

Provisional Acceptance Verification Report

La Vendimia PV Plant

June 28, 2024

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Matrix – TPG

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GLOSSARY

Term	Definition	Term	Definition
AC	Alternating current	PAS	<i>Permiso Ambiental sectorial</i> (Sectoral environmental permit)
CCTV	Closed-circuit television	PAT	Provisional Acceptance Test
CEN	<i>Coordinador Eléctrico Nacional</i> (National Electricity Coordinator)	PMGD	<i>Pequeño medio de generación distribuida</i> (small distributed generation project)
DC	Direct current	PoC	Point of Connection
DOM	<i>Departamento de Obras Municipales</i> (Municipal Works Division)	PR	Performance ratio
DS 88	<i>Decreto Supremo 88 del Ministerio de Energía</i> (Supreme Decree 88) 8 October 2020	PV	Photovoltaic
EPC	Engineer, procure, construct	RCA	<i>Resolución de Calificación Ambiental</i>
ICC	<i>Informe de criterios de conexión</i> (Connection standards report)	SAG	<i>Servicio Agrícola Ganadero</i> (Agriculture and Livestock Service)
LV	Low voltage	SCADA	Supervisory control and data acquisition
MINVU	<i>Ministerio de Vivienda y Urbanismo</i> (Housing and Planning Ministry)	TCU	Tracker control unit
MV	Medium voltage	UPS	Uninterrupted power supply
NCU	Network control unit	VLF	Very low frequency
PAC	Provisional acceptance certificate	VII	<i>Región de Maule</i> (Maule Region)

1. INTRODUCTION

1.1. Background

Matrix Renewables Chile SpA (**the Client**) through its subsidiary El Boldo SpA (**the Owner**) has acquired the La Vendimia photovoltaic (PV) project with capacities of 10,507.05 kW direct current (DC) and 9,000 kW alternating current (AC), located in the Maule (VII) of Chile (**the Plant** or **the Project**).

The Project was developed under the small distributed generation project scheme (*pequeño medio de generación distribuida*, PMGD) and initially acquired by Trina Solar Systems (Chile) SpA (**the Sponsor**), who built it on an engineer, procurement and construction (EPC) basis and is therefore also referred to as **the Contractor**.

The EPC contract, signed between the Contractor and the Owner, is referred to as **the Contract**. Capitalised terms not defined herein shall have the meaning given to them in the Contract.

The Project was connected to the grid on February 9, 2024.

The Client has retained Enertis Chile Spa (**Enertis**) to render technical review services for the Project and their associated facilities in order to review, assess and report on the construction status and any technical issues.

1.2. Purpose and Scope

The purpose of the work is to review commissioning documentation and assess whether all requirements have been met for the Project to sign the provisional acceptance certificate (PAC).

The scope of work to be performed by Enertis was established in technical proposal reference number CL2021-1782C01-2 signed by the Client on March 18, 2021.

1.3. Sources of Information

This report was prepared based on documentation provided by the Sponsor and the Contractor, and observations made by Enertis during site visit carried out on May 23, 2024.

1.4. Addressees

The report is addressed to the Client. This document must not be delivered or reproduced partially or entirely in any form or by any medium to or by any person/s other than the intended recipient without the prior written permission of Enertis.



1.5. Disclaimer

This report was written from the analysis of the documentation provided by the Sponsor.

With regard to Enertis' responsibility for the content of this report, it should be noted that the following assumptions have been made: (i) the documentation provided is authentic and (ii) there are no significant technical documents related to the Project that have not been delivered to Enertis. Thus, the conclusions in this document are based upon the authenticity and totality of the documentation received.

In any case, the responsibility of Enertis within the context of this document will never exceed the fees paid by the Sponsor for the work.

The acceptance of these documents by the intended recipients implies full acceptance of the Disclaimer.



2. DESCRIPTION OF THE PROJECT

2.1. Location

The Project is located in the Maule Region (VII). The figures below show its location and main geographical characteristics. The area indicated in Table 2.1 corresponds to the leased area as described in the land lease agreements.

