

**Capital Expenditure Report
for
the Proposed Project of
6GW Ingot Wafer , Solar Cell and Solar PV Module manufacturing facility
in the
State of Odisha,
India**



WAAREE ENERGIES LTD.

602, 6th Floor, Western Edge – I, Western Express Highway, Borivali (East), Mumbai - 400 066, Maharashtra,
India

By:


Oriens Advisors LLP

DISCLAIMER

Date: October 07, 2024

Oriens Advisors LLP has prepared this Project Report on **September 20, 2024** for the setting up new Manufacturing Unit (“**Proposed Project**”) at Odisha of Waaree Energies Limited (the “**Company**”), with its Registered Office at 602, 6th Floor, Western Edge – I, Western Express Highway, Borivali (East), Mumbai - 400 066, Maharashtra, India, on a best judgment basis.

While all reasonable care has been taken in its preparation, details contained in this report have been compiled in good faith based on information provided by Waaree Energies Limited. We have also examined and reviewed all the quotations, along with any other documents or information required for the project execution.

This Report is for information and for inclusion (in part or full) in any documents issued by the Company in connection with the proposed Initial Public Offering of its equity shares (the "**Offer**"), including the red herring prospectus and the prospectus of the Company intended to be filed by the Company with the Securities and Exchange Board of India, the stock exchanges where such equity shares are proposed to be listed, Registrar of Companies, Maharashtra at Mumbai and any other material which the Company may issue in relation to the Offer. This Report can be relied upon by the Company, any book running lead managers and the legal advisors appointed by the Company and the book running lead managers, in relation to the Offer. I hereby consent to the inclusion of this Report as part of “*Material Contracts and Documents for Inspection*” in connection with the Offer and have no objection with the Company uploading the Report on its website and sharing the Report with any regulatory, statutory or judicial authority.

EXECUTIVE SUMMARY

Project Highlights:

Company	Waaree Energies Limited ('WAAREE')
Constitution	Public Limited Company
Registered Office Address of the Company	602, 6th Floor, Western Edge – I, Western Express Highway, Borivali (East), Mumbai - 400 066, Maharashtra, India
Reg. / CIN No.	U29248MH1990PLC059463
Date of Incorporation	April 25, 2007
Proposed Project Site Address	Village Bandhunuagaon,, Tehsil Dhenkanal, Ambakhal, Tehsil Gondia, Chhatia, Tehsil Gondia in Dhenkanal District, Odisha in Dhenkanal District of Odisha
Business & Products	WAAREE is engaged in the production and global marketing of solar energy product portfolio consists of the following PV modules: (i) multicrystalline modules; (ii) monocrystalline modules; and (iii) Topcon Modules, comprising flexible modules and monocrystalline passivated emitter and rear cell modules, which includes bifacial modules (framed and unframed), building integrated photo voltaic modules. The Company's products are primarily sold under its flagship brand "WAAREE".
Scope of the Capital Expenditure Report	To assess the capital cost for setting up of the proposed project to be executed by Waaree through its wholly owned subsidiary named "Sangam Solar One Pvt. Ltd." at Bandhunuagaon, Ambakhal, Chhatia Villages in Dhenkanal District of Odisha
Summary of the cost of the Proposed Project	Proposed Project Cost (Refer Annexure I for details):

Sr. No.	Particulars	Status	Estimated Cost (in ₹ millions)
1.	Land	Leased	1,385.80
2.	Engineering Consultancy	Proposed	868.55
3.	Civil infrastructure and Development Works	Proposed	10,856.06
4.	Machinery	Proposed	44,228.34
5.	Utilities	Proposed	29,318.82
6.	IT Infrastructure	Proposed	929.96
7.	Freight Charges	Proposed	1,285.97
8.	Miscellaneous	Proposed	874.98
9.	Contingencies	Proposed	751.11
	Total Costs**		90,499.59

** The estimated cost includes applicable taxes and duties.

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CHAPTER 1 – BRIEF BACKGROUND OF THE COMPANY

Waaree is one of the major players in the solar energy industry in India focused on PV module manufacturing, with an aggregate installed capacity of 12 GW as of June 2024. The solar energy product portfolio consists of the following PV modules: (i) multicrystalline modules; (ii) monocrystalline modules; and (iii) TopCon Modules, comprising flexible modules and monocrystalline passivated emitter and rear cell modules, which includes bifacial modules (framed and unframed), building integrated photo voltaic modules. The Company operate four manufacturing facilities at Chikhli, Surat, Tumb and Nandigram in the State of Gujarat, India.

In order to support the growth strategy and to expand their manufacturing capabilities, the Company has recently been issued a Letter of Award for lease of 595.39 acres of land which is located over three villages Bandhunuagaon, Ambakhal, Chhatia Villages in Dhenkanal District of Odisha

Waaree proposes to implement the project through a 100% subsidiary named “Sangam Solar One Pvt. Ltd.”

CHAPTER 2- MANUFACTURING PROCESS

Manufacturing process of the key products of the Company

2.1. Ingot Manufacturing

Silicon is a non-casting material due to its physical and chemical properties. It is prone to chemical reactions with other substances during melting, hence crystal growing process needs to take place either in a vacuum or in the atmosphere of inert gas.

Solar ingot is produced from high-quality mono-crystal seed (single Si-crystal). The crystal seed is introduced in a polysilicon melted at high temperature of the order of 1425 Deg. C in a cylindrical crucible made of graphite and quartz. Polysilicon melt will be in contact with the quartz. On introduction of the seed crystal in the polysilicon melt, crystallisation occurs due to a slight drop in temperature. The seed crystal is pulled upwards and single mono-crystal clings to the seed crystal as a cylinder. By regulating the temperature, rate of pulling and speed, a silicon mono-crystal is pulled – whose structure is identical to that of seed crystal – in the form of ingots.

2.2. Manufacturing Process from Polysilicon to Ingot to Wafer

The production process of polysilicon ingot is as below.

2.2.1. Polysilicon Storage and conveying:

Polysilicon is the purest form of silicon and its purity is important in the performance of solar cells. Hence, it is required to be stored in the clean room and handled with abundant caution to maintain the purity and the raw material warehouse and conveyors are to be designed accordingly.

2.2.2. Crushing

Polysilicon can be received either in the form of stone or powder. The polysilicon stones are required to be crushed into smaller particles for better heating in the melting process.

2.2.3. Melting

The next stage is to melt the polysilicon. The polysilicon is charged into an electrically heated crucible. The polysilicon is melted at 1425 °c. The molten silicon is cooled gradually and seed mono silicon crystal mounted on a rotating shaft is introduced from the top. The melt solidifies at the seed crystal and adopts the orientation of the crystal. The crystal is rotating and pulled upwards slowly, allowing the formation of a large, single-crystal cylindrical column- ingot from the melt. To prevent the formation of impurities, the process is conducted in inert atmosphere line argon. The quality and length of the ingot is controlled by maintaining temperature, rate of pulling shaft upwards and rotational speed.

2.2.4. Ingot Cooling and Quality Check

The quality and length of the ingot is controlled by maintaining temperature, rate of pulling shaft upwards and rotational speed. With the latest production equipment, ingot length can be from 200 mm to 2000 mm. Upon rod formation, the ingot is cooled and taken form quality check. Rod length, diameter, resistivity, oxygen and carbon content, dislocation are measured and qualified rods are moved ahead for wafer manufacturing.

2.3. Manufacturing Process from Polysilicon to Ingot to Wafer

Wafer manufacturing process has been described below.

2.3.1. Machining

The ingot produced is conical from both ends due to pulling process. Hence both ends of the ingots are truncated and ground to achieve desired surface finish. The bar is further cropped from four sides. The cylindrical bar is now in brick form. Dimensions and surface will be inspected. The rejected silicon is reused by melting in the crucible.

2.3.2. Brick Bonding

The cylindrical ingot would be transferred through roller conveyors, however, Automated Guided Vehicles could also be used for after machining of the ingot. Hence a resin plate is attached to a plane of the ingot bar.

2.3.3. Wire Sewing / Slicing

- The average thickness of N-type silicon wafer cell is 140 μm . Diamond wire is used to slice the bar into small wafers. Diamond wire cutting is fast, wears less and environment friendly. The diameter of the diamond wire used to cut photovoltaic silicon wafers is 50 ~ 65 μm .

2.3.4. Wafer Debonding

The cut wafer are dipped into the lactic acid bath. The adhesive between wafer and resin plate expands after absorbing lactic acid and the resin plate separates from wafers. Wafers also gets separated from each other in the process.

2.3.5. Cleaning

The wafers are cleaned for any impurities such as silicon fumes, cutting fluid, organic layer, oxidation and metal power using cleaning agent and ultrasonic waves.

2.3.6. Inspection and sorting

- This is the last stage in the wafer manufacturing. The wafers are inspected for any surface defect by using visual inspection as well as electro luminated inspection. The accepted wafers are sorted using automated sorting machines are sent for cell manufacturing.

2.4. Manufacturing Process of Cells

2.4.1. Pre-Check and Pre-Treatment

The raw silicon wafer disks first undergo a pre-check during which they are inspected on their geometric shape and thickness conformity and on damages such as cracks, breakages, scratches, or other anomalies, followed by splitting of wafers and cleaning with industrial soaps to remove any metal residues, liquids or other production remains from the surface.

2.4.2. Texturing

Texturing is the process of etching the surface of the wafer by anisotropic (directional dependent) which creates a pyramidal serration thereby increasing the surface area to capture the incident light at different angles resulting to minimise the losses caused by the complete reflection of the light. Texturing is done by wet etching with both the alkaline and acidic solutions by using KOH, HF & H₂O₂.

2.4.3. Acid Cleaning

After texturing, the wafers undergo acidic rinsing where any post-texturing particle remains are removed from the surface. Using hydrogen fluoride (HF) vapor, oxidized silicon layers on the substrate can be etched away from the wafer surface. The result is a wet surface that can be easily dried. By using hydrogen chloride (HCl), metallic residues on the surface can be absorbed by the chloride and thus removed from the wafer.

2.4.4. Diffusion

The diffusion is a process of introducing the dopants into silicon via high-temperature thermal processes is one method in which silicon wafers are doped with extrinsic elements such as boron or phosphorous in a gaseous or liquid phase to form a p-n junction. N-type cell will be doped with Phosphorus (P) and PERC P- type cell will be doped with boron (B) to form a p-n junction.

Plasma-enhanced chemical vapor deposition (PECVD) system is one of the methods used in the recent times.

This stage can be divided further as follows

Primary Boron Expansion – In this process, the required dopant (Boron) is diffused into the surface of silicon wafer at high temperature.

Secondary Expansion (SE) – in SE, the energy from laser is used to melt the part of surface of silicon wafer and P element from PSG is doped in the melted portion of the silicon wafer.

Secondary Boron Expansion – This process is mainly to push the silicon wafer in diffusion furnace to form the emitter of P/N junction.

2.4.5. Etching and Rear polishing

Etching is done as the same process as cited above in the texturing process and rear side polishing is done by wet chemical treatment on single side is included in the production process for high efficiency solar cells. While polishing, rear side structures are flattened and thus surface enlargement decreases. This improves passivation quality and influences optical effects like light trapping. All these effects can help to increase the final cell efficiency.

2.4.6. PSG removal and RCA cleaning

In edge isolation, removal of PSG (Phosphorus silicate glass) and RCA cleaning is the process of wafer cleaning which removes the doped material on the edges and other sides of the wafer.

2.4.7. ALD Deposition – For Tunnelling Layer

Atomic layer deposition (ALD) is a thin film deposition and passivation technology which is used to fabricate ultrathin, highly uniform and conformal material layers on complex, three dimensional objects with atomic precision. ALD uses alternating, self-limiting surface controlled chemical reactions between gaseous precursors and a surface to deposit material in an atomic layer-by-layer.

