emba
ELEKTRİK ÜRETİM ANONİM ŞİRKETİ

ANNOUNCEMENT

Turkey Hunutlu Hybrid Power Station Photovoltaic Power Generation Project of Emba Electricity Product Inc. are now conducting public bidding for procurement. Please refer to the bidding documents for the deadline for bidding.

DUYURU

Emba Elektrik Ürünleri A.Ş.'nin Türkiye Hunutlu Hibrit Enerji Santrali Fotovoltaik Enerji Üretim Projesi ihalesi devam ediyor. Son teklif verme tarihi için lütfen ihale dokümanlarına bakınız.

土耳其 Hunutlu 混合电站光伏发电项目
3.3MW 组件
3.3MW PV Module
for
Turkey Hunutlu Hybrid Power Station
Photovoltaic Power Generation Project

采购文件
Procurement Document

采购人：土耳其 EMBA 发电有限公司

Buyer：Emba Electricity Product Inc.

二〇二三年五月

May. 2023

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Chapter 1　Information for Potential Suppliers

潜在供应商须知信息前表
Information Table for Potential Suppliers

序 号 No.	项目 Project	内容 Content
1.	工程名称 Project Name	土耳其 Hunutlu 混合电站光伏发电项目 Turkey Hunutlu Hybrid Power Station Photovoltaic Power Generation Project
2.	工程地点 Construction Place	土耳其阿达那省尤穆尔塔勒克市 Sugözü村 Sugözü, Yumurtalik, Adana, Turkey.
3.	工程规模 Project Scale	项目总容量 100MW，3.3MW，逆变器交流侧出口容量：19.1 MWp The total capacity of the project is 100MW, and the project is 3.3MW. The output capacity of the AC side of the inverter is 19.1MWP
4.	采购范围 Procurement Scope	双面单晶组件 3.3MW Bifacial Mono PERC Module 3.3MW
5.	采购主体（采购人） Purchasing Subject (Buyer)	土耳其 EMBA 发电有限公司 Emba Electricity Product Inc.
6.	采购方式 Procurement Method	公开询价 Open Competitive Inquiry
7.	评审方法 Evaluation Method	综合评估法 Comprehensive Evaluation Method
8.	采购文件的获取方式 Method of Obtaining Procurement Document	在土耳其报纸“Hürriyet(自由报)”发布公告，在收到投标意向后，通过电子邮件发送完整采购文件。 An announcement was published in the Turkish newspaper Hurriyet and After we receive the bid intention, the complete procurement documents will be send to the participating parties by Email.
9.	资金来源 Capital Source	由项目资本金（20%）和融资两部分构成 Project Capital (20%) and Financing
10.	采购澄清会及现场踏勘 Procurement Clarification Meeting and Site Survey	在业主协助下，自行安排考察，如需开会澄清另行通知。 Self-arranged inspection with the assistance of the owner, further notice will be given if a meeting is needed to clarify.
11.	响应文件份数 Number of Response Files	打印版 2 份，电子版 2 份（以 U 盘形式提供） 2 printed copies, 2 electronic copies (provided in the form of USB stick)
12.	响应文件（报价文件）递交地点 Response Document (Offer Document) Submission Location	土耳其 Hunutlu 电站，土耳其阿达那省尤穆尔塔勒克市 Sugözü村 Turkey Hunutlu Power Plant,Sugözü, Yumurtalik, Adana, Turkey.
13.	响应文件（含报价文件）递交截止时间 Deadline for Submission of Response Documents (Including Quotation	土耳其时间 2023 年 6 月 5 日 9：00 9:00am June 5, 2023 Turkey time（UTC +3:00）

序 号 No.	项目 Project	内容 Content
	Documents)	
14.	谈判及评审地点、时间 Negotiation and Evaluation Location and Time	土耳其 Hunutlu 电站 Turkey Hunutlu Thermal Power Plant
15.	供货时间 Delivery Time	合同签订后 30 天。 30 days after signing the contract.
16.	交货地点 Delivery Location	土耳其 Hunutlu 电站项目现场（车板交货） Turkey Hunutlu Power Plant Project Site (Free on Truck)
17.	基本资格要求 Basic Qualification Requirements	(1)投标人必须是本次招标货物生产厂家，在土耳其境内具备该类设备生产的资质，并在人员、设备、资金等方面具备相应的能力; The bidder must be the manufacturer of the bidding goods, with the qualification of the production of such equipment in Turkey, and has the corresponding capacity in terms of personnel, equipment, funds, etc. (2)具有独立法人资格、具有履行合同所必需的财务、技术及相关服务等能力，商业信誉良好; Have independent legal personality, have the necessary financial, technical and related services to perform the contract, and good business reputation. (3)具有完善的质量、环境、职业健康安全保证体系，通过第三方认证审核，并获得认证证书; Have a perfect QMS、EMS & OHSAS management system, passed the third-party certification audit, and obtained the certification certificate. (4)具有 2 年以上的同类产品供货业绩，累计达到 500MW（提供证明文件）。 More than 2 years of similar product supply performance, accumulated 500MW (provide supporting documents)
18.	专项资格要求 Special Qualification Requirements	无 None
19.	是否接受联合体参与本次采购 Whether to Accept Consortium Participation in this Procurement	1) 不接受联合体投标。 Consortium bids are not accepted
20.	联系方式 Contact Information	商务联系人/ Business Contact： Mr. ABDULHAMİT OĞUR 电话/Phone：05393048044 电子邮箱/Email：HongDequan@embapower.com/AbdulhamitOgur@embapower.com 工作地点/ Work Location： EMBA 发电有限公司胡努特鲁发电厂 Emba Electricity Product Inc./Hunutlu Power Plant, Sugözü, Yumurtalik, Adana, Turkey 技术联系人/ Technical Contact：

序 号 No.	项目 Project	内容 Content
		叶琦/Mr. Qi Ye 电话/Phone：90-530-3280-508 电子邮箱/Email：2273734897@qq.com 工作地点/ Work Location： EMBA 发电有限公司胡努特鲁发电厂 Emba Electricity Product Inc./Hunutlu Power Plant, Sugözü, Yumurtalik, Adana, Turkey
21.	相关费用 Related Fees	潜在供应商自行承担提交文件准备与递交，参加此次报价所涉及的一切费用。 The potential supplier shall bear all costs associated with the preparation and submission of documents and participation in the competition.
22.	其他要求 Other Requirements	潜在供应商必须提供以下资料： Potential suppliers must provide the following information: （1）提供组件功率保证值单晶≥Wp Provide module power guarantee value monocrystalline ≥ Wp （2）衰减率（首年）≤%，（逐年）≤% Attenuation rate (first year) ≤ %, (year) ≤ % （3）承诺按本文件规定提供履约保函 Commitment to provide a performance bond in accordance with the provisions of this document.

1. 总则 General Provisions

1.1 工程概况 Project Overview

土耳其 Hunutlu 混合电站光伏发电项目位于土耳其 Adana 省尤穆尔塔勒克市 Sugözü村胡努特鲁发电站周围，项目总容量 100MW，第一期工程 21MW。

Turkey Hunutlu Hybrid Power Station PV Power Generation Project is located around Hunutlu Power Plant in Sugöz, Yumurtalik, Adana, Turkey, with a total project capacity of 100MW and the capacity for the first phase is 21MW.

1) 业主：土耳其 EMBA 发电有限公司

Owner: Emba Electricity Product Inc.

2) 项目发电站地址：土耳其阿达那省尤穆尔塔勒克市 Sugözü村

Construction Place: Sugözü, Yumurtalik, Adana, Turkey.

1.2 采购范围 Procurement Scope

序号 No.	标段名称 Name	电池尺寸要求 Battery Size Requirement(mm)	功率要求 Power Requirement(Wp)	容量 Capacity (MWp)
1	双面组件 Bifacial Mono PERC Module	166mm 或 182mm 166mm or 182mm	166mm 组件：双面 455Wp 及以上，效率 20.9%及以上 166mm Modul: Bifacial Mono PERC Module ≥ 455Wp, Efficiency≥20.9% 182mm 组件： 双面 540Wp 及以上，效率 20.9%及以上 182mm Modul: Bifacial Mono PERC Module ≥ 540Wp, Efficiency≥20.9%	3.3MW

1.3 供货时间 Delivery Time

合同签订后 30 天 30 days after signing the contract

1.4 适应规范要求 Adaptation to Specification Requirements

合同设备应符合本技术条款的要求，本技术规范未作规定的要求按照下述标准执行。除本规范对标准和规程另有规定，合同项下所使用和提供的所有设备、器件、材料和所有设计计算及试验应根据以下最新版本的标准和规程或经批准的其他标准或同等的适用于制造国的其他相关标准。如提供的设备或材料不符合如下标准，其建议标准和以下标准之间的所有详细区别应予以说明，投标人应就其可能影响设备设计或性能内容的标准用中文文本提供给招标人，供其批准。

Contract equipment shall conform to the requirements of this Technical Requirements, and requirements not specified in this Technical Requirements shall be performed in accordance with the following standards. Except as otherwise provided in this Technical Requirements for standards and

procedures, all equipment, devices, materials and all design calculations and tests used and furnished under the contract shall be in accordance with the latest edition of the following standards and procedures or other approved standards or equivalent other relevant standards applicable to the country of manufacture. If the equipment or materials supplied do not conform to the following standards, all detailed differences between their proposed standards and the following standards shall be stated and the bidder shall provide the Chinese text of the standards that may affect the design or performance content of the equipment for its approval.

标准的使用等级顺序如下：The standard ranking of use is as follows:

国际电工委员会标准: International Electrotechnical Commission Standards:

IEC 61215 《地面用晶体硅光伏组件设计鉴定和定型》

IEC 61215 *Design Qualification and Finalization of Crystalline Silicon Photovoltaic Modules for Terrestrial Use*

IEC 61345 《太阳电池组件的紫外试验》

IEC 61345 *UV Test of Solar Cell Modules*

IEC 61730《光伏组件安全鉴定》

IEC 61730 *Safety Qualification of Photovoltaic Modules*

IEEE 1262《太阳电池组件的测试认证规范》

IEEE 1262 *Specification for Testing and Certification of Solar Cell Modules*

采用上述所有标准的最新版

Adopt the latest version of all the above standards

1.5 履约担保 Performance Guarantee

1.5.1 供应商应在签订合同协议书后 15 个工作日内，向业主提交履约担保。履约担保采用履约保函的形式，保函应采用采购人事先同意的格式，由供应商从采购人认可的具有法人资格的银行开具，并保证其有效。保函的正本由采购人保存。执行本条各项要求所需的费用由供应商承担。

The Seller shall submit a performance guarantee to the Owner within 15 working days after signing the contract agreement. The performance guarantee shall be in the form of a Performance Bond, which shall be in the form agreed in advance by the Buyer, issued by the Seller from a bank with legal personality recognized by the Buyer and guaranteed to be valid. The original copy of the guarantee shall be kept by the Buyer. The costs required to implement the requirements of this article shall be borne by the Seller.

1.5.2 履约保函的金额为：合同总金额的 10%。

The amount of the Performance Bond is: 10% of the total contract amount.

1.5.3 履约担保的释放 Release of Performance Guarantee

履约保函将在供应商完成合同约定范围内的工程内容后释放。

The Performance Bond will be released after the Seller completes the works within the scope of the contract.

在任何情况下，业主按照履约担保提出索赔同时，书面通知供应商，说明导致索赔的性质和原因。

In any event, the Buyer shall notify the Seller in writing of the nature and cause of the claim when making a claim under the performance guarantee.

2. 采购文件 Procurement Document

2.1 采购文件的组成 Composition of Procurement Documents

2.1.1 采购文件除下列文件外，还包括所有按采购文件第一章第 2.2 款和第 2.3 款所发出的澄清/修改补充资料。

The procurement document includes, in addition to the following documents, all additional clarifications/modifications issued in accordance with subparagraphs 2.2 and 2.3 of Chapter I of the procurement documents.

采购文件共分四章：The procurement document is divided into four Chapters:

第一章 潜在供应商须知

Chapter 1 Information for Potential Suppliers

第二章 响应文件(含报价)格式

Chapter 2 Response Document (Including Quotation) Format

第三章 合同协议书及合同主要条款

Chapter 3 Contract Agreement and Main Terms of Contract

第四章 技术要求

Chapter 4 Technical Requirements

2.1.2 各潜在供应商应认真阅读并全面理解采购文件中所有的须知、条件、格式、条款、规范和图纸等资料，各潜在供应商由此而做出的推论、理解和结论采购方概不负责。因响应文件（含报价）不满足采购文件要求的，责任由潜在供应商自行承担。

Each potential supplier should carefully read and fully understand all the instructions, conditions, formats, terms, specifications and drawings and other information in the procurement documents, and each potential supplier is not responsible for the inferences, understandings and conclusions made therefrom by the Buyer. As the response documents (including quotations) do not meet the requirements of the procurement documents, the responsibility shall be borne by the potential suppliers themselves.

2.1.3 凡获得采购文件者，无论是否参与后续相关事宜，均应对采购文件保密，不得向第三者透露，采购方保留因响应人有意或无意透露造成采购方的任何损失追偿的权利。

Those who have obtained the procurement document, regardless of whether they are involved in subsequent related matters, shall keep the procurement documents confidential and shall not disclose them to any third party. The Buyer reserves the right to claim compensation for any loss caused by the disclosure of the documents by the responder, whether intentionally or unintentionally.

2.2 采购文件的解释与澄清 Interpretation and Clarification of Procurement Document

2.2.1 采购文件的解释和澄清主要采用书面、电子邮件或面谈形式进行。各潜在供应商需解释和澄清的问题应在采购文件发出后至截标日前 5 天以传真或电子邮件或面谈的形式提出。

Explanations and clarifications of the Procurement Document will mainly be made in writing, by e-mail or in person. Questions for explanation and clarification from each potential supplier should be submitted by fax or email or in person 5 days after the issuance of the Procurement Document until the closing date.

2.2.2 采购方将在接到解释和澄清的问题后 2 天内将所有潜在供应商的问题以书面或邮件形式答复给参与本次采购的所有潜在供应商，但不说明询问的来源，并对双方具有约束力。但采购方认为无需澄清的问题可以不予答复。对未作答复的问题应视为无效，亦不做出解释。

The Buyer will respond to all potential suppliers' questions in writing or by mail to all potential suppliers participating in this procurement within 2 days of receipt of the explanation and clarification, without specifying the source of the inquiry, and binding on both parties. However, questions that the procuring party believes do not require clarification may be left unanswered. Questions that are not answered shall be considered invalid and no explanation will be given.

2.3 采购文件的修改和补充 Modifications and Additions to the Procurement Document

2.3.1 采购方有权对采购文件进行任何的修改或补充，并及时通知所有潜在供应商，对方应及时以书面或电子邮件形式确认已收到该修改。采购方发出的所有补充、修改和变更文件均作为采购文件的组成部分，与采购文件具有同等法律效力。

The Buyer shall have the right to make any modification or addition to the Procurement Document and promptly notify all potential suppliers, and the other party shall promptly confirm in writing or by e-mail that such modification has been received. All supplements, modifications and changes issued by the Buyer shall be considered as part of the Procurement Document and shall have the same legal effect as the Procurement Document.

3. 潜在供应商报价 Potential Supplier Quotation

3.1 报价原则 Quotation Principle

3.1.1 报价由各潜在供应商依据采购文件提供的相关文件，根据项目实际情况，凭借自身的经验，结合自身技术和管理水平、经营状况、机械配置和采购文件相关要求，自主确定报价。

The quotation is determined independently by each potential supplier based on the relevant documents provided in the Procurement Document, based on the actual situation of the project, with their own experience, combined with their own technical and management level, operating conditions, mechanical configuration and the relevant requirements of the procurement document.

3.1.2 报价包括设备(含备品备件、专用工具)、技术资料、技术服务等费用，还包括合同设备的税费、运杂费（含保险费）等与本合同中卖方应承担的所有义务和所有工作的费用。

The quotation includes the cost of equipment (including spare parts, special tools), technical data, technical services, etc., but also includes the contract equipment taxes, freight and miscellaneous charges (including insurance) and other costs of all obligations and all work to be undertaken by the Seller in this contract.

3.1.4 响应文件报价中所有价格全部采用美元表示。

All prices in the response document quotation are expressed in U.S. dollars.

3.1.5 投标报价为各分项报价金额之和，投标报价与分项报价的合价不一致的，应以各分项合价累计数为准，修正投标报价；如分项报价中存在缺漏项，则视为缺漏项价格已包含在其他分项报价之中。投标人在投标截止时间前修改投标函中的投标报价总额，应同时修改投标文件“分项报价表”中的相应报价。此修改须符合本章第 4.4 款的有关要求。

The tender offer is the sum of the sub-quote amount. If the tender offer is inconsistent with the total price of the sub-quote, the cumulative price of each sub-quote shall prevail and the tender offer shall be revised; if there are missing items in the sub-quote, the price of the missing items shall be regarded as included in the other sub-quotes. If the bidder modifies the total tender offer in the letter of tender before

the tender deadline, the corresponding price in the Itemized Quotation Table of the tender document shall be modified at the same time. This amendment shall comply with the relevant requirements of subparagraph 4.4 of this Chapter.

3.2.5 投标报价的其他要求见投标人须知前附表。

Other requirements for the tender offer are listed in the Preliminary Schedule of Instructions to Bidder

3.3 投标有效期 Tender Validity

3.3.1 除投标人须知前附表另有规定外，投标有效期为 90 天。

Unless otherwise specified in the Preliminary Schedule to the Instructions to Bidders, the tender is valid for 90 days.

3.3.2 在投标有效期内，投标人撤销投标文件的，应承担招标文件和法律规定的责任。

If the bidder withdraws the tender document during the tender validity period, shall bear the responsibilities stipulated in the tender document and the law.

4. 响应文件（含报价）Response Document (Including Quotation)

4.1 响应文件（含报价）的编制 Preparation of Response Documents (Including Quotation)

响应文件应由技术和商务两部分组成，具体内容及要求见采购文件第二章。各潜在供应商所作的一切有效补充、修改文件，均被视为响应文件不可分割的部分。

The response document shall be composed of two parts: Technical part and Commercial part, and the specific contents and requirements are listed in Chapter 2 of the procurement document. All effective supplements and modifications made by each potential supplier shall be regarded as an integral part of the response document.

4.2 响应文件的语言 Language of the Response Document

响应文件及各潜在供应商与采购方之间的与采购有关的往来函件和文件均应为英文编写。

Response documents and procurement-related correspondence and documents between each potential supplier and the Buyer shall be prepared in English.

4.3 响应文件的份数和签署 Number of Copies and Signatures of Response Document

响应文件打印版【2】份，电子版【2】份（U 盘形式）。电子文件与书面文件有差异时，以书面文件为准。

Printed 2 copies of the response document and 2 electronic copies (in the form of a USB stick). In case of discrepancies between the electronic document and the written document, the written document shall

prevail.

4.4 潜在供应商建议 Potential Supplier Suggestions

潜在供应商可提出补充建议或说明，提出比采购文件的要求更为合理的建议方案。

Potential suppliers may make additional suggestions or clarifications to present a more reasonable proposed solution than the requirements of the procurement documents.

5.初步预审 Preliminary Pre-screening

5.1 评审委员会依据本章须知中规定的标准对响应文件进行初步预审。响应人有以下情形之一的，评审委员会将否决其响应资格：

The Procurement Evaluation Committee conducts preliminary pre-screening of response documents based on the criteria specified in the instructions of this Chapter. The Procurement Evaluation Committee will reject the response qualification if the responder has one of the following circumstances.

（1）不满足本表（**潜在供应商须知信息前表**）规定的基本资格要求及专项资格要求：

Does not meet the basic qualification requirements and special qualification requirements specified in this form **(Information Table for Potential Suppliers)**.

（2）串通响应或弄虚作假或有其他违法行为的；

Collusion in response or falsification or other illegal acts.

（3）不按评审委员会要求澄清、说明或补正的；

Failure to clarify, explain or make corrections as required by the Procurement Evaluation Committee;

（4）未提供首年发电量保证值或发电效率保证值的；

The guaranteed value of first-year generating capacity or guaranteed value of generating efficiency is not provided;

（5）未承诺按本文件规定提供履约保函的。

Failing to provide the Performance Bond as stipulated in this document.

5.2 首次响应报价有算术错误的，评审委员会按以下原则对报价进行修正，总价金额与依据单价计算出的结果不一致的，以单价金额为准修正总价，但单价金额小数点有明显错误的除外。修正的价格经响应人书面确认后具有约束力。

If there is any arithmetic error in the first response to the quotation, the Procurement Evaluation Committee shall correct the quotation according to the following principles. If the total price is inconsistent with the result calculated according to the unit price, the total price shall be corrected according to the unit

price, except for the obvious error in the decimal point of the unit price. The revised price shall be binding upon written confirmation by the responder.

响应人不接受修正价格的，评审委员会将否决其响应资格。

If the responder does not accept the revised price, the Procurement Evaluation Committee will deny its qualification to respond.

7. 综合评审 Comprehensive Review

7.1 评审组织 Review Organization

本次采购的评审工作由采购评审委员会负责，由采购人代表及专家组成。评审小组对各供应商提交的采购最终响应文件进行评审，出具评审报告，并向采购人推荐首选供应商及备选供应商。

The evaluation of this procurement is carried out by the Procurement Evaluation Committee, which consists of representatives of the Buyer and experts. The evaluation team evaluates the final response documents submitted by each supplier, issues evaluation reports, and recommends the preferred supplier and alternative suppliers to the Buyer.

采购评审委员会分为技术组及商务组，技术组负责响应文件的技术部分评审，商务组负责响应文件的商务部分评审。

The Procurement Evaluation Committee is divided into Technical Group and Commercial Group, the Technical Group is responsible for the evaluation of the technical part of the response documents, and the Commercial Group is responsible for the evaluation of the commercial part of the response documents.

7.2 技术评审 Technical Evaluation

7.2.1 技术评审对象包括所有参与采购的潜在供应商提交的采购最终响应文件的技术部分（供货要求部分）。本次采购评审委员会的技术组阅读技术文件，分析各潜在供应商提交的最终响应文件的技术部分，根据各潜在供应商所提交的产品文件中的技术数据，进行评审打分。

The technical evaluation object includes the technical part (supply requirements part) of the procurement final response documents submitted by all potential suppliers participating in the procurement. The Technical Group of the Procurement Evaluation Committee shall read the technical documents, analyze the technical part of the final response documents submitted by each potential supplier, and give evaluation scores according to the technical data in the product documents submitted by each potential supplier.

7.2.2 技术评分项 Technical Scoring Items

技术评分标准 Technical scoring	技术特性、配置特点 Technical features, configuration characteristics	峰值功率 Peak Power	10%
		串联电阻 Series Resistance	10%

criteria		组件温度系数 Module Temperature Coefficient	10%
		最大承载电流 Maximum Load Current	10%
		封装材料 Packaging Materials	10%
	运行特性 Operating characteristics	衰减率 Attenuation Rate	10%
		防 PID 功能 Anti-PID Function	10%
	其它 Others	土耳其供货业绩 Turkey Supply Performance	10%
		综合制造能力 Comprehensive Manufacturing Capability	20%

7.3 商务评审 Commercial Evaluation

采购评审委员会的商务组将对潜在供应商提交的响应文件的商务部分进行评审打分，包括非价格商务因素及价格商务因素。

The Commercial Group of the Procurement Evaluation Committee will evaluate and score the commercial part of the response documents submitted by potential suppliers, including non-price commercial factors and price commercial factors.

序号 No.	项目 Items	占比 Proportion
1	财务经营状况 Financial Operating Status	30%
2	商业资信文件完整性 Integrity of Commercial Credit Documents	
2.1	提供信用证明 Provide Proof of Credit Certificates	20%
2.2	提供公司目前法律诉讼情况文件 Provide Documents of Current Legal Proceedings of the Company	10%
2.3	提供适用的相关法律法规、规程规范清单 Provide Laws and Regulations, Standards and Specifications List	10%
3	HSE 体系认证 HSE Certification	10%
4	商务条款响应性 Responsiveness of Commercial Terms	20%

竞谈人的评审价等于评审基准价价格得分为满分，高于或低于评审基准价价格得分按相应比例进行扣除。

If the bid price after review by the negotiator is equal to the review benchmark price, the price score will be full marks, and if it is higher or lower than the review benchmark price, the price score will be deducted in proportion.