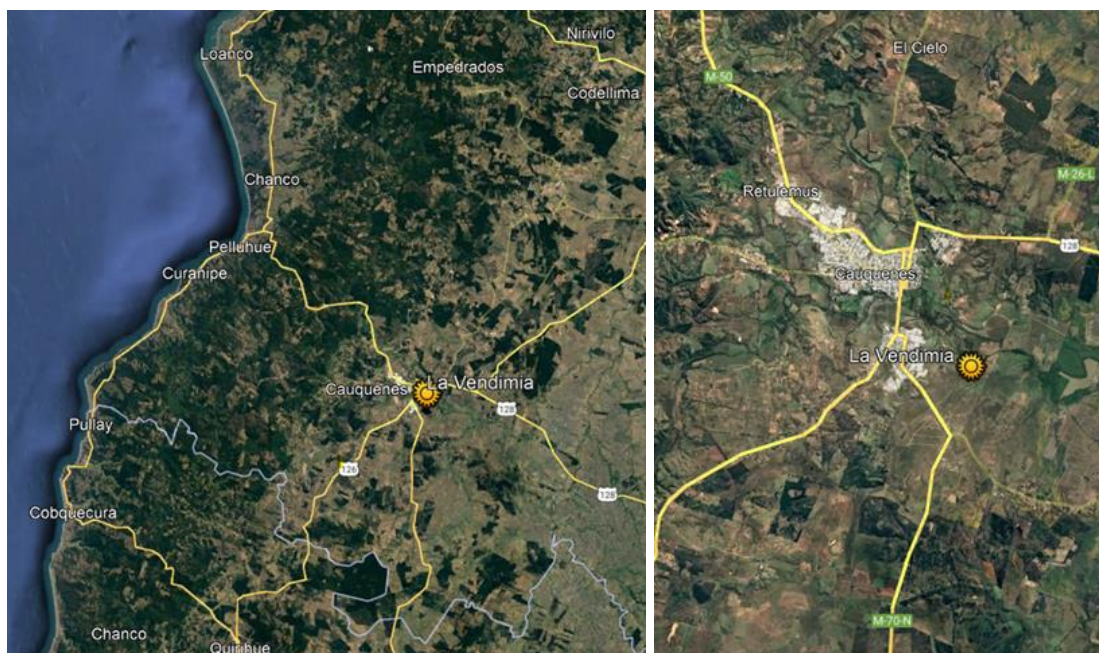


Figure 2.1. Location of the Project in Chile (left) and in a more localised view (right). Source: Google Earth.

Table 2.1 shows the geographical location and area of the Project.

Project	Coordinates	Elevation (m a.s.l.)	Area (ha)	Distance to coast (km)
La Vendimia	35.991° S, 72.293° W	138	29.7	35

Table 2.1. Geographical location and area of the Project.

2.2. Plant Characteristics

The technical characteristics of the Plant are summarised in Table 2.2. , Figure 2.2 shows the layout.

Parameter	Value
Modules	Trina Solar TSM DEG21C.20 (650 Wp) Trina Solar TSM DEG21C.20 (655 Wp)
Number of modules	650 Wp x 13,716 655 Wp x 2,430
DC capacity	10,512.45 kWp
Number of modules per string	27
Inverters	45 x Huawei SUN2000-215KTL-H3
AC power	9,675 kVA @30°C 9,000 kVA @42°C
Mounting structures	TrinaTracker Vanguard-1Vx54 single-row (47 trackers) TrinaTracker Vanguard-1Vx81 single-row (168 trackers)
Mounting configuration	Single row Single-Axis 1P
Pitch	7.0 m
Azimuth	0°
Structure rotation angle	±60°

Table 2.2. Technical characteristics of the Plant. Source: Trina Solar.

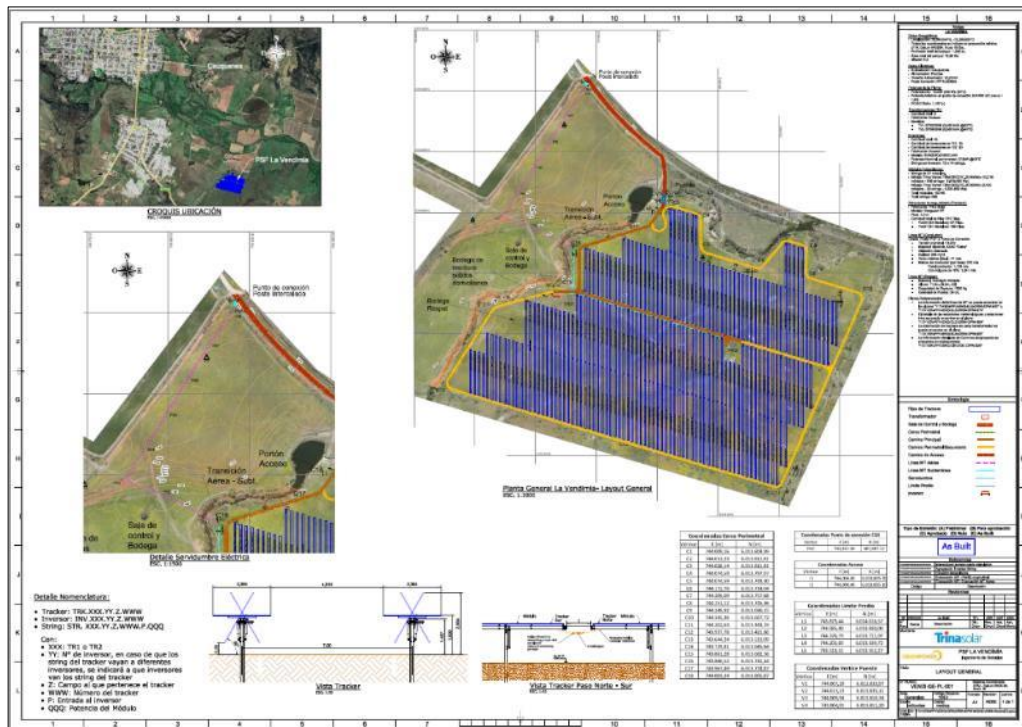


Figure 2.2. Project layout. Source: Trina Solar.

2.3. Grid Connection

Table 2.3. summarises the grid connection characteristics of the Project: medium-voltage (MV) line through which the electricity is evacuated, MV feeders and substation to which the Project connects, distance to the point of connection (PoC) and the pole number.

Project	Voltage	Feeder	Substation	Distance to PoC	Pole number
La Vendimia	13.2	Pocillas	Cauquenes	No. 5-229524	0.38

Table 2.3. Grid connection characteristics of the Plant. Source: Trina Solar.

3. EXECUTIVE SUMMARY

Enertis has assessed the quality of construction of the Plant and compliance with the Provisional Acceptance requirements under the Contract. This evaluation is based on documentation provided by the Sponsor, the Contractor and information gathered during the site visit carried out on May 23, 2024.