Plasma Enhanced Chemical Vapor Deposition (PECVD) is one of the processes for depositing a variety of thin films at lower temperatures. Silicon nitride (SiNx) layer, positive charge is introduced for n-type surfaces and aluminium oxide (AlOx) is used in the rear passivation of p-type surfaces.

2.4.8. Screen Printing

Screen printing is the metallization process over solar PV cell using stencil to reproduce the same print repeatedly used to form the rear aluminium electrode and the front surface silver grid (busbars and fingers) on the silicon nitride antireflection coating (ARC)

This involves the application of three different metallization paste types onto the c-Si cell.

The first paste is the front side silver used on the side that faces the sun, creates the collector gridlines and silver bus bars, and the second is the rear side tabbing silver or silver-aluminium, and the third is rear-side aluminium paste that reacts with silicon to create the back surface field.

2.4.9. Inspection

Following screen printing and drying, solar PV cell undergoes visual and performance inspection process. Visual inspection will be carried with AOI (Automatic Optical inspection) and EL (Electroluminescence) where the cells are imaged and analysed for cracks, uniformity, dimensions, area defectors, bus bars and finger interruptions. In a final stage, the solar cells undergo performance testing with I-V Curve parameters in a solar simulator station.

2.4.10. Sorting and Packing

Based on the cell colour, size and defects identified in the above process, solar cells are sorted and redirected to either corrections or scrapped through automated conveying systems with the help of plant MES (Manufacturing Execution System) Solar cells become a raw material for manufacturing of solar module are further conveyed and packed.

2.5. Solar Module Manufacturing

Module manufacturing is the process of converting solar cells to solar module which generates power. This is the final process of solar value chain.

The detailed material flow for the solar module manufacturing is described below.

2.5.1. Cell cutting

Cell cutting is the process of slitting the solar PV cells to the required size based on the module size and power output of the solar module. Cell cutting is slitted with laser under controlled temperature with minimal heating and thermal effects.

2.5.2. Tabbing & Stringing

Post cell cutting the Solar cells goes through the tabbing and stringing. The tabbing is the process where the cells are connected in series with the coated copper wires and these connected arrays of cells are called strings and process is called stringing.

2.5.3. Glass Loader

This is a parallel activity running along with the laser cutting, tabbing, and stringing. Glass loader is a glass placing machine in the process followed by back sheet and EVA (Ethylene Vinyl Acetate) sheet.

2.5.4. Lay-up

Layup is an automation process where the glass, back-sheet, EVA and string of cells are placed one over the other as sandwich layers for further process.

2.5.6. Bussing.

Bussing is connecting the positive and negative terminals of each cell and joining the cell strings to the power output terminal i.e., junction box of the solar module with the help of ribbons.

Two different techniques followed by the manufacturers are

2.5.6.1. Manual bussing

2.5.6.2. Automatic bussing.

Automatic bussing has more advantages over the former as it is designed to handle the cells with car, minimizing the risk of cracks, scratches or other damage that could effect the performance and durability. By adopting the auto bussing, manufacturers can produce more panels in less time, reducing costs and increasing

production volumes while maintaining quality.

2.5.7. Automatic Optical inspection (AOI) and Electroluminescence (EL) testing

Automatic Optical inspection (AOI) and Electroluminescence (EL) the modules are checked for cracks, spots and defects in tabbing, stringing and bussing process before the lamination process. If the module found with any above said defects, module is directed for re-work thorough automated conveyors.

2.5.8. Lamination

During the Lamination process, the layered Solar module is fed to the lamination machine in which the air between the layers is vacuumed out and heated at $\sim 150^{\circ}\text{C}$. Post lamination the module will go through intermediate checks and trimming of excessive EVA and back-sheets.

2.5.9. Framing and Junction box fixing

Framing incudes fixing of aluminium frames on all sides of the module and applying adhesives and sealants along the sides of module for gluing the frame. Later module moves for fixing of junction box with the bus bar of the module.

2.5.10. Curing

Curing of module happens in the cooling chamber under controlled temperatures with dry air below 30°C that ensures the proper adhesion and bonding between the layers of the module and frames post applying of RTV (Room temperature vulcanizing) sealant.

2.5.11. Inspection & Testing

AOI & EL test is carried out for cracks, spots and defects post lamination, framing and curing. For performance checking the panel is moved to the sun simulator that provides the illumination approximating the natural sunlight based on artificial irradiation and therefore the reproduction of the standard conditions of temperature, irradiance and spectrum in which the module works.

In Sun simulator IV parameter is measured to read and check the power and efficiency of the module and immediate feedback there by ensuring the quality of the module.

2.5.12. Sorting and Packing

Based on the module capacity, type (mono-facial, bi-facial), size and defects identified in the above process, solar modules are sorted and redirected to either corrections or scrapped through automated conveying systems with the help of plant MES (Manufacturing Execution System).

Solar modules are further packed and stored in the designated area and racks.

CHAPTER 3 – EXISTING FACILITIES

As on date of this Capex Report, the Company undertakes the manufacturing operations from facilities located in Chikhli, Tumb, Nandigram and Surat, in the State of Gujarat , India. These Facilities include manufacturing units, storage warehouses and finished good depots. The facilities in Chikhli, Tumb, Nandigram, and Surat, are either owned by the Company or leased from Industrial Development Corporation's (on long term leases), or taken on lease from third parties/ promoter group members.

CHAPTER 4 – PROPOSED PROJECT

Proposed Project Justification

The Company proposes to tap the market potential in Solar energy category. The Company proposes to undertake the project through wholly owned subsidiary in the name and style of Sangam Solar one Private Limited.

The Company intends to continue to invest in the capacity expansion and backward integration of it's operations, which would enable the Company not only gain competitive advantage but also lead to benefits such as product improvement and cost reduction, that would help to improve the competitive advantage and ability to compete with larger global players. For the purpose of this Proposed Project, the Company, in the current calendar year, has been allotted land on a leased basis admeasuring 595.39 acres located over three villages viz Bandhunuagaon,, Tehsil Dhenkanal, Ambakhal, Tehsil Gondia, Chhatia, Tehsil Gondia in , Dhenkanal District, Odisha.

The Company intends to use a portion of the Net Proceeds from the Initial Public Offering for construction of the proposed new manufacturing facilities, towards investing in plant & machineries, utilities to expand its module production capabilities and to achieve backward integration of it's operations to the extent of Cell, wafer and Ingot manufacturing, that shall allow the Company to increase its production capacity, derisk the supply chain and reduce the dependence on imported components and improvise the profitability.. (“**Proposed Project**”). The total estimated cost for setting up the Proposed Project is mentioned below:

Sr. No.	Particulars	Total Estimated Cost** (in ₹ millions)	Total Amount already deployed from Internal Accruals as on August 31, 2024 (in ₹ millions)	Total Amount to be deployed from the Net Proceeds and Internal Accruals (in ₹ millions)
1.	Land	1,385.80	1,385.80	-
2	Engineering Consultancy	868.55	80.90	787.65
3.	Buildings and Civil works	10,856.06		10,856.06
4.	Purchase of machinery including Ingot and Wafer Manufacturing machines, Cell Manufacturing, Module Manufacturing machines and other related ancillaries	44,228.34		44,228.34
3.	Utilities	29,318.82		29,318.82
4.	IT Infrastructure	929.96		929.96
5.	Freight	1,285.97		1,285.97
6.	Miscellaneous	874.98		874.98
7.	Contingencies	751.11		751.11
	Total Project Cost	90,499.59	1,466.70	89,032.89

The Estimated Cost includes applicable taxes and duties. Customs Duty and Goods and Service Tax for import of equipment has not been considered as Waaree proposes to avail benefits under Manufacturing and Other Operations in Warehouse Regulations (MOOWR) / Export Promotion Capital Goods (EPCG) scheme of the Government of India scheme for export goods as notified by Government of India and Good and Service Tax services are based on assessable value of services where ever they are excluded

Land:

Lease deed dated 24th June 2024 entered between The Odisha Industrial Infrastructure Development Corporation and M/s Waaree Energies Limited. The Company has received an allotment letter from Odisha Industrial Infrastructure Development Corporation (IDCO), a Government of Odisha undertaking, dated 7th September 2023 and allotment letter dated 9th October 2023, regarding allotment of the above land admeasuring 595.39 acres The details of the land allotted to the Company on a long-term lease basis are as follows:

Sr. No.	Name of Village, Tehsil	Present Area (Acres)
1.	Bandhunuagaon, Dhenkanal	478.65
2.	Ambakhal, Gondia	53.01
3.	Chhatia, Gondia	63.73
4	Total	595.39

Sr. No.	Particulars	Cost (in ₹ millions)
1.	Land Cost	1,240.09
2.	IDCO Admin cost	124.01
3.	Annual Rent	21.70
	Total Consultancy	1,385.80

Waaree has made the requisite payment as advance to IDCO of Rs 1385.50 Million to IDCO as on [30th November 2023].

Engineering Consultancy:

The Company has invited quotations from various agencies to provide consultancy for a) total plant design including concept design, basic design, detailed design, technical specifications and technical support b) Detailed engineering for Ingot and Wafer plant c) Detailed engineering for Cell Manufacturing plant d) Detailed engineering for Module Manufacturing plant & Other Complementary Services, and e) Project Management consultancy.

Cost associated with consultancy is

Sr. No.	Particulars	Cost (in ₹ millions)
1.	Total Plant Design	283.22
2.	Detailed Engineering Design for Ingot and Wafer Plant	98.40
3.	Detailed engineering for Cell Manufacturing plant	127.92
4.	Detailed engineering for Module Manufacturing plant	39.36
5.	Other Complementary Services	98.40
5.	Mechanical Engineering Plumbing	26.55
6.	Project Management consultancy	194.70
	Total Consultancy	868.55

Building Construction and Civil work:

The Company plans to construct 4 buildings totalling to an area of approximately 2,024,154 sq. feet as a part of its Proposed Project. Building and civil works for the proposed expansion include construction related work including building the foundation, structure, roof, doors and windows, drainage and sewerage system, Electrical Substation, Gas Station, Waste Heat Recovery Station, Stores, Workshops, Administrative Building and other Infrastructure works like internal roads, Parking area, Drainage, The detailed scope of work in building construction and civil work is provided in **Annexure I**. The costs associated with the construction of building and civil work comprises of as follows:

Sr. No.	Particulars	UoM	Area (Approximate)
1	Ingot and Wafer Building	Sq. feet.	568,106
2	Cell Line Building	Sq. feet.	712,742
4	Module Line Building	Sq. feet.	743,301
5.	Electrical Substation	Sq. feet.	163,982
6.	Gas Station	Sq. feet.	360,223
7.	Waste Heat Recovery Station	Sq. feet.	635,131

8.	Stores	Sq. feet.	2,048,424
9.	Work Shops	Sq. feet.	
10.	Other Plant Areas including Administration Buildings	Sq. feet.	314,170
11.	Site Development	Million Cu.M	1.915

Sr. No.	Particulars	Cost (in ₹ millions)
1.	Civil Works for Infrastructure	10,336.39
2.	Site Development	519.67
Total		10,856.06

Purchase of Machinery:

The Company has identified the machinery it intends to purchase and install at the Proposed Project. The key plant and machinery include purchase and installation of equipment for a) Ingot and Wafer Plant, b) Cell Manufacturing Plant, c) Module Manufacturing plant along with laboratory which will be utilised for the purposes of setting up of the Proposed Project. The details of the plant and Machinery that will be installed at the Proposed Project, the detailed break-up of which is provided in **Annexure II**.