7.4 综合评分 Comprehensive Scoring

本次评审采用综合评估法，对采购最终响应文件从技术、商务两个部分进行评分，技术因素权重占 30%（30 分），非价格商务因素权重占 10%（10 分），价格及经济性因素权重占 60%（60 分）。最终评审委员会按综合评分依次排序，并形成书面报告，并上报采购人。

The comprehensive evaluation method shall be adopted to score the final response documents from technical and commercial parts in this review, the weight of technical factors accounted for 30% (30 points), the weight of non-price commercial factors accounted for 10% (10 points), price and economic factors accounted for 60% (60 points). The Procurement Evaluation Committee shall rank in order of the comprehensive score, and form a written report and report to the Buyer.

8. 采购决定 Procurement Decision

8.1 采购评审委员会按照采购文件规定的评审方法（详见本章节 7 综合评审），计算出各潜在供应商的加权总分（包括技术、商务和价格经济性三个部分），按加权总分对各潜在供应商排序，提出推荐意见，并向采购人递交书面评审报告。评审报告中排名第一位的是首选供应商，排名第二位的是备选供应商。

The Procurement Evaluation Committee shall calculate the weighted total score of each potential supplier (including three parts: technical, commercial and price economy) in accordance with the evaluation method specified in the procurement documents (see section 7 Comprehensive Evaluation), rank the potential suppliers according to the weighted total score, make recommendations and submit a written evaluation report to the Buyer. The first ranking in the evaluation report is the preferred supplier, and the second is the alternative supplier.

8.2 采购人根据评审报告和采购评审委员会提出的推荐排序意见确定候选供应商。

The Buyer shall determine the candidate suppliers according to the evaluation report and the recommendation ranking opinion put forward by the Procurement Evaluation Committee.

9. 授予合同 Contract Award

9.1 采购人按照本须知第 8 条的规定确定中选供应商后，将通知中选供应商。

The Buyer shall notify the selected supplier after identifying the selected supplier in accordance with Article 8.

9.2 中选供应商收到通知后，应在规定的时间内派法定代表人或其授权代表到指定地点按采购文件规定的合同条款和格式与采购人谈判并签订合同。在合同谈判过程中如果双方未达成一致，不

满足采购文件的要求时，采购人有权终止与中选供应商签约。

Upon receipt of the notification, the selected supplier shall, within the specified time, send its legal representative or its authorized representative to the designated place to negotiate and sign the contract with the Buyer according to the contract terms and format stipulated in the procurement document. In the course of contract negotiation, if both parties fail to reach an agreement and fail to meet the requirements of the procurement document, the Buyer has the right to terminate the contract with the selected supplier.

9.3 如果采购人在签约过程中认为中选供应商不具备履行合同的能力，采购人有权终止与其签约，并将其响应废弃。

If the Buyer considers that the selected supplier is not capable of performing the contract during the signing process, the Buyer has the right to terminate the signing and discard its response.

9.4 由于中选供应商的原因，导致成交供应商不按本条规定及时与采购人签署合同，采购人有权取消其资格，并将合同授予备选供应商或重新组织采购。

If the supplier fails to sign the contract with the Buyer in accordance with this provision due to the reason of the selected supplier, the Buyer has the right to cancel its qualification and award the contract to the alternative supplier or reorganize the procurement.

10. 特殊条款 Special Terms and Conditions

无 None

第二章 响应文件格式
Chapter 2 Response Document Format

（项目名称）设备采购
(Project Name) Equipment Procurement

响应文件
Response Document

供应商(Supplier)：（盖单位章）(Seal)
法定代表人或其委托代理人(Legal Representative or Authorized Agent)（签字）(Signature)
年月日(Date)

1. 响应人承诺函
Commitment Letter

（采购人名称）(Name of Buyer)：

1．我方已仔细研究了（项目名称）组件供货采购文件的全部内容，愿意以（不含税价）的报价，按合同约定进行设备供货，更正缺陷，完成验收。

We have carefully studied all the contents of the PV Module Procurement Document of (project name), and are willing to supply the equipment, correct the defects and complete the acceptance according to the contract with the quotation (excluding tax price).

2．我方承诺在采购文件规定的响应有效期内不修改、撤销响应文件。

We promise not to modify or cancel the response documents within the response validity period specified in the Procurement Documents.

3．如我方中标：If we are the selected supplier:

（1）我方承诺在收到中选通知书后，在中选通知书规定的期限内与你方签订合同。

We undertake to enter into the contract with you within the period specified in the acceptance notice upon receipt of the acceptance notice.

（2）随同参与采购函递交的附录属于合同文件的组成部分。

The appendices attached to the participating purchase letter form an integral part of the contract documents.

（3）我方承诺在合同约定的期限内完成合同供货及相关移交工作。

We promise to complete the contract supply and relevant handover work within the time limit agreed in the contract.

4．我方在此声明，所递交的响应文件及有关资料内容完整、真实和准确。

We hereby declare that the response documents and relevant information submitted are complete, true and accurate.

5．我方已理解，本次竞谈评标采用综合评分法，并非最低价中标。

We have understood that the comprehensive scoring method is adopted in this competition, not the lowest bid.

6．其他事项，可补充

(Additional notes).

响应人(Responder)：（盖单位章）(Seal)

法定代表人或其委托代理人(Legal Representative or Authorized Agent)：

（签字）(Signature)

年月日(Date)

2. 潜在供应商响应文件（技术部分）

Potential Suppliers Respond Document (Technical Part)

1） 组件技术参数表 Technical Parameters of PV Modules

2） 技术偏差表 Technical Deviation Table

序号 No.	招标文件章节及条款号 Bidding Document Section and Clause Number	投标文件章节及条款号 Tender Document Section and Clause Number	偏差说明 Deviation Description
1			
2			
……			

3. 潜在供应商响应文件（商务部分）

Potential Suppliers Respond Document (Commercial Part)

1） 商务资信全部证明书 All Certificates of Business Credit

(1)有效期内的营业执照 Business License within the Validity Period

(2)质量保证体系认证证书 QMS Certification

(3)环境管理体系认证 EMS Certification

(4)职业健康安全管理体系认证 QHSAS Certification

(5)其他证明文件（生产能力等）Other Supporting Documents (Production Capacity, etc.)

2） 2019 年~2021 年经审计的财务报表 Audited Financial Statements for the Years 2019 to 2021

3） 光伏电站组件供应的累计业绩（以列表形式简述并需提供证明文件）

Cumulative Performance of Photovoltaic Power Plant Module Supply (Brief description in tabular form with supporting documents required)

序号 No.	规格和型号 Specifications and Models	项目名称 Project Name	买方名称 Name of the Buyer	买方联系人及电话 Contact Person and Phone Number of the Buyer	合同容量（MWp） Contract Capacity (MWp)	项目概况及投标人履约情况 Project Overview and Bidder Performance	备注 Notes

4）价格表

Quotation

No.	Items	Description	电池尺寸 Battery Size(mm)	Quantity (Adet)	Quantity (Watt)	Unit Price (USD/W)	Total (USD/W)
1	PV Module	Monofacial Mono PERC Module	166				
2	PV Module	Bifacial Mono PERC Module	166 or 182				
		TOTAL					

5）商务偏差表 Business and Technical Deviation Table

序号 No.	招标文件章节及条款号 Bidding Document Section and Clause Number	投标文件章节及条款号 Tender Document Section and Clause Number	偏差说明 Deviation Description
1			
2			
……			

4. 履约保函格式
Performance Guarantee Format

履约保函 Performance Guarantee

_____（受益人）(Beneficiary)：

根据贵方与_____（交易对方）于_____年___月____日签订的编号为_____的合同（下称组件供货合同），应交易对方的申请，我行特开立以贵方为受益人的履约保函：

According to the contract numbered _____ (hereinafter referred to as the PV Module supply contract) signed between you and _____ (counterparty) on ____ , at the application of the counterparty, our bank hereby issues a performance bond in favor of you:

一、保函金额按照以下第几种方式确定：

The amount of the guarantee is determined in the following ways:

1、保函金额不超过（币种）美元。

The amount of the guarantee shall not exceed US dollars.

2、保函金额按以下标准确定：但最高不超过美元。

The amount of the guarantee shall be determined according to the following criteria: but the maximum amount shall not exceed US dollars.

二、我行承诺，如果交易对方未按照组件供货合同的约定履行义务，我行将在收到贵方提交的书面索赔通知和交易对方具有违约事实的下述证明材料后，最晚不迟于次月月末以保函金额为限向贵方承担担保责任：

We undertake that if the counterparty fails to perform its obligations in accordance with the contract for the PV Module supply contract, we will, upon receipt of the written notice of claim from you and the following documents proving that the counterparty is in breach of contract, assume the guarantee liability to you up to the amount of the guarantee no later than the end of the following month:

1、

2、

3、

三、本保函的担保金额将随我方已支付的金额而自动递减。

The amount of this guarantee will automatically decrease with the amount paid by us.

四、如果贵方与交易对方协商变更组件供货合同且涉及我行担保责任的，应事先书面通知我行，如加重我行担保责任的还应事先征得我行书面认可，否则，我行对加重我行担保责任的部分不承担责任。

If you negotiate with the counterparty to change the PV Module supply contract and the guarantee liability of our bank is involved, you shall notify us in writing in advance. If the guarantee liability of our bank is increased, we shall obtain written approval in advance. Otherwise, we shall not be liable for the part that increases the guarantee liability of our bank.

五、贵方转让本保函项下权利的，应经我行书面同意，否则我行不再承担担保责任。

Your transfer of rights under this guarantee shall be subject to our written consent, otherwise we shall not be liable for the guarantee.

六、保函有效期按照以下第种方式确定：

The validity period of the guarantee shall be determined in the following way:

1、本保函自开立之日起生效，至（日期）止。

This guarantee shall be effective from the date of issuance until (date).

2、本保函自开立之日起生效，发生下列情形时到期：但最迟不超过（日期）。

This guarantee shall be effective from the date of issuance and shall expire in the following circumstances: But not later than (date).

七、书面索赔通知和有关证明材料必须在保函有效期内送达我行，否则我行在本保函项下的责任自动解除。

The written notice of claim and relevant supporting materials must be delivered to our bank within the validity period of this guarantee, otherwise our liability under this guarantee will be automatically discharged.

八、合同按期履行完毕、保函超过有效期或我行的担保义务履行完毕，本保函即行失效，无论本保函是否退回我行注销。

Upon the completion of the contract, expiration of the guarantee period or completion of the guarantee obligations of our bank, this guarantee shall become invalid, regardless of whether this guarantee is returned to our Bank for cancellation.

XX 银行_____（公章）：

XX Bank _____ (Official Seal)

负责人/授权代理人（签字）：

Responsible Person/Authorized Agent (Signature).

_____年_____月_____日

Date:

第三章　合同协议书及合同条款
Chapter 3　Contract Agreement and Contract Terms

土耳其 Hunutlu 混合电站光伏发电
Turkey Hunutlu Hybrid Power Station Photovoltaic Power Generation

组件供货合同
PV Module Supply Contract

买方：土耳其 EMBA 发电有限公司
Buyer: Emba Electricity Product Inc.
卖方：
Seller:

二〇二三年六月　日
June,2023

1. 定义 Definitions

本合同和附件中所用下列名词的含义在此予以确定

The definitions of the nouns used in this contract and Annexes shall be herein defined.

1.1 "买方"是指，包括该法人的继任人和法人的受让人。

The "Buyer" refers to,including the successor and transferee of the legal person.

1.2 "卖方"是指，包括该法人的继任人和法人的受让人。

The "Seller" refers to, including the successor and transferee of the legal person.

1.3 Delete

1.4 “合同” 指本文件及其附件中的所有部分。

The "Contract" refers to all parts of this document and its Annexes.

1.5"合同价格"是指在本合同第 4 款中规定的部分。

The "Contract price" refers to the part defined in Article 4.

1.6 “生效日期”是指本合同 17 款中所规定的合同的生效日期。

The “Effective date” refers to the date on which the Contract comes into force defined in Article 17.

1.7 “技术资料”是指合同设备及其与电厂相关的设计、制造、监造、检验、安装、调试、验收、性能验收试验和技术指导等文件(包括图纸、各种文字说明、标准、各种软件)，和本合同技术协议（附件 1）规定的用于电厂正确运行和维护的文件。

"Technical documents” refers to the Contract equipment and related design, manufacturing, supervision, inspection, installation, commissioning, acceptance, performance acceptance test and the technical guidance and other documents (including drawings, all kinds of text, standard, all kinds of software), and the files stipulated in the Technical Specification (Annex 1) of the Contract for correct operation and maintenance of the power plant.

1.8"合同设备"是指卖方根据合同所要求供应的机器、装置、材料、物品、专用工具、备品备件和所有各种物品，如本合同技术协议（附件 1）所列示和规定。

"Contract equipment" refers to the machines, equipment, materials and articles, special tools, spare parts, and all sorts of items supplied by the Seller under this contract, as shown and listed in the clauses in the Technical Specification (Annex 1).

1.9 空白。Void.

1.10 “初步验收”是指在合同设备获得 TEIAS 颁发的使用许可证后 30 天内，由买方签发初步验收证书。

"Preliminary acceptance" refers to The Buyer shall issue the Preliminary Acceptance Certificate within 30 days after the use permit of the Contract equipment is issued by TEIAS.

1.11 “质量保证期”是指每个发电单元的光伏组件自到货验收证书签署之日起 120 个月，卖方保证合同设备在满足本合同规定的技术性能和保证指标下稳定运行，并负责免费消除合同设备存在的任何缺陷。

The quality guarantee period refers to 120 months from the date of signing the acceptance certificate of arrival of the photovoltaic modules of each power generation unit. The seller guarantees that the contract equipment will run stably under the technical performance and guarantee indicators specified in this contract, and is responsible for eliminating the contract equipment free of charge. any defects that exist.

1.12 “最终验收”是指质量保证期内，发电单元光伏组件均已达到本合同的要求、国家和行业的技术规范，运行中出现的问题都已得到妥善处理，光伏组件全部设备通过验收后满 12 个月，验收合格后，最终用户与卖方将签署最终验收证书一式四份，买卖双方各执两份。

"Final acceptance" refers to during the quality assurance period, the photovoltaic modules of the power generation unit have met the requirements of this contract, the technical specifications of the country and the industry, the problems in operation have been properly dealt with, and all photovoltaic modules have passed the acceptance inspection. After passing the acceptance, the end user and the seller will sign the final acceptance certificate in quadruplicate, and two copies for each side.

1.13 “日、月、年”是指公历的日、月、年；“天”是指 24 小时；“周”是指 7 天。

"Day, month, year" refers to the calendar day, month, year; "Day" refers to 24 hours; "Week" refers to 7 days.

1.14 “电厂”是指土耳其胡努特鲁发电厂。

The “Power Plant” refers to the Turkey Hunutlu Thermal Power Plant.

1.15 “技术服务”是指卖方应提供与本合同相关的全过程技术服务，包括培训、现场监督、安装和施工指导、现场测试、调试、政府批准等服务。（详见技术协议）

"Technical Services" refers to the Seller shall provide the whole process technical services related to this Contract, including training, on-site supervision, installation and construction guidance, on-site testing, commissioning, government approval and other services. (see Annex 1)

1.16 “现场”是指位于买方安装合同设备的所在地。

"Site" refers to the location of the equipment to be installed by the Buyer.

1.17 “随机备品备件”是指根据本合同提供的满足设备安装、调试、试运行的备用部件，如本合同技术协议（附件 1）所列示和规定。

"Mandatory spare parts" refers to the spare parts to be used in the installation, commissioning and trial operation according to the Contract, which are listed and stipulated in the Technical Specification (Annex 1).

1.18 “书面文件”是指任何手书、打字或印刷的有印章和/或具有法人代表或其授权人签名的文件。

"Written document" refers to any written, typed or printed documents with seals and/or with the signature of the legal representative or the authorized person of the legal representative.

1.19 “分包商”是指经买方同意由卖方将合同供货范围内任何部分的供货分包给其他的法人及该法人的继任人和该法人允许的受让人。

"Subcontractor" refers to whom the Seller subcontracts part of the supply scope, or to some other legal person and its successor and the transferee thereof permitted by the Buyer.

1.20 “最后一批交货”是指该批货物交付后，使得该套合同设备的已交付货物总价值达到合同设备价格 98%以上，余下设备则应在不影响项目进度下，于初步验收前交齐。

"The Last Shipment" refers to the shipment after the delivery of which, the total delivered equipment will reach more than 98% of the value of the set of the Contract Equipment The remaining undelivered equipment shall be delivered before the Preliminary Acceptance without affecting the progress of the Project.

1.21 “设备缺陷”是指卖方因设计、制造错误或疏忽所引起的本合同设备（包括部件、原材料、铸锻件、元器件等）达不到本合同规定的性能、质量标准要求的情形。

"Equipment Defect" refers to the equipment fails to reach the quality standard or performance specification stipulated in this Contract due to faults or carelessness of the Seller in design or manufacturing (including parts, raw materials, castings and forgings, and other components, etc.).

1.22 删除。Deleted

2. 合同标的 Contract Object

2.1 本合同标的是卖方为买方的光伏发电站供应的 3.3MW 光伏组件。

The subject of this contract is 3.3MW PV Module provided by the Seller for the Buyer's PV power station.

2.2 该设备应是全新的、技术先进的、成熟的、安全的、经济的和完整的，并按特定的标准设计的其性能应符合合同技术协议（附件 1）规定的性能保证值要求。

The equipment shall be brand new, advanced, technical proven, safe, economic and complete, and shall follow the design standard and reach the performance guarantee requirement stipulated in the Technical Specification (annex 1).

2.3 本合同所供设备的技术规范、技术经济指标和性能按本合同技术协议（附件 1）。

The technical specifications, technical and economic indexes and performance parameters of the equipment supplied in the Contract are stipulated in the Technical Specification (annex 1).

2.4 卖方提供合同设备的具体供货范围按本合同技术协议（附件 1）。

The specific scope of supply that the Seller shall provide is defined in the Technical Specification (annex 1).

2.5 卖方提供的具体技术资料按本合同技术协议（附件 1）。

The specific technical documents that the Seller shall provide are defined in the Technical Specification (annex 1).

2.6 卖方提供的具体调试和技术服务按合同技术协议（附件 1）。

The specific commissioning and technical services provided by the Seller shall be in accordance with the Contract Technical Specification. (annex 1).

3. 合同范围 Scope of Contract

3.1 合同范围包括了所有设备、调试、技术资料、专用工具、随机备品备件、人员培训及技术协调、技术服务及技术指导和设备运输及运输保险等。在执行合同过程中如发现有任何漏项和短缺，在供货清单中并未列入而且确实是卖方供货范围中应该有的，并且是满足合同技术协议（附件 1）对合同设备的性能保证值要求所必须的，均应由卖方负责将所缺的设备、技术资料、专用工具、随机备品备件、人员培训及技术协调、技术服务及技术指导等按工程进度要求补上，发生的费用由卖方承担。

The scope of Contract includes all equipments, commissioning,technical documents, special tools, mandatory spare parts, personnel training and technical coordination, technical service and technical guidance and equipment transportation and transportation insurance, etc. If anything found missing in the execution of the Contract, which is not included but is necessary to guarantee the performance requirement defined in the Technical Specification (annex 1) and shall be covered by the scope of supply, the Seller shall be responsible to supply the missing equipment and the technical data, special tools, mandatory spare parts, personnel training and technical coordination, technical service and technical guidance, etc., and the

Seller shall bear the incurred costs.

4. 合同价格 Contract Price

4.1 本合同价格即合同总价为 美元，大写:。

The total price of this contract is U.S. dollar, say:.

本合同价格包括卖方完成合同中所有工作的所有费用,包括合同设备(含备品备件、专用工具)、技术资料、技术服务等费用，还包括合同设备的运杂费（含保险费）等与本合同中卖方应承担的所有义务和所有工作的费用。

The Contract price includes all fees of Seller to complete all the work in the Contract, including the Contract Equipment (including spare parts and special tools), Technical Documents, Factory Acceptance Fee,Commissioning,Technical Service, as well as the Freight (including insurance) and other expenses in connection with this Contract which shall be borne by the Seller.

4.2 本合同设备价格(含备品备件、专用工具)为 美元，大写:。

The equipment price (including spare parts and special tools) is U.S. dollar, say:.

1.技术资料费，合同设备土耳其制造的设备或部套件从设备制造厂到项目工地（车上/船上/飞机上）的运输、装卸、保险费及所有设备包装费;

Technical document fees, the fees of the car/boat/plane transportation, loading and unloading, insurance and packing from manufacturer to the project job site for the equipment or parts manufactured in Turkey;

2.合同设备中进口的设备或部套件从制造厂到目的港的运输、装卸、保险费及所有设备包装费和进口环节的所有税、费（如关税、报关费等）。

The imported equipment or parts from the factory to the port of destination of the transportation, loading and unloading, insurance and all equipment packing and all taxes and fees in the process of import (e.g., duties, customs charges, VAT, etc.).

4.3 技术服务费（含调试费）为 美元，大写:。

The Technical Services price (including Commissioning fee) is U.S. dollar , say:.

按本合同第 8 款中及技术协议（附件 1）中的卖方服务范围和卖方人员来买方现场的各种费用，包括来买方现场的薪金（其中包括个人所得税费和生活费）及往返买方现场之间的旅费和签证费等，买方将为卖方技术指导人员在现场提供生活及办公的便利条件，但生活、住宿、办公、通讯、医疗、交通等费用由卖方自理。

Technical Services fee includes all the expenses incurred from the engineers sent by the Seller travelling to the site to provide service defined in the supply scope in the Technical Specification (annex 1), clause 8, including salary (including income tax and living expenses), round trip expenses and visa fees; the Buyer shall provide convenience to the Seller's engineers in living and office conditions, but the costs of living, accommodation, office, communications, medical, transportation and others shall be borne by the Seller.

4.4 合同的分项价格见附件 2。

The price breakdown is listed in annex 2.

4.5 本合同价格不含增值税。合同价格在合同有效期内为不变价。

VAT is not included in the Contract price. The Contract price is fixed during the validity period of the Contract.

5. 付款方式 Payment Term

5.1 本合同使用货币种类为美元，支付货币为土耳其里拉。

The Contract shall be settled by U.S. dollar, and payment currency is Turkish lira.

付款汇率按照开发票当日土耳其央行公布的现汇买入价和卖出价的平均汇率作为结算汇率。

The payment exchange rate shall be the average exchange rate of the Forex Buying price and Forex Selling price announced by the Turkish central bank(TCMB) on the date of invoicing as the settlement exchange rate.

5.2 付款方式：银行票据或电汇。

Payment: by T/T or bank bill.

5.3 合同款的支付

The payment of the Contract

5.3.1 预付款 Advance Payment 10%

合同生效日期起一个月内,卖方提交金额为合同价格的 10%不可撤销的履约保函（有效至初步验收）、10%预付款保函以及金额为合同价格的 10%的形式发票，买方审核无误后一个月内,支付给卖方合同价格的 10%作为预付款。

Within one month from the effective date of the Contract, an irrevocable 10% Performance Bond (valid to preliminary acceptance), an Advance Payment Bond and a proforma invoice of 10% of the Contract price shall be submitted by the Seller. Within one month after check, the Seller shall be paid 10% of the Contract price as Advance Payment.

5.3.2 删除。Deleted

5.3.3 交货款 Delivery Payment 60%

每批次合同设备交付后，卖方应向买方提交该批次设备合同价格的 100%的增值税发票和付款要求，买方将向卖方支付合同价格的 60%作为交货付款。

After each batch of contract equipment is delivered, the Seller shall issue and submit a 100% VAT invoice of the Contract price of this batch of equipment to the Buyer, and the Buyer shall pay 60% of the Contract price as a delivery payment.

