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Greener Smarter Sustainable

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Proposal for grant of subsidy by the government for promotion of use of Solar Water Heaters in the UT of J&K

Due to very cold climatic conditions in J&K, the hot water requirement is relatively very high. Most of UT of J&K being snow bound, in the harsh climatic conditions of winter, people find electricity as the most convenient means for water heating. In towns mostly electrical water heaters are being used for water heating whereas in rural areas, where people cannot afford electrical water heaters, majority of households use crude water heaters locally known as 'boilers' for water heating (Exhibit #1 in Annexure-A). The crude water heaters are formed by winding a bare nichrome coil around a cylindrical wooden or ceramic block. The heater is immersed in water without any insulation between the coil and water. While in use electricity comes in direct contact with water. Crude water heaters are therefore a safety hazard. Further no thermal cut off is used to switch off the heater when the water attains its desired temperature. The water tanks in which these crude water boils are used are either metallic or plastic without any thermal insulation to prevent heat loss. The metallic tap fitted in the tank is generally earthed in crude manner. While in operation, two current paths are formed, one through the heater and other from heater to earth which causes huge loss of electricity. The efficiency of crude water-heaters, therefore, may be less than 50% which means that more than 50% heat is lost to the atmosphere.

Replacing electrical water heaters and crude water heaters with solar water heaters ((Exhibit #2 in Annexure-A) could be an ideal demand side management (DSM) measure in the UT. It will not only save on the electricity bill of the consumers but reduce AT&C losses of the Discoms, reduce carbon foot print because of use of clean solar energy and provide a safe means of water heating to consumers. A 100-litre capacity solar water heater can replace an electric water heater or crude water heater for residential use and can save approximately 1500 units of electricity annually (125 units per month) and prevent emission of 1.5 tons of carbon dioxide annually. An electricity consumer is entitled to rebate of Rs. 150/- per month in J&K on electricity bill for minimum capacity of 100 Ltr Solar Geyser.

Solar Water Heaters are being used extensively globally. In Rizhao, China, a city of 3 million people 98% of homes use the sun to heat their water. 90% of all homes in Israel/Palestine use the sun to heat their water (Exhibit #3 in Annexure-A). In neighboring Ladakh also Solar water heaters are being used extensively, inspite of the fact that it is extremely difficult to maintain free flow of water through pipe work under sub zero conditions during winter. The solar water heaters are heavily subsidized in Ladakh. The

scheme is being implemented on the basis of 25:75 share. The 25 percent cost of solar water heaters have to be borne by the beneficiaries while the rest 75 percent cost has been sanctioned under the scheme. 5-year manufacturing operation and maintenance has also been ensured for each device. Around 40% households in Ladakh use solar water heaters.

In Kargil district alone, during financial year 2021-2022, 1,218 solar water heaters of 100 LPD and 577, 200 LPD had been distributed. In the financial year, 2022-23, 995 solar water heaters of 100 LPD and 930 solar water heaters of 200 LPD were distributed. Similarly, during financial year 2023-2024, 110 solar water heaters of 100 LPD and 250 solar water heaters of 200 LPD had been provided (Exhibit # 4 in Annexure-A).

Unfortunately, the use of Solar Water Heaters has not picked up in J&K although JAKEDA distributed some units under earlier MNRE scheme which stands closed long back. Those who already use these heaters are satisfied with their performance. With a view to promote use of Solar Water Heaters in J&K, it is therefore proposed to provide 50% subsidy or more on these units.

It has been observed that two units of 100 Litre Per Day (LPD) capacity for small families and two units of 150 LPD capacity for larger families are sufficient to meet the hot water requirement except during three months of peak winter when temperature raised by these heaters falls short of the actual requirement of around 60 degrees centigrade. Even during these months these heaters preheat the water which can be further heated by electrical water heaters at minimal electricity consumption. Two units of smaller capacity are preferred over single unit of large capacity to facilitate series and parallel connections during winter and summer months respectively.

