



No.SO(C)ED/6-4/2021  
GOVERNMENT OF THE PUNJAB  
ENERGY DEPARTMENT

Dated Lahore: 11<sup>th</sup> August, 2021

To

**The Secretary,**  
Government of the Punjab,  
Planning & Development Department,  
Lahore.

Atten: ✓ *Planning Officer (Coord-II)*

Subject: **SUBMISSION OF ADP 2021-22 PC-II SCHEME G.S. NO. 5583**  
**"FEASIBILITY STUDY OF CANAL TOP SOLAR POWER GENERATION**  
**AT GUJRANWALA DIVISION AND FAISALABAD"**

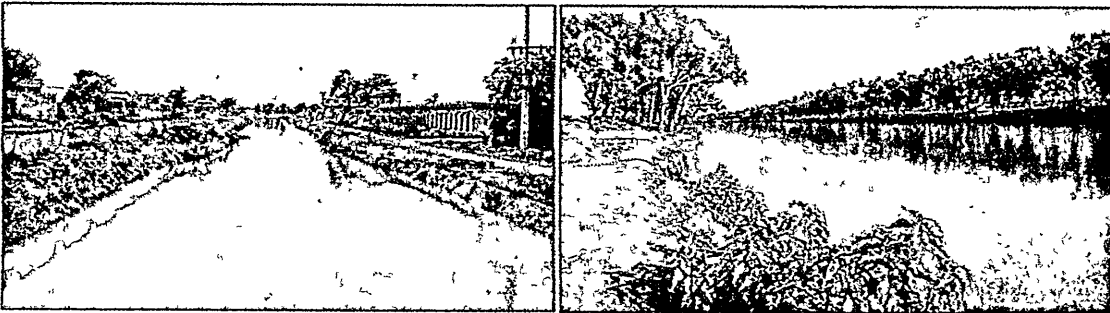
Kindly refer to the subject cited above and to find enclose herewith a copy of PC-II of "Feasibility Study of Canal Top Solar Power Generation at Gujranwala Division and Faisalabad", for onward submission to quarter concerned.

*for*   
SECTION OFFICER (CONSERVATION)

**CC:**

A copy is forwarded for information to:-

1. Managing Director, PPDB, Energy Department.
2. PS to Secretary, Energy Department, Lahore.
3. PA to Additional Secretary (Dev), Energy Department, Lahore.
4. PA to Deputy Secretary (Dev), Energy Department, Lahore.
5. Master File.



**GOVERNMENT OF THE PUNJAB  
ENERGY DEPARTMENT**



**PC-II**

**Feasibility Study of Canal Top Solar Power  
Generation at Gujranwala Division and  
Faisalabad**

**Cost Rs. 5 Million**

**August, 2021**

**ENERGY DEPARTMENT, GOVT. OF PUNJAB**

## TABLE OF CONTENTS

Sr.	DESCRIPTION	Page No.
1	Name by which the Scheme will be identified	3
2	Administrative Authorities Responsible for Sponsoring & Execution	3
3	General Description and Justification	3
4	Aims and Objectives	4
5	Detail of Consultancy	4
6	Project Gestation Period	5
7	Duration of Consultancy Services	6
8	Year Wise Cost Estimates	6
9	Sources of Financing	6
10	Personnel Requirement	6
11	Consultancy Cost Details	6
12	Mode of Implementation	6
13	Expected Outcome	6
14	Certificate	7

1.	<b>Name by which project will be identified</b>	Feasibility Study of Canal Top Solar Power Generation at Gujranwala Division and Rakh Canal Faisalabad
2.	<b>Administrative Authorities responsible for:</b>	
	<b>i. Sponsoring</b>	Government of the Punjab, Energy Department
	<b>ii. Execution</b>	Punjab Power Development Board (PPDB)
3.	<b>General Description and Justification</b>	<p>Government of the Punjab (GoPb) attaches great importance to the promotion of indigenous fuel based renewable energy resources to produce cheaper and affordable electricity for masses. As per World Bank ESMAP report, Punjab has solar potential in the range of 1900-2100 kWh/m<sup>2</sup>. In order to harness and exploit the solar power potential in Punjab, various initiatives, schemes and projects have been initiated and successfully completed by Energy Department and its attached entities.</p> <p>Punjab Power Development Board (PPDB) provides facilitation for promotion and encouragement of private power projects in Punjab. With active facilitation role of PPDB, country's first 4x100 MW Solar Power Projects (SPP) successfully completed and so far injected more than 3 Billion units into national grid.</p> <p>Ground mounted solar power generation is a mature technology and roof top solar is also getting popular in Punjab through private service providers. Canal top solar power generation is a newer concept where surface water channels are covered with solar PV panels suspended over metallic structures. Punjab has one of the widest spread canal network in the region; comprising of lined and unlined channels. Globally, some canal top solar power projects are successfully operating. Maximum power generation capacity of commissioned canal top solar project is so far up to 15 MW.</p> <p>Chief Minister (CM) Punjab constituted a committee (the "Committee") (under the Chairmanship of Advisor to CM on Economic Affairs and Planning &amp; Development Department) vide notification No.DS(F&amp;P)/CMO/21/OT-4/041521 dated January 07, 2021 to review and improve the performance &amp; financial sustainability of all Authorities and Boards in Punjab.</p> <p>During the review meeting of PPDB on March 01, 2021, the Committee observed that Punjab has largest canal network and installations of solar PV panels on canal top and/or canal bank can avoid use of expensive land for generating environment friendly power. The generated electricity can be used by nearby localities or industry. It was also observed that some similar nature initiatives were initiated in the neighboring country. During the Committee meetings Energy Department / PPDB was advised to examine potential of canal top solar power generation at Gujranwala and Rakh Branch Canal Faisalabad.</p>

