F. No. 15-14/9/2022-H-II (Part)
Government of India / Bharat Sarkar
Ministry of Power / VidyutMantralay
Shram Shakti Bhawan, Rafi Marg
New Delhi – 110001, Tel: 011-23705841
***

Dated: 15th February, 2023

To

1. **Chief Secretaries – All the State Governments & Union Territories**
2. **Principal Secretaries (Energy / Power) - All the State Governments & Union Territories**
3. **CMDs – PGCIL, NTPC, NHPC, SJVN, THDC, NEEPCO, Grid India,**
4. **The Chairman – BBMB, DVC**
5. **All Private Sector Developers of PSPs**

विषय: देश में पंप भण्डारण परियोजनाओं के विकास के लिए प्रारूप दिशानिर्देश - टिपण्णी / सुझाव आमंत्रित।

Subject: Draft guidelines to promote development of Pump Storage Projects (PSP) in the country – seeking comments - regarding.

Sir,

Energy Transition entails an increasing presence of variable & intermittent Renewable Energy Sources (VREs) like solar & wind in the energy mix. This presents a grid-level challenge, that would require incentivization of technologies offering storage & ancillary services attributes. Pumped Storage (PSPs) is a MW scale, domestically available, time tested, and internationally accepted technology available for addressing this requirement of storage and ancillary services.

2. The positive aspects of PSPs are not limited to the attributes of storage and ancillary services, rather PSPs are clean, green, safe, and non-explosive. They don't produce any poisonous/ harmful by-products or pose problems of disposal.

3. Keeping in view the immense utility of the PSPs in grid stabilization as well as meeting the peaking power demand, a need for formulating a separate guideline to promote PSPs was felt to set the direction of its development. Accordingly, this Ministry has come up with draft guidelines on PSPs, which seeks to promote the development of PSPs across the country with proactive support of the State Governments. A copy of the draft PSP Guidelines is enclosed herewith.

4. In view of the above, all the State Governments / UTs alongwith other stakeholders are requested to furnish their comments / suggestions within 15 days of the issuance of the draft guidelines, to the email id - hydro2-mop@gov.in.

This issues with the approval of Hon'ble Minister of Power and New & Renewable Energy.

Yours sincerely,

(Vikrant S. Dhillon)
Deputy Director
Email: hydro2-mop@gov.in
Tel: 011-23705841

Copy with similar request to:-
Secretary, Department of Economic Affairs, Ministry of Finance
Secretary, Ministry of New & Renewable Energy
Secretary, Ministry of Environment Forests & Climate Change
Secretary, Ministry of Mines
Secretary, Ministry of Coal
Chairperson, Central Electricity Authority

Copy also to:
In-charge, **NIC Cell, MoP**: with request to upload the draft guidelines on the Home Page of the official website of the Ministry and to kindly ensure that it stays on the Home Page for at least 20 days.

(Vikrant S. Dhillon)
Deputy Director

Guidelines on Pumped Storage Projects

1. Introduction

Energy Transition entails increasing presence of variable and intermittent Renewable Energy Sources (VREs) like solar & wind in the energy mix. This presents a grid-level challenge for stability and a need for addressing the temporal considerations in power availability. Storage and ancillary services would be the attributes that require incentivization in the power system to ensure appropriate capacity. Comprehensive storage guidelines are required to set the direction of developments in this regard. Amongst the various technologies available for addressing this requirement of storage and ancillary services, Pumped Storage Projects (PSPs) are clean, MW scale, domestically available, time tested, and internationally accepted.

The positive aspects of PSPs are not limited to the attributes of storage and ancillary services. PSPs are clean, green, safe, and non-explosive. They don't produce any poisonous/ harmful by-products or pose problems of disposal. The guidelines to promote PSPs are not only based on their usefulness in maintaining grid stability and facilitating VRE integration but also keeping in view their other positive attributes when compared to other available energy storage systems.

1.1 Perspectives

Flexible Energy Generation Assets that can supply both Base Load & Peaking Power efficiently and economically are the need of the future and the necessary solution to address the dynamically evolving energy needs of India. At present, Variable Renewable Energy Sources (VRE) such as wind and solar are being connected to the grid at a rapid pace owing to their low cost of installation and the thrust on sustainable & green energy. The energy supply from VREs can't be regulated fully since they are dependent on the time of the day, different seasons, and the vagaries of weather. Hence, there is an ever- increasing demand for Flexible Energy Generation and Storage Assets. PSPs are best suited in the present scenario for addressing this demand. PSPs are also known as 'the Water Battery', which is an ideal complement to modern clean energy systems.

PSPs provide the necessary scale of storage and have a long service life of more than 40-50 years. This is much more than any other energy storage technology presently available. This also results in a low cost of delivered energy over the life of the projects. They are non-polluting and are more environmentally friendly. Pumped Storage Projects account for over 95 percent of installed global energy storage capacity, well ahead of lithium-ion and other battery types. It is estimated that pumped hydro projects worldwide store up to 9,000 gigawatt hours (GWh) of electricity worldwide.

(a) Energy Transition Considerations

India is on the path towards a clean energy transition, guided by the Nationally Determined Contribution NDCs) targets, to reduce the emission intensity of its Gross Domestic Product (GDP) by 45% by 2030, get to 50% of installed capacity from non-fossil fuel sources by 2030 and achieve net zero carbon emissions by 2070. Given this thrust, the presence of variable renewable energy in the energy spectrum in the form of solar and wind is bound to increase. Given these ongoing energy transitions in the country, the development of PSPs is of paramount importance for providing greater inertia and balancing power to the grid. With its ability to store a large amount of

energy, frequent starts/stops, and faster ramp-ups/ramp-downs, PSPs are ideally suited to address the dynamic supply and demand in the country. PSPs can also be used for peaking operation and improves the reliability of the power system. While battery storage solutions are still evolving and are required for short duration storage needs in grid management, PSPs are a natural enabler for integrating greater amounts of wind and solar power.