To begin with it is proposed that government may provide 50% subsidy to 2000 units to be distributed during 2024-25, 1000 units each for 100 LPD and 150 LPD, to promote use of these wonderful devices. Thereafter subsidy may be provided to 10,000 units each during 2025-26 and 2026-27, 5000 each for 100 LPD and 150 LPD during. The total amount of subsidy is accordingly worked out as under:

Capacity	Rate (Rs.)	Year								
		2024-25			2025-26			2026-27		
		Quantity (No.)	Amount (Rs. in Cr.)	50% Subsidy (Rs. in Cr.)	Quantity (No.)	Amount (Cr.)	50% Subsidy (Rs. in Cr.)	Quantity (No.)	Amount (Cr.)	50% Subsidy (Rs. in Cr.)
100 LPD	20000	1000	2.00	1.00	5000	10.00	5.00	5000	10.00	5.00
150 LPD	25000	1000	2.50	1.25	5000	12.50	6.25	5000	12.50	6.25
Total			4.50	2.25	10000	22.50	11.25	10000	22.50	11.25

The subsidy burden on J&K government, therefore works out to Rs. 2.25 Cr. during 2024-25 and Rs. 11.25 Cr annually thereafter which may be continued till the use of these heaters becomes very common. This suggestion is indicative only. Actual percentage of subsidy and number of units to be distributed may be decided by the authorities.

Benefit to Consumer: As mentioned above, a 100 LPD Solar Water Heater saves 1500 units of electricity annually. The domestic consumers are billed at an average billing rate of Rs. 3.47 per unit as per Table-90 (page-184) (Exhibit # 5 in Annexure-A). of Joint Electricity Regulatory Commission Tariff Order for 2023-24.
Therefore, Saving in electricity bill for 1500 units per annum @ Rs. 3.47 is Rs. 5205.00. Since beneficiary share is Rs. 10,000 only, the payback period of the consumer is less than 2 years' time period. Thereafter consumer gets free hot water for remaining 18 years, taking design life of these heaters as 20 years.

Benefits to J&K Power Development Department:

The standard acceptable transmission and distribution losses for a distribution company are considered to be of the order of 15%. Since J&K Power Development Department purchases most of the power from other states and it is the Northernmost UT of India, the losses also include intrastate and interstate transmission losses which are relatively high. Keeping these factors and also the scattered population and condition of T&D system in J&K in view, the losses of the order of 20% are considered to be reasonable for J&K. This implies that for every 100 units delivered at the consumer installation, the Discoms lose 20 units of electricity in Transmission and Distribution. This of course excludes the losses due to pilferage.

Since Solar Water Heaters are installed at the consumer premises, as such T&D losses of the order of 20% are saved.

Average cost of supply of JKPDD (landed cost of electricity) as determined by JERC vide Tariff Order for 2023-24 is Rs. 7.22 per unit. The relevant schedule is attached. (Exhibit # 5 in Annexure-A).

Saving per unit per annum on account of subsidy = Cost of Supply - Loss of revenue due to installation of solar water heater

= 1500 X 7.22 – 1500 X 3.47
= Rs. 5625 /- per annum

Saving for 20 years on current market rate = 5625 X 20 = Rs. 1.125 lacs

Total Benefits to JKPDD are worked as under:

Capacity	Rate per unit (Rs.)	Quantity (No.)	Units of Electricity saved per Heater annually (U)	Total units saved annually (LU)	Amount on power subsidy saved @ Rs. 3.75 annually	Total Subsidy Provided to beneficiary for solar heater @50% (Rs. in Cr)	Payback period to JKPDD (Years)	Savings to JKPDD over remaining 18 years of design life (Rs. Cr.)
100 LPD	20000	11000	1500.00	165.00	6.19	11.00	1.78	111.38
150 LPD	25000	11000	2250.00	247.50	9.28	13.75	1.48	167.06
Total			3750.00	412.50	15.47	24.75		278.44

It may, as such, be noted that the payback period to JKPDD is less than 2 years and savings to the department are very attractive of the order of Rs. 278/- Cr. at current rates, over the design life of the solar water heater.