The major costs associated with the plant, machineries and other items are as follows:

Sr. No.	Particulars	Cost (in ₹ millions)
1.	Ingot and Wafer Plant	20,065.59
2.	Cell Manufacturing Plant	20,041.54
3.	Module Manufacturing plant	4,121.21
4.	Total Purchase of machinery:	44,228.34

* Basis the quotations received from multiple suppliers of these plant, machineries & others, details of which are provided in Annexure II.

Utilities:

The Company intends to procure Utilities for each of the Ingot and Wafer Plant, Cell Manufacturing Plant and Module Manufacturing plant requirement for the proposed project at the said location.

The various utilities proposed are

a) **for Ingot and wafer Plant** comprising are Chillers Centrifugal, Pump House, Cooling Towers, Compressors, Dryer, Receiver, Piping, Argon Recovery System, Argon Liquid Storage, Exhaust and Scrubber, Process Water, Room Temp PCW for pullers, HVAC AHU including Ducting and Piping, Deionised Water, Reverse Osmosis(RO) + ElectroDeionisation (EDI), Effluent Treatment Plant and Recycling System, Chemical Distribution Unit and Piping, DG Sets, UPS and all Electrical system,

b) **for Cell Manufacturing plant** comprising Abatement System (Waste Gas) with Piping, Piping - PECVD Vacuum, Pumps to Abatement System, Compressed Dry Air & Piping, Special Gases Delivery System, Chemical Delivery System, Chemical Scrubber, Piping & General Exhaust, DI, ETP (Waste Water) & Piping, Process Cooling Water with Chiller & PHE Pumps, Clean Room, HVAC, with piping, Cooling Towers, DG Sets, UPS, Electrical systems,

c) **for the Module Manufacturing Plant** comprising Compressed Dry Air & Piping, Clean Room, HVAC with Chillers, Exhaust Air System with Piping, DG Sets, UPS, Fire Safety System, Electrical Misc - Lightings, earthing, cabling, site services, and

d) **Common Utility** comprising Electrical Line etc. The details of Utilities that will be installed at the Proposed Project and the detailed break-up of which is provided in **Annexure III**

Sr. No.	Particulars	Cost* (in ₹ millions)
1.	Ingot and Wafer Plant	8,899.88
2.	Cell Manufacturing Plant	17,996.21
3.	Module Manufacturing plant	829.74
4.	Common	1,593.00
	Total Utilities	29,318.82

* Basis the quotations received from multiple suppliers, details of which are provided in Annexure III.

IT Infrastructure :

The Company has also invited quotes of the Information Technology Infrastructure for the a) Ingot and Wafer Plant, b) Cell Manufacturing Plant and c) Module Manufacturing plant

The details of IT Infrastructure that will be installed at the Proposed Project and the detailed break-up of which is provided in **Annexure IV**

Sr. No.	Particulars	Cost* (in ₹ millions)
1.	Ingot and Wafer Plant	436.60
2.	Cell Manufacturing Plant	436.60
3.	Module Manufacturing plant	56.76
4.	Total IT Infrastructure	929.96

* Basis the quotations received from multiple vendors details of which are provided in Annexure IV.

Freight charges

The Company intends to engage with specialist loading, unloading and freight forwarders for the various equipment

The details of scope of work comprises the freight charges, port and customs clearances, Unloading, Erection and Local movement and the detailed break-up of which is provided in **Annexure V**

Sr. No.	Particulars	Cost (in ₹ millions)
1.	Ingot and Wafer Plant	585.73
2.	Cell Manufacturing Plant	415.70
3.	Module Manufacturing plant	284.54
4.	Total Freight and Unloading	1,285.97

* Basis the quotations received from multiple vendors details of which are provided in Annexure V.

Miscellaneous

The Company has budgeted about Rs 874.98 Million towards purchase of minor material handling equipment, pre-operative tools, fire safety systems and consultancy, unquoted insurance and freight charges

Contingencies:

Contingencies comprises costs related to increase in a) scope of work for all the plant and machinery, civil, utilities, freight and IT infrastructure which will be finalised along with detailed engineering., b) foreign exchange variations , c.) taxes and duties etc.. The estimated contingency is 0.85%% of the hard cost costs at Rs. 751.11 Million

CHAPTER 5 – PROPOSED PROJECT TIMELINES DEPLOYMENT OF ESTIMATED COST & KEY APPROVALS

Project Timelines

Based on the past experience of the execution of the projects by the Company, discussions with the management and the experience of the personnel involved, the Company is very well placed to execute the Proposed Project within the timelines it has defined and which are mentioned hereunder:

Particulars	Estimated date of commencement	Estimated date of completion
Acquisition of Land (by way of lease)	December 2023	June 2024*
Consultancy	August 2024	October 2026
Building Construction & Civil Work	December 2024	December 2025
Plant & Machineries	February 2025	October 2026
Utilities	December 2024	September 2025
Commercial Production- Solar Module Plant		31 st July 2025
Commercial Production- Solar Cell Plant		30 th April 2026
Commercial Production- Solar Ingot and Wafer Plant		31 st October 2026

*The Company has leased the land for the Project pursuant to a lease agreement with IDCO dated June 24, 2024. The Company has made an application to IDCO dated September 23, 2024 seeking IDCO's consent to sublease the said land to the Project Company.

Considering the Company's plans to construct four buildings at the new manufacturing facility. These building are expected to be completed in a phased manner. Accordingly, installation and commissioning of the plant & machineries shall also happen in a phased manner. Consequently, the commercial production shall also start in a phased manner. However, the table above considers the timelines for completion of the entire Proposed Project.

Deployment of Estimated Costs

The proposed deployment of the of estimated costs towards the Proposed Project is as follows:

(in Rs. Million)

Particulars	Total estimated amount/ expenditure (A)	Total amount spent on the Objects as of August 31, 2024 (B)	Balance amount to be incurred (C=A-B)	Estimated utilisation from Net Proceeds	Year wise break-up of Utilisation from Net Proceeds		
					Fiscal 2025	Fiscal 2026	Fiscal 2027
					Cost of Proposed Project	90,499.59	1,466.70
General corporate purposes ⁽¹⁾	[•]	-	[•]	[•]	[•]	[•]	[•]
Total ⁽¹⁾	[•]	1,466.70	[•]	[•]	[•]	[•]	[•]

⁽¹⁾ To be finalised upon determination of the Offer Price.

Key Approvals

Companies engaged in the manufacturing activities in India are regulated by various central, state & local legislations. Additionally, functioning of these units requires the sanction of concerned authorities, at various stages, under relevant legislations and local laws. With respect to the Proposed Project, the Company would be required to obtain approvals from certain governmental and local authorities, an indicative list of which is mentioned below:

Sr. No.	Approval Description	Approving Authority and Department	Stage at which the approval is required	Status of the approval
1.	Lease of land *	Gram Panchayat / Concerned Local Authority	Prior to commencement of civil works	Completed
2.	Environmental Clearance from Ministry of Environment, Forest, and Climate Change	Central Pollution Control Board	Prior to commencement of civil works	To be applied for at the appropriate stage
3.	Consent to Establish	Odisha State Pollution Control Board	Prior to commencement of civil works	To be applied for at the appropriate stage
4.	Approved factory layout plan	Gram Panchayat / Concerned Local Authority	Prior to commencement of civil works	To be applied for at the appropriate stage
5.	License to work a Factory, as per Factories Act, 1948	Directorate of Industrial Safety and Health, Odisha State	Upon completion of civil works and prior to commencement of commercial production	To be applied for at the appropriate stage
6.	Import Export Code (IEC)	Directorate general of foreign trade, Ministry Commerce, and industry	Prior to undertaking export of goods	To be applied for at the appropriate stage
7.	Manufacturing and Other Operations in Warehouse Regulations / Export Promotion Capital Goods scheme	Director General of Foreign Trade	Prior to commencement of commercial production	To be applied for at the appropriate stage
8.	Approval for usage of Power required for construction as well as operation	Electricity Board / State Power Distribution Agency	During the period of construction	To be applied for at the appropriate stage
9.	Drawing Approval for Electrical Installation	Chief Electrical Inspector, Odisha	During the period of construction	To be applied for at the appropriate stage
10.	Approval for load connection at substation	Chief Electrical Officer	During the period of construction	To be applied for at the appropriate stage
11.	Approval for usage of water required both during construction and operation	Water Resources Department	During the period of construction and subsequently during the period of commercial operation	To be applied for at the appropriate stage
12.	Raw Water Cross-Country Pipeline	IDCO	During the period of commercial operation	To be applied for at the appropriate stage
13.	Building Plan Approval	Town & Country Planning Department	Prior to commencement of civil works	To be applied for at the appropriate stage
14.	Fire NoC	Odisha Fire Service Department	Prior to commencement of commercial production	To be applied for at the appropriate stage
15.	Building and Construction Workers Registration	Directorate of Industrial Safety and Health, Odisha State	During the period of construction	To be applied for at the appropriate stage
16.	Consent to Operate	Odisha Pollution Control Board	Upon completion of construction and before commercial production	To be applied for at the appropriate stage

17.	License to store and handle Hazardous substances	Petroleum & Explosives Safety Organization (PESO)/ Ministry of Commerce & Industry	During the period of commercial operation	To be applied for at the appropriate stage
18.	Insurance under Public Liability Insurance Act, 1991	Directorate of Factories – Labour department	During the period of commercial operation	To be applied for at the appropriate stage

**The Company has leased the land for the Project pursuant to a lease agreement with IDCO dated June 24, 2024. The Company has made an application to IDCO dated September 23, 2024 seeking IDCO's consent to sublease the said land to the Project Company.*

Taking into consideration the experience of the Company, and the team which is involved in the Proposed Project, the Company is well placed to apply for and get the required approvals/ licenses/ certifications for the Proposed Project.

CHAPTER 6 – CONCLUSIONS & RECOMMENDATIONS

Oriens Advisors LLP has assessed the cost estimates of the Proposed Project for reasonableness and fairness based on the following:

- Specifications provided
- Proposals invited by the Company and the Budgetary (non-negotiated) Quotations/ Proposals received from vendors with the scope of work
- Similar manufacturing facilities commissioned by the Company
- Basic engineering for the project
- Clarifications and representations provided by the Company

Oriens confirms that all budgetary quotations/ proposals invited by the Company are related to first hand and brand-new machines/ equipment.

For the Building Construction and Civil Works, the Company has invited and received turnkey quotations.

Goods and Service Tax for quotations received from domestic vendors and service providers are based on the current applicable rates of 18% and 28%. Goods and Service Tax and Customs Duty have not been considered for imported equipment as Waaree proposes to avail benefits under Manufacturing and Other Operations in Warehouse Regulations (MOOWR) / Export Promotion Capital Goods (EPCG) scheme of the Government of India scheme for export goods. Goods and service tax on import of Services have been considered at 18% grossed up for withholding tax

The Company proposes to procure insurance for those goods which have been quoted without insurance. The cost of insurance has been estimated and included in the miscellaneous as they are negligible compared to the overall cost.

Certain quotations have been received without freight charges. They have been excluded as they constitute a minimal percentage of overall costs.

Oriens has only referenced the signed budgetary quotations and proposals for technical specifications of the capital expenditure programme and timelines for implementation schedules but does not opine on any other conditions of the agreements.

Oriens Advisors estimates that the costs are fair and reasonable.

The implementation of the facilities is estimated to be completed in phases by Fiscal 2025, Fiscal 2026 and Fiscal 2027

Oriens does not have expertise in the laws relating to approvals required and based on experience the list of approvals specifically required for setting up the plants is given.