The following code has been used throughout the report:

- ✓ Requirement met
- ! Some information is missing, or minor works are pending, in order to meet the requirement. These will be included in the Punch List for late completion.
- ✗ No proof that the requirement has been met

Construction completion

The Plant has been constructed in accordance with the specified design. The construction is of good quality. Section 5 includes a comprehensive description of the status of the main items inspected. Appendix I shows photographs taken during the site visit.

Minor Finishing Works are defined in the Contract as pending minor works that do not affect the operation, production, performance and security of the Project. Following the site visit, Enertis made suggestions for a number of Minor Finishing Works that were added to the Punch List and closed certain points after verifying their status. The updated document was provided in a separate Excel spreadsheet.

Provisional Acceptance Certificate (PAC)

Enertis reviewed the PAC requirements as defined in the Contract. Enertis considers that the requirements have been fulfilled, with certain documents, Spare Parts, Minor finishing Works and permits pending that were added to the Punch List. The Guaranteed Performance Ratio was exceeded upon the second attempt.

4. PROVISIONAL ACCEPTANCE CERTIFICATE

Enertis reviewed the Contract between the Project company and the Contractor dated April 21, 2021. The requirements for issuing the PAC are set out in Section 10.4. These are summarised below and commented on in the following sections.

- i. Commercial Operation has been achieved;
- ii. Works Completion has been achieved;
- iii. The Guaranteed Performance Ratio has been achieved;
- iv. Test Certificates issued according to Clause 10.2;
- v. The quantities of Spare Parts referred to in Annex 13 have been delivered by the Contractor per Clause 4.17, and are available in accordance with the provisions of the Contract;
- vi. The Work (not included in the Punch List) has been performed;
- vii. Any Minor Finishing Works are not material and can be completed within the timing provided under Clause 10.8 a);
- viii. The Contractor has delivered to the Owner the Warranty Guarantee;
- ix. The Contractor has delivered to the Owner the manufacturers' warranty certificates for the benefit of the Owner;
- x. The O&M Contract has been signed in the form and substance of Annex 23;
- xi. All amounts and payment obligations due by Contractor under the Developer's Agreement have been fully satisfied, and no other payment obligation of Contractor thereunder remains in effect, as evidenced by the corresponding statement duly signed by the Contractor's counterparty under the Developer's Agreement.
- xii. The Owner has entered into a transit easement agreement with EFE to enter into the Project Site and it has been registered on the Mortgages and Liens Registry of the relevant CBR.

4.1. Provisional Acceptance

Table 4.1 presents a review of the general requirements to achieve Provisional Acceptance.

Source	Requirement	Status	Enertis assessment
i. Commercial Operation has been achieved			
Annex 1	Injection in accordance to Distribution Company	✓	Enertis reviewed Form 21 dated February 09, 2024. At that time the Plant capacity was limited, however, on March 18, 2024, the total injection will be authorized. Currently at full capacity.
Annex 1	Injection in accordance to Connection Agreement, Connection Infrastructure Authorisation.	✓	Enertis reviewed the Connection Agreement signed on January 12, 2022, and the Annexe Connection Agreement signed on September 1, 2022, by the distribution company, CGE.
Annex 1	Injection in accordance to Applicable Laws and Permits	✓	Confirmed.
Annex 4	Owner Permit: Land Lease	✓	Enertis reviewed the land lease agreement.
Annex 4	Owner Permit: Mining Rights	✓	Enertis reviewed the mining concessions named "LA VENDIMIA DOS" and "LA VENDIMIA CUARTO."
Annex 4	Owner Permit: Environmental Approval	✓	Enertis reviewed the environmental resolution (RCA) No. 0340/2020.
Annex 4	Owner Permit: IFC (SAG & MINVU)	✓	Enertis reviewed the SAG and MINVU permits.
Annex 4	Owner Permit: Industrial Rating	✓	Enertis reviewed industrial qualification permit.
Annex 4	Owner Permit: Preliminary Works Permit	n/a	Preliminary Works Permit does not apply to the Project.
Annex 4	Owner Permit: Building Permit	✓	Enertis reviewed the building permit issued by the DOM on May 11, 2023.
Annex 4	Owner Permit: Road Access Permit	✓	Enertis reviewed the access road construction permit.
Annex 4	Owner Permit: Interconnection	✓	Enertis reviewed the ICC issued on October 03, 2019, and the Connection Agreement signed on January 12, 2022, and the Annexe Connection Agreement signed on September 1, 2022, by the distribution company, CGE.