(b) Ancillary Services Considerations

Wind and Solar power, have become one of the lowest-cost sources of renewable energy. However, their inherent variable, uncertain and intermittent nature presents a huge challenge for integrating large quantities of renewables, while maintaining grid stability. The curtailment of wind and solar power is already being witnessed whereas they presently constitute only around 25% of total energy generation. With the increasing presence of VREs, the need for curtailment will be more acute if there is insufficient storage in the grid. PSPs present a viable solution to the integration issues of large RE capacities. They are best equipped for peak load requirements. PSPs can store a large amount of energy during off-peak hours and discharge over longer period. Thus, PSPs would help reduce RE curtailment and improve the plant load factor of VREs.

(c) Temporal Considerations

It is anticipated that with the increasing presence of VRE in the energy mix, the generation of wind and solar energy may be at its peak where the energy demand is the lowest. If the energy from these sources is not stored during off-peak hours in times to come, there will be an increasing need for large operating reserves from thermal power plants (typically high carbon coal and gas) to meet the peak demands of the nation. PSPs provide an economical solution by off taking a large amount of energy from the grid during off-peak hours, increasing the load factor of other systems, and also providing additional capacity to meet the peak loads. Under suitable conditions, pumped hydro storage provides a dynamic response and offers critical backup during periods of excess demand along with maintaining grid stability. Without PSPs, full decarbonization of the electricity sector may not be achievable at reasonable costs. Thus, PSPs provide 'green storage' and make VREs dispatchable by firming up the capacities.

1.2 Advantages of Pumped Storage Projects

(a) Ecologically friendly

PSPs have minimal impact on the environment in their vicinity as they are mainly envisaged on the existing Hydro Electric Projects, reservoirs, or as off-the-river projects. All components of PSPs are connected, operated, and maintained in an environmentally friendly manner. There are no residual environmental impacts in the case of PSPs. The assessment of the storage technologies should be based on life cycle costing including the cost of decommissioning.

(b) Atmanirbhar Bharat

The guidelines for the development of storage systems should be synchronized with the vision of Atmanirbhar Bharat. The PSPs primarily use indigenous technologies and domestically produced materials. Most of the electrical & mechanical parts of PSPs are also made in India. Other alternate solutions to storage such as batteries are heavily import-dependent especially given the current holding of lithium

reserves at the global level. The increasing demand for storage poses a major challenge to the energy security of our country.

(c) Tested Technology

The PSPs operate on time-tested technology thereby infusing confidence in the lending institutions for a longer duration of loans. Additionally, the cost of technologies involved in the construction has reduced rendering PSPs a viable proposition. The technological surety associated with PSPs has opened the possibility for the developers to claim a higher debt-equity ratio in the projects.

(d) Local developmental

The development of PSPs is highly capital intensive and involves the development of local transport infrastructure for the mobilization of men and materials. Local industries such as cement and steel also get impetus and drive job creation in the economy. This in turn can have a salutary effect on local area development. PSPs are an ideal investment for socio-economic and regional development considerations like infrastructure up-gradation and employment generation.

(e) Longer and reliable duration of discharge

PSPs are generally designed for a longer duration of discharge of more than 6 hours to meet the peak demand or for compensating the variability in the grid due to VREs. Currently, Battery Energy Storage Systems are designed for up to 4 hours of discharge generally. The firm capacity of PSPs during peak hours is guaranteed and relatively immune to the grid conditions.

1.3 Pumped Storage Potential and Development Status

As of date, the CEA estimates regarding on-river pumped storage potential is 103 GW in India. Apart from the above, a large number of off-river pumped storage potential is also available which is being estimated. Suitable support is to be extended to the identification and evaluation of such potential.

As of now, 8 projects (4745.60 MW) are presently in operation, 4 projects (2780 MW) are under construction, and 24 projects (26630 MW) have been allotted by States which are under different stages of development.

1.4 Long Term Plan for Pumped Storage Hydro Development

The long-term approach to the development of pumped storage projects will be driven by various factors regarding the requirement of the grid to achieve the energy transition. The draft National Electricity Plan(NEP) published by Central Electricity Authority indicates that 18.8 GW of Pumped Storage Projects and 51.5 GW of BESS (5 hour) are required to integrate the planned RE capacity addition till 2032. However, additional development of PSPs at viable cost would bring down the requirement of BESS. As per the draft NEP published by the Central Electricity Authority, the country would require 18.8 GW of Pumped Storage Projects and 51.5 GW of BESS (5 hour) to integrate the RE capacity envisaged till 2032. The PSP capacity requirement may further increase if the cost of BESS does not come down as expected. The Central Electricity Authority will continue modelling and forecasting the energy demand and energy mix over the long term and providing an indication of the probable requirement of the various forms of storage. This exercise would mean factoring in the aspects of viability and technology change. The Resource Adequacy Plan will consider storage as an element of planning.

1.5 Barriers in the development of Pumped Storage Projects

(a) Environmental clearances

Presently, the environmental clearance and forest clearance process of PSPs is very cumbersome, since these projects are treated at par with the conventional hydro projects for the purpose of grant of EC and FC. The environment impact of PSPs constructed on existing reservoirs on on-the-river sites and on the off-the-river sites is generally less as compared to conventional HEPs. Further, unlike the conventional hydro projects, development of PSPs do not lead to significant displacement of the people and thus, require minimum R&R. Therefore, PSPs constructed on existing reservoirs on on-the-river sites and on off-the-river sites are required to be treated as a separate category for processing of clearances as an of infrastructure project.

(b) Free power

PSPs are fundamentally energy storage projects designed to cater the need of grid stability during the peak hours. Unlike conventional hydro projects, PSPs do not produce electricity. They are net consumers of electricity. Therefore, there is no question of imposing the requirement of free power on PSPs.

(c) Cost of pumping power

The cost of power from PSPs has three components - cost of storage, cost of conversion losses and cost of input power. One of the prerequisites to ensure the commercial viability of a PSP unit is availability of input power at affordable tariff. However, this constraint is likely to be overcome in near future, with the availability of solar power at relatively cheaper rates

(d) Value of peak power

The importance of PSP lies in its capability to offer peaking power. Further, other services offered by PSPs, like spinning reserves, reactive support, black start ability, frequency response ancillary services and faster start-up and shutdown, which are essential for grid stability are not adequately monetized.

(e) Taxation

With the approval of Union Cabinet, PSPs have been declared as renewable sources. However, associate concessions which are available to other renewable sources, are yet to be extended to PSPs. PSP components continue to be taxed at the GST rate of 18%/28%, whereas the GST on renewable sources such as solar and wind has been kept as 12%. This affects the viability of PSPs.

