PROJECT JUSTIFICATION

INTRODUCTION

Hydropower is a clean renewable and environmentally friendly source of energy. It provides valuable peaking power with the ability to start and stop quickly with instantaneous load acceptance/rejection making it suitable for meeting peaking power demand for enhancing grid reliability and stability. The increasing energy demand of the country and requirement of peaking power can be met sustainably by having a fair share of hydropower in the grid. Hydropower projects provide additional benefits in terms of recreation, tourism, pisciculture, etc.

The northern region of India has been experiencing acute power shortage during the last decade due to rapid industrialization, developing irrigation network & urbanization. It is obviously not possible to meet rapidly growing power demands of industry and agriculture from the existing power stations. Electrical energy being the basic ingredient for economic upliftment through industrial and agricultural development, power shortage has slowed down the wheels of progress and put a curb on development activities in the region. By commissioning Uri-I Stage-II HEP, energy and peaking problems would be considerably improved in the region.

It is an undoubted fact that Hydropower projects are the boon to the society. With the construction of hydroelectric project, there is visible socio-economic development in the region. Medical/ Health, education, communication and other infrastructure/civic amenities are strengthened. Such facilities of the project are also extended to the locals, which directly benefits them. Work/ self-employment opportunities for the locals are also generated due to the emergence of new markets and other commercial establishments in the area. Thus, social benefits accruing from the construction of a hydroelectric project in the area are manifold and lead to improved quality of life of the local people in and around the project area/ surroundings.

Minimal impact on Environment and Forest Aspect

Uri- I Stage II HE project will utilize the already completed structures of existing Uri I Power Station which includes Barrage, Cut and Cover Culvert, Desilting Basin, Open Power Channel, Adits. It involves construction of HRT, Powerhouse and TRT only. There is minimal Forest Land involved in the construction of the Project. Besides, the non-forest land is already available with the existing Uri-I Power Station for disposal of muck generated from the project and also for installation of machinery and mobilization of manpower required for the construction of the project.

There is no requirement of additional private and revenue land for the construction of the said project. The Forest land involved for the construction of HRT, Powerhouse and TRT is underground and hence there is no involvement of trees in their alignment of the structures.

R&R Aspect/ No displacement of the Population

For the development of proposed project, the land required for the construction of the project is already available with the existing Power station and hence, there is no involvement of the additional revenue land due to which the local population shall not be affected. Also the project will utilize the already completed structures of existing Uri-I Power Station which include Barrage, Cut and Cover Culvert, Desilting Basin, Open Power Channel, Adits and there will be no submergence of any forest/revenue land.

Optimum Utilization of the additional Kishanganga Water

Kishanganga Hydroelectric Project (KGHEP) was commissioned in May-2018. It is inter basin transfer river and after commissioning of KGHEP its water comes to Uri-I Barrage site through Boniyar Nallah- Madhumati Nallah- Wular Lake- Jhelum. This flow utilized by machines after generation is being released in the Bonar Nallah / Wullar Lake, which reaches to Uri-I Power Station. With the construction of proposed Uri-I Stage-II HE Project, NHPC would be able to make optimum utilization of this surplus water that is being otherwise discharged through the Dam gates without having any utility. By tapping this water, NHPC will be able to generate additional electricity that would be beneficial to the nation.

Generation of Local Employment and other indirect benefits

With the construction of proposed project local manpower under various categories viz Unskilled, semi-skilled and Skilled categories shall be required during construction activities. Besides manpower, inspection vehicles shall also be deputed for various inspection works. In addition to that hiring of various services will also require during the construction activities. In order to benefit the local population NHPC has framed a policy to cater local/PAF population which will benefit the immediate local surroundings. In this regard PAF/local are preferred for all the categories of manpower based on the skillset available with the local population, hiring of vehicles will be reserved exclusively for the PAFs of the project. Also, preference will be given to locals/ PAFs contractors during hiring service contracts and other small contracts. As per the extant PAF policy of NHPC a contract upto the value of Rs 60.00 lac has been kept reserved for locals/ PAFs contractors so that the immediate surrounding shall be benefitted. It is to mention here that the PAFs of existing Uri I Power Station shall also benefit with the PAF policy of NHPC.

