

## STATUS OF PUMPED STORAGE DEVELOPMENT IN INDIA

Region/ State	ON RIVER		OFF RIVER		TOTAL	
	No of projects	Installed capacity (MW)	No of projects	Installed capacity (MW)	No of projects	Installed capacity (MW)
In Operation	8	4745.60			8	4745.60
Under Construction	3	1580	1	1200	4	2780.00
DPR concurred by CEA	2	2350			2	2350.00
Under Examination	-	-	-	-	-	-
Under S&I	5	6940	37	48910	42	55850.00
<b>Grand Total</b>	<b>18</b>	<b>15615.60</b>	<b>38</b>	<b>50110</b>	<b>56</b>	<b>65725.6</b>

**STATUS OF ON-RIVER PUMPED STORAGE DEVELOPMENT IN INDIA**  
(Installed Capacity above 25 MW)

S.No.	SCHEMES	STATE	INSTALLED CAPACITY		REMARKS
			No. of units x Unit size(MW)	MW	
<b>A. SCHEMES CONSTRUCTED</b>					
<b>a) Working in Pumping Mode</b>					
1	Nagarjuna Sagar	Telangana	7x100.80	705.60	
2	Srisailem LBPH	Telangana	6x150	900	
3	Kadamparai	Tamil Nadu	4x100	400	
4	Bhira	Maharashtra	1x150	150	
5	Ghatgar	Maharashtra	2x125	250	
6	Purulia	West Bengal	4x225	900	
			<b>Sub Total</b>	<b>3305.60</b>	
<b>b) Presently not working in Pumping Mode</b>					
<b>b) Presently not working in Pumping Mode</b>					
1	Kadana	Gujarat	4x60	240	Note at Annex-a1
2	Sardar Sarovar Project	Gujarat	6x200	1200	Note at Annex-b1
			<b>Sub total</b>	<b>1440</b>	
8			<b>Grand Total</b>	<b>4745.60</b>	
<b>B. SCHEMES UNDER CONSTRUCTION</b>					
<b>a) Under Active Construction</b>					
1	Tehri St.-II	Uttarakhand	4x250	1000	Likely commissioning by 2024-25 (Sept.'24)
2	Kundah (Stage I,II&III)	Tamil Nadu	4x125	500	Likely commissioning by 2024-25 (Oct. 2024)
			<b>Total</b>	<b>1500</b>	
<b>b) On which Construction is held up</b>					
1	Koyna Left Bank	Maharashtra	2x40	80	Likely commissioning by 2027-28
			<b>Total</b>	<b>80</b>	
3			<b>Grand Total</b>	<b>1580</b>	
<b>C. DPR CONCURRED BY CEA</b>					
1	Turga	West Bengal	4x250	1000	EC & FC-I obtained. FC-II -obtained
2	Upper Sileru	Andhra Pradesh	9x150	1350	EC & FC yet to be obtained by developer.
2			<b>Total</b>	<b>2350</b>	
<b>D. SCHEMES UNDER SURVEY &amp; INVESTIGATION</b>					
<b>I. Both Reservoirs to be constructed</b>					
1	Bhavali	Maharashtra	6x250	1500	•UR-downstream of Bhavali Dam, LR-Ulhas •Target date of Preparation of DPR- 03/24 •Agency-JSW Energy •Date of MOA-14.09.2021
2	Savitri	Maharashtra	6x300	1800	•UR- proposed on the Koyna River (Tributary of Krishna River), LR-Proposed on the Savitri River near •Agency-NHPC •Target date of DPR preparation-02/25
3	Sillahalla St.-I	Tamil Nadu	4x250	1000	•Both Reservoirs are to be constructed •Agency-TANGEDCO •Date of MOA-23.01.2019 •Target Date of DPR Preparation-02/24
			<b>Sub-Total</b>	<b>4300</b>	
<b>II. Both Reservoirs Existing</b>					
1	Sharavathy	Karnataka	8x250	2000	•Both Reservoirs are existing. Upper Reservoir is on Talakalale reservoir and Lower Reservoir is on Gurusappa reservoir(Existing Hydro Project) •Agency-KPCL •Target date of DPR preparation-03/24 •Date of MoA-07.12.2017
2	Indira Sagar	Madhya pradesh	6x80+ 1x45	640	•Upper reservoir-ISP reservoir , LR- Omkareshwar reservoir •Agency-NHDC •Target date of DPR preparation-06/24 •Date of MOA-07.06.2023
			<b>Sub-Total</b>	<b>2640</b>	
5			<b>Total</b>	<b>6940</b>	
18			<b>GRAND TOTAL (On-river)</b>	<b>15615.60</b>	