2. Measures already taken by Government of India for promotion of PSPs

2.1 Utilization of financial and project execution capabilities of CPSUs

Government of India vide its order dated 08.12.2022 has indicated identified PSP sites against CPSUs to facilitate their development. A state-wise indication has also been carried out to help the States with work related to PSPs. States are encouraged to allocate the PSPs to CPSUs for early and prompt development aligned with the national interest. The present indication is at **Annexure-I**.

2.2 Energy Storage Obligation

Government of India has, vide its order dated 22.07.2022, notified the trajectory of Energy Storage Obligation for the distribution companies to ensure the capacities regarding storage as a grid element. This would create demand for storage. The present trajectory is at **Annexure-II**.

2.3 Waiver of ISTS charges for PSPs

Given the importance of facilitating RE integration to the grid and in pursuance of National Tariff Policy 2016, waiver of ISTS and other transmission charges have also been made available to Pumped Storage Projects vide Ministry of Power's Order dated 23.09.2021 which is given at **Annexure-III**.

2.4 Budgetary Support for Enabling Infrastructure

The hydro projects and PSPs are often taken up in remote areas which have infrastructure deficits. The infrastructure created for hydropower / PSP enables further development of the area as the same is available for reuse for other purposes. Given the same, the Central Government is providing budgetary support for funding the enabling infrastructure of hydropower projects. This scheme will also cover PSPs. The grant for enabling infrastructure is due to the creation of infrastructure facilities that have alternate developmental value. The present dispensation in this regard is at **Annexure-IV**.

3. Guidelines for promotion of PSPs

The following guidelines are being issued for the promotion of Pumped Storage Projects:

3.1 Allotment of project sites

The State Governments may allot project sites to developers in the following manner:

(i) On nomination basis to CPSUs and State PSUs

For early development, States may award projects directly to hydro CPSUs or State PSUs on a nomination basis. Due consideration shall be given to the experience and financial strength of the CPSUs/State PSUs. Further the CPSU/State PSU shall ensure that award of contracts for the supply of equipments and construction of the project, either through a turnkey or through well-defined packages, is done based on competitive bidding.

(ii) Allotment through competitive bidding

PSP project may also be awarded to private developers by following a two stage competitive bidding process. PSUs may also be allowed to participate in the bidding process. The first stage shall be for pre-qualification based on criteria of financial strength, experience of developing infrastructure projects of similar size, past track record of developing projects, turnover andability to meet performance guarantees. In

the second stage, bids are to be called based on quantifiable parameters such as concession period of the project or any other parameter as specified by the Central/State Government.

In case of allocation through modes 3 (i) & (ii) above,the home state shall have the right of first refusal for 40% of the project capacity and tariff shall be fixed by the Appropriate Commission u/s 62 of the Electricity Act, 2003 The developer would be free to sell the balance storage space under short / medium / long term PPA, or in power markets or through bilateral contract.

(iii) Allotment through TBCB

PSP projects may also be awarded on TBCB basis to developers on the basis of:

a. Composite tariff (including the cost of input power) in case input power is arranged by the developer; or
b. Tariff for conversion of power from off-peak to peak if the input power is to be arranged by the procurer of the storage capacity.

The appropriate Commission shall adopt the above tariff u/s 63 of the Electricity Act, 2003

3.2 Charges to be paid by the developer

Developers shall begin construction within a period of 2 years from the date of allotment of the project, failing which, allotment of the project site shall be cancelled by the State. Further,in order to ensure the viability of the Pumped Storage Projects, States shall ensure that no upfront premium is charged for project allocation.

3.3 Market reforms

The comparison of PSPs with other conventional and VRE sources purely based on financial aspects is undervaluing and de-emphasizing the economic benefits extended by these projects. The monetization of Ancillary services provided by Pumped Storage Projects will give a much-needed boost to the sector. For this purpose, the following reforms may be undertaken:

i. The appropriate Commission shall ensure that services like spinning reserves, reactive support, black start, peaking supply, tertiary and ramping support, faster start-up and shutdown, which help in supporting grid stability are suitably monetized.
ii. Appropriate Commission shall notify Peak and Off-Peak tariffs for Generation to provide appropriate pricing signal to Peak and Base Load Generating Plants.
iii. PSPs and other storage projects shall be allowed to participate in the proposed high price segment of the day ahead market (HP-DAM) so that they can take suitable advantage of the price differential between Peak and Off-Peak tariffs.

iv. In the event of capacity contracted not being fully utilized by the contracting agency, the developer would be free to transfer the usage of the capacity to other interested entities so that resources do not remain idle.

3.4 Financial Viability

The current power scenario indicates an imminent deep penetration of electricity storage in future and PSPs would be required to be operated invariably in two cycles for as long as variable RE infusion keeps on increasing. Thus, PSPs are expected to be utilized or run to their full capacities. This ensures recovery of costs in a minimum period. With high rates during peak hours in the power exchanges, PSP developers have the opportunity to optimize their operations and earn suitable returns.

To ensure that only viable PSPs are taken up for construction under Section 62 of The Electricity Act, 2003 the Central Government may notify a benchmark cost of storage for investment decisions of CPSUs for PSPs considering 6-8 hours of operation. This will be based on the prevailing and anticipated difference between peaking and non-peaking rates. Efforts would be made to ensure that only those PSP projects are taken up for development whose levelized cost of storage is within the benchmark cost of storage.

3.5 Taxes and duties

To reap the long-term benefits and socio-economic development of states due to hydropower projects, State Government shall consider reimbursement of SGST on hydropower project components. States may exempt land to be acquired by off-the-river PSPs from payment towards stamp duty and registration fees. Government land, if available, may be provided at a concessional rate to the developers on annual lease rent basis.

Storage is an intermediary system where energy is stored and released later. In line with the principles of double taxation avoidance, power from PSPs may be suitably considered to avoid double taxation.

3.6 Exemption from Free Power obligation

PSPs are energy storage schemes. They do not produce energy. They are net consumers of energy. Hence, the PSPs would be kept out of the liability of free power.

