**FIXED ASSET VALUATION – POWER PLANT**

**OF COSTAL ENERGEN PVT. LTD.**





Report Prepared for : **State Bank of India**

Stressed Assets Management Branch

“Red Cross Building”, 32, Red Cross Road, Egmore , Chennai-600 008

Report Prepared By : **Vastukala Consultants (I) Pvt. Ltd., Mumbai**

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Vastu/Thane/11/2023/5124/35771

08/10-97-APU

Date: 20.11.2023

To,

**State Bank of India**

Stressed Assets Management Branch

“Red Cross Building”, 32, Red Cross Road,

Egmore , Chennai-600 008.

**Subject: Valuation Report of 2 X 600 MW Independent Power Plant of M/s. Coastal Energen Pvt. Ltd. located at** **Village - Melamaruthur, D. Duraiswamipuram, Pattanamarudhur & Tharuvaikulam, Post - Ottapidaram, District - Thoothukudi, PIN Code-628 105, State-Tamil Nadu, Country-India.**

Sir,

This is with reference to terms of our engagement confirming Vastukala Consultants Private Limited confirming by Assistant General Manager (AGM), State Bank of India, Stressed Assets Management Branch, “Red Cross Building”, 32, Red Cross Road, Egmore, Chennai-600 008 (the ‘Client’ or the ‘Bank). We enclose the report (the ‘Report’) prepared in connection with the services requested by the Client.

We have carried out the valuation of **Fixed Assets of 2 X 600 MW** Independent Power Plant of **M/s. Coastal Energen Pvt. Ltd.** located at Village - Melamaruthur, D. Duraiswamipuram, Pattanamarudhur & Tharuvaikulam, Post - Ottapidaram, District - Thoothukudi, PIN Code-628 105, State-Tamil Nadu, Country-India [The “Company”], borrower of State Bank of India, as at 20th November 2023 (the ‘Valuation Date’).

We provided a Report to the Bank. The Report has been prepared on the basis of the data provided by the management of the “Company”. The Report is confidential to the Client and is subject to the restrictions on use as per terms of our engagement.

We disclaim any responsibility to any other person / party for any decision of such person / party based on the Report. We draw your attention to the sections titled ‘Scope of Work’ and ‘Scope Limitations’ included in the Report, wherein we refer to the scope of work and the limitations of the work undertaken. Any person who is not an addressee in the Report is not authorized to have access to the Report. The Report should not be copied or made available in whole or in part to any person other than the Client without the express written permission of Vastukala. We [Vastukala] accepts no responsibility for any reliance that may be placed on the Report should it be used by any party other than the Client or for any purpose that has not been expressly agreed by Vastukala. Our name and the Report should not be referred to in any offering, circular or other document, without our prior written permission.

Yours Truly

|  |  |
| --- | --- |
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|  | |

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# CHAPTER:- 1. INTRODUCTION

**M/s. Coastal Energen Pvt. Ltd. (“Company” or “CEPL”)** is a Private Limited Company incorporated on 29th May 2006. It is classified as non-govt company and is registered at Registrar of Companies, Chennai. Its authorized share capital is Rs. 2,250,000,000 and its paid up capital is Rs. 2,109,042,350. CEPL's Corporate Identification Number is (CIN) U40102TN2006PTC060009 and its registration number is 60009. Its registered address is No. 5, Moores Road, Chennai-600 006, Tamil Nadu.

CEPL is a special purpose vehicle (SPV) promoted by Mr. Ahmed Buhari (promoter of the Coal & Oil Group) for the development of 1200 MW (2 X 600 MW) imported coal based thermal power plant (TPP) located in the Thoothukudi District (Earlier Tuticorin District) of Tamil Nadu State. The power plant is also known as Mutiara Thermal Power Plant (MTPP). Both the Units of power plant are based on sub critical technology. Unit 1 of 600 MW of TPP started operations and commenced supply of power to TANGEDCO from 23rd December 2014. Unit 2 of TPP 600 MW went live on 16th January 2016.

Power Purchase Agreement (PPA) is executed for 558 MW generation with Tamil Nadu Generation and Distribution Corporation Ltd., (TANGEDO). PPA was signed on December 2013. PPA is valid till September 2028. Power is transmitted through a double circuit transmission line to the Power Grid Corporation of India Ltd.’s (PGCIL) 400 kV Bays at Thoothukudi pooling station.

Company’s 1200 MW (2 X 600 MW) Thermal Power Plant at Thoothukudi District is set up with the financial assistance from 16 Banks in consortium led by State Bank India (SBI). SBI is acting as Lender’s Agent through its project finance SBU, for the consortium of lenders. Due to inadequate cash flows the Company could not service the interest and installment dues on time and the Company’s debt were restructured as prescribed by Reserve Bank of India (RBI) for infrastructure Companies.

As per the Fixed Assets Register of CEPL for the period ended 31.03.2023, the Gross Block and Net Block of Tangible Fixed Assets under Valuation of 2 X 600 MW coal based subcritical thermal power plant stand at Rs 8,134.67 Crores and Rs 6,577.85 Crores respectively.

The Tangible Fixed Assets under Valuation of 2 X 600 MW coal based subcritical thermal power plant consist of Land, Buildings (i.e. Factory Building, Buildings other than RCC Frame Structure - Unit 1, Buildings-Temporary Structures, Bridges, Culverts, Bunders Ext, Roads- Carpeted), Plant & Equipment (i.e. Electrical Equipments and Installations, General Plant and machinery, Thermal Power Generation Plant, Transmission Lines, Cables and other network assets, Water Distribution Plant Including Pipelines, Railways sidings, locomotives, rolling stocks, tramways and railways used by concerns, excluding railway concerns) and Other Assets (i.e. Office Equipment, Furniture & Fixtures

Computers, Vehicles (Cars, Motor Bikes, Fire tenders)).

Pursuant to Letter of appointment to M/s Vastukala Consultants (I) Pvt. Ltd.’s Mumbai (VCIPL) assigning the work of Asset Valuation of 1200 MW (2 X 600 MW) Thermal Power Plant (TPP) of M/s Coastal Enerqen Private Limited at Thoothukudi District, Tamil Nadu, vide ref. no. SBI/SAMB/CHE/CLO-V/2023-24/463, dated 05.10.2023 from Assistant General Manager, State Bank of India, Stressed Assets Management Branch, Chennai, VCIPL has inspected the thermal power plant on 20.10.2023 & 21.10.2023. VCIPL has held discussions with the company officials and referred the documents and information provided and the information available on public domain. VCIPL has valued the fixed assets as per fixed asset register as at 31.03.2023 and is submitting the fixed assets valuation report.

# CHAPTER:-2. SCOPE OF VALUATION

### 2.1. SCOPE:-

**State Bank of India, SAMB-Chennai** has appointed **M/s. Vastukala Consultants (India) Pvt. Ltd.** to undertake the valuation of fixed assets of CEPL’s facilities located at Village - Melamaruthur, D. Duraiswamipuram, Pattanamarudhur & Tharuvaikulam, Post - Ottapidaram, District - Thoothukudi, PIN Code-628 105, State-Tamil Nadu, Country-India. The broad scope of the assignment was as detailed below:

1. Inspection of Fixed Assets for physical verification and observations of the same.
2. Assessment of Fair Market Value, Realizable Sale Value, Distress Sale Value and Liquidation Value of Fixed Assets.

### 2.2. DOCUMENTS PROVIDED FOR VALUATION:-

The following documents were perused during the said assignment:

* Appointment Letter issued by Assistant General Manager, State Bank of India, Stressed Assets Management Branch, Chennai vide No. SBI/SAMB/CHE/CLO-V/2023-24/463 dated 05.10.2023.
* Fixed Asset Register 31.03.2023.
* Land Tax Receipt.
* Land Details.
* Building Area Statement.
* Technical Dairy.
* Annual Report for the FY 2020-21 & FY 2021-22.
* MOA and AOM.
* Operation and Maintenance Contract made between M/s. Coastal Energen Pvt. Ltd. (Owner) and Power Mech Projects Limited (O&M Contractor) dated 18.11.2021.
* Addendum for Operation and Maintenance Contract dated 01.07.2022.
* Addendum for Operation and Maintenance Contract dated 23.09.2022.
* Process Flow Chart.
* Power Purchase Agreement for procurement of 558 MW RTC Power through long term under Case-1 Bidding Procedure through tariff based competitive bidding process for meeting the vase load requirements made between Tamil Nadu Generation and Distribution Corporation Limited (Procurer) and Coastal Energen Pvt. Ltd. (Seller) dated 19.12.2013.
* Generation Details.
* Insurance Policies.
* Layout Plan.

### 2.3. DATE OF VISIT:-

Our Engineers has visited CEPL’s facilities located at Village - Melamaruthur, D. Duraiswamipuram, Pattanamarudhur & Tharuvaikulam, Post - Ottapidaram, District - Thoothukudi, PIN Code-628 105, State-Tamil Nadu, Country-India on 20.10.2023 & 21.10.2023 for the physical inspection of Fixed Asset.

### 2.4. OFFICIALS ACCOMPANIED OUR ENGINEER:-

Following company Official accompanied our Engineer and showed the Fixed Assets of CEPL’s facilities located at Village - Melamaruthur, D. Duraiswamipuram, Pattanamarudhur & Tharuvaikulam, Post - Ottapidaram, District - Thoothukudi, PIN Code-628 105, State-Tamil Nadu, Country-India during our visit:-

* Mr. Namdevan, AGM.

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### 2.5. NOTES, LIMITATIONS. DISCLAIMERS AND CAVEATS:-

Assessment of Fair Market Value (FMV), Realizable Sale Value (RSV) and Distress Sale Value (DSV) of Fixed Assets of CEPL’s facilities located at Village - Melamaruthur, D. Duraiswamipuram, Pattanamarudhur & Tharuvaikulam, Post - Ottapidaram, District - Thoothukudi, PIN Code-628 105, State-Tamil Nadu, Country-India is subject to following notes, limitations, disclaimers and caveats.

* In the preparation of the report, we has relied on the following information:-
* Information provided to us by the client and its affiliates and lenders.
* Other relevant information available to us and our data bank.
* Other publicly available information, internet information & reports.
* Present status of the project.
* We have visited the CEPL’s facilities located at Village - Melamaruthur, D. Duraiswamipuram, Pattanamarudhur & Tharuvaikulam, Post - Ottapidaram, District - Thoothukudi, PIN Code-628 105, State-Tamil Nadu, Country-India on 20.10.2023 & 21.10.2023 & inspected the assets.
* The assets valuation report is prepared based on our site visit, physical inspection of assets, performance of the plant, audited results, approvals and clearances obtained, etc.
* We have worked out the valuation considering the supply of raw material, availability of water, manpower, prevailing market rate of land, present cost of construction of buildings, gross block & net block of Assets, Replacement cost, Industrial scenario of the country & market trends and our own data base available with us.
* The fact that the total useful life of P & M of is considered 30 years. Market Trend is based on the raw material supply, return on equity, ready to use assets & considering the period required to setup the plant etc. If any one of the factors gets affected, then market trend can change which will change the FMV, RSV, DSV and LV.
* Our valuation is based on our experience and knowledge & this is an opinion only and does not stand as a guarantee for the value it can fetch if disposed, due to any emergency, in future.
* The legal documents pertaining to the ownership of the above said property has been referred to on its face value and that is presumed that Bank has got the same verified through its legal counsel.
* Since this being an established Power Plant, we have relied on the documents and information provided by the party. It is presumed that the soft copy of documents is taken from the originals duly tested and verified about veracity.
* Changes in Socio – Economic and political conditions could result in a substantially different situation than those presumed at the stated effective date. We assume no responsibility for changes in such external conditions.
* It should be noted that our value assessments are based upon the facts and evidence available at the time of assessment. It is therefore recommended that the value assessments be periodically reviewed.
* The report is issued at the specific request of the party for specific purpose and the said report is not valid if the purpose of use and party is different.
* Our report should be read along with disclaimers. The value given in our report is only an opinion on the FMV, RSV, DSV and LV as on date. If there is any opinion from others / valuers about increase or decrease in the value of the assets valued by us, we should not be held responsible as the views vary from person to person and based on circumstances. The principle of “BUYERS BEWARE” is applicable in case of any sale/ purchase of assets.
* This report should be read along with legal due diligence report. Value assigned herein is subject to this stipulation.
* Our report is only for the use of the party to whom it is addressed and no responsibility is accepted to any third party for the whole or any part of its contents. The said report will not hold good / should not be used for any court / legal matters.

# CHAPTER:- 3. ABOUT COMPANY

### 3.1. INTRODUCTION:-

**M/s. Coastal Energen Pvt. Ltd.** was incorporated on May 29, 2006 as **M/s Coastal Gujarat Power Company Pvt. Ltd**. under the Companies act 1956 with Registrar of Companies, Tamil Nadu.   
Its corporate identification number is U40102TN2006PTC6009. The name of the Company was changed to M/s Coastal Energen Pvt. Ltd. on June 13, 2007.

The main Objects to be pursued by the Company are as under:

1. To carry on the business of Power Projects, Distribution and Generation of Power and sell the same to Electricity boards and others.
2. To carry on the business of selling the electricity to State Government & Central Gov-ernment and other bodies and trade in merchant Power etc.
3. To carry on the business of generating power and distribute the same through trans-mission by setting of Power Plant.
4. To carry on the business of setting up Captive Power Plant and Generate Electricity, erect, install, commission, service, repair, maintain, operate, consult on power generating equipments of any capacity and their accessories.

M/s Coastal Energen Pvt. Ltd. has set up a 1200 MW (2 X 600 MW) imported coal based thermal power plant at Thoothukudi district, Tamil Nadu State and commenced the commercial operation of Unit 1 (600 MW) from 23rd of December 2014 and that of Unit 2 (600 MW) from 15th of January 2016. The Company is pursuing its main objective.

The Board of Directors got suspended on account of admission of the Company into CIRP as per NCLT order dated 4th February 2022.

# CHAPTER: - 4. ABOUT 2 X 600 MW CBTPP

M/s Coastal Energen Pvt. Ltd. has set up a 1200 MW (2 X 600 MW) imported coal based thermal power plant at Thoothukudi district, Tamil Nadu State and commenced the commercial operation of Unit 1 (600 MW) from 23rd of December 2014 and that of Unit 2 (600 MW) from 15th of January 2016. The Company is pursuing its main objective.

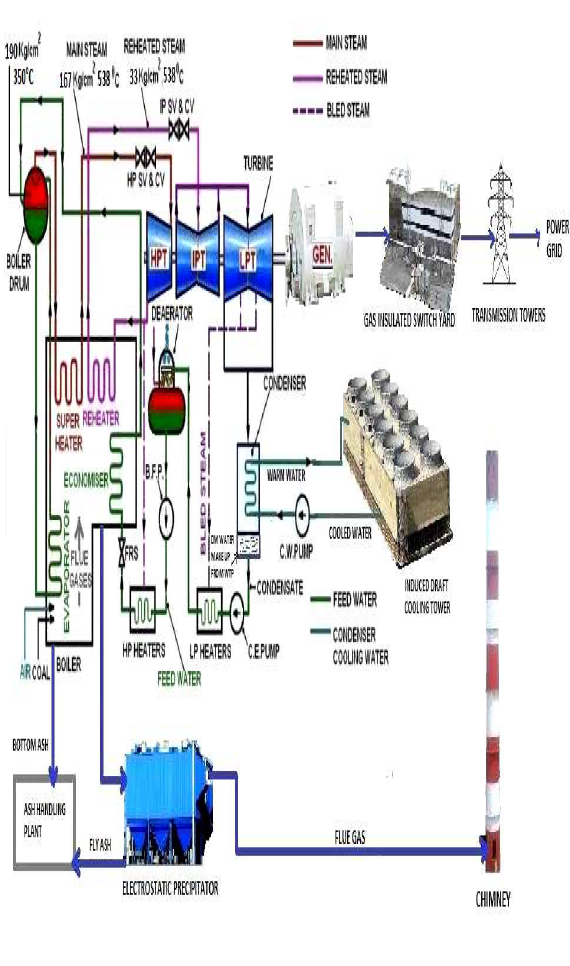
The power project consists of two sets of sub–critical, pulverized coal fired, 2060 TPH, Steam Generators and associated Steam Turbines Generators (STG) each of 600 MW capacities, along with Balance of Plant (BOP) systems and equipments. The main fuel for power plant station is imported coal.

CEPL appointed M/s TCE Consulting Engineers Limited, Bangalore as a project technical consultant. TCE carried out Total technical consultancy service for 2 X 600 MW TPP, from concept to commissioning viz. Site selection, Detailed Project report, Basic Study, Main Plant Civil Design, Pre-award engineering including Bids preparation, Vendors selection, Post award engineering, supervision of site execution, Performance Guarantee test. CEPL / TCE selected the leading reputed international vendors for various system of power project. M/s Lloyd’s Register Inspection Service & M/s Tata Projects Limited, Hyderabad was appointed as third party inspection for equipments.

The Boiler-Turbine-Generator (“BTG”) order was placed with Harbin Power Engineering Company Ltd, China and all the Balance of Plant (BOP) packages were awarded under fixed price contracts, with Tata Consulting Engineers (TCE) as coordinators. The broad scope of work under EPC package includes design, engineering, manufacturing, supply, construction, erection, commissioning of BTG & BOP equipment, testing, conducting of trial runs, performance testing of complete plant and equipment inclusive of all mechanical, electrical, instrumentation & control systems and civil, structural and architectural works necessary for putting in-to commercial operation of 2 X 600 MW coal fired sub-critical thermal power project. The power plant consists of

* Main Power Plant – Boiler, Turbine Generator (BTG)
* Electrostatic Precipitator (ESP) & Chimney
* Corridors Pipe, Drain & Road;
* Sea Water Intake and Take off
* Ash Pond
* Coal Handling Area
* Green Belt
* Desalination Plant
* Cooling Towers
* 400 kV Gas Insulated Substation (GIS)

The Process Flow Diagram is as under:-



The General Layout Plan is prepared by Tata Consulting Engineers Limited, Mumbai is as under:-



The development consist of

* Plant Boundary
* Green Belt Area
* Watch Tower
* Coal Stock Yard
* Switch Yard Area
* Transformer Yard
* Powerhouse Building
* Boiler Units
* Electrostatic Precipitator (ESP)
* ESP Control Room
* Air Washer Room
* CW Corridor
* Bunker Bay
* Main Control Building
* Chimney
* Cooling Tower (IDCT)
* CW Pump House
* DM Plant
* Guard Pond
* Fuel Oil Pump House
* Fuel Oil Tanks Area
* Service Water Overhead Tank
* Bottom Ash Silo
* Fly Ash Silo
* Electro Chlorination Building
* Admin Building Complex with Cafeteria
* Gate House Cum Security
* Fire Station
* Weigh Bridge
* Service Building and Workshop Building
* Car Parking Area
* Fabrication Area
* Storage Area, Contractor Shed & Consultant Office
* Ash Handling Complex- Recovery System
* Cafeteria
* DM Water Storage Tank Area
* Ash Bund
* Oil Water Separator
* Pre Treatment Plant Area
* RO Plant
* Space for Marshalling Yard
* Permeate Water Storage Tank
* Service Building Car Parking Area
* Ash Handling Complex- Main
* Mill Rejection Silo
* Coal Handling System Control and Switchgear Building
* Control / Switchgear Room for WT Plant
* Ware House
* Material Movement Gate
* Track Hopper Complex
* Coal Stockpile Runoff Clarification Plant
* Intermediate Surge Hopper
* Sewage Treatment Plant
* IDCT MCC Room-1
* IDCT MCC Room-2
* Switchyard Control Room
* Compressor House
* Blow Down Sump

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### 4.1 LOCATION ANALYSIS:-

The plant is situated at Village - Melamaruthur, D. Duraiswamipuram, Pattanamarudhur & Tharuvaikulam, Post - Ottapidaram, District - Thoothukudi, PIN Code-628 105, State-Tamil Nadu, Country-India at 8°54'49.5"N Latitude and 78°08'44.7"E Longitude.