**STATUS OF OFF-RIVER PUMPED STORAGE DEVELOPMENT IN INDIA**  
(Installed Capacity above 25 MW)

S.No.	SCHEMES	STATE	INSTALLED CAPACITY		REMARKS
			No. of units x Unit size(MW)	MW	
<b>A. SCHEMES UNDER CONSTRUCTION</b>					
1	Pinnapuram	Andhra Pradesh	4x240+2x120	1200	Likely commisiioning by 2024-25 (Dec 24)
<b>1</b>	<b>TOTAL</b>			<b>1200</b>	
<b>B. SCHEMES UNDER SURVEY &amp; INVESTIGATION</b>					
<b>I. One Reservoir Existing &amp; One to be constructed</b>					
1	Narihalla	Karnataka	2x150	300	<ul style="list-style-type: none"> <li>•Upper Reservoir is proposed on minor rivulet draining into Narihalla Reservoir and Lower Reservoir- Narihalla Reservoir existing on Narihalla River</li> <li>• target date of DPR preparation- 07/24</li> <li>• Agency- JSW Energy</li> <li>•Date of MOA-28.11.2022</li> </ul>
2	Upper Indravati	Odisha	4x150	600	<ul style="list-style-type: none"> <li>•Upper Reservoir is existing on Upper Indravati HEP reservoir (Exisiting Hydro Project) and Lower Reservoir is to be constructed.</li> <li>•Target date for preparation of DPR – 03/24</li> <li>•Agency-OHPCL</li> <li>•Date of MOA-29.07.2015</li> </ul>
3	Saundatti	Karnataka	320X4+160x2	1600	<ul style="list-style-type: none"> <li>•Upper Reservoir is proposed Off Stream and Lower Reservoir is on RenukaSagar which is existing on Malaprabha river</li> <li>•Target date for preparation of DPR – 03/24</li> <li>•Agency-Greenko</li> <li>•Date of MOA-12.03.18. Revised approval on 27.02.19</li> </ul>
4	MP30 Gandhi Sagar	Madhya Pradesh	7x240+2x120	1920	<ul style="list-style-type: none"> <li>•Upper Reservoir is proposed off the river and Lower Reservoir is exisiting on Gandhi Sagar which is on Chambal river</li> <li>•Target date of DPR preparation-03/24</li> <li>•Agency-Greenko</li> <li>•Date of MOA-13.10.2021</li> </ul>
5	Gandikota	Andhra Pradesh	7x240+2x120	1000	<ul style="list-style-type: none"> <li>•Upper Reservoir is proposed Off Stream and Lower Reservoir is exisiting on Gandikota reservoir which is on Penna river</li> <li>•Target date of Preparation of DPR- 03/24</li> <li>•Agency- Adani green energy</li> <li>•Date of MOA-29.06.2022</li> </ul>
6	OWK	Andhra Pradesh	4x200	800	<ul style="list-style-type: none"> <li>•Upper Reservoir is proposed Off Stream and Lower Reservoir is exisiting on Owk reservoir which is on Penna river</li> <li>•Target date of Preparation of DPR- 03/24</li> <li>•Agency- Aurobindo Realty &amp; Infrastructure Pvt. Ltd.</li> <li>•Date of MOA-12.09.2022</li> </ul>
7	Chitravathi	Andhra Pradesh	2x250	500	<ul style="list-style-type: none"> <li>•Upper Reservoir is proposed Off Stream and Lower Reservoir is exisiting on Chitravathi reservoir</li> <li>•Target date of Preparation of DPR- 03/24</li> <li>•Agency-Adani Green Energy Ltd</li> <li>•Date of MOA-29.06.2022</li> </ul>
8	Tarali	Maharashtra	5x300	1500	<ul style="list-style-type: none"> <li>•Upper Reservoir is proposed Offstream and Lower Reservoir is existing Tarali reservoir</li> <li>•Target date of DPR preparation- 04/24</li> <li>•Agency-Adani Green Energy Ltd.</li> <li>•Date of MOA-28.06.2022</li> </ul>
9	Upper Kolab	Odisha	2x160	320	<ul style="list-style-type: none"> <li>•Upper Reservoir is existing on Upper Kolab HEP reservoir (Exisiting Hydro Project) and Lower Reservoir is to be constructed (off stream).</li> <li>•Agency-OHPCL</li> <li>•Target date of preparation of DPR- 12/24</li> </ul>
10	Balimela	Odisha	2x250	500	<ul style="list-style-type: none"> <li>•Upper Reservoir is existing on Balimela HEP reservoir (Exisiting Hydro Project) and Lower Reservoir is to be constructed.</li> <li>•Agency-OHPCL</li> <li>•Target date of preparation of DPR- 12/24</li> </ul>
11	Shirwata	Maharashtra	5x300 +2x150	1800	<ul style="list-style-type: none"> <li>•Upper Reservoir is off stream and Lower Reservoir is existing Shirawata reservoir</li> <li>•Agency-TATA power</li> <li>•Target date of preparation of DPR- 06/24</li> <li>•Date of MOA-08.08.2023</li> </ul>