Environmental Benefits:

As mentioned above, solar water heater uses clean energy of the sun for heating water. A 100-litre capacity solar water heater can replace an electric geyser for residential use and may save approximately 1500 units of electricity annually (125 units per month) and prevent emission of 1.5 tons of carbon dioxide per year which is equivalent to planting of 30 trees. The environmental benefits of the proposed 22000 no solar water heaters are therefore worked out as under:

Capacity	Quantity (No.)	Prevention of equivalent Carbon emission @1.5 ton per 100 LPD per anum (tCO2e)	Equivalent trees planted @30 per 100 LPD (No.)
100 LPD	11000	16500.00	330000.00
150 LPD	11000	24750.00	495000.00
Total		41250.00	825000.00

Pertinent to mention during 2023-24, J&K consumed 20985 MU of electrical energy, out of which 7223 MU came from thermal power plants. So more than one third energy consumed by J&K comes from thermal power plants

Since quantity of Coal required to generate 1 unit of Electricity in India is 0.59 to 0.89 kg. and average carbon intensity for electricity generation in India is around 0.82 kilograms of carbon dioxide per kilowatt-hour ($kgCO_2/kWh$), so the Carbon emission caused by 7223 MU electricity

consumed by J&K works out to 7223 X 0.82 X 1000000 / 1000 = 60 lac tons (tCO2e). The proposed 22000 Solar Water Heaters will prevent emission of 41250-ton equivalent carbon emission annually.

Benefits to the nation and to world:

On 9th Sept. 2023, G20 member states (of which India is a member), which are responsible for around 80% of global greenhouse gas emissions, committed to achieving net zero emissions by mid-century while noting with concern that the efforts to address climate change remain insufficient. At the 26th session of the Conference of the Parties (COP26) of the UNFCCC in November 2021, Hon'ble Prime Minister had announced that India will achieve the target of net zero emissions by 2070. G20 states said they will focus on transitioning to low carbon energy systems, including "rapidly scaling up clean power generation including renewable energy. Experts say that tripling of renewable energy capacity by 2030 will bring a step change in emissions from the electricity sector.

Every effort, as such, is required to be made to improve the progress of carbon neutralization capacity so that commitments made by the Hon'ble Prime Minister on various global platforms are met and the ambitious target of net zero emission by mid of century is achieved. Replacing electrical water heaters with solar water heaters offers a good opportunity towards fulfilling these commitments made by the Hon'ble Prime Minister.

In view of foregoing, it is suggested as under:

i. ***To approach the government for grant of subsidy for distribution of 22000 Solar Water Heaters of 100 LPD and 150 LPD to the beneficiaries on first come first serve basis, over the three years as per phasing below:***

Capacity (LPD)	*Quantity (No)*	*50% Subsidy during 2024-25 (Rs. in Cr.)*	*50% Subsidy during 2025-26 (Rs. in Cr.)*	*50% Subsidy during 2026-27 (Rs. in Cr.)*
100 LPD	*11000*	*1.00*	*5.00*	*5.00*
150 LPD	*11000*	*1.25*	*6.25*	*6.25*
	22000	*2.25*	*11.25*	*11.25*

ii. ***The proposed subsidy will benefit the consumers with a payback period of less than 2 years and they will get free hot water for remaining 18 years of design life of the solar water heaters. The solar water heaters are also safer for the consumers as compared to crude water heaters.***

iii. ***The payback period to the government is also less than 2 years. Thereafter government will save Rs. 278/- Cr over remaining 18 years design life of the solar water heaters.***

iv. ***Since solar water heaters use clean energy of the sun for water heating, the environmental benefits are enormous. These subsidized 22000 no. solar water heaters will offset 41250.00-ton equivalent carbon (tCO2e) annually which is equivalent to planting of 825000.00 no trees. It will therefore be a step towards achieving the net zero emissions committed by Hon'ble Prime Minister in various international fora.***

v. ***A mechanism similar to the one under PM Surya Ghar Muft Bijli Yojana may be established for claiming the subsidy. Government may form a committee under Secretary Technical, JKPDD with member engineers from Electrical Inspectorate and Discoms which may fix the bench mark cost of 100 LPD and 150 LPD Solar Water Heaters. The committee may also approve 10 top makes and models of Solar Water Heaters for claiming the subsidy. The committee may also authorize the empanelled solar rooftop vendors to supply and install the solar water heaters at beneficiary premises. The vendors may also be required to maintain the units for 5 years free of cost.***

vi. ***The subsidized solar geyser units may be distributed through JPDCL and KPDCL only because of the presence of these corporations throughout J&K including in rural and far-flung areas of the UT and because of the excellent performance shown be these corporations in launching of PM Surya Ghar Muft Bijli Yojana and its quality control.***

vii. ***The annual number of subsidized Solar water heaters to be distributed and the percentage subsidy proposed is indicative only. The authorities may decide the actual number / subsidy as per budgetary allocation available.***