The project is located on the eastern coast of South India in Tuticorin district, Tamil Nadu state, India. The project site is accessible by road about 4 km from NH-45 B. The site is located about 18 Km from Tuticorin town; 23 Km from the Tuticorin Port, and about 26 Km from the airport. The nearest railway station is Milavittan (Broad Gauge), 13 Km from the site. The site is about 3.5 km from the sea.



### 4.2 GEOGRAPHIC COORDINATE:-

The geographic Coordinates of 2 X 600 MW TPP is 8°54'49.5"N Latitude and 78°08'44.7"E Longitude. The power plant location is as under: -

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### 4.3. LAND FOR THE POWER PLANT: -

As per Village wise List for Freehold Land provided by the Company, Land for CEPL’s 2 X 600 MW CBTTP is 1,089.04 Acres which consists of Freehold. The breakup of freehold land provided by Company is as under: -

| S No. | Document No | Village | Survey No. | Sub Divn | Land Area (Acres) |
| --- | --- | --- | --- | --- | --- |
| 1 | 3318 / 25/09/2007 | Tharuvaikulam | 3 | 3B | 1.45 |
| 2 | 3318 / 25/09/2007 | Tharuvaikulam | 3 | 4A | 0.30 |
| 3 | 3318 / 25/09/2007 | Tharuvaikulam | 3 | 5A | 0.77 |
| 4 | 3316 / 19/09/2007 | Tharuvaikulam | 4 | 2 | 1.20 |
| 5 | 4335 / 04/12/2007 | Tharuvaikulam | 13 | 1A | 0.51 |
| 6 | 4335 / 04/12/2007 | Tharuvaikulam | 13 | 3B | 0.21 |
| 7 | 1041 / 01/04/2009 | Tharuvaikulam | 13 | 5A | 1.44 |
| 8 | 2602 / 02/ 08/2007 | Tharuvaikulam | 13 | 6 | 3.52 |
| 9 | 2715 / 09/08/2007 | Tharuvaikulam | 13 | 7 | 0.73 |
| 10 | 2816 / 21/08/2007 | Tharuvaikulam | 13 | 8 | 2.65 |
| 11 | 4182 / 23/11/2007 | Tharuvaikulam | 14 | 1A | 0.62 |
| 12 | 4175 / 23/11/2007 | Tharuvaikulam | 14 | 1B | 0.74 |
| 13 | 2517 / 26/07/2007 | Tharuvaikulam | 14 | 2 | 2.54 |
| 14 | 4174 / 23/11/2007 | Tharuvaikulam | 14 | 3 | 2.01 |
| 15 | 2309 / 12/07/2007 | Tharuvaikulam | 14 | 4 | 1.72 |
| 16 | 2268 / 10/07/2007 | Tharuvaikulam | 14 | 5 | 1.56 |
| 17 | 2309 /12/07/2007 | Tharuvaikulam | 14 | 6 | 1.67 |
| 18 | 4014 /17/08/2007 | Tharuvaikulam | 15 | 1A | 0.31 |
| 19 | 2661 / 06/08/2007 | Tharuvaikulam | 15 | 1B | 0.32 |
| 20 | 2536 /27/07/2007 | Tharuvaikulam | 15 | 1C | 0.64 |
| 21 | 2309 /12/07/2007 | Tharuvaikulam | 15 | 2 | 5.50 |
| 22 | 4184 / 23/11/2007 | Tharuvaikulam | 15 | 3 | 1.80 |
| 23 | 2309 /12/07/2007 | Tharuvaikulam | 15 | 4 | 0.35 |
| 24 | 4184 / 23/11/2007 | Tharuvaikulam | 15 | 5B | 0.47 |
| 25 | 4896 /23/12/2008 | Tharuvaikulam | 15 | 6 | 1.77 |
| 26 | 2538 / 27/07/2008 | Tharuvaikulam | 16 | 1A | 1.17 |
| 27 | 4463 / 12/12/2007 | Tharuvaikulam | 16 | 1B | 0.89 |
| 28 | 2541 / 27/07/2007 | Tharuvaikulam | 16 | 1C | 0.83 |
| 29 | 3021 / 03/09/2007 | Tharuvaikulam | 16 | 1D | 0.65 |
| 30 | 4463 / 12/12/2007 | Tharuvaikulam | 16 | 1E | 0.17 |
| 31 | 2538 / 27/07/2008 | Tharuvaikulam | 16 | 1F | 0.19 |
| 32 | 3021 / 03/09/2007 | Tharuvaikulam | 16 | 1G | 0.17 |
| 33 | 3021 / 03/09/2007 | Tharuvaikulam | 16 | 1H | 0.23 |
| 34 | 0087 / 12/01/2009 | Tharuvaikulam | 18 | 1A | 1.00 |
| 35 | 0087 / 12/01/2009 | Tharuvaikulam | 18 | 1B | 0.01 |
| 36 | 2679 / 07/08/2007 | Tharuvaikulam | 31 | 1 | 2.46 |
| 37 | 2662 /06/08/2007 | Tharuvaikulam | 37 | 1 | 1.65 |
| 38 | 2870/ 23/08/2007 | Tharuvaikulam | 37 | 1 | 1.64 |
| 39 | 2282 / 11/07/2007 | Tharuvaikulam | 37 | 2 | 0.99 |
| 40 | 3306 / 19/09/2007 | Tharuvaikulam | 37 | 3 | 0.95 |
| 41 | 3308 / 24/09/2007 | Tharuvaikulam | 37 | 4 | 1.76 |
| 42 | 0078 / 10/01/2008 | Tharuvaikulam | 38 | 1 | 1.73 |
| 43 | 0400 / 05/02/2008 | Tharuvaikulam | 38 | 2 | 5.01 |
| 44 | 0076 / 10/01/2008 | Tharuvaikulam | 38 | 3 | 1.53 |
| 45 | 4823 / 15/12/2008 | Tharuvaikulam | 38 | 4 | 1.16 |
| 46 | 2229 / 16/07/2009 | Tharuvaikulam | 38 | 5 | 1.01 |
| 47 | 0478 / 08/02/2008 | Tharuvaikulam | 39 | 1 | 0.49 |
| 48 | 0478 / 08/02/2008 | Tharuvaikulam | 39 | 4 | 0.89 |
| 49 | 0546 / 13/02/2008 | Tharuvaikulam | 39 | 5 | 1.05 |
| 50 | 0478 / 08/02/2008 | Tharuvaikulam | 39 | 6 | 0.26 |
| 51 | 0078 / 10/01/2008 | Tharuvaikulam | 39 | 7 | 1.06 |
| 52 | 0478 / 08/02/2008 | Tharuvaikulam | 39 | 8 | 0.74 |
| 53 | 2763 / 14/08/2007 | Tharuvaikulam | 39 | 9 | 1.45 |
| 54 | 2764 / 14/08/2007 | Tharuvaikulam | 39 | 10 | 0.44 |
| 55 | 4178 / 23/11/2007 | Tharuvaikulam | 40 | 1 | 1.28 |
| 56 | 2508 / 26/07/2007 | Tharuvaikulam | 40 | 2 | 1.23 |
| 57 | 0077 / 10/01/2008 | Tharuvaikulam | 40 | 3 | 2.82 |
| 58 | 3132 / 12/09/2007 | Tharuvaikulam | 41 | 1 | 0.68 |
| 59 | 3132 / 12/09/2007 | Tharuvaikulam | 41 | 7A | 0.40 |
| 60 | 4178 / 23/11/2007 | Tharuvaikulam | 41 | 7B | 0.17 |
| 61 | 4886 / 22/12/2008 | Tharuvaikulam | 41 | 7C | 0.22 |
| 62 | 3132 / 12/09/2007 | Tharuvaikulam | 41 | 7F | 0.44 |
| 63 | 2988 / 31/08/2007 | Tharuvaikulam | 41 | 8 | 1.60 |
| 64 | 4010 / 17/08/2007 | Melamaruthur | 113 | 2A | 4.37 |
| 65 | 4010 / 17/08/2007 | Melamaruthur | 113 | 2B | 5.43 |
| 66 | 2271 / 09/07/2007 | Melamaruthur | 113 | 3 | 3.28 |
| 67 | 2478 / 25/07/2007 | Melamaruthur | 114 |  | 0.42 |
| 68 | 2478 / 25/07/2007 | Melamaruthur | 114 |  | 5.08 |
| 69 | 799 / 12/03/2009 | Melamaruthur | 114 | 1 | 2.72 |
| 70 | 4085 / 19/11/2007 | Melamaruthur | 115 | 1 | 2.81 |
| 71 | 4085 / 19/11/2007 | Melamaruthur | 115 | 2 | 1.03 |
| 72 | 4010 / 17/08/2007 | Melamaruthur | 115 | 3 | 0.87 |
| 73 | 2856 / 23/8/2007 | Melamaruthur | 115 | 4 | 1.78 |
| 74 | 2856 / 23/8/2007 | Melamaruthur | 115 | 5 | 1.90 |
| 75 | 4010 / 17/08/2007 | Melamaruthur | 115 | 6 | 1.68 |
| 76 | 3647 / 18/10/2007 | Melamaruthur | 116 | 1 | 2.24 |
| 77 | 2663 / 06/08/2007 | Melamaruthur | 116 | 2 | 1.12 |
| 78 | 4179 / 23/11/2007 | Melamaruthur | 116 | 3 | 0.88 |
| 79 | 2480 / 25/07/2007 | Melamaruthur | 116 | 4A | 0.95 |
| 80 | 2653 / 06/08/2007 | Melamaruthur | 116 | 4B | 0.91 |
| 81 | 4867 / 18/12/2008 | Melamaruthur | 116 | 4C | 0.86 |
| 82 | 799 / 12/3/2009 | Melamaruthur | 116 | 5A | 0.74 |
| 83 | 2447 / 23/07/2007 | Melamaruthur | 116 | 5B | 0.75 |
| 84 | 2675 / 07/08/2007 | Melamaruthur | 116 | 6 | 1.10 |
| 85 | 2463/ 24/07/2007 | Melamaruthur | 116 | 7 | 1.64 |
| 86 | 3644 / 18/10/2007 | Melamaruthur | 117 | 1 | 0.04 |
| 87 | 3644 / 18/10/2007 | Melamaruthur | 117 | 2 | 1.64 |
| 88 | 2257 / 17/07/2007 | Melamaruthur | 117 | 3 | 1.16 |
| 89 | 4169 / 23/11/2007 | Melamaruthur | 117 | 5 | 0.80 |
| 90 | 3315 / 25/9/2007 | Melamaruthur | 117 | 9 | 0.70 |
| 91 | 2600 / 2/8/2007 | Melamaruthur | 117 | 10 | 1.33 |
| 92 | 2226 / 16/7/2009 | Melamaruthur | 117 | 11 | 0.63 |
| 93 | 4252 / 28/11/2007 | Melamaruthur | 124 | 4 | 1.41 |
| 94 | 3682 / 23/10/2007 | Melamaruthur | 125 | 1A | 0.79 |
| 95 | 2480 / 25/07/2007 | Melamaruthur | 125 | 1B | 0.79 |
| 96 | 3681 / 23/10/2007 | Melamaruthur | 125 | 1C | 0.64 |
| 97 | 3683 / 23/10/2007 | Melamaruthur | 125 | 1D | 0.69 |
| 98 | 4844 / 17/12/2008 | Melamaruthur | 125 | 3 | 0.42 |
| 99 | 4844 / 17/12/2008 | Melamaruthur | 125 | 4 | 0.49 |
| 100 | 3309 / 24-9-2007 | Melamaruthur | 125 | 5 | 0.59 |
| 101 | 3674/23/10/2007 | Melamaruthur | 125 | 7 | 1.37 |
| 102 | 3645/18/10/2007 | Melamaruthur | 125 | 8 | 1.33 |
| 103 | 4179/23/11/2007 | Melamaruthur | 125 | 9 | 1.56 |
| 104 | 2460/24/7/2007 | Melamaruthur | 125 | 10 | 1.95 |
| 105 | 4868 / 18-12-08 | Melamaruthur | 127 | 1A | 0.83 |
| 106 | 4082 / 19/11/2007 | Melamaruthur | 127 | 1B | 0.73 |
| 107 | 2846 / 22/8/2007 | Melamaruthur | 127 | 2A | 0.67 |
| 108 | 4082 / 19/11/2007 | Melamaruthur | 127 | 2B | 0.63 |
| 109 | 2214 / 04/07/2007 | Melamaruthur | 127 | 5 | 1.23 |
| 110 | 2479 / 25/07/2007 | Melamaruthur | 130 | 1 | 0.91 |
| 111 | 2762 / 14/08/2007 | Melamaruthur | 130 | 2 | 1.14 |
| 112 | 2310 / 12/07/2007 | Melamaruthur | 130 | 3A | 2.20 |
| 113 | 2214 / 04/07/2007 | Melamaruthur | 130 | 3B | 4.00 |
| 114 | 2489 / 25/07/2007 | Melamaruthur | 131 | 1 | 1.96 |
| 115 | 869 / 05/03/2008 | Melamaruthur | 131 | 2 | 2.45 |
| 116 | 2312 / 12/07/2007 | Melamaruthur | 131 | 3 | 3.43 |
| 117 | 2286 / 11/07/2007 | Melamaruthur | 131 | 4A | 1.33 |
| 118 | 2480 / 25/07/2007 | Melamaruthur | 131 | 4B | 0.98 |
| 119 | 2226 / 05/07/2007 | Melamaruthur | 131 | 5 | 1.79 |
| 120 | 3646 / 18/10/2007 | Melamaruthur | 132 | 1A | 0.63 |
| 121 | 2228 / 05/07/2007 | Melamaruthur | 132 | 1B | 1.03 |
| 122 | 3637 / 18/10/2007 | Melamaruthur | 132 | 2 | 3.43 |
| 123 | 3770 / 31/10/2007 | Melamaruthur | 132 | 4 | 3.26 |
| 124 | 3770 / 31/10/2007 | Melamaruthur | 132 | 5 | 0.07 |
| 125 | 2212 / 04/07/2007 | Melamaruthur | 133 | 1A | 25.00 |
| 126 | 2213 / 04/07/2007 | Melamaruthur | 133 | 1A | 25.00 |
| 127 | 2213 / 04/07/2007 | Melamaruthur | 133 | 1A | 12.84 |
| 128 | 2212 / 04/07/2007 | Melamaruthur | 133 | 1A | 25.00 |
| 129 | 2214 / 04/07/2007 | Melamaruthur | 133 | 1A | 25.00 |
| 130 | 2478 /25/07/2007 | Melamaruthur | 133 | 1A | 9.50 |
| 131 | 2478 /25/07/2007 | Melamaruthur | 133 | 1A | 8.16 |
| 132 | 2478 /25/07/2007 | Melamaruthur | 133 | 1A | 9.50 |
| 133 | 2226 / 05/07/2007 | Melamaruthur | 133 | 1A2 | 28.00 |
| 134 | 2223 /05/07/2007 | Melamaruthur | 133 | 1A2 | 28.00 |
| 135 | 4010 / 17/08/2007 | Melamaruthur | 133 | 1A | 1.45 |
| 136 | 433 / 07/02/2008 | Melamaruthur | 133 | 1B1 | 31.90 |
| 137 | 431 / 07/02/2008 | Melamaruthur | 133 | 1B2 | 13.88 |
| 138 | 432 / 07/02/2008 | Melamaruthur | 133 | 1C | 7.00 |
| 139 | 2212 / 04/07/2007 | Melamaruthur | 133 | 2 | 23.50 |
| 140 | 2478 / 25/07/2007 | Melamaruthur | 133 | 3 | 0.92 |
| 141 | 2226 / 05/07/2007 | Melamaruthur | 134 | 1 | 5.58 |
| 142 | 2226 / 05/07/2007 | Melamaruthur | 134 | 2 | 1.00 |