Source	Requirement	Status	Enertis assessment
Annex 4	Contractor Permit: PAS 140	✓	PAS issued by the SEREMI Salud (Construction stage) by means of resolution 2307382293 on October 20, 2023. PAS issued by the SEREMI Salud (O&M stage) by means of resolution 2307564593 on December 28, 2023.
Annex 4	Contractor Permit: PAS 142	✓	PAS issued by the SEREMI Salud (Construction stage) by means of resolution 2307405679 on October 30, 2023. PAS issued by the SEREMI Salud (O&M stage) by means of resolution 2307564757 on December 28, 2023.
Annex 4	Contractor Permit: PAS 146	✓	PAS issued by the SEREMI Salud by means of resolution 671/2022 on May 25, 2022.
Annex 4	Contractor Permit: PAS 156	!	Water channel Crossing Permit, granted by the Water administration (DGA) Service of Maule Region, by means of resolution 1206/2022 on September 12, 2022. Final acceptance of the works has been requested by the DGA. This will be included in the Punch List.
Annex 4	Contractor Permit: Sanitary Report	!	Sanitary Report resolution from the SEREMI de Salud is pending. This will be included in the Punch List.
Annex 4	Contractor Permit: Building Permit update (if needed)	✓	Enertis reviewed the Building Permit update issued by the DOM of Cauquenes on February 06, 2024.
Annex 4	Contractor Permit: Final Works Acceptance request	✓	Enertis reviewed the Final Works Acceptance issued by the DOM of Cauquenes on April 01, 2024.
Annex 4	Contractor Permit: Emission declaration, if applicable	✓	Enertis reviewed the Emission declaration provided by the Contractor.
Annex 4	Contractor Permit: F17 to F21	✓	Forms 17 to 21 submitted.
Annex 4	Contractor Permit: Start-up Authorization by the CEN ("Autorización de puesta en servicio")	✓	Enertis reviewed the start-up letter from the CEN, N° OP00113-24, issued on November 15, 2024.
Annex 4	Contractor Permit: Commencement of operations by the CEN ("Autorización de entrada en operación comercial")	✓	Commencement of operations letter issued by the CEN was provided, by means of resolution DE 01314-24 on March 15, 2024.
Annex 4	Contractor Permit: Electrical Declaration TE1	✓	Enertis reviewed the TE1 certificate issued by the SEC on January 8, 2024.

Source	Requirement	Status	Enertis assessment
ii. Works Completion has been achieved			
Annex 1 – Definitions and Interpretation			
Annex 1	Mechanical Completion	✓	Enertis verified the Mechanical Completion during the site visit. See below.
Annex 1	Electrical Completion	✓	Enertis verified the Electrical Completion during the site visit. See below.
Annex 1	Contractor Permits have been obtained	!	Certain Contractor Permits have not yet been obtained, and these will be included in the Punch List. See above.
Annex 15 – Commissioning Tests			
2.2	Procedures: Contractor complies with all procedures from the DNO, including F17 to F21	✓	Enertis reviewed F17 to F21.
2.3	Commissioning Plans, Procedures and Program	✓	Enertis received the main equipment (module, inverter, tracker, transformation centre, monitoring system, meteorological station and CCTV) commissioning reports.
2.4	Test Records	✓	
3	Commissioning Tests	✓	
Annex 9 – Final Documentation			
2	O&M Manual	✓	The O&M Manual is kept up to date and contains the required information.
3) Documentation Required for Technical Design			
3) 1.1	Structural calculations for all structures and building (NCh 2369 or NCh 433 or UBC/IBC)	✓	Enertis reviewed the structural calculations for the trackers and CCTV foundations according to NCh 2369 and NCh 433. Enertis reviewed the structural calculations for the trackers, meteorological station, MV station, O&M building and waste tanks foundation according to NCh 2369.
3) 1.3	Cable Sections	✓	The cable sections of the Plant have been identified.
3) 1.4	Civil works layouts and design	✓	Enertis reviewed the civil works layouts and design drawings.
4) Documentation Required for Technical Acceptance			
4.4.	Static/dynamic calculation by manufacturer	✓	Enertis reviewed the static and dynamic calculation.
4.5.	Galvanisation certificates and pull-out tests	✓	Enertis reviewed the galvanisation certificates and the pull-out test results.

Source	Requirement	Status	Enertis assessment
4.6.	Product Documentation (datasheet, manuals for modules, structure, inverter, transformer and switchgear)	✓	The Product Documentation has been delivered.
4.7.	Warranty certificates of major equipment (for modules, structure, inverter, transformer and switchgear) with reference to serial numbers of the products installed (when required)	✓	The inverter, power station and tracker warranty certificate has been provided with reference to the La Vendimia Project. The inverter warranty extension up to 10 years was provided.
4.8.	Declaration of Total Installed Capacity (TIC) and Declared Net Capacity (DNC)	✓	Enertis reviewed the TIC and DNC form.
4.9.	Flash-Test of Modules	✓	Enertis reviewed the flash-test of the modules.
5) Documentation Required for Commissioning			
5.1	Signed and dated commissioning document by Contractor	✓	Enertis reviewed the LV and MV commissioning procedure, testing protocols and results.
5.2.	Single-Line Diagram, General Layout and Cable trench Layout	✓	The Single-Line Diagram, General Layout and Cable trench Layout were provided,
5.3.	LV DC Tests	✓	Enertis reviewed the LV DC circuit functional tests.
5.4.	Inverter commissioning protocols	✓	Enertis reviewed the inverters commissioning protocols.
5.5.	Switchgear insulation tests results and commissioning protocols	✓	Enertis reviewed the switchgear insulation commissioning protocols and test results.
5.7.	Insulation and continuity tests	✓	Enertis received the LV cables insulation and continuity tests.
5.8	Calibration certificates for all instrumentation	✓	Enertis reviewed the calibration certificates.
5.9.	Location and details of all electrical metering and serial numbers	✓	All electrical metering and serial numbers are correctly identified.
5.14.	Detailed design calculations and drawings for earthing circuits	✓	Enertis reviewed the design calculations and drawings for earthing circuits and the earthing test report.
5.15	Earthing test report	✓	Enertis reviewed the design calculations and drawings for earthing circuits and the earthing test report.
6) Documentation Required for PAC			
6.1.	As-Built Drawings	✓	As-built drawings were provided.

