
	<p>EXPRESSION OF INTEREST FLEXIBLE PHOTOVOLTAIC MODULES</p>	Ref: SCPVMM0004
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BHEL Electronics Division, Bangalore invites Expression of Interest (EOI) for supply of Flexible PV Modules.

EOI NO and date	SCPVMM0004 dated 06.07.2017
EOI due date	31.07.2017 (Monday), 13.00 hours (Indian Time)
SUBMISSION OF EOI	The EOI and supporting documents shall be submitted to BHEL EDN before the due date by post/ email.
Address for Communication & Contact Person in BHEL	<p>Mr. Muhammed Shakir/ Mr. Rohit Anand,</p> <p>SC&PV Department, NEB 5th floor, BHEL Electronics Division, PB NO 2606, Mysore road, Bangalore-560 026. INDIA</p> <p>Email: muhammedshakir@bheledn.co.in/ rohitanand@bheledn.co.in</p> <p>Telephone number: +91 80 26989665/ +91 80 26998164</p> <p>Fax: +91 80 26989217</p>

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1. INTRODUCTION

Bharat Heavy Electricals Limited (BHEL) is a leading Government of India-owned public sector undertaking. BHEL is an integrated power plant equipment manufacturer and one of the largest engineering & manufacturing organizations in India, catering to the infrastructure sectors of Indian economy viz. energy, transportation & industry. The energy sector covers generation, transmission and distribution equipment for hydro-, fossil and gas fuels. BHEL has been in this business for more than 50 years and BHEL manufactured sets account for nearly 70% of total power generated in India. For more details about the company & its range of products, kindly visit www.bhel.com.

1.1. ABOUT BHEL-ELECTRONICS DIVISION


BHEL-Electronics Division (BHEL-EDN), a unit of BHEL, was established in 1976 at Bangalore (India), with the objective of being a nodal agency for electronics in BHEL & to provide a strong base in the areas of automation and power electronics. Many of the power plants and industries in the country today are equipped with electronics products and systems manufactured and supplied by EDN.

EDN also has a strong presence in the field of transportation for more than a decade and has been supplying vehicle control electronics and GTO/IGBT based converters for Indian Railways. EDN is also into manufacturing of semiconductor devices and PV modules and has executed several solar power projects on turnkey basis till date. BHEL has been contributing to the national initiatives for developing and promoting renewable energy based products on a sustained basis for the past three decades.

1.2. PV BUSINESS IN BHEL-EDN

BHEL-EDN is engaged in semiconductor processing and manufacturing since 1978 and is one of the pioneering organizations in the country in this area. Commencing in the year 1983, the division has continuously worked in the field of solar cells, PV modules and PV systems and developed its own in-house technology. The efficiency levels reached with in-house R&D efforts are on par with international standards. PV modules manufactured by EDN have been type-tested & certified by international agencies as per latest IEC standards.

EDN is one of the few organizations in the country which has developed expertise in the silicon value chain, i.e., from wafer-to-power plant which involves design, supply, commissioning and O&M of solar PV power plants. The company has installed more than 340 MW of solar power with system size varying from kW scale to several MW and has about 130 MW PV power plant orders presently under execution. It has a dedicated team of R&D and field engineers who help to maintain global standards with a defined R&D road

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map to address the market needs and requirements. The company has enhanced its solar cell manufacturing capacity to 105 MW in January 2017.

Solar Energy, a clean renewable resource with zero emission, has shown tremendous potential. With the huge spurt in installation of conventional ground mounted solar power plants in India, flexible solar photovoltaics are also paving its way to enhance harnessing of this clean energy.

Toward furthering 'Green Initiatives' of India's National Solar Mission, big government entities like Indian Railways has called for installation of solar photovoltaic systems with Crystalline flexible photovoltaic modules over the railway coaches of Indian Railways. Indian Navy had also carried out a pilot project of installation of solar photovoltaic systems with Thin-Film flexible photovoltaic modules over one of the Indian Naval Ship.