| 143 | 2272 / 09/07/2007 | Melamaruthur | 134 | 2 | 6.03 |
| 144 | 2222 / 05/07/2007 | Melamaruthur | 136 | 1 | 13.88 |
| 145 | 2222 / 05/07/2007 | Melamaruthur | 136 | 2 | 8.30 |
| 146 | 2213 / 04/07/2007 | Melamaruthur | 138 | 1 | 3.15 |
| 147 | 2213 / 04/07/2007 | Melamaruthur | 138 | 2 | 3.28 |
| 148 | 2213 / 04/07/2007 | Melamaruthur | 139 |  | 8.11 |
| 149 | 2214 / 04/07/2007 | Melamaruthur | 139 |  | 13.77 |
| 150 | 2227 / 05/07/2007 | Melamaruthur | 141 |  | 20.00 |
| 151 | 2227 / 05/07/2007 | Melamaruthur | 141 |  | 19.43 |
| 152 | 2227 / 05/07/2007 | Melamaruthur | 142 |  | 1.30 |
| 153 | 2664 / 06/08/2007 | Melamaruthur | 142 |  | 1.20 |
| 154 | 2673 / 07/08/2007 | Melamaruthur | 142 |  | 1.50 |
| 155 | 2674 / 07/08/2007 | Melamaruthur | 142 |  | 1.50 |
| 156 | 3183 / 17/09/2007 | Melamaruthur | 142 |  | 1.50 |
| 157 | 4084 / 19/11/2007 | Melamaruthur | 142 |  | 5.99 |
| 158 | 4436 / 11/12/2007 | Melamaruthur | 143 | 1 | 3.38 |
| 159 | 3072/ 07/09/2007 | Melamaruthur | 143 | 2 | 3.80 |
| 160 | 4435/ 11/12/2007 | Melamaruthur | 146 |  | 8.53 |
| 161 | 3317/ 25/09/2007 | Melamaruthur | 149 |  | 6.39 |
| 162 | 2275/ 09/07/2007 | Melamaruthur | 150 | 1A | 1.03 |
| 163 | 2264/ 10/07/2007 | Melamaruthur | 150 | 1B | 1.17 |
| 164 | 2482/ 25/07/2007 | Melamaruthur | 150 | 1C | 1.00 |
| 165 | 2479/ 25/07/2007 | Melamaruthur | 150 | 1D | 1.00 |
| 166 | 2281/ 11.07.2007 | Melamaruthur | 150 | 1E | 0.62 |
| 167 | 2265/ 10.07.2007 | Melamaruthur | 150 | 1F | 0.58 |
| 168 | 2484/ 27.07.2007 | Melamaruthur | 150 | 2 | 2.85 |
| 169 | 3723/ 26/10/2007 | Melamaruthur | 153 | 1 | 0.44 |
| 170 | 4056/ 16/11/2007 | Melamaruthur | 153 | 2 | 0.47 |
| 171 | 4056/ 16/11/2007 | Melamaruthur | 153 | 3 | 0.57 |
| 172 | 3723/ 26/10/2007 | Melamaruthur | 153 | 4 | 0.49 |
| 173 | 4476/ 13/12/2007 | Melamaruthur | 156 | 1 | 13.30 |
| 174 | 4465/ 12/12/2007 | Melamaruthur | 157 | 2A | 0.88 |
| 175 | 4464/ 12/12/2007 | Melamaruthur | 157 | 2B | 0.79 |
| 176 | 4843/ 17/12/2008 | Melamaruthur | 157 | 3 | 1.20 |
| 177 | 2330/ 11/06/2008 | Melamaruthur | 157 | 4 | 3.27 |
| 178 | 2330/ 11/06/2008 | Melamaruthur | 158 | 1 | 0.05 |
| 179 | 2330/ 11/06/2008 | Melamaruthur | 158 | 4 | 2.45 |
| 180 | 4170/ 23/11/2007 | Melamaruthur | 158 | 5 | 1.28 |
| 181 | 4057/ 16/11/2007 | Melamaruthur | 158 | 6 | 0.98 |
| 182 | 2783/ 16/08/2007 | Melamaruthur | 158 | 7 | 1.42 |
| 183 | 2266/ 10/07/2007 | Melamaruthur | 158 | 8 | 0.30 |
| 184 | 2330/ 11/06/2008 | Melamaruthur | 159 | 3A | 0.48 |
| 185 | 4810/ 15/12/2008 | Melamaruthur | 159 | 3C | 1.72 |
| 186 | 4810/ 15/12/2008 | Melamaruthur | 159 | 3D | 1.57 |
| 187 | 2270/ 09/07/2007 | Melamaruthur | 159 | 4 | 1.61 |
| 188 | 2330/ 11/06/2008 | Melamaruthur | 160 | 1 | 1.32 |
| 189 | 2225/ 05/07/2007 | Melamaruthur | 160 | 2 | 0.83 |
| 190 | 2270/ 09/07/2007 | Melamaruthur | 160 | 3 | 1.98 |
| 191 | 2330/ 11/06/2008 | Melamaruthur | 160 | 5 | 2.14 |
| 192 | 4810/ 15/12/2008 | Melamaruthur | 160 | 6A | 1.07 |
| 193 | 2676/ 07/08/2007 | Melamaruthur | 160 | 6B | 0.59 |
| 194 | 2225/ 05/07/2007 | Melamaruthur | 161 | 1 | 1.73 |
| 195 | 4813/ 11/12/2008 | Melamaruthur | 161 | 2 | 0.10 |
| 196 | 2228/ 16/07/2009 | Melamaruthur | 161 | 3 | 0.19 |
| 197 | 2483/ 25/07/2007 | Melamaruthur | 161 | 4 | 0.45 |
| 198 | 2270/ 09/07/2007 | Melamaruthur | 161 | 5 | 0.20 |
| 199 | 4317/ 03/12/2007 | Melamaruthur | 161 | 7 | 1.11 |
| 200 | 4813/ 11/12/2008 | Melamaruthur | 161 | 8 | 0.42 |
| 201 | 2285/ 11/07/2007 | Melamaruthur | 161 | 9 | 0.41 |
| 202 | 2481/ 25/07/2007 | Melamaruthur | 161 | 10 | 0.28 |
| 203 | 2483/ 25/07/2007 | Melamaruthur | 161 | 11 | 0.30 |
| 204 | 2483/ 25/07/2007 | Melamaruthur | 161 | 12 | 0.16 |
| 205 | 2270/ 09/07/2007 | Melamaruthur | 161 | 13 | 4.17 |
| 206 | 2330/ 11/06/2008 | Melamaruthur | 161 | 14 | 1.22 |
| 207 | 2225/ 05/07/2007 | Melamaruthur | 161 | 15 | 1.12 |
| 208 | 4843/ 17/12/2008 | Melamaruthur | 162 | 1 | 4.08 |
| 209 | 2225/ 05/07/2007 | Melamaruthur | 162 | 2 | 2.27 |
| 210 | 2477/ 25/07/2007 | Melamaruthur | 163 | 1 | 2.86 |
| 211 | 2255/ 17/07/2009 | Melamaruthur | 163 | 2 | 1.49 |
| 212 | 2225/05/07/2007 | Melamaruthur | 163 | 3 | 2.70 |
| 213 | 3034/ 05/09/2007 | Melamaruthur | 164 | 1A | 2.08 |
| 214 | 3035/ 05/09/2007 | Melamaruthur | 164 | 1B | 2.12 |
| 215 | 2519/ 26/07/2007 | Melamaruthur | 165 | 1 | 2.99 |
| 216 | 2519/ 26/07/2007 | Melamaruthur | 165 | 3 | 1.61 |
| 217 | 2225/ 05/07/2007 | Melamaruthur | 165 | 4 | 2.63 |
| 218 | 2225/ 05/07/2007 | Melamaruthur | 165 | 5 | 1.38 |
| 219 | 2665/ 06/08/2007 | Melamaruthur | 166 | 1 | 0.96 |
| 220 | 2520/ 25/07/2007 | Melamaruthur | 166 | 2 | 0.88 |
| 221 | 2676/ 07/08/2007 | Melamaruthur | 166 | 3 | 1.23 |
| 222 | 2676/ 07/08/2007 | Melamaruthur | 167 | 1 | 0.65 |
| 223 | 2330/ 11/06/2008 | Melamaruthur | 167 | 2 | 4.25 |
| 224 | 2270/ 09/07/2007 | Melamaruthur | 167 | 3 | 2.00 |
| 225 | 2519/26/07/2007 | Melamaruthur | 167 | 4 | 3.17 |
| 226 | 2330/ 11/06/2008 | Melamaruthur | 167 | 6 | 0.16 |
| 227 | 2225/ 05/07/2007 | Melamaruthur | 167 | 7 | 0.36 |
| 228 | 4864/ 18/12/2008 | Melamaruthur | 168 | 1 | 0.64 |
| 229 | 4866/ 18/12/2008 | Melamaruthur | 168 | 2A | 0.85 |
| 230 | 2225/ 05/07/2007 | Melamaruthur | 168 | 2B | 0.42 |
| 231 | 2330/ 11/06/2008 | Melamaruthur | 168 | 3A | 2.72 |
| 232 | 2977/ 30/08/2007 | Melamaruthur | 168 | 3B | 0.30 |
| 233 | 3133/ 12/09/2007 | Melamaruthur | 168 | 3C | 0.22 |
| 234 | 4810/ 15/12/2008 | Melamaruthur | 168 | 4A | 1.57 |
| 235 | 2977/ 30/08/2007 | Melamaruthur | 168 | 4B | 0.65 |
| 236 | 3133/ 12/09/2007 | Melamaruthur | 168 | 4C | 0.63 |
| 237 | 3133/ 12/09/2007 | Melamaruthur | 168 | 6 | 0.04 |
| 238 | 4180/ 23/11/2007 | Melamaruthur | 168 | 7 | 0.88 |
| 239 | 2284/ 11/07/2007 | Melamaruthur | 169 | 1 | 1.40 |
| 240 | 2670/ 07/08/2007 | Melamaruthur | 169 | 2 | 0.65 |
| 241 | 2670/ 07/08/2007 | Melamaruthur | 169 | 3 | 0.73 |
| 242 | 2330/ 11/06/2008 | Melamaruthur | 169 | 4 | 0.73 |
| 243 | 2270/ 09/07/2007 | Melamaruthur | 169 | 5 | 0.68 |
| 244 | 4087/ 19/11/2007 | Melamaruthur | 169 | 6 | 1.14 |
| 245 | 2542/ 27/07/2007 | Melamaruthur | 169 | 7 | 1.16 |
| 246 | 3185/ 12/09/2007 | Melamaruthur | 169 | 8 | 0.33 |
| 247 | 2670/ 07/08/2007 | Melamaruthur | 169 | 9 | 0.35 |
| 248 | 3182/ 12/09/2007 | Melamaruthur | 169 | 10 | 0.28 |
| 249 | 3184/ 12/09/2007 | Melamaruthur | 169 | 11 | 0.32 |
| 250 | 2479/ 25/07/2007 | Melamaruthur | 170 | 1 | 1.14 |
| 251 | 2601/ 02/08/2007 | Melamaruthur | 170 | 2A | 1.30 |
| 252 | 2481/ 25/07/2007 | Melamaruthur | 170 | 2B | 1.06 |
| 253 | 2270/ 09/07/2007 | Melamaruthur | 170 | 4 | 1.52 |
| 254 | 2283/ 11/07/2007 | Melamaruthur | 171 | 2 | 1.61 |
| 255 | 2254/ 17/07/2009 | Melamaruthur | 171 | 3 | 0.92 |
| 256 | 2254/ 17/07/2009 | Melamaruthur | 171 | 4 | 0.94 |
| 257 | 4180/ 23.11.2007 | Melamaruthur | 171 | 5 | 2.45 |
| 258 | 4491/ 14/12/2007 | Melamaruthur | 171 | 6 | 1.30 |
| 259 | 2544/ 27/07/2007 | Melamaruthur | 172 | 1 | 0.12 |
| 260 | 2534/ 27/07/2007 | Melamaruthur | 172 | 3A | 1.09 |
| 261 | 2539/ 27/07/2007 | Melamaruthur | 172 | 3B | 0.91 |
| 262 | 2540/ 27/07/2007 | Melamaruthur | 172 | 3C | 0.85 |
| 263 | 4888/ 22/12/2008 | Melamaruthur | 172 | 4A | 0.59 |
| 264 | 4673/ 27/12/2007 | Melamaruthur | 172 | 4B | 0.59 |
| 265 | 4176/ 23/11/2007 | Melamaruthur | 172 | 5 | 0.96 |
| 266 | 396/ 04/02/2008 | Melamaruthur | 173 |  | 6.25 |
| 267 | 517/ 12/02/2008 | Melamaruthur | 174 | 1 | 1.07 |
| 268 | 4811/ 11/12/2008 | Melamaruthur | 174 | 2 | 1.82 |
| 269 | 517/ 12/02/2008 | Melamaruthur | 174 | 3 | 1.29 |
| 270 | 86/ 12/01/2009 | Melamaruthur | 174 | 4 | 1.26 |
| 271 | 2788/ 22/08/2007 | Melamaruthur | 174 | 5 | 1.80 |
| 272 | 2313/ 12/07/2007 | Melamaruthur | 175 | 1 | 3.43 |
| 273 | 2489/ 25/07/2007 | Melamaruthur | 175 | 2 | 1.33 |
| 274 | 2314/ 12/07/2007 | Melamaruthur | 175 | 3 | 7.40 |
| 275 | 2485/ 25/07/2007 | Melamaruthur | 176 | 1 | 4.85 |
| 276 | 2462/ 24/07/2007 | Melamaruthur | 176 | 2 | 2.31 |
| 277 | 2967/ 29/08/2007 | Melamaruthur | 177 | 1 | 5.48 |
| 278 | 2274/ 09/07/2007 | Melamaruthur | 177 | 2 | 0.69 |
| 279 | 4180/ 23/11/2007 | Melamaruthur | 177 | 3 | 1.67 |
| 280 | 2545/ 27/07/2007 | Melamaruthur | 178 | 1 | 2.43 |
| 281 | 2270/ 09/07/2007 | Melamaruthur | 178 | 2 | 2.52 |
| 282 | 2267/ 10/07/2007 | Melamaruthur | 178 | 3 | 0.96 |
| 283 | 2280/8 11/07/2007 | Melamaruthur | 178 | 6 | 1.24 |
| 284 | 3307/ 24/09/2007 | Melamaruthur | 179 | 3 | 1.84 |
| 285 | 2227/ 16/07/2009 | Melamaruthur | 179 | 4 | 1.86 |
| 286 | 2269/ 10/07/2007 | Melamaruthur | 179 | 5 | 3.31 |
| 287 | 2273/ 09/07/2007 | Melamaruthur | 179 | 6 | 1.49 |
| 288 | 2535/ 27/07/2007 | Melamaruthur | 179 | 7 | 1.62 |
| 289 | 4814/ 15/12/2008 | Melamaruthur | 180 | 1 | 5.16 |
| 290 | 4811/ 11/12/2008 | Melamaruthur | 180 | 2 | 1.70 |
| 291 | 2507/ 26/07/2007 | Melamaruthur | 180 | 3 | 0.80 |
| 292 | 2507/ 26/07/2007 | Melamaruthur | 180 | 4 | 0.80 |
| 293 | 4813/ 11/12/2008 | Melamaruthur | 181 | 1 | 0.80 |
| 294 | 2601/ 02/08/2007 | Melamaruthur | 181 | 3 | 4.74 |
| 295 | 2676/ 07/08/2007 | Melamaruthur | 181 | 4 | 2.17 |
| 296 | 2507/ 26/07/2007 | Melamaruthur | 181 | 5 | 0.80 |
| 297 | 4813/ 11/12/2008 | Melamaruthur | 183 | 2 | 0.56 |
| 298 | 4185/ 23/11/2007 | Melamaruthur | 197 | 1 | 0.06 |
| 299 | 4185/ 23/11/2007 | Melamaruthur | 197 | 2 | 0.49 |
| 300 | 4842/ 17/12/2008 | Melamaruthur | 197 | 4 | 0.86 |
| 301 | 2227/ 16/07/2009 | Melamaruthur | 197 | 5 | 1.61 |
| 302 | 4653/ 27/12/2007 | Melamaruthur | 198 | 2 | 1.75 |