Benefits to farmers

Uri- I Stage II HE Project shall be beneficial to farmers. Implementation of Catchment Area Treatment shall reduce soil erosion, maintain soil moisture, increase sub-surface water and fertility of fields.

Hydropower: A climate resilient power

Hydropower, being a renewable energy, is main factor in the global energy transition towards mitigating anthropogenic climate change. Conventional hydroelectric power is a potentially important alternative to coal-based power stations in the country in terms of avoided carbon emissions. In the case of Uri-I Stage-II HEP out of total 102.0 ha of required land 85.0 ha is under NHPC possession and remaining 17.0 ha of underground forest land is needed only for underground work. No major deforestation activity is involved in the

proposed project.

Hydropower: An efficient Power

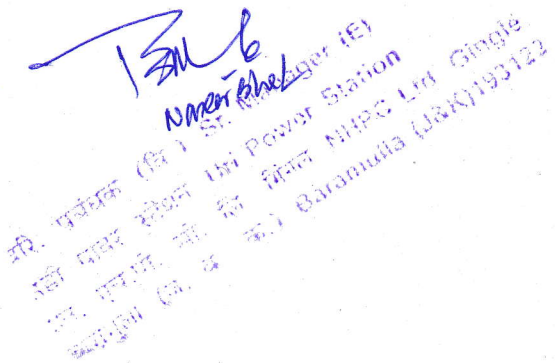
Hydropower projects are known to have a long life. Projects constructed in the past many years are still working in an efficient manner which do not vouch the assertion that hydropower is an in-efficient power. Pertinent here to mention that hydropower is a renewable source of energy and saves scarce fossil fuels. It is relatively non-polluting and hence an environmentally benign source of power generation.

The future is Clean Ethical Energy

Enormous hydropower potential is available in Union Territory of Jammu & Kashmir, the harnessing of which can help in overall growth in the UT of J&K and country as well. Construction of Uri-I Stage-II HEP will not only help in tapping the unutilized vast hydro-potential of the Union Territory of Jammu & Kashmir but will also help in providing strategic strength to the country in the Northern region. Hydropower is the demand of the hour for grid security in India. Hydroelectric Project is designed for expected extreme conditions and all the concerns are adequately addressed at every stage of project design, planning and execution.

CONCLUSION

Development, in all forms, is a gateway to economic sustainability and self-reliance. Ever increasing demands of the growing population, for meeting its basic needs, calls for greater and self-sustained economic growth. Hydropower projects have made an important and significant contribution in human development, and the benefits derived from them have been considerable. Extensive technological innovations now provide the capability to plan, design, build and operate hydropower projects with minimum undesirable environmental consequences. Government of India has taken many policy decisions to promote hydropower as a green and renewable source of power generation.



CHAPTER – II

JUSTIFICATION OF PROJECT FROM POWER SUPPLY ANGLE

CHAPTER-II

JUSTIFICATION OF PROJECT FROM POWER SUPPLY ANGLE

2.1 POWER- SUPPLY DEMAND

2.1.1 On All India Basis

The Power System in India has grown from small, isolated stations, serving limited consumers in and around large cities, into large Regional Power Grids and further interlinked to one National Grid. As per monthly report of CEA for All India Installed Capacity (In MW) of Power stations, total installed capacity in the country has already grown to 395607.86 MW (As on 28.02.2022).

For the purpose of efficient power system planning and operation, the power system of the country has been divided into the five geopolitical regions: Northern, Western, Southern, Eastern and North-Eastern regional grids and the regional grids have been inter-connected to make the national grid.

The objective of the system development is to evolve self-sufficient regional grid catering to the individual regional power demands. It is also aimed at achieving the maximum benefits from integrated operation, through a proper mix of thermal, hydro and other renewable energy sources. The actual power position in the five Regional Grids for the year 2020-21, as per "Load Generation Balance Reports (LGBR) "2020-2021" published by CEA has been shown in table 2.1 (Annexure - I).

2.1.2 On Regional Basis

The Northern Region includes the states of Punjab, Haryana, Himachal Pradesh, Delhi, UP, Uttarakhand, Rajasthan, UT of Chandigarh, UT of J&K and UT of Laddakh. The Northern grid consists of power system controlled by various Electricity Boards/ GENCOS/ TRANSCOS/ DISCOMS located in the above states.