5.3.4 调试款 Commissioning Payment 25%

每批次设备完成调试且通过初步验收后，卖方应向买方提交该批次设备合同价格的 25%的付款要求，买方将向卖方支付合同价格的 25%作为调试款。买方应释放履约保函。

After completing the commissioning of the equipment and passing the Preliminary Acceptance, the Buyer shall pay 25% of the Contract price as a Commissioning payment after received the payment requirement from Seller. The Buyer shall release the Performance Bond.

5.3.5 质保金 Retention 5%

每批次全部设备通过最终验收后，买方凭卖方提交的卖方与最终用户签署的最终验收证书并经买方审核无误后 10 天内，支付给卖方合同价格的 5%作为质保金付款。

After each batch of equipment has passed the final acceptance, the buyer shall pay 5% of the Contract price to the Seller within 10 days after the final acceptance certificate signed by the Seller and the end user submitted by the Seller and verified by the Buyer.

5.4 删除。Deleted;

5.5 删除。Deleted;

5.6 付款时间以买方银行承付日期为实际支付日期。

The actual payment date shall be in line with the date of acceptance of the Buyer’s bank.

5.7 根据本合同第 10、11 款的规定，如果卖方向买方支付损坏赔偿费、现场加工及代采购费、违约金时，卖方应在接到买方的书面索赔通知后一个月内，将款项支付给买方。如逾期不交，买方有权在本合同项下的质保金和/或保函中将这部分索赔金额及其利息扣除。

According to Article 10 and 11 of the Contract, If the seller pays the buyer compensation for damage, on-site processing and procurement fees and liquidated damages, the seller shall make the payment to the Buyer within one month after receiving the written notice of claim from the Buyer. In case of delay, the Buyer shall have the right to deduct such claim amount and interest from the retention money and/or letter of guarantee under this Contract.

5.8 由卖方出具的用于支付保函等方面的费用均由卖方承担。

The expense incurred from the issue of the Seller's guarantee shall be borne by the Seller.

5.9 卖方发票价值应与合同含增值税价值相符，如有不符，买方有权拒绝付款。

The value of the Seller's invoice shall correspond to the Contract price (plus VAT); if there is any discrepancy, the Buyer shall be entitled to refuse to pay.

6. 交货和运输 Delivery and Transportation

6.1 本合同设备的交货期及交货顺序应满足工程建设设备安装进度和顺序的要求，应保证及时和部套的完整性。分部套交货时间（即设备交付到达交货地点的时间）见技术协议(附件 1)。

Delivery date and delivery schedule of the Contract equipment shall comply with the requirement of the progress of project construction, and shall also guarantee the delivery promptly and completely. Delivery schedule of parts (i.e., equipment arrives at the delivery location) is defined in the Technical Specification (annex 1).

6.2 合同设备所有权自合同设备交付时起由卖方转移给买方。合同设备毁损、灭失的风险，在合同设备交付之前由卖方承担，交付之后由买方承担。

The ownership of the equipment shall be transferred from the Seller to the Buyer at the time of delivery. The risks of damage and loss of the Contract equipment shall be borne by the Seller before the delivery of the equipment and by the Buyer thereafter.

6.2.1 卖方提供的合同设备按以下地点交货：

The Seller shall deliver the equipment to following locations:

电厂车板交货

FOT on site.

卖方为了满足合同交货期或者其他非买方的原因而调整运输方案，买方不承担由此而产生的任何费用，即合同价格不因运输方案的调整而变更。

If the Seller changes its transportation plan in order to meet the Contract delivery date or other than the Buyer's reason, the Buyer shall not bear any expense.

6.2.2 技术资料邮寄地址在设计联络会明确。

Mail address for technical documents shall be specified at design liaison meeting.

技术资料应由卖方负责使用特快专递交付买方项目现场地址，卖方应负担所有的包装费、运费及保险费。

The Seller shall send technical documents by express mail to the buyer’s address on site; the Seller shall bear all the cost of packing, freight and insurance premium.

6.3 卖方应在第一次设计联络会上按照本合同附件 1 的规定向买方提供每批货物名称、总重量、总体积和交货日期的初步交货计划，并提供一份重量超过 20 吨或体积大于 9 米×2.7 米×3 米的大件货物

清单。
In the first design liaison meeting, the Seller shall provide the Buyer the details of the each batch of cargo, gross weight, total volume and delivery date of the initial delivery plan, as well as a list of bulk cargo that is more than 20 tons of weight or volume is more than 9 m x 2.7 m x 3 m large in accordance with the clause of Annex 1 of the Contract.

6.4 如果在到货检验过程中发现错误，例如货物缺损、装箱单与实际到货不符等，则设备交货日期以通过现场修复、补充发货等手段完全改正了发运交货错误的时间为准。
If there is any error in the process of cargo inspection, for instance defect in the cargo and packing list not consistent with the actual delivery, the delivery date shall be altered to comply with finishing the field repair and supplementary delivery.

6.5 卖方须向承运部门办理申请发运设备所需要的运输工具计划,负责合同设备从卖方到交货地点的运输。
The Seller shall submit the plan required for the procedure of transportation to the transportation department, and shall be responsible for the transportation of the equipment to the delivery location.

6.6 删除。Deleted.

6.7 如有属于本合同条款 3.2 条所述的、在附件 1 中没有开列的货物应配合安装进度根据买方要求进行交货。
If cargo is listed in Article 3.2 of this contract, but not listed in Annex 1, the Seller shall cooperate regarding the installation schedule requested by the Buyer.

6.8 在保证期内,由于卖方的过失或疏忽造成的供应设备（或部件）的损坏或潜在缺陷，而动用了买方库存中的备品备件以调换损坏的设备或部件，则卖方应负责免费将动用的备品备件补齐，最迟不得超过 3 个月运到买方现场。
Within the Warranty Period, if damage or potential defects of supplied equipment (or components) occur due to the Seller's fault or negligence which causes Buyer’s to use spare parts to replace the damaged equipment or component(s), the Seller shall be responsible to provide the spare parts for free in no later than 3 months.

6.9 卖方应按附件 1 规定，向买方分批提供所需的技术资料。
The Seller shall, as stipulated in the Annex 1, provide the Buyer the Technical Information, in batches which refers to Annex 1.

6.10 技术资料一般以邮寄方式递交，每批技术资料交邮后，卖方应在 24 小时内将技术资料的交邮日

期、邮单号、技术资料的详细清单、件数及重量、合同号等以传真通知买方。

The technical documents shall be sent by mail. After each mail batch, the Seller shall inform the Buyer of the mail date, tracking number, a detailed list of technical data, number and weight, contract number and so on by fax within 24 hours.

6.11 技术资料以邮政部门提货通知单时间戳记为技术资料的实际交付日期。**此日期将作为按合同 11.10 款对任何延期交付资料进行延期违约金计算的依据。**

The postal stamp date shall be the date of technical documents delivery which shall be used for the calculation of the technical documents delivery delay defined in Article 11.10.

如果技术资料经买方或买方代表检查后发现有缺少、丢失或损坏，卖方应在收到买方通知后 7 天内（对急用者应在 3 天内）免费向现场补充提供缺少、丢失或损坏的部分。

If any component in the technical documents found missing, lost or damaged, after the inspection by buyer or buyer's representative, the Seller shall further provide the missing parts for free to the site within 7 days after receiving buyer's notice (3 days in time of urgency).

6.12 买方派遣代表到卖方工厂及装货场站检查包装质量和监督装车情况。卖方应按 7.12 的要求通知买方交运日期。如果买方代表不能及时参加检验时，卖方有权发货。上述买方代表的检查与监督不能免除卖方应负的责任。

The Buyer will send representatives to the Seller's factory and the loading location to examine the packing quality and supervise the loading work. The Seller shall notify the Buyer the arrival date of shipment according to Article 7.12. If the Buyer cannot conduct inspection on time, the Seller shall have the right to deliver. The inspection and supervision of Buyer’s representative shall not exempt any responsibility of the Seller.

6.13 为实现对设备及材料的计算机管理。卖方应在每批货物交运后向买方发送一份装箱清单的电子邮件。

In order to implement the computer management of equipment and materials, the Seller shall send the Buyer a copy of packing list in detail by E-mail after each batch of cargo shipped.

7. 包装与标记 Packing and Mark

7.1 卖方保证本合同范围内货物的包装能满足长途运输、多次搬运及装卸的需要，并依据所供货物的特点分别采取防潮、防霉、防锈、防腐、防冻措施。

The Seller shall guarantee that all the equipments under this Contract shall be packed up in a manner and with the selected materials that can satisfy the requirements of long-distance transport, repeated handling and loading/unloading. Sufficient protective measures shall be adopted against moisture, mold, rust, corrosion and frost.

7.2 每件包装箱内，应附有包括分件名称、数量、图号的详细装箱单及产品出厂质量合格证明书、操作说明书、设备图纸和设备试验或检验报告一式五份。包装箱内的散装件应逐一贴附标签，注明名称、数量、在装配图中的部件号或零件号，并与装箱单完全对应。

All the packing containers shall be sealed up with the packing lists with detailed information of the description, quantities, related drawing numbers of the equipments, along with the quality certifications issued by the concerned manufacturers, operating instructions, corresponding drawings and inspection/test reports of the equipments, all in quintuplicate. Each of the bulk items inside the containers shall be labeled with such information as the description, quantities, reference numbers of the parts or components in the corresponding assembly drawings, which shall be in complete consistence with the information revealed in the packing lists.

7.3 专用工具、备品备件应分别单独包装，并标明“专用工具”、“备品备件”字样，一次性发货。

The special tools and spare parts shall be packed up separately, and words of Special Tools and Spare Parts need to be marked outside the packages. All the special tools and spare parts shall be delivered at a time.

7.4 外购件包装箱内亦应有产品出厂质量合格证明书、操作说明书、设备图纸和设备试验或检验报告一式五份。

The packing containers for outsourcing equipments shall also be sealed up with the quality certifications issued by the concerned manufacturers, operating instructions, corresponding drawings and inspection/test reports of the same, all in quintuplicate.

7.5 卖方交付的技术资料应使用适合于长途运输、多次搬运、防雨和防潮的包装，并应防止潮气和海水的侵蚀。每包技术资料的封面上应注明合同号、供货收货单位名称、目的地、毛重。每包技术资料内应附有资料的详细清单一式二份，并标明技术资料的序号、文件项号、名称和页数。

The technical document submitted by the Seller shall be packed up in a manner and with the selected materials that can satisfy the requirements of long-distance transport, repeated handling and loading/unloading. Sufficient protective measures shall be adopted against the rain water, moisture, and sea water. Each package of the technical document shall be marked with the Contract number, titles of the supplier and consignee, destination and gross weight on its cover. Inside each package there shall be a detailed list of the document in duplicate, indicating such information as the serial number, document number, description and page number of the technical document.

7.6 因包装不当致使货物和技术资料损坏或丢失，无论在何时何地发现，卖方均应负责及时修复、更换或赔偿。运输中发生货物损坏或丢失时，买方协助卖方做好记录，卖方负责与承运人及保险公司交涉，同时卖方应尽快向买方补供货物以满足工期要求。

Any loss or damages of the equipments and technical document as a result of inappropriate package, no matter when and where the defects are identified, shall be rectified, replaced or compensated by the Seller

without further delay. If the loss or damages occur in the course of shipment, the Buyer shall offer its assistance to the Seller in making a record. The Seller is obliged to seek negotiations with the concerned freight agent and the insurance company. At the same time, the Seller shall deliver additional equipments and technical document as soon as possible so as to catch up with the project schedule.

7.7 每件包装箱的两个侧面，应用不褪色油漆写明合同号、到货站、收货人、货物名称、箱（件）号、体积（长*宽*高，以毫米表示）、毛（净）重以及生产日期和生产工厂。

On two side of each packing container, such information as the Contract number, destination, consignee, description of the goods, serial number of the container (piece), volume (Length*Width*Height, all in millimeters), gross (net) weight, manufacturing time and title of the corresponding manufacturer shall all be marked with an indelible paint.

7.8 必要时，需在包装箱上明显标注“轻放”、“勿倒置”、“防雨”等字样。

Such warnings as Handle with Care, Keep Upright and Rain-proof shall be marked in prominent positions outside the packing containers if necessary.

7.9 毛重 2 吨以上货物，应在包装箱侧面标明起吊挂绳的位置。

For any goods with a gross weight of over 2 tons, the positions for fixing the hoisting ropes shall be marked on the sides of the packing containers.

7.10 卖方与其分包商不得用同一箱号标注任何两个箱件。包装箱应连续编号，而且在全部装运过程中保持箱号顺序始终连贯。

Neither the Seller nor its subcontractor is allowed to use the same number for any two containers. All the packing containers shall be numbered consecutively and the numbers of the packing containers shall always be kept in sequential coherence throughout the course of shipment.

7.11 合同生效后 1 个月内，卖方应向买方提供每批货物的名称、总重量、总体积和交货日期的初步交货计划及货物装箱总清单。

The Seller shall submit to the Buyer a preliminary delivery schedule and a general packing list within 1 month when this Contract comes into effect, revealing a description of goods in each batch and their weight and volume in totality and delivery date.

7.12 在每批货物正式启运 30 天前和 10 天前，卖方应以电报或传真书面通知买方及收货单位该批货物的合同号、品名、数量、体积、毛重和件数。货物启运后，卖方应在 24 小时之内再次以电报或传真方式准确通知买方及收货单位上述内容及预计到货时间。

30 days and 10 days respectively before each batch of goods is to be dispatched, the Seller shall notify the Buyer and consignee by cable or fax of the corresponding contract number, goods description, quantities, volumes, gross weight and number of packages. When shipment starts, the Seller shall notify the Buyer and consignee once again by cable or fax within 24 hours of the aforementioned information and the expected

arrival time.

7.13 每批资料交邮后，卖方应在 24 小时内将技术资料的交邮日期、邮单号、该批资料的详细清单、件数及重量、合同号等书面传真通知买方。

When each batch of technical document is sent off by courier, the Seller shall notify the Buyer within 24 hours by cable and fax of the sending time, track number, a detailed list of the document, copies and weight as well as the concerned contract number.

7.14 由于卖方未能及时、准确地提供发运（交邮）通知而使买方发生的任何费用均由卖方承担。

Any expenses that incur to the Buyer due to the Seller's failure to issue a shipment (courier) notification in a timely and accurate manner shall be borne by the Seller.

8. 技术服务 Commissioning and Technical Services

8.1 卖方应提供全过程服务，包括培训、现场监督、安装和施工指导、现场测试、调试、政府批准等服务。（详见技术协议 1）

The Seller shall provide whole process service including Training, Site Supervision, Guidance of Installation and Construction, Test on Job site, Commissioning, Government Approvals and etc.（see Annex 1）

8.2 卖方提供的全部进口货物（包括分包/外购货物）的外文资料及图纸均应由卖方翻译成土耳其语和英语（免费）。

The technical data and drawings in a foreign language for all the imported goods (including the subcontracted/outsourcing goods) supplied by the Seller shall all be translated into Turkish & English by the Seller (free of charges).

8.3 由于卖方技术人员对安装、调试、试运技术指导的疏忽和错误以及卖方未按要求派员指导而造成的损失由卖方负责。

Any loss due to the negligence and mistakes of the technical representatives in their technical guidance in the course of installation, commissioning and pilot run or the loss due to the Seller's failure to dispatch technical representatives as stipulated in this Contract shall be accounted for by the Seller.

9. 检验 Inspection and Test

9.1 卖方提供的所有货物（包括分包或外购）在生产过程中都须进行严格的检验和试验，出厂前须进行部套/整机总装和试验。所有检验、试验和总装（装配）必须有正式的记录文件，这些记录文件作为技术资料的组成部分应以快递方式邮寄予买方或与对应设备同箱发运予买方存档。

All the equipments (including the subcontracted/outsourcing goods) supplied by the Seller shall be subject to strict inspections and tests throughout the whole manufacturing process, and the packaged equipments

must be assembled and tested in the package before being dispatched from the workshop. All the tests, inspections and assembly works must be recorded in the formal log files, which will then be transferred by courier or dispatched along with the corresponding equipments in the packing containers to the Buyer as part of the technical document so that they can be put on file by the Buyer.

9.2 设备运达目的地后，买方通知卖方派员赴现场共同清验交收。

When the equipments are delivered to their destination, the Buyer will notify the Seller and request the latter to dispatch representatives to participate in the joint acceptance inspections at the project site.

9.3 清验中，若发现由于卖方原因（包括运输）设备有任何损坏、缺陷、缺少或与合同规定的质量标准和规范不符，应做好记录，并由双方代表签字，各执一份，作为买方向卖方提出修理、更换、索赔的依据。

During the joint acceptance inspections at the project site, if the equipments are identified with any damages, defects, deficiencies or deviations from the quality standards and technical specifications stipulated in this Contract for which the Seller is held responsible (including transport), all the details shall be recorded. The records, duly signed and held by the representatives from both Parties, offer a basis for the Buyer to seek repair, replacement and claims from the Seller.

9.4 若卖方代表未按约定时间赴现场参加验收，买方有权自行开箱清点检验，其检验结果和记录对双方同样有效，并作为买方向卖方索赔的有效证据。

If the representatives of the Seller fail to show up as per the agreed schedule for the joint acceptance inspections at the project site, the Buyer is then entitled to unpack the equipments and conduct acceptance inspections on its own. In such a case, the results and records of the inspections are regarded as equally valid as the ones of the joint inspections and can therefore be cited as valid evidence for the Buyer to pursue claims against the Seller.

9.5 卖方如对买方提出的修理、更换、索赔要求有异议，应在接到买方书面通知后 7 天内提出，并在该时间内自费派代表赴现场同买方代表共同复验。

If the Seller raises an objection to the Buyer’s demands of repair, replacement and claims, it shall notify the Buyer within 7 days after receipt of a notification in writing from the Buyer and then dispatch its representatives for a re-inspection at the project site along with the buyer’s representatives. All the expenses that incur accordingly will be borne by the Seller.

9.6 双方代表在工程现场会同检验中对检验记录不能取得一致意见时，可由双方委托权威的第三方检验机构或双方权威检验机构联合进行检验。检验结果对双方都有约束力，检验费用由责任方负担。

During the joint acceptance inspections at the project site, if no agreement can be reached on the inspection records between the representatives from both Parties, further inspections can be conducted by a third party inspection authority entrusted by both Parties or jointly by the authoritative inspection agencies of both

Parties. The inspection results shall be binding on both Parties and the related fees will be borne by the responsible party.

9.7 卖方在接到买方按本合同规定提出的索赔后，应以不影响工程进度为原则尽快修理、更换或补发短缺部分，由此产生的制造、修理和运费及保险费均由卖方负担。上述索赔，买方从下次付款中扣除。

When the Seller receives claims from the Buyer as stipulated in this Contract, it shall arrange repair and replacement or dispatch the balancing items on an early basis under the principle that the overall project progress will not suffer. All the expenses and fees for manufacturing, repair, freight and insurance that incur accordingly will be borne by the Seller. The claim amount will be deducted from the following payments by the Buyer.

9.8 上述各项检验仅是现场的到货检验，尽管没有发现问题或卖方已按索赔要求予以更换或修理均不能被视为卖方应承担的质量保证责任的解除。

The aforementioned inspections are simply arranged for site acceptance. The Seller will not be exempted from its responsibilities for quality guarantee even though no defects are identified in the inspections or the Seller has conducted repair or replacement as required by the Buyer.

10. 保证与索赔 Assurance and Claims

10.1 保证期是指合同设备签发初步验收证书之日起一年。

The Warranty period refers to one year from the date of the Contract Equipment Preliminary Acceptance Certificate issued.

10.2 卖方保证其供应的本合同设备是全新的，符合本合同规定的。

The Seller ensures its supply is brand new and in compliance with this Contract.

卖方保证根据本合同附件 1 所交付的技术资料完整统一和内容正确、准确。

The Seller ensures that technical documents delivered in accordance with Annex 1 of this Contract is complete and content is accurate

10.3 设备更换或修复 Equipment replacement or repair

10.3.1 本设备合同执行期间，如果卖方提供的设备有缺陷和技术资料有错误，或者由于卖方技术人员指导错误和疏忽，造成工程返工、报废，卖方应立即无偿更换和修理。如需更换，卖方应负担由此产生的到安装现场更换的一切费用，更换或修理期限应不迟于证实属卖方责任之日起的 7 天内，否则,应按 11.11 条处理。

During the execution of this contract, if there is any equipment defect or technical data error, or any rework, scrap due to the Seller’s technician guidance errors and negligence, the Seller shall immediately replace and

repair for free. If replacement is needed, the Seller shall bear all costs of the installation; all field-replaceable, replacement or repair shall be performed within 7 days of the case confirmed, otherwise, it shall be handled in accordance with Article 11.11.

10.3.2 由于买方未按卖方所提供的技术资料、图纸、说明书和卖方现场技术服务人员的指导而进行施工、安装、调试造成的设备损坏，由买方负责修理，更换，但卖方有义务尽快提供所需更换的部件，对于买方要求的紧急部件，卖方应安排最快的方式运输，所有费用均由买方负担。

If the Buyer fails to comply with the Seller's technical information, drawings, specifications and guidance, which causes damages during construction, installation commissioning, the Buyer is responsible for the repair or replacement, but the Seller is obligated to provide the necessary replacement parts as soon as possible, as for urgent parts, the Seller shall arrange the fastest way to transport, the costs of which shall be borne by the Buyer.

10.4 删除。Deleted

10.5 在保证期内，如发现设备有缺陷，不符合本合同规定时，如属卖方责任，则买方有权向卖方提出索赔。卖方在接到买方索赔文件后，应立即无偿修理、更换、赔款或委托买方安排大型修理，由此产生的到安装现场的更换费用、运输费及保险费也由卖方承担，同时所更换和/或修理后的设备或部件的质量保证期应重新计算。

During the Warranty period, if equipment defects were found and not in compliance with the provisions of this contract, the Seller shall take the liability, in which case the Buyer shall be entitled to make a claim against the Seller. The Seller shall repair, replacement, make compensation free of charge or commission the Buyer for the arrangement of large-scale repairs after receiving the claim file immediately, herein incurred costs of the installation, replacement, transportation and insurance shall be borne by the Seller, meanwhile the Warranty period of the replaced and / or repaired equipment or parts herein shall be recalculated.

10.6 如由于卖方责任需要更换、修理有缺陷的设备，而使合同设备停运或推迟安装时，则保证期应按实际修理或更换所延误的时间作相应的延长。

If equipment installation delay or outage is due to the Seller fails to replace, repair equipment with defects, the Warranty period shall be extended in accordance with the duration of the actual repair.

10.7 如果不是由于买方原因或买方没有要求推迟交货而卖方未能按本合同附件 1 规定的交货期交货时（不可抗力除外），实际交货日期按本合同 6.1 条和 6.4 条规定计算，买方有权按下列比例向卖方收取迟交货违约金或从应付款项中扣除迟交货违约金，迟交货违约金计算如下：

If the Seller fails to deliver on time in accordance withthe Technical Specification (Annex 1) (except for force majeure) without the buyer's reasons or the buyer's request for delivery postponement, the actual

delivery date shall be calculated in accordance with provision 6.1 and 6.4; the Buyer shall be entitled to charge the Seller liquidated damages of late delivery or deduct the liquidated damages of late delivery from the accounts payable, liquidated damages of late delivery shall be calculated as the following:

当迟交 1－2 周时，违约金为迟交总周数乘迟交货物金额的 0.1%；

1-2 weeks late, liquidated damages shall be the total number of weeks multiplies by 0.1% of the value of cargo;

当迟交 3－5 周时，违约金为迟交总周数乘迟交货物金额的 0.2%；

3-5 weeks late, liquidated damages shall be the total number of weeks multiplies by 0.2% of the value of cargo;

当迟交 5 周以上时，违约金为迟交总周数乘迟交货物金额的 0.4%；

More than 5 weeks late, liquidated damages shall be the total number of weeks multiplies by 0.4% of the value of cargo;

不满一周按比例计算。

Less than one week, pro rata.