| 303 | 3071/ 05/09/2007 | Melamaruthur | 199 | 3 | 1.79 |
|  | 787/ 11/03/2009 | Melamaruthur | 199 | 4C | 0.88 |
| 304 | 2782 / 16/08/2007 | D. Duraiswamipuram | 268 | 2 | 0.67 |
| 305 | 2782 / 16/08/2007 | D. Duraiswamipuram | 268 | 5 | 0.61 |
| 306 | 1967 / 26/06/2009 | D. Duraiswamipuram | 268 | 4 | 0.43 |
| 307 | 4019 /17/08/2007 | D. Duraiswamipuram | 268 | 6 | 1.24 |
| 308 | 2504 / 26/07/2007 | D. Duraiswamipuram | 269 | 3 | 1.76 |
| 309 | 2505 / 26/07/2007 | D. Duraiswamipuram | 271 | 1 | 1.86 |
| 310 | 2659 / 06/08/2007 | D. Duraiswamipuram | 275 | 3 | 0.35 |
| 311 | 2666 / 06/08/2007 | D. Duraiswamipuram | 276 | 1B | 0.57 |
| 312 | 2537 / 27/07/2007 | D. Duraiswamipuram | 276 | 2 | 0.77 |
| 313 | 2656 / 06/08/2007 | D. Duraiswamipuram | 277 | 3 | 1.07 |
| 314 | 2668 / 07/08/2007 | D. Duraiswamipuram | 278 | 11 | 0.61 |
| 315 | 2668 / 07/08/2007 | D. Duraiswamipuram | 278 | 16 | 0.30 |
| 316 | 2516 / 26/07/2007 | D. Duraiswamipuram | 278 | 18 | 1.40 |
| 317 | 2506 / 26/07/2007 | D. Duraiswamipuram | 278 | 22 | 1.06 |
| 318 | 2511 / 26/07/2007 | D. Duraiswamipuram | 279 | 5 | 1.00 |
| 319 | 3134 / 12/09/2007 | D. Duraiswamipuram | 322 | 1 | 0.94 |
| 320 | 4009 / 17/08/ 2007 | D. Duraiswamipuram | 325 | 1 | 1.41 |
| 321 | 2533 / 27/07/2007 | D. Duraiswamipuram | 326 | 3A | 0.48 |
| 322 | 2512 / 26/07/2007 | D. Duraiswamipuram | 326 | 3B | 0.49 |
| 323 | 2503 / 26/07/2007 | D. Duraiswamipuram | 326 | 4A | 2.56 |
| 324 | 2658 /06/08/2007 | D. Duraiswamipuram | 326 | 4B | 2.59 |
| 325 | 2449 / 23/07/2007 | D. Duraiswamipuram | 327 | 1 | 1.89 |
| 326 | 2518 / 26/07/2007 | D. Duraiswamipuram | 327 | 2 | 1.86 |
| 327 | 2547 / 27/07/2008 | D. Duraiswamipuram | 327 | 3 | 1.80 |
| 328 | 2332 / 11/06/2008 | D. Duraiswamipuram | 328 | 2 | 2.30 |
| 329 | 4018 / 17/08/2007 | D. Duraiswamipuram | 328 | 3 | 0.80 |
| 330 | 2532 / 27/07/2007 | D. Duraiswamipuram | 328 | 4 | 0.44 |
| 331 | 4011 / 17/08/2007 | D. Duraiswamipuram | 328 | 5 | 0.10 |
| 332 | 4011 / 17/08/2007 | D. Duraiswamipuram | 328 | 6 | 0.20 |
| 333 | 2789 /17 /08/2007 | D. Duraiswamipuram | 331 | 1 | 0.61 |
| 334 | 2509 / 26/07/2007 | D. Duraiswamipuram | 331 | 2 | 1.51 |
| 335 | 4013 / 17/08/2007 | D. Duraiswamipuram | 331 | 3 | 6.29 |
| 336 | 2651 / 06/08/2007 | D. Duraiswamipuram | 332 | 1 | 2.80 |
| 337 | 0434 / 07/02/2008 | D. Duraiswamipuram | 333 |  | 35.61 |
| 338 | 2671 / 07/08/2007 | D. Duraiswamipuram | 334 | 1 | 1.88 |
| 339 | 2461 / 24/07/2007 | D. Duraiswamipuram | 334 | 2 | 1.66 |
| 340 | 2648 /06/08/2007 | D. Duraiswamipuram | 334 | 2 | 1.66 |
| 341 | 2647 / 06/08/2007 | D. Duraiswamipuram | 334 | 3 | 1.69 |
| 342 | 4018 / 17/08/2007 | D. Duraiswamipuram | 337 | 3A | 0.05 |
| 343 | 4018 / 17/08/2007 | D. Duraiswamipuram | 337 | 3B | 1.52 |
| 344 | 3101 / 07/09/2007 | D. Duraiswamipuram | 337 | 3C | 0.72 |
| 345 | 4012 / 17/08/2007 | D. Duraiswamipuram | 337 | 3E | 1.53 |
| 346 | 4016 / 17/08/2007 | D. Duraiswamipuram | 337 | 3F | 1.68 |
| 347 | 4016 / 17/08/2007 | D. Duraiswamipuram | 338 | 1C | 0.07 |
| 348 | 2448 / 23/07/2007 | D. Duraiswamipuram | 338 | 3A | 0.17 |
| 349 | 2448 / 23/07/2007 | D. Duraiswamipuram | 338 | 3B | 1.27 |
| 350 | 2677 / 06/08/2007 | D. Duraiswamipuram | 346 | 1 | 0.85 |
| 351 | 4017 /17/08/2007 | D. Duraiswamipuram | 346 | 2 | 1.90 |
| 352 | 4865 / 18/12/2008 | D. Duraiswamipuram | 346 | 4 | 0.40 |
| 353 | 2543 / 27/07/2007 | D. Duraiswamipuram | 346 | 5 | 0.62 |
| 354 | 2649 / 06/08/2007 | D. Duraiswamipuram | 346 | 6 | 1.64 |
| 355 | 4318 / 03/12/2007 | D. Duraiswamipuram | 347 | 1 | 18.00 |
| 356 | 4325 / 04/12/2007 | D. Duraiswamipuram | 347 | 1 | 9.00 |
| 357 | 4324 / 04/12/2007 | D. Duraiswamipuram | 347 | 1 | 6.68 |
| 358 | 2649 / 06/08/2007 | D. Duraiswamipuram | 347 | 5 | 0.80 |
| 359 | 4434 / 11/12/2007 | D. Duraiswamipuram | 348 | 1 | 2.48 |
| 360 | 4434 / 11/12/2007 | D. Duraiswamipuram | 348 | 2 | 0.12 |
| 361 | 4434 / 11/12/2007 | D. Duraiswamipuram | 348 | 3 | 5.40 |
| 362 | 2654 / 06/08/2007 | D. Duraiswamipuram | 349 | 3 | 0.33 |
| 363 | 2655 / 06/08/2007 | D. Duraiswamipuram | 349 | 4 | 1.71 |
| 364 | 3636 / 18/10/2007 | D. Duraiswamipuram | 349 | 5 | 0.44 |
| 365 | 2657 / 06/08/2007 | D. Duraiswamipuram | 349 | 6 | 0.51 |
| 366 | 2657 / 06/08/2007 | D. Duraiswamipuram | 349 | 7 | 0.51 |
| 367 | 4324 / 04/12/2007 | D. Duraiswamipuram | 349 | 8 | 0.61 |
| 368 | 4433 / 11/12/2007 | D. Duraiswamipuram | 349 | 9 | 0.54 |
| 369 | 4433 / 11/12/2007 | D. Duraiswamipuram | 349 | 10 | 0.58 |
| 370 | 4433 / 11/12/2007 | D. Duraiswamipuram | 349 | 11 | 0.73 |
| 371 | 4433 / 11/12/2007 | D. Duraiswamipuram | 349 | 12 | 0.73 |
| 372 | 4433 / 11/12/2007 | D. Duraiswamipuram | 349 | 13 | 0.99 |
| 373 | 4434 / 11/12/2007 | D. Duraiswamipuram | 349 | 14 | 2.33 |
| 374 | 2652 / 06/08/2007 | D. Duraiswamipuram | 349 | 15 | 1.56 |
| 375 | 2660 / 06/08/2007 | D. Duraiswamipuram | 349 | 16 | 0.68 |
| 376 | 2660 / 06/08/2007 | D. Duraiswamipuram | 349 | 17 | 0.63 |
| 377 | 2672 / 07/08/2007 | D. Duraiswamipuram | 349 | 19 | 2.61 |
| 378 | 2654 / 06/08/2007 | D. Duraiswamipuram | 349 | 20 | 1.27 |
| 379 | 2654 / 06/08/2007 | D. Duraiswamipuram | 349 | 21 | 1.49 |
| 380 | 2655 / 06/08/2007 | D. Duraiswamipuram | 349 | 22 | 1.33 |
| 381 | 2256 / 17/07/2009 | D. Duraiswamipuram | 349 | 23 | 1.38 |
| 382 | 2669 / 07/08/2007 | D. Duraiswamipuram | 349 | 24 | 1.38 |
| 383 | 2657 / 06/08/2007 | D. Duraiswamipuram | 349 | 25 | 1.15 |
| 384 | 4324 / 04/12/2007 | D. Duraiswamipuram | 349 | 26 | 1.25 |
| 385 | 4433 / 11/12/2007 | D. Duraiswamipuram | 349 | 27 | 1.12 |
| 386 | 4433 / 11/12/2007 | D. Duraiswamipuram | 349 | 28 | 1.20 |
| 387 | 4433 / 11/12/2007 | D. Duraiswamipuram | 349 | 29 | 1.26 |
| 388 | 4433 / 11/12/2007 | D. Duraiswamipuram | 349 | 30 | 1.43 |
| 389 | 4433 / 11/12/2007 | D. Duraiswamipuram | 349 | 31 | 1.53 |
| 390 | 2652 / 06/08/2007 | D. Duraiswamipuram | 349 | 32 | 1.33 |
| 391 | 2660 / 06/08/2007 | D. Duraiswamipuram | 349 | 33 | 1.19 |
| 392 | 2660 / 06/08/2007 | D. Duraiswamipuram | 349 | 34 | 1.07 |
| 393 | 2513 / 26/07/2007 | D. Duraiswamipuram | 350 | 1 | 5.77 |
| 394 | 2513 / 26/07/2007 | D. Duraiswamipuram | 350 | 2 | 0.95 |
| 395 | 2513 / 26/07/2007 | D. Duraiswamipuram | 350 | 3 | 1.86 |
| 396 | 2513 / 26/07/2007 | D. Duraiswamipuram | 351 | 1 | 1.05 |
| 397 | 2513 / 26/07/2007 | D. Duraiswamipuram | 351 | 2 | 0.99 |
| 398 | 2513 / 26/07/2007 | D. Duraiswamipuram | 351 | 3 | 0.90 |
| 399 | 2510 / 26/07/2007 | D. Duraiswamipuram | 351 | 4 | 1.00 |
| 400 | 2510 / 26/07/2007 | D. Duraiswamipuram | 351 | 5 | 1.03 |
| 401 | 2510 / 26/07/2007 | D. Duraiswamipuram | 351 | 6 | 0.95 |
| 402 | 2510 / 26/07/2007 | D. Duraiswamipuram | 351 | 7 | 0.77 |
| 403 | 2510 / 26/07/2007 | D. Duraiswamipuram | 352 | 1 | 1.19 |
| 404 | 2510 / 26/07/2007 | D. Duraiswamipuram | 352 | 2 | 0.95 |
| 405 | 2510 / 26/07/2007 | D. Duraiswamipuram | 352 | 3 | 0.95 |
| 406 | 2510 / 26/07/2007 | D. Duraiswamipuram | 352 | 4 | 2.36 |
| 407 | 2510 / 26/07/2007 | D. Duraiswamipuram | 352 | 5 | 0.96 |
| 408 | 2514/ 26/07/2007 | D. Duraiswamipuram | 352 | 6 | 1.94 |
| 409 | 2514/ 26/07/2007 | D. Duraiswamipuram | 352 | 7 | 1.91 |
| 410 | 2514/ 26/07/2007 | D. Duraiswamipuram | 353 | 1 | 1.28 |
| 411 | 2514/ 26/07/2007 | D. Duraiswamipuram | 353 | 2 | 0.93 |
| 412 | 2514/ 26/07/2007 | D. Duraiswamipuram | 353 | 3 | 1.06 |
| 413 | 2514/ 26/07/2007 | D. Duraiswamipuram | 353 | 4 | 0.98 |
| 414 | 2514/ 26/07/2007 | D. Duraiswamipuram | 353 | 5 | 0.88 |
| 415 | 2514/ 26/07/2007 | D. Duraiswamipuram | 353 | 6 | 1.88 |
| 416 | 2311 / 12/07/2007 | D. Duraiswamipuram | 353 | 7 | 1.65 |
| 417 | 2660 / 19/08/2009 | Tharuvaikulam | 41/7D |  | 0.57 |
| 418 | 2660 / 19/08/2009 | Tharuvaikulam | 41/7E |  | 0.20 |
| 419 | 2497 / 31/07/2009 | D. Duraiswamipuram | 349/1 |  | 1.07 |
| 420 | 3251 / 09/10/2009 | Melamaruthur | 127/3 |  | 1.00 |
| 421 | 2288 / 20/07/2009 | Melamaruthur | 127/4B |  | 0.50 |
| 422 | 116 / 18/01/2010 | Melamaruthur | 156/1 |  | 2.91 |
| 423 | 2291 / 20/07/2009 | Melamaruthur | 159/5 |  | 0.37 |
| 424 | 2258 / 17/07/2009 | Melamaruthur | 176/3 |  | 2.16 |
| 425 | 2258 / 17/07/2009 | Melamaruthur | 177/4 |  | 1.98 |
| 426 | 2258 / 17/07/2009 | Melamaruthur | 178/4 |  | 2.12 |
| 427 | 445 / 11/02/2010 | Melamaruthur | 181/2 |  | 1.74 |
| 428 | 2292 / 20/07/2009 | Melamaruthur | 197/3 |  | 0.40 |
| 429 | 444 / 11/02/2010 | Melamaruthur | 197/6 |  | 1.71 |
| 430 | 2662 / 19/08/2009 | Melamaruthur | 197/6 |  | 1.71 |
| 431 | 2289 / 20/07/2009 | Melamaruthur | 198/1 |  | 1.96 |
| 432 | 2289 / 20/07/2009 | Melamaruthur | 198/4 |  | 1.77 |
| 433 | 2290 / 20/07/2009 | Melamaruthur | 199/1 |  | 1.78 |
| 434 | 443 / 11/02/2010 | Melamaruthur | 199/2 |  | 1.65 |
| 435 | 3752 / 30/11/2009 | Pattanamarudhur | 199/2 |  | 13.74 |
| 436 | 3752 / 30/11/2009 | Pattanamarudhur | 202 |  | 8.22 |
| 437 | 3752 / 30/11/2009 | Pattanamarudhur | 203 |  | 5.96 |
| 438 | 3752 / 30/11/2009 | Pattanamarudhur | 204/3A2B |  | 14.25 |
| 439 | 4083 / 24/12/2009 | Pattanamarudhur | 121/1 |  | 0.31 |
| 440 | 4082 / 24/12/2009 | Pattanamarudhur | 121/2 |  | 3.98 |
| 441 | 4082 / 24/12/2009 | Pattanamarudhur | 137/2 |  | 2.32 |
| 442 | 4082 / 24/12/2009 | Pattanamarudhur | 137/3 |  | 2.49 |
| 443 | 436 / 11/02/2010 | Tharuvaikulam | 31/2 |  | 1.47 |
| 444 | 446 / 11/02/2010 | Tharuvaikulam | 31/5 |  | 2.16 |
| 445 | 446 / 11/02/2010 | Tharuvaikulam | 31/6 |  | 0.12 |
| **Total** | | | | | **1,089.04** |