Source	Requirement	Status	Enertis assessment
6.2	Commissioning report of the monitoring system	✓	Documentation provided.
6.3.	Commissioning report of the security system	✓	Documentation provided.
6.4.	Calibration certificates for Pyranometers	✓	Enertis reviewed the calibration certificates of the pyranometers.
6.6.	Spare Parts list	!	<p>Enertis has reviewed the Spare Parts list, these should be located according to the list provided in Annex 13 of the contract. The Contractor provided a list matching the list provided in Annex 13 of the contract. However, during the visit it was found that the following items are not included: FTP cable, pile drivers, torque tubes, headers.</p> <p>This will be included in the Punch List.</p> <p>During the visit to the plant, the Warehouse was poorly organized, it was organized after the visit, the Contractor provided picture documentation.</p>
6.7.	Health and safety file during construction	✓	Weekly health and safety reports have been issued in 2023 and months of early 2024.
6.8.	Quality inspection report	✓	Quality inspection report was provided.
Annex 15 – Commissioning Tests			
3.2	DC Circuits: (1) Shall be tested in accordance with IEC62446, (2) Carried out when irradiance is greater than 250 W/m ² and (3) Calibrated equipment with accuracy of ±1%.	✓	The DC commissioning tests were carried out according to the requirements.
3.2	Specific format should be followed showing per string: (1) Open circuit voltage, (2) Short circuit current, (3) Insul. Resist. Short Circ., (4) Insul. Resis. Positive and (5) Modules in series (including serial numbers)	✓	The required format has been followed in the reports.
3.2	Specific format should be followed, showing: (1) Test equipment used with its calibration date and (2) Technician		
3.2.1	Open Circuit Voltage Check: (A) Vocs = N* Voc*(1+TC*(T-25)), (B) Test 100% of strings, (C) Compare voltages and verify (1) all have the same polarity, (2) are within ±5% of the average value, and (3) are within ±10% of the calculated value.	✓	Enertis reviewed the Open-Circuit Voltage tests.

Source	Requirement	Status	Enertis assessment
3.2.2	Short Circuit Current Check: (1) To be done in each single string separately and (2) Measure and record irradiance prior to the test	✓	Enertis reviewed the Short-Circuit Current tests.
3.2.3 & 3.2.4	Insulation Resistance (short circuited string to ground and DC cables): Verify that is greater than 1M Ohm	✓	Insulation Resistance tests provided.
3.2.5	IV Curves: (1) At least 100% of strings, (2) minimum irradiance of 600 W/m ² , (3) follow IEC62446-1	✓	Documentation provided. All strings comply with maximum short-circuit current and open-circuit voltage values.
3.3	MV Cables: Perform pressure tests on all MV cables through a specialist contractor.	✓	It is unclear what "pressure tests" are. Note that for previous projects, this was replaced by the very low frequency (VLF) tests. Enertis reviewed the VLF test report.
3.4	Earthing: Perform site earthing test to verify earth resistance is than that given in the earthing report.	✓	Enertis reviewed the earthing tests performed.
3.5.1	Cold Commissioning (F21)	✓	Enertis reviewed F21.
3.5.2	Inverters tested by manufacturer	✓	Enertis reviewed the inverter commissioning tests.
3.5.3	Power station	✓	Enertis reviewed the inverter commissioning tests.
3.5.4	Power Tracker	✓	Enertis reviewed the inverter commissioning tests.
3.5.5	Module mapping	✓	Enertis reviewed the module mapping report.
3.5.11	Optical Fibre	✓	Enertis reviewed the optical fibre commissioning report.
3.5.12	Thermography	✓	Thermography tests were performed in the modules, inverters, transformers and electrical connections.
3.5.13	CCTV	✓	Enertis reviewed the CCTV commissioning report.
3.5.14	SCADA	✓	Documentation provided.
iii. The Guaranteed Performance Ratio has been achieved			
Annexes 16 and 18	Achievement of the Guaranteed Performance Ratio (PR)	✓	Enertis verified that the PR achieved during the Performance Test exceeds the Contract requirements. See Section 4.2.

Source	Requirement	Status	Enertis assessment
iv. Test Certificates issued according to Clause 10.2			
	Issuance of the Test Certificates	✓	The Owner issued the Technical Acceptance Certificate, Test Certificate and Works Completion Certificate.
v. Spare Parts referred to in Annex 13 have been delivered by the Contractor			
Annex 13	Spare Parts delivered by the Contractor	✓	<p>Enertis has reviewed the Spare Parts list, these should be located according to the list provided in Annex 13 of the contract. The Contractor provided a list matching the list provided in Annex 13 of the contract.</p> <p>During the visit to the plant, the Warehouse was poorly organized, it was organized after the visit, the Contractor provided picture documentation.</p>
vi. The Work (not included in the Punch List) has been performed			
	Activities, works and supplies provided by the Contractor	✓	The Work, as defined in the Contract, includes some permits, test and specifications that are missing. See comments in Sections i and ii. above.
vii. Any Minor Finishing Works are not material and can be completed within the timing provided			
	Minor works not affecting the operation, production or performance yield not material	✓	Enertis has made suggestions of items to be added to the Punch List. See Section 6 below.
viii. The Contractor has delivered to the Owner the Warranty Guarantee			
	Autonomous and first demand bank guarantee provided by the Contractor	✓	According to the Contractor, the Warranty Guarantee will be delivered upon the PAC signing date.
ix. The Contractor has delivered to the Owner the manufacturers' warranty certificates			
	The Contractor has delivered to the Owner the manufacturers' warranty certificates for the benefit of the Owner	✓	The manufacturer's warranty certificates have been transferred to the Owner.
x. The O&M Contract has been signed in the form and substance of Annex 23			
	The O&M Contract has been signed in the form and substance attached herein under Annex 23	✓	Enertis was provided with the signed O&M Contract in accordance with Annex 23.
xi. All amounts and payment obligations due by Contractor under the Developer's Agreement have been fully satisfied, and no other payment obligation of Contractor thereunder remains in effect, as evidenced by the corresponding statement duly signed by the Contractor's counterparty under the Developer's Agreement.			
	All amounts and payment obligations have been fully satisfied	✓	<p>The Contractor issued F30 and F30-1 forms from its subcontractors valid up to April 2024.</p> <p>Enertis defers to the legal advisor.</p>