Based on the detailed discussions with various senior level personnel, Oriens Advisors LLP is of the opinion that Waaree Energies Limited is capable of executing the Proposed Project within the estimated cost and within the desired timelines.

Yours faithfully,



Oriens Advisors LLP



Membership No.: LLP IN: AAN 6288

Place: Mumbai

Date: October 07, 2024

1. Land:

The Company has received an allotment letter from Odisha Industrial Infrastructure Corporation, IDCO, an undertaking of the Government of Odisha, dated 7th September 2023 and allotment letter dated 9th October, 2023, regarding allotment of the above land admeasuring 595.390 acres The details of the land allotted to the Company are as follows:

Sr. No.	Name of Village, Tehsil	Present Area (Acres)
1.	Bandhunuagaon, Dhenkanal	478.65
2.	Ambakhal, Gondia	53.01
3.	Chhatia, Gondia	63.73
4	Total	595.39

The land has been allotted for a period of 76 years under lease.

As per the terms of the letter of allocation, Waaree is required to make the following payments

Sr. No.	Description	Rs. Million
1.	Land Rate	1,240.09
2.	IDCO Administration Charges	124.01
3.	Annual Rent	21.70
4.	Total	1,385.80

Waaree has made following payments to IDCO

Sr. No.	Description	Rs. Million
1.	Land Rate	1,240.09
2.	IDCO Administration Charges	124.01
3.	Annual Rent	21.70
4	Total	1,385.80

2. Consultancy:

2.1. *Basic Engineering*

2.1.1. *Scope*

Design Consultancy for all facilities and Utilities including concept design, basic design, detailed design, Owners Engineer during procurement, execution and commissioning and as built drawing

2.1.2. Waaree has received quotation from Suhua construction Group Co. Ltd for the above scope as follows

Description	Design Consultancy
Vendor	Suhua construction Group Co. Ltd
Date of Quotation	31 st May 2023
Validity of Quote	31 st December 2024
Price.	USD 2.80 Million
Taxes and Duties	USD 0.56 Million
Freight	Not Applicable
Insurance	Not Applicable
Total Cost	USD 3.36 Million
Total Cost	INR 275.52 Million

2.1.2

Description	Vastu Consulting
Vendor	Sarang Archibuild
Date of Purchase Order	12 th July 2024
Price.	INR 3.5 Million
Taxes and Duties	INR 0.63 Million
Freight	Not Applicable
Insurance	Not Applicable
Total Cost	INR 4.13 Million
Total Cost	INR 4.13 Million

2.1.3 Providing Services for carrying out Hydrology Study, Surface Water Assessment, Ground Water Assessment and Flood Analysis (HSGF) for proposed development at ODISHA for Wafer, Solar Cell and Module

Description	HSGF Service
Vendor	CADD Consulting Engineers Private Limited
Date of Purchase Order	17 th July 2024
Price.	INR 3.03 Million
Taxes and Duties	INR 0.54 Million
Freight	Not Applicable
Insurance	Not Applicable
Total Cost	INR 3.57 Million
Total Cost	INR 3.57 Million

2.2. *Detailed engineering for the entire plant*

2.2.1. *Scope of work shall include*

The scope of work of the Consultant broadly covers, to provide Engineering Design Services to Sangam

for the Project as specified in the Annexure A annexed to this Contract (collectively, the "Services"). The Project includes all buildings and systems that are related to process production and power including but not limited to ingot workshop, wafer workshop, cell workshop, modules workshop, supporting raw material warehouse, finished product

2.2.2. Waaree has placed Order for the above scope on The IT Electronics Eleventh Design & Research Institute Scientific and Technological Engineering Co. Ltd.as follows

Description	Engineering Design Ingot Wafer Plant
Vendor	The IT Electronics Eleventh Design & Research Institute Scientific and Technological Engineering Co. Ltd.
Date of Purchase Order	11 th July 2024
Price.	USD 1.00 Million
Taxes and Duties	USD 0.20 Million
Freight	Not Applicable
Insurance	Not Applicable
Total Cost	USD 1.20 Million
Total Cost	INR 98.40 Million

2.3. Detailed engineering for Cell Manufacturing plant

2.3.1. Waaree has placed Order for the above scope on The IT Electronics Eleventh Design & Research Institute Scientific and Technological Engineering Co. Ltd.as follows:

Description	Engineering Design for Solar Cell
Vendor	The IT Electronics Eleventh Design & Research Institute Scientific and Technological Engineering Co. Ltd.
Date of Purchase Order	11 th July 2024
Price.	USD 1.30 Million
Taxes and Duties	USD 0.26 Million
Freight	Not Applicable
Insurance	Not Applicable
Total Cost	USD 1.56 Million
Total Cost	INR 127.92 Million

2.4. Detailed engineering for Module Manufacturing plant

2.4.1. Waaree has placed Order for the above scope on The IT Electronics Eleventh Design & Research Institute Scientific and Technological Engineering Co. Ltd.as follows

2.4.2.

Description	Engineering Design
Vendor	The IT Electronics Eleventh Design & Research Institute Scientific and Technological Engineering Co. Ltd.
Date of Purchase Order	11 th July 2024
Price.	USD 0.40 Million
Taxes and Duties	USD 0.08 Million
Freight	Not Applicable
Insurance	Not Applicable
Total Cost	USD 0.48 Million
Total Cost	INR 39.36 Million

*rounded to second decimal

2.5. Other Complementary Services

Waaree has placed Order for the above scope on The IT Electronics Eleventh Design & Research Institute Scientific and Technological Engineering Co. Ltd.as follows

Description	Engineering Design
Vendor	The IT Electronics Eleventh Design & Research Institute Scientific and Technological Engineering Co. Ltd.
Date of Purchase Order	11th July 2024
Price.	USD 1.00 Million
Taxes and Duties	USD 0.20 Million
Freight	Not Applicable
Insurance	Not Applicable
Total Cost	USD 1.20 Million
Total Cost	INR 98.40 Million

2.6. Detailed engineering for Mechanical Electrical and Plumbing (MEP),

2.6.1. Scope

Design & Engineering consultancy for Mechanical Electrical Plumbing

2.6.2. Waaree has received quotation from Avant Garde Cleanroom & Engg. Solutions Pvt. Ltd. for the above scope as follows

Description	Engineering Design for MEP
Vendor	Avant Garde Cleanroom & Engg. Solutions Pvt. Ltd.
Date of Quotation	2 nd December 2023
Validity of Quote	December 2024
Price.	INR 22.50 Million
Taxes and Duties	INR 4.05 Million
Freight	Not Applicable
Insurance	Not Applicable
Total Cost	INR 26.55 Million

2.7. Project Management consultancy

2.7.1. Scope

2.7.1.1. Technology & Capital Equipment Sourcing

2.7.1.2. Assessment of Vendor ecosystem

2.7.1.3. Procurement Support Services

2.7.1.3.1. Organization structure and capability development plans

2.7.1.3.2. communication/coordination among project stakeholders

2.7.1.3.3. Project readiness assessment & development of execution methodologies

2.7.1.3.4. Project Approvals / Clearances / Permits submissions

2.7.1.3.5. Regulatory support for benefit realisation

2.7.2. Cost

Waaree has issued Purchase Order to Tata Consulting Engineers Limited (TCEL) on fixed cost lump sum and manpower deployment basis. Based on the price quoted and estimated man hours, quoted by TCEL Waaree has estimated the total cost as follows

Description	Project Management Consultancy
Vendor	Tata Consulting Engineers Limited (TCEL)
Date of Purchase Order	10 th July 2024
Total	INR 165.00 Million
Taxes and Duties	INR 29.70 Million
Freight	Not Applicable
Insurance	Not Applicable
Total Cost	INR 194.70 Million

3. Civil Works

3.1. Scope of Civil Works

3.1.1. Civil Works comprises entire site development and Infrastructure Works and construction of Buildings - Main Sheds, Substation, Gas Station, Waste Recovery System, Ware Houses, Storage, Store, Workshop, and Other Plant Areas

3.1.2. The detailed area to be developed are as follows:

SI No	Description	Unit	Floor	Area - Sqft
A	Buildings - Main Sheds			
	6 GW Ingot and Wafer	1	1/2/3.	5,68,106
	6 GW Ingot Part (RCC + PEB)			
	6 GW Cell Line	1	1/2.	7,12,742
	6 GW Module Line	1	1/2.	7,43,301
				20,24,150
B	Substation			
	110 KVA Substation			1,63,982
				1,63,982
C	Gas Station			
	Argon Recovery			1,17,467
	Special Gas Room	1		3,723
	Hydrogen Station			3,723
	Ammonia			8,780
	Air Separation Nitrogen Station	1		29,396
	Hydrogen Production Workshop			1,97,134
				3,60,223
D	Substation			
	ETP	1		3,02,173
	Desulfurization & Denitrification			11,190
	Kangen Water System			87,156
	Fire Pool	1		2,34,611
				6,35,131
E	Ware Houses			
		1		11,621
		2		6,886
		3		10,330
	Chemical Ware Houses	4		7,102
		5		10,330
		6		10,330
		1		93,160
	Utility Station	2		2,02,686
		1		3,723
	Silane Station	2		3,723
	Ware House			1,60,184
	Silicon Raw Material			3,98,981
				9,19,055
F	Storage			

	Hazardous Waste Storage		12,202
	Solid Storage Recyclable		12,202
		1	30,279
	Waste Store	2	12,202
		3	10,975
		4	66,239
	Chlorosilane Tank		1,74,118
			3,18,216
G	Store		
	Wafer Store		8,11,153
	Cell Store		
	Module Store		
			8,11,153
H	Other Plant Areas		-
	Office Building	5	2,15,200
	Canteen	2	80,700
	Infirmary		16,140
		1	355
		2	355
	Guard Rooms	3	355
		4	355
		5	355
		6	355
	Hostel & Guest Houses		75,000
	Site Development & Infra Works		3,14,170
J	Internal Roads		1,30,000
	Parking Area & Garden		5,22,720
	Drainage System Internal		150000 RFT
	Drainage System External		46000 RFT

3.2. Waaree has invited budgetary quote from on sum turkey basis contract with Desai Construction Pvt Ltd. for setting up of the infrastructure facilities as mentioned above.

Description	Entire Civil Works
Vendor	Desai Construction Pvt Ltd
Date of Quote	24 th November 2023
Validity of Quote	31 st December 2024
Lump sum Turnkey Price	INR 8,759.65 Million
Taxes and Duties	INR 1,576.74 Million
Freight	Not Applicable
Insurance	Not Applicable
Total Cost	INR 10,336.39 Million

3.3. Waaree has invited quotations from on sum turkey basis contract with Desai Construction Pvt Ltd. for land levelling estimated at 19.15 million cu meters .