10.8 每套合同设备迟交货物的违约金总金额不超过每套合同设备价格的 3%，除非对安装、试运行有重大影响的设备迟交超过 2 个月时，卖方向买方支付的违约金总额可超过每套合同设备价格的 5%，但不得超过该设备价格。与此同时,买方有权终止部分或全部合同。

The total amount of liquidated damages for each unit delay shall not exceed 3% of the contract price of each unit, unless otherwise there is more than two months delay on delivery. The total amount of liquidated damages that the Seller shall pay under this Contract to the Buyer shall not exceed 5% of the Contract Price

10.9 卖方支付迟交货违约金，并不解除卖方按照合同继续交货的义务。

The Seller paying liquidated damages of late delivery shall not exempt the Seller from any obligation complete the remaining delivery.

10.10 如由于确属卖方责任未能按本合同附件 1 的规定按时交付经双方确认属影响工程进度和相关单位工作的关键技术资料时，买方有权按下列比例向卖方收取违约金：

If the Seller fails to deliver critical technical documents that are deemed by both parties as affecting project schedule and related participants to proceed in accordance with the Technical Specification (Annex 1) , the Buyer shall be entitled to charge the Seller liquidated damages based on the following:

迟交 1 周内，违约金金额为 500 美元/批；

1 week late, liquidated damages shall be U.S. dollar 500 / batch;

迟交 2－4 周，违约金金额为 1,000 美元/周.批；

2-4 weeks late, liquidated damages shall be U.S. dollar 1,000 /week. batch;

迟交 4 周以上，违约金金额为 5,000 美元/周.批；

More than 4 weeks late, liquidated damages shall be U.S. dollar 5,000 / week. batch;

不满一周按比例计算。

Less than one week, pro rata.

10.11 每套合同设备迟交关键技术资料的违约金总金额不超过该套合同设备价格的 0.5%。

For each unit,the total amount of liquidated damages for late delivery of key technical documents shall not exceed 0.5% of each contract equipment price.

10.12 如果由于卖方技术服务的延误、疏忽和/或错误，在执行合同中造成延误，每延误工期一周卖方将向买方支付技术服务费价格的 0.1%违约金，这部分违约金最多不超过合同价格的 5%。且卖方需支付由于卖方技术服务错误或违约造成买方的直接损失。

If there is any delay in the execution of the Contract due to the delay, omission and errors of the Seller's technical service for each week of delay the Seller shall pay the Buyer 0.1% of Technical Services price that shall be no more than 5% of the contract price. The Seller shall pay for direct losses occurred to the Buyer due to faults or default of its technical service.

此项违约金从应支付的技术服务费中扣除，不足部分从设备费用支付中扣除。

The liquidated damages shall be deducted from the technical service fees and any shortage shall be deducted from the price of equipment.

10.13 卖方对于根据本合同承担的违约金总额不论单项或多项累计将不超过每套合同价格的 5%，除非发生 11.7 发生的情况。

The total amount of single or multiple accumulations of liquidated damages paid by the Seller shall not exceed 5% of the price of e each contract price unless otherwise the situation in Article 11.7 occurs.

10.14 卖方支付迟交违约金并不解除按合同所规定的相应义务。

The Seller paying liquidated damages shall not exempt the Seller from the corresponding obligations stipulated in the Contract.

10.15 如果由于买方原因，迟付货款，买方须按下列方式支付违约金：

If due to the buyer's reason of late payment, the Buyer shall pay liquidated damages calculated with the following methods:

迟付一周，每周违约金为迟付金额的 0.1%；

Liquidated damages for each week shall be 0.1%;

不满一周按一周计算。

Less than one week, shall be calculated as one week.

每批合同设备迟付款违约金总额不超过该批设备价的 5%。

The liquidated damages of late payment penalty for each shipment shall not exceed 5% of the equipment price of this shipment.

10.16 履约保函 Performance Guarantee

10.16.1 本合同生效 1 个月内,卖方须向买方提供由卖方主办银行开具金额为合同总价 10%的不可撤销的履约保函,以买方为受益人。

Within a month since the Contract comes into effect, the Seller shall provide an irrevocable, 10% of the total contract price Performance Guarantee with the Buyer as the beneficiary.

10.16.2 由卖方银行出具的履约保函应有效至合同设备初步验收时，买方将出具卖方银行的履约保函期满通知证明，该通知书的发出日期应视为卖方的履约保函到期日期的证据。

The Performance Guarantee issued by the bank of the Seller shall be valid until the Contract Equipment Preliminary Acceptance. The Buyer shall issue a notice of expiry of the Seller's bank performance guarantee, and the issuing date of the notice shall be deemed as the credential for the expiration date of the Performance Guarantee.

10.16.3 如果卖方在履约保函的有效期内没有履行合同项下卖方的责任和义务，买方有权从履约保函中追索。

If the Seller fails to fulfill the responsibilities and obligations under the Contract within valid duration of the performance guarantee, the Buyer shall be entitled to recourse from the Performance Guarantee.

10.17 性能保证违约赔偿 Liquidated Damages for Performance Guarantee

10.17.1 在质量保证期内，若设备未达到性能保证指标，将按下列方式计算卖方赔偿金额（以下指标按年度考核）,其计算方法如下：

During the quality guarantee period, if the equipment does not meet the performance guarantee index, the seller's compensation amount will be calculated according to the following method (the following index is assessed annually), and the calculation method is as follows:

保证内容 Guarantee content	保证指标 Guaranteed Indicators	罚金 Fines
组件功率 Module Power	单晶≥Wp Monocrystalline ≥ Wp	性能保证值合格率应为 100%，低于保证值 1%，赔偿全场组件价格的 1% The qualified rate of performance guarantee value shall be 100%, and 1% of the price of all PV Modules shall be compensated if the guarantee value is lower than 1%
入库抽检合格率 Acceptance Rate of Sampling Inspection	100%	抽检内容见附件 4，每项低于该项保证值，赔偿全场组件价格的 0.1% See Annex 4 for sample inspection. If each item is lower than the guaranteed value, 0.1% of the price of all PV Modules shall be compensated
衰减率（首年） Attenuation rate (first year)	≤%	每高 0.01%赔偿全场组件价格的 1% Compensation of 1% of the all PV Modules price for each 0.01% higher
衰减率（逐年） Attenuation rate (year)	≤%	每高 0.01%赔偿全场组件价格的 1% Compensation of 1% of the all PV Modules price for

		each 0.01% higher
故障率 Failure rate	≤0.01%	每高 0.01%赔偿全场组件价格的 1% Compensation of 1% of the all PV Modules price for each 0.01% higher

10.17.2 以上所述赔偿总额不应超出合同总价的 5 %。前述赔偿，买方有权从任何应向卖方支付的付款中予以扣除。

The total amount of compensation mentioned above shall not exceed 5% of the total contract price. Buyer shall be entitled to deduct such claims from any payment due to Seller.

10.17.3 如果某发电单元的光伏电池组件功率曲线负偏差数量超过该单元验收检验数量的 10%，买方有权利要求卖方更换该单元所有组件，由此产生的费用由卖方负担。

If the amount of negative deviation of photovoltaic cell module power curve of a power generation unit exceeds 10% of the amount of acceptance inspection of the unit, the buyer has the right to require the Seller to replace all PV Modules of the unit, and the costs incurred thereby shall be borne by the Seller.

10.17.4 由买方提出，买方和卖方共同进行性能保证值的考核，卖方在买方提出要求后 30 日内不配合考核的，买方有权自行进行考核，考核结果对卖方有约束力。双方共同考核的情况下，如果对考核结果有异议双方共同请第三方来验证。如果 30 日内无法确定一个共同认可的第三方，买方有权自行聘请有资质的第三方，第三方的考核是最终的考核。聘请第三方的费用双方分担。

If the Seller fails to comply with the assessment within 30 days upon the request of the Buyer, the Buyer shall have the right to conduct the assessment by itself, and the assessment results shall be binding on the Seller. In the case of joint assessment by both parties, if there is any objection to the assessment result, both parties shall jointly invite a third party to verify it. If a mutually agreed third party cannot be identified within 30 days, the buyer shall have the right to hire a qualified third party and the third party's assessment shall be final. The cost of hiring a third party shall be shared by both parties.

11. 保险 Insurance

11.1 与本合同有关的、土耳其政府或者相关法律规定应该购买各类保险，如一切险（火灾、爆炸、雷电、地震、洪水等自然灾害、运输险、第三方责任险等）。

In connection with this contract, the Turkish government or relevant laws stipulate that all kinds of insurance shall be purchased, such as all risks insurance（fire, explosion, lightening, earthquake, flood and other natural disasters;damages, losses and accidents that may occur during transportation, third party insurance and all other risks）

11.2 卖方须对合同设备，根据水运、陆运和空运等运输方式，向保险公司投保发运合同设备价格 110%的运输一切险，保险区段为卖方仓库到现场仓库（车板交货），合同设备到达交货地点前以卖方为

被保险人，合同设备到达交货地点后以买方为被保险人。在保险期间，一旦发生货物损坏等，卖方负责向保险公司索赔的有关工作。

The Seller shall purchase the insurance of 110% equipment price for water, land and air and other forms of transportation; the insurance shall cover the transportation from the Seller's warehouse to Buyer's site warehouse (FOT on site). Before the equipment arrival, the Seller is the insured person. . During the period of insurance, the Seller is responsible for insurance claims if any damage occurs.

11.3 卖方应将保险单的副本于每一批设备交货前 20 天提供给买方。由于卖方原因未能提供以上保险单副本，卖方同意买方拒付运杂费直到收到保险单的副本为止。

A copy of the insurance shall be provided to the Buyer in 20 days prior to each batch of equipment delivery. If the Seller fails to provide a copy for the insurance, the Seller shall agree that the Buyer can refuse to pay transport fees until receiving a copy of the insurance.

12. 税费 Taxes

12.1 合同价格不含增值税。

VAT is not included in the Contract price.

12.2 印花税由卖方承担。

The stamp tax of this Contract shall be born by the Seller.

13. 分包与外购 Subcontracting and Procurement

13.1 卖方未经买方同意不得将本合同范围内的设备/部件进行分包。卖方需分包的内容和比例应征得买方书面同意，否则不得分包。

Without authorization of the Buyer, the Seller shall not subcontract any equipment / components within the scope of this Contract. The Content and the proportion of subcontracting shall obtain the written consent from the Buyer, otherwise, the Seller shall not subcontract.

13.2 卖方须在买方同意的分包商名单中选定分包商，并形成书面文件。

The Seller must select subcontractors from the Buyer approved list, and forms a written document.

13.3 卖方对所有分包设备、部件承担本合同项下的全部责任。

The Seller shall take full responsibility for all subcontractors of equipment and parts under this Contract.

13.4 双方任何一方未取得另一方事先书面同意，不得将本合同项下的部分或全部权利或义务转让给第三方。卖方在取得买方同意后而选定的分包商应被视为同卖方一样为履行本合同对买方承担责任，

卖方应对其分包商的违约行为承担责任。

Without written consent in advance of the other party, one party shall not transfer all of the rights or obligations under the Contract to a third party. In obtaining the consent from the Buyer, the Seller can select subcontractors and subcontractors shall be considered to take the same obligations for the performance of this contract as the Seller. The Seller shall take full responsibility for breach of contract of its subcontractors.

14. 合同的变更、修改、中止和终止 Changes, Modification, Suspension and Termination of the Contract

14.1 本合同一经生效，合同各方均不得擅自对本合同的内容（包括附件）作任何单方的修改。但任何一方均可以对合同内容以书面形式提出变更、修改、取消或补充的建议。该项建议应以书面形式通知对方并经各方签字确认。

Once the Contract comes into effect, all parties shall not make any unilateral modification on the contents of the Contract (including Annexes). However, any party may propose changes, modification, cancel or supplement recommendations regarding the Contract in writing. The proposal shall notify the other parties in writing and signed by all parties to confirm.

如果该项修改改变了合同价格和交货进度，卖方应在收到上述修改通知书后的 7 天内，提出影响合同价格和/或交货期的详细说明。双方同意后经双方法定代表人或委托代理人(须经法定代表人书面授权委托)签字并报双方上级主管部门审查同意后方能生效。并将修改后的有关部分抄送原合同有关单位。

If the modification changes the Contract price and delivery schedule, the Seller shall submit a detailed description of the impact thereof on the Contract price and / or delivery time within seven days after receiving the notice of modifications. Upon mutual agreement, legal representative or agent of both parties (subject to the written authorization of the legal representative) shall report to the higher authorities for review and approval and send a copy of revised contract to relevant units.

14.2 如果卖方有违反或拒绝执行本合同规定的行为时，买方将用书面通知卖方，卖方在接到通知后 7 天内确认无误后应对违反或拒绝做出修正，如果认为在 7 天内来不及纠正时，应提出修正计划。

If the Seller has breached the clauses of this Contract or refused to perform, the Buyer shall send a written notice to the Seller. The Seller shall correct or amend within 7 days after receiving the notice; if the Seller cannot rectify within seven days, it shall submit correction plan.

如果得不到纠正或提不出修正计划，买方有权中止部分或全部合同。对于这种中止，买方将不出具变更通知书，由此而发生的一切费用、损失和索赔将由卖方负担。

If the Seller fails to provide correct or amend plan, the Buyer shall reserve the right to suspend part or the entire contract. For the suspension thereof, the Buyer will not issue a notice of change; all costs, losses and claims incurred shall be borne by the Seller.

如果卖方的违约行为在本合同其它条款中有明确规定,则按有关条款处理。
If any breach of the Seller is stipulated in other clauses of the Contract, it shall be managed in accordance with relevant provisions.

14.3 如果买方行使中止权利，买方有权停付到期应向卖方支付中止部分的款项，并有权将在执行合同中预付给卖方的中止部分款项索回。
If the Buyer exercises the right to suspend the payment, the Buyer shall reserve the right to suspend payments to the Seller and reclaim part of the payment made to the Seller.

14.4 在合同执行过程中，若因国家政策和/或计划调整而引起本合同无法正常执行时，卖方和/或买方可以向对方提出中止执行合同或修改合同有关条款的建议，与之有关的事宜双方协商办理。
During the execution of the Contract, if national policy and / or program adjustments caused that the Contract cannot be executed properly, the Seller and / or Buyer can suspend execution and make recommendations to the other relevant provisions of the Contract or modification of the Contract, relating matters shall be handled through mutual negotiation.

14.5 删除。 Deleted

14.6 删除。 Deleted

14.7 如果卖方破产、产权变更(被兼并、合并、解体、注销)或无偿还能力，或为了债权人的利益在破产管理下经营其业务，买方有权立即书面通知卖方或破产清算管理人或合同归属人终止合同，或向该破产管理人、清算人或该合同归属人提供选择，视其给出合理忠实履行合同的保证情况，执行经过买方同意的一部分合同。
If the Seller went through bankrupt, change of ownership (merger, consolidation, disintegration, cancellation) or insolvent, or through bankruptcy management for the benefit of creditors, the Buyer is entitled to immediately notify the Seller in writing to terminate the Contract, or notify the insolvency administrator, liquidator or the person who has the Contract to provide choice, or execute part of the Contract depending on their reasonable assurance after the Buyer agreed.

14.8 若 15.7 条款所述的情况确实发生，买方有权从卖方手中将与本合同设备有关的工作接管并收归己有，并在合理期限内从卖方处迁出所有与本合同设备有关的设计、图纸、说明和材料，这些东西的所有权已属买方，卖方应给买方提供全权处理并提供一切方便，使其能获得上述这类设计、图纸、说明和材料，买方对这种终止合同直接或间接引起的对卖方的任何索赔不承担责任。此外，双方应对卖方已经实际履行的合同部分评价达成协议，并处理合同提前结束的一切后果。
If the situation described in Article 15.7 occurs, the Buyer shall reserve the right to take over from the

Seller the Contract work-related equipment and reverted to their own, and move out all the equipment associated with this contract from design drawings, descriptions and materials within a reasonable period, ownership of these things shall be transferred to buyer; the Seller shall provide full assistance to the buyer, it can get above design, drawings, descriptions and materials; the Buyer is not liable for the termination of the Contract, directly or indirectly and any claims arising from the Seller. In addition, both sides have to evaluate the actual execution part of the Contract, and deal with all the consequences of early termination of the Contract.

14.9 由于不可抗力造成的合同终止情况下：
The Contract shall be terminated due to force majeure under the following circumstances:

14.9.1 卖方应把一切与合同有关的文件、资料、设备、（成品或半成品）及材料在买方未取走之前卖方应负责存放并保险，费用由买方负责。
The Seller shall bear the costs of storage and insurance fees of all contract-related documents, materials, equipment, (finished or semi-finished products) and materials before transferred to the buyer.

14.9.2 买方不承担任何由于终止合同一部分或全部而由第三方向卖方提出的各项索赔，不论直接的或间接的。
The Buyer shall not bear any of the claims due to the termination of all or part of the Contract by a third party, no matter direct or indirect.

14.9.3 如只是合同的一部分被终止，其他部分仍应继续执行不受影响。
If only part of the Contract is terminated, other parts shall continue to perform unaffected.

14.10 删除。 Deleted

15. 不可抗力 Force Majeure

15.1 合同双方中的任何一方，由于战争及严重火灾和水灾、台风、地震以及双方同意的其他不可抗力事故，而影响合同履约义务的执行时，则延迟履行合同义务的期限，应相当于不可抗力事故影响的时间，但是不能因为不可抗力造成的交货的延迟而调整合同价格。
When either party fails to fulfill obligations accordingly due to war, serious fires and floods, typhoons, earthquakes and other force majeure both parties agreed, then the delivery date of contract obligations shall be delayed and shall be considered as the impact of force majeure, but the delivery delay caused by force majeure shall not affect contract price.

15.2 受到不可抗力影响的一方应在不可抗力事故发生后，尽快将所发生的不可抗力事件的情况以传

真通知另一方，并在 14 天内将有关权威当局出具的证明文件提交给另一方审阅确认，受影响的一方同时应尽量设法缩小这种影响和由此而引起的延误，一旦不可抗力的影响消除后，应将此情况立即通知对方并进而立即履行其合同义务。

The party affected by the force majeure shall notify the other party by fax as soon as the force majeure occurs and submit evidence issued by relevant authorities to the other party for confirmation within 14 days; meanwhile, the affected party shall endeavor to reduce the damages and delay caused thereby; once the impact of force majeure terminated, the affected party shall notify the other party immediately and thus fulfill contract obligations.

15.3 如双方对不可抗力事件的影响估计将延续到 120 天以上时，双方应通过友好协商解决本合同的执行问题（包括交货、安装、试运行、性能考核试验和验收等问题）。

If both parties agree the force majeure will continue more than 120 days, the two parties shall friendly negotiate on execution of the Contract (including delivery, installation, commissioning, acceptance testing and performance evaluation issues).

16. 合同争议的解决 Settlement of Disputes

双方特此明确同意通过友好协商解决因本协议引起的或与本协议有关的争议。如果此类争议未通过谈判解决，则任何一方均可将其提交给 Istanbul 法院，该法院对因本协议而产生或与之相关的任何诉讼具有管辖权。

Each party hereby expressly consents to solve disputes arising from or in connection with this Contract by friendly negotiation. If such dispute is not solved through negotiation, either party may submit it to the Court in Istanbul that have jurisdiction for any lawsuit filed there arising from or related to this Contract.

17. 合同生效 Effectiveness of Contract

17.1 本合同于 2022 年*月**日由买卖双方授权代表在阿达纳签字。

This Contract is signed by the authorized representatives of both parties in Adana on the date of **, 2022

17.2 合同生效条件如下：

The Contract effective conditions are as follows:

17.2.1 买卖双方的法定代表人或被授权人（须经法定代表人书面授权委托）签字并加盖公章或合同专用章。

The legal representatives or authorized persons of both parties (with written authorization of legal representatives) shall sign and affix official seal or special seal for contract.

17.3 本合同有效期：从合同生效之日起到签发“最终验收证书”并理赔完毕货款两清之日止。

The duration of the Contract: From the effective date of the Contract to the date when the "Final Acceptance Certificate" is issued and the payment for goods is paid in full and the claim is completed.

18. 其它 Others

18.1 本合同适用法律为土耳其共和国法律。

The Contract shall be subject to the law of The Republic of Turkey.

18.2 本合同所包括的附件，是本合同不可分割的一部分，具有同等的法律效力。

All Annexes included in the Contract are integral parts of the Contract and shall have the same legal effect.

18.3 合同双方承担的合同义务都不得超过合同的规定，合同任何一方也不得对另一方做出有约束力的声明、陈述、许诺或行动。

Obligations undertaken by all parties shall not exceed the Contract. Neither party shall be bound to statement, representation, promise or action of the other party.

18.4 本合同列明了双方的责任、义务、补偿和补救条款。任何一方不承担本合同规定以外的责任、义务、补偿和补救。

This contract sets out the responsibilities, duties, compensation and redress provisions of both sides. Any party shall not assume responsibility, obligation, compensation and redress other than the clauses of the Contract.

18.5 双方任何一方未取得另一方事先同意前，不得将本合同项下的部分或全部权利或义务转让给第三方。

Any party, without obtaining the prior consent from the other party, shall not transfer part or all of its rights or obligations under the Contract to a third party.

18.6 本合同项下双方相互提供的文件、资料，双方除为履行合同的目的外，均不得提供给与合同设备和相关工程无关的第三方。

Documents and information provided by both parties under the Contract are solely for fulfilling the purpose of the Contract and shall not be provided to third parties not related to the Contract.

18.7 卖方保障买方为本合同或其任何部分规定用途而使用合同设备、服务和文件，不受第三方关于专利、商标或工业设计权的侵权指控。

The Seller shall ensure the Buyer free from third-party allegations of infringement upon patent, trademark or industrial design rights in the case of using contract equipment, service and documents for the purposes

stipulated in the Contract or any part of the Contract.

如果发生任何第三方的侵权指控，买方于上述指控之日起 7 个工作日内尽快通知卖方，卖方负责与第三方交涉并使买方免受由于第三方索赔从法律及经济责任上所造成的损害。

If there is any allegation of infringement from a third party, the Buyer shall notify the Seller within seven working days since the date of the allegation; the Seller is responsible for negotiating with the third party and exempting the Buyer from the legal and financial liabilities resulting from claims arising from third party.

合同双方各应分别指定二名授权代表，分别负责直接处理本合同设备的技术和商务问题。双方授权代表的名称和通讯地址在合同生效的同时通知对方。

Each party shall designate two authorized representatives, who are responsible for the direct contact of technical and business issues respectively. Each party shall in form the other party of names and mail address of the authorized representatives as soon as the Contract comes into force.

18.8 任何一方向对方提出的函电通知或要求，如系正式书写并按对方 19.11 条款地址派员递送或挂号、航空邮寄、快递或传真发送的，在取得对方人员和/或通讯设施接收确认后，即被认为已经被对方正式接收。

Correspondence notice or request made to the other party, delivered in formal writing and sent to address provided in clause 19.11by mail, air mail, courier or facsimile transmission, shall be deemed as having been officially accepted in obtaining receiving confirmation from the other person and/or communication facilities.

18.9 本合同用两种语言起草。如中英文版本有矛盾，以英文版本为准。合同执行过程中所涉及的相互往来文件、技术资料、说明书、会议纪要、信函等文件均应以英文编写。

This Contract is drafted in two languages. In case of contradiction between English and Chinese version, English version shall prevail. During execution of this contract, technical information, specifications, meeting minutes, correspondence and other documents shall be written in English.

第三节 合同附件格式
Contract Annexes Format

附件一合同协议书（格式）Annex I Contract Agreement (Format)

合同协议书

Contract Agreement

_____（买方名称,以下简称“买方”)为获得_____（项目名称）合同设备和技术服务和质保期服务,已接受_____（卖方名称,以下简称“卖方”）为提供上述合同设备和技术服务和质保期服务所作的投标，买方和卖方共同达成如下协议：

(Name of Buyer, hereinafter referred to as "Buyer") has accepted (Name of Seller, hereinafter referred to as "Seller")'s bid for the provision of the above-mentioned contract equipment and technical services and warranty services for the purpose of obtaining (Project Name) contract equipment and technical services and warranty services. Buyer and Seller mutually agree as follows:

1. 合同文件构成：The Contract Documents Constitute.

（1）合同协议书；Contract Agreement.

（2）合同条款；Contract Terms..

（3）报价表；Quotation Form.

（4）技术协议；Technical Agreement

（5）其他合同文件。Other Contract Documents.