The Northern Region has been experiencing acute power shortage especially the peaking power, during the last decade, due to rapid industrialization,

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developing irrigation network & urbanization. Electrical energy being the basic ingredient for economic upliftment through industrial and agricultural development, power shortage had slowed down the wheels of progress and put a curb on all development activities in the region. Thermal and nuclear generation of power, being base power, is not the right solution for meeting peaking power deficit in this region. Further, there are limitations imposed by inadequate availability of coal and nuclear fuel, long distances over which fuel has to be transported through an overloaded railway system and higher cost of power generation. Moreover, our country is committed to focus on decarbonisation and promote zero carbon emission, hence adding non fossil sources of power generation to reduce the adverse impact of fossil fuels on environment. Therefore, endeavour should be adoption of cleaner fuels, increasing share of RE, phasing out of old & inefficient polluting power plants etc.

One side, the demand is increasing due to rapid industrialization, urbanization, electric transportation, modernization of agriculture etc. and on the other side generation from thermal power stations will go on decreasing due to retirement of old/ inefficient plants. Though, renewable energy sources like solar and wind are added rapidly to meet the energy demand, but the peak demand (morning and evening peak demand) cannot be met with the addition of solar based power plants without storage. Hence, advance planning and implementation of new hydro projects is extremely beneficial to meet the peak demand as well as grid balancing requirement expected to arise due to addition of other renewable energy sources in the grid.

2.1.3 JUSTIFICATION FOR THE PROJECT

From the Table 2.1 a for the year 2020-21, it is observed that the North Region has deficit in peak capacity of 0.7% and energy deficit of 1.0%. The proposed Uri-I Stage-II HE Project is a run of the river project and would form an integral part of the Northern Grid to contribute in projected energy requirement. This project is proposed to be commissioned by the end of 2027-28 and envisages utilization of surplus water of Jhelum River after full

utilization by Uri-I Stage-I Power Station & additional water from Kishanganga HE Project released through turbine outlets into Wular lake and subsequently to the Jhelum river. Besides, to an extent, it will also contribute peak capacity to the grid, grid balancing power in the aftermath of rapid augmentation of seasonal and intermittent renewable energy like solar and wind.

2.2 SCHEME FOR WHEELING EVACUATING POWER

Power from Uri-I Stage-II HE Project is proposed to be evacuated through existing 400kV transmission lines (Line-1 & Line-2 to 400/220kV Substation at Amargarh and Line-3 to 400/220kV Substation at Wagoora via Uri-II Power station) through inter connecting of 400kV GIS of Uri-I Power Station and Uri-1 Stage-II HEP.

2.3 AVAILABLE GENERATING CAPACITY IN REGION

As per monthly report of CEA for All India Installed Capacity (In MW) of Power stations, total installed capacity in Northern Region as on 28th Feb 2022 is 110456.05 MW. Out of this, capacity of thermal & nuclear is 65048.57 MW, capacity of Hydro plant is 20433.77 MW and capacity of RES plants (Solar, Wind, SHPs and Bio Mass etc.) is 24973.71MW.

2.4 FUTURE ENERGY REQUIREMENTS IN REGION

As per draft National Electricity Plan'2022 circulated by CEA in Feb-2022, the projected available energy, total energy requirement and peak demand during the year 2026-27 has tentatively been assessed as 1967 BU, 1874 BU and 272 GW respectively. However, the projected available energy, total energy requirement and peak demand during the year 2031-32 has been assessed tentatively as 2655 BU, 2538 BU and 363 GW respectively.

2.5 POWER SUPPLY POSITION WITHOUT & WITH PROJECT

The Power supply position with and without Uri-I Stage-II project has been assessed and indicated at table 2.2 & 2.3 (Annexure-II &III).From table 2.2,

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the power scenario in All India Level without Uri-I Stage-II Project by the end of 2027-28 is summarized as under:-

Region	Position of Peaking Power (MW) (Deficit/ Surplus)	Peaking Power (%) (Deficit/ Surplus)	Energy(MU) (Deficit/ Surplus)	Energy (%) (Deficit/ Surplus)
National Grid	-25988	-9.0%	+232528	+11.58%

Note: Surplus denoted by (+)
Deficit denoted by (-)

Uri-I Stage-II Project having installed capacity of 240 MW, is one of the potential schemes in UT of J&K and, as such, merits clearance at an early date so as to be taken up for execution immediately to obtain benefits by 2027-28. The need for Uri-I Stage-II Project has, therefore, been considered in the national interest for providing environmental friendly clean energy, boosting thrust on decarbonisation and energy requirements of Northern region apart from other considerations like grid balancing on account of expected huge capacity addition of Solar and wind power in the grid.