Description	Site Developments
Vendor	Desai Construction Pvt Ltd
Date of Quote	24 th November 2023
Validity of Quote	31 st December 2024
Lump sum Turnkey Price	INR 440.40 Million
Taxes and Duties	INR 79.27 Million

Freight	Not Applicable
Insurance	Not Applicable
Total Cost	INR 519.67 Million

4. Machineries:

The machines proposed to be procured are for 384 nos . of Ingot manufacturing, 12 nos. of Cell Manufacturing Lines and 12 nos of Module Manufacturing Lines

4.1. Ingot and Wafer Plant comprising

4.1.1. Main Plant comprising

4.1.1.1. Scope

Sr.No.	Description	Quantity
1	Si cleaner system including Si cleaner system including : 1. the automatic silicon cleaning machine of square basket type 2.the automatic silicon cleaning machine of rotary type 3. the edge pre-cleaning machine 4.CDS acid supply system 5. the manual cleaning machine	1
2	Si crusher line including Si crusher line includes: 1. the crusher 2. the screen machine 3. the magnetic separator	2
3.	Crystal Grower Crystal grower supply scope includes: 1. the main machine 2. the cooling shield 3. the tungsten cables (1 pc/set) 4. the controlling system and operation interface 5. IGBT power supply 6. UPS 7. Filter 8. Vacuum pump (Main & auxiliary)	384
4.	Hot Zone	384
5.	Extension Chamber	384
6	automation, shaping	1
7	Single Diamond Wire Cropper	5
8	Multi Diamond Wire Cropper	4
9	Diamond Wire Squarer	14
10	Grinder	24
11	gluing automation	1
12	slicing automation	1
13	Diamond Wire Slicer	66
14	Degluing	4
15	Brick Holder Cleaner	6
16	Wafer singulator & Cleaner	13
17	Wafer Sorter	13

4.1.1.2. Waaree has received budgetary quote from Linton Technologies Group for supply as follows

Description	Wafer Manufacturing Plant
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Vendor	Linton Technologies Group
Date of Quotation	12 th October 2023
Validity of Quote	31 st December 2024
Price.	USD 186.35 Million
Taxes and Duties*	USD 0.00 Million
Freight	Not Included
Insurance	Not Included
Total Cost	USD 186.35 Million
Total Cost	INR 15,280.37 Million

*Exempted under MOOWR/ EPCG scheme

4.1.2. Wafering Equipment

4.1.2.1. Waaree has received budgetary quote from Qingdao Gaoce Technology Co. Ltd. for supply as follows

Description	Wafering Equipment
Vendor	Qingdao Gaoce Technology Co. Ltd.
Date of Quotation	30 th May 2024
Validity of Quote	30 th May 2025
Price.	USD 52.60 Million
Taxes and Duties	USD 0.00 Million
Freight	Excluded
Insurance	Excluded
Total Cost	USD 52.60 Million
Total Cost	INR 4,313.22 Million

4.1.3. Laboratory Equipment

4.1.3.1. Scope

4.1.3.1.1. Turnkey supply of laboratory equipment comprising Fully integrated Workstation is a fully integrated solution (Nos 4) , Laser Depaneling System with Accuracy: 50 µm, System Repeatability: 20 µm (Nos 4), Fully automatic continuous downfeed grinding machine - Output : 2.5--7.5 tons/24 hours (Nos 3), Automatic handling, inspection and wafer sorting system with 00 MHz Bandwidth Pulser/Receiver for transducers from 100 to 400 MHz Nos 4, Acoustic Microscope Nos 6, Supporting Accessories and movable furniture

4.1.3.2. Waaree has received budgetary quote from Global Marketing Services.for supply as follows

Description	Supply, Installation, Commissioning & Site Acceptance Test of Laboratory Equipment
Vendor	Global Marketing Services
Date of Quotation	11 th December 2023
Validity of Quote	31 st December 2024
Price.	INR 400.00 million
Taxes and Duties	INR 72.00 million
Freight	Included
Insurance	Included
Total Cost	INR 472.00 Million

4.2. Cell Manufacturing Plant

4.2.1. Main Plant

4.2.1.1.

Scope : Supply of Main Plant

Process	No.	Name	Qty. Set
Texturing	1	Mono Texturing Equipment H2O2, 720wafers/Carrier, 17baths	8
	1.1	Wafer Loader/Unloader Incl. wafer breakage detector	8
LP Boron Diffusion	2	Boron Diffusion 6 tubes, 2880pcs/boat for 182	13
	2.1	Wafer Handling System for Diffusion (Inline, 1 by 1)	13
SE Laser	3	SE Laser with Automation	14
2 nd Boron Diffusion (Annealing)	4	Boron Diffusion 6 tubes, 2880pcs/boat for 182	16
	4.1	Wafer Handling System for Diffusion (Inline, 1 by 1)	16
Etching& Backside Polishing	5	6+6 lanes BSG removal	10
	5.1	Alkaline Polishing H2O2, 480wafers/Carrier	10
	5.3	Wafer Loader/Unloader for BSG with Transfer Robot	10
	5.4	Wafer Unloader for Bath Polish	10
PE-Poly	6	PECVD-Poly 6 tubes, 768pcs/boat for 182	18
	6.1	Wafer Handling System for PECVD for 768pcs/boat	18
LP Annealing	7	LP Annealing Equipment 6 tubes, 6 tubes, 2880pcs/boat for 182	13
	7.1	Wafer Handling System for Annealing (Inline, 1 by 1)	13
RCA for Wrap around	8	6+6 lanes, PSG removal	10
	8.1	RCA Cleaning 20 baths, H2O2	10
	8.2	Wafer Loader/Unloader for PSG with Transfer Robot	10
PEALD (AlOx, Si3N4), Front Side	9	PECVD 6 tubes, 768pcs/boat for 182	27
	9.1	Wafer Handling System for PECVD for 768 pcs/boat	27
PE (Si3N4),	10	PECVD 6 tubes, 768pcs/boat for 182	15

Rear Side Passivation	10.1	Wafer Handling System for PECVD for 768pcs/boat	15
Pre-coating	11	Pre-coating for graphite boat	4
Metallization	12	Print line 4xPrinter, 3xDryer, Firing, Tester and Sorter IV/AOI/EL included	12
	12.1	Offline Tester	3
Auxiliary Equipment	13	Graphite Boat Cleaning	5
	14	PE-poly Graphite Boat Cleaning	2
	15	Oven hood	21
	16	Quartz Boat Cleaning	2
	17	Quartz Tube Cleaning	1
	18	Rework Wafer Cleaning Equipment	2
	19	Carriers Cleaning (Manual)	1
	20	Carriers (PVDF, Wet bench)	12600
	21	Carriers (PP, Transfer)	7200

4.2.1.2. *Waaree has received budgetary quote from Shenzhen S.C New Energy Technology Corporation for supply as follows*

Description	Equipment
Vendor	Shenzhen S.C New Energy Technology Corporation
Date of Quotation	05 th May 2023
Validity of Quote	31 st December 2024
Price.	USD 212.03 Million
Taxes and Duties	USD 0.00 Million
Freight	Not Included
Insurance	Not Included
Total Cost	USD 212.03 Million
Total Cost	INR 17,386.46 Million

4.2.2. *Installation, Commissioning*

4.2.2.1. Scope comprises Installation and commissioning of following equipment

No.	Name of Equipment	Qty
1	Mono Texturing	8
2	Loader & Unloader for Texturing	8
3	Boron Diffusion + 2 nd Boron Diffusion	29
4	Quartz Boat Automation (1by1)	29
5	SE Laser with Automation	14
6	BSG Removal	10
7	Wafer Load/Unload + Wafer unloader for Bath Polish	10
8	Alkali Polishing	10

9	PECVD-Poly	18
10	Graphite Boat Automation	18
11	LP Annealing Furnace	13
12	Quartz Boat Automation (1by1)	13
13	PSG Removal	10
14	RCA Cleaning	10
15	Wafer Load/Unload + Wafer unloader for Bath RCA	10
16	Front PEALD (Al ₂ O ₃ , + Si ₃ N ₄)	27
17	PECVD (Si ₃ N ₄) + Pre-coating PECVD	19
18	Graphite Boat Automation	42
19	Print lines (incl. firing, sorter etc.)	12
20	Auxiliary Equipment	1

4.2.2.2. Waaree has received budgetary quote from Shenzhen S.C New Energy Technology Corporation for supply as follows

Description	Installation & Commission
Vendor	Shenzhen S.C New Energy Technology Corporation
Date of Quotation	05 th May 2023
Validity of Quote	31 st December 2024
Price.	USD 5.00 Million
Taxes and Duties	USD 0.90 Million
Freight	Not Included
Insurance	Not Included
Total Cost	USD 5.90 Million
Total Cost	INR 483.80 Million

4.2.3. Automated Guiding Vehicle (AGV) system

4.2.3.1. Scope of Supply

No.	Name	Qty
AGV solution (from Texturing till Metallization line)		
1	• AGV vehicles (Ca. 150~165nos, Separated-type)	1
	• Charge piles	
	• RCS+MCS Software	
	• RCS server	
	• UPS power	
	• Data storage	
Automatic Packaging line		
2	□ Automation from Metallization line to package station	1

4.2.3.2. Waaree has received budgetary quote from Shenzhen S.C New Energy Technology Corporation for supply as follows

Description	AGV system + Automatic Packaging line
Vendor	Shenzhen S.C New Energy Technology Corporation
Date of Quotation	05 th May 2023
Validity of Quote	31 st December 2024
Price.	USD 12.95 Million
Taxes and Duties	USD 0.00 Million
Freight	Not Included
Insurance	Not Included
Total Cost	USD 12.95 Million
Total Cost	INR 1,061.90 Million

4.2.4. Manufacturing Execution System (MES system)

4.2.4.1. Scope

No.	Name	Qty
MES system for 6GW TOPCon line		
1	<ul style="list-style-type: none"> • Just software system • Excl. all hardware e.g. computer, laptop, cable, data server etc. • For work order management, production management 	1

4.2.4.2. Waaree has received budgetary quote from Shenzhen S.C New Energy Technology Corporation for supply as follows

Description	work order management, production management, quality management and equipment management
Vendor	Shenzhen S.C New Energy Technology Corporation
Date of Quotation	05 th May 2023
Validity of Quote	31 st December 2024
Price.	USD 3.79 Million
Taxes and Duties	USD 0.00 Million
Freight	Not Included
Insurance	Not Included
Total Cost	USD 3.79 Million
Total Cost	INR 310.78 Million

4.2.5. Turnkey Services

4.2.5.1. **Scope:** Designing , Consultation, After sales Service, Transfer of technology for Cell Manufacturing Plant .

4.2.5.2. Waaree has received budgetary quote from Shenzhen S.C New Energy Technology Corporation for Turnkey Services as as follows

Description	Design, Consult, After Service, Transfer of technology etc
Vendor	Shenzhen S.C New Energy Technology Corporation
Date of Quotation	05 th May 2023
Validity of Quote	31 st December 2024
Price.	USD 5.58 Million
Taxes and Duties	USD 1.00 Million

Freight	Not Included
Insurance	Not Included
Total Cost	USD 6.58 Million
Total Cost	INR 539.92 Million

4.2.6. Lab Equipment
4.2.6.1. Scope of Supply

No.	Item	Quantity (set)
1	Ultrasonic cleaner	4
3	Mixer (for sliver mixing)	10
4	Counter for wafer	8
5	Electro-Thermostatic Water Cabinet	2
6	Temperature tester	2
7	Micro control heating table	2
8	Servo testing machine	3
9	Automatic standard 8 degrees of integral type suede reflectometer	8
10	P-N type Conductive	2
11	Roughmeter	2
12	Electronic balance	16
13	Electronic balance	16
14	Electronic balance	16
15	Electronic balance	16
16	Infrared thermometer	2
17	Metalloscope	4
18	CYGM	4
19	Infrared thermal image detector + EL	8
20	Hand-held laser dust particle counter	4
21	Hygrothermograph	10
22	Digimatic Micrometer	4
23	Slide caliper	4
24	Oven temperature tester	1
25	Conductivity tester	3
26	Ellipsometer	3
27	2D Microscope	2
28	3D Microscope	2
29	ECV Profiler	2
30	PL Tester	2
31	LID Tester	4
32	PID Tester	4
33	Contact Resistance Tester	4
34	QSSPC Lifetime tester	4
35	Edge Isolation Tester	4
36	Cell Bow Tester	4
37	Four-probe meter	8
38	Titration System	2
38	Offline GP solar Col Q camera System	6
39	Offline GP Solar Print Inspection	3