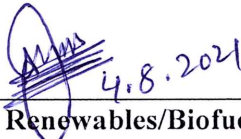
		<p>Accordingly, on the directions of the Committee, PPDB has conducted preliminary examination for solar power potential of canal top solar at Gujranwala Division and Rakh Branch Canal Faisalabad keeping in view possible issues and opportunities. Later, an NOC was provided by Irrigation Department, vide letter dated June 29, 2021, to conduct for canal top solar feasibility study at Rakh Branch Canal Faisalabad.</p> <p>Further, GoPb is working on a Regional Economic Growth Strategy (REGS) of Gujranwala Division. Number of initiatives in various sectors of economy including infrastructure, agriculture, manpower development, education and energy are underway. The need for conducting the detailed study on possibility of canal top solar power generation in Gujranwala has also been advised during REGS meetings.</p> <p>In view of the directions of the above Committee and in consideration of possible issues and opportunities, it is essential to conduct detailed feasibility study at Gujranwala Division and Rakh Branch Canal Faisalabad to ascertain the commercial and technical viability of canal top solar power project.</p>
4.	<b>Aims and Objectives</b>	<p>Subject to the results of the Feasibility Study, following aims and objectives may be achieved;</p> <ol style="list-style-type: none"> <li>i. Provision of cheaper electricity through solar energy by using extensive Irrigation canal network.</li> <li>ii. Utilization of area above the canals and area available at the bank of canals for generating environment friendly power.</li> <li>iii. Saving of expensive government land.</li> <li>iv. Possibility of saving of resources such as conservation of water by means of reduced evaporation of water due to installed solar panels at top of canal.</li> <li>v. Temperature gradient effect beneath solar panels might yield better solar panel performance resulting in increased solar panels life.</li> <li>vi. Effective use of distributed solar power generation in load centers at Gujranwala and Faisalabad.</li> <li>vii. Private sector participation would set new trends by use of canal top solar for possible B2B sale of electricity.</li> </ol>
5.	<b>Detail of Consultancy Services</b>	<p>The Consultant shall be required to conduct feasibility study including following but not limited to;</p> <ol style="list-style-type: none"> <li>a) <b>Survey and data collection</b> <ol style="list-style-type: none"> <li>i. Complete survey of canals at each district of Gujranwala division i.e. Gujranwala, Gujrat, Sialkot, Mandi Bahhudin, Hafizabad &amp; Narowal and complete Rakh Branch Canal Faisalabad.</li> <li>ii. Identification of lined and unlined canals parcels and distributary minor canals, suitable for canal top solar power generation, for Gujranwala</li> </ol> </li> </ol>

		<p>division and Rakh Branch Canal Faisalabad.</p> <p>iii. Selection of six (06) most suitable canal locations / spans at each district of Gujranwala division mentioned above and Rakh Branch Canal Faisalabad for installation of solar panels. In case no suitable span is available in one or more districts, alternative additional span(s) may be selected in other district(s).</p> <p>iv. Identification of existing grid infrastructure / electricity lines for power connectivity / evacuation arrangements at suitable canal locations / spans.</p> <p><b>b) Feasibility Study</b></p> <p>i. Collection of canal related data from Irrigation Department Punjab for conduct of Feasibility Study.</p> <p>ii. Conduct of complete feasibility studies at most suitable canal locations/spans one each at above mentioned six districts of Gujranwala and Rakh Branch Canal Faisalabad (feasibility at seven sites) including:</p> <p>a. Design of most suitable solar PV panels and steel support structure.</p> <p>b. Determination of optimal project size, energy yield assessment of suitable canal areas including shading effect.</p> <p>c. Identification of possible power purchaser(s) in view of proximity of the identified spans, load flow studies, power transmission arrangements and prevailing legal framework.</p> <p>d. Indicative tariff / Levelized cost of electricity (LCOE) at six identified projects in Gujranwala and Rakh Branch Canal Faisalabad for use as benchmark tariff for competition amongst private project developer(s) in case of private investment.</p> <p>e. Financial &amp; cash flow analysis and economical comparison with other available competing options of electricity.</p> <p>f. Technical and economic viability of solar canal top or bank side at recommended/suitable location(s).</p> <p>g. Environment and social impact assessment of the project.</p> <p>h. Risk analysis &amp; safeguard to canal network, canal operation &amp; maintenance during project construction and operation.</p> <p><b>c) Approvals</b></p> <p>i. Approval of proposed project design, layout, O&amp;M activities / methodology and safeguard to canal network from Irrigation Department Punjab.</p> <p>ii. Approval of Feasibility Study from Energy Department appointed Panel of Experts.</p>
6.	<b>Project Gestation Period</b>	Completion within financial year 2021-22


