

Executive Summary

of

LCD Module Manufacturing Unit (60,000 Glass Sheets /Month) Along With 150 MW Captive Coal Based Thermal Power Plant

Proponent

M/s. Twin Star Display Technologies Ltd
At Additional MIDC Area, Butibori, Nagpur, Maharashtra.

By

Pollution & Ecology Control Services
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Executive Summary

Introduction

Environment Impact Assessment (EIA) is a process, used to identify the environmental, social and economic impacts of a project prior to decision-making. It is a decision-making tool, which guides the decision makers in taking appropriate decisions for projects. It aims predicting environmental impacts at an early stage of project planning and design, find ways and means to reduce adverse impacts, shape projects to suit the local environment and present the predictions and options to decision makers. By using EIA, both environmental and economic benefits can be achieved. EIA systematically examines both beneficial and adverse consequences of the project and ensures that these impacts are taken into account during the project design. By considering environmental effects and mitigation early in the project planning cycle, there are many benefits, such as protection of the environment, optimum utilization of resources and saving overall time and cost of the project. Properly conducted EIA also lessens conflicts by promoting community participation, informs decision-makers, and helps lay the base for environmentally sound projects.

Twinstar Display Technologies Ltd has proposed LCD manufacturing unit with FAB for 60,000 glass sheets per month in the additional MIDC area of Butibori along with 1x 80MW and 1x 70MW (Total 150 MW) coal based Captive Thermal Power Plant.

Process Description

The proposed manufacturing facility of the Company is situated in the additional MIDC area of Butibori and comprises of the following:

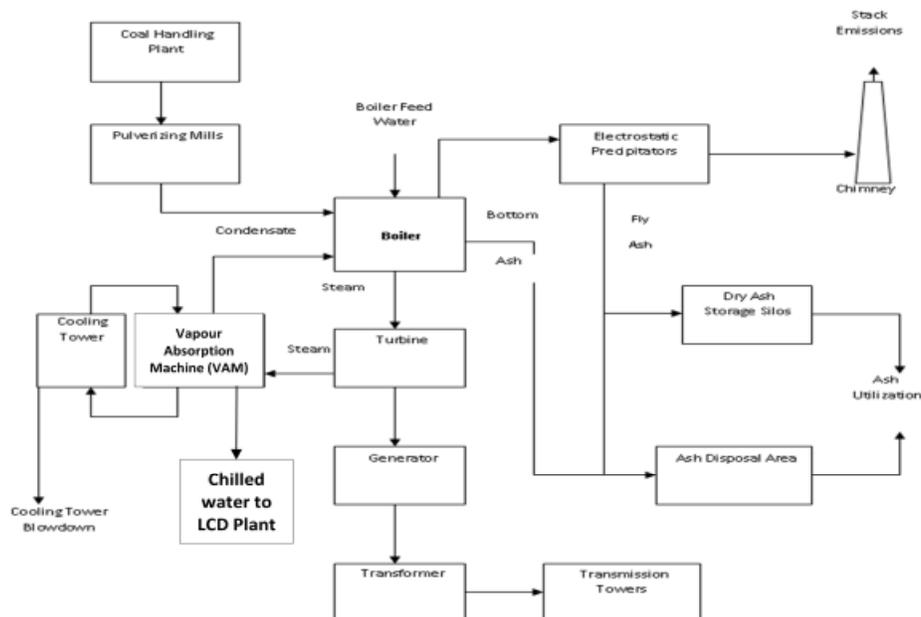
The layered panel structure below shows the LCD panel is sandwiched between Rear and Top Polarizers. The LCD module is made up of 2 layers of Glass Substrate containing a layer of Liquid Crystal Material, through which Light passes, provided by the Backlight. White Light from the backlight passes through the LCD panel which manipulates passage of light to form images projected onto the front of the LCD panel screen.

- **Polarizing Filter**-The function of the polarizer is to improve color and definition, making it possible to see the screens of LCDs. the optical characteristics of LCDs, such as brightness and k2contrast, are greatly influenced by the properties of polarizing films

- **Color Filter Layer**-To allow the LCD to produce colors, the color filter consists of a substrate coated with an opaque BM (black matrix) with regular arrangement of red, green and blue regions
- **Liquid Crystal layer**- LC can be induced by electrical fields to take certain patterns which block light or allow it through.
- **Sub pixel Electrodes**-An LCD picture consists of millions of tiny pixels which together form a visual display. These Electrodes which coat the plates holding the liquid crystal send vibrations to the plates to determine how and what light passes through.
- **LED Backlight**- It allows the visual display projection in an LCD panel. Without which a viewer cannot see the picture because the liquid crystal needs the backlight for illumination.

