand rises.**



Disadvantage: We may have to start and stop the machine for a change in mode during higher or lower demands.

## 2. Asynchronous pumped storage.

Regulation of the amount of energy absorbed (Kind of a frequency droop) in pumping mode, facilitating energy storage when power levels on the network are low, in addition to reducing the number of starts and stops and finally helping to regulate the network frequency or voltage in pumping mode

Operating close to the turbines optimal efficiency point, which results in a significant increase in plant efficiency

Operating in a wider head range, increasing the availability of the plant and facilitating installation of pumped-storage plants on sites characterised by wide head variations

Alstom says they are introducing this technology in India and it seems to be TEHRI project.

In simple words let's say frequency of the system is below 50 HZ, nowadays our hydro machine should deliver more even if it's an off peak hour to stabilize the system. But if we were having a pumped storage plant they can reduce the pumping by lowering the speed of the machine (No Stopping from pumping mode, Kinda what we say Inverter AC in this era of airconditioning system, refrigerated etc.) and there by releasing some power to stabilize the system. When the frequency is above 50 Hz it will pump more and there by utilizing the UI share for KSEBL.

**Modern systems need just thirty seconds to start the pumps or turbines up from a standstill**

**SPIN RESERVE**(How we can use PSP in for this?!!)

We can use this Asynchronous machine as a spin reserve during off peak hours. Now we are using IHEP machine for this purpose since it's the biggest machine in the Kerala grid which can absorb or reject power in the order of 100 MW. So let's say we are running asynchronous pumped storage plant of 160 MW(80x2), the demand rises then they will go to generating mode and release 160 MW power. If it's a EHV feeder tripping issue then this can be reversed to generating mode according to our water availability. So it's very quick and easy. So our valuable idukki storage can be further utilised for dry season/peak hours.

**How to accommodate renewable energy.**

I feel, pumped-storage schemes can bring glory to the renewable energy sector. Because wind and solar cannot be stored in **battery** practically and not viable too. But we can consider our reservoir as huge battery with no acid or chemicals. This can pump the surplus of solar energy in to the dam and we can use this green energy and promote it with the help of pumped storage. **Why that TNEB has so much of affinity towards pumped storage???? They are planning for 1 GW capacity.**

The highest installed capacity of pumped storage power plants can be found in the USA, China, Japan and Western Europe. More and more countries around the globe are turning

to the potential of pumped storage power plants as they prepare the way for increased use of renewable energy. Wind and solar power plants are subject to strong natural fluctuations. They cannot always provide electricity in the required amounts or at the desired time. Excess energy thus needs to be stored so that it can be made available at any time. With the current state of technology, there is only one possibility for achieving this in an economically viable, large-scale way: with the help of pumped storage plants.

### **Solar+Hydro (Hybrid)**

We can also think of converting Sengulam and Vadakepuzha pumping schemes in to a hybrid syste. During sunny days it can utilize solar power and later it can work with KSEB supply. At any cost it is beneficial to our system. **1, Socio Economic front of KSEBL for projects Viz. BDPP,KDPP and considering the submerged lands for our large hydro plants. 2, Right of way for feeders also consume some plants- So having a solar plant in the already submerged/unutilized land like reservoirs will give us a front in our carbon emission reductions.3. Not much of shades 4. These pumping stations are small load center(So transmission loss is not there, as of now we are transmitting power to the pumps using kerla grid).**

**Environmental friendly projects are in demand for todays growth and we have a brighter future.**

Why No Pumped storage plants in kerala??

Why cant we think one at Athirappilly??

Will PSP answer to the questions from the so called environmentalist about the firm power and financial viability of existing proposal of 80x2 and 1.5x3??

Remember our proposal for the existing plant is a vertical shaft penstock, and pools in the U/S and D/S. Tamil Nadu is going to commission a new plant at KUNDHA(250x2).. So why not in kerala??

Continued..

Shine Sebastian