Source	Requirement	Status	Enertis assessment
xii. The Owner has entered into a transit easement agreement with EFE to enter into the Project Site and it has been registered on the Mortgages and Liens Registry of the relevant CBR.			
	All amounts and payment obligations have been fully satisfied	✓	Enertis reviewed a transit easement agreement with EFE to enter the Project Site and has been registered on the Mortgages and Liens Registry of the relevant CBR on April 18, 2024. Enertis defers to the legal advisor for further details.

Table 4.1. Commissioning requirements according to Section 10.4 of the Contract.

4.2. Performance Tests

For the issuance of the PAC, a Provisional Acceptance Test (PAT) must be carried out to verify that the Plant achieves the Guaranteed Performance Ratio (PR). The PAT considers the following:

- A minimum testing period of 15 days.
- The granularity of the data used must be at least 15 minutes.
- Every testing day must have at least 400 W/m² irradiance for a minimum of two hours.
- Minimum irradiance threshold of 50 W/m².
- The Plant must have full availability during the testing period.

The following formula is used to calculate the PAT:

$$\frac{\sum_i E_{ac-i}}{P_{STC} \sum_i (1 - L_{t-i}) * G_{dg-i} * \left(1 \frac{kW}{m^2}\right)^{-1} * A_o}$$

Where:

- E_{ac-i} is the energy production during interval i.
- P_{STC} is the installed capacity of the Plant in standard test conditions (10,507.05 kWp).
- G_{dg-i} is the irradiation recorded during interval i.
- A_o is the agreed maximum availability of the Plant (100%).
- $L_{t-i} = \beta * (T_{mod} - T_{meas-i})$

Where:

- β is the temperature coefficient for power in the module datasheet (%/°C).
- $T_{mod} - T_{meas-i}$ is the difference between the temperature computed in PVsyst (per Annex 18) and the average module temperature during interval i.

The testing period considered is from May 4, 2024, to May 21, 2024. The granularity of the data used was 15-minute intervals. Enertis also reviewed calibration certificates for the pyranometers used.

The following days were not considered in the calculation:

Day	Reason
05/05/2024	Irradiation levels below the threshold of 400 W/m ² for a minimum of two hours
07/05/2024	Irradiation levels below the threshold of 400 W/m ² for a minimum of two hours
20/05/2024	Irradiation levels below the threshold of 400 W/m ² for a minimum of two hours

Table 4.2. Days excluded from the calculation and reason.

Table 4.3 shows the Guaranteed PR and T_{mod} for the months in which the PR test took place.

Month	Guaranteed PR	T_{mod}
April	90.36%	23.99°C

Table 4.3. PR and T_{mod} values. Source: Annex 18.

The following figures were calculated by the Sponsor, and then by Enertis using raw data downloaded from the monitoring system supplied by Green Power Monitor (GPM).


Testing Day	Date	Energy (kWh)	Irradiation (kWh/m ²)	Calculated PR	Time (h) Irradiance > 400 W/m ²
1	04/05/2024	27,992	2.8	94.36%	3.3
2	06/05/2024	37,788	3.8	92.92%	4.1
3	08/05/2024	37,364	3.7	95.62%	4.9
4	09/05/2024	31,411	3.0	98.76%	2.4
5	10/05/2024	24,724	2.5	93.30%	2.4
6	11/05/2024	41,072	4.1	94.35%	5.1
7	12/05/2024	45,036	5.1	82.77%	7.8
8	13/05/2024	50,989	5.2	92.48%	7.4
9	14/05/2024	51,461	5.2	94.63%	7.7
10	15/05/2024	34,618	3.4	94.96%	3.9
11	16/05/2024	42,389	4.2	96.81%	6.2
12	17/05/2024	45,630	4.5	97.45%	6.8
13	18/05/2024	42,139	4.2	95.83%	6.7
14	19/05/2024	57,244	6.8	79.70%	9.0
15	21/05/2024	47,576	4.7	95.55%	7.5
Total 15 valid days		617,433	63.33	92.45%	85.20

Table 4.4. PR figures.

As the Guaranteed PR has been exceeded, **Enertis considers that the PAT has been passed.**

5. SITE VISIT

Enertis staff visited the Project on May 23, 2024. Vincent Burgmeier of Enertis was accompanied by Contractor staff. The weather conditions were acceptable (partially sunny). The table below summarizes the construction status of the Project. Photographs taken during the site visit are presented in Appendix I.