### Observation: - As per documents provided by the Company, the total Land area is 1,089.04 Acres and the same is considered for the Valuation.

### 4.4. BUILDINGS: -

As per documents provided by the Company, buildings/ Structure constructed at Site for CEPL’s 2 X 600 MW CBTTP is under: -

| S. No. | Block Name | Type of construction | Total Slabs/ Floors | Floor wise Height (ft.) | Nos | YOC | Total Area (m²) |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **1** | **GIS Building** |  |  |  |  |  |  |
| i | Hall | RCC Foundations, MS structural beams &coloumns,Floor beams with deck sheet & RCC slab / Wall- semi unitized Glass and HF panels / Roof- llyods profile sheet with insulation, side wall- brick wall with vitrified tiles. | 1 Slabs / 1 Floors | 56'2" | 1.00 | 2012 | 502.46 |
| ii | Ground Floor | RCC load bearing structure on beam column and 9" brick walls | 1 Slabs / 1 Floors | 14'6" | 1.00 | 2012 | 323.53 |
| iii | First Floor | RCC load bearing structure on beam column and 9" brick walls | 1 Slabs / 1 Floors | 9'8" | 1.00 | 2012 | 323.53 |
| iv | Second Floor | Plain Tin shed roof mounted on iron pillars, trusses frame structure resting on brick wall | 2 Slabs / 1 Floors | 31'4" | 1.00 | 2012 | 323.53 |
| **2** | **Station Building** |  |  |  |  |  |  |
| i | Ground Floor | RCC Foundations, MS structural beams &coloumns,Floor beams with deck sheet & RCC slab, granolithic flooring / Wall- semi unitized Glass and HF panels / Roof- llyods profile sheet with insulation, side wall- brick wall with plastering and painting. | 1 Slabs/ 1 Floors | 22'5" | 2.00 | 2014 | 11,018.49 |
| ii | EDR/LP Floor | RCC load bearing structure on beam column and 9" brick walls | 1 Slabs/ 1 Floors | 22'5" | 2.00 | 2014 | 11,018.49 |
| iii | TG Floor | Glass facade on RCC steel frame | 1 Slabs/ 1 Floors | 62'7" | 2.00 | 2014 | 6,541.09 |
| iv | HP Floor | RCC load bearing structure on beam column and 9" brick walls | 1 Slabs/ 1 Floors | 40' | 2.00 | 2014 | 2,486.38 |
| v | Dereator Floor | Plain Tin shed roof mounted on iron pillars, trusses frame structure resting on brick wall | 1 Slabs/ 1 Floors | 32'5" | 2.00 | 2014 | 2,486.38 |
| vi | Station Building Trippler Floor | Plain Tin shed roof mounted on iron pillars, trusses frame structure resting on brick wall | 2 Slabs/ 1 Floors | 32'5" | 2.00 | 2014 | 2,486.38 |
| **3** | **Main Control Building** | |  |  |  |  |  |
| i | Under Ground Floor | RCC Foundations, MS structural beams &coloumns,Floor beams with deck sheet & RCC slab, granolithic flooring / Wall- semi unitized Glass and HF panels / Roof- llyods profile sheet with insulation, side wall- brick wall with plastering and painting. | 1 Slabs / 1 Floors | 11'3" | 1.00 | 2014 | 2,096.66 |
| ii | Ground Floor | RCC load bearing structure on beam column and 9" brick walls | 1 Slabs / 1 Floors | 16'3" | 1.00 | 2014 | 2,097.92 |
| iii | First Floor | RCC load bearing structure on beam column and 9" brick walls | 1 Slabs / 1 Floors | 11'7" | 1.00 | 2014 | 2,097.92 |
| iv | Second Floor | RCC load bearing structure on beam column and 9" brick walls | 1 Slabs / 1 Floors | 10'4" | 1.00 | 2014 | 2,097.92 |
| v | Third Floor | RCC load bearing structure on beam column and 9" brick walls | 2 Slabs / 1 Floors | 14'7" | 1.00 | 2014 | 2,097.92 |
| vi | Fourth Floor | RCC load bearing structure on beam column and 9" brick walls | 1 Slabs / 1 Floors | 14'7" | 1.00 | 2014 | 2,124.94 |
| 7 | Fifth Floor | RCC load bearing structure on beam column and 9" brick walls | 2 Slabs / 1 Floors | 20'5" | 1.00 | 2014 | 97.96 |
| **4** | **ESP Control Building** | |  |  |  |  |  |
| i | Ground Floor | RCC Foundations, MS structural beams &coloumns,Floor beams with deck sheet & RCC slab, granolithic flooring / Wall- semi unitized Glass and HF panels / Roof- llyods profile sheet with insulation, side wall- brick wall with plastering and painting. | 1 Slabs / 1 Floors | 16'3" | 1.00 | 2012 | 1,175.04 |
| ii | First Floor-Gabel Gallery | RCC load bearing structure on beam column and 9" brick walls | 1 Slabs / 1 Floors | 13' | 1.00 | 2012 | 1,175.04 |
| iii | Control Room | RCC load bearing structure on beam column and 9" brick walls | 2 Slabs / 1 Floors | 19'5" | 1.00 | 2012 | 1,175.04 |
| iv | AW Room | RCC load bearing structure on beam column and 9" brick walls | 1 Slabs / 1 Floors | 16'3" | 1.00 | 2012 | 501.12 |
| 5 | CEMS Building | RCC load bearing structure on beam column and 9" brick walls | 2 Slab / 1 Floor | 12'6" | 1.00 | 2014 | 61.62 |
| 6 | Compressor House | RCC Foundations, MS structural beams &coloumns,Floor beams with deck sheet & RCC slab, granolithic flooring / Wall- semi unitized Glass and HF panels / Roof- llyods profile sheet with insulation, side wall- brick wall with plastering and painting. | 2 slab / 1 Floor | 36'5" | 1.00 | 2013 | 304.50 |
| 6.a. | Compressor House | RCC load bearing structure on beam column and 9" brick walls | 2 slab / 1 Floor | 16' | 1.00 | 2013 | 478.50 |
| 7 | Service Building | RCC load bearing structure on beam column and 9" brick walls | 6 Slabs/6 Floors | 14'8" | 6.00 | 2016 | 7,046.16 |
| 8 | IDCT PMCC Building | RCC load bearing structure on beam column and 9" brick walls | 2Slab / 1 Floor | 16'4" | 2.00 | 2014 | 653.64 |
| 9 | Sea Water Pump House | Plain Tin shed roof mounted on iron pillars, trusses frame structure resting on brick wall | 2Slab / 1 Floor | 51'8" | 1.00 | 2012 | 648.00 |
| 9.a | Sea Water Pump House | RCC load bearing structure on beam column and 9" brick walls | 2Slab / 1 Floor | 22'8" | 1.00 | 2012 | 457.56 |
| 10 | CW Pump House Pump area | Plain Tin shed roof mounted on iron pillars, trusses frame structure resting on brick wall | 2slabs/1 Floor | 65'6" | 1.00 | 2012 | 918.00 |
| 10.a | Control Room | RCC load bearing structure on beam column and 9" brick walls | 2slabs/1 Floor | 27'7" | 1.00 | 2012 | 218.40 |
| 11 | Over Head water Tank | RCC load bearing structure on beam column and 9" brick walls | 2Slab / 1 Floor | 131'00" | 1.00 | 2013 | 29.52 |
|  | **Water Treatment Plant** | |  |  |  |  |  |
| 12 | Switch Gear and Control Room | RCC load bearing structure on beam column and 9" brick walls | 3Slabs/2 Floor | 16'4"/13'00" | 1.00 | 2013 | 999.60 |
| 13 | RO - DM Building | RCC load bearing structure on beam column and 9" brick walls | 2 Slab / 1 Floor | 19'6" | 1.00 | 2012 | 1,487.86 |
| 14 | Fire Water/ Desalinated Water Tranfer Pump House | RCC load bearing structure on beam column and 9" brick walls | 2 Slab / 1 Floor | 26'00" | 1.00 | 2013 | 373.28 |
| 15 | Pump House for Clarified Water Storage Tank | RCC load bearing structure on beam column and 9" brick walls | 2 Slab / 1 Floor | 17'8" | 1.00 | 2012 | 310.40 |
| 16 | CPU Building | RCC load bearing structure on beam column and 9" brick walls | 2 Slab / 1 Floor | 32'8" | 1.00 | 2012 | 112.89 |
| 17 | Electrolyzer Building | RCC load bearing structure on beam column and 9" brick walls | 2 Slab / 1 Floor | 19'6" | 1.00 | 2013 | 314.40 |
| 18 | Workshop Building | RB wall structure | 1 Slab/1Floor | 12'00" | 1.00 | 2015 | 32.00 |
| 19 | Chemical/Material Storage Building | GI shed roof mounted on iron pillars, trusses frame structure | 1 Slab/1Floor | 12'00" | 1.00 | 2015 | 94.30 |
|  | **Coal Handling Plant** | |  |  |  |  |  |
| 20 | Track Hopper MH 1 &2 TH 1 | Plain Tin shed roof mounted on iron pillars, trusses frame structure resting on brick wall | 3 slabs/ 3Floors | 60'00" | 1.00 | 2012 | 1,274.00 |
| 21 | TH 2 | RCC load bearing structure on beam column and 9" brick walls | 4 Slabs / 3 Floors |  | 1.00 | 2012 | 540.00 |
| 22 | MCC 2 | RCC load bearing structure on beam column and 9" brick walls | 2 slabs/ 1 Floor |  | 1.00 | 2012 | 450.00 |
| 23 | PENT House | RCC load bearing structure on beam column and 9" brick walls | 2 slabs/ 1 Floor |  | 1.00 | 2012 | 144.00 |
| 24 | Crusher House Building | RCC load bearing structure on beam column and 9" brick walls | 6 Slabs/5 Floors | 32'8"/26'/15'7" | 6.00 | 2012 | 3,969.00 |
| 25 | CHP Control Building & MCC 1, Pump House | RCC load bearing structure on beam column and 9" brick walls | 3 Slabs/ 2 Floors |  | 1.00 | 2012 | 800.00 |
| 26 | Junction Towers 1 | Plain Tin shed roof mounted on iron pillars, trusses frame structure resting on brick wall | 3 Slabs / 3 Floors | 185'3" | 1.00 | 2013 | 222.50 |
| 27 | Junction Towers 2 | Plain Tin shed roof mounted on iron pillars, trusses frame structure resting on brick wall | 4 Slabs / 4 Floors | 40'6" | 1.00 | 2013 | 79.95 |
| 28 | Junction Towers 3 | Plain Tin shed roof mounted on iron pillars, trusses frame structure resting on brick wall | 4 Slabs / 4 Floors | 64'3" | 1.00 | 2013 | 209.00 |
| 29 | Junction Towers 4 & 5 | Plain Tin shed roof mounted on iron pillars, trusses frame structure resting on brick wall | 5 Slabs / 5 Floors | 81'6" | 1.00 | 2013 | 455.40 |
| 30 | Drive House 1 & 2 | Plain Tin shed roof mounted on iron pillars, trusses frame structure resting on brick wall | 1 slabs/ 1 Floor | 36"6" | 1.00 | 2013 | 63.75 |
| 31 | CHP Switch Gear MCC -3 & BVS Compressor House | RCC load bearing structure on beam column and 9" brick walls | 2 Slabs/ 1 Floors |  | 1.00 | 2012 | 450.00 |
| 32 | Stock Pile |  | 1slab | - | 4.00 | 2014 | 80,000.00 |
| 33 | service water tank | RCC load bearing structure on beam column and 9" brick walls | 2 slab | 30' | 1.00 | 2014 | 72.00 |
|  | **Ash Handling Plant** | |  |  |  |  |  |
| 34 | Electrical Building | RCC load bearing structure on beam column and 9" brick walls | 2 Slabs/ 1 Floors | 16'8"/11'8" | 1.00 | 2013 | 694.20 |
| 35 | Compressor House | RCC load bearing structure on beam column and 9" brick walls | 2 Slabs/ 1 Floors | 33'00" | 1.00 | 2013 | 820.00 |
| 36 | Chemical Building A | RCC load bearing structure on beam column and 9" brick walls | 3 Slabs/ 2 Floors | 18'6"/23'6" | 1.00 | 2013 | 218.94 |
| 37 | Chemical Building B | RCC load bearing structure on beam column and 9" brick walls | 3 Slabs/ 2 Floors | 18'6"/23'6" | 1.00 | 2014 | 218.94 |
| 38 | FOPH Pump House /MCC | Plain Tin shed roof mounted on iron pillars, trusses frame structure resting on brick wall | 1 Slab / 1Floor | 16'4"/29'6" | 1.00 | 2014 | 1,069.88 |
|  | **Miscellaneous Buildings** | |  |  |  |  |  |
| 39 | Wear House | Plain Tin shed roof mounted on iron pillars, trusses frame structure resting on brick wall | 2Slab /1Floor | 39'5" | 1.00 | 2011 | 1,796.44 |
| 40 | Insulation Shed | Plain Tin shed roof mounted on iron pillars, trusses frame structure resting on brick wall | 1 Slab/1Floor | 16'4" | 1.00 | 2012 | 4,831.75 |
| 41 | Gas Storage Building | Plain Tin shed roof mounted on iron pillars, trusses frame structure resting on brick wall | 1 Slab/1Floor |  | 1.00 | 2016 | 196.00 |
| 42 | Oil Storage Building | Plain Tin shed roof mounted on iron pillars, trusses frame structure resting on brick wall | 1 Slab/1Floor | 13'00" | 1.00 | 2017 | 186.05 |
| 43 | Closed Material Storage Shed 1 | Plain Tin shed roof mounted on iron pillars, trusses frame structure resting on brick wall | 1 Slab/1Floor | 18'6" | 1.00 | 2016 | 989.00 |
| 44 | Closed Material Storage Shed 2 | Plain Tin shed roof mounted on iron pillars, trusses frame structure resting on brick wall | 1 Slab/1Floor | 18'6" | 1.00 | 2014 | 576.00 |
| 45 | ABB Office 1 | Plain Tin shed roof mounted on iron pillars, trusses frame structure resting on brick wall | 0 Slab/1Floor | 10'00" | 1.00 | 2012 | 221.25 |
| 46 | OCH & Weigh Bridge Control Room | Plain Tin shed roof mounted on iron pillars, trusses frame structure resting on brick wall | 1 Slab/1Floor | 10'00" | 1.00 | 2015 | 237.51 |
| 46.a | Security Officer Room | Plain Tin shed roof mounted on iron pillars, trusses frame structure resting on brick wall | 1 Slab/1Floor | 10'00" | 1.00 | 2015 | 72.25 |
| 47 | Saftey Induction Room & Security Office | Plain Tin shed roof mounted on iron pillars, trusses frame structure resting on brick wall | 1 Slab/1Floor | 10'00" | 1.00 | 2015 | 141.98 |
| 48 | Security Checking Room | Plain Tin shed roof mounted on iron pillars, trusses frame structure resting on brick wall | 1 Slab/1Floor | 10'00" | 1.00 | 2016 | 18.00 |
| 49 | Site Staff Guest House | RCC load bearing structure on beam column and 9" brick walls | 3 Slabs/2Floors | 12'5" | 1.00 | 2014 | 358.97 |
| 50 | Site MD Guest House | Plain Tin shed roof mounted on iron pillars, trusses frame structure resting on brick wall | 1 Slab/1Floor | 13' | 1.00 | 2011 | 136.00 |
| 51 | Main Office 1 | Plain Tin shed roof mounted on iron pillars, trusses frame structure resting on brick wall | 1 Slab/1Floor | 13' | 1.00 | 2011 | 1,200.00 |
| 52 | Main Office 2 | Plain Tin shed roof mounted on iron pillars, trusses frame structure resting on brick wall | 1 Slab/1Floor | 13' | 1.00 | 2009 | 1,200.00 |
| 53 | Main Office 3 | Plain Tin shed roof mounted on iron pillars, trusses frame structure resting on brick wall | 1 Slab/1Floor | 13' | 1.00 | 2009 | 1,200.00 |
| 54 | Canteen for Staff | Plain Tin shed roof mounted on iron pillars, trusses frame structure resting on brick wall | 1 Slab/1Floor | 13' | 1.00 | 2012 | 3,000.00 |
| 55 | Mack Building | RCC framed pillar beam column structure on RCC slab | 3 Slabs/2Floor | 11' | 1.00 | 2009 | 240.00 |
| 56 | Crusher House Toilets & Wash Rooms | Plain Tin shed roof mounted on iron pillars, trusses frame structure resting on brick wall | 1 Slab/1Floor | 10' | 1.00 | 2016 | 32.00 |
| 57 | Fire Tender Building | Plain Tin shed roof mounted on iron pillars, trusses frame structure resting on brick wall | 2 Slabs/2Floors | 11'5" | 2.00 | 2013 | 276.00 |
| 58 | Main Store for CHP & AHP | RB wall structure | 1 Slab/1Floor | 18'00" | 1.00 | 2015 | 384.75 |
| 59 | Material Storage shed CHP | GI shed roof mounted on iron pillars, trusses frame structure | 1 Slab/1Floor | 12'00" | 1.00 | 2015 | 432.00 |
|  | **Concrete Structures** | |  |  |  |  |  |
| 60 | Intake Well | RCC framed pillar beam column structure on RCC slab | 2 Slabs | 43' | 2.00 | 2013 | 127.25 |
| 61 | Weigh Bridge | RCC framed pillar beam column structure on RCC slab | 1 Slabs | 5' | 4.00 | 2015 | 248.00 |
| 62 | Ash Bund | Earth Bund with Bitumen mat topping | 0 Slabs | - |  | 2014 | 0.00 |
| 63 | Fly Ash Silo | RCC framed pillar beam column structure on RCC slab | 2 Slabs | 118' | 2.00 | 2014 | 438.08 |
| 64 | Bottom Ash Silo | RCC framed pillar beam column structure on RCC slab | 2 Slabs | 101'2" | 1.00 | 2014 | 195.75 |
| 65 | Clarifier A | RCC framed pillar beam column structure on RCC slab | 1 slab | 18'6" | 1.00 | 2014 | 531.00 |
| 66 | Clarifier B | RCC framed pillar beam column structure on RCC slab | 1 slab | 18'6" | 1.00 | 2014 | 531.00 |
| 67 | Desalinated Tank | RCC framed pillar beam column structure on RCC slab | 2 slab | 21'2" | 1.00 | 2014 | 1,551.36 |
| 68 | Clarrifier Tank | RCC framed pillar beam column structure on RCC slab | 2 slab | 21'2" | 1.00 | 2014 | 502.40 |
| 69 | **Roads in KM** | Bitumen / WBM Raods | - | - | 1.00 | - | 23.49 Km |
| a | Material Movement Road | Bituminious concrete road | 1 slab | - | 1.00 | 2010 | 22,500.00 |
| b | Plant Internal Road | DBM Road | 1 slab | - | 1.00 | 2014 | 38,598.50 |
| c | Plant Periferial road | WBM Road | 1 slab | - | 1.00 | 2012 | 28,280.00 |
| d | Plant internal road | WBM Road | 1 slab | - | 1.00 | 2012 | 45,220.00 |
| e | Bouleward Inside Road | GSB Road | 1 slab | - | 1.00 | 2012 | 9,405.00 |
| f | Bouleward outside Road | WBM Road | 1 slab | - | 1.00 | 2012 | 18,700.00 |
| 70 | Drains in KM | RCC raft & wall | - | - | 1.00 | 2011 | 18.5 Km |
| 71 | Boundary Walls in RM | RR Stone Masonry with concrete piller and beams 450mm width | 0 Slabs | 10' | 1.00 | 2011 | 12000 RMT |
| 72 | Bridges | RCC framed pillar beam column structure on RCC slab | 1 Slabs | 19'5" | 3.00 | 2013 | 504.00 |
| 73 | Culverts | RCC framed pillar beam column structure on RCC slab | 1 slab | 12' | 4.00 | 2010 | 320.00 |
| 74 | Nallah Lining | RR Stone Masonry with concrete piller and beams 450mm width | 1 slab | 14'6" | 1.00 | 2011 | 26400 RMT |
| 75 | Watch Towers | RCC framed pillar beam column structure on RCC slab | 1 slab | 33'2" | 8.00 | 2013 | 288.00 |
| 76 | Sewage Treatment Plant | RCC framed pillar beam column structure on RCC slab | 1 slab | 18'5" | 1.00 | 2015 | 72.25 |
| 77 | Construction water tank |  | 1 slab | 13'4" | 1.00 | 2010 | 124.32 |
| 78 | sea water intake line (GRP) |  | 1 slab | 9' | 1.00 | 2014 | 14,000.00 |
| 79 | Sea water outfall line (GRP) |  | 1 slab | 9' | 1.00 | 2014 | 16,800.00 |
| 80 | Intake line( Well to PH) HDPE) |  | 1 slab | 12' | 1.00 | 2014 | 3,600.00 |

### Observation: - Building area statement is provided by the company and the same is considered for the Valuation.

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### 4.5. TECHNOLOGY FOR THE POWER PLANT: -

The general Layout Plan for the project has been developed taking into consideration various aspects like land acquisition, ground features and terrain, corridor for outgoing transmission lines, road/rail approaches, coal transportation route, prevailing wind direction and intake pump house and associated pipe corridors etc. Space provision for Flue Gas De-sulphurisation (FGD) has been kept near chimney. Twin flue two numbers stack of 275 is constructed for 2 X 600 MW. The stack is designed as per CPCB Guidelines.

The Cooling towers for the project are located at the safe distance from switchyard and the main plant. The water treatment plant and DM water facilities are located close to the main plant.

**Selection of Technology & Unit Size**

The plant is established on the basis of unitized system. Total capacity of the plant is 2 X 600 MW. The size of the plant is so decided to achieve:

* Better efficiency
* Lo we r overall heat rate.
* Lo we r Operation & Maintenance cost
* Minimum land requirement

**4.5.1. BOILER & AUXILIARIES:-**

**Manufacturer:** Harbin Boiler Company (HBC)

**Type:** Sub-critical steam generator, outdoor type, single furnace balanced draft, controlled circulation, tangential-firing with seven layers of burners, single reheat, pulverized coal fired, dry slagging, outdoor laid, complete steel structure hanging construction, Π-type drum boiler.

The main fuel of the steam generator is design coal, check coal -1 and check coal-2 detailed as under:

* + The SG is designed to give 100% load and the performance guarantee for the design coal (SM 50%: Indian Coal 50%).
  + The SG is also designed to give 100% load for SM coal (check coal 1)
  + The SG is also designed to give 70% BMCR load for Indian coal (check coal 2).

The steam generator is capable of operating either on constant pressure or sliding pressure mode. The load range for sliding pressure unit operation would be from about 40% TGMCR to about 80% TGMCR. The lowest flame stabilization load of the steam generator without oil support is 40% of BMCR.

**Membrane type construction:-**

The membrane type construction for water wall is employed to ensure air tightness of the furnace. During variable pressure operation, the water distribution and heating of the water wall tubes are uniform to ensure even steam production along the width of the furnace and even water level along the full length of the drum. Sufficient dynamic head is produced to prevent stagnation, reverse flow, unstable hydrodynamic values etc. due to abnormal water circulation.

The design of the furnace employs balanced draft, and provides adequate sustaining capability of explosion and implosion. The steam generator has an expansion centre to permit free expansion of steam generator parts.

The steam generator roof employs gas-tight, all welded metallic construction with refractory, ensuring the free expansion of various heating surfaces without cracking and leaking under variable pressure operation.

**Technical Specification:-**

|  |  |  |
| --- | --- | --- |
| S. No. | Parameters | Specification |
| 1 | Manufacturer | Harbin Boiler Company Ltd., |
| 2 | No. of Units. | 2 |
| 3 | Type of Units | Hg - 2060/17.5-ym |
| 4 | Fuels | Coal |
| 5 | Fuel For Initial Warm Up | LDO |
| 6 | LDO Forwarding P | 3X100 % for 2 Units |
| 7 | Fuel For Start Up/Flame Stabilization | HFO |
| 8 | HFO Forwarding Pumps | 3X100 % for 2 Units |
| 9 | Fuel For Performance Guarantee | SM Coal 50% & Indian Coal 50% |
| 10 | Igniters | High Energy Electric Arc (HEA) Igniter |
| 11 | Stabilization Bur | LDO/HFO Oil Burner with HEA Igniter |

**4.5.2. TURBINE & ITS AUXILIARIES:-**

The steam turbine and the generator form a tandem-compounded machine designed to operate at 50Hz. The turbine is of a multi-flow condensing turbine type, with extraction for condensate and feed water pre-heating including deaerator. The turbine is directly connected to a 50 Hz, three phase A.C. generator.

The Steam Turbine is provided with a Gland Sealing System to provide automatic, efficient sealing of the turbine shaft glands against steam leakage. The system includes a gland steam condenser (cooled by condensate) and gland steam exhauster fans together with associated piping and control system.

Permanent steam strainers are provided for MSV’s and IP control valves to HP/IP turbines.

A lubricating oil system is provided to supply clean oil to the turbine, generator, journal and thrust bearings. A main oil pump (MOP) is directly coupled with steam turbine shaft for lubrication under normal working condition. In addition to standard system components for normal operation, one AC motor-driven auxiliary oil pump (AOP) with power supply from the Emergency Board and one DC motor-driven emergency oil pump (EOP) with power supply from 220V DC Board is provided. One HP start up oil pump is provided in lube oil system to supply oil for emergency governor and additional source oil for seal oil system.

The Steam Turbine is provided with a Turning Gear and associated Jacking oil system with (1 AC + 1 DC) pumps and turbine DEH control oil system.

**Steam Flow Path**

The steam turbine uses combined impulse and reactive design. The steam enters the combined main stop and control valve supported by fixed bearings at both sides and discharge from two control valves at each side. After 4 pieces of HP pipe, the steam will enter the HP turbine. Two pieces of piping are located on both upper half and lower half respectively. The steam after passing one control stage and 9 HP stages will discharge from the outlets on lower half of outer casing and then enter the reheater.