S.No.	SCHEMES	STATE	INSTALLED CAPACITY		REMARKS
			No. of units x Unit size(MW)	MW	
12	Bhivpuri	Maharashtra	4x200 +2x100	1000	<ul style="list-style-type: none"> <li>•Upper Reservoir is existing Thokerwadi reservoir and Lower Reservoir is offstream.</li> <li>•Agency-TATA power</li> <li>•Target date of preparation of DPR-06/24</li> <li>•Date of MOA-08.08.2023</li> </ul>
12	<b>Sub-Total</b>			<b>11840</b>	
<b>III. Both Reservoirs to be constructed</b>					
1	Somasila	Andhra Pradesh	4x225	900	<ul style="list-style-type: none"> <li>•Both Upper &amp; Lower Reservoirs are proposed off stream</li> <li>• Target date of Preparation of DPR- 03/24</li> <li>•Agency- Shirdi Sai Electricals Ltd.</li> <li>•Date of MOA-19.01.2023</li> </ul>
2	Paidipalem East	Andhra Pradesh	6x200	1200	<ul style="list-style-type: none"> <li>•UR- new proposed Off Stream , LR - new proposed draws water Paidipalem Balancing reservoir</li> <li>•Date of DPR preparation-07/24</li> <li>•Agency-Indosol Solar Power Pvt. Ltd.</li> <li>•Date of MOA-12.09.2022</li> </ul>
3	Singanamala	Andhra Pradesh	4x200	800	<ul style="list-style-type: none"> <li>•UR- Off Stream, LR- Off Stream.</li> <li>•Date of DPR preparation-09/24</li> <li>•Agency- Aurobindo Realty &amp; Infrastructure Pvt. Ltd.</li> <li>•Date of MOA-12.09.2022</li> </ul>
4	Sukhpura Off-Stream	Rajasthan	7x320 + 2x160	2560	<ul style="list-style-type: none"> <li>•UR &amp; LR-Off stream, Both Upper Reservoir &amp; Lower Reservoirs are to be constructed..</li> <li>•Target date for preparation of DPR – 03/24</li> <li>•Agency- Greenco</li> <li>•Date of MOA-24.01.2023</li> </ul>
5	Paidipalem North	Andhra Pradesh	5 x 200	1000	<ul style="list-style-type: none"> <li>•UR- new proposed Off Stream , LR - new proposed draws water Paidipalem Balancing reservoir</li> <li>•Date of DPR preparation– 07/2024</li> <li>•Agency-Indosol Solar Power Pvt. Ltd.</li> <li>•Date of MOA-12.09.2022</li> </ul>
6	Shahpur	Rajasthan	5x300 +2x150	1800	<ul style="list-style-type: none"> <li>•Offstream closed loop, UR &amp; LR -off stream</li> <li>•Target date of preparation of DPR- 03/24</li> <li>•Agency-Greenko</li> <li>•Date of MOA-18.12.2021</li> </ul>
7	Sirohi	Rajasthan	3x400	1200	<ul style="list-style-type: none"> <li>• UR off stream, LR located across a minor rivulet draining into Sili Nallah, a tributary of Sipu river in West Banas river basin</li> <li>•Target date of preparation of DPR- 08/24</li> <li>• Agency- JSW Energy</li> <li>•Date of MOA-24.01.2022 (acknowledgment letter to LOI)</li> </ul>
8	Pane	Maharashtra	5x250+2x150	1500	<ul style="list-style-type: none"> <li>•UR-Offstream LR-connected to a small stream which joins the downstream Kal river</li> <li>•Target date of preparation of DPR- 6/24</li> <li>•Agency- JSW Energy</li> <li>•Date of MOA-29.09.2022</li> </ul>
9	Veeraballi Off-stream	Andhra Pradesh	5x300+2x150	1800	<ul style="list-style-type: none"> <li>•UR &amp; LR- both off stream</li> <li>• Target date of preparation of DPR- 02/24</li> <li>• Agency-Astha Green Energy Ventures India PVT. LTD.</li> <li>•Date of MOA-12.09.2022</li> </ul>
10	vempalli	Andhra Pradesh	6x250	1500	<ul style="list-style-type: none"> <li>• UR &amp; LR- both off stream</li> <li>• Target date of preparation of DPR- 03/25</li> <li>• Agency-JSW Energy</li> <li>•Date of MOA-25.01.2022</li> </ul>
11	Gujjili	Andhra Pradesh	6x250	1500	<ul style="list-style-type: none"> <li>• UR &amp; LR- both off stream</li> <li>• Target date of preparation of DPR- 03/25</li> <li>• Agency-NREDCAP</li> <li>•Date of MOA-25.01.2022</li> </ul>
12	Kandhaura	Uttar Pradesh	5x280+2x140	1680	<ul style="list-style-type: none"> <li>• UR &amp; LR- both off stream</li> <li>• Target date of preparation of DPR- 05/24</li> <li>• Agency-JSW Energy</li> <li>•Date of MOA-25.11.2022</li> </ul>
13	UP01	Uttar Pradesh	11x305+2x152.5	3660	<ul style="list-style-type: none"> <li>• UR &amp; LR- both off stream</li> <li>• Target date of preparation of DPR- 05/24</li> <li>• Agency-Greenko</li> <li>•Date of MOA-01.02.2023</li> </ul>