Site visit findings (May 23, 2024)	
	Project status
<p>The Project was found in good conditions during the site visit. The Project is generating at full capacity. Some works were pending at the time of the visit. These mostly involve the construction of the water retention wall along the site perimeter. A Punch List has been discussed with the Contractor and Client.</p>	
<p>Comment: Enertis inspected key Plant equipment including structural parts, PV modules, MV stations, string inverters, weather instruments, security cameras and monitoring system. See the following sections for more detail.</p>	
	Site access, roads and drainage
<p>Access to the project is through an unpaved road that goes along the railway. It originates in Road M-70-N, which one can reach from Road 126 after going through the town of Cauquenes. The latter two are paved roads in good condition and are visible in the figure below.</p>	
	
<p>Figure 5.1 Access to the Project site. Source: Google Earth.</p>	
<p>A bridge needs to be crossed just before reaching the Plant access gate (Figure I.1). The access gate was in good conditions and with the corresponding warning signs (Figure I.2) and grounded (Figure I.3). There were works going on at the bridge during the visit.</p>	
<p>The internal roads were found in good condition (Figure I.4). The main road is made of compacted and treated soil in accordance with the design. It gives access to the power stations control room and warehouse containers. The secondary roads were marked, and a track was visible.</p>	
<p>A parapet was under construction at the time of the visit, along the site perimeter (Figure I.5, Figure I.6 and Figure I.7).</p>	
<p>Comment: The unpaved road is in decent conditions. Enertis raises no issues.</p>	

Site visit findings (May 23, 2024)	
	PV modules
<p>Based on a sample of tables inspected, PV modules have been installed per design documentation (Figure I.8). Enertis checked the nameplates and found them consistent with design specifications: Module Trina Solar TSM DEG21C.20.</p> <p>Modules are attached to purlins using four bolts and nuts. The purlins are in turn affixed to the torque tube with brackets. The torque tube rests on several piles; the mechanical connection is achieved via a slew drive and bearings installed on the piles.</p> <p>The PV module frame and support structures are made of aluminum and galvanized steel, respectively. This means that there is no risk of bimetallic corrosion between the two. Each module is grounded through metallic contact between the brackets, torque tube and piles. A cable ensures continuity between the torque tube and pile. The modules were clean due to recent rains.</p>	
Comment: Enertis raises no issues.	
	Trackers
<p>Enertis inspected the trackers and associated parts such as piles, purlins, torque tubes, brackets, screws, bearings and dampers (Figure I.9). This structure is equipped with a geared motor powered by the Trina Smart Controller. Self-sufficiency is achieved by supplying power through links to the strings.</p> <p>All torque marks are applied. No signs of corrosion or degradation were observed. The tracker is grounded through a copper wire fixed at the last pile of each row which connect to the earthing mesh.</p> <p>The tracker number is visible on the external pile near the internal road (Figure I.10).</p> <p>Some tracker piles have concrete foundations (Figure I.11 and Figure I.12).</p> <p>Met stations with anemometers and wind vanes communicate with the tracker control unit (TCU) of each tracker. Met stations are grounded, as can be seen in Figure I.13 and Figure I.14.</p>	
Comment: no issues raised.	
	DC cabling
<p>PV modules are connected in strings of 27 modules each. Based on a sample of strings inspected, the Plant uses UV protected cables with a cross-section of 6 mm².</p> <p>Cables and connectors are shielded from direct exposure to the environment by their position below the PV modules and structures and with conduits between tables.</p> <p>String cables are tied to the torque tube using cable ties (Figure I.15) and are then placed in ducting that is tied to the last pile. No sharp edges were noted with the structure. Cables then travel underground before connecting to the string inverters. Labels are used below the modules (Figure I.16) and inverters to indicate the number, polarity and corresponding inverter of each string.</p>	
Comment: Enertis raises no issues.	
	Inverters
<p>A total of 45 string inverters, model SUN2000-215KTL-H3 supplied by Huawei, are used at the Plant. The inverters are identified. The inverters are distributed throughout the Plant along the internal road and are installed on two piles. Enertis verified the height of the inverters and found it consistent with the design specifications (60 cm, see Figure I.17).</p> <p>The structure of the inverters is grounded, but corrosion was noted on the bolt used to affix the copper wire to the pile (Figure I.18). The conduits below the inverters are fixed to the structure by metallic clamps.</p> <p>The AC LV cables exiting the inverters go underground to reach the power station.</p>	
Comment: The point mentioned above was added to the Punch List.	