2. 上述合同文件互相补充和解释。如果合同文件之间存在矛盾或不一致之处，以上述文件的排列顺序在先者为准。

The above contract documents complement and explain each other. If there is any contradiction or inconsistency between the contract documents, the order of the above documents shall prevail.

3. 卖方承诺保证完全按照合同约定提供合同设备和技术服务和质保期服务并修补缺陷。

The seller undertakes to provide the contracted equipment and technical services and warranty services and to repair defects in full accordance with the contract.

4. 买方承诺保证按照合同约定的条件、时间和方式向卖方支付合同价款。

The buyer undertakes to pay the contract price to the seller in accordance with the conditions, time and manner agreed in the contract.

5. 本合同正本一式×份，副本一式×份；买卖双方各执正本×份，副本×份。

This Contract is in duplicate and original copies. Each party shall hold (x) originals and (x) copies.

6. 合同未尽事宜，双方另行签订补充协议，补充协议是合同的组成部分。

For matters not covered herein, both parties shall enter into a supplementary agreement separately, which shall be an integral part of the contract.

买方：（盖章/合同专用章）	卖方：（盖章/合同专用章）
Buyer: (Seal/Special Seal for Contract)	Sell:(Seal/Special Seal for Contract)
法定代表人或其委托代理人法定代表人或其委托代理人	
（签字）（签字）	
Responsible Person/Authorized Agent	Responsible Person/Authorized Agent
(Signature)	(Signature)
签字日期：xxxx 年 xx 月 xx 日签字日期：	xxxx 年 xx 月 xx 日
Date:	Date:
统一社会信用代码：统一社会信用代码：	
Unified Social Credit Code:	Unified Social Credit Code:
地址：地址：	
Address:	Address:
邮政编码：邮政编码：	
Postal Code:	Postal Code:
法定代表人：法定代表人：	
Legal Representative:	Legal Representative:
委托代理人：委托代理人：	
Authorized Agent:	Authorized Agent:
电话：电话：	
Phone:	Phone:
传真：传真：	
Fax:	Fax:
电子邮箱：电子邮箱：	
Email Address:	Email Address:
开户银行：开户银行：	
Bank:	Bank:
账号：账号：	
Account Number:	Account Number:

第四章 技术要求
Chapter 4 Technical Requirements

一、技术规范 Technical Specifications

1. 概述 Summary

1.1 目的 Objective

本规范的目的是为满足EMBA胡努特鲁混合电站所需的光伏电池组件设备及其相关服务的要求。

投标人如进行投标，必须对所有标段全部进行投标。招标人将对上述标段进行评标。最终由EMBA根据本规范的要求选定。

本规范包括光伏组件的性能、设计、制造、保修、验收、技术服务和资料要求。

The purpose of this specification is to meet the requirements of PV module equipment and related services required for EMBA Hunutlu Hybrid Power Station.

If the bidder submits a bid, it must submit a bid for all bid sections. The tenderee shall evaluate the above bid sections. Finally selected by EMBA according to the requirements of this specification.

This specification covers the performance, design, manufacturing, warranty, acceptance, technical services and data requirements of photovoltaic modules.

1.2 工作概要 Job Summary

投标人负责光伏电池组件的设计、制造、运输、交付、安装指导、调试、120个月质保期服务。

EMBA及其代表将负责完成太阳能光伏电站的土建和电气工程。投标人应当向业主提供光伏电池组件及相关附件；用于电站安装、试运行、运行和维护的支持性和监督性的服务；光伏电池组件设计、制造、安装指导、调试、验收；相关培训和120个月的质保期服务。投标人应按合同要求对其所供的设备提供咨询和监督服务。

The tenderer shall be responsible for the design, manufacturing, transportation, delivery, installation guidance, commissioning and 120-month warranty service of photovoltaic cell modules.

EMBA and its representatives shall be responsible for completing the civil and electrical works of the photovoltaic power station. The bidder shall provide photovoltaic cell modules and relevant accessories to the owner; Supporting and supervisory services for installation, commissioning, operation and maintenance of the power station; Design, manufacturing, installation guidance, commissioning and acceptance of photovoltaic cell modules; Relevant training and 120-month warranty service. The tenderer shall provide

consulting and supervision services for the equipment provided according to the contract requirements.

1.3 语言 Language

投标人与招标代理和本项目涉及的其他方机构之间的所有文件、信函、传真、电子邮件、图纸及信件均以英文为准。无论何时需要对合同条款进行编写、标注也应使用英文。

All documents, letters, faxes, e-mails, drawings and letters between the bidder and the tendering agent and other parties involved in the project shall be in English. The terms of the Contract shall be written and annotated in English whenever necessary.

1.4 单位 Units

所有的技术资料和表格，所有的图纸和所有的仪器都应使用国际单位制。

All technical data and tables, all drawings and all instruments shall use the international system of units.

1.5 标准和规程 Standards and Procedures

合同设备应符合本技术条款的要求，本技术规范未作规定的要求按照下述标准执行。除本规范对标准和规程另有规定，合同项下所使用和提供的所有设备、器件、材料和所有设计计算及试验应根据以下最新版本的标准和规程或经批准的其他标准或同等的适用于制造国的其他相关标准。如提供的设备或材料不符合如下标准，其建议标准和以下标准之间的所有详细区别应予以说明，投标人应就其可能影响设备设计或性能内容的标准用中文文本提供给招标人，供其批准。

The contract equipment shall meet the requirements of the technical terms. The requirements not specified in the technical specifications shall be implemented in accordance with the following standards. Unless otherwise specified in the standards and procedures in this specification, all equipment, devices, materials, and all design calculations and tests used and provided under the contract shall be in accordance with the following latest versions of standards and procedures or other approved standards or equivalent other relevant standards applicable to the manufacturing country. If the equipment or materials provided do not conform to the following standards, all detailed differences between the proposed standards and the following standards shall be explained. The tenderer shall provide the tenderee with Chinese text of the standards that may affect the equipment design or performance content for approval.

标准的使用等级顺序如下：The standard ranking of use is as follows：

国际电工委员会标准: International Electrotechnical Commission Standards:

IEC 61215 《地面用晶体硅光伏组件设计鉴定和定型》

IEC 61215 *Design Qualification and Finalization of Crystalline Silicon Photovoltaic Modules for Terrestrial Use*

IEC 61345 《太阳电池组件的紫外试验》

IEC 61345 *UV Test of Solar Cell Modules*

IEC 61730《光伏组件安全鉴定》

IEC 61730 *Safety Qualification of Photovoltaic Modules*

IEEE 1262《太阳电池组件的测试认证规范》

IEEE 1262 *Specification for Testing and Certification of Solar Cell Modules*

ISO 2859-1《计数抽样检验程序第 1 部分》

IOS 2859 *Sampling Procedures for Inspection by Attributes - Part 1*

2. 技术要求 Technical Requirement

2.1 光伏组件 PV Module

2.1.1 光伏组件技术要求 Technical Requirements for PV Modules

2.1.1.1 通用要求 General Requirements

（1）针对每个太阳能光伏电站，除光伏电站特殊要求外，投标人应采用一致的规格投标。

(1) For each solar photovoltaic power station, except for the special requirements of the photovoltaic power station, the bidder shall adopt consistent specifications for bidding.

（2）输出功率范围及公差：投标产品规格型号的正公差。

(2) Output power range and tolerance: positive tolerance of the specification and model of the bidding product.

（3）太阳能光伏组件所标参数均在标准条件下，其条件（光谱辐照度：1000W/m^2；AM 1.5；温度： 25℃）

(3) The standard parameters of solar PV modules are all under standard conditions (spectral irradiance: 1000w/m2; AM 1.5; temperature: 25 ℃)

*（4）应具有可靠的抗风压、抗冰雹冲击能性试验。耐雹撞击性能：23m/s 耐风压：2400Pa；荷载（长期）：≥5400Pa

(4) It shall have reliable wind pressure resistance and hail impact resistance test. Hail impact

resistance: 23m/s wind pressure resistance: 2400pa; Load (long term): ≥ 5400pa

*（5）运行环境温度范围：（-40±2）℃到（85±2）℃。

(5) Operating ambient temperature range: (-40 ± 2) ℃ to (85 ± 2) ℃.

（6）符合 IEC61730、IEC61215 的长期室外电气和机械性能标准要求。

(6) Meet the requirements of long-term outdoor electrical and mechanical performance standards of IEC61730 and IEC61215.

（7）试验报告符合 IEC-61215 标准。

(7) The test report shall comply with IEC -61215 standard.

（8）爬电距离符合 IEC 标准要求

(8) creepage distance shall meet the requirements of IEC standard.

（9）最大承载电流符合 IEC 61730-2004 《光伏组件安全鉴定》。

(9)The maximum carrying current shall comply with IEC 61730-2004 safety qualification of photovoltaic modules.

（10）选用电池符合《地面用晶体硅太阳电池单体质量分等标准》的优等品。

(10) Select the superior products that meet the quality grading standard for crystalline silicon solar cells for ground use.

（11）标称工作温度、峰值功率温度系数、开路电压温度系数、短路电流温度系数符合 IEC 标准。

(11) The nominal operating temperature, peak power temperature coefficient, open circuit voltage temperature coefficient and short-circuit current temperature coefficient shall comply with IEC standards.

（12）工作温度范围符合 IEC 标准。

(12) The operating temperature range complies with IEC standards.

（13）工作电压、工作电流符合 IEEE 1262-1995 《太阳电池组件的测试认证规范》。

(13) The operating voltage and current shall comply with IEEE 1262-1995 specification for testing and certification of solar cell modules.

*（14）热冲击：-40±2℃到＋85±2℃。

*(14) Thermal shock: -40 ± 2 ℃ to ＋ 85 ± 2 ℃.

（15）电池片表面颜色均匀，无裂纹、破碎和针孔，无明显色斑，虚印，漏浆，手印，水印，油印，脏污等，P 型电池白斑≤2mm^2，N 型电池≤3mm^2，单片电池≤1 处，同一块光伏组件白斑的电池数量≤电池数量的 5%；玻璃无压痕、皱纹、彩虹、裂纹、不可擦除污物，电池组件的 I-V 曲线基

本相同。

(15) The surface color of the cells shall be uniform without cracks, cracks, pinholes, obvious color spots, false prints, slurry leakage, fingerprints, watermarks, mimeograph, dirt, etc. the white spots of p-type cells shall be ≤ 2mm2, the white spots of n-type cells shall be ≤ 3mm2, the number of single-chip cells shall be ≤ 1, and the number of white spots of the same PV module shall be ≤ 5% of the number of cells; The glass shall be free of indentation, wrinkle, rainbow, crack and indelible dirt, and the I-V curve of the battery module shall be basically the same.

（16）光伏组件 EL 测试电池外观、发光性均良好，无黑心、针孔、黑斑，及超出要求的隐裂和明暗片；不允许裂片/碎片导致的局部面积失效；不允许局部短路或短路情况存在。

(16) The appearance and luminosity of PV module El test cell are good, without black center, pinhole, black spot, and cracks and bright and dark films exceeding the requirements; Local area failure caused by cracks / fragments is not allowed; Local short circuit or short circuit is not allowed.

隐裂：线状隐裂纹及其延长线长度≤电池原片边长的 10%，同一块组件线状隐裂电池数量≤电池数量的 2%；十字隐裂中较长的隐裂长度≤电池原片边长的 5%，同一块组件十字隐裂电池数量≤电池数量的 2%；片状隐裂：不允许；单片缺角面积≤4mm²，单片电池≤1 处，碎片无脱离，同一块组件缺角电池数量≤1 片。

明暗片：P 型组件灰度值相差 15%以下的明暗片，数量不计；灰度值相差 15%～30%的明暗片≤电池数量的 10%；灰度值相差 30%～50%的明暗片≤电池数量的 5%；不允许灰度值相差 50%以上的明暗片；N 型组件灰度值相差 30%以下的明暗片，数量不计；灰度值相差 30%～50%的明暗片≤电池数量的 10%；灰度值相差 50%～70%的明暗片≤电池数量的 5%；不允许灰度值相差 70%以上的明暗片。

Hidden crack: linear hidden crack and its extension line length ≤ 10% of the side length of the original cell, and the number of linear hidden crack cells in the same module ≤ 2% of the number of cells; The longer crack length in the cross crack ≤ 5% of the side length of the original cell, and the number of cross crack cells in the same module ≤ 2%; Flaky crack: not allowed; Single piece corner area ≤ 4mm ²， Single cell ≤ 1 place, no fragments are separated, and the number of missing cells in the same component ≤ 1 piece.

Shading film: shading film with gray value difference of less than 15% for p-type components, and the quantity is not counted; The number of bright and dark films with a gray value difference of 15% ~ 30%

shall be less than or equal to 10% of the number of batteries; The number of bright and dark films with a difference of 30% ~ 50% in gray value ≤ 5% of the number of batteries; It is not allowed to use shading films with gray value difference of more than 50%; The number of shading films with gray value difference of less than 30% for n-type components is not counted; The number of bright and dark films with a gray value difference of 30% ~ 50% shall be less than or equal to 10% of the number of batteries; The difference of gray value between 50% ~ 70% of the bright and dark films ≤ 5% of the number of batteries; Do not allow shaders with gray value difference of more than 70%.

（17）不允许电池区域的气泡；非电池区域：单个气泡面积≤0.5mm²，数量不计；单个气泡面积≤4mm²，数量≤2 处；气泡与电池间距≥0.3mm，气泡距离玻璃边缘≥10mm。

(17) Bubbles in the battery area are not allowed; Non battery area: single bubble area ≤ 0.5mm ²， Quantity is not counted; Single bubble area ≤ 4mm ²， Quantity ≤ 2 places; The distance between bubble and battery is ≥ 0.3mm, and the distance between bubble and glass edge is ≥ 10mm.

（18）光伏电池组件必须具备抗 PID 功能。（提供认证证书）

(18) PV module must have anti PID function. (provide certification).

2.1.1.2 专用要求 Special requirements

（1） 166mm 电池片组件类型必须是 P 型或 N 型单晶高效单体电池，规格为 72 片串并联。

(1) The type of 166mm cell module must be P-type or N-type Mono PERC **high-efficiency single cell, and the specification is 72 pieces in series and parallel.**

（2） 182mm 电池片组件类型必须是 P 型或 N 型单晶高效单体电池，规格为 72 片串并联，短边安装孔间距 400mm，长边安装孔间距 1400mm，安装孔两侧间距 1096mm±2mm。

(2) The 182mm cell module must be a P-type or N-type Mono PERC **high-efficiency single cell, with 72 pieces in series and parallel connection. The distance between the short side mounting holes is 400mm, the distance between the long side mounting holes is 1400mm, and the distance between the two sides of the mounting holes is 1096mm ± 2mm.**

各规格组件具体要求如下：

Specific requirements for components of various specifications are as follows:

序号 Serial number	P 型/N 型 P type /n type	电池尺寸（mm） Battery size	单/双面 Monofacial/ Bifacial	尺寸要求 Dimensional requirements	*衰降要求 Attenuation requirements
1	P 型	166	单面 Monofacial	$(2094^{+10}_{-10})\times(1038^{+5}_{-5})\times(35^{+5})$	首年功率衰降≤2%；以后逐年功率衰降≤0.7% Power attenuation in the first year ≤ 2%; Annual power attenuation ≤ 0.7%
2	P 型	166	双面 Bifacial	$(2094^{+10}_{-10})\times(1038^{+5}_{-5})\times(35^{+5})$	首年功率衰降≤2%；以后逐年功率衰降≤0.45% Power attenuation in the first year ≤ 2%; Annual power attenuation ≤ 0.45%
2	P 型	182	双面 Bifacial	$(2285^{+5}_{-5})\times(1134^{+5}_{-5})\times(35^{+5})$	首年功率衰降≤2%；以后逐年功率衰降≤0.45% Power attenuation in the first year ≤ 2%; Annual power attenuation ≤ 0.45%
3	N 型	182	双面 Bifacial	$(2285^{+5}_{-5})\times(1134^{+5}_{-5})\times(35^{+5})$	首年功率衰降≤1%；以后逐年功率衰降≤0.4% Power attenuation in the first year ≤ 1%; Annual power attenuation ≤ 0.4%

2.1.2 光伏玻璃 PV Glass

2.1.2.1 **双玻组件 Bifacial PV module**

优选通过 CE 产品认证或投标人自身生产的产品，保证单晶双面双玻光伏组件运行的高可靠性且须满足以下条件。投标人应当负责对购进的低铁半钢化玻璃材料取样试验（如果出现异常情况，次数应当增加），并将对结果进行分析，分析结果或试验报告应当提交业主。

It is preferred to adopt the CE product certification or the products produced by the bidder to ensure the high reliability of the Bifacial Mono PERC Module and meet the following conditions. The tenderer shall be responsible for sampling and testing the purchased low-iron semi tempered glass materials (in case of abnormal conditions, the frequency shall be increased), and shall analyze the results. The analysis results or test reports shall be submitted to the owner.

提供数据需满足或好于以下参数。

The data provided shall meet or be better than the following parameters.

（1）玻璃厚：厚度≥2.0mm。

(1) Glass thickness: thickness ≥ 2.0mm.

（2）光伏电池组件用低铁半钢化玻璃铁含量应不高于 0.015%。三氧化二铁）。

(2) The content of low iron semi tempered glass iron used for photovoltaic cell modules shall not be higher than 0.015%. Ferric oxide).

（3）太阳光直接透射比：在 380nm～1100nm 光谱范围内，太阳电池组件用镀膜钢化玻璃的太阳光直接透射比应＞93.5%。

(3) Direct sunlight transmittance: within the spectral range of 380nm ~ 1100nm, the direct sunlight transmittance of coated tempered glass for solar cell modules shall be greater than 93.5%.

其他要求同 2.1.2.1 条。

Other requirements are the same as 2.1.2.1.

2.1.3 晶体硅电池片：Crystalline Silicon Cell

应保证光伏组件运行的高可靠性。投标人应当负责对购进的电池片取样试验（如果出现异常情况，次数应当增加），并将对结果进行分析，或供应商提供的试验报告，分析结果或试验报告应当提交业主。提供数据需满足或好于以下参数。

High reliability of PV module operation shall be ensured. The tenderer shall be responsible for sampling and testing the purchased battery (if there are abnormal conditions, the frequency

shall be increased), and shall analyze the results, or the test report provided by the supplier. The analysis results or test report shall be submitted to the owner. The data provided shall meet or be better than the following parameters.

（1）所有电池片尺寸一致，边长±0.25mm；翘曲度＜2.5mm；无可视裂纹、缺口、虚印、漏浆、水印、油污、破碎、针孔、隐裂等缺陷。同一电池正面允许出现相近颜色色差；印刷栅线无氧化变色。

(1) All cells shall have the same size, with side length of ± 0.25mm; Warpage ＜ 2.5mm; No visible crack, notch, false print, slurry leakage, watermark, oil stain, breakage, pinhole, hidden crack and other defects. Similar color difference is allowed on the front of the same battery; The printing grid line shall be free of oxidation and discoloration.

（2）崩边长度≤3 mm，宽度≤0.5 mm，深度≤1/2 电池片厚度，崩边不能到达栅线，单片电池片数量≤1 处，相邻两处崩边的间距≥30.0mm，同一块光伏组件崩边电池数量≤电池数量的 3%；

(2) The length of edge collapse ≤ 3 mm, width ≤ 0.5 mm, depth ≤ 1/2 of the thickness of the cell, the edge collapse cannot reach the grid line, the number of single cell ≤ 1, the distance between two adjacent edge collapse ≥ 30.0mm, and the number of edge collapse cells of the same PV module ≤ 3% of the number of cells;

（3）不允许 V 型缺角，“U”型缺角长度≤5 mm，深度≤1.5 mm，单片电池片内数量≤1 处；长度≤3 mm，深度≤1 mm，单片电池≤2 处，同一块光伏组件缺口电池数量≤电池数量的 3%；

(3) V-shaped corner missing is not allowed. The length of "U" shaped corner missing is ≤ 5 mm, the depth is ≤ 1.5 mm, and the number of single-chip cells is ≤ 1; Length ≤ 3 mm, depth ≤ 1 mm, single-chip cell ≤ 2 places, and the number of notched cells of the same PV module ≤ 3% of the number of cells;

（4）P 型电池划痕长度≤10 mm，单片电池片划痕数量≤1 条，同一块组件划痕的电池数量≤电池数量的 8%；N 型电池长度≤电池边长 1/4，数量≤8 处；电池边长 1/4≤划痕长度≤电池边长 1/3，数量≤2 处；同一块光伏组件上划痕电池数量≤电池数量的 15%；

(4) The scratch length of p-type battery is ≤ 10 mm, the number of scratches on a single battery is ≤ 1, and the number of scratches on the same module is ≤ 8% of the number of batteries; Length of n-type battery ≤ 1/4 of side length of battery, quantity ≤ 8; Battery side

length 1/4 ≤ scratch length ≤ battery side length 1/3, quantity ≤ 2; Number of scratched cells on the same PV module ≤ 15% of the number of cells;

（5）栅线颜色一致，无氧化、黄变，断栅长度≤1 mm，单片电池≤3 处，一块光伏组件断栅电池≤电池数量的 3%；不允许连续性断栅；双面电池背面断栅长度≤3mm，单片电池≤10 处，同一块组件断栅电池≤电池数量的 10%；

(5) The grid lines shall be of the same color without oxidation and yellowing, the grid breaking length shall be ≤ 1 mm, the single-chip cell shall be ≤ 3 places, and the grid breaking cell of a photovoltaic module shall be ≤ 3% of the number of cells; Continuous grid breaking is not allowed; The back broken grid length of Bifacial battery ≤ 3mm, the single-chip battery ≤ 10 places, and the broken grid battery of the same module ≤ 10% of the number of batteries;

（6）助焊剂印≤10 mm^2，单片电池片助焊剂印数量≤2 处，同一块光伏组件助焊剂印电池数量≤电池数量的 8%；

(6) Flux printing ≤ 10 mm2, the number of flux printing ≤ 2 on a single cell, and the number of flux printing cells on the same PV module ≤ 8% of the number of cells;

（7）正面和背面焊带偏移量≤焊带宽度的 1/3，数量＜3 处，主栅线与焊带之间脱焊长度≤5mm。多主栅组件，每根焊带允许 1/3 数量以内的空焊点，连续空焊点≤焊点数量的 1/3；焊带偏离主栅线≤两根主栅线间距的 1/5，且连续漏出焊点≤焊点数量的 1/3；头尾焊接完好时允许焊带与 U 型口细栅重叠。（双面电池组件正背面偏焊均执行此标准）

(7) The offset of the front and back welding strips shall be ≤ 1/3 of the width of the welding strip, the number shall be ＜ 3, and the desoldering length between the main grid line and the welding strip shall be ≤ 5mm. For multi main grid components, the number of empty solder joints within 1/3 of each welding strip is allowed, and the number of continuous empty solder joints ≤ 1/3 of the number of solder joints; The deviation of the welding strip from the main grid line ≤ 1/5 of the distance between the two main grid lines, and the continuous leakage of welding points ≤ 1/3 of the number of welding points; When the head and tail are well welded, the welding strip is allowed to overlap with the fine grid of the U-shaped opening. (both front and back side of Bifacial battery module are subject to this standard)

2.1.4 封装材料 Packaging Materials

***双面双玻组件选用符合 IEC 标准的 POE 封装材料或 POE+EVA 封装材料。**

*Poe packaging material or poe+eva packaging material conforming to IEC standard shall be selected for Bifacial Mono PERC Module.

电池组件的封装层中不允许气泡或脱层在某一片电池或组件边缘形成一个通路。

No bubble or delamination is allowed in the packaging layer of the battery module to form a path at the edge of a certain battery or module.

*2.1.5 背板：**【单面组件适用】Backplane: Applicable to MonofacialModuls**

背板应当采用三层复合膜结构背板，外层采用 PVDF 材料，中间层采用 PET 材料，内层采用 PVDF 材料或氟涂料[氟烯烃和乙烯基酯共聚物(FEVE)、三氟氯乙烯(CTFE)、聚四氟乙烯(改性 PTFE)]。外观平整无缺陷，机械性能、电气性能、生化性能、对不良环境条件的耐受性能等符合国家标准。

The back plate shall be a three-layer composite membrane structure back plate, the outer layer shall be made of PVDF material, the middle layer shall be made of PET material, and the inner layer shall be made of PVDF material or fluoro paint [fluoroolefin and vinyl ester copolymer (FEVE), chlorotrifluoroethylene (CTFE), polytetrafluoroethylene (modified PTFE)]. The appearance shall be smooth and free of defects, and the mechanical performance, electrical performance, biochemical performance and resistance to adverse environmental conditions shall meet the national standards.