S.No.	SCHEMES	STATE	INSTALLED CAPACITY		REMARKS
			No. of units x Unit size(MW)	MW	
14	Musakhand	Uttar Pradesh	2x200+2x100	600	<ul style="list-style-type: none"> <li>• UR &amp; LR- both off stream</li> <li>• Agency- ACME Urja Two Private Limited</li> <li>• Target date of DPR preparation-02/25</li> <li>• Date of MOA-'03.04.2023</li> </ul>
15	Raiwada	Andhra Pradesh	2x300+2x150	900	<ul style="list-style-type: none"> <li>• UR on on a tabletop hill across a minor rivulet draining into a nallah &amp; LR-across Sarada river</li> <li>• Target date of preparation of DPR- 1/24</li> <li>• Agency-Adani Green Energy Ltd.</li> <li>• Date of MOA-23.05.2022</li> </ul>
16	Malshej Ghat Bhorande	Maharashtra	6 x 250	1500	<ul style="list-style-type: none"> <li>• UR on Minor nallah draining into Kukadi river &amp; LR-on Minor nallah draining Into Kalu river</li> <li>• Target date of preparation of DPR- 05/24</li> <li>• Agency-Adani Green Energy Ltd.</li> <li>• Date of MoA- 28.06.2022</li> </ul>
17	Chittamvalasa	Andhra Pradesh	4x200	800	<ul style="list-style-type: none"> <li>• UR &amp; LR- both off stream</li> <li>• Agency-NREDCAP</li> <li>• Target date of preparation of DPR- 08/24</li> </ul>
18	Yaganti	Andhra Pradesh	4x250	1000	<ul style="list-style-type: none"> <li>• UR on Minor rivulet &amp; LR-on Minor rivulet</li> <li>• Agency-APGENCO</li> <li>• Target date of preparation of DPR- 08/24</li> <li>• Date of MOA-23.08.2023</li> </ul>
19	Kamalapadu	Andhra Pradesh	3x238 +2x118	950	<ul style="list-style-type: none"> <li>• UR &amp; LR- both off stream</li> <li>• Agency-APGENCO</li> <li>• Target date of preparation of DPR- 08/24</li> <li>• Date of MOA-23.08.2023</li> </ul>
20	Warasgaon warangi	Maharashtra	5x300	1500	<ul style="list-style-type: none"> <li>• UR- proposed on minor nallah draining into Ambi river , LR- proposed on on minor nallah draining into Kal river</li> <li>• Agency-Adani Green</li> <li>• Date of MOA-28.06.2022</li> <li>• Target date of DPR Preparation-06/24</li> </ul>
21	Aravetipalli	Andhra Pradesh	6x220	1320	<ul style="list-style-type: none"> <li>• UR &amp; LR- both off stream</li> <li>• Agency-APSPCL</li> <li>• Target date of DPR Preparation-08/24</li> </ul>
22	Koyna Nivakane	Maharashtra		2700	<ul style="list-style-type: none"> <li>• UR &amp; LR-minor rivulet draining into Kera River/ Koyna river</li> <li>• Agency- Adani Green</li> <li>• Target date of DPR Preparation-06/25</li> </ul>
23	Rayavaram	Andhra Pradesh		1500	<ul style="list-style-type: none"> <li>• UR &amp; LR- on minor stream</li> <li>• Agency-NREDCAP</li> <li>• Target date of DPR preparation-06/25</li> </ul>
24	Gadikota	Andhra Pradesh		1200	<ul style="list-style-type: none"> <li>• UR &amp; LR- off stream</li> <li>• Agency-APGENCO</li> <li>• Target date of DPR preparation-06/25</li> </ul>
25	Nayagaon	Maharashtra		2000	<ul style="list-style-type: none"> <li>• UR- Off Stream , LR- Minor Nallah Draining into Hivra river</li> <li>• Agency-Greenko</li> <li>• Date of MOA-16.01.2023</li> <li>• Target date of DPR Preparation-06/25</li> </ul>
25	<b>Sub-Total</b>			<b>37070</b>	
37	<b>TOTAL</b>			<b>48910</b>	
38	<b>GRAND TOTAL(Off-River)</b>			<b>50110.00</b>	