From the perusal of table 2.3, the power scenario in all India level with Uri-I Stage-II Project by the end of 2027-28 is summarized as follows:

Region	Position of Peaking Power (MW) (Deficit/ Surplus)	Peaking Power (%) (Deficit/ Surplus)	Energy(MU) (Deficit/ Surplus)	Energy (%) (Deficit/ Surplus)
National Grid	-25804	-8.9%	+233264	+11.62%

Note: Surplus denoted by (+)
Deficit denoted by (-)

It is observed that in National Grid, by the end of 2027-28, the peaking deficit after addition of Uri-I Stage-II HE Project (240MW) would improve from 9% to 8.9% and Energy surplus would be approx. 11.6%.

The power from this project would be fully absorbed in the Northern grid/National Grid. As such, Uri-I Stage-II H.E. Project is being proposed for immediate implementation.

Annexure-I

Table: 2.1

Actual Power Position for Year 2020-21

	Energy				Peak			
Region	Requirement	Availability	Surplus/ Deficit (-)		Demand	Met	Surplus/ Deficit (-)	
	(MU)	(MU)	(MU)	(%)	(MW)	(MW)	(MW)	(%)
Northern	396151	392323	-3828	-1.0%	68288	67806	-482	-0.7 %
Western	388013	387975	-38	0.0%	61778	61692	-86	-0.1 %
Southern	326885	326836	-49	0.0%	58395	58395	0	0.0 %
Eastern	147530	146999	-531	-0.4%	24016	24016	0	0.0 %
North-Eastern	16995	16531	-464	-2.7%	3294	3107	-187	-5.7 %
All India	1275574	1270664	-4910	-0.4%	215771	215016	-755	-0.3 %

The data for the year 2020-2021 tabulated above is as per 'Load generation balance report (LGBR) Published by CEA on the website www.cea.nic.in

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Annexure-II

Table 2.2

POWER SUPPLY POSITION ALL INDIA

WITHOUT URI-I STAGE-II H.E. PROJECT

	Unit	2021-22	2022-23	2023-24	2024-25	2025-26	2026-27	2027-28
Installed Capacity (Up to 28.02.2022)	MW	395607	451608	507609	563609	619610	675611	720007
Installed capacity excl renewables	MW	289232	298053	306874	315695	324515	333336	343249
Peak availability	MW	222665	229456	236246	243037	249827	256618	264250
Peak requirement	MW	205873	219098	232324	245549	258775	272000	290238
Peak Surplus(Deficit)	MW	16792	10357	3922	-2512	-8947	-15382	-25988
Peak Surplus(Deficit)	%	8.2%	4.7%	1.7%	-1.0%	-3.5%	-5.7%	-9.0%
Energy availability	MU	1568247	1637911	1762276	1886640	2011004	1967000	2239419
Energy requirement	MU	1474025	1554020	1634015	1714010	1794005	1874000	2006892
Energy Surplus(Deficit)	MU	94222	83891	128261	172630	172630	93000	232528

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Energy Surplus(Deficit)	%	6.4%	5.4%	7.8%	10.1%	9.6%	5.0%	11.58%
Fuel Type Installed capacity:								
Thermal (Coal, Lignite, Diesel)	MW	211029 MW	215786 MW	220542 MW	225298 MW	230055 MW	234811 MW	238431 MW
Gas	MW	24900 MW	24913 MW	24927 MW	24941 MW	24954 MW	24968 MW	24968 MW
Nuclear	MW	6780 MW	8180 MW	9580 MW	10980 MW	12380 MW	13780 MW	15520 MW
Hydro & PSP	MW	46525 MW	49175 MW	51826 MW	54476 MW	57127 MW	59777 MW	64330 MW
Renewables (solar, wind, small hydro, biomass)	MW	106375 MW	153555 MW	200735 MW	247915 MW	295095 MW	342275 MW	376758 MW
Total	MW	395608 MW	451608 MW	507609 MW	563610 MW	619610 MW	675611 MW	720007 MW
1.The Peak/Energy availability & requirement data for the year 2021-22 has been taken from 'Load generation balance report 2021-22' Published by CEA on the website www.cea.nic.in. Installed capacity of 395607.86 MW as on 28.02.2022 has been taken from CEA website.								
2. Projected total Installed capacity for the 2026-27 has been taken from Draft National Electricity Plan for calculation.								