3.7 Local Area Development Fund

PSPs have a minimal environmental impact and have no R&R issues. Therefore**,** there will be no requirement of creation of a Local Area Development Fund.

4. Measures that concern other Ministries

4.1 Utilization of exhausted mines to develop PSPs

The discarded mines including coal mines in different parts of the country could be used as Hydro Storage and thereby become natural enablers for development of Hydro Pumped Storage Projects (PSPs). Efforts would be made to identify and

develop exhausted mines / coal mines as prospective PSP sites in consultation with the Ministry of Coal and Ministry of Mines.

4.2 Rationalization of Environmental Clearances for off-river PSPs

The off-river PSPs, are located away from the river course and have minimum impact on the riverine ecology. Hence they may be treated differently for grant of Environmental Clearance. PSP projects, where both reservoirs are built off-river or where one reservoir is built off-river and the existing on-river reservoir undergoes minor structural modification to connect it with the new reservoir may be treated as B-2 category projects. Such projects may be exempted from Environmental Impact Assessment (EIA) and public hearing and may only require preparation of Environment Management Plan (EMP).

4.3 Green Finance

Pumped storage projects are essential for the integration of renewable energy sources in the grid and their utilization, thereby avoiding greenhouse gas emissions. Hence, in order to initiate and accelerate the pace of establishment, PSPs may be supported through concessional climate finance. Sovereign green bonds issued for mobilizing resources for green infrastructure as a part of the Government's overall market borrowings may be deployed in the development of PSPs which utilize renewable energy for charging.

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ANNEXURE - I

File No.15-23/3/2021-HYDEL-II(MoP)

No.15-23/3/2021-HYDEL-II(MoP)
Government of India
भारत सरकार
Ministry of Power
विद्युत मंत्रालय
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Shram Shakti Bhawan, Rafi Marg
New Delhi, dated 08th August, 2022

To
The Chairman – BBMB, DVC
The CMDs – NTPC, NHPC, SJVN, THDCIL, NEEPCO

Subject: Revised indication of Pumped Storage Projects (PSPs) to the Hydro CPSEs / BBMB / DVC – regarding.

Sir,

In supersession of this Ministry's letter of even no. dated 06.04.2022, I am directed to enclose herewith the 'revised indication of identified PSP sites to Hydro CPSEs / DVC / BBMB' and 'revised indication of States to Hydro CPSEs / BBMB / DVC' for development of Pumped Storage Projects (PSPs).

2. The concerned utilities would be responsible to take up the matter with the concerned State Governments, carry out suitable analysis and prepare the evaluation reports expeditiously on the projects indicated. Progress made by the utilities in this regard will be reviewed by this Ministry at regular intervals.

This issues with the approval of Hon'ble Union Minister of Power and New & Renewable Energy.

Encl: as above

Yours faithfully,

(R. P. Pradhan)
Director (Hydro-II)
Email: hydro2-mop@nic.in

Copy to:
(I) The Chief Secretaries of all the State Government / UTs – with request to extend all the necessary support to the Organizations.
(II) The Chairperson, Central Electricity Authority.
(III) The Chairman, Central Water Commission.

Copy for information to:
(I) O/o Hon'ble Minister of Power and New & Renewable Energy.
(II) O/o Hon'ble Minister of State for Power.
(III) Sr. PPS to Secretary (Power) / PPS to Joint Secretary (Hydro) / PS to Director (H-I) / DD (H-II) / DD (NHPC) / DD(BBMB) / US(H-I), MoP.

I - ANNEXURE

Annexure-I

Indication of Identified PSP sites to Hydro CPSEs / DVC / BBMB

S. No.	Name of Project	State/UT	Probable IC (MW)	Earlier Indicated Agency	Revised indication / Changes proposed
1	Matlimarg	Jammu & Kashmir	1650	NHPC	NHPC
2	Majra	Himachal Pradesh	1800	BBMB	BBMB
3	Jaspalgarh	Uttarakhand	1935	THDCIL	THDCIL
4	Ulhas	Maharashtra	1000	NHPC	NHPC
5	Pinjal	Maharashtra	700	NHPC	NHPC
6	Kengadi	Maharashtra	1550	NHPC	NHPC
7	Jalond	Maharashtra	2400	NHPC	NHPC
8	Kolmondapada	Maharashtra	800	SJVNL	SJVNL
9	Kalu	Maharashtra	1150	NHPC	NHPC
10	Sidgarh	Maharashtra	1500	SJVNL	SJVNL
11	**Amba**	**Maharashtra**	**2500**	**THDCIL**	**NTPC**
12	Chornai	Maharashtra	2000	SJVNL	SJVNL
13	Savitri	Maharashtra	2250	NHPC	NHPC
14	**Madliwadi**	**Maharashtra**	**900**	**SJVNL**	**NTPC**
15	Baitarni	Maharashtra	1800	SJVNL	SJVNL
16	Morawadi	Maharashtra	2320	THDCIL	THDCIL
17	Gadgadi	Maharashtra	600	THDCIL	THDCIL
18	**Kundi**	**Maharashtra**	**600**	**SJVNL**	**NTPC**
19	Aruna	Maharashtra	1950	THDCIL	THDCIL
20	Kharari	Maharashtra	1050	THDCIL	THDCIL
21	Jalvara	Maharashtra	2000	SJVNL	SJVNL
22	**Tigaleru**	**Andhra Pradesh**	**1650**	**SJVNL**	**NTPC**