**Kadana Pumped Storage Hydro Electric Project (4x60 MW = 240 MW)**

- Kadana Pumped storage project is located on river Mahi in Santarampur taluka of District Panchmahals in Gujarat State. An existing reservoir with 1300 Mm<sup>3</sup> live storage and 1700 Mm<sup>3</sup> gross storage capacity has already been created over this river by providing a 58.2 m high and 2225 m long masonry-cum-earth dam. This reservoir is proposed to serve as upper reservoir for this pumped storage project. The FRL & MDDL for this reservoir are 127.7 m and 114.3 m respectively. The lower reservoir for this project would be formed near the power house by creating a tail pool with FRL & MDDL 96 m & 78.7 m respectively.
- It was proposed to install four reversible pump/turbine units of 60 MW each, operating under an average gross head of 43.5 m with rated discharge of 168.7 cumecs and at rated speed of 142.86 r.p.m. Each unit of this project would consume 65 MW of power to carry water with rated discharge of 126.2 cumecs for 47 m head, while operating in pumping mode.
- Two units of 60 MW each of the project were commissioned during 1990 & two units of 60 MW each of the project were commissioned during 1998. Machines operated in generation mode till 2004 and trial for pump mode operation was done during 2004-05. However, operation in pumping mode was not taken up subsequently due to vibration problem in the machines. CKD Blanksko (OEM) was contacted by the project authorities and they submitted their offer for rectification of the problem.
- This offer was discussed in a meeting by GSECL and its management decided to rectify the problem on its own (through in house expertise) as the offer of CKD Blanksko was costlier.
- The Kadana unit no 3 was identified as the pilot unit for revival of Pump Mode Operation of KHEP. As per the report of vibration analysis of unit no 3 (carried out through Ex-BHEL expert to diagnose the root cause of vibrations observed during previous trial of unit under pump mode), necessary corrections like replacement of both the bearings, alignment and centering of turbine shaft is completed recently. The stop log gates of Kadana Unit no 3 are removed. The protection testing of Kadana Unit no 3 is completed and found OK.
- At present, after attending the bearings, the unit no 3 was run in generation mode. The vibration analysis was carried out by Ex BHEL expert in generation mode and found to be working properly. Now the matter will be taken up with Irrigation Department to take permission for reversible mode trial. Along with it, the systems/control loops for reversible mode operations will be checked for healthiness and further actions will be planned accordingly.
- As per meeting organized by CEA on 16.08.2021 through video conference to discuss operation of Kadana Pumped Storage Project not working in pumping mode, it was discussed that there are 4 units in Kadana PSP & Rs. 108 Crores /unit has been quoted by OEM for rectification, a total expenditure of about Rs. 450 Crores is required. CE (Hydro), GSECL requested that this fund may be provided by Central Government through some scheme like PSDF, etc.
- On successful trial of unit no 3 under pump mode, similar corrections/rectification activities will be replicated in other units also.
- The matter for revival of one unit through the OEM is also being explored in parallel by GSECL.