2.1.5 背玻璃：**【双玻组件适用】Back glass: applicable to** Bifacial Mono PERC Module

要求同 2.1.2 条款。The requirements are the same as those in Article 2.1.2

2.1.6 接线盒：接线盒：Junction Box

选用的接线盒产品应外壳具有强烈的抗老化性材料、较好耐紫外线能力，符合于室外恶劣环境条件下的使用；所有的连接方式采用插入式连接，提供数据需满足或好于以下参数。

The selected junction box shall be made of strong anti-aging materials and good UV resistance, which are suitable for outdoor use under harsh environmental conditions; All connection methods adopt plug-in connection, and the data provided shall meet or be better than the following parameters.

*（1）最大承载工作电流能力≥额定电流的 1.5 倍

(1) Maximum carrying current capacity ≥ 1.5 times of rated current

*（2）使用温度（-40±2～85±2）℃

*(2) Service temperature (-40 ± 2 ～ 85 ± 2) ℃

（3）工作湿度范围 5%～95%

(3) Operating humidity range 5% ~ 95%

*（4）防护等级不小于 IP67

(4) The protection grade shall not be less than IP67

标识完整、清晰，外观完好无损。具有良好的机械性能、电气性能、耐紫外线老化功能。

The identification shall be complete and clear, and the appearance shall be intact. It has good mechanical performance, electrical performance and UV aging resistance.

2.1.7 焊带（汇流条/互连条）：Welding Strip (bus bar / interconnection bar):

外观光亮无缺陷，电阻率、抗拉强度、伸长率、折断率、基材等符合 IEC 标准。

The appearance is bright and free of defects, and the resistivity, tensile strength, elongation, breaking rate, base material, etc. comply with IEC standards.

2.1.8 铝边框：Aluminum Frame:

外观完好，阳极氧化膜厚度、硬度、弯曲度等符合 IEC 标准。

The appearance is in good condition, and the thickness, hardness and curvature of anodic oxide film comply with IEC standards.

2.1.9 硅胶/胶带：Silicone / Tape

（1）硅胶：Silicone

外观细腻均匀，抗拉强度、伸长率、剪切强度、阻燃等级符合 IEC 标准。

The appearance is fine and uniform, and the tensile strength, elongation, shear strength and flame retardant grade comply with IEC standards.

（2）胶带：Tape

外观清洁无缺陷，-40℃-95℃范围可正常使用。断裂伸长率、基材百度、胶带宽度、透水率、机械强度、抗老化性能符合 IEC 标准。

The appearance is clean and free of defects, and the range of -40 ℃ -95 ℃ can be used normally. Elongation at break, base material, tape width, water permeability, mechanical strength and anti-aging performance shall comply with IEC standards.

2.1.10 组件引出线电缆 Component Outgoing Cable

（1）每块单晶硅电池组件应带有正负出线、正负极连接头和旁路二极管（防止组件热斑故障）。

(1) Each MonoPERC battery module shall be equipped with positive and negative outgoing lines, positive and negative connectors and bypass diodes (to prevent component hot spot failure).

（2）单晶硅电池组件自带的串联所使用的电缆线应满足抗紫外线、抗老化、抗高温、防腐蚀和阻燃等性能要求，选用双绝缘防紫外线阻燃铜芯电缆，电缆性能符合 IEC 性能测试的要求。

(2) The cable used for the series connection of the monocrystalline silicon battery module shall meet the performance requirements of anti ultraviolet, anti-aging, high temperature, anti-corrosion and flame retardance. The double insulated anti ultraviolet and flame retardant copper core cable shall be selected, and the cable performance shall meet the requirements of IEC performance test.

（3）电缆规格为4mm²，固定支架上组件的正负极线缆长度各暂定为1200mm至1600mm之间（含 MC4 插头），实际长度合同签订阶段确定。

(3) The cable specification is 4mm2, and the length of the positive and negative cables of the components on the fixed support is tentatively 1200mm to 1600mm (including MC4 plug), and the actual length will be determined at the contract signing stage.

2.2 光伏组件材料/部件产地 Origin of PV Module Materials / Components

光伏 PERC 单晶高效组件总装在场区完成。投标人应向业主方提供两家国内/国际采购的材料和零部件的必要证明材料（包括但不限于出厂检验证、合格证、供货单）。

The final assembly of Mono PERC high efficiency PVmodules is completed in the field. The tenderer shall provide the owner with necessary supporting materials (including but not limited to factory inspection certificate, certificate of conformity and supply list) for the two domestic / international purchased materials and parts.

2.3 其它要求 Other Requirements

2.3.1 互换性 Interchangeability

所提供的光伏高效组件要有相同的设计和结构，同容量组件可以互换使用。所有光伏高效组件应采用统一的条码和或接线标记。在正常使用中可以互换的光伏高效组件的性能和寿命要统一，都应可以互换而不须要改变接口特性。

The photovoltaic high-efficiency modules provided shall have the same design and structure, and the modules with the same capacity can be used interchangeably. All PV high-efficiency modules shall adopt uniform bar code and or wiring mark. The performance and service life of PV high-efficiency modules that can be interchanged in normal use shall be uniform, and they shall be interchangeable without changing the interface characteristics.

2.3.2 铭牌和标志 Nameplate and Mark

光伏组件主要部件，以及列入备品备件清单的都要标明部件编号和制造厂的名称。对成批生产制造的组件，必须为同一批次，必须标出时间和序号。

The main components of PV modules and those listed in the list of spare parts shall be marked with the component number and the name of the manufacturer. The components manufactured in batch must be of the same batch, and the time and serial number must be marked.

每板光伏组件都要有永久性标志，标出以下内容：

Each PV module shall be permanently marked with the following contents:

- 型号 model
- 功率因数和额定功率 Power factor and rated power
- 输出电压 output voltage
- 输出电流 Output current
- 制造厂 manufacturer
- 制造日期 Date of manufacture
- 电流分档标识 Current grading mark

3. 随机备品备件和专用工具 Accompanying Spare Parts and Special Tools

3.1 随机备品备件 Accompanying Spare Parts

3.1.1 随机备品备件 Accompanying Spare Parts

投标人按使用数量千分之三提供随机备品备件。该备品备件及相应的清单应与光伏组件同时交付。

The tenderer shall provide random spare parts by 3 ‰ of the quantity used. The spare parts and the corresponding list shall be delivered together with the PV module.

3.1.2 随机备品备件的使用 Use of Spare Parts

投标人应及时负责免费更换质保期内的损坏部件。如果投标人用了招标人的随机备品备件存货，投标人应当对此及时补足，确保在十年质保期末，业主的备品备件存货应得到充分补足。

对于质保期内实际使用的随机备品备件品种和数量，超出清单范围的，也应在质保期末按实际用掉的数量免费补足。

The tenderer shall timely replace the damaged parts within the warranty period free of charge. If the tenderer uses the tenderee's random spare parts inventory, the tenderer shall timely supplement it to ensure that the owner's spare parts inventory shall be fully supplemented at the end of the ten-year warranty period.

If the type and quantity of random spare parts actually used during the warranty period exceed the scope of the list, they shall also be supplemented free of charge according to the actual quantity used at the end of the warranty period.

3.1.3 随机备品备件额外的供应 Additional Supply of Spare Parts

质保期后，业主如有需要，可按合同协议书提供的主要备品备件、工具和服务的单价向投标人购买。这些单价将被认作固定价格，但在质保期结束后可能增长，其最大增长率将按照价格调整公式（如果有）计算，如此计算所得的价格应看作是今后定货的最高单价。

在质保期结束后，如果投标人将停止生产这些零备件，应提前 6 个月通知业主，以便使业主做最后一次采购。在停产后，如果业主要求，投标人应在可能的范围内免费帮助业主获得备品备件的蓝图、图纸和技术规范。

After the warranty period, if necessary, the owner can purchase from the bidder at the unit price of main spare parts, tools and services provided in the Contract agreement. These unit prices will be considered as fixed prices, but may increase after the end of the warranty period. The maximum growth rate will be calculated according to the price adjustment formula (if any). The price thus calculated shall be regarded as the maximum unit price for future orders.

After the warranty period, if the tenderer will stop producing these spare parts, it shall notify the owner 6 months in advance so that the owner can make the last purchase. After the shutdown, if required by the owner, the tenderer shall help the owner to obtain the blueprints, drawings and technical specifications of spare parts free of charge to the extent possible.

3.1.4 随机备品备件的品质 Quality of Accompanying Spare Parts

所提供的全部备品备件应能与原有部件互相替换，其材料，工艺和构造均应相同。

All spare parts provided shall be able to be replaced with the original parts, and their materials, processes and structures shall be the same.

4. 技术数据表 Technical Data Sheet

投标人可根据自己情况,充分提供能够说明投标者的光伏组件的技术性能资料。

The bidder may, according to its own situation, fully provide the technical performance data of photovoltaic modules that can explain the bidder.

表 4-1　组件的总体技术数据(单面组件适用,不仅限于以下数据）

Table 4-1 overall technical data of components (applicable to Mono facial Modules ,not limited to the following data)

序号 Serial Number	部件 Components	单位 Unit	数值 Numerical Value	
1	组件数据 Component Data		要求值 Required Value	响应值 Response Value
1.1	制造厂家/型号 Manufacturer / Model			
*1.2	峰值功率 Peak Power	W	455	
*1.3	功率公差 Power Tolerance	W	0～+5	
1.4	组件转换效率 Component Conversion Efficiency	%	≥20.9%	
1.5	开路电压 Open Circuit Voltage	V		。
1.6	短路电流 Short-circuit Current	A		
1.7	工作电压 Working Voltage	V		
1.8	工作电流 Operating Current	A		

序号 Serial Number	部件 Components	单位 Unit	数值 Numerical Value	
1.9	串联电阻 Series Resistance	Ω		
1.10	填充因数 Fill Factor	%		
1.11	组件功率温度系数 Module Power Temperature Coefficient	%/K		
1.12	组件电压温度系数 Component Voltage Temperature Coefficient	%/K		
1.13	组件电流温度系数 Component Current Temperature Coefficient	%/K		
*1.14	工作温度范围 Perating Temperature Range	℃	-40℃-95℃	
1.15	工作湿度 Operating Humidity	%		
*1.16	1 年功率衰降 1-year Power Degradation	%	≤2	
*1.17	10 年功率衰降 10year Power Degradation	%	≤6.5	
*1.18	25 年功率衰降 25-year Power Degradation	%	≤12.8	
*1.19	耐雹撞击性能 Resistance to Hail Impact	m/s	23	
*1.20	耐风压 Wind Pressure Resistance	Pa	2400	
*1.21	荷载 Load	Pa	5400	
1.22	光伏组件尺寸结构 Size	mm		
2	玻璃数据 Glass Data			
2.1	玻璃厚 Glass Thickness	mm	3．2	
2.2	透射比 Transmittance	%	＞93.5	
3	电池片数据 Battery Slice Data			
3.1	转化率 Conversion Rate	%	≥20.9	
3.2	短路电流 Short-circuit Current	A		
3.4	开路电压 Open Circuit Voltage	mV		
3.5	少子寿命 Minority Carrier Lifetime	μs		
3.6	氧浓度 Oxygen Concentration	atoms/cm^3		
3.7	碳浓度 Carbon Concentration	atoms/cm^3		

序号 Serial Number	部件 Components	单位 Unit	数值 Numerical Value	
4	封装材料 Packaging Materials	POE/POE+EVA	POE/POE+EVA	
5	EVA 数据 EVA Data			
*5.1	克重 Gram Weight	g/cm^2	≥390g/m²	
*5.2	交联度 Degree of Crosslinking	%		
5.3	对玻璃剥离强度 Peel Strength to Glass	N/cm^2		
5.4	对背板剥离强度 Peel Strength of Back Plate	N/cm^2		
6	删除 Delete			
7	背板数据 Backplane Data			
7.1	背板结构类型 Backplane Structure Type			
7.2	厚度 Thickness	mm		
7.3	外层厚度 Outer Layer Thickness	μm		
7.4	中间层厚度 Thickness of Intermediate Layer	μm		
7.5	内层材料 Inner material			
7.6	分层剥离强度 Delamination Strength	N/cm		
7.7	水蒸气透过率 Water Vapor Transmission	g/㎡ d		
8	接线盒数据 Junction Box Data			
*8.1	最大承载工作电流 Maximum Carrying Working Current	A		
*8.2	最大耐压 Maximum Withstand Voltage	V		
*8.3	使用温度 Service Temperature	℃	-40~+85	
8.4	最大工作湿度 Maximum Operating Humidity	%		
*8.5	防护等级 Degree of Protection		≥IP67	
8.6	连接线规格 Specification of Connecting Wire	mm^2	4	

表 4-2　组件的总体技术数据(双面组件适用,不仅限于以下数据）

Table 4-2 Overall technical data of components (applicable to Bifacial Mono PERC Module ,not limited to the following data)

序号 Serial Number	部件 Components	单位 Unit	数值 Numerical Value	
1	组件数据 Component Data		要求值 Required Value	响应值 Response Value
1.1	制造厂家/型号 Manufacturer / Model			
*1.2	峰值功率 Peak Power	W	540	
*1.3	功率公差 Power Tolerance	W	0～+5	
1.4	组件转换效率 Component Conversion Efficiency	%	≥20.9%	
1.5	开路电压 Open Circuit Voltage	V		。
1.6	短路电流 Short-circuit Current	A		
1.7	工作电压 Working Voltage	V		
1.8	工作电流 Operating Current	A		
1.9	串联电阻 Series Resistance	Ω		
1.10	填充因数 Fill Factor	%		
1.11	组件功率温度系数 Module Power Temperature Coefficient	%/K		
1.12	组件电压温度系数 Component Voltage Temperature Coefficient	%/K		
1.13	组件电流温度系数 Component current temperature coefficient	%/K		
*1.14	工作温度范围 Operating Temperature Range	℃	-40℃-95℃	
1.15	工作湿度 Operating Humidity	%		
*1.16	1 年功率衰降 1-year Power Degradation	%	≤2	
*1.17	10 年功率衰降 10year Power Degradation	%	≤6.5	
*1.18	25 年功率衰降 25-year Power Degradation	%	≤12.8	
*1.19	耐雹撞击性能 Resistance to Hail Impact	m/s	23	
*1.20	耐风压 Wind Pressure Resistance	Pa	2400	

序号 Serial Number	部件 Components	单位 Unit	数值 Numerical Value	
*1.21	荷载 Load	Pa	5400	
1.22	光伏组件尺寸结构 Size	mm		
2	玻璃数据 Glass Data			
2.1	玻璃厚 Glass Thickness	mm	3．2	
2.2	透射比 Transmittance	%	＞93.5	
2.3	玻璃厚（背面）【双玻组件适用】Glass Thickness (Back) (applicable to Bifacial Module)	mm	2	
3	电池片数据 Battery Slice Data			
3.1	转化率 Conversion Rate	%	≥20.9	
3.2	短路电流 Short-circuit Current	A		
3.4	开路电压 Open Circuit Voltage	mV		
3.5	少子寿命 Minority Carrier Lifetime	μs		
3.6	氧浓度 Oxygen Concentration	atoms/cm^3		
3.7	碳浓度 Carbon Concentration	atoms/cm^3		
4	封装材料 Packaging Materials	单组份 POE/POE+EVA	POE/POE+EVA	
5	EVA 数据 EVA Data			
*5.1	克重 Gram Weight	g/cm^2	≥390g/m²	
*5.2	交联度 Degree of Crosslinking	%		
5.3	对玻璃剥离强度 Peel Strength to Glass	N/cm^2		
5.4	对背板剥离强度 Peel Strength of Back Plate	N/cm^2		
6	POE 数据 POE Data			
*6.1	克重 Gram Weight	g/cm^2		
*6.2	交联度 Degree of Crosslinking	%		
7	删除 delete			
*8.1	最大承载工作电流 Maximum Carrying Working Current	A		

序号 Serial Number	部件 Components	单位 Unit	数值 Numerical Value	
*8.2	最大耐压 Maximum Withstand Voltage	V		
*8.3	使用温度 Service Temperature	℃	-40~+85	
8.4	最大工作湿度 Maximum Operating humidity	%		
*8.5	防护等级 Degree of Protection		≥IP67	
8.6	连接线规格 Specification of Connecting Wire	mm^2	4	

5. 预防 PID 效应措施 Measures to Anti-PID Effect

投标人可根据自己情况，对预防 PID 效应的措施进行描述，包括措施原理、测试报告和数据支持等。已获得认证的提供认证证书复印件。

The tenderer can describe the measures to prevent PID effect according to its own situation, including measure principle, test report, data support, etc. If the certificate has been obtained, a copy of the certificate shall be provided.

二、供货范围 Scope of Supply

1. 一般要求 General Requirements

1.1 提供光伏电池组件设备及其所有附属设备和附件。

1.1 Provide PV module equipment and all its auxiliary equipment and accessories.

1.2 卖方应满足下列所述及技术规范中所提供货要求，但不局限于下列设备。

1.2 The Seller shall meet the supply requirements mentioned below and in the technical specifications, but not limited to the following equipment.

序号 No.	标段名称 Name	规格 Specifications	功率要求（Wp） Power Requirement(Wp)	数量 Quantity	容量 Capacity(MW)
1	双面组件 Bifacial Mono PERC Module	166mm Or 182mm	166mm 组件：双面 455Wp 及以上，效率 20.9%及以上 166mm Modul: Bifacial Mono PERC Module ≥455Wp, Efficiency≥20.9% 182mm 组件： 双面 540Wp 及以上，效率 20.9%及以上 182mm Modul: Bifacial Mono PERC Module ≥540Wp, Efficiency≥20.9%		3.3

1.3 卖方应提供详细供货清单，清单中依次说明型号、数量、产地、生产厂家等内容。对于属于整套设备运行和施工所必需的部件，即使本合同未列出和/或数目不足，卖方仍须在执行合同时补足，且不发生费用问题。

1.3 The Seller shall provide a detailed supply list, in which the model, quantity, place of origin, manufacturer, etc. shall be described in turn. For the components necessary for the operation and construction of the whole set of equipment, even if they are not listed in the contract and / or the number is insufficient, the seller must make up for them during the execution of the contract without cost.

1.4 卖方在交付光伏组件同时应移交：每板光伏组件应有工厂测试报告，报告中必须标示

出该板光伏组件的产品参数表、产品 I-V 特性曲线图、产品缺陷检测图像等资料。

1.4 The Seller shall hand over the PV modules at the same time: each PV module shall have a factory test report, which must indicate the product parameter table, product I-V characteristic curve, product defect detection image and other data of the PV module.

1.5　卖方应在投标书中详细列出所供随机备品备件、专用工具清单。卖方应在投标书中详细列出推荐备品备件清单，并单独报价，供买方选择。

1.5 The Seller shall list the list of attached spare parts and special tools in the tender document. The Seller shall provide a detailed list of recommended spare parts in the tender document and quote separately for the buyer's selection.

1.6　卖方应向买方提供进口及外购设备的范围及清单，供买方审阅。买方有权决定进口或外购设备的范围。

1.6 The Seller shall provide the buyer with the scope and list of imported and purchased equipment for review. The buyer has the right to determine the scope of imported or purchased equipment.

1.7　投标书供货范围和设备配置如与招标书要求不一致，应在差异表中明确，否则认为完全满足招标书要求。

1.7 If the scope of supply and equipment configuration in the tender document are inconsistent with the requirements of the bidding document, they shall be specified in the difference table, otherwise they shall be deemed to fully meet the requirements of the bidding document.

1.8　如需要，卖方应提供用以说明其供货范围的相关图纸资料。

1.8　If necessary, the Seller shall provide relevant drawings and data to explain its scope of supply.

2. 删除。Deleted

3. 供货范围 Scope of Supply

3.1 供货范围包括整套光伏电池组件及组件间连接电缆和电连接器。

3.1 The scope of supply includes a complete set of photovoltaic cell modules and connecting cables and electrical connectors between modules.

3.2 用于安装、调试、试运行、运行所供设备维修的专用工具及材料等。

3.2 Special tools and materials for installation, commissioning, trial operation and maintenance of equipment provided.

3.3 用于质保期的随机备品备件（具体数量）和消耗品（质保责任期内投标人对所有消耗掉的随机备品备件和易耗部件全面补足）。提供推荐的清单和单价。

3.3 random spare parts (specific quantity) and consumables used in the warranty period (the tenderer shall fully supplement all consumed random spare parts and consumable parts within the warranty period). Provide recommended list and unit price.

3.4 提供组件设备施工安装、调试、运行、维护所需要的全部技术文件资料、图纸。

3.4 provide all technical documents and drawings required for construction, installation, commissioning, operation and maintenance of component equipment.

3.5 提供光伏电池组件产品参数表、产品 I-V 特性曲线图、产品缺陷检测图像等资料。

3.5 provide PV module product parameter table, product I-V characteristic curve, product defect detection image and other data.

3.6 提供光伏电池组件安装指导、调试等技术服务，以及运行人员的培训、质保期内的计划和非计划维修和保养等。

3.6 provide technical services such as installation guidance and commissioning of photovoltaic cell modules, as well as training of operating personnel, planned and unplanned repair and maintenance within the warranty period.

三、技术资料及交付进度 Technical Data and Delivery Schedule

1 一般要求 General Requirements

1.1 卖方提供的资料应使用国际单位制，语言为英文。如有第三方资料非英文应翻译为英文。

1.1 The information provided by the seller shall be in the International system of units and in English. Any third party information not in English shall be translated into English.

1.2 资料的组织结构清晰、逻辑性强。资料内容要正确、准确、一致、清晰完整，满足工程要求。

1.2The organizational structure of the data is clear and highly logical.The data content should be correct, accurate, consistent, clear and complete, to meet the engineering requirements.

1.3 删除。Deleted

1.4 对于其它没有列入合同技术资料清单，却是工程所必需的文件和资料，一经发现，卖方也应及时免费提供。

1.4For other documents and materials that are not included in the contract technical data list but are necessary for the project, the Seller shall also provide them free of charge once found.

1.5 卖方提供的图纸应清晰，不得提供缩微复印的图纸。

1.5The drawings provided by the Seller shall be clear, and the microcopy drawings shall not be provided.

1.6 卖方提供资料的电子版本应为当时通用的成熟版本。

1.6The electronic version of the information provided by the Seller shall be the mature version commonly used at the time.

2 文件资料和图纸要求 Documentation and Drawing Requirements

投标人提供的资料应包括：太阳能光伏组件设计文件、产品质量保证、全部交付产品的电性能参数和组件缺陷图像资料以及控制文件、储运指导、安装文件、运行和维护手册、光

伏组件的备品备件清单、培训计划和培训材料、调试计划、试验和调试报告、竣工资料、计划内的维护报告和的特别维修报告、结束时的最终检查报告。所有的图纸都应是标准尺寸的，如：A0、A1、A2、A3 或 A4，并提供电子文档，电子文档应为 WORD2003、EXCEL、AUTOCAD 版图纸。

Information provided by the Bidder shall include: solar photovoltaic module design documents, product quality assurance, electrical performance parameters and module defect image data, control documents, storage and transportation guidance, installation documents, operation and maintenance manual, spare parts list of photovoltaic modules, training plan and training materials, commissioning plan, commissioning and commissioning report, completion data, planned maintenance report and special maintenance report, final inspection report at completion.All drawings shall be of standard size, such as A0, A1, A2, A3, or A4, and shall provide electronic documents, which shall be WORD2003, EXCEL, AUTOCAD paper.