<p>Offline GP Solar Inspection tool for inspection of wafer backside for Wafer Size 175mm-210mm Compact Inspection system for print process control of solar cell to check print and busbar positions, finger width and print quality like interrupts, paste stains, knots and missing paste; incl. SPC features, finger width map and cumulative defect overlay. Small Enhousing optimized for Integration direct in Printer, e.g. Rotary Table. Consisting of: SE Housing with integrated power supply and Light ONE Illumination Unit Camera Unit 12M ONE, Standard Cabling Set Compact Industrial Inspection PC, 64 Bit</p> <p>UDP/Ethernet Communication Windows 10, PRINT-Q ONE Software License PRINT-Q ONE Recipe Standard for FS, RS, Bifacial * * * AX: 260465 ONE SE Filter Set 12M</p>	4
<p>Software License for Rear Side Inspection</p> <ul style="list-style-type: none"> - for CELL-Q and PRINT-Q 41 - Support for Bifacial RS Busbar - Added Support for Connected PV Server v2.3 - YieldViewer 	4

4.2.6.2. Waaree has received budgetary quote from Zuvay Technologies Pvt Ltd.for Laboratory equipment as follows

Description	Solar Cell Characterisation Measuring Offline Tools
Vendor	Zuvay Technologies Pvt Ltd.
Date of Quotation	28 th August 2023
Validity of Quote	31 st December 2024
Price.	USD 3.15 Million
Taxes and Duties	USD 0.00 Million
Freight	Included
Insurance	Included
Total Cost	USD 3.15 Million
Total Cost	INR 258.68 Million

4.3. Module Manufacturing Plant

4.3.1. Main Plant

4.3.1.1. Scope

Sr. NO.	Details	QTY
A1-1	Auto Glass Loader	12
A1-2	1 Axis CV with FAN	12
A1-3	First EVA cutting and placing machine	12
A1-4	2 Axis CV	12
A1-5	Buffer	12
A1-6	1 Axis CV for Manual Glass Loading	12
A1-7	1 Axis CV with passage	12
A1-8	Powered passage	12
A1-9	1 Axis CV	12
A1-10	Powered passage	12
A1-11	1 Axis CV	12

A1-12	2 Axis CV	12
A1-13	Powered passage	12
A1-14	Buffer	12
A1-15	2 Axis CV	12
A1-16	Powered passage	12
A1-17	Buffer	12
A1-18	2 Axis CV	12
A1-19	Powered passage	12
A1-20	Buffer	12
A1-21	2 Axis CV	12
A1-22	Powered passage	12
A1-23	2 Axis CV	12
A1-24	Alignment CV	12
A1-25	1 Axis CV with passage	12
A1-26	2 Axis CV	12
A1-27	Manual Rotational Bussing CV	12
A1-28	Manual Bussing CV	12
A1-29	Manual Bussing CV	12
A1-30	Manual Rotational Bussing CV	12
A1-31	2 Axis CV	12
A1-32	1 Axis CV with passage	12
A1-33	2 Axis CV	12
A1-34	Buffer	12
A1-35	2 Axis CV	12
A1-36	2nd EVA cutting , punching and placing	12
A1-37	1 Axis CV	12
A1-38	Backsheet cutting , punching and placing	12
A1-39	1 Axis CV with passage	12
A1-40	Manual/Auto Rotation CV	12
A1-41	2 Axis CV	12
A1-42	1 Axis CV	12
A1-43	Glass Loader for G2G Panels	12
A1-44	1 Axis CV with Fan	12
A1-45	Alignment CV	12
A1-46	Gantry for Glass placement	12
A1-47	Alignment CV	12

A1-48	Auto/Manual Rotation	12
A1-49	Auto/Manual Rotation	12
A1-50	1 Axis CV	12
A1-51	2 Axis CV	12
A1-52	Alignment CV	12
A1-53	1 Axis CV	12
A1-54	Buffer	12
A1-55	Powered passage	12
A1-56	2 Axis CV	12
A1-57	Alignment CV	12
A1-58	1 Axis CV	12
A1-59	Buffer	12
A1-60	Buffer	12
A1-61	Rework Glass Handler	12
A1-62	2 Axis CV	12
A1-63	Rework cv	12
A1-64	Rework cv	12
A1-65	Rework cv	12
A1-66	2 Axis CV with passage	12
A1-67	Rework Glass Handler	12
A1-68	Buffer	12
A1-69	2 Axis CV	12
A1-70	1 Axis CV with passage	12
A1-71	2 Axis CV	12
A1-72	Auto/Manual Rotation	12
A1-73	2 Axis CV	12
A1-74	1 Axis CV with passage	12
A1-75	2 Axis CV	12
A1-76	1 Axis CV with passage	12
A1-77	2 Axis CV	12
A1-78	1 Axis CV with passage	12
B1-1	2 Axis CV	12

B1-2	1 Axis CV	12
B1-3	Powered passage	12
B1-4	Powered passage	12
B1-5	2 Axis CV	12
B15	Powered passage	12
B1-6	1 Axis CV with passage	12
B1-7	Powered passage	12
B1-8	Powered passage	12
B1-9	Buffer	12
B1-10	Auto/Manual Rotation	12
B1-11	Auto Trimming	12
B1-12	90 Deg flip and Inspection	12
B1-13	90 Deg flip and Inspection	12
B1-14	Auto/Manual Rotation	12
B1-15	2 Axis CV	12
B1-16	1 Axis CV	12
B1-17	Frame Handler	12
B1-18	Auto Framing Machine	12
B1-19	2 Axis CV	12
B1-20	Jbox fixing CV	12
B1-21	Jbox Soldering CV	12
B1-22	Auto /Manual Rotation	12
B1-AP	Auto Potting CV	12
B1-23	1 Axis CV	12
B1-24	2 Axis CV	12
B1-25	1 Axis CV with passage	12

B1-26	Alignment CV	12
B1-27	Curing Loader	12
B1-29	Curing Unloader	12
C1-1	1 Axis CV	12
C1-2	1 Axis CV	12
C1-3	Buffer	12
C1-4	Auto Corner filing	12
C1-5	Manual Cleaning CV with passage	12
C1-6	2 Axis CV	12
C1-7	1 Axis CV with passage	12
C1-8	2 Axis CV	12
C1-9	180 Deg flp	12
C1-10	Manual Cleaning CV	12
C1-11	IV Tester CV	12
C1-12	180 Deg flp	12
C1-13	1 Axis CV	12
C1-14	HI Pot tester CV	12
C1-15	HI Pot tester CV	12
C1-16	Auto/Manual Rotation	12
C1-17	2 Axis CV	12
C1-18	1 Axis CV with passage	12
C1-19	2 Axis CV	12
C1-20	Auto/Manual Rotation	12
C1-21	360 degree flip inspection unit	12
C1-22	Auto/Manual Rotation	12
C1-23	Alignment CV	12
C1-24	Vertical sorting unit with vision system (5 bins)	12
Control System		
FUNCTIONAL AND OFFLINE MACHINES		
A-L	Battery string automatic laying machine	42

A-B	Three-in-one half-piece convergent belt soldering machine	18
A-T	Automatic tape pasting machine	18
A-GS	Double glass automatic edge sealing machine	12
A-EL1	EL Tester	12
A-EL2	EL Tester	12
B2-JB	Automatic soldering machine of junction box	12
C2-EL3	EL Tester	12
B1-LM	Laminator JCCY-2774-DST-CP	24
B1-32	Curing Line	12
C1-L	Automatic labeling machine	12
C1-C	Auto Corner cap insert	12
OF-1	MES	12
OF2	Bus strip cutting machine	12
OF-3	Glue machine Nozzle	800
O	Laminated Template	400
O	CELL Tester	4
O	Laptop	6
O	Two-component glue machine	12
O	Frame and junction box gluing machine	12
O	HiPot Tester	24
OF	Testing Jigs	1200
O	Spares	1
Third Party Machines		
T	Automatic Stringer MBB	4
T	IV tester	1

S.no.	Equipment Description
1	Full Automatic Turnkey Module Production line
2	Installation and commissioning
3	Ramp up support and onsite training

4	12 months on site support (Direct costs excluded)
5	Export Packing

4.3.1.2. Waaree has obtained Budgetary Quotation from Jinchen Machinery Co. Ltd. for the above scope

Description	Automation Line
Vendor	Jinchen Machinery Co. Ltd.
Date of Quotation	3 rd October 2024
Validity of Quote	1 st January 2025
Price.	USD 34.20 Million
Taxes and Duties	USD 0.00 Million
Freight	Not Included
Insurance	Not Applicable
Total Cost	USD 34.20 Million
Total Cost	INR 2,804.40 Million

4.3.2. Multi Bus Bar (MBB) Photo Voltaic cell soldering stringer
4.3.2.1. Scope

Item	Content	Description	Q'ty	Notes
1	MBB PV Cell Soldering Stringer AM05FS	BB Tab&Stringer soldering machine (Dual track) With 10BB 1/2 kit With micro gap tool With Connected NDC 1/2 cell Wood package for sea transport	36	Speed Third-cut cells: 6600-68000 cells/h Speed Half-cut cells: 6600-6800cells/h Speed full cell: 3000-3200 cells/h Cell size: 156mm to 230mm cells Remark: this offer include only 10BB kit with machine, any additional kit will come with additional cost, see options below; Connected NDC cell cutter with
2	String EL Inspection	Dual track EL system	36	EL Image display only. Operator will need to classify the images. ATW will provide a free of charge AI for classification but needs to be tested before any commitments.
3	extended warranty for 24 months	extra 12 months warranty	36	
4	9BB Half Cell Kit M10 cell	To process 9BB half cell	36	Each tool kit will be compatible for one BusBar pitch for only one cell size. If Busbar pitch or cell size changes then new kit is needed.
5	16BB Half Cell Kit	To process 16BB half cell	36	Customer should also order item SMBB UPGRADE. Each tool kit will be compatible for one

6	Negative Cell Gap	additional parts and jig for negative cell gap	36	This option will allow the machine to enable or disable negative cell gap, - 1mm. (cell edge will be overlapped)
7	Setup installation fee	Install, Set up, Ramp up, Commissioning and production sustain	1	Includes 2 engineers for a period of 70 days on site each engineer. Air flight ticket and travel expenses like transportation, hotel and meals are not
8	Triangular Ribbon	to process triangular ribbon	1	To run sectioned triangular/flat ribbon. On sunny side ribbon will be triangular and on bottom side ribbon is flat.
9	Power transformer for 380V	step down transformer to 380V	1	ATW equipment on 380V. If customer voltages does not match then this option is needed.