The reheat steam will enter the two combined reheat stop and intercept valves at both sides and discharge from two IP control valves at each side. After 4 pieces of IP piping, the steam will enter the IP turbine from the middle inlet. The IP inlet pipings are located with two pieces on both lower and upper half respectively. The steam after passing 6 reactive stages in IP turbine will discharge from the upper outlet of IP turbine and then enters No.1 and No.2 LP turbine respectively at the middle inlet after passing the LP crossover piping. Both of the LP turbines are with double flow structure which means the steam will enter from the middle inlet and flow to the exhaust hood at each end after separately passing through 6 stages both positive and reverse stages. Then, the steam will enter the condenser below the LP turbine. The extraction point 1, 2(HP turbine )3,4 (IP turbine), 5,6,7,&8 (LP1/LP2 turbine) is at the lower half of casing for extracting the steam to heat the feedwater.

**HP and IP valves**

Two HP combined stop and control valves are located on each side of HIP turbine. Each combined stop and control valve consists of one horizontal main stop valve and two identical vertical control valves. The openings of these valves are controlled by its servo motor which is controlled by DEH system.

Two reheat stop and intercept valves are located on each side of HIP turbine. Each combined reheat stop and intercept valve consists of one staggering main stop valve and two control valves. The openings of these valves are controlled by its servo motor which is controlled by DEH system.

**Main Stop Valve**

The main stop valve is “double valve disk” which consists of two unbalanced valves with a single seat. One valve will be installed in the other one. The pressure of steam and force of spring and will close each valve at the seat by the valve stem when the valve being at the closing position.

**Condenser and Cooling Water System**

The condenser is N-34760-1 type double shell, double back pressure, single flow path, dual inlet and outlet and surface type one in lateral arrangement.

The main components include a condenser upper portion, condenser lower portion, front water box, rear water box, condensing water collector, dead point seat in one fixed support and eight siding support and arm-carried basket type drain flash tank etc.

The cooling titanium tubes in the condenser is arranged in the shape of banding, around which there are steam flow passages to facilitate the steam flow to enter into the internal of the tube bundles and minimize the steam flow drag force. The central zone of the tube bundles is used as an air-cooling zone, which is divided from the main condensing zone by steam baffles. When the uncondensable air and steam pass through the air-cooling zone, a large quantity of steam can be condensed and the small portion of the steam left will enter into the air extraction pipe together with the uncondensable air. After the steam discharged from the LP cylinder has been fed into the condenser, it will be distributed on the whole length of the cooling tubes, forcing the steam to comprehensively undergo a heat exchange along the cooling tubes surface through the passages between the tube bundles as well as at both sides of the tube bundles and to be condensed into water. A part of the steam will flow to the places under the tube bundles via both sides of the tube

bundles to heat the condensate dropping down. The small portion of uncondensable steam left and the unncondensable air having been cooled down will be collected in the air extraction pipes at the air-cooling zone and then be extracted out by the vacuum pump.

At the upper portion of each condenser shell, installed NO.7 & NO.8 LP heaters in one shell and one temperature and pressure reducers. Also mounted a steam extraction pipe group, led out from the upper portion of the condenser. On each steam extraction pipeline, an expansion joint is installed.

The condenser itself is provided with two arm-carried type drain flash tanks, which collecting the drain water at different pressures, temperatures and amounts from the thermal system of the steam turbine.

The condenser shall have two sections of cooling chambers. The Condenser shall be of the

surface type and be capable of effectively condensing all the exhaust steam at turbine rated output and, HP and LP bypass steam in case of turbine tripped.

Debris filters is installed to protect condensers. The condenser tube is provided with self cleaning (on load ball cleaning) system.

**Condenser extracting vacuum system**

This system will remove the non-condensed gas from the condenser steam space, to maintain the condenser vacuum, and assure the unit normal operation. This system is equipped with three water-ringed vacuum pumps to extract non-condensed gas from condenser to maintain required vacuum; the capacity of each vacuum pump is 50%. Two pumps working and one is standby under normal operating condition. Three pumps are put into operation to set up vacuum quickly during unit start-up.

Two proper drainage flash vessels is provided with the condenser. During unit normal operation and start-up operation, the flash vessel will be used to collect the drainage of turbine proper drain, gland steam condenser drain, Aux. steam drain, all kinds of thermal cycle pipe and heaters emergency drain, etc. Each electric vacuum-breaking valve will be set on each condenser shell to destroy the vacuum of the condenser while the turbine trips, which can reduce the turbine idle time.

**Condensate Water System**

The condensate water system includes two 100% capacity condensate extraction pump (one operating and one standby), four low-pressure heaters (No.5 LP heater, No.6 LP heater, No.7 LP heater, No.8 LP heater), one gland steam condenser, one deaerator with storage water tank, one condensate makeup water tank with the capacity of 300m3, and one condensate transfer pumps.

No.5 LP heater and No.6 LP heater and condensate polishing device have individual bypass pipe, while No.7 LP heater and No.8 LP heater have a common bypass pipe. The effective capacity of deaerator storage tank is 235 cum (the water volume between the normal water level and low-low water level), which equals to max. feed water consumption flow of the boiler during 6 minutes under boiler BMCR condition. Condensate recirculating system is provided from manifold downstream of the gland steam condenser returning to condenser with a regulating valve station. Recirculation flow will be choosing the bigger value between condensate extraction pump and gland steam condenser min. flow.

**Condensate Extraction Pump**

The condensate Extraction pump will remove condensate water from the hot well and deliver it to the deaerator, and condensate water will be heated by turbine extracting steam, deaerated and chemical treated, to improve the plant thermal efficiency and assure the plant safely operating. Beside these, the system can also provide spraying water to reducing temperature, make-up cooling water and other miscellaneous water.

**Deaerator**

Deaerator is a direct contact condensing type heat exchanger. The function of deaerator is to remove dissolved non-condensable gases and to heat boiler feed water. A deaerator consists of a pressure vessel in which water and steam are mixed in a controlled manner. When this occurs, water temperature rises and all non-condensable dissolved gases are liberated and removed. The effluent water may be considered corrosion free from oxygen or carbon dioxide stand point.

**Feed water System**

Boiler feed water system will supply feed water from deaerator to the boiler economizer header inlet with required flow and flow rate under all operating conditions, and feed water will be heated by turbine extracting steam through HP heaters. Besides feed water system supplies spraying water for super-heater attemperator, re-heater emergency attemperator and HP bypass attemperator. For the purpose of improving the plant thermal efficiency and reducing thermal damage, spraying water for superheat steam and HP bypass comes from BFP outlet common pipe. Spraying water for cold reheat steam comes from intermediate extraction of boiler feed water pump (BFP).

**Boiler Feed Pump**

Two steam-driven feed water pumps with capacity of 50% each and one motorized feed water pump with capacity of 50% are installed for feeding water system. Each of them has booster pump. During normal operation, two turbine-driven BFP(TDBFP) are working and one motor-driven BFP(MDBFP) is standby. The MDBFP with 50% capacity is used for unit start-up and for standby. Three high-pressure heaters will be applied with 100%BMCR capacity. TDBFP will control feed water flow by regulating the rotation speed of BFP turbine, and MDBFP will control by hydraulic coupling. A set of regulating valves for unit low load is provided at the inlet bypass pipe of economizer. Each set of Min. flow regulating valve is provided at pipe from the outlet of each feed water pump.

Two steam sources of HP & LP are designed for feed water pump turbine with automatic transfer, among which LP steam source is from fourth stage extraction steam and LP auxiliary steam, HP steam is from cold reheat steam of turbine, and steam source from Aux. steam system during low load.

Exhaust steam of feed water pump turbine is extracted to condenser of the turbine.

The H.P feed heaters has individual bypass system.

**Closed cycle cooling water system**

The closed cycle cooling water system comprises two closed cycle water pumps, two 100% demineralized water/seawater plate type heat exchangers, and one expansion water tank with 10m3 capacity. Closed cycle cooling water system offer the water to the following equipment:

• EH oil, Turbine & BFP Turbine lube oil cooler , Plate heat exchanger, mechanical seal cooler of TDBFP booster pump, mechanical seal cooler of MDBFP, motor cooler of MDBFP, Lube oil and working oil cooler of MDBFP sampling cooler of steam-water, seal oil system hydrogen and air side coolers, hydrogen cooler of generator, stator water cooler of generator, motor and bearing cooler of condensate pump, oil station cooler of coal mill, cooling for bearing of PA fans, oil station cooler of FD fans, bearing cooler of circulating pump of boiler, lubricated oil cooler of air pre-heater,

oil station cooler of induced draft fans etc.

**Assisted cooling water system**

This system supply DM water for APH bearing cooling and BCWP bearing cooling during block out.

**Circulating water and open cycle cooling water system**

The circulation water is from the seawater supply pipe. Two sets of sponge ball cleaning device installed at the water side of condenser. Condenser type is double back-pressure, tube material is titanium. The circulating water enters into low back pressure condenser through two DN2200mm pipes and motor driven butterfly valve, and then enters into high back-pressure condenser, finally discharge to circulating water outlet pipe through sponge ball collector.

This system provides cooling water for closed cycle cooling water heat exchanger, cooler of water ringed vacuum pumps. Cooling water for above equipment’s coolers comes from the circulating water inlet pipe and then it guided through electric filter, opened cycle cooling water pump and heat exchanger, finally it is discharged to circulating water outlet pipe.

**Bypass System:**

A 60%BMCR capacity HP and LP Bypass System is provided to facilitate Unit Start-up.

**Gland System**

The gland sealing system provided from Main steam line, CRH and auxiliary steam is the main part to keep the high efficiency of steam turbine during the steam flow on blades. The labyrinth flexible sealing ring ensures the small radial clearance between stationary blade and moving blade to minimize the steam leakage.

**Main steam, reheat steam and turbine bypass system**

**Main steam system**

Two main steam pipes are connected with the both sides of super-heater outlet header of the boiler, then joined together and divided into two pipes again at front of turbine, finally connected to the two main stop valves.

**Reheat steam system**

Two cold reheat steam pipes are connected with turbine HP cylinder exhausting pipes, joined together at front of turbine and divided into two pipes again at front of boiler, then connected to inlet of boiler re-heater header. Two hot reheat steam pipes are connected with two ends of outlet header of boiler re-heater and joined one pipe at front of boiler, and divided into two pipes again at front of turbine, then connected with left and right IP steam valves.

Cold reheat steam not only supplies steam to No.2 HP heater, but also supplies steam to BFP turbine‘s aux. steam system and gland sealing system during unit low load.

**Turbine bypass system**

The HP and LP turbine bypass system of 60% BMCR capacity, capable to permit the matching of steam and cylinder metal temperature during unit start-up condition, so as to reducing unit start-up time. And the system will be capable to protect the unit during emergency condition and the bypass system will be capable of operating on house load during sudden total export load. This system has perfect drainage system in order to prevent water ingress in turbine. This system operated by separate hydraulic skid for LP and HP bypass valves.

Control oil system of turbine adopts HV fire resistant oil and is completely separated from lubricate oil system, which improves the speediness of speed regulation system, reliability and agility.

**Extraction steam system**

There are eight stages of non-regulating extraction steam used to heat regenerative system. The 1st and 3rd extraction steam and exhausting steam from the HP cylinder or 2nd extraction steam heats three HP heaters separately. The 4th extraction steam supplies steam to deaerator, BFP turbines and auxiliary steam header. The 2nd extraction steam will also be used as standby steam source of aux. Steam BFP Turbine and turbine gland sealing. The No. 5,6,7,8 extraction steam supplies to four LP heaters separately.

**Auxiliary steam system**

Aux. steam system with pressure ~0.8 MPa (a), temperature 350℃ provides steam source for the unit.

Aux. steam comes from 4th extraction steam during normal operation and from the other unit Aux. steam system from Main steam line during initial start up and from cold reheat pipe during unit low load. The Aux. steam system will provide steam for commissioning and standby steam for BFP turbine, turbine gland sealing, steam air heater of boiler secondary air duct. The Aux. steam system will provide steam for fuel oil atomization, fuel oil heating, mill fire-fighting steam, coal feeder fire-fighting steam and etc.

The steam for heating water in deaerator comes from Aux. steam system during low load.

Gland sealing steam comes from aux. steam during unit start-up and low load.

**Lube oil storage, purification & vent system**

This system satisfies the requirement of on-line purifying, off-line purifying, and storage for units lube oil. The system includes mail oil tank, oil tanks for BFPT, two lube oil transfer pumps lube oil storage tank (each one per unit) purifier (each one per unit). In operation lube oil goes through oil purifier and return to the main oil tank and lube oil tanks for BFPT. While unit is shut-off lube oil for steam turbine and BFPT will exhaust to lube oil storage tank and go through oil purifier return to the lube oil storage tank at last. When the oil can satisfy the requirement it transfers to the main oil tank and lube oil tanks for BFPT through lube oil transfer pump. The capacity of the lube oil storage tank is designed as per total oil volume for one unit.

**Maintenance facility**

Two sets of electric overhead-travelling crane with the capacity of 100/20t is be provided in the turbine hall.

**Turbine specifications**

|  |  |  |
| --- | --- | --- |
| S. No. | Parameters | Specification |
| 1 | Manufacturer | Harbin Turbine Company Ltd., |
| 2 | No. of Units. | 2 |
| 3 | Unit Model | N600-16.7/538/538 |
| 4 | Type | Sub-critical, single reheat, three casings and four flow, tandem compound, single shaft, condensing type(double back ressure) |
| 5 | Rated Power | 600 MW (TMCR working condition) |
| 6 | Maximum Power | 652.0123 MW (VWO working condition) |
| 7 | Rated running Speed | 3000 rpm |
| 8 | Running Direction | clockwise (from turbine to generator) |
| 9 | Working Frequency | 50 Hz |
| 10 | Steam Exhaust Pressure | 9.6 KPa (rated double pressure) |
| 11 | Flow Stages   * HP Cylinder * IP Cylinder * LP Cylinder | Total 40 stages   * One single-row governing stage + nine (9) pressure stages * 1×six (6) pressure stages * 2×2×6 pressure stages (two double flow low pressure cylinders) |
| 12 | Final stage blade height | 680 mm |
| 13 | Steam distribution mode | Composite governing |
| 14 | Feed water heat returning stage number | Three stages HP heaters＋one stage  deaerator＋four stages LP heaters |
| 15 | Feed water temperature | 272.3℃ |
| 16 | Turbine rotor original eccentricity | 0.076mm |
| 17 | Turning gear running speed | 3.35 r/min |
| 18 | Noise level | ≤90 dB(A) |
| 19 | Type of control system | DEH |
| 20 | Load Sharing HIP-LP1-LP2 | 32.1%-28.3%-39.6% |
| 21 | Total length of turbine mm (including enclosure) | ～27800 |
| 22 | Maximum width of turbine mm (including enclosure) | 11400 |
| 23 | Weight of turbine proper turbine | ～1108 |

**4.5.3. GENERATOR:-**

This generator is closed, self-ventilation, forced lubrication, water / hydrogen / hydrogen cooled cylindrical rotor and synchronous alternator, of which stator windings are watercooled directly, iron cores of stators/rotors and rotor windings are hydrogen-cooled. Seal oil system uses a double-flow sealing pad. Excitation system adopts SCR-side self-shunt static excitation system mode. Excitation power is supplied directly from outlet of generator, with an excitation transformer; while excitation-starting power is supplied from MCC.

**Excitation system:**

The static excitation system consists of two 100% controlled rectifier sets fed from the generator terminals through an excitation transformer. The output from these feed to the generator field winding through a field breaker and field suppression device.

A static excitation system regulates the terminal voltage and the reactive power flow of the synchronous machine by direct control of the field current using thyristor converters.

The excitation system will be capable of maintaining generator voltage within +/- 0.5% of the preset value over the entire load range of the machine.

**Automatic Voltage Regulator:**

The voltage regulator will be of the automatic, high speed, continuously acting, high response, static type and will be complete with the following limiters, compensators etc.

a) Maximum excitation limiter, adjustable type

b) Maximum stator current limiter

c) Reactive drop compensator

d) Overfluxing (volts / hertz) limiter

e) Minimum excitation limiter

f) Power system stabiliser

The AVR capable of working over the whole load voltage range of the Generator.

The AVR will control the generator voltage under steady state load conditions and over the whole of the operating range of the Exciter within the +/-0.5 percent of the preset value without hunting.

**Turbine specifications**

|  |  |  |
| --- | --- | --- |
| S. No. | Parameters | Specification |
| 1 | Generator Model | QFSN-600-2YHG |
| 2 | Rated Capacity | 705.88 MVA |
| 3 | Rated Power | 600 MW |
| 4 | Rated power factor | 0.85 (lagging) Cos φ |
| 5 | Rated power factor under steam turbine TMCR status | 0.85 (lagging) Cos φ |
| 6 | Water temperature of generator cooler under steam turbine TMCR status | 38 °C |
| 7 | Generator hydrogen pressure under steam turbine TMCR status | 0.4 MPa |
| 8 | Rated voltage of stator | 20 kV |
| 9 | Rated current stator | 20.337 A |
| 10 | Rated frequency | 50 Hz |
| 11 | Rated rotating speed | 3000 rpm |
| 12 | Rated excitation voltage | 465.6 V |
| 13 | Rated excitation current | 4557 A |
| 14 | No-load excitation voltage | 144.2 V |
| 15 | No-load excitation current | 1480 A |
| 16 | Stator coil connection mode | YY |
| 17 | Cooling method | Water, hydrogen, hydrogen |
| 18 | Excitation mode | Static self-shunt excitation |
| 19 | Allowed frequency deviation | ± 2% |
| 20 | Allowed stator voltage deviation | ± 5% |
| 21 | Copper loss of stator coil Qcu1 | 1853.59 kW |
| 22 | Iron loss of stator Qfe | 420.57 kW |
| 23 | Excitation loss Qcu2 | 2163.96 kW |
| 24 | Short-circuit additional loss QKd | 1038.8 kW |
| 25 | Mechanical loss Qm | 1154.08 kW |
| 26 | Total loss ΣQ | 6818.18 kW |
| 27 | Full load efficiency η | 98.85 % |

**4.5.3. ELECTRICAL BALANCE OF PLANT (E-BOP):-**

This generator is closed, self-ventilation, forced lubrication, water / hydrogen / hydrogen cooled cylindrical rotor and synchronous alternator, of which stator windings are watercooled directly, iron cores of stators/rotors and rotor windings are hydrogen-cooled. Seal oil system uses a double-flow sealing pad. Excitation system adopts SCR-side self-shunt static excitation system mode. Excitation power is supplied directly from outlet of generator, with an excitation transformer; while excitation-starting power is supplied from MCC. The major electrical equipment / Systems:

• Power Generation System and Evacuation

• Generator Control and protection

• Generator Circuit Breaker

• 400KV Bus reactor

• Generator Transformer, ST, UT, UAT

• Relay, Control and Metering Panel

• Electrical Auxiliary system

• Isolated phase bus duct

• Segregated Phase Bus duct

• Non-segregated phase bus duct

• 11kV & 6.6kV Switchgear

• LT switchgear/PMCC/MCC

• Un-interruptible Power supply system

• DC system

• BTG earthing and Lightning protection system

• 11kV & 6.6kV Neutral Grounding Resistor

• Generator NG cubicle consisting of transformer and resistor

• Cable tray & Cabling system

• Plant illumination system

• Plant communication system

• DG set

**System Description**

* + Each units consist of 3 nos of Single phase Generator Transormers each of rating 250MVA, 420/√3/20kV, YNd1 used to evacuate the power generated through 400KV evacuation system. 1 no of single phase transformer used as a spare for both units.
  + 400 KV evacuation system is 400 KV GIS double bus configuration system. Consists of 6 nos Bay. 2 Nos of Line Bay, 2 Nos of GT bay, 1 no of Bus Reactor bay and 1 no of Bus coupler bay.
  + Each units consist of 1 no of Station Transformers of Capacity 50MVA, 20/11.5kV, ONAN/ONAF Dyn11 each utilized for 100% Station load.
  + Each Station Transformer (ST) connected to the tap-off of Generator Main IPBD of Unit-1 & 2 respectively.
  + For each units the Unit Auxiliaries provided through 2 Nos. Unit Transformer of rating 45MVA, 20/11.5 kV. The UTs will be connected to the tap-off of Generator Main IPBD.
  + The 6.6 KV HT load of Unit Auxiliaries provided through 2 Nos. UAT of rating 16MVA, ONAN, 11/6.9 kV. The UATs connected to the Unit Switchboard.
  + Normal/Emergency DG will cater to the emergency load requirements of the respective unit.
  + Each of the 1 x 600 MW generators with static excitation system generates power at 20 kV which is stepped up to 400 kV by Generator Transformer. The generated power is evacuated to 400 kV GIS switchyard through 20/420 kV Generator Transformer. The Generator is connected to the Generator Transformer LV terminals through 24 kV IPBD. The power is evacuated to the grid through Two Nos. 400 kV transmission line emanating from the switchyard to PGCIL pooling station.