7.	<b>Duration of Consultancy Services</b>	<ul style="list-style-type: none"> <li>The consultancy duration is up to four (04) months after award of contract.</li> <li>The consultant will report directly to MD PPDB.</li> </ul>						
8.	<b>Year Wise Cost Estimates</b>	<p>Year wise estimated costs are;</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>Financial Year</th> <th>Million PKR</th> </tr> </thead> <tbody> <tr> <td>FY (2021-22)</td> <td>5</td> </tr> <tr> <td>Grand Total</td> <td>5</td> </tr> </tbody> </table> <p>Detail of scheduled payments against deliverables is placed at <b>Annex-A</b>.</p>	Financial Year	Million PKR	FY (2021-22)	5	Grand Total	5
Financial Year	Million PKR							
FY (2021-22)	5							
Grand Total	5							
9.	<b>Source of Financing</b>	<ul style="list-style-type: none"> <li>This cost will be met from ADP 2021-22, GS No. 5583 by Finance Department, Government of the Punjab.</li> </ul>						
10.	<b>Personnel Requirement</b>	<ul style="list-style-type: none"> <li>PPDB has been assigned to accomplish the tasks given in para-5.</li> </ul>						
11.	<b>Consultancy Cost Details</b>	<ul style="list-style-type: none"> <li>Consultancy deliverables indicating cost detail is attached as <b>Annex-A</b>.</li> </ul>						
12.	<b>Mode of Implementation</b>	<ul style="list-style-type: none"> <li>PPDB will obtain short term consultancy services as per PPRA rules</li> </ul>						
13.	<b>Expected Outcome</b>	<ul style="list-style-type: none"> <li>Feasibility Study for setting up solar panels at canals of Gujranwala Division and at Rakh Branch Canal Faisalabad.</li> <li>Completion of Feasibility Study duly specifying viable technical, financial and commercial aspects for offering the feasible sites to private sector for development under the scope of services.</li> <li>Identification of suitable canal span nearby public building for setting up canal top solar PV power, as a pilot project in Gujranwala.</li> <li>Promotion of cheap and clean solar power generation by use of extensive Irrigation canal network diminishes the expensive land requirement.</li> <li>Effective use of distributed solar power generation in load centers at Gujranwala and Faisalabad.</li> </ul>						

**Certificate:** Certified that the Project Proposal for conducting the Feasibility Study of setting up solar panels at six (06) suitable locations of canals in Gujranwala Division and Rakh Branch Canal Faisalabad (total seven sites) has been prepared on the basis of instructions provided by the Planning Commission for the preparation of PC-II for Energy Sector Projects:


Prepared by:

  
\_\_\_\_\_  
**Manager Renewables/Biofuels**  
Punjab Power Development Board  
Energy Department  
Government of the Punjab


Checked by:

  
\_\_\_\_\_  
**Managing Director**  
Punjab Power Development Board  
Energy Department  
Government of the Punjab

Reviewed by:

  
\_\_\_\_\_  
**Chairman Review Committee**  
Energy Department  
Government of the Punjab

Approved by:

  
\_\_\_\_\_  
**Secretary**  
Government of the Punjab  
Energy Department, Lahore



## Consultancy Cost, Deliverables and Payment Details

### Feasibility Study at Six Identified Suitable Canals/Spans in Gujranwala Division and for Rakh Canal Branch Faisalabad (Total Seven Sites)

Sr. #	Description of Assignment	Time Duration	Deliverables	Amount to be paid submission of deliverables (PKR Million)
1.	<ul style="list-style-type: none"> <li>• Survey and identification of suitable canals / spans at Gujranwala Division and Rakh Branch Canal Faisalabad.</li> <li>• Selection of six (06) most suitable canal locations / spans at each district of Gujranwala division mentioned above and most suitable span at Rakh Branch Canal Faisalabad for installation of solar panels.</li> </ul>	15 days	Submission of survey report on all suitable canals / spans at Gujranwala Division and Rakh Branch Canal Faisalabad including selection of spans as per assignment. Approval of survey report from the Panel of Expert appointed by the Energy Department	0.5
2.	Proposed project design, layout, O&M activities / methodology and safeguard to canal network from Irrigation Department Punjab	45 days	Submission of Proposed project design, layout, O&M activities / methodology & safeguard to canal network and NOC from Irrigation Department	1.0
3.	Draft Feasibility Study at six identified suitable canals/spans in Gujranwala division and most suitable span Rakh Branch Canal Faisalabad (total seven sites)	45 days	Submission of draft Feasibility Study	1.0
4.	Feasibility Study approval from Energy Department appointed Panel of Experts	15 days	Approval of Feasibility Study from Energy Department appointed Panel of Experts	2.5

*Estimated cost, Feasibility Study at Six Identified Suitable Canals / Spans in Gujranwala Division and for Rakh Canal Branch Faisalabad (total seven sites), is Rs.5 Million.*

\*\*x\*\*