23	**Varahi****	**Karnataka**	**700**	**SJVNL**	**Karnataka Power Corporation Ltd. (KPCL)**
24	Nallar	Tamil Nadu	2700	THDCIL	THDCIL
25	Idukki	Kerala	300	THDCIL	THDCIL
26	Pallivasal	Kerala	600	THDCIL	THDCIL
27	Jharlama	Odisha	2500	NHPC	NHPC
28	Kulbera	West Bengal	1110	DVC	DVC
29	Panchet Hill	West Bengal	600	DVC	DVC
30	Lugupahar	Jharkhand	2800	DVC	DVC
31	Boro	Jharkhand	500	DVC	DVC
32	Tuivai	Manipur	2100	NEEPCO	NEEPCO
33	Hengtam	Manipur	2250	NEEPCO	NEEPCO
34	KhuaiLui	Assam	2100	NEEPCO	NEEPCO
35	LeivaLui	Mizoram	2100	NEEPCO	NEEPCO
36	Pakwa	Mizoram	1000	NHPC	NHPC
37	TuithoLui	Mizoram	1050	NEEPCO	NEEPCO
38	Mat	Mizoram	1400	NEEPCO	NEEPCO
39	TuiphaiLui	Mizoram	1650	NEEPCO	NEEPCO
40	Nghasih	Mizoram	1250	NEEPCO	NEEPCO
41	DaizoLui	Mizoram	2000	SJVNL	SJVNL
42	**Sandynalla**	**Tamil Nadu**	**1200**		**NTPC**
43	**Upper Bhavani**	**Tamil Nadu**	**1000**		**NTPC**
44	**Sigur**	**Tamil Nadu**	**1200**		**NTPC**
45	**Sillahalla Stage-II**	**Tamil Nadu**	**1000**		**NTPC**
46	**Netravathy Stage-I**	**Karnataka**	**1500**		**NTPC**
47	**Indira Sagar – Omkareshwar**	**Madhya Pradesh**	**500**		**NHPC**
48	**Panyor**	**Arunachal Pradesh**	**660**		**NEEPCO**

49	**Kopili**	**Assam**	**320**		**NEEPCO**
50	**CheraKhad**	**Himachal Pradesh**	**500**		**SJVNL**
51	**Dhurmu**	**Himachal Pradesh**	**1600**		**SJVNL**
52	**TaalKhad**	**Himachal Pradesh**	**135**		**SJVNL**
53	**Sadda**	**Himachal Pradesh**	**220**		**SJVNL**
54	**Purthi and Sach Khas PSP**	**Himachal Pradesh**	**190**		**SJVNL**
55	**MalshejGhat**	**Maharashtra**	**700**		**THDCIL**
56	**Humbarli**	**Maharashtra**	**400**		**THDCIL**

** Government of Karnataka has allotted the Varahi PSP to Karnataka Power Corporation Limited (KPCL) and KPCL has already prepared that PFR with installed capacity of 1500 MW.

Summary

Agency	**Number of Projects**		**Capacity (in MW)**	
	Earlier	Revised	Earlier	Revised
NHPC	9	**10**	14200	**14700**
SJVNL	10	**11**	13950	**12745**
THDCIL	9	**10**	13955	**12555**
NEEPCO	8	**10**	13900	**14880**
DVC	4	**4**	5010	**5010**
BBMB	1	**1**	1800	**1800**
NTPC	-	**9**	-	**11550**
Total	**41**	**55**	**62815**	**73240**

Annexure-II

Indication of States to Hydro CPSEs / BBMB / DVC for development of Pumped Storage Projects (PSPs)

S. No.	State	Earlier Proposed Agency	Revised Proposed Agency
	Northern Region		
1	UT of Jammu & Kashmir and Ladakh	NHPC	-
2	Himachal Pradesh	SJVN	
3	Uttarakhand	THDCIL	
4	Punjab	BBMB	
5	Haryana	BBMB	
6	Rajasthan	BBMB	
7	Uttar Pradesh	THDCIL	
	Western Region		
8	Maharashtra	NHPC, SJVN, THDCIL	NHPC, SJVN, THDCIL, **NTPC**
9	Gujarat	SJVN	-
10	Madhya Pradesh	NHPC	
11	Chhattisgarh	THDCIL	
	Eastern Region		
12	Jharkhand	DVC	-
13	Bihar	SJVN	
14	Odisha	NHPC	
15	West Bengal	DVC	
16	Sikkim	NHPC	
	Southern Region		
17	Andhra Pradesh	SJVN	**NTPC**
18	Telangana	NHPC	-
19	Tamil Nadu	THDCIL	**NTPC**
20	Karnataka	SJVN	**NTPC**
21	Kerala	THDCIL	-
	North Eastern Region		
22	NER	NHPC, SJVN, THDCIL, NEEPCO	-

ANNEXURE-I

F. No. 09/13/2021-RCM
Ministry of Power
Government of India

Shram Shakti Bhawan, New Delhi
Dated 22 July, 2022

ORDER

Subject: Renewable Purchase Obligation (RPO) and Energy Storage Obligation Trajectory till 2029-30 - regarding.

In exercise of the powers conferred under section 3(3) of Electricity Act, 2003, the Central Government had notified the revised Tariff Policy, which was published in Gazette of India, Extraordinary, Part-I, Section-1 dated 28.01.2016.

2. Para 6.4(1) of the Tariff Policy 2016 provides as follows:

> *"Pursuant to provisions of section 86(1)(e) of the Act, the Appropriate Commission shall fix a minimum percentage of the total consumption of electricity in the area of a distribution licensee for purchase of energy from renewable energy sources, taking into account availability of such resources and its impact on retail tariffs. Cost of purchase of renewable energy shall be taken into account while determining tariff by SERCs.* ***Long term growth trajectory of Renewable Purchase Obligations (RPOs) will be prescribed by the Ministry of Power in consultation with MNRE.***
>
> *Provided that cogeneration from sources other than renewable sources shall not be excluded from the applicability of RPOs."*

3. Energy from Hydro Power Projects is Renewable Energy (RE) as has been recognized world over. On 8th March 2019, the Government of India had also recognized Large Hydro Power Projects (LHPs) including Pumped Storage Projects (PSPs), having capacity of more than 25 MW, as part of RE. It was further specified that energy from all LHPs, commissioned after 8th March 2019, will be considered as part of Renewable Purchase Obligation (RPO) through a separate obligation, i.e. Hydro power Purchase Obligation (HPO).

4. Accordingly, the Ministry of Power (MoP), after detailed consultation with Ministry of New and Renewable Energy (MNRE), notified the HPO trajectory for the period from 2021-22 to 2029-30 vide order dated 29th January, 2021 and subsequent clarification dated 1st April, 2021. The revised trajectory of RPOs for Solar and Other Non-Solar power was also notified for the period from 2019-20 to 2021-22. The aforesaid order also mentioned that the RPO trajectory beyond 2021-22 will be specified later.