- As per discussion during the Meeting regarding PSP storage held on 12.11.21, the work of exploring the feasibility & timeline for revival of Pump Mode Operation of Kadana HEP is awarded to IIT, Roorkee by GSECL. A team from IIT Roorkee visited Kadana HEP & necessary information was collected by them. The discussion on observations is made with IIT Team during the month of March, 2022. The draft feasibility study report from IIT Roorkee was received & as suggested in the report, the RLA study of the civil structures & CFD study is being planned. During the last week of August 2022, an introductory meeting with the OEM was conducted to identify the alternatives available for replacement of entire units within the existing civil infrastructure without impacting the dam structures. At present M/s BHEL has carried out a study of KHEP units for revival of PMO. As per their report, major R & M is required looking to the physical condition & obsolescence related issues. GSECL has undertaken the process of appointment of consultant to prepare the scope of work, entire activity right from tender preparation up to execution and PG test

**Sardar Sarovar Pumped Storage Hydro Electric Project**

- Sardar Sarovar Hydro Electric Project was commissioned during 2004-06. The River Bed Power House (RBPH) of the project has 6 nos of reversible motor / generator and pump / turbine each of 200 MW installed capacity means total capacity of 1200 MW. The Generation of SSHEP is shared between Gujarat (16%), Maharashtra (27%) & Madhya Pradesh (57%) States, as per the NWDT Award.
- The entire operations of the Project are based on the directives by Narmada Control Authority, Indore and as per Narmada Water Disputes Tribunal (NWDT) award. There was no mention of pump storage operation of the project in NWDT award.
- The project was not operating in Pumping mode as the lower reservoir at Garudeshwar weir was not operational and the equipments required to operate it in pumping mode were also not installed. Further, Narmada Control Authority (NCA) has to take decision to operate the project in pumping mode in consultation with the states of Maharashtra, M.P. and Gujarat.
- Now, the lower reservoir at Garudeshwar weir has been made operational.
- The following equipments are required to be installed for pumping mode operation:-

<b>Items Description</b>	<b>Quantity</b>
Isolated Phase Bus Ducts or 13/8 KV, 400 KV Cables	For Six Units
Phase Reversal Switches	Six nos for Six Units
Static Frequency Converter	Six nos for Six Units

In the meeting held on 31<sup>st</sup> August, 2021 via video conferencing organised by CEA, representative of SSNNL stated that for operationalization of pumping mode of 6 units of 200 MW of River Bed Power House (RBPH) of Sardar Sarovar Project, an expenditure of Rs. 294/- crore (Rupees Two hundred ninety-four crores only) is required which should be shared among the partner States.

❖ **92<sup>nd</sup> meeting of NCA held on 24.08.2021**

Out of three partner states of M.P. Gujarat and Maharashtra, only M.P. Govt. is not agreeable to pumping mode operation of project. The issue was discussed in its 92nd meeting held on 24.8.2021 and Chairman, NCA has directed Member (Power), NCA to thoroughly examine the matter, taking into consideration all the correspondences that have been made between Govt. of Gujarat, Govt. of M.P. and NCA and prepare a detailed report.

❖ **93<sup>rd</sup> meeting of NCA held on 12.04.2022**

In the 93rd meeting of NCA held on 12th April 2022 at 11 AM, CEA representative informed that they had carried out the study from incremental investment point of view and as per their study if GoMP go for PSP model, then over a period of 20 years their share will be Rs. 1,726 crore only, where as if they procure power from the market it will be around Rs. 2,300 crore. So CEA's final view is that the project is beneficial for GoMP and considering the long term benefits, they should go for PSP model at SSP



The Vice Chairman, NVDA, GoMP stated that their Narmada Control Board (NCB) had already taken a decision with regard to sharing of cost for construction of Garudeshwar Weir and pumping mode of RBPH operation and their stand is still the same, i.e., since the Pumped Storage Project (PSP) is not provided in the NWDT Award, hence GoMP will not participate in it. He further stated that as per recent Govt. instruction there is no change in the stand of State of Madhya Pradesh

MD SSNNL, in response stated that there may be views/stands of either of Government of MP or Govt. of Gujarat but NCA is the deciding body in this matter and this body (NCA) has been given mandate to take the decisions by NWDT Award, considering the views expressed by all the members.