With recent developments, flexible photovoltaic modules have opened up possibility for application of installation of solar panels on irregular curved surfaces. Equipped with advantages like flexibility, modular design, light-weight, ease of erection, numerous possibility of installation etc., Flexible photovoltaic modules have got a huge potential in market of cleaner solar energy generation.

Bharat Heavy Electricals Limited (Electronics Division, Bangalore, India) a Government of India Undertaking is looking for business association with reputed firms who have demonstrated capabilities and experience in design, engineering, manufacture, supply of solar photovoltaic systems with Crystalline and Thin-Film flexible photovoltaic modules.

In addition, interested vendors may also indicate their willingness, if any, to participate in joint bidding together with BHEL - Electronics Division, Bangalore, India on case to case basis.


2. PRE QUALIFICATION CRITERIA

2.1 TECHNICAL CRITERIA

The vendor shall fulfill either 2.1.1 OR 2.1.2

2.1.1

- The vendor should be a manufacturer/supplier of Flexible Photovoltaic Modules.
- AND
- The vendor should have supplied cumulative of 1000 KWp of Flexible PV modules in India or abroad, in last three financial years.
 - At least one supplied order should be of minimum 100 KWp of Flexible PV modules with in a period of One year from the date of publishing of this EOI, which should

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have been in successful operation for a period of Six Months from the date of publishing of this EOI.

2.1.2

- The vendor should be a Solar PV System Integrator/EPC Agency who has designed/supplied Solar PV systems with Flexible PV modules, having business association with a Flexible PV module manufacturer/supplier.

AND

- The vendor should have experience in designing, installation and successful commissioning of Solar PV systems with Flexi PV modules for a minimum cumulative installation of 100kWp anywhere in India or abroad, in last three financial years.
- At least one Solar PV system project with Flexi PV modules of capacity 50kWp, which should have been in successful operation for a period of Six Months from the date of publishing of this EOI.

Note: Vendor has to furnish documentary evidence for meeting the qualification criteria in the form of purchase order references and completion certificates from customers.


2.2 FINANCIAL CRITERIA

The average annual turnover of the vendor from the sale of flexible PV Products/systems should not be less than INR 4 Crore (Indian Rupees Four Crore Only) during the preceding three (3) completed financial years as on date of EOI publication.

Vendor shall submit audited financial statements of the preceding three financial years in support of the Financial QR Criteria OR a recent Duns and Bradstreet (D&B) report.

3. EOI REQUIREMENTS/CONDITIONS


1. This EOI calls for technical details from both Crystalline and Thin-Film Flexible PV module vendors. This will enable selection of vendors on case to case basis; as per Customer's tender requirements.
2. The vendors are requested to provide details of their offerings for Crystalline and/or Thin-Film flexible PV modules.

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3.1 The vendor shall furnish following details for Flexible PV Module:

GENERAL INFORMATION & CONTACT DETAILS


1.0	General information	
	1.1. Name of company	
	1.2. Year of Establishment	
	1.3. Address: Telephone: Fax: E-mail: Website:	
	1.4. Factory / Works: Address: Telephone: Fax: E-mail: Website:	
	1.5. Chief Executive:	
2.0	Contact Details	
	Name(s): Official capacity: Address: Telephone: Fax:	

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	E-mail:	
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TECHINICAL DATA

Sl No	Description	Vendors Response	
		Crystalline	Thin-Film
1	Cell type (Mono/Poly/CGIS/a-Si/other)		
2	Cell dimensions (mm)		
3	Cell Efficiency (@module level)		
4	Module Power rating range (Pmax)		
5	Open Circuit Voltage (Voc)		
6	Short Circuit Current (Isc)		
7	Voltage at Peak Power Point (Vmp)		
8	Current at Peak Power Point (Imp)		
9	Module Efficiency (%)		
10	Number of cells per module		
11	Number of cells in series		
12	Fill factor (%)		
13	Operating Conditions: a) Temperature Range ($^{\circ}\text{C}$) b) Relative Humidity (%) c) Wind Speed (Km/Hr)		
14	Thermal Characteristics: a) NOCT ($^{\circ}\text{C}$) b) Temp. Coeff. of Pmpp (%/ $^{\circ}\text{C}$) c) Temp. Coeff. of Voc (%/ $^{\circ}\text{C}$) d) Temp. Coeff. of Isc(%/ $^{\circ}\text{C}$)		
15	Maximum Over Current Protection / Series Fuse Rating (A)		