Captive Power Plant

In thermal power generation, chemical energy of coal is first converted into thermal energy (during combustion), which is then converted into mechanical energy (through a turbine) and finally into electrical energy (through a generator). Figure shows the schematic process flow sheet for coal fired thermal power plant. Their raw materials are coal, air and water.



Description of Environment

The baseline environmental quality for the period of November, December, January and February 2016 - 17 was assessed in an area of 10 km radius around the proposed project site.

Air Environment

It has observed that about 21.5% of total time, the wind was calm i.e. the speed was less than 1 km/hr. The predominant wind directions were from ENE, from NNE and from WNW.

The ambient air quality monitored at 8 locations selected based on predominant wind direction, indicated the following ranges;

PM ₁₀	:	38.7 to 59.1 µg/m ³ .
PM _{2.5}	:	20.5 to 40.1µg/m ³
SO ₂	:	6.7to 18.9µg/m ³
NO _x	:	10.7 to 27.7µg/m ³

Industrial Area	PM ₁₀	PM _{2.5}	SO ₂	NO _x
Residential, Rural Area (CPCB Norms)	100 µg/m ³	60 µg/m ³	80 µg/m ³	80 µg/m ³

The concentrations of PM₁₀, PM_{2.5}, SO₂ and NO_x were found within the National Ambient Air Quality Standards (NAAQ).

Water Environment

A total 10 samples including five surface & five ground water samples were collected and analyzed. The water samples were analyzed as per Standard Methods for Analysis of Water and Wastewater, American Public Health Association (APHA) Publication.

The data indicates that the ground water as well as the surface water quality are below the stipulated standard for drinking water (BIS 10500 – 2012) except high concentration of total coli form in surface water, which may be due to the human activities.

Noise Environment

Noise levels measured at eight stations are within limit of 55.0 dB (A) for Residential Area or 75.0 dB (A) for Industrial Area as given in MoEF Gazette notification for National Ambient Noise Level Standard.

Area Code	Category of Area	Limits in dB(A) Leq	
		Day time	Night time
A	Industrial Area	75	70
B	Commercial Area	65	55
C	Residential Area	55	45
D	Silence Zone**	50	40

**Silence zone is defined as area up to 100 meters around premises of hospitals, educational institutions and courts. Use of vehicle horns, loud speakers and bursting of crackers are banned in these zones

Land Environment

Three Soil samples were collected analyzed for physico-chemical characteristics at selected locations in the study area to assess the existing soil conditions around the proposed project site. The relevant parameters show the following characteristics.

The characteristics of the soil sample were compared with different depths for respective parameters.

The observations of soil characteristics are discussed parameter wise below;

- Texture of soil samples of two agriculture lands are sandy loam and clay loam, sample from waste land of project site are clay-loam in Texture Classification.
- color of soil samples of two agriculture lands are dark gray and gray, sample from waste land of project site are light gray in colour.
- The bulk density of soil samples of two agriculture lands are range in 1.51-1.68 g/cc and 1.31-1.40 g/cc, sample from waste land of project site are range in 1.33-1.43 g/cc.
- (Soil samples from two agriculture lands have pH values between 8.41-8.45 and 8.13-8.24, sample from waste land of project site have pH values between 7.64-8.08. The pH values are indicating nature of soil samples is neutral to alkaline.

- e) Soil samples from both agriculture land have conductivities between 0.180 to 0.201 and 0.288-0.329 mmhos/cm however; conductivity of soil sample from waste land ranges between 0.412 to 0.513 mmhos/cm.
- f) Soil samples from both agriculture land have Organic Matter between 0.85 to 0.95 and 1.00 to 151 % and sample from waste land of project site have between 0.25 to 0.40 %. These values represent good fertility of soils.
- g) Soil samples from both agriculture land have concentration of Available Nitrogen values ranged between 346.6 to 387.4 and 407.8 to 611.7 kg/ha and samples from waste land range between 101.9 to 163.1 kg/ha.
- h) Soil sample from both agriculture land have concentration of Available Phosphorous values ranged between 166.2 to 186.1 and 64.6 to 92.3 kg/ha and soil samples from waste land have concentration values ranges from 21.5 to 25.4 kg/ha.
- i) Soil sample from both agriculture land have concentration of Available Potassium values range between 406.6 to 446.2 and 392.0 to 434.8 kg/ha, whereas sample from waste lands concentration of Available Potassium as its values range between 122.4 to 139.9 kg/ha.
- j) All three soils are moderately suitable for cultivation of climatic crops and have good fertility.