3 投标阶段应提供技术资料 Technical data shall be provided at the bidding stage

投标人应与投标文件一起提交如下文件：

The Bidder shall submit the following documents together with the bid documents:

（一）光伏高效组件的说明 Description of photovoltaic energy-efficient modules

（二）光伏高效组件性能参数文件 Photovoltaic highly efficient module performance parameter file

（三）材料及零部件相关的文件 Documents related to materials and components

（四）主要备品备件、工具和消耗品清单 List of major spare parts, tools, and consumables

（五）安装、临时储存、施工场地等要求 Installation, temporary storage, construction site requirements, etc

（六）由国家认定的第三方检测或认证机构提供的试验报告。必须包括：机械载荷试验；冰雹试验；绝缘测试；湿漏电试验；热循环试验；湿-冻试验；湿-热试验；室外暴露试验；紫外试验；热斑耐久试验。

Test report provided by a third-party testing or certification body recognized by the state.It must include: mechanical load test; hail test; insulation test; wet leakage test; thermal cycle test; wet-freezing test; wet-heat test; outdoor exposure test; ultraviolet test; hot spot durability test.

4 合同实施应提供的文件（4 套文件以及 2 套电子文档）

Documents to be provided (4 sets of documents and 2 sets of electronic documents)

合同实施过程中，卖方应提交如下：

太阳能光伏组件设计、制造说明和手册，包括生产商、特性、型号和数量。

During the implementation of the Contract, the Seller shall submit the following:

Solar PV module design, manufacturing instructions and manuals, including manufacturer, characteristics, model and quantity.

5 储运指导（4 套文件）Storage and transportation guidance (4 sets of documents)

应提交在现场搬运、贮存和保管设备的详细说明文件，并附有图解、图纸和重量标示，应包括：

Detailed instructions of handling, storage and storage equipment on site shall be submitted with drawings, drawings and weight marks and shall include:

5.1.1 各部件要求户外、户内、温度或湿度控制、长期或短期贮存的专门标志；

5.1.1 Special marks for outdoor, indoor, temperature or humidity control, long-term or short-term storage;

5.1.2 户外、户内、温度或湿度控制、长期或短期贮存的空间要求；

5.1.2 Space requirements for outdoor, indoor, temperature or humidity control, long-term or short-term storage;

5.1.3 设备卸货、放置、叠放和堆放所要遵守的程序；

5.1.3 Procedures to be followed for unloading, placing, stacking and stacking of equipment;

5.1.4 长期和短期维护程序，包括户外贮存部件推荐的最长存期。

5.1.4 Long-term and short-term maintenance procedures, including the recommended maximum storage duration for outdoor storage components.

6 安装文件（8 套文件以及 2 套电子文档）Installation files (8 sets of files and 2 sets of electronic documents)

安装文件应提供设备安装所需的所有资料，如：（不仅限于此）

Installation documents shall provide all information required for installation of equipment such as: (not limited)

6.1.1 安装图纸和技术要求，安装步骤说明及安装材料清单；

6.1.1 Installation drawings and technical requirements, installation steps instructions and installation materials list;

6.1.2 安装工具，分专用工具和一般工具；

6.1.2 Installation tools, including special tools and general tools;

6.1.3 电缆布置图，包括端子图和外部连接图；

6.1.3 Cable layout drawing, including the terminal diagram and the external connection diagram;

6.1.4 设备安全预防措施。

6.1.4 Equipment safety and preventive measures.

7 随机备品备件清单（2套文件以及2套电子文档）List of random spare parts (2 sets of files and 2 sets of electronic documents)

投标人应提供详细的备品备件清单，并给出订货时必需的数据，包括规格和价格。另外，还应提供一份能从独立的供应点获得的备品备件清单和/或消耗品清单，清单应提供直接购买所需的足够信息。

The Bidder shall provide a detailed list of spare parts and give the data necessary for ordering, including specifications and prices.Also, provide a list of spare parts and / or consumables available from separate points of supply, which shall provide sufficient information required for direct purchase.

8 培训计划和培训材料 Training Program and Training Materials

投标人应提供详细的培训计划，包括时间表和内容，作为草案供业主批复，并作为培训条款的最终版本。另外，适当的培训材料，如：手册、图纸和散发材料等应在培训过程中提供。

The Bidder shall provide a detailed training plan, including the schedule and contents, as a draft for the Employer and as a final version of the training terms.In addition, appropriate training materials such as manuals, drawings and distribution materials shall be provided during the training process.

9 试验和检测报告（4 套文件）Test report (4 sets of documents)

依照 IEC-61215 标准的要求，提供有效的型式试验报告、例行试验报告。所有的试验和调试记录和报告都应编写成试验和检测报告，并提交业主。

Provide valid type test reports and routine test reports according to IEC-61215 standard.All test and commissioning records and reports shall be prepared into test and test reports and submitted to the Employer.

10 删除 Deleted

11 资料和图纸交付时间 Data and Drawings for Delivery Time

11.1 设计资料和安装详图及说明应在合同签订后一周内提交。

11.1 Design data and installation details and instructions shall be submitted within one week of the contract.

11.2 每批货随机提交质量保证和组件缺陷测试图像资料、电性能参数资料以及质量控制文件。

11.2 Submit quality assurance and component defect test images, electrical performance parameter data and quality control documents randomly for each batch.

四、设备监造（工厂检验/试验）Equipment Construction Supervision (Factory Inspection / Test)

1. 概述 Summary

1.1 本章用于合同执行期间对卖方所提供的设备（包括对分包、外购材料）进行工厂检验/试验、监造，确保卖方所提供的设备符合技术规范规定的要求。

1.1 This Chapter is used to conduct factory inspection / testing and supervision of the equipment provided by the Seller (including subcontracting and purchased materials) during the execution of the Contract to ensure that the equipment provided by the Seller meets the requirements stipulated in the technical specifications.

2. 工厂检验 Factory Inspection

工厂检验是质量控制的一个重要组成部分。卖方必须严格进行厂内各生产环节的检验和

试验。卖方提供的合同设备须签发质量证明、检验记录和测试报告，并且作为交货时质量证明文件的组成部分。

卖方检验的范围包括原材料和元器件的进厂，零部件的加工、组装全过程的检验和试验，直至出厂。

卖方检验的结果要满足技术规范书的要求，如有不符之处或达不到标准要求，卖方采取措施处理直至满足要求。如果在原组件规格型号上有设计变更，卖方须将变更方案实施前书面提供买方，并书面说明变更的原因可能达到的效果及投入商业运行后可能造成的后果。卖方发生重大质量问题时将情况及时通知买方。

Factory inspection is an important part of quality control.The Seller must strictly conduct the inspection and test of each production link in the factory.The contract equipment provided by the Seller shall be issued with quality certificates, inspection records and test report, and shall be an integral part of the quality certificate documents at the time of delivery.

The scope of the Seller's inspection includes the entry of raw materials and components, and the inspection and testing of the processing and assembly of parts until the factory.

The inspection results of the Seller shall meet the requirements of the technical specification. If there is any inconsistency or failure to meet the standard requirements, the Seller shall take measures to deal with them until the requirements are met.If there is any design change in the original component specifications, the Seller shall provide the Buyer in writing before the implementation of the change plan, and explain in writing the possible effects of the change and the possible consequences after being put into commercial operation.The Seller shall timely inform the Buyer of the occurrence of major quality problems.

3. 设备监造 Equipment Supervision

3.1 一般要求 General Requirements

买方将对卖方的合同设备进行监造。买方的监造并不免除卖方对设备制造质量任何所应负的责任。

The Buyer shall supervise the Seller's Contract equipment. The manufacturing supervision of the Buyer does not exempt the Seller from any responsibility for the manufacturing quality of the equipment.

设备监造买方派人到现场参加，文件见证和现场见证资料在见证前 30 天内提供给买方

监造代表。

The Buyer shall send personnel to the site, and the documents and site witness materials shall be provided to the manufacturing supervision representative within 30 days before the witness.

卖方在产品投料前 1 周提供生产计划，每月第 1 周内将生产计划和检验试验计划书面通知监造代表。

The Seller shall provide the production plan one week before the commissioning and notify the production plan and inspection plan in writing within the first week of each month.

买方监造代表有权查阅与监造设备有关的技术资料，卖方积极配合并提供相关资料的复印件。

The Buyer shall have the right to consult the technical data related to the supervision equipment, and the Seller shall actively cooperate and provide copies of the relevant materials.

合同设备的重要部件和专用部件未经买方允许，卖方不得擅自调换。

The Seller shall not replace the important parts and special parts of the contract equipment without the buyer's permission.

买方监造代表有权随时到车间检查设备质量生产情况。

The Buyer's manufacturing supervision representative has the right to go to the workshop to check the quality of equipment at any time.

卖方给买方监造代表提供专用办公室及通讯、生活方便。

The Seller shall provide special office and communication and living convenience.

卖方在现场见证前 10 天以书面形式通知买方监造代表。

The Seller shall notify the Buyer's supervision representative in writing 10 days before the site witness.

3.2 删除。Deleted

3.3 监造方式 Supervision Method

文件见证、现场见证和停工待检，即 R 点、W 点、H 点。

R 点：卖方提供检验、试验记录及报告的项目，即文件见证。

W 点：买方监造代表参加的检验或试验项目，检验或试验后卖方提供检验或试验记录，即现场见证。

H 点：停工待检。卖方在进行至该点时停工等待买方监造代表参加的检验或试验项目，检验或试验后卖方提供检验及试验记录。

买方接到质量见证通知后,及时派代表到卖方参加现场见证。如果买方代表不能按期参加，买方在接到卖方书面通知 7 日内不回复卖方，则 W 点自动转为 R 点，但 H 点没有买方书面通知同意转为 R 点时，卖方不转入下道工序，与买方联系商定更改见证日期，如果更改时间后，买方仍未按时到达，则 H 点自动转为 R 点。

每次监造内容完成后，卖方和买方监造代表均在见证表上履行签字手续。签字手续一式 3 份，交买方监造代表 1 份。

Document witness, site witness and shutdown for inspection, namely points R, W and H.

Point R: the items of inspection, test records and reports provided by the Seller, namely the document witness.

Point W: For the inspection or test items attended by the Buyer's manufacturing supervision representative, the Seller shall provide the inspection or test records, namely the site witness.

Point H: Stop for inspection.The Seller shall stop waiting for the inspection or test items of the Buyer, and the Seller shall provide the inspection and test records after the inspection or test.

After receiving the quality witness notice, the Buyer shall timely send representatives to the Seller to attend the site witness.If the buyer's representative cannot attend on schedule, the buyer does not reply to the seller within 7 days after receiving the seller's written notice, the W point to R point, but point H without the buyer agreed to R point, the seller does not turn to the next process, contact the buyer to change the witness date, if the change time, the buyer still did not arrive on time, the H point automatically turn to the R point.

After the completion of each supervision content, the seller and the buyer's supervision representative shall perform the signature procedures on the witness form.The signature procedures are made in triplicate, with one copy submitted to the buyer's manufacturing supervision representative.

3.4 监造内容 Supervision of Manufacturing Content

投标人应根据上述要求结合设备的实际情况，提出监造内容清单。

The bidder shall submit a list of construction supervision contents according to the above requirements and the actual conditions of the equipment.

序号 order	监造部件 Supervised parts	编号 number	见证项目 project	见证方式 Witness way			备注 remarks
				H	W	R	
1	设备控制 device control	1-1-R	安全测试设备台账 Safety test equipment ledger			√	
		1-2-R	主要设备的校准证书 Calibration certificate for the main equipment			√	
		1-3-R	内部校准方法和记录 Internal calibration methods and records			√	
		1-4-R	设备主要参数现场校验 Field verification of the main parameters of the equipment		√	√	
2	人员、环境 Personnel, environment	2-1-R	人员资质 Personnel qualification			√	
		2-2-W	人员防护 Personnel protection		√		
		2-3-W	生产现场环境条件 Environmental conditions of the production site		√		
3	工艺 technology	3-1-R	审查工艺文件、检查记录等 Review the process documents, inspection records, etc			√	
		3-2-W/R	焊接工序 Welding process		√	√	操作人员严格按照工艺要求执行、并查看检验记录 The operator shall strictly follow the process requirements and check the inspection records
		3-3-W/R	层压工序 Laminating process		√	√	
		3-4-W/R	其它工序 Other processes		√	√	
4	原材料 raw material	4-1-R	原材料相关检查报告资料 Inspection reports related to raw materials			√	
4 .1	电池片 Battery	4-2-W	外观检查 observational check		√	√	目测：裂纹、破碎、针孔、崩边、缺角、主栅缺失、细栅断栅、银浆玷污、助焊剂印、互连条偏离、主栅与互连条脱焊 Visual inspection: crack, crushing, pinhole, broken

							edge, missing main gate, fine gate failure, silver paste stain, auxiliary printing, interconnection strip deviation, main gate and interconnection strip dewelding
4.2	汇流带与互连条 Exchange belt and interconnection strip	4-3-W	外观检查 observational check		√	√	目测：连接处、间距、浸润 Visual inspection: connection, spacing, infiltration
4.3	表面玻璃 clock glass	4-4-W	外观检查 observational check		√	√	目测。异物、气泡、划伤等 visualization.Foreign bodies, air bubbles, scratches, etc
4.4	铝边框 Aluminum frame	4-5-W	外观检查 observational check		√	√	划痕、尺寸偏差、边框凹槽内硅胶填量等 Scratch, size deviation, silicone filling in the frame groove, etc
4.5	EVA 和背板 EVA and backplane	4-6-W	外观检查 observational check		√	√	断胶，背板孔洞、撕裂、划伤等 Broken glue, backplane holes, tears, scratches, etc
5	组件表面 Component surface	5-1-W/R	表面污染 surface contamination		√	√	目测 visualization
		5-2-W/R	色差 colour aberration		√	√	目测 visualization
6	接线盒和输出电缆 Junction box and output cable	6-1-R	连接器 junctor		√	√	目测 visualization
7	EL 测试 EL test	7-1-W/R	组件电池片异常检测 Abnormal detection of the assembly cell sheet		√	√	将组件样品放在 EL 测试仪中进行测试，通过电脑图像观察组件电池片是否存在异常情况 Put the component sample in the EL tester and observe the component battery through the computer image
8	绝缘性能试验 Insulation	8-1-W/R	绝缘测试仪测试 Insulation tester test		√	√	

	performance test						
9	湿漏电流性能试验 Wet-leakage current performance test	9-1-W/R	测试绝缘电阻 Test insulation resistance			√	型式试验 type approval test
10	环境试验 environmental test	10-1-R	室外曝晒试验 Outdoor exposure test			√	型式试验 type approval test
		10-2-R	引线端强度试验 Lead-end strength test			√	
		10-3-R	热斑耐久试验 Hot spot durability test			√	
		10-4-R	热循环试验 thermal cycling test			√	
		10-5-R	紫外预处理试验 The UV pretreatment test			√	
		10-6-R	湿-冻试验、湿-热试验 Wet-freezing test, wet-heat test			√	
		10-7-R	机械载荷试验 Mechanical load test			√	
		10-8-R	冰雹冲击试验 Hail impact test			√	
		10-9-R	旁路二极管热性能试验 Thermal performance test of bypass diodes			√	
11	包装发运 Packaging shipping	11-1-W	检查包装及标识 Check the packaging and identification		√		
注：同一工程的同一机型抽检 1%进行现场见证，其余为文件见证；故表中 W、R 点并存。 Note: 1% of the same model of the same project is witnessed on site, and the rest are document witness; so the W and R points coexist in the table.							

4. 设备抽样复验 Sampling and Re-inspection of Equipment

光伏电池组件设备抽样复验即抽查检验是在合格成品中随机抽取不低于 0.3%的样品，在卖方实验室进行复查检验，但需要接受买方代表对试验设备的校准和对试验资质的查验。复查检验内容一般为缺陷检查及电性能测试和老化试验，其中老化试验每个生产基地抽取 10 块组件进行相关试验等。抽查检验费用由卖方承担，卖方需提供抽查检验所需的人员、技术和设备配合。

The sampling reinspection of photovoltaic cell module equipment is to randomly select no less than 0.3% of the qualified finished products and recheck them in the seller's laboratory, but they need to accept the calibration of the test equipment and the test qualification by the buyer's representative.The review inspection content is generally defect inspection, electrical performance test and aging test, in which 10 components are selected from each production base for relevant tests.The sampling inspection cost shall be borne by the Seller, who shall provide the personnel, technology and equipment cooperation required for the sampling inspection.

4.1 卖方实验室能力 Seller Laboratory Capability

投标人根据自备实验室的试验能力和试验要求提供抽检试验清单

The bidder shall provide the sampling test list according to the test capacity and test requirements of the self-provided laboratory

5. 投标人实施的试验和检验 Test and Inspection Performed by the Bidder

投标人或制造厂家应当按认定的质量保证程序制造合同设备，并根据内部试验程序实施规定的试验和检验，试验程序应当符合相应的标准。在实施之前，应当向业主或业主委托方提交试验和质量保证程序。投标人应当提供相应的质量保证和控制文件，包括检验记录，型号测试和/或试验证书。投标人应当在设备出厂之前向业主或业主委托方提交质量保证和控制文件。除了质量保证核对清单和试验证书之外，文件中还应包括设备主要部件的详细规范。

The bidder or the manufacturer shall manufacture the contract equipment in accordance with the identified quality assurance procedures, and carry out the prescribed tests and tests in accordance with the internal test procedures, which shall meet the corresponding standards.Test and quality assurance procedures shall be submitted to the Owner or the Client before implementation.The Bidder shall provide relevant quality assurance and control documents, including inspection records, model testing and / or test certificates.The bidder shall submit quality assurance and control documents to the Owner or the entrusting party before the equipment leaves the factory.In addition to the quality assurance checklist and test certificate, the document shall include detailed specifications of the main components of the equipment.

6. 运输和开箱检验 Transportation and Unpacking Inspection

6.1 卖方在开箱检验 10 天之前应通知业主或业主委托方预计到货的时间。双方按商定的计划检验时间进行检验。

6.1 The Seller shall notify the Owner or the Client of the expected arrival time 10 days before the unpacking inspection.Both parties shall conduct the inspection according to the agreed scheduled inspection time.

如果在运输和/或开箱检验过程中发现设备短缺，缺陷和损坏，或其他不符合交付设备合同的情况，检验证书应被认作是业主方向投标人对其负责的部分提出索赔的有效证明。

In the event of equipment shortage, defects and damage, or other noncompliance with the contract of equipment during transportation and / or unpacking inspection, the inspection certificate shall be considered as a valid proof of the claim against the Bidder.

6.2 验收检验 Acceptance Inspection

验收检验按随机地抽取，抽样过程需在买卖双方参与情况下进行。

Acceptance inspection shall be selected randomly, and the sampling process shall be carried out with the participation of both buyer and Seller.

6.3 检验方法 Method of Calibration

现场抽检 Site Sampling

业主单位组织检测机构、监理、组件安装单位和组件供货企业共同组成现场验收小组。

The Owner shall organize the testing organization, supervision, component installation unit and component supplier to jointly form an on-site acceptance team.

6.3.1 检测依据 Detection Basis

IEC 61730.1 光伏组件安全认证第 1 部分：光伏组件的安全性构造要求。

IEC 61215 地面用晶体硅光伏组件设计鉴定和定型

IEC 61730.1 Safety certification of photovoltaic modules-Part 1: safety construction requirements of photovoltaic modules.

IEC 61215 ground use crystal silicon photovoltaic module design identification and finalization

6.3.2 删除。Deleted

6.3.3 抽样比例 Sampling Proportion

为保障测试的准确性，更好的表征组件的质量情况，本要求优先选择移动检测平台（车）对到货组件进行检测。在不具备移动检测平台（车）检测的情况下，采用便携式设备进行检测。本要求参考国家标准 GB/T 2828.1，结合电站现场的组件到货情况及测试方法，对到货组件采取随机抽样，抽样比例如下：

In order to ensure the accuracy of the test and better characterize the quality of the components, this requirement prefers the mobile testing platform (vehicle) to test the incoming components.In the case of no mobile detection platform (vehicle) detection, the portable equipment is used for testing.This requirement refers to the national standard GB / T 2828.1, combined with the arrival situation and test method of the power station site, take random sampling of the arrival components, the sampling proportion is as follows:

(1) 外包装检查以及到货组件材料符合性检验采取 100%抽样；

Outer packaging inspection and conformity inspection of arrived component material take 100% sampling;

(2) 采用移动检测平台（车）测试方法时，其余抽检项目（外观、功率等）的抽检比例参照标准 ISO2859-1-1999 的相关规定执行，抽检比例不低于 1%。

When the testing method of mobile testing platform (vehicle) is adopted, the sampling ratio of other sampling items (appearance, power, etc.) shall be implemented according to the relevant provisions of standard ISO2859-1-1999, and the sampling ratio shall not be less than 1%.

(3) 采用便携式 IV 测试方法时，其余抽检项目（外观、功率等）的抽检比例参照标准 ISO2859-1-1999 的相关规定执行，抽检比例为 0.5%；

When the portable IV test method is adopted, the sampling proportion of other sampling items (appearance, power, etc.) shall be implemented according to the relevant provisions of standard ISO2859-1-1999, and the sampling ratio is 0.5%;

备注：每个抽样批抽样采用随机抽取，每车在不同位置随机选取 4 个包装箱，从中抽取；

Note: Each sampling batch is randomly selected, and each vehicle randomly selects 4 packaging boxes in different locations, from which they are selected;

6.3.4 检测设备要求 Test equipment requirements

序号 No.	设备名称 device name	测试内容 test items	测试条件要求 Test condition requirements	设备主要技术要求 Main technical requirements of the equipment	备注 remarks
1	组件功率测试仪 Component power tester	测试组件功率特性 Test the component power characteristics	25℃±2℃	采用 3A 光源 测试重复性：≤0.5% A 3A light source was used Test repeatability：≤0.5%	适用移动检测车方案 Applicable to the mobile detection vehicle scheme
2	EL 测试仪 EL tester	测试组件隐裂特性 Test the hidden crack characteristics of the components	暗室 darkroom	像素 pixel：≥2144 x 1414	适用移动检测车方案 Applicable to the mobile detection vehicle scheme
3	便携式红外光谱仪 Portable infrared spectrometer	测试组件背板材料特性 Test the characteristics of the assembly backplane material	无 no	无 no	两个方案均适用 Both schemes are applicable
4	标准组件 Standard components	定期标定组件功率测试仪 Calibrate the assembly power tester regularly	25℃±2℃	专业计量机构计量，含计量报告 Measurement of a professional measurement organization, including a measurement report	适用移动检测车方案 Applicable to the mobile detection vehicle scheme
5	光谱仪 spectrograph	测试功率测试仪的光谱特性是否满足 3A 光源要求 Test whether the spectral characteristics of the power tester meet the requirements of the 3A light source	25℃±2℃	测试波长 Test wavelength：280nm—1100nm	适用移动检测车方案 Applicable to the mobile detection vehicle scheme
6	小型标准组件 Small standard components	测试功率测试仪的均匀性是否满足 3A 光源要求 Test whether the uniformity of the power tester meets the requirements of the 3A	25℃±2℃	专业计量机构计量，含计量报告 Measurement of a professional measurement organization, including a measurement report	适用移动检测车方案 Applicable to the mobile detection vehicle scheme

		light source			
7	便携式 IV 测试仪 Portable IV tester	测试组件功率特性 Test the component power characteristics	辐照大于 700W/㎡；且辐照稳定 Irradiation is greater than 700W / ㎡; and the irradiation is stable	电流 current：0-10A 电压 voltage：0-100V	适用便携式测试方案 Portable test scheme is applicable
8	高精度辐照计 High precision irradiation meter	配合便携式 IV 测试仪使用 Use with a portable IV tester	无 no	辐照测试误差小于 2% The irradiation test error was less than 2%	适用便携式测试方案 Portable test scheme is applicable
9	红外测温仪 infrared radiation thermometer	测试组件背板温度 Test the assembly backplane temperature	无 no	可同时测试多点温度，并得到平均值、最大值等参数 The multipoint temperature can be tested simultaneously, and the average and maximum parameters are obtained	两个方案均适用 Both schemes are applicable
12	直尺、卡尺等 ruler, caliper, etc	检验组件外观特性 Check the component appearance properties	照明大于 500 流明 Lighting is greater than 500 lumens	无 no	两个方案均适用 Both schemes are applicable
13	照相机 camera				

6.3.5 检测组织机构 Test Organization

业主单位组织检测机构、监理、组件安装单位和组件供货企业共同组成现场验收小组。

The Owner shall organize the testing organization, supervision, component installation unit and component supplier to jointly form an on-site acceptance team.