Er. Bashir Ahmad Dar
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Annexure-A

Exhibit -1 of 5

Crude Water Heater

- Consumers who can't afford Eletcrical Geyser for heating water use this crude water heating gadget, locally known as "Boiler".
- No insulation for the water tank and no thermal cut off being used due to effieciency is less than 50% which implies that more than 50% energy is lost to atmosphere.
- These are also a safety hazard because electricity remains in touch with water during operation of the crude gadget.
- Does not confrom to any national or international standard

Exhibit# 2 of 5

Solar Water Heater

- Uses free energy of sun to heat water.
- A 100 litres capacity solar geyser can replace an electric geyser for residential use and may save approximately 1500 units of electricity annually (125 units per month) and prevent emission of 1.5 tones of carbon dioxide per year.
- An electricity consumer is entitled to rebate of Rs. 150/- per month in J&K on electricity bill for minimum capacity of 100 Ltr Solar Geyser.
- High density compressed PUF insulated storage tank is used to retain hot water for 72 hours.
- Being used extensively world-wide
- In neighboring Ladakh 40% households use Solar water heaters, inspite of the fact that it is extremely difficult to maintain free flow of water through pipe work during winter.
- Adminstration of Union Territory of Ldakh has been promoting use of solar water heaters by offering huge subsidy of the order of 75%.

Exhibit -3 of 5

In Rizhao, China, a city of 3 million people 98% of homes use the sun to heat their water. 90% of all homes in Israel/Palestine use solar water heaters

Exhibit# 4 of 5

Press Note from Administration of Union Territory of Ladakh

Publish Date: May 22, 2023

CEC Feroz Khan flags off distribution of solar water heaters and other equipments procured under Subsidy Component/CCDA.

LAHDC Kargil had proposed solar water heaters and other renewable devices which include solar home lighting, electric flour mill, solar street light and various other renewable devices to procure under subsidy scheme through Councilor quota procured by KREDA. The scheme had been implemented on the basis of 25:75 share. The 25 percent cost of solar water heaters and other renewable devices have to be borne by the beneficiaries while the rest 75 percent cost has been sanctioned under the scheme.

Project Director and CEO, KREDA, Kacho Ahmed Khan thanked the CEC, Executive Councilors, Deputy Commissioner Kargil, Councilors and other dignitaries and guests. He also said that 5-year manufacturing operation and maintenance has been ensured for each device.

It was also informed that in the financial year 2021-2022, 1,218 solar water heaters of 100 LPD and 577 200 LPD had been distributed. In the same year, 70 solar home lightings, 188 solar street lights and 2 solar high mast have been distributed.

In the previous financial year, 2022-2023, 995 solar water heaters of 100 LPD and 930 solar water heaters of 200 LPD are under distribution. In the current financial year, 245 solar home lighting, 12 electric floor mills, 13 solar street lights are under the process of distribution.

Similarly, for the current financial year 2023-2024, 110 solar water heaters of 100 LPD and 250 solar water heaters of 200 LPD have been proposed. For the same financial year, 120 solar home lighting, 6 electric floor mills, 10 solar butter churners, 03 electric scooties and 20 solar street lights have been proposed.

Exhibit# 5 of 5

ACoS and ABR approved by JERC, JKL

Table 90: Approved average cost of supply and average billing rate for JPDCL & KPDCL, FY 2023-24

SL NO	Consumer category	ACoS	ABR	ABR as a % of ACoS	% below / (above) of ACOS
1	Domestic	7.22	3.47	48.13%	51.87%
2	Commercial	7.22	6.45	89.43%	10.57%
3	State / Central Govt	7.22	8.68	120.40%	-20.40%
4	Agriculture	7.22	4.13	57.33%	42.67%
5	Street light	7.22	8.72	121.00%	-21.00%
6	LT Public water works	7.22	8.72	120.96%	-20.96%
7	HT Public water works	7.22	9.61	133.25%	-33.25%
8	LT industry	7.22	6.27	86.96%	13.04%
9	HT Industry	7.22	5.35	74.24%	25.76%
10	HT PIU	7.22	6.31	87.46%	12.54%
11	General purpose bulk supply	7.22	7.97	110.52%	-10.52%
12	EV	7.22	7.58	105.16%	-5.16%
13	Traction	7.22	6.29	87.24%	12.76%