5. To recommend RPO trajectory beyond 2021-22, a Joint-Committee under the Co-chairmanship of Secretary, Ministry of Power and Secretary, Ministry of New and Renewable Energy, was constituted on 17th December, 2020. Based on the recommendations of the Joint Committee and further discussions with MNRE, MoP hereby specifies the following RPO Trajectory beyond 2021-22:

Year	Wind RPO	HPO	Other RPO	Total RPO
2022-23	0.81%	0.35%	23.44%	24.61%
2023-24	1.60%	0.66%	24.81%	27.08%
2024-25	2.46%	1.08%	26.37%	29.91%
2025-26	3.36%	1.48%	28.17%	33.01%
2026-27	4.29%	1.80%	29.86%	35.95%
2027-28	5.23%	2.15%	31.43%	38.81%
2028-29	6.16%	2.51%	32.69%	41.36%
2029-30	6.94%	2.82%	33.57%	43.33%

(a) Wind RPO shall be met only by energy produced from Wind Power Projects (WPPs), commissioned after 31st March 2022.

(b) HPO shall be met only by energy produced from LHPs (including PSPs), commissioned after 8th March 2019.

(c) Other RPO may be met by energy produced from any RE power project not mentioned in (a) and (b) above.

6. From F.Y. 2022-23 onwards, the energy from all Hydro Power Projects (HPPs) will be considered as part of RPO. The HPO trajectory, as has been notified earlier will continue to prevail for LHPs commissioned after 8th March 2019. All other HPPs will be considered as part of 'RPO' under category of 'other RPO'.

7. RPO shall be calculated in energy terms as a percentage of total consumption of electricity.

8. HPO obligations may be met from the power procured from eligible LHPs (including PSPs) commissioned on and after 8th March, 2019 to 31st March, 2030.

9. HPO obligation of the State/Discom may be met out of the free power being provided to the State from LHPs (including PSPs), commissioned after 8th March, 2019 as per agreement at that point of time excluding the contribution towards LADF, if consumed within the State/Discom. Free power (not that contributed for Local Area Development) shall be eligible for HPO benefit.

10. In case, the free power mentioned above is insufficient to meet the HPO obligations, then the State would have to buy the additional hydro power to meet its HPO obligations or may have to buy the corresponding amount of Renewable Energy Certificate corresponding to Hydro Power.

11. The Renewable Energy Certificate mechanism corresponding to Hydro Power to be developed by CERC to facilitate compliance of HPO Obligation would have a capping price of Rs.5.50/Unit of electrical energy w.e.f. 8th March, 2019 to 31st March, 2021 and with an annual escalation @ 5% thereafter for the purposes of ensuring HPO compliance.

12. The above HPO trajectory shall be trued up on an annual basis depending on the revised commissioning schedule of Hydro projects. The HPO trajectory for the period between 2030-31 and 2039-40 shall be notified subsequently.

13. Hydro power imported from outside India shall not be considered for meeting HPO.

14. Any shortfall remaining in achievement of 'Other RPO' category in a particular year can be met with either the excess energy consumed from WPPs, commissioned after 31st March 2022 beyond 'Wind RPO' for that year or with excess energy consumed from eligible LHPs (including PSPs), commissioned after 8th March 2019 beyond 'HPO' for that year or partly from both. Further, any shortfall in achievement of 'Wind RPO' in a particular year can be met with excess energy consumed from Hydro Power Plants, which is in excess of 'HPO' for that year and vice versa.

15. The following percentage of total energy consumed shall be solar/wind energy along with/ through storage,

F.Y.	Storage (on Energy basis)
2023-24	1.0 %
2024-25	1.5 %
2025-26	2.0 %
2026-27	2.5 %
2027-28	3.0 %
2028-29	3.5 %
2029-30	4.0 %

16. The Energy Storage Obligation in para 15 above shall be calculated in energy terms as a percentage of total consumption of electricity and shall be treated as fulfilled only when at least 85% of the total energy stored in the Energy Storage System (ESS), on an annual basis, is procured from renewable energy sources.

17. The Energy Storage Obligation to the extent of energy stored from RE sources shall be considered as a part of fulfilment of the total RPO as mentioned in para 5 above.

18. The Energy Storage Obligation shall be reviewed periodically considering the commissioning/ operation of PSP capacity, to accommodate any new promising commercially viable Energy Storage technologies and also reduction in cost of Battery Energy Storage Systems (BESS).

19. POSOCO will maintain a data related to compliance of RPO Obligations.

20. Further, the State Commissions may consider notifying RPO trajectory including HPO and Energy Storage Obligation trajectory for their respective States, over and above the RPO, HPO and Energy Storage Obligation trajectory given in para 5. Moreover, the Central Commission shall consider devising a suitable mechanism similar to Renewable Energy Certificate (REC) mechanism to facilitate fulfilment of HPO.

ANNEXURE-III

21. This issues with the approval of Hon'ble Minister of Power and New & Renewable Energy.

(Piyush Singh)
Joint Secretary to the Government of India
Tele No: 011-23714367

To

1. ACS/Principal Secretary/Secretary (Power/Energy), State Governments/UTs.
2. Secretary (CERC/FOR), New Delhi
3. Secretary, State Electricity Regulatory Commissions/Joint Electricity Regulatory Commissions

Copy to:

1. Secretary, MNRE, New Delhi
2. Chairperson, CEA, New Delhi

Copy also for information to:

1. PS to Hon'ble Minister for Power and NRE
2. Additional PS to Hon'ble Minister of State for Power
3. Sr. PPS to Secretary(P)/PPS to AS&FA, MoP/ PPS to AS(AT), MoP
4. PPS to All Joint Secretaries/ EA/ CE, MoP

ANNEXURE-III

No. 23/12/2016-R&R
Government of India
Ministry of Power
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Shram Shakti Bhawan, Rafi Marg,

New Delhi, 23rd November, 2021

ORDER

Subject: Waiver of inter-state transmission charges on transmission of the electricity generated from solar and wind sources of energy under Para 6.4(6) of the Tariff Policy, 2016.

1.0 In exercise of the powers conferred under section 3(3) of Electricity Act, 2003, the Central Government notified the revised Tariff Policy on 28.01.2016.