Secretary (Power), GoI, has taken up this issue with Power Secretaries of States and has convened various meetings to address this issue and clearly spelled out that this pump storage operation is the solution and can fulfill the peak demand. He then requested Chairman NCA to take a decision for taking this project ahead taking into account the need of the hour as this is a very important subject for all the beneficiary States and the Country.

The GoM representative stated that they have already conveyed their consent for sharing the cost of Garudeshwar Weir except sharing the cost of construction of new structures of bridges/culverts as it was not the part of Garudeshwar Weir.

GoG representative stated that the cost incurred towards the construction of new structure of bridges/ culverts is an integral part of the scheme as with the construction of pond to facilitate the reversible operation this old Gora Bridge became submersible and was required to be demolished and replaced with an elevated one.

The Chairman, NCA requested GoM to consider sharing the cost in totality as they are already convinced with the scheme and agreed to share the cost of Garudeshwar Weir and requested all the concerned party States to review their respective stand so that this project can move forward with their willing consent.

#### ❖ **Meeting taken by Hon'ble Minister of Power & NRE on 26.10.2022**

A Meeting under the Chairmanship of Hon'ble Union Minister of Power & NRE was held on 26.10.2022 at 3.30 P.M. to discuss the issues related to operationalization of Sardar Sarovar PSP in the pumping mode. Hon'ble Minister pointed out that the peak hour tariff in the power exchange should justify the need for the PSP. The Partner states can make a healthy profit if they incur the small additional expenditure to operationalize the PSP. Secretary, Ministry of Jal Shakti, informed that the issue was also discussed in the 93rd NCA meeting. Maharashtra and Gujarat have agreed to incur this additional expenditure but Madhya Pradesh is still reluctant.

Principal Secretary, Energy, GoMP stated that as far as power aspect is concerned, operationalizing the PSP seems an attractive proposition. The storage cost of the project would only be 60 paisa. However, GoMP has certain concerns regarding sharing of water since the PSP was not envisaged as part of the NWDT award. Further operation of the reservoir, especially during pre-monsoon, may not be optimum if PSP is operationalized. He informed that a decision has been taken in 2017 at the level of Hon'ble CM of Madhya Pradesh not to participate in the project.

Hon'ble Minister directed that a Committee may be constituted under the Chairmanship of Chairperson, CEA with representatives from CWC, NCA, NVDA and Grid-India, which would examine the concerns raised by GoMP and come up with a detailed plan to operationalize the project in pumping mode. The Committee shall so structure the scheme as to ensure that there is no loss of existing irrigation and power share of any of the Partner States.

#### ❖ **Constitution of the Committee to suggest possible Measures to operationalize the SSPSP**

As per the direction of Hon'ble Minister of Power, MoP vide Order dated 13.12.2022, has constituted a Committee to suggest possible Measures to operationalize the Sardar Sarovar

Pumped Storage Project under the Chairmanship of Chairperson, CEA with representatives from Govt. of MP, Gujrat and Maharashtra, CWC, Narmada Control Authority, Grid-India & CEA. In this regard, three meetings of the committee have been held on 20.01.2023 , 14.03.2023 and 23.08.2023 and action plan for operationalization of Sardar Sarovar Project in pumping mode is under preparation.

During the first meeting held on 20.01.2023, along with other various issues related to operationalization of Sardar Sarovar Project in Pumping mode are discussed. Representative of Govt. of Gujrat & Maharashtra were agreeable to operationalization of the RBPH machines in pumping mode and sharing the cost of additional infrastructure required. Representative of Govt. of MP conveyed that power aspect is not a concern and operationalizing the PSP is an attractive proposal. However, Govt. of MP had certain concerns regarding sharing of water, since PSP was not envisaged as part of the NWDT award. He further stated that they had written a letter to NCA on 05.01.2018 conveying the decision taken by Narmada Control Board and response of the NCA is still awaited.