4.3.2.2. Cost

Description	Multi Bus Bar Photo Voltaic cell soldering stringer Machine
Vendor	Wuxi Autowell Supply Chain Management Co. ,Ltd
Date of Quotation	05 th March 2023
Validity of Quote	31 st December 2024
Price.	USD 13.08 Million
Taxes and Duties	USD 0.00 Million
Freight	Not Included
Insurance	Not Included
Total Cost	USD 13.12 Million
Total Cost	INR1076.00 Million

4.3.3. Sun Simulator

- 4.3.3.1. Scope of Work
- 4.3.3.1.1. Design, Engineering, Supply, Installation, Commissioning and Site Acceptance Test of A+A+A+ Sun Simulators used for PERC & TopCon Solar Module manufacturing.
- 4.3.3.1.2. Tester (Dark room ladder)
- 4.3.3.1.3. Electrical capacitor box
- 4.3.3.1.4. Electrical control box
- 4.3.3.1.5. IR temperature sensor
- 4.3.3.1.6. Label printer
- 4.3.3.1.7. Software and OS in English language
- 4.3.3.1.8. PC, Display screen, mouse, keyboard
- 4.3.3.1.9. installation tool
- 4.3.3.1.10. 1year Warranty and free spare replacement

4.3.3.2. Cost

Description	Sun Simulator
Vendor	Gsolar Power Co. Ltd
Date of Quotation	27 th August 2024
Validity of Quotation	26 th February 2025

Price	USD 0.58 Million
Taxes and Duties	USD 0.00 Million
Installation and Commissioning	Included
Freight	Included
Insurance	Included
Total	USD 0.58 Million
Total	USD 0.58 Million
Basis of Price	INR 47.64 Million

4.3.4. Laboratory Equipment

4.3.4.1. Sun Simulator Equipment

4.3.4.2. Waaree has obtained budgetary quotation from Pasan SA for supply of Sun Simulator

Description	Pasan SA
Vendor	28 th August 2023
Date of Agreement	31 st December 2024
Validity of Agreement	CHF 0.43 Million
Price	CHF 0.00 Million
Freight	Not Included
Insurance	Not Included
Total	CHF 0.43 Million
Total	INR 39.82 Million

*CHF/INR =93.58

4.3.5. Balance Laboratory Equipment

4.3.5.1. Scope of Supply

1	Bending Tester	1
2	Non uniform snow load tester	1
3	Cyclic/TC-HF chamber (Type 1)	4
4	Electricity Continuity Testing System cabinet	4
5	Damp heat chamber (Type 2)	3
6	PID chamber	3
7	PID Testing System cabinet with voltage & leakage current	3
8	LeTID Chamber (Type 2)	2
9	Electrical continuity system for Letid	2
10	UV preconditioning chamber	3
11	Programmable withstand voltage insulation tester	1
12	3 in 1 Insulation withstand voltage tester (Insulation test , Wet leakage current test, Continuity test of equipotential bonding)	2
13	Wet leakage test setup with Water Tub	1
14	Mechanical load test equipment	1
15	Hail tester	1
16	Robustness termination test setup	1
17	Salt mist test chamber	1

18	Bypass diode test setup	2
19	Cut susceptibility tester (car+weight)	1
20	Sharp edge tester	1
21	Accessibility tester	1
22	Impulse voltage generator	1
23	Ignitability tester	1
24	Reverse current overload test setup	1
25	Module breakage test setup	1
26	Digital Torque Wrench	2
27	Peel tester	1
28	Lap shear strength test setup	1
29	Insulation thickness measuring equipment	1
30	Mechanical load test equipment (Sand pressure)	1

4.3.5.2. Waaree has obtained budgetary quote from China Testing & Certification International Group co Ltd. for the above scope

Description	Module Laboratory Equipment
Vendor	China Testing & Certification International Group co ltd
Date of Quotation	1 st September 2023
Validity of Quote	31 st December 2024
Price.	USD 1.87 Million
Taxes and Duties	USD 0.00 Million
Freight	Not Included
Insurance	Not Included
Total Cost	USD 1.87 Million
Total Cost	INR 153.34 Million

5.0. Utilities:

- 5.1. Scope of Work Comprises utilities for
 - 5.1.1. Main Ingot and Wafer plant,
 - 5.1.2. Cell Plant, and
 - 5.1.3. Module Manufacturing plant

5.2. Utilities for Main Ingot and Wafer plant

- 5.2.1. turnkey design and supply solution for the following for Ingot Fabrication Facility and Wafer Production Line
 - 5.2.1.1. Argon Recovery System + Argon - 90 Lot + Liquid Storage
 - 5.2.1.2. Chemical Distribution Unit (5 System) + Piping
 - 5.2.1.3. Chillers Centrifugal (7W+1ST)
 - 5.2.1.4. Compressor -(3W+1st)+Dryer + Receiver + Piping
 - 5.2.1.5. Diesel Generator Sets
 - 5.2.1.6. DI Water
 - 5.2.1.7. Electrical including Ingot & Wafer (Both for Main Tools and Utilities) + Design Development Services
 - 5.2.1.8. ETP + Recycling System
 - 5.2.1.9. Exhaust and Scruber
 - 5.2.1.10. HVAC AHU+ Ducting+Piping
 - 5.2.1.11. PCW for pullers 4 System
 - 5.2.1.12. Process Water -1, Room Temp
 - 5.2.1.13. Pump House+ Cooling Towers
 - 5.2.1.14. RO + EDI

5.2.2. Waaree has obtained quotation for Design, Engineering and supply of Utilities for Ingot and Wafer Line as follows

Description	Design, Engineering and supply for Utilities for Ingot and Wafer Line
Vendor	Zuvay Technologies Pvt. Ltd.
Date of Quotation	28 th August 2023
Validity of Quote	31 st December 2024
Price.	INR 7,508.00 Million
Taxes and Duties	INR 1,351.44 Million
Freight	Not Included
Insurance	Not Included
Total Cost	INR 8,859.44 Million

5.3. Utilities for Cell Line

- 5.3.1. Scope of supply comprises following
 - 5.3.1.1. Abatement System (Waste Gas) with Piping,
 - 5.3.1.2. Chemical Delivery System,
 - 5.3.1.3. Chemical Scrubber, Piping & General Exhaust,
 - 5.3.1.4. Clean Room,
 - 5.3.1.5. Compressed Dry Air & Piping,
 - 5.3.1.6. Cooling Towers,
 - 5.3.1.7. DI, ETP (Waste Water) & Piping,
 - 5.3.1.8. Electrical including all - Lightings, earthing, cabling, site services, distribution panels, HVAC, with piping,
 - 5.3.1.9. Piping - PECVD Vacuum Pumps to Abatement System,

5.3.1.10. Process Cooling Water with Chiller & Plate Heat Exchanger (PHE) Pumps,

5.3.2. Waaree has obtained budgetary quotations from various vendors for supply of various Utilities as mentioned above

5.3.2.1. Abatement System (Wet Gas) with Piping,

Description	Scrubbers for TOPCon Plasma Enhanced Chemical Vapor Deposition (PECVD) Tools including Installation and commissioning and Acceptance Tests and Vacuum piping from PECVD Pump outlet to Scrubber Inlet
Vendor	Kiansh International Technologies Pvt. Ltd
Date of Quotation	25 th August 2023
Validity of Quote	31 st December 2024
Price.	USD 8.74 Million
Taxes and Duties	USD 0.00 Million
Freight	Not Included
Insurance	Not Included
Total Cost	USD 8.74 Million
Total Cost	INR 716.99 Million

5.3.2.2. Chemical Delivery System

Description	Supply & Installation of Chemical Delivery System including Clean Coupling Booth, Chemical Distribution Modules, Chemical Transportation Units, Tanks, Valve Manifold Boxes , Piping & Accessories, Electricals, PLC, SCADA & Automation, Installation
Vendor	Air Gas Electronic Materials India Pvt Ltd.
Date of Quotation	29 th August 2023
Validity of Quote	31 st December 2024
Price.	USD 24.55 Million
Taxes and Duties	USD 0.00 Million
Freight	Included
Insurance.99	Included
Total Cost	USD 24.55 Million
Total Cost	INR 2,013.10 Million

5.3.2.3. Chemical Scrubber, Piping & General Exhaust

Description	Scrubber Pipes and Ducting & insulations for Acid Exhaust,alkali Exhaust, Silane Exhaust, Hot Gas Exhaust systemTreatment
Vendor	Polyplast Chemi-Plants (I) Pvt Ltd, Vadodara
Date of Quotation	01 st December 2023
Validity of Quote	31 st December 2024
Price.	INR 1,347.34 Million
Taxes and Duties	INR 242.52 Million
Freight	Included
Insurance	Included
Total Cost	INR 1,589.86 Million

5.3.2.4. Clean Room

Description	a. Wall panels including 50 mm thick Progressive wall panels (20% Non-Progressive), and Column and Wall Cladding Panels b. Ceiling Panels including T-Grid Structure and Panels for Filter Fan Unit Ceiling c. Covings and d. Doors
Vendor	P .M. Electro Auto Pvt Ltd
Date of Quotation	28 th August 2023
Validity of Quote	31 st December 2024
Price.	INR 496.05 Million
Taxes and Duties	INR 89.29 Million
Freight	Included
Insurance	Included
Total Cost	INR 585.34 Million

5.3.2.5. Air Compressor, Dryer, Air Receiver Tank, Piping and Accessories, Installation & Commissioning

Description	Supply installation of Oil Free Compressor, Compression Dessicant Dryer, 15,000 Ltr. Receiver Tank, Piping and Installation and Commissioning
Vendor	Atlas Copco Ltd.
Date of Quotation	9 th August 2023, 10 th August 2023, 1 st December 2022, 25 th August 2022,
Validity of Quote	31 st December 2024
Price.	INR 362.12 Million
Taxes and Duties	INR 65.18 Million
Freight	Included
Insurance	Included
Total Cost	INR 427.30 Million

5.3.2.6. Cooling Towers

Description	36 Nos Induced Draught Crossflow Cooling Towers with one Cell per Tower for 750 Cubic metre per Hour Capacity each
Vendor	Paharpur Cooling Towers Limited
Date of Quotation	25 th August 2023
Validity of Quote	31 st December 2024
Price.	INR 107.62 Million
Taxes and Duties	INR 19.37 Million
Freight	Included
Insurance	Not Included
Total Cost	INR 126.99 Million

5.3.2.7. DeInonised Water, Effluent treatment Plant (Waste Water) & Piping

Description	Effluent treatment plant with ZeroLine Discharge Cell Line Facility
Vendor	Permionics Membranes Pvt. Ltd.
Date of Quotation	4 th December 2023
Validity of Quote	31 st December 2024
Price.	INR 2,405.50 Million
Taxes and Duties	INR 432.99 Million
Freight	Not Included
Insurance	Not Included

Total Cost	INR 2,838.49 Million
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5.3.2.8. Electrical including all - Lightings, earthing, cabling, site services, distribution panels

Description	Supply, Installation, Testing and Commissioning of Electrical Works for Ingot to Cell Manufacturing Project
Vendor	S.K .Electricals
Date of Quotation	2 nd December 2023
Validity of Quote	31 st December 2024
Price.	INR 1,300.00 Million
Taxes and Duties	INR 234.00 Million
Freight	Not Included
Insurance	Not Included
Total Cost	INR 1,534.00 Million

5.3.2.9. Heating Ventilation & Air Conditioning (HVAC) with piping

Description	HVAC, with piping
Vendor	Avant Garde Cleanroom & Engg. Solutions Pvt. Ltd
Date of Quotation	2 nd December 2023
Validity of Quote	31 st December 2024
Price.	INR 2,240.93 Million
Taxes and Duties	INR 403.37 Million
Freight	Not Included
Insurance	Not Included
Total Cost	INR 2,644.29 Million

5.3.2.10. Piping - PECVD Vacuum Pumps to Abatement System

Description	Abatement process Silane Exhaust line
Vendor	Bangalore Vacuum Technology
Date of Quotation	02 th September 2023
Validity of Quote	31 st December 2024
Price.	INR 41.05 Million
Taxes and Duties	INR 7.39 Million
Freight	Not Included
Insurance	Not Included
Total Cost	INR 48.43 Million

Description	Piping between PECVD Vacuum Pumps and the Abatement System
Vendor	Bangalore Vacuum Technology
Date of Quotation	02 th September 2023
Validity of Quote	31 st December 2024
Price.	INR 72.19 Million
Taxes and Duties	INR 13.00 Million
Freight	Not Included
Insurance	Not Included
Total Cost	INR 85.20 Million