Site visit findings (May 23, 2024)	
	Power stations
<p>Two medium-voltage stations (MVS) supplied by Huawei are used at the Plant (Figure I.19). The MVS include the following equipment:</p> <ul style="list-style-type: none"> Transformer used for stepping up the voltage from 800 V to 13.2 kV (the grid voltage). LV and MV switchgear. MV cables connecting to the PoC. An auxiliary transformer to power the auxiliary services. <p>Warning signs and labels indicating the presence of live parts have been installed on the equipment. A steel plate was welded to the foundation and fixed with bolts to the power station container. Torque marks on the anchor bolts are applied.</p>	
<p>Comment: Enertis checked the oil level (Figure I.20), fire extinguisher (Figure I.21), and MVS grounding (Figure I.22) with no issues arising.</p>	
	MV line and grid connection
<p>Enertis inspected the MV line between the Plant and the PoC. The PoC consists of several poles holding the following equipment:</p> <ol style="list-style-type: none"> Cables emerging from the ground, within the Plant perimeter (Figure I.23). Current transformer used for metering purposes, and associated cabinet (Figure I.24). Automatic circuit recloser and associated cabinet, transformer for auxiliary services (Figure I.24). Cables connecting to the distribution line. 	
<p>Comment: Enertis raises no issues.</p>	
	Spare parts
<p>The spare parts are stored in a container joint to the control room. The container is in good conditions, grounded and anchored via welding to the foundations (Figure I.25).</p> <p>At the time of the visit, the warehouse was disorganized, and several spare parts were missing.</p>	
<p>Comment: The point mentioned above was added to the Punch List.</p>	
	Security system
<p>The security system comprises a fence with barbed wire, an entrance gate and security cameras equipped with video analytics software.</p> <p>The poles holding the security cameras are affixed to the concrete foundations by four bolts and nuts. The poles are grounded. Poles No.8 and 9 are shown in Figure I.27 and Figure I.28, respectively.</p>	
<p>Comment: A part of the fence with collapsed barbed wire was identified (Figure I.26). This was fixed during the site visit.</p>	
	Control room and monitoring system
<p>Enertis inspected the control room. It includes: an air conditioning unit, access system, supervisory control and data acquisition (SCADA) cabinet, CCTV rack with a monitor and uninterrupted power supply (UPS) for security cameras. Some of these are shown in Figure I.29 and Figure I.30.</p> <p>The control room is in good condition, anchored to the foundations by bolts and grounded.</p>	
<p>Comment: Enertis raises no issues.</p>	

Site visit findings (May 23, 2024)	
	Weather equipment
<p>Enertis inspected the two weather stations installed each near an MVS. The first one (Figure I.31) includes:</p> <ul style="list-style-type: none">• A horizontal pyranometer supplied by Hukseflux.• An ambient temperature sensor, wind wane, and anemometer, all mounted on the same mast.• A rain gauge (Figure I.32).• An auxiliary PV panel. <p>The second weather stations includes:</p> <ul style="list-style-type: none">• Two tilted pyranometers supplied by Hukseflux.• Two PT100 module temperature sensors (Figure I.33).• Two sets of reference cells, each containing a clean and a dirty cell (Figure I.34).	
<p>Comment: Following review of the EPC contract, Enertis determined that the installation of the weather stations complies with contractual specifications. In future EPC contracts, it is recommended that the tilted pyranometers should be spread across the Plant to provide more representative measurements.</p>	
	General site condition
<p>The Plant was found to be in decent condition considering the recent rainfalls. Some temporary facilities and construction materials were yet to be removed (Figure I.35). Enertis inspected the interior of manholes (Figure I.36) with no issues arising but found two manholes with damaged lids (Figure I.37 and Figure I.38).</p>	
<p>Comment: The points mentioned above were added to the Punch List.</p>	

Table 5.1. Overall Project status.

6. PUNCH LIST

Enertis has elaborated a draft Punch List containing the Minor Finishing Works observed during the site visits in a separate Excel file.



APPENDIX I. PHOTOGRAPHIC REPORT OF THE SITE VISIT



Figure I.1. Bridge just outside of the Plant perimeter.



Figure I.2. Access road and gate.



Figure I.3. Access gate grounding.



Figure I.4. Internal road.



Figure I.5. under construction.



Figure I.6. Parapet along site perimeter.



Figure I.7. Concrete compaction on the parapet.



Figure I.8. PV module rows.



Figure I.9. Trackers.



Figure I.10. Tracker numbering.



Figure I.11. Tracker pile with concrete foundation.



Figure I.12. Tracker pile with concrete foundation.



Figure I.13. Met station foundation.



Figure I.14. Met station cabinet.



Figure I.15. String cable management.



Figure I.16. String cable label.



Figure I.17. Inverter height.



Figure I.18. Corroded bolt on inverter pile.



Figure I.19. MVS.



Figure I.20. Oil level on MVS.



Figure I.21. Fire extinguisher.



Figure I.22. MVS grounding.



Figure I.23. MV cables emerging from the ground.



Figure I.24. PoC.



Figure I.25. Entrance to spare parts container.



Figure I.26. Fence with collapsed barbed wire.



Figure I.27. CCTV camera No.8.



Figure I.28. CCTV camera No.9.



Figure I.29. Control room digital padlock.

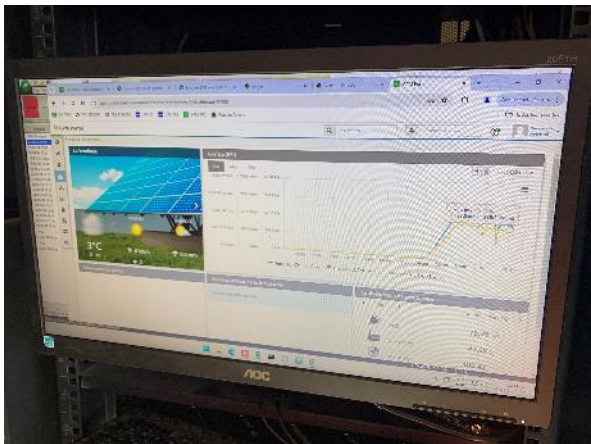


Figure I.30. SCADA system in control room.



Figure I.31. Main weather station.



Figure I.32. Rain gauge.



Figure I.33. PT100 module temperature sensor.



Figure I.34. Reference cells used for measuring soiling.



Figure I.35. Accumulated construction material.



Figure I.36. Manhole.



Figure I.37. Damaged manhole lid.



Figure I.38. Damaged manhole lid.



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