Chairperson, CEA directed NCA to respond to the concerns raised by Govt. of MP and to convey their confirmation to GoMP that their percentage share of water would not change even after operationalizing the PSP. NCA agreed to submit the reply to Govt. of MP after due approval from authority.

During the second meeting of the Committee held on 14.03.2023, Sardar Sarovar Narmada Nigam Limited (SSNNL) informed that a site visit of Sardar Sarovar Project has also been conducted by NCA and it has been found that there were no space constraints for installation of equipment required for operationalization of RBPH machines in pumping mode. So far, expenditure of about Rs. 599 Crs. have already been incurred for construction of Garudeshwar Weir and associated structures. SSNNL in consultation with the OEM has worked out the financial details of work executed/to be executed and sharable by all the party States for operationalizing the Sardar Sarovar PSP in pumping mode and tentative expenditure of about Rs. 466 Crs. (excluding GST) is further required.

It has also been informed that OEM has provided 2 years' time line for supply of equipment and 55 months for installation and commissioning work after receipt of Equipment.

During the meeting, SSNNL was suggested that an Expression of Interest (EOI) could be floated by SSNNL inviting the vendors to visit the Sardar Sarovar Project and budgetary offer/bids along with detailed execution plan as well as performance guarantee at competitive price could be sought from the vendors. Accordingly, SSNNL have also invited the Expression of Interest (EOI) and the cost will come out very clearly after agencies start quoting on that. The estimate of Rs. 466 Crs. quoted by OEM may reduce further and through EOI the better and competitive price will be discovered, which will be beneficial for all participating States.

Third meeting of the committee was held on 23<sup>rd</sup> August 2023. Since, Govt. of MP has already given consent for participation in PSP mode operation, it was decided in the committee meeting that further activities can be simultaneously carried out before accord of formal approval from the Narmada Control Board headed by Hon'ble Chief Minister of MP. It was also decided to carry out Health Check-up of the System at RBPH by OEM and cost to be shared among the beneficiary States.

#### ❖ **94<sup>th</sup> meeting of NCA held on 08.05.2023**

The 94<sup>th</sup> meeting of NCA was held on 08.05.23. As discussed in the meeting, it was decided that NCA may write a letter to the Govt. of MP, based on the inputs from CEA and deliberations held during this meeting, so as to enable GoMP to present this case before NCB headed by Hon'ble Chief Minister of Madhya Pradesh for consideration.

## ❖ Way forward

NCA in its 94<sup>th</sup> meeting held on 08.05.2023, deliberated on the issue of operationalization of Sardar Sarovar Project in pumping mode and it was decided that NCA shall write a letter to the Govt. of MP, based on the inputs received from CEA, for consideration of Govt. of MP. The inputs from CEA regarding justification for operationalization of Sardar Sarovar Project in pumping mode were sent to NCA on 26.05.2023. Further, a revised cost benefit analysis was carried out by CEA on the request of NCA and the same was forwarded to NCA on 10.07.2023 for further necessary action. NCA vide letter dated 14.07.2023 has written a letter to Govt. of MP for favourable consideration of operationalization of Sardar Sarovar Project in pumping mode. Now Govt. of MP has to present the case of operationalizing Sardar Sarovar Project in pumping mode before Narmada Control Board headed by Hon'ble Chief Minister of Madhya Pradesh for consideration.

During the 3<sup>rd</sup> meeting of the Committee to suggest possible Measures to operationalize the SSPSP, it was decided that since, Govt. of MP has already given consent for participation in PSP mode operation, further activities can be simultaneously carried out before accord of formal approval from the Narmada Control Board headed by Hon'ble Chief Minister of MP.

In compliance to the decisions taken during the third meeting of the Committee, SSNNL organized a meeting with stakeholders and OEMs (M/s. Toshiba & M/s, HM Hydro- formerly Hitachi Ltd.). During the meeting OEM suggested for Capital Overhauling (COH) of the RBPH machines. Both proposals of COH and pumped mode operation would be processed simultaneously and it was proposed to carryout COH of two RBPH units in first Stage. M/s Toshiba indicated that tentative scheduled of supply of spares and consumables is 18 to 24 months. M/s SSNNL stated that the work of pumping mode modification could be started from Feb'2026 subject to approval from all party States and NCA and accordingly, order needs to be placed by February, 2024.