2.0 In accordance with the Para 6.4(6) of the Tariff Policy 2016, Ministry of Power issued Order No. 23/12/2016-R&R dated 30.09.2016 on waiver of inter-state transmission charges on transmission of the electricity generated from solar and wind sources of energy. This order was amended vide orders dated 14.06.2017, 13.02.2018, 06.11.2019, 05.08.2020, 15.01.2021 and 21.06.2021.

3.0 With a view to encourage faster capacity addition based on solar or wind energy sources, in supersession of aforesaid orders and in accordance with para 6.4 (6) of the Tariff Policy, 2016 and sub-rule 12 of rule 5 of the Electricity (Transmission System Planning, Development and Recovery of Inter-State Transmission Charges) Rules, 2021, the following are notified:

3.1 For the solar, wind, Hydro PSP and BESS Projects commissioned upto 30.06.2025, the waiver of inter-state transmission charges shall be applicable for the following:

(i) Solar or wind energy generation set up by any person/entity. The power generated from such sources can be self consumed or sold to any entity either through competitive bidding, Power Exchange or through bilateral agreement.

(ii) Electricity from solar and/or wind sources used by Hydro Pumped Storage Plant (PSP) and Battery Energy Storage System (BESS) projects and subject to the following conditions:

(a) atleast 51% of the annual electricity requirement for pumping of water in the Hydro Pumped Storage Plant is met by use of electricity generated from solar and/or wind power plants.

(b) atleast 51% the annual electricity requirement for charging of the Battery Energy Storage System is met by use of electricity generated from solar and/or wind power plants.

(iii) Electricity generated / supplied from such Hydro PSP and BESS power plants as mentioned in (ii) above.

(iv) For trading of electricity generated/supplied from solar, wind and sources mentioned in (ii) and (iii) above, in Green Term Ahead Market (GTAM) and Green Day Ahead Market (GDAM) are upto 30.06.2025.

(v) For Green Hydrogen production plants commissioned upto 30.06.2025. i.e Hydrogen produced using the electricity produced from solar, wind and sources mentioned in (ii) and (iii) above. This waiver shall be applicable for a period of 8 years from the date of commissioning of such hydrogen plant.

(vi) For the power generated from solar and wind energy as per RE bundling scheme issued by Ministry of Power on 16.11.2021. Provided that the evacuation of this solar and/or wind power is being made from the main substation of the Thermal/Hydro power plant and this does not lead to any additional cost in augmentation of transmission system.

Further, no transmission charges for use of Inter State Transmission System (ISTS) shall be levied, when solar and/or wind power from power plant situated at one Thermal/Hydro Generating Station is supplying to procurers of another Generating Station, of the same Generating Company, located at a different location.

3.2 In order to have long term visibility and certainty to the renewable power generation, it is also provided that ISTS charges shall be levied for the solar, wind, Hydro PSP and BESS Projects commissioned after 30.06.2025, gradually as per following trajectory:

S.No.	Period of Commissioning	Inter-State Transmission Charges
1	01.07.2025 to 30.06.2026	25 % of the applicable ISTS charges
2	01.07.2026 to 30.06.2027	50% of the applicable ISTS charges
3	01.07.2027 to 30.06.2028	75% of the applicable ISTS charges
4	From 01.07.2028	100% of the applicable ISTS charges

4.0 The waiver shall be applicable, for a period of 25 years for solar, wind and Hydro PSP or for a period of 12 years for BESS or for a period subsequently notified for future projects by the Central Government, from the date of commissioning of the power plant.

5.0 It is also clarified that waiver is allowed for Inter-state transmission charges only and not losses. However, it is clarified that waiver of losses shall be applicable for the projects whose bidding was completed upto 15.01.2021.

6.0 This order shall be applied prospectively i.e. from the date of issue of order.

7.0 This issues with the approval of Minister for Power and NRE.

(Ghanshyam Prasad)
Joint Secretary to the Govt. of India
Tel: 2371 0389

To

Secretary, CERC, New Delhi.

Copy to:

1. Secretary, MNRE, New Delhi.
2. Chairperson, Central Electricity Authority, New Delhi.
3. Secretary in charge, Power/Energy Dept., State Governments/UTs.
4. Secretary, State Electricity Regulatory Commissions/Joint Electricity Regulatory Commissions.

Copy for information to:

1. PS to Minister for Power and NRE, APS to MoSP.
2. Joint Secretaries/Chief Engineer/Economic Adviser, Ministry of Power.
3. Sr. PPS to Secretary (Power), PPS to AS (SKGR), PPS to AS (VKD), Sr. PPS to JS (R&R)

ANNEXURE- IV

No.15/2/2016-H.I(Pt.)(230620)
Government of India
Ministry of Power
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Shram Shakti Bhawan, New Delhi,
Dated, the 28th September, 2021

OFFICE MEMORANDUM

Subject: Budgetary Support towards Cost of Enabling Infrastructure, i.e., roads/ bridges - regarding.

1. Ministry of Power (MoP), vide OM no. 15/2/2016-H-I(Pt.)(230620) dated 08.03.2019, notified various measures approved by the Union Cabinet to promote Hydropower in the country. This included budgetary support for Enabling Infrastructure i.e., roads/ bridges for Hydropower projects on case-to-case basis. The basic objective of budgetary support for enabling infrastructure is to reduce tariff of Hydropower projects by ensuring that consumers are charged cost related to power components only. The budgetary support shall be provided for projects starting construction after 08.03.2019, i.e., date of notification. It was also mentioned that the budgetary support would be provided after appraisal/approval of each project by PIB/ CCEA as per the extant rules/due process and would be provided by MoP through its budgetary grants. The limit of this budgetary support for such roads and bridges would be i) Rs. 1.5 crore per MW for projects upto 200 MW and ii) Rs. 1.0 crore per MW for projects above 200 MW.