**All 415V motors modules (DOL) provided with:**

* + MPCBs with inbuilt O/L relay, inbuilt short circuit protection and Power Contactors for motors up to and including 45 kW suitable for type-2 Co-Ordination.
  + MCCB with inbuilt short circuit protection and separate thermal O/L and Power Contactors for motor above 45kW to up to 110 kW suitable for type-2 Co-Ordination.
  + ACB and composite motor protection relay are of numerical and communicable type for motors 110 kW and above.
  + All the incomers and bus couplers of 415V switchgear and MCC and outgoing feeders of 415V switchgear have ACB and provided with microprocessor based numerical relays.
  + Three (3) set of 1X100%, 220 Volts Lead Acid Plante Battery with their Float cum Boost charger i.e. one set for each unit and one set for total station load and DC switchboard provided for the unit and Station loads. In addition, a common standby Float cum Boost charger provided which can be switched to unit 1, Unit 2 or Station batteries as per requirements.
  + The switchyard provided with a separate 2nos of 220V battery system. And 48 V battery system for PLCC communication system.
  + All Power cables have Aluminium conductor with minimum conductor cross section of 4 sq.mm and Control cables have Copper conductor.

**Lighting system consists of**

* + Normal 240 V AC Lighting System
  + Normal-cum-Emergency 240 V AC Lighting System
  + Emergency 220 V DC Lighting System
  + Maintenance 24V AC lighting system

Dry type Vacuum pressure Impregnated (VPI) / cast resin Lighting transformers provided in the plant AC lighting system to reduce the fault level at Lighting Panel.

MS rod below ground level, GS conductors above ground level and MS conductor in embedded concrete / Floor slab are used as Earthing materials.

Two (2) X 100% rated, 240 Volts, single phase, parallel redundant UPS with static bypass and Maintenance bypass arrangement with (1hr backup) provided to cater the BTG load.

**Power Generation and Evacuation**

Two (2) nos. of 600MW generator with static excitation system generate power at 20 kV for the plant. The generator connected to the Single Phase Generator Transformer (GT) through IPBD and Generator Circuit Breaker. One no of spare Transformer provided without radiator bank.

The Generator neutral, grounded through neutral grounding cubicle transformer and resistor to limit the earth fault current 1A.

A tap off from IPBD to SP & VT cubicle provided between Generator and Generator Circuit Breaker. SP & VT cubicle comprises voltage transformers, surge arrestors, surge capacitors etc.

The HV terminals of Generator Transformer (GT) connected to 400 kV Switchyard (GIS) for power evacuation.

**400 kV Bus reactor**

Bus Reactor is provided to limit 400 KV bus Voltages during line Energization and Load rejection. The Reactor is 63 MVAR, 3 phase, 5 limbed core, Oil immersed ONAN cooled and connected to 400 KV Bus.

• Make : ABB

• Rating MVAr : 63.0

• Rated Voltage : 420 KV

• Rated Current : 86.60 A

• Vector Group : Star with Neutral grounded

• Type of cooling : ONAN

• Protections details : Differential ( High Impedance and Low impedance), REF and over fluxing

**Generator Transformer:**

Generator Transformers of two winding, 420/√3/20 kV, 250 MVA, single phase with four cooler banks (3 working & 1 S/b). One number of single phase transformers as spare for two units. ONAN/ONAF/OFAF cooled with on load tap changer with a range of ±10% in steps of 1.25% and vector group Ynd1 is envisaged. The HV side terminals connected to 400 kV switchyard through overhead conductor and LV side terminals to generator through IPBD with HV side solidly earthed.

Station Transformer:

Station Transformers (ST) 50 MVA, two winding, 20/11.5 KV, ONAN / ONAF, with off load tap changer with a range of ± 5% in steps of 1.25 % on HV side and vector group Dyn11. The HV side connected to 20KV generator side through IPBD and LV side to station buses through segregated phase bus ducts. The ST’s are provided with 2 X 50% capacity radiator banks.

**Unit Transformer:**

Unit Transformers (UT) 45 MVA, two winding, 20/11.5 KV, ONAN / ONAF, with off load tap changer with a range of ± 5% in steps of 1.25 % on HV side and vector group Dyn11. The HV side is connected to 20KV generator side through IPBD and LV side to station buses through segregated phase bus ducts. The UT’s are provided with 2 X 50% capacity radiator banks.

**Unit Auxiliary Transformer:**

Unit Auxiliary Transformers (UAT) 16 MVA, three phase, two winding, 11/6.6 KV, ONAN / ONAF, with off load tap changer with a range of ± 5% in steps of 2.5 % on HV side and vector group Dyn11. The HV side connected to 11KV side through IPBD and LV side to Unit auxiliary bus through segregated phase bus ducts. The UAT’s are provided with 2 X 50% capacity radiator banks.

**Service Transformer:**

Unit Service Transformers, Station Service Transformers and other service transformers is oil filled. Lighting Transformers is of dry type transformers. Service Transformers will be of three phase, two winding, 11/0.433, 6.6/.415 kV,Dyn11, 50 Hz, ONAN / AN cooled with OCTC with a range of ±5% in steps of 2.5% on HV side.

# CHAPTER: - 5. POWER GENERATION

As per information provided by the Company, the details of Power Generation of 2 X 600 MW CBTPP of CEPL is as under: -

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| S. No. | Parameters | FY 15-16 | FY 16-17 | FY 17-18 | FY 18-19 | FY 19-20 | FY 20-21 | FY 21-22 | FY 22-23 |
| 1 | No of days of operation (In Hrs) | 6140 | 9116 | 8962 | 7040 | 8623 | 5707 | 2901 | 5594 |
| 2 | Station Generation (MU) | 2713 | 3749 | 3906 | 3222 | 3560 | 2297 | 1222 | 2350 |
| 3 | Power Export (MU) | 2505 | 3483 | 3630 | 2980 | 3276 | 2109 | 1125 | 2171 |
| 4 | Power Import (MU) | 19.48 | 12.58 | 6.82 | 12.40 | 11.53 | 21.03 | 30.41 | 17.54 |
| 5 | Gen loss due to Back down (MU) | 3661 | 6760 | 6606 | 7290 | 6981 | 8215 | 9290 | 8145 |
| 6 | Back down certified by Discom (MUs) |  |  |  |  |  |  |  |  |
| 7 | PLF (%) - Station | 25.74% | 35.66% | 37.16% | 30.65% | 33.77% | 21.85% | 11.62% | 22.36% |
| 8 | PAF(%) - Station | 57.49% | 69.37% | 88.75% | 70.63% | 87.62% | 78.24% | 69.75% | 48.40% |
| 9 | PLF (%) - Unit 1 | 44.87% | 48.33% | 23.63% | 24.81% | 44.99% | 20.57% | 15.34% | 2.86% |
| 10 | PAF(%) - Unit 1 | 65.42% | 84.79% | 89.23% | 68.58% | 86.09% | 64.58% | 66.22% | 8.03% |
| 11 | PLF (%) - Unit 2 | 6.62% | 23.00% | 50.69% | 36.49% | 22.55% | 23.13% | 7.91% | 41.85% |
| 12 | PAF(%) - Unit 2 | 49.56% | 53.96% | 88.27% | 72.69% | 89.14% | 91.90% | 73.28% | 88.77% |
| 13 | Station Aux Power Consumption (MU) | 209 | 266 | 276 | 242 | 284 | 189 | 97 | 179 |
| 14 | Station Aux Power Consumption (%) | 7.69% | 7.10% | 7.07% | 7.51% | 7.97% | 8.21% | 7.94% | 7.62% |
| 15 | Unit 1 Aux Power Consumption (MU) | 182 | 180 | 94 | 105 | 187 | 86 | 58 | 28 |
| 16 | Uint 1 Aux Power Consumption (%) | 7.70% | 7.08% | 7.53% | 8.02% | 7.89% | 7.91% | 7.20% | 7.56% |
| 17 | Unit 2 Aux Power Consumption (MU) | 26 | 86 | 183 | 137 | 96 | 102 | 33 | 151 |
| 18 | Unit 2 Aux Power Consumption (%) | 7.58% | 7.15% | 6.86% | 7.16% | 8.09% | 8.40% | 8.05% | 6.85% |
| 19 | ULF (%) | 73.65% | 68.54% | 72.65% | 76.27% | 68.80% | 67.08% | 70.18% | 70.02% |
| 20 | Fuel Oil Consumption (KL) | 2998 | 2951 | 1252 | 1659 | 2309 | 2329 | 1837 | 1692 |
| 21 | Specific Oil Consumption (ml/kwh) | 1.10 | 0.79 | 0.32 | 0.51 | 0.65 | 1.01 | 1.50 | 0.72 |
| 22 | Coal Consumption (MT) (Actual) | 1703303 | 2357545 | 2449784 | 2030308 | 2248725 | 1476986 | 802168 | 1571730 |
| 23 | SCC (kg/kwh) | 0.628 | 0.629 | 0.627 | 0.630 | 0.632 | 0.643 | 0.657 | 0.669 |
| 24 | Avg GCV (as fired) (in Kcal/Kg) | 4071 | 4054 | 4102 | 4058 | 4098 | 4108 | 4120 | 4000 |
| 25 | SHR (Kcal/KWh) | 2555 | 2550 | 2572 | 2558 | 2588 | 2641 | 2705 | 2675 |

During the date and time of our visit to the Power Plant, Unit-1& 2 is in operation. Unit 1 is operating at less capacity due to no operation of 1 No. of Steam Valve The generation of Power Plant at the time of our visit is as under:-

| S. No. | Unit No. | Generation (MW) |
| --- | --- | --- |
| 1 | Unit-1 | 333.00 |
| 2 | Unit-2 | 583.60 |

# CHAPTER: - 6. MANUFACTURER/ SUPPLIER

The Major Manufacturer/ Supplier for the 2 X 600 MW CBTPP of CEPL at Village - Melamaruthur, D. Duraiswamipuram, Pattanamarudhur & Tharuvaikulam, Post - Ottapidaram, District - Thoothukudi, PIN Code-628 105, State-Tamil Nadu, Country-India is as under:-

|  |  |
| --- | --- |
| Plant components | Supplier / Agency |
| BTG Manufacturing & supply | Harbin Power Engineering Company Ltd., China |
| Main Plant Civil Works | Gammon India Ltd. |
| BTG Erection | EDAC Engineering Ltd. |
| Coal Handling Plant | Thyssen Krupp Industries India Ltd. |
| Ash Handling Plant | Macawber Beekay Pvt. Ltd |
| Water Treatment Plant | Aquatech Asia |
| RCC Chimney | Gammon India Ltd |
| IDCT | Paharpur Cooling Towers Ltd. |
| CW Pump House Civil Works | ECCI Ltd & GMW |
| E-BOP | ABB |
| 400KV LILO Line | SPIC –SMO |
| M-BOP | BSBK & GMW |
| Fire Protection System | GMW |
| SW Intake –Pumps | ITT Corporation |
| SW Intake Off Shore Works | Meka Infra & Jain Irrigation |
| SW Intake -GRP Piping | Graphite India |
| SW Intake Pump House | NAPC Ltd. |
| Ash Bund |
| OH, Service Water Tank |
| Roads & Drains | ECCI Ltd |
| Afforestation & Green Belt Development | BVG India Ltd. |

* Coal Handling Plant is of 1400 TPH.
* Boiler installed is of 2060 TPH. The Boiler is Subcritical, PC fired, assisted   
  circulation, single furnace, balanced draft, single reheat.
* Turbine is of Single reheat, 3-casing, 4-flow, tandem compound, condensing   
  turbine.
* Generator Rated Terminal Voltage is 20KV & Rated Stator Current is 20377 Amp.
* Water Treatment Plant is of 13MLD. The water is taken from sea and is treated by De-Salination Plant and Reverse Osmosis process.
* The Power Evacuation is through 400KV GIS; D/C quad line to PGCIL
* The Cooling Water Systems are sea water based & IDCT with 1.3 COC.
* The Ash Handing Plant– Bottom ash is 24MT/Hr (Semi wet) & Fly Ash-108MT/Hr.

# CHAPTER:-7. TERMINOLOGY

## 7.1. FAIR MARKET VALUE:-

As per International Valuation Standards (IVS), bases of value (sometimes called standards of value) describe the fundamental premises on which the reported values will be based. It is critical that the basis (or bases) of value be appropriate to the terms and purpose of the valuation assignment, as a basis of value may influence or dictate a valuer’s selection of methods, inputs and assumptions, and the ultimate opinion of value.

Market Value is the estimated amount for which an asset or liability should exchange on the valuation date between a willing buyer and a willing seller in an arm’s length transaction, after proper marketing and where the parties had each acted knowledgeably, prudently and without compulsion. The definition of Market Value must be applied in accordance with the following conceptual framework:

1. “The estimated amount” refers to a price expressed in terms of money payable for the asset in an arm’s length market transaction. Market Value is the most probable price reasonably obtainable in the market on the valuation date in keeping with the market value definition. It is the best price reasonably obtainable by the seller and the most advantageous price reasonably obtainable by the buyer. This estimate specifically excludes an estimated price inflated or deflated by special terms or circumstances such as atypical financing, sale and leaseback arrangements, special considerations or concessions granted by anyone associated with the sale, or any element of value available only to a specific owner or purchaser.
2. “An asset or liability should exchange” refers to the fact that the value of an asset or liability is an estimated amount rather than a predetermined amount or actual sale price. It is the price in a transaction that meets all the elements of the Market Value definition at the valuation date.
3. “On the valuation date” requires that the value is time-specific as of a given date. Because markets and market conditions may change, the estimated value may be incorrect or inappropriate at another time. The valuation amount will reflect the market state and circumstances as at the valuation date, not those at any other date.
4. “Between a willing buyer” refers to one who is motivated, but not compelled to buy. This buyer is neither over eager nor determined to buy at any price. This buyer is also one who purchases in accordance with the realities of the current market and with current market expectations, rather than in relation to an imaginary or hypothetical market that cannot be demonstrated or anticipated to exist. The assumed buyer would not pay a higher price than the market requires. The present owner is included among those who constitute “the market”.
5. “And a willing seller” is neither an over eager nor a forced seller prepared to sell at any price, nor one prepared to hold out for a price not considered reasonable in the current market. The willing seller is motivated to sell the asset at market terms for the best price attainable in the open market after proper marketing, whatever that price may be. The factual circumstances of the actual owner are not a part of this consideration because the willing seller is a hypothetical owner.
6. “In an arm’s length transaction” is one between parties who do not have a particular or special relationship, e.g. parent and subsidiary companies or landlord and tenant, that may make the price level uncharacteristic of the market or inflated. The Market Value transaction is presumed to be between unrelated parties, each acting independently.
7. “After proper marketing” means that the asset has been exposed to the market in the most appropriate manner to effect its disposal at the best price reasonably obtainable in accordance with the Market Value definition. The method of sale is deemed to be that most appropriate to obtain the best price in the market to which the seller has access. The length of exposure time is not a fixed period but will vary according to the type of asset and market conditions. The only criterion is that there must have been sufficient time to allow the asset to be brought to the attention of an adequate number of market participants. The exposure period occurs prior to the valuation date.
8. “Where the parties had each acted knowledgeably, prudently” presumes that both the willing buyer and the willing seller are reasonably informed about the nature and characteristics of the asset, its actual and potential uses, and the state of the market as of the valuation date. Each is further presumed to use that knowledge prudently to seek the price that is most favourable for their respective positions in the transaction. Prudence is assessed by referring to the state of the market at the valuation date, not with the benefit of hindsight at some later date. For example, it is not necessarily imprudent for a seller to sell assets in a market with falling prices at a price that is lower than previous market levels. In such cases, as is true for other exchanges in markets with changing prices, the prudent buyer or seller will act in accordance with the best market information available at the time.
9. “And without compulsion” establishes that each party is motivated to undertake the transaction, but neither is forced or unduly coerced to complete it.

The concept of Market Value presumes a price negotiated in an open and competitive market where the participants are acting freely. The market for an asset could be an international market or a local market. The market could consist of numerous buyers and sellers, or could be one characterised by a limited number of market participants. The market in which the asset is presumed exposed for sale is the one in which the asset notionally being exchanged is normally exchanged. The Market Value of an asset will reflect its highest and best use. The highest and best use is the use of an asset that maximises its potential and that is possible, legally permissible and financially feasible. The highest and best use may be for continuation of an asset’s existing use or for some alternative use. This is determined by the use that a market participant would have in mind for the asset when formulating the price that it would be willing to bid.

The nature and source of the valuation inputs must be consistent with the basis of value, which in turn must have regard to the valuation purpose. For example, various approaches and methods may be used to arrive at an opinion of value providing they use market- derived data. The market approach will, by definition, use market-derived inputs. To indicate Market Value, the income approach should be applied, using inputs and assumptions that would be adopted by participants. To indicate Market Value using the cost approach, the cost of an asset of equal utility and the appropriate depreciation should be determined by analysis of market-based costs and depreciation.