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16	Maximum System Voltage (V)		
17	No. of Bypass diodes		
18	Bypass diode rating (A)		
19	Module dimensions (mm)		
20	Module Weight (Kg)		
21	Lamination details: a) Cell Lamination Details b) Module Lamination Details		
22	Value of Transitivity of front layer polymer (%)		
23	Frame details (if any)		
24	Junction Box IP rating		
25	JB Output cables (Type, Sqmm, Length in mm, Connector type)		
26	Position of Junction Box (front/back)		
27	Flexibility to change position of Junction Box from front to back or vice-versa.		
28	Details contained by RFID tag		
29	Installation mechanism		
30	Potential Induced Degradation (Resistant/Free)		
31	Service life of PV module (years)		
32	Guarantees and Warrantees provided		
33	Power loss in 25 years (%) / Degradation rate		
34	Maintenance details		
35	Details of Available International Certifications and Conformity to		


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	applicable relevant Standards shall be mentioned		
36	Conformance to all relevant health, safety and environmental norms		
37	Willingness to enter into an exclusive agreement with BHEL on project-to-project basis		
38	Willingness to share the liability in the form of back-up BG corresponding scope of work		

Note: Electrical specifications mentioned above shall be at Standard Test Conditions of 1000 W/sqm solar insolation (AM 1.5) and at 25°C cell temperature.

3.2 COMMERCIAL CRITERIA

1. The vendor shall furnish details about their company particulars regarding the year of establishment, operation, facilities, manpower, number of projects executed since inception and other experiences with necessary credentials in support of their claim by furnishing purchase order from customer, completion certificates from the customer certifying the scope of works and the time lines for various activities including the work order released by the customer for the systems installed.
2. Vendor shall furnish requested documents asked anywhere across this EOI along with following minimum details.
 - a) Company profile & organizational information
 - b) Ownership information
 - c) Registration particulars
 - d) Manpower
 - e) Bank details of the Company for financial transactions with BHEL
 - f) Quality Systems
 - g) Work Experience in the Solar Photovoltaics Systems with flexi PV modules in last 3 years as on the date of opening of EOI.
 - h) Warranty, Guarantee and Installation & Commissioning support rendered by vendor.
 - i) Datasheet and drawings of proposed PV modules.

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The EOI in sealed envelope or through e-mail shall reach us before 13.00 hours, 31st July, 2017 and the same shall be opened on the same day at 13.30 hours by BHEL.

4. INSTRUCTION FOR OFFER SUBMISSION

EOI may be sent through post to the following address or through email to muhammedshakir@bheledn.co.in / rohitanand@bheledn.co.in

Mr. Muhammed Shakir/ Mr. Rohit Anand,
SC&PV Department, NEB 5th floor,
BHEL Electronics Division,
PB NO 2606, Mysore road,
Bangalore-560 026. INDIA

5. EVALUATION

1. BHEL will be evaluating the offers Vendor on all the parameters above and shortlist vendors separately for Crystalline and Thin-Film flexible PV modules based on BHEL ranking methodology.
2. BHEL shall intimate the shortlisted vendors; inviting them for further discussions, presentations. BHEL decision on this will be final. BHEL at its discretion shall inspect the vendor works/premises/installation sites for evaluation.
3. The vendor may be advised to provide further information for clarifications during evaluation of their received offers.

6. DISCLAIMER

1. The EOI does not constitute 'an invitation of offer' or 'Purchase order' for supply of PV wafers. This is not a contract nor a tender. The sole intended purpose of this document is enlistment of new vendors.
2. There may be deviations / changes in specification during actual tendering for the supply of PV wafers.