2. **Eligibility for Budgetary Support towards Cost of Enabling Infrastructure**

i. All large Hydropower projects (above 25 MW capacity) including Pumped Storage Projects (PSPs), concurred either by Central Electricity Authority (CEA) or the State Government, wherein Letter of Award (LoA) for the first major works package (Dam/ HRT/ Power House etc.) is issued after 08.03.2019, shall be eligible for budgetary support towards Cost of Enabling Infrastructure.

ii. All Roads and Bridges required to connect major components like Dam, Power House, Adits, Surge shaft, Pressure Shaft, TRT, etc. of the project to the nearest

State/ National Highway including any strengthening/ widening works shall be considered eligible for budgetary support. However, these roads/ bridges would exclude the works, for which either the Letter of Award have been issued or are currently under implementation by any Central/ State Agency like NHAI, BRO, PWD, SRRDA, RWD, PWD (Roads), REO(Rural Engineering Organisation) etc. or Central Schemes like PMGSY (Pradhan Mantri Gram Sadak Yojna), MGNREGA or State specific schemes like Mukya Mantri Sadak Yojana etc.

iii. Cost of roads and bridges normally covered under head "R-Communications" in the concurred DPR including the following related costs shall be eligible for release as budgetary support:

a. Land acquisition cost
b. All statutory taxes/ levies, duties, cess, etc.

The specifications/ requirements like carrying capacity, turning radius, vertical clearance, width and gradient etc. of the roads/ bridges shall be as per concurred DPR.

3. The grant of Budgetary Support for the 'Enabling Infrastructure' shall be in the form of 'Reimbursement' after achievement of milestones mentioned in succeeding paragraphs related to the construction of project.

4. This OM shall be applicable to all eligible hydro projects i) wherein tariff is determined by CERC/ SERC under Section 62 of the Electricity Act 2003, ii) tariff is determined through competitive bidding under Section 63 of the Electricity Act 2003 iii) projects developed by agencies like BBMB which do not approach CERC/SERC for tariff determination/ adoption.

5. **'In-principle' approval of Ministry of Power for Grant of Budgetary Support**

The procedure for obtaining 'In-principle' approval of Ministry of Power for grant of budgetary support for 'Enabling infrastructure' prior to commencement of construction is given below:

a. After the DPR is concurred by CEA/ State Govt., the developer shall submit an application for 'in-principle' approval of budgetary support to CEA in the specified format **(Annexure-I)**. For DPRs concurred before the issue of these guidelines, the developer shall submit the updated cost of Enabling Infrastructure (based on indexation issued by CWC) in the application for 'in-principle' approval.

b. CEA shall examine applications received in consultation with CWC and forward its recommendations in the specified format **(Annexure-II)** to Ministry of

Power within one month of the end of the quarter in which application is received.

c. Ministry of Power shall issue 'in-principle' approval for Budgetary Support in the specified format **(Annexure-III)** to the Developer after receiving recommendations from CEA.

The 'in-principle' approval by Ministry of Power would be only for the purpose of facilitating financial closure, etc. of projects from Banks/ FIs and will not create any obligation or commitment on part of Government to provide Budgetary Support subsequently till all the conditions for grant of the same are satisfied.

6. Procedure for Release of Grant towards Budgetary Support

The grant of Budgetary Support for the 'Enabling Infrastructure' shall be provided to the developer in the form of 'Reimbursement' as per the following procedure:

i. After achievement of 25% financial progress w. r. t. approved / original project cost, the Developer shall submit the application in the specified format **(Annexure–IV)** to CEA for Reimbursement of Budgetary Support towards Enabling Infrastructure.

ii. The developer shall submit a Bank Guarantee in specified format **(Annexure-V)** to the CEA for an amount equivalent to eligible Budgetary Support (or the Support requested whichever is less) with validity period up to the date of determination of tariff by the regulatory commission. Ministry of Power may encash the Bank Guarantee, in part or full, upon the recommendation of CEA, in cases where (a) the project is delayed by more than two years beyond the scheduled commissioning date excluding any delays attributable to force majeure conditions and (b) in cases where the funds are found being used/ diverted for works other than those related to enabling infrastructure. CEA shall maintain a proper account of the Bank Guarantee and shall be the custodian of such Bank Guarantee.

iii. The developer shall submit verification records viz., auditor's certificate, self-certification, etc. along with the application as specified in para 6 (i) above in support of his claim for release of Grant.

iv CEA shall examine the applications received during each quarter in consultation with CWC and forward its recommendations in the given format **(Annexure-VI)** to Ministry of Power within one month of end of each quarter.

v On receiving recommendation from CEA, Ministry of Power shall process and obtain the approval of the competent authority for grant as per delegation of powers and General Financial Rules issued by Ministry of Finance, GoI which would be released through budgetary Provisions of Ministry of Power.

vi The Grant shall be limited to the amount as per "In-Principle' approval or the actual expenditure incurred on Enabling Infrastructure whichever is lower under the overall ceilings mentioned in para 1 above.

7. The physical progress of the enabling infrastructure works of each of the projects shall be monitored by a Monitoring Committee to be constituted by CEA and a Status Report, in this regard, shall be submitted to MoP on quarterly basis.

8. By 15th July of every year, the CEA shall send Estimates for Annual Budgetary Grants for the next financial year to Ministry of Power. These budgetary estimates would be based on projects scheduled for completion of milestone, as specified in para 6 above, during the next year.

9. A Report on the 'In-principle' approvals granted and Budgetary Support released during the year shall be sent by CEA to Ministry of Power every year by 31st May.

10. If ownership of the project changes before the commissioning of the project, MoP and CEA would be duly informed within three (03) months of such change.

11. This issues with the approval of Hon'ble Minister for Power.

28/9/21.

(Raghuraj Rajendran)
Joint Secretary

To:

1. **Principal Secretary/Secretary (Power / Energy), State Governments/UTs.**
2. **Secretary, CERC/FOR, Chanderlok Building, Janpath, New Delhi**
3. **Secretary, State Electricity Regulatory Commissions/Joint Electricity Regulatory Commissions**

Copy to:

1. **Secretary, MNRE, CGO Complex, New Delhi**
2. **Secretary, Ministry of Jal Shakti**
3. **Chairperson, CEA, Sewa Bhawan, RK Puram, New Delhi**
4. **Chairperson, CWC, RK Puram, New Delhi**

Copy also for information to:

1. **PS to Hon'ble Minister of Power/ Ps to Hon'ble Minister of State for Power.**
2. **Sr. PPS to Secretary (Power)/ Sr.PPS to AS&FA/ PPS to AS(Hydro)/ PPS to JS(Hydro)**
3. **PPS/Ps to All Joint Secretaries/Directors/Deputy Secretaries in the Ministry of Power.**