5.3.2.11. Process Cooling Water with Chiller & PHE Pumps

Description	Supply of Process Cooling Water with Chiller & PHE Pumps Solar Cell Line
Vendor	Sterling Wilson Ltd.
Date of Quotation	2 nd December 2023

Validity of Quote	December 2024
Price.	INR 2800.00 Million
Taxes and Duties	INR 504.00 Million
Freight	Included
Insurance	Included
Total Cost	INR 3,304.00 Million

5.3.2.12. Special Gases Delivery System

Description	Supply & Installation of Gas Delivery System
Vendor	Air Gas Electronic Materials Pvt Ltd.
Date of Quotation	26 th August 2023
Validity of Quote	31 st December 2024
Price.	USD 23.91 Million*
Taxes and Duties	USD 0.00 Million
Freight	Included
Insurance	Included
Total Cost	USD 23.91 Million
Total Cost	INR 1960.80 Million

*rounded

5.4. Utilities for Module Line

5.4.1. Scope of Work comprises supply of Compressed Dry Air & Piping, Clean Room, HVAC with Chillers, Exhaust Air System with Piping, Fire Safety System, Electrical Misc - Lightings, earthing, cabling, site services

5.4.2. Cost

5.4.2.1. Clean Room

Description	False Ceiling
Vendor	Elegant Enterprise
Date of Quotation	29 th August 2023
Validity of Quote	31 st December 2024
Price.	INR 58.20 Million
Taxes and Duties	INR 10.48 Million
Freight	Not Applicable
Insurance	Not Applicable
Total Cost	INR 68.68 Million

5.4.2.2. Compressed Dry Air & Piping

Description	Compressed Dry Air & Piping System
Vendor	S V Trendz
Date of Quotation	28 th August 2023
Validity of Quote	31 st December 2024
Price.	INR 25.70 Million
Taxes and Duties	INR 4.63 Million
Freight	Not Included
Insurance	Not Applicable
Total Cost	INR 30.33 Million

5.4.2.3. Electricals

Description	Supply and Installation Electrical low side works
Vendor	Expel Prosys Pvt Ltd.
Date of Quotation	16 th October 2023

Validity of Quote	31 st December 2024
Price.	INR 115.00 Million
Taxes and Duties	INR 20.70 Million
Freight	Not Included
Insurance	Not Included
Total Cost	INR 135.70 Million

5.4.2.4. Exhaust Air System with Piping

Description	Heating Ventilation and AirConditioning & PEX system
Vendor	Shree HVAC Engineers
Date of Quotation	30 th August 2023
Validity of Quote	31 st December 2024
Price.	INR 70.00 Million
Taxes and Duties	INR 12.60 Million
Freight	Not Included
Insurance	Not Included
Total Cost	INR 82.60 Million

5.4.2.5. HVAC with Chiller

Description	HVAC & Crossed Linked Polyethylene (PEX) system
Vendor	Shree HVAC Engineers
Date of Quotation	30 th August 2023
Validity of Quote	31 st December 2024
Price.	INR 400.00 Million
Taxes and Duties	INR 72.00 Million
Freight	Not Included
Insurance	Not Included
Total Cost	INR 472.00 Million

5.4.2.6. Diesel Generator

5.4.2.6.1. For Ingot and Wafer

Description	Supply, Installation and Commissioning of 2 x 1500 kVA Diesel Generator Sets
Vendor	Mahindra & Mahindra Ltd.
Date of Quotation	2 nd December 2023
Validity of Quote	31 st December 2024
Price.	INR 25.53 Million
Taxes and Duties	INR 4.60 Million
Freight	Not Applicable
Insurance	Not Applicable
Total Cost	INR 30.13 Million

5.4.2.6.2. Cell Line

Description	Supply , Installation & Commission of 6 x 1500 kVA Diesel Generator Sets
Vendor	Mahindra & Mahindra Ltd
Date of Quotation	02 nd December 2023
Validity of Quote	31 st December 2024
Price.	INR 76.59 Million
Taxes and Duties	INR 13.79 Million
Freight	Not Included

Insurance	Not Included
Total Cost	INR 90.38 Million

5.4.2.6.3. Module Line

Description	Supply, Installation and Commissioning 2 x 1500 kVADiesel Generator Sets
Vendor	Mahindra & Mahindra Ltd
Date of Quotation	02 nd December 2023
Validity of Quote	31 st December 2024
Price.	INR 25.53 Million
Taxes and Duties	INR 4.60 Million
Freight	Not Applicable
Insurance	Not Applicable
Total Cost	INR 30.13 Million

5.4.2.7. Uninterrupted Power Supply (UPS) System

5.4.2.7.1. For Ingot and Wafer Line

Description	Supply, Installation Commissioning of 3 X 3, 600 kVA, 415 V AC, 50 Hz Uninterrupted Power Supply System wiith 152 Nos 200 Ah batteries with 15 min backup @ 650 kVA Load At 0.8 PF
Vendor	Vertiv Energy Pvt. Ltd
Date of Quotation	31 th August 2023
Validity of Quote	31 st December 2024
Price.	INR 8.51 Million
Taxes and Duties	INR 1.80 Million
Freight	Not Applicable
Insurance	Not Applicable
Total Cost	INR 10.31 Million

5.4.2.7.2. Cell Line

Description	Supply, Installation and Commissioning of 3 X 3, 600 kVA, 415 V AC, 50 Hz Uninterrupted Power Supply System wiith 456 Nos 200 Ah batteries with 15 min backup @ 650 kVA Load At 0.8 PF Ups System
Vendor	Vertiv Energy Pvt Ltd
Date of Quotation	31 st August 2023
Validity of Quote	31 st December 2024
Price.	INR 25.54 Million
Taxes and Duties	INR 5.42 Million
Freight	Not Included
Insurance	Not Included
Total Cost	INR 30.96 Million

5.4.2.7.3. Module Line

Description	Supply, Installation And Commissioning of 3 X 3, 600 kVA, 415 V AC, 50 Hz Uninterrupted Power Supply System wiith 152 Nos 200 Ah batteries with 15 min backup @ 650 kVA Load At 0.8 PF
Vendor	Vertiv Energy Pvt. Ltd.
Date of Quotation	31 st August 2023
Validity of Quote	31 st December 2024

Price.	INR 8.51 Million
Taxes and Duties	INR 1.80 Million
Freight	Not Applicable
Insurance	Not Applicable
Total Cost	INR 10.31 Million

5.4.2.8. Common Utilities

Scope: Supply of 4 Nos x 110 MVA Electrical Transformers

Description	Electrical Infrastructure Main (Transformer, Transformer Substation, Control Room, Switch gear Substation)
Vendor	Ascent Engineers
Date of Quotation	1 st December 2023
Validity of Quote	31 st December 2024
Price.	INR 1350.00 Million
Taxes and Duties	INR 243.00 Million
Freight	Not Applicable
Insurance	Not Applicable
Total Cost	INR 1,593.00 Million

6.0. IT Infrastructure

6.1. IT infrastructure for Ingot and Wafer

6.1.1. Scope of work

6.1.1.1. Supply, Services and Implementation of Operational Technology (OT) network, Central SCADA, ELVS, Central MES, PMS, BMS, MZ+DMZ packages

6.1.2.. Cost

Description	for Central MES, Central SCADA, PMS, BMS, OT Hardware and ELV Systems - 6GW Ingot and Wafer line
Vendor	Honeywell Automation India Ltd.
Date of Quotation	29 th November 2023
Validity of Quote	31 st December 2024
Price.	INR 370.00 Million
Taxes and Duties	INR 66.60 Million
Freight	Not Included
Insurance	Not Included
Total	Rs. 436.60 Millions

6.2. IT infrastructure for Cell Line

6.2.1. Scope of work

6.2.1.1. Supply, Services and Implementation of OT network, Central SCADA, ELVS, Central MES, PMS, BMS, MZ+DMZ packages

6.2.1.2. Cost

Description	Proposal for Central MES, Central SCADA, PMS, BMS, OT Hardware and ELV Systems - 6GW Cell Line
Vendor	Honeywell Automation India Ltd.
Date of Quotation	29 th November 2023
Validity of Quote	31 st December 2024
Price.	INR 370.00 Million
Taxes and Duties	INR 66.60 Million
Freight	Not Included
Total	Rs. 436.60 Millions

6.3. IT infrastructure for Module Line

6.3.1. Scope of work

- Design & Implementation of IT/OT Network & Backup
- Network Design
- Network Requirements Analysis: Requirements Analysis for Operations, Maintenance, IT, and Engineering, requirements, manufacturing process flows, interoperability requirements, functional zones, planned expansions, etc.
- Logical Design Elements
- Network Implementation
- Network Implementation Plan
- Network Hardware
- Switch Configurations
- Physical Infrastructure Installation Services
- Test Plan Development
- Commissioning, Start-up, and Acceptance Testing
- Network Design Package Updates
- The logical design drawings, VLAN schema, IP Addressing schema, and hardware port maps will be updated to show the final as-built information.

- Backup Software Implementation
- Hardware & Software

6.3.2. Cost

Description	IT-OT Network and Cybersecurity solution
Vendor	Rockwell Automation India Ltd.
Date of Quotation	9 th August 2023
Validity of Quote	31 st December 2024
Price.	INR 48.10 Million
Taxes and Duties	INR 8.66 Million
Freight	Not Included
Insurance	Not Included
Total Cost	INR 56.76 Million

7.0. Freight forwarding & Unloading, Handling and Erection :

Scope of Work includes Unloading , Handling, Move in and positioning along with Erection of equipment and freight forwarding

7.1.0 Cost

7.1.1 Freight Forwarding and Clearance Charges for Ingot and Wafer equipment

Description	Quotation For Freight Forwarding for Ingot and Wafer Equipment
Vendor	Fast Logistics
Date of Quotation	26 th August 2023
Validity of Quote	31 st December 2024
Price.	INR 323.99 Million
Taxes and Duties	INR 58.32 Million
Freight	Not Applicable
Insurance	Not Included
Total Cost	INR 382.30 Million

7.1.2 Freight Forwarding and Clearance Charges for Cell Line equipment

Description	Quotation For Freight Forwarding for Cell Line equipment
Vendor	Fast Logistics
Date of Quotation	26 th August 2023
Validity of Quote	31 st December 2024
Price.	INR 283.94 Million
Taxes and Duties	INR 51.11 Million
Freight	Not Applicable
Insurance	Not Included
Total Cost	INR 335.05 Million

7.1.3 Freight Forwarding and Clearance Charges for Module equipment

Description	Quotation For Freight Forwarding for Module Equipment
Vendor	Fast Logistics
Date of Quotation	26 th August 2023
Validity of Quote	31 st December 2024
Price.	INR 241.13 Million
Taxes and Duties	INR 43.40 Million
Freight	Not Applicable
Insurance	Not Included
Total Cost	INR 284.54 Million

7.2.1. Unloading, Handling and Erection for Ingot and Wafer equipment

Description	Unloading, Handling, Move in and positioning along with Erection of equipment
Vendor	Procam Logistics Private Limited
Date of Quotation	2 nd December 2023
Validity of Quote	31 st December 2024
Price.	INR 172.40Million
Taxes and Duties	INR 31.03 Million
Freight	Not Applicable
Insurance	Not Included
Total Cost	INR 203.43 Million

7.2.2. Unloading, Handling and Erection for Cell and Module equipment

Description	Unloading, Handling, Move in and positioning along with Erection of equipment
Vendor	Procam Logistics Private Limited
Date of Quotation	2 nd December 2023
Validity of Quote	31 st December 2024
Price.	INR 68.35 Million
Taxes and Duties	INR 12.30 Million
Freight	Not Applicable
Insurance	Not Applicable
Total Cost	INR 80.66 Million