The data available and the circumstances relating to the market for the asset being valued must determine which valuation method or methods are most relevant and appropriate. If based on appropriately analysed market-derived data, each approach or method used should provide an indication of Market Value. Market Value does not reflect attributes of an asset that are of value to a specific owner or purchaser that are not available to other buyers in the market. Such advantages may relate to the physical, geographic, economic or legal characteristics of an asset. Market Value requires the disregard of any such element of value because, at any given date, it is only assumed that there is a willing buyer, not a particular willing buyer.

**The other important factors considered in this valuation report are:-**

**Assessed Value:**

It is used to determine ad valorem taxes, or to levy damages on the orders of a court. It is determined by the Government agencies. For example, the value of a property is assessed by the local government to levy the property tax.

**Book Value:**-

The value of a security or asset carried on a balance sheet. It is the value of the business as per the audited financial statements.

**Book Value:-**

Total Assets less Intangible Assets like patents, goodwill and total liabilities.

**Scrap Value:-**

Scrap value is the expected or estimated value of the asset at the end of its useful life. It is the estimated price that can be realized by selling the depreciable asset at the end of its useful life. In accounting parlance it is also known as the residual value, salvage value, or break-up value.

Scrap Value = Cost of Asset – Total Depreciation

Cost of Asset = Purchase Price + Freight + Installation

**Replacement Value:-**

Replacement value is the cost of replacing an asset of a company. It refers to the actual cost that has to be incurred to replace an asset in its existing condition. An entity would have to pay to replace an asset today, according to its current worth.

**Depreciation:-**

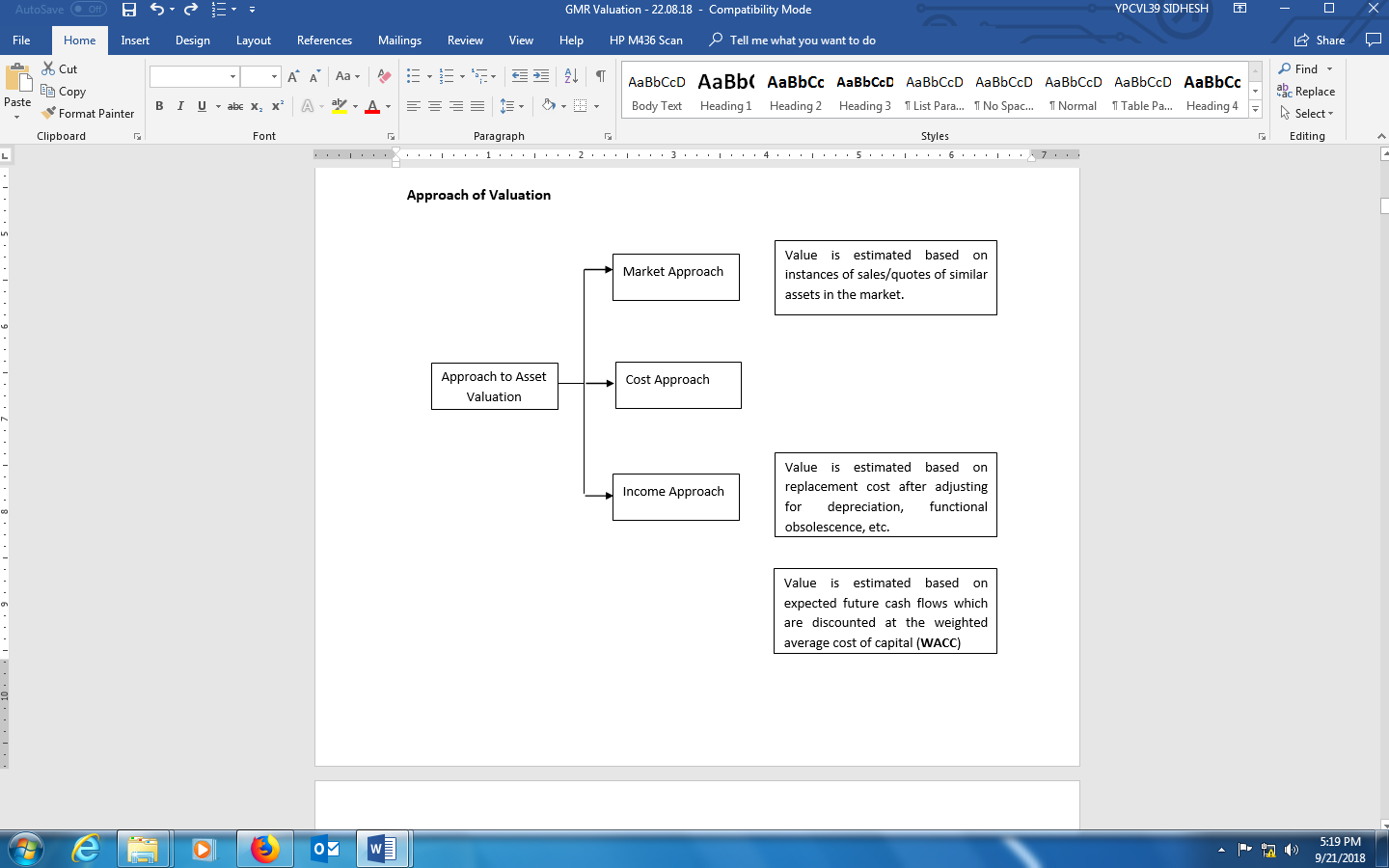
Depreciation can be defined as "That part of cost of an asset not recoverable when disposed of by its Owners". From time immemorial, it is understood that depreciation is the best approach in fixing the value of Fixed Assets. The question is whether this amount (depreciated amount) of the assets is lost or being retrieved in a rational manner or not. Also as per the legal sense "depreciation accounting is a process of allocation, and not of valuation". Moreover, "neither assets replacement nor cost recover is a legitimate objective of replacement policy but instead it should reflect the use of expiration of an asset service potential". Depreciation is a measure of the wearing out, consumption or other loss of value of depreciable asset arising from use, effluxion of time of obsolescence through technology and market changes. Depreciation is allocated so as to each accounting period during the expected useful life or the asset. Depreciation includes amortization of assets whose useful life is predetermined. ‘Depreciable assets’ are assets which

* are expected to be used during more than one accounting period and
* have limited useful life, and
* are held by an enterprise for use in the production or supply of goods and service, for rental to others, or for administrative purpose and not for the purpose of sale in the ordinary course of business.

## 7.2. USEFUL LIFE:-

Useful Life is either the period over which a depreciable asset is expected to be used by the enterprise or the number of production or similar units expected to be obtained from the use of the asset by the enterprise. 'Depreciable amount' of a depreciable asset is its historical cost or other amount substituted for historical cost in the financial statements less the estimated residual value.

## 7.3. METHOD OF VALUATION:-



**Method adopted for Valuation:-**

* **Market Approach is adopted for estimating the market value of land.**
* **The Depreciated Replacement Cost (DRC) method is adopted for estimating market value of building, Plant and Machinery and Other Movable Assets.**

### 7.3.1. MARKET APPROACH:-

### A market approach is a method of determining the appraisal value of an asset based on the selling price of similar items. The market approach is a valuation method that can be used to calculate the value of property or as part of the valuation process for a closely held business. Additionally, the market approach can be used to determine the value of a business ownership interest, security or intangible asset. Regardless of what asset is being valued, the market approach studies recent sales of similar assets, making adjustments for differences in size, quantity or quality.

In the power industry, the value of a power plant can be estimated by looking at the comparable: recently sold / auctioned plants that are similar in size and features that are located within a close geographic proximity to the property being valued. Outlier transactions, indicative of particularly motivated buyers or sellers, may need to be compensated for since the price may not adequately reflect the value.

### 7.3.2. DEPRECIATED REPLACEMENT COST:-

The Depreciated Replacement Cost (DRC) method is the most common method under the cost approach. It can be applied to wide range of asset types. It is frequently used when there is either very limited or no evidence of sale transaction. The cost approach estimates value using the economic principle that a buyer will pay no more for an asset than the cost to obtain an asset of equal utility, whether by purchase or by construction. It is based on the principle of substitution, i.e. that unless undue time, inconvenience, risk or other factors are involved, the price that a buyer in the market would pay for the asset being valued would not be more than the cost to assemble or construct an equivalent asset. The DRC method is a common application of the cost approach. In assessing what it might be prepared to pay for the subject asset, a potential purchaser may consider as an alternative to acquiring the subject asset, the cost to construct a similar asset having the same functionality. This represents the maximum that a potential purchaser would be prepared to pay for the subject asset if it were new at the date of valuation



# CHAPTER:-8. VALUATION OF FIXED ASSETS

**­­­­**

### FIXED ASSETS UNDER VALUATION: -

The Gross Block and Net Block of Fixed Assets under valuation of CEPL’s 2 X 600 MW Subcritical Coal Based Thermal Power Plant are as under: -

| S. No. | Description of Assets | Gross Block as on 31.03.2023 (Rs) | Net Carrying Value as on 31.03.2023 (Rs.) |
| --- | --- | --- | --- |
|  | **Land** |  |  |
| 1 | Freehold Land | 1,62,01,55,661 | 1,62,01,55,661 |
|  | **Total (Land)** | **1,62,01,55,661** | **1,62,01,55,661** |
|  | **Buildings** |  |  |
| 2 | Factory Building | 33,37,30,566 | 24,66,55,875 |
| 3 | Buildings other than RCC Frame Structure - Unit 1 | 13,63,48,953 | 9,67,56,388 |
| 4 | Buildings-Temporary Structures | 1,45,23,002 | 7,18,231 |
| 5 | Bridges, Culverts, Bunders Ext | 60,69,55,635 | 44,82,53,046 |
| 6 | Roads- Carpeted | 42,39,72,095 | 8,99,58,080 |
| **Total (Buildings)** | | **1,51,55,30,251** | **88,23,41,619** |
|  | **Plant & Equipment** |  |  |
| 7 | Electrical Equipments and Installations | 20,63,16,778 | 4,85,07,760 |
| 8 | General Plant and machinery | 4,38,49,629 | 1,93,55,659 |
| 9 | Thermal Power Generation Plant | 71,39,61,90,253 | 58,28,75,34,263 |
| 10 | Transmission Lines, Cables and other network assets | 1,33,04,34,091 | 1,10,25,92,498 |
| 11 | Water Distribution Plant Including Pipelines | 5,12,91,19,078 | 3,79,99,32,520 |
| 12 | Railways sidings, locomotives, rolling stocks, tramways and railways used by concerns, excluding railway concerns | 42,80,821 | 25,64,089 |
|  | **Total (Plant & Equipment)** | **78,11,01,90,651** | **63,26,04,86,789** |
|  | **Other Assets** |  |  |
| 13 | Office Equipment | 2,96,68,260 | 59,98,057 |
| 14 | Furniture & Fixtures | 2,58,14,159 | 40,54,822 |
| 15 | Computers | 2,47,64,547 | 25,94,287 |
| 16 | Vehicles (Cars, Motor Bikes, Fire tenders) | 2,05,50,925 | 28,82,766 |
| **Total (Other Assets)** | | **10,07,97,891** | **1,55,29,931** |
| **Grand Total** | | **81,34,66,74,454** | **65,77,85,14,001** |
| **Rs. in Crores** | | **8,134.67** | **6,577.85** |
| **Rs. in Crores (per MW)** | | **6.78** | **5.48** |

### BASIS OF VALUATION OF POWER PLANT: -

The factors considered for valuation of CEPL’s 2 X 600 MW Subcritical Coal Based Thermal Power Plant are as under: -

* Replacement Cost
* Gross & Net block
* Fixed Asset Register
* Power Plant Land Area
* Circle Rate and Prevailing market rates of land
* Constructed Area of structures / buildings
* Age & Condition
* Rated Capacity of Power Plant
* Location Advantages of Power Plant
* Manufacturer /Supplier of BTG Equipment’s
* Technology used
* Availability of Raw material & Water
* Coal linkage
* Power Evacuation
* Performance
* Useful life of Power Plant
* Power Purchase Agreement
* Ash Disposal System.
* Approvals and clearances
* Assets Insurance
* Pre-Operative Expense

The project consists of 2 units. The total cost incurred on the 2 X 600 MW coal based subcritical thermal power plant of CEPL as per the Fixed Asset Register as at 31.03.2023 is   
Rs 8,134.67 Crores. The cost incurred per MW is Rs 6.77 Crores.

The total useful life of Power Plant is considered as 30 Years.

We have assessed the Fair Market Value (FMV) of Assets by applying appropriate depreciation to Replacement Cost considering the above parameters.

## SUMMARY FOR VALUATION:-

| S. No | Description of Assets | Working Sheet | Fair Market Value (Rs.) | Realizable Value (Rs.) | Distress Sale Value (Rs.) | Liquidation Value (Rs.) |
| --- | --- | --- | --- | --- | --- | --- |
|  | **Land** |  |  |  |  |  |
| 1 | Freehold Land | 1 | 1,63,35,60,000 | 1,47,02,04,000 | 1,30,68,48,000 | 1,14,34,92,000 |
|  |  | **Total (Land)** | **1,63,35,60,000** | **1,47,02,04,000** | **1,30,68,48,000** | **1,14,34,92,000** |
|  | **Buildings** |  |  |  |  |  |
| 2 | Factory Building | 2 | 1,20,89,38,213 | 1,08,80,44,392 | 87,04,35,514 | 84,62,56,749 |
| 3 | Buildings other than RCC Frame Structure - Unit 1 |
| 4 | Buildings-Temporary Structures |
| 5 | Bridges, Culverts, Bunders Ext |
| 6 | Roads- Carpeted |
| **Total (Buildings)** | | | **1,20,89,38,213** | **1,08,80,44,392** | **87,04,35,514** | **84,62,56,749** |
|  | **Plant & Equipment** |  |  |  |  |  |
| 7 | Electrical Equipments and Installations | 3 | 5,80,10,406 | 4,93,08,845 | 4,06,07,284 | 2,90,05,203 |
| 8 | General Plant and machinery | 4 | 1,98,66,236 | 1,68,86,301 | 1,39,06,365 | 99,33,118 |
| 9 | Thermal Power Generation Plant | 5 | 38,63,71,14,162 | 32,84,15,47,037 | 27,04,59,79,913 | 19,31,85,57,081 |
| 10 | Transmission Lines, Cables and other network assets | 6 | 94,89,47,229 | 80,66,05,144 | 66,42,63,060 | 47,44,73,614 |
| 11 | Water Distribution Plant Including Pipelines | 7 | 2,56,39,01,490 | 2,17,93,16,266 | 1,79,47,31,043 | 1,28,19,50,745 |
| 12 | Railways sidings, locomotives, rolling stocks, tramways and railways used by concerns, excluding railway concerns | 8 | 33,81,849 | 28,74,571 | 23,67,294 | 16,90,924 |
| **Total (Plant & Equipment)** | | | **42,23,12,21,370** | **35,89,65,38,165** | **29,56,18,54,959** | **21,11,56,10,685** |
|  | **Other Assets** |  |  |  |  |  |
| 13 | Office Equipment | 9 | 60,12,845 | 51,10,918 | 42,08,992 | 30,06,423 |
| 14 | Furniture & Fixtures | 10 | 50,55,842 | 42,97,466 | 35,39,090 | 25,27,921 |
| 15 | Computers | 11 | 33,99,100 | 28,89,235 | 23,79,370 | 16,99,550 |
| 16 | Vehicles (Cars, Motor Bikes, Fire tenders) | 12 | 39,56,250 | 33,62,813 | 27,69,375 | 19,78,125 |
| **Total (Other Assets)** | | | **1,84,24,037** | **1,56,60,432** | **1,28,96,826** | **92,12,019** |
| **Grand Total** | | | **45,09,21,43,621** | **38,47,04,46,989** | **31,75,20,35,299** | **23,11,45,71,453** |
| **Rs. in Crores** | | | **4,509.21** | **3,847.04** | **3,175.20** | **2,311.46** |
| **Rs. in Crores (per MW)** | | | **3.76** | **3.21** | **2.65** | **1.93** |

**(Rs in Crores)**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| S. No. | Plant | FMV | RV | DSV | LV |
| 1 | Fixed Assets of 2 X 600 MW Power Plant | 4,509.21 | 3,847.04 | 3,175.20 | 2,311.46 |

# CHAPTER:-9. PHOTOGRAPHS

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# CHAPTER:-10. OPINION

We hereby certify that the Valuation of Fixed Assets of   
2 X 600 MW Coal based Thermal Power Plant located at Village - Melamaruthur, D. Duraiswamipuram, Pattanamarudhur & Tharuvaikulam, Post - Ottapidaram, District - Thoothukudi, PIN Code-628 105, State-Tamil Nadu, Country-India of **M/s. Coastal Energen Pvt. Ltd. (CEPL)** is as under:-

**(Rs in Crores)**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| S. No. | Plant | FMV | RV | DSV | LV |
| 1 | Fixed Assets of 2 X 600 MW Power Plant | 4,509.21 | 3,847.04 | 3,175.20 | 2,311.46 |

# CONCLUSION

|  |  |
| --- | --- |
| Particular | Details |
| Name of Client | **M/s. Coastal Energen Pvt. Ltd. (CEPL)** |
| Asset being Valued | Fixed assets (Movable & Immovable) |
| Intended Users | State Bank of India, SAMB, Chennai |
| Valuation Currency | Indian Rupees (INR) |
| Purpose of Valuation | Assets the Fair Value |
| Valuation Standards Referred | International Valuation Standards |
| Basis of Value | Fair Value & Liquidation Value |
| Premises for value | Fair value: Highest & Best Use  Realizable value: Existing and Current Use  Distress Value: Orderly liquidation |
| Valuation Date | 20.11.2023 |
| Valuation Approach | Land: Market Approach  Building / Movable Assets: Cost Approach |
| Valuation Methodology | Deprecated Replacement Cost |
| Value of Assets in Crores | **FMV- ₹ 4,509.21 Crores**  **RV- ₹ 3,847.04 Crores**  **DSV- ₹ 3,175.20 Crores**  **LV- ₹ 2,311.46 Crores** |

For Vastukala Consultants (I) Pvt. Ltd.

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| **Sharad B. Chalikwar**  Govt. Reg. Valuer  B.E.(Civil), M.E.(Civil), M.Sc. (Real Estate Valuation), M.Sc. (P&M Valuation), F.I.E. (India), F.I.V., M.I.C.A., FIWRS,  Chartered & Professional Engineer (India)  Reg. No. (N) CCIT/1-14/52/2008-09  **SBI Empanelment No.:** SME / TCC / 2016-17 / 156 / Sr. No. – 193 | **Umang Ashwin Patel**  Registered Valuer  B.Tech.(Mech.), M.Sc. (Real Estate Valuation), M.Sc. (P&M Valuation)  Member – The Indian Institution of Valuers  Chartered Engineer (India) |