6.3.6 检测内容 Test Content

检测小组对组件进行开箱检查，并对组件进行性能验收测试，具体检测内容如下：

The inspection team unpacking the components and conducts the performance acceptance test on the components. The specific test contents are as follows:

（1）外包装检查 Outer packing inspection;；

（2）资料符合性检查，包括生产方提供生产组件的原辅材料清单、组件的标称功率、条码、电性能检测结果记录、检验合格证、采用的标准组件以及功率测试仪设备校验记录等；

(2) Data compliance inspection, including the list of raw and auxiliary materials of the production components, the nominal power, bar code, electrical performance test results record, inspection certificate, standard components and power tester equipment verification records;

（3）组件外观特性及原材料特性检验；

(3) Inspection of component appearance characteristics and raw material characteristics;

（4）组件功率特性检验；Component power characteristic test;

（5）组件隐裂特性检验；Inspection of component hidden crack characteristics;

6.3.7 检验流程 Inspection Process

（1）检查组件外包装；Check the outer packaging of the components;

（2）根据合同清点批次现场具体数量、检查设计规格等；

(2) Check the specific quantity on site and check design specifications of the batch according to the contract;

（3）审核供应商文件记录（原材料采购、制作记录、测试记录等）和资质证明；

(3) Review the supplier documents and records (raw material procurement, production records, test records, etc.) and qualification certificates;

（4）进行开箱抽检，抽检要求按照 3.(2)-3.(3)的要求，随机抽取；

(4) Carry out open-box sampling inspection, and the sampling inspection requirements shall be randomly selected according to the requirements of 3. (2) -3. (3);

（5）对产品的外观、关键性能等进行现场测试，并根据抽检产品的合格率做出是否正常交付、产品送第三方实验室检测或产品不合格的判定。

(5) Conduct on-site tests on the appearance and key performance of the products, and determine whether the products are delivered normally, the products are tested or the products are unqualified.

6.3.8 检验方法及检验标准 Inspection Method and Inspection Standards

（1）外包装检查 Packaging inspection

检验方式: 全检。Inspection method: full inspection.

检验方法：目视。Inspection method: Visual inspection.

检验内容：Inspection content:

1）外包装质量，箱体印刷字迹等情况；Outer packaging quality, box printing and handwriting, etc.;

2）标签粘贴情况。Label paste situation.

合格判据 Qualified judgment：

成箱组件在运输车辆上无明显偏移、倾斜、撞击和雨淋；

外包装良好，无破损，印刷字迹清晰；条形码标签齐全，字迹清晰。

The ned components have no obvious deviation, tilt, impact and rain on the transport vehicle; Good outer packaging, no damage, clear printing writing; complete barcode labels, clear writing.

（2）清点批次现场具体数量、检查设计规格

(2) Check the specific quantity of batches on site and check the design specifications

检验方式：全检。Inspection method: full inspection.

检验方法：对照装箱单，清点批次现场具体数量、检查设计规格。

Inspection method: check the specific quantity of batches on site and check the design specifications against the packing list.

检验设备：无。Inspection equipment: No.

检验内容：组件数量及设计规格。

Inspection content: the quantity of the components and the design specifications.

合格判据：组件数量齐全，设计规格和尺寸满足合同要求。

Qualification criteria: a complete number of components, design specifications and dimensions to meet the contract requirements.

（3）审核批次供应商文件记录 Review the batch of supplier document records

检验方式：全检。Inspection method: full inspection.

检验方法：核对。Inspection method: check it.

检验内容 Inspection content：

1）原辅材料清单、入厂检验合格记录等；

2）组件成品检验测试记录；

3）制作工艺记录，并对原始的关键性能测试数据进行复查。

1) List of raw and auxiliary materials, incoming inspection qualification records, etc.;

2) Inspection and test record of finished component products;

3) Make process records and review the original key performance test data.

合格判据 Qualification criteria：

1）原辅材料清单满足合同规定厂家及型号，且入厂检验合格；

2）组件出厂前成品检验测试数据齐全，且检验合格；

3）组件生产过程中的检验记录齐全，且满足标准要求。

1) The list of raw and auxiliary materials shall meet the manufacturer and model specified in the contract, and pass the factory inspection;

2) The inspection and test data of finished products before leaving the factory are complete and pass the inspection;

3) The inspection records in the component production process are complete and meet the standard requirements.

（4）组件外观检验 Component appearance inspection

检验方式：抽检，抽样方式和抽样数量参照 3.(2)、3.(3)的要求。

Inspection method: sampling inspection, sampling method and sampling quantity refer to the requirements of 3. (2) and 3. (3).

检验方法：目视检查。Inspection method: Visual inspection.

检验设备：照相机。Inspection equipment: the camera.

检验内容：组件有无外观缺损，玻璃、铝合金框、背板、接线盒（包括电缆，接头）和硅胶，串焊、叠层排布情况等。

Inspection content: whether the component has appearance defects, glass, aluminum alloy frame, backplane, junction box (including cable, joint) and silicone, string welding, laminated arrangement, etc.

合格判据 Qualified judgment：

1) 外表面干净，边框表面无明显划伤；

2）无破碎、裂纹、针孔的单体电池；

3) 电池片崩边、缺角符合标准（IEC61215）要求；

4) 组件内的电池片之间、两边电池片与玻璃边缘之间无明显位移；

5) 组件内无毛发、虫子等杂物；

6) 组件内气泡符合标准（IEC61215）要求；

7) 背板无明显折皱、凹坑和刮痕；

8) 单块组件内电池片之间无明显色差和花片。

1) The outer surface is clean, and there are no obvious scratches on the border surface;

2) Single battery without breakage, crack and pinhole;

3) The broken edge and missing Angle of the battery meet the standard (IEC61215) requirements;

4) There is no obvious displacement between the batteries in the assembly, between both sides and the glass edge;

5) No hair, bugs and other debris in the components;

6) The air bubbles in the assembly meet the standard (IEC61215) requirements;

7) No obvious wrinkles, pits and scratches on the back plane;

8) There is no obvious color difference and flower between cells in a single assembly.

（5）组件原材料特性检测 Testing of component raw materials

检验方式：抽检，抽样方式和抽样数量参照 3.(2)、3.（3)要求。

Inspection method: sampling inspection, sampling method and sampling quantity refer to 3. (2) and 3. (3) requirements.

检验方法：设备实际测试。Inspection method: actual equipment test.

检验设备：便携式红外光谱仪。Inspection equipment: Portable infrared spectrometer.

检验内容：组件背板原材料材质以及背板光折射度。

Inspection content: raw material of component backplane and optical refractor of backplane.

合格判据：满足合同要求的背板材质。

Qualification criterion: the backplane material that meets the contract requirements.

（6）组件功率特性测试 Component power characteristic test

1）采用移动检测平台（车）测试 Use the mobile detection platform (vehicle) to test

检验方式：抽检，抽样方式和抽样数量参照 3.(2)、3.(3)的要求。

Inspection method: sampling inspection, sampling method and sampling quantity refer to the requirements of 3. (2) and 3. (3).

检验方法：设备实际测试。Inspection method: actual equipment test.

检验设备：组件功率测试仪。Inspection equipment: the component power tester.

检验内容：组件的功率特性。Inspection content: the power characteristics of the components.

合格判据 Qualified judgment：

①所抽组件功率的 I-V 特性曲线平滑、无明显台阶；

②每块组件的功率为正偏差；

The I-V characteristic curve of the component power extracted by ① is smooth and without obvious steps;

The ② power per component is a positive deviation;

备注：记录最大功率以及工作电流的复测值，并比较分析与出厂检测原始数据的偏差。

Note: Record the retest value of the maximum power and the working current, and compare and analyze the deviation from the original data of the factory test.

2）便携式测试方法 Portable test method

检验方式：抽检，抽样方式和抽样数量参照 3.(3)、3.(3)要求。

Inspection method: sampling inspection, sampling method and sampling quantity refer to 3. (3), 3. (3) requirements.

检验方法：设备实际测试 Inspection method: actual equipment test

检验设备：便携式 IV 测试仪 Inspection equipment: Portable IV tester

检验内容：组件的功率特性。Inspection content: the power characteristics of the components.

合格判据 Qualified judgment：

①所抽组件功率的 I-V 特性曲线平滑、无明显台阶；

②组件功率测试值与出厂检测原始数据的负偏差不超过 2%。

The I-V characteristic curve of the component power extracted by ① is smooth and without obvious steps;

The negative deviation between the ② component power test value and the original factory test data shall not exceed 2%.

备注：温度系数以产品认证报告中的数据为准。

Note: The temperature coefficient is subject to the data in the product certification report.

（7）组件 EL 特性测试 Component EL property test

检验方式：抽检，抽样方式和抽样数量参照 3.(2)-3.(3)要求。

Inspection method: sampling inspection, sampling method and sampling quantity refer to the 3. (2) -3. (3) requirements.

检验方法：设备实际测试。Inspection method: actual equipment test.

检验设备：EL 测试仪。Inspection equipment: EL Tester.

检验内容：组件是否存在隐裂。Inspection content: whether the component has a hidden crack.

合格判据 Qualified judgment：

1) 太阳电池不允许出现碎片及黑心片或黑斑片；

2) 太阳电池组件不允许出现局部短路或断路的情况；

3) 线状隐裂纹及其延长线长度≤电池原片边长的 10%，同一块光伏组件线状隐裂电池数量≤电池数量的 2%；十字隐裂中较长的隐裂长度≤电池原片边长的 5%，同一块光伏组件十字隐裂电池数量≤电池数量的 2%；片状隐裂：不允许；

4) 灰度值相差 15%以下的明暗片不计；灰度值相差 15%～30%的明暗片≤电池数量的 10%；灰度值相差 30%～50%的明暗片≤电池数量的 5%；不允许灰度值相差 50%以上的明暗片。

1) Do not allow debris or black heart pieces or black spots in solar cells;

2) The solar cell assembly is not allowed to appear in the local short circuit or open circuit situation;

3) 10% of the side length of the cell, 2% of the number of the cell, 2% of the cell number of cells; sheet hidden crack: not allowed;

4) No shades of less than 15%; 10% of number of cells of 15% to 30%; 5% of 30% to 50%; and shades with differences of more than 50% are not allowed.

6.3.9 组件批次判定标准 Component batch determination criteria

对到货组件批次产品的外包装、文件检查、组件外观以及关键性能现场测试结果进行整理分析，根据抽检产品的合格率做出是否正常交付、产品送第三方实验室检测或产品不合格的判定。具体判定依据如下：

Organize and analyze the outer packaging, document inspection, component appearance and key performance field test results of the batch of the incoming component products, and determine

whether the products are being delivered normally, the products are sent to a third-party laboratory for testing or the products are unqualified according to the qualified rate of the sampled products.The specific judgment basis is as follows:

（1）外包装要求全部满足合格判据要求；The outer packaging requirements all meet the requirements of the qualification criteria

（2）组件数量要求全部满足合格判据要求； The quantity requirements of the components shall all meet the qualification criteria requirements

（3）符合性文件要求全部满足合格判据要求；All compliance documents shall meet the requirements of qualification criteria

（4）组件外观要求按照 ISO2859-1 标准执行；The component appearance requirements are performed in accordance with the ISO2859-1 standards

（5）组件原材料要求全部满足合格判据要求；All raw materials of components meet the requirements of qualified criteria

（6）采用便携式 I-V 测试仪测试组件功率特性时，判据如下：When testing the component power characteristics with a portable I-V tester, the criteria are as follows

1）被抽检组件的功率负偏差全部在小于 2%，判定为合格；

2）如被抽检组件功率负偏差大于 2%，将功率负偏差超过 2%的组件送双方认可的第三方机构进行复检。复检结果若全部满足组件额定功率正偏差，可以判定该批次合格；如发生有 1 块为组件额定功率负偏差，则判定为该批次不合格。

1) The negative power deviation of all the sampled components is all less than 2%, and it is judged to be qualified;

2) If the negative power deviation of the sampled component is more than 2%, the component with a negative power deviation of more than 2% shall be sent to a third party approved by both parties for reinspection.If the reinspection results meet the positive deviation of the component, the batch can be judged to be qualified; If one piece is the negative deviation of the component, the batch is judged to be unqualified.

（7）采用移动检测平台（车）测试组件功率特性时，判据如下 When testing the power characteristics of the component by using a mobile detection platform (vehicle), the criteria are as follows：

被抽检组件仅发生 1 块组件不合格，可以判定该批次合格；超过 1 块组件不合格，另需

要加抽原抽检数量相同组件，如仍有超过 1 块不合格，则判定该批次组件不合格；

If only one component is unqualified, the batch can be judged as qualified; if more than one component is unqualified, the same original components shall be sampled. If more than one component is still unqualified, the batch of components shall be deemed unqualified;

（8）组件 EL 特性测试要求按照 ISO2859-1 中 AQL2.5 标准执行。Assembly EL characteristic test requirements follow AQL2.5 standard in ISO2859-1.

五、性能验收试验 Performance Acceptance Test

1. 概述 Summary

1.1 本章用于对卖方所提供的光伏电池组件（包括对分包外购零部件）进行性能验收检验，确保卖方所提供的光伏电池组件符合技术规范规定的要求。

1.1 This chapter is used to conduct the performance acceptance inspection of the photovoltaic modules (including the subcontract purchased parts) provided by the Seller to ensure that the photovoltaic modules provided by the Seller meet the requirements stipulated in the technical specifications.

1.2 性能验收检验的目的为了检验合同设备的所有性能是否符合技术规范的要求。

1.2 The Purpose of Performance Acceptance Inspection is to check whether all the performance of the contract equipment meets the requirements of the technical specifications.

1.3 性能验收检验的地点为买方现场。

1.3 The site of performance acceptance inspection is the Buyer's site.

1.4 性能验收检验由买方主持，卖方参加。检验大纲由买方提供，与卖方讨论后确定。如检验在现场进行，性能验收检验所需的就地仪表、仪器的装设应由委托第三方提供，卖方应派出技术人员配合；如检验在工厂进行，试验所需的人员、仪器和设备等由卖方提供。

1.4 Performance acceptance inspection shall be conducted by the Buyer and attended by the Seller.The inspection outline shall be provided by the Buyer and determined after discussion with the Seller.If the inspection is conducted on site, the installation of local instruments and instruments required for performance acceptance inspection shall be provided by a third party, and the Seller shall send technical personnel to cooperate; If the inspection is conducted in the factory, the personnel, instruments and equipment required for the test shall be provided by the Seller.

1.5 性能验收包括验收检验和试运行两部分

1.5 Performance acceptance includes acceptance inspection and trial run

2. 试运行（可靠性运行）Trial Run (reliable operation)

每发电单元组件的可靠性运行应当通过在太阳辐射强度不低于 400W/m2 的条件下进行其累计 240 小时、并无任何会影响长期运行的缺陷的运行来考核。在可靠性运行期间发生因电网故障或其他原因，并且不为投标人控制的原因而造成的停机不作为不利于卖方的理由。这种停机时间不应加进 240 小时，以确保光伏组件净可靠的运行时间为 240 小时。如果发电单元的组件的可靠性运行因为某个缺陷而中断，卖方应当对此缺陷立即进行修理，该发电单元的可靠性运行应重新计时，直至 240 小时。

当每单元的最后发电单元通过 240 小时试运行后，买方签发该电站全部光伏组件的初步验收证书，并确认该单元光伏组件开始进入质保期。

The reliability operation of each generating unit assembly shall be assessed by a operation of 240 hours of solar radiation intensity of no less than 400 W/m2 without any defects that will affect long-term operation.Shutdown due to power grid failure or other reasons and not under the control of the bidder during the reliability operation shall not be detrimental to the Seller.This downtime should not be added to 240 hours to ensure a net and reliable running time of the photovoltaic modules of 240 hours.If the reliability operation of the components of the generating unit is interrupted by a defect, the seller shall immediately repair the defect, and the reliability operation of the generating unit shall be retimed until 240 hours.

When the final power generation unit of each unit passes the 240-hour trial operation, the buyer issues the preliminary acceptance certificate of all the photovoltaic modules of the power station, and confirms that the photovoltaic modules of the unit begin to enter the warranty period.

3. 试运行期的检查 Inspection During the Commissioning Period

在调试期或试运行期发现设备有缺陷，原因包括但不局限于潜在的缺陷或使用了不当材料，业主或业主委托方应当向权威机构提出要求检验的申请，并有权根据检验证书的效力和保修证明向投标人提出索赔要求。

在整个检验过程中，如果发现投标人提供的技术标准不完整，权威机构有权根据业主方所在国当前有效标准和/或其他被权威机构认为适合的标准实施检验。

If the equipment is defective during the commissioning or commissioning period, including but not limited to potential defects or using improper materials, the Owner or the owner's entrusting party shall apply to the authority and have the right to claim against the bidder

according to the validity of the inspection certificate and the warranty certificate.

During the whole inspection process, if the technical standards provided by the bidder are found incomplete, the authority has the right to implement the inspection according to the current effective standards in the owner's country and / or other standards deemed appropriate by the authority.

4. 最终验收 Final Acceptance

组件设备全部通过初步验收后满一年，并且已满足上述条件，买方签署最终验收的全部文件。

One year after all the component equipment passes the preliminary acceptance and has met the above conditions, the Buyer shall sign all the documents for the final acceptance.

六、技术服务和联络 Technical Services and Liaison

1. 概述 Summary

投标人需对所提供全部光伏电池组件的设计、制造、运输、安装指导、调试、运行和维护指导负责。并全面负责质保期间的维护和检修，保证在质保期内设备的运行达到保证性能。因此，投标人要提供所有相关的和必需的建议、培训、监督和维护/维修服务，直到结束。

The bidder shall be responsible for the design, manufacturing, transportation, installation, commissioning, operation and maintenance guidance of all the photovoltaic cell modules provided.And fully responsible for the maintenance and maintenance during the warranty period, to ensure that the equipment during the warranty period to achieve the guaranteed performance.Therefore, the Bidder shall provide all relevant and necessary advice, training, supervision and maintenance / repair services until completion.

2. 支架 Support

投标人签定合同后为配合支架设计，提供所需要的图纸、技术资料等。

After signing the contract, the bidder shall provide the required drawings and technical data to cooperate with the support design.

3. 安装和试运行过程中的责任 Responsibilities During Installation and Commissioning

为了对整个太阳能光伏电站施工负责，投标人应在设备安装过程中协助提供支持、监督和指导，并负责调试。

业主或其授权的代表作为工程项目经理，只要与投标人责任直接相关的部分，项目经理应听取投标人的建议。

投标人应向项目经理提供建议，与之协调与合作，并完成所有要求的任务，如：

In order to be responsible for the construction of the whole solar photovoltaic power station, the Bidder shall assist in providing support, supervision and guidance during the equipment installation process, and shall be responsible for commissioning.

The Employer or his authorized representative, as the Project Manager, shall take the Bidder's advice on the part directly related to the Bidder's responsibilities.

The Bidder shall advise the Project Manager, coordinate and cooperate with them, and complete all required tasks such as:

(1) 设备安装前准备工作 Preparation work before equipment installation

－提供所供设备的安装手册，详细说明设备的卸货、组装、安装和试运行；

－对安装人员提供确保安全装配、安装所需的必要培训；

－提供安装必需的专用工具；

－提供调试计划；

－检查安装现场的准备情况（包括基础、自然条件、工器具等）；

－对将要安装的设备进行检查和清点。

-Provide the installation manual of equipment supplied, detailed the unloading, assembly, installation and commissioning of equipment;

-Provide the necessary training to ensure safe assembly and installation;

-Provide special tools necessary for installation;

-Provide the commissioning plan;

-Check the preparation of the installation site (including foundation, natural conditions, instruments, etc.);

-Check and inventory of the equipment to be installed.

(2) 设备安装期间投标人应 The bidder shall be required during the equipment installation：

－负责所供设备的安装指导；

－与现场其它投标人（如果有的话）协调。

设备安装结束后投标人应负责进行调试，以及对正常运行并达到性能保证值负责。因此，投标人将进行计划内的维护和维修和/或部件的调换。

-Responsible for the installation and guidance of the supplied equipment;

-Coordinate with other bidders on site (if any).

The Bidder shall be responsible for commissioning and for normal operation and performance assurance.Therefore, bidders will perform the planned maintenance and repair and / or replacement of parts.

4. 技术联络会 Technical Liaison Meeting

业主和投标人之间将举行技术联络会议，以讨论有关具体要求、澄清技术规范中的疑问，并进行必要的协调工作。

Technical contact meeting will be held between the Employer and the Bidder to discuss

specific requirements, clarify questions in technical specifications and conduct necessary coordination.

5. 培训 Training

5.1 现场培训 On-site Training

现场培训应在设备安装和预调试过程中进行，时间为 1 周，经过培训的操作人员应在调试和保证值试验前到位。培训应在教室和现场进行，内容包括光伏组件安装、误差检测、维修、维护和故障检修。业主有权更换投标人不合格的培训师。培训计划必须足够确保业主方人员在调试结束后有能力进行工程运行工作。

除了与投标文件一起提交的资料外，在培训开始前 1 周，投标人还应提供一份培训计划和培训材料，说明怎样完成培训。培训计划应包括：时间、地点和培训类型。培训材料应包括：设备的详细介绍、部件清单和安装、维修和维护手册。

Site training shall be conducted during equipment installation and pre-commissioning for 1 week, and the trained operators shall be in place before commissioning and guaranteed value test.Training should be conducted in the classroom and site, including photovoltaic module installation, error detection, maintenance, maintenance and troubleshooting.The Employer has the right to replace the unqualified trainer of the bidder.The training plan must be sufficient to ensure that the Owner's personnel are able to perform the project operation after the commissioning.

In addition to the information submitted with the tender documents, the bidder shall provide a training plan and training materials 1 week prior to the training commencement on how to complete the training.The training plan shall include: time, place, and type of training.Training materials shall include: detailed description of equipment, parts list and installation, repair and maintenance manuals.

培训应包括但不限于下列各项 Training shall include, but is not limited to, the following items：

• 阅读和使用所提供的手册和资料 Read and use the manuals and materials provided；

• 光伏电池组件的装配方法、原理和更换 Assembly method, principle and replacement of photovoltaic cell modules；

• 备品备件的管理（储存、文档记载和备品备件序号，等等）Management of spare parts (storage, documentation and serial number, etc.)；

• 文档记载指操作监测、维护和修理记录 Documentation refers to the operational monitoring, maintenance, and repair records。

下列情况的实际演示 Practical demonstration of the following situations：

• 维护手册的正确使用 Proper use of the maintenance manual；

• 故障检修，备品备件识别 Trouault, spare parts identification；

• 运行监测和光伏电池组件维护/维修文档记载 Operation monitoring and photovoltaic module maintenance / maintenance documentation；

• 操作和维护安全步骤 Operation and maintenance security steps。

6. 质保期 Warranty

在质保期内，投标人应协助业主对所有合同设备进行维护和检修，维护应当是综合性的，包括有缺陷部件的维护和调换。质保期内维护和检修所需费用包含在报价中，如人工、设备更换、安装和运输等。

During the warranty period, the Bidder shall assist the Owner in the maintenance and overhaul of all the contract equipment, which shall be comprehensive, including the maintenance and replacement of defective parts.The cost of maintenance and maintenance during the warranty period is included in the quotation, such as labor, equipment replacement, installation and transportation, etc.

七、交货进度 Delivery Schedule

1．一般要求 General Requirements

1.1 投标人需承诺设备交货满足工程进度的要求。

1.1 The bidder shall promise that the equipment delivery shall meet the requirements of the project progress.

1.2 交货时间为到达交货地点的时间。

1.2 Delivery time is the time to arrive at the delivery place.

第一批 单面组件 2.5MW 2022 年 7 月 30 日前。

First Batch Delivery Monoficial Module 2.5MW by 30th July, 2022.

第二批 双面组件 18.5MW 2022 年 10 月 1 日前。

Second Batch Delivery Bificial Module 18.5MW by 1st October , 2022.

八、附图（不适用）Supplementary Drawing (Not Applicable)