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3. Projected total Installed capacity for all other years been calculated on pro rata basis from total Installed capacity for the year 2021-22 and Projected Installed capacity 2026-27 has been taken from Draft National Electricity Plan.
4. Peak availability for all the years has been estimated on the basis of ratio of Peak availability to Installed capacity (excluding renewables) considering year 2021-22 as reference.
5. Energy availability for the year 2026-27 is as per Draft National Electricity Plan (page no 5.23). Energy availability for the all other years, has been calculated on projected Installed capacity and considering PLF of 59.94% for Thermal, 16% for Gas, 70% for Nuclear, 35% for Hydro and CUF of 20% for Renewables. (Energy available MU = IC (MW) x365*24*PLF/CUF/1000)
6. Energy requirement and peak requirement for the year 2026-27 & 2031-32 taken for calculation purpose based on Draft National Electricity Plan (page no 4.3) and for other all years calculated on pro rata basis
7. Uri-I Stage-II HE Project with installed capacity of 240 MW and Design Energy of 932.60 MU is likely to be commissioned during year 2027-28
This is a statistical analysis based on various publications mentioned above and meant for study and planning purposes only.

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Annexure-III

Table 2.3

POWER SUPPLY POSITION ALL INDIA

WITH URI-I STAGE-II H.E. PROJECT

	Unit	2021-22	2022-23	2023-24	2024-25	2025-26	2026-27	2027-28
Installed Capacity (Up to 28.02.2022)	MW	395608	451608	507609	563610	619610	675611	720247
Installed capacity excl renewables	MW	289233	298054	306874	315695	324515	333336	343489
Peak availability	MW	222665	229456	236247	243037	249827	256618	264434
Peak requirement	MW	205873	219098	232324	245549	258775	272000	290238
Peak Surplus(Deficit)	MW	16792	10358	3923	-2512	-8948	-15382	-25804
Peak Surplus(Deficit)	%	**8.2%**	**4.7%**	**1.7%**	**-1.0%**	**-3.5%**	**-5.7%**	**-8.9%**
Energy availability	MU	1568247	1637911	1762276	1886640	2011004	1967000	2240155
Energy requirement	MU	1474025	1554020	1634015	1714010	1794005	1874000	2006892
Energy Surplus(Deficit)	MU	94222	83891	128261	172630	172630	93000	233264

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Energy Surplus(Deficit)	**%**	**6.4%**	**5.4%**	**7.8%**	**10.1%**	**9.6%**	**5.0%**	**11.62%**
Fuel Type Installed capacity:								
Thermal (Coal, Lignite, Diesel)	**MW**	211029 MW	215786 MW	220542 MW	225298 MW	230055 MW	234811 MW	238431 MW
Gas	**MW**	24900 MW	24913 MW	24927 MW	24941 MW	24954 MW	24968 MW	24968 MW
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Renewables (solar, wind, small hydro, biomass)	**MW**	106375 MW	153555 MW	200735 MW	247915 MW	295095 MW	342275 MW	376758 MW
Total	**MW**	**395608 MW**	**451608 MW**	**507609 MW**	**563610 MW**	**619610 MW**	**675611 MW**	**720247 MW**
1.The Peak/Energy availability & requirement data for the year 2021-22 has been taken from 'Load generation balance report 2021-22' Published by CEA on the website www.cea.nic.in. Installed capacity of 395607.86 MW as on 28.02.2022 has been taken from CEA website.								
2. Projected total Installed capacity for the 2026-27 has been taken from Draft National Electricity Plan for calculation.								

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7.Uri-I Stage-II HE Project with installed capacity of 240 MW and Design Energy of 932.60 MU is likely to be commissioned during year 2027-28
This is a statistical analysis based on various publications mentioned above and meant for study and planning purposes only.

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