Anticipated Environmental Impacts & Mitigation Measures

Impact on Air Quality

Major sources of air pollution are boilers, crushers and coal stockpiles. Fugitive dust emissions are also inevitable from Coal handling system and transportation sections.

The flue gases from power plant boilers pass through Electrostatic precipitators. It will be ensured that the PM levels do not exceed 50mg/Nm³.

Impacts of Fugitive Emissions

Emission of fugitive dust from coal handling plant will be controlled through adequate dust suppression and/or extraction system so that the impact will be negligible.

Mitigation Measures

Stack Emissions

The following measures will be adopted for the control of emissions for the proposed plant.

- Suitably designed ESP with efficiency of 99.89% will be placed downstream of the stacks which will separate out the incoming dust in flue gas and limit the dust concentration at its designed outlet concentration of 50 mg/Nm³.
- For the effective dilution and dispersion of the pollutants stack height has been proposed based on the CPCB guidelines. Stack of 30 m height from ground level attached to scrubber and 60 m height for CFBC Boiler of 1x 80MW and 1 x 70MW(total 150 MW) for proper dispersion of pollutants will be installed.
- The dust generated from coal handling plant will be insignificant because of handling of fine coal is in closed circuit. For further suppression of dust adequate water spray system will be provided;
- A well-designed burner system, will limit the temperature to a reasonably low value of NO_x.
- Adequate thickness of insulating material with proper fastening will be provided to control the thermal radiation;

Fugitive Emissions

The following measures will be adopted to control fugitive emissions:

- Dust suppression system by water sprinkler at dump hopper of coal
- Regular dust suppression with water sprinkler at transfer points;
- Control of fugitive emissions from the ash pond through maintaining a permanent blanket of water cover over the deposited ash
- Green belt development and afforestation in the plant and surroundings of ash disposal area.
- Dust suppression/extraction system at Coal handling plant to control fugitive emissions.

Noise Levels

During operation, the major noise generating sources are crushing mill, auto loading sections, electric motors etc. These sources will be located far off from each other. Under any circumstances the noise level from each of these sources will not exceed 85 dB (A). Noise levels generated in the project site will be confined within the Proposed plant the impact of noise levels on surrounding will be insignificant.

Mitigation Measures

The noise levels stipulated by Central Pollution Control Board at any point of time will not exceed the standards. The equipment will have inbuilt noise control devices. The measured noise level produced by any equipment will not exceed 85 dB (A) at a distance of 1.0 m from its boundary in any direction under any load condition. The noise produced in valves and piping associated with handling compressible and incompressible fluids will be attenuated to 75 dB(A) at a distance of 1 m from the source by the use of low noise trims, baffle plate silencers/ line silencers, acoustic lagging (insulation), thick-walled pipe work as and where necessary. The general mitigation for the attenuation of the noise are given below:

- ❖ By providing padding at various locations to avoid sharp noise due to vibration.
- ❖ Encasement of noise generating equipment where otherwise noise cannot be controlled
- ❖ Providing noise proof cabins to operators where remote control for operating noise generating equipment is feasible.
- ❖ In all the design/installation precautions are taken as specified by the manufacturers with respect to noise control will be strictly adhered to;
- ❖ High noise generating sources will be insulated adequately by providing suitable enclosures;
- ❖ Use of lagging with attenuation properties on plant components / installation of sound attenuation panels around the equipment
- ❖ Other than the regular maintenance of the various equipment, ear plugs/muffs are recommended for the personnel working close to the noise generating units;
- ❖ All the openings like covers, partitions will be designed properly
- ❖ Inlet and outlet mufflers will be provided which are easy to design and construct.

- ❖ All rotating items will be well lubricated and provided with enclosures as far as possible to reduce noise transmission. Extensive vibration monitoring system will be provided to check and reduce vibrations. Vibration isolators will be provided to reduce vibration and noise wherever possible;
- ❖ The insulation provided for prevention of loss of heat and personnel safety will also act as noise reducers.

Impact on Water

Raw water requirement for FAB for 60k /month capacity is 18 MLD and power plant requirement is 9 MLD. Waste water discharge will be 16 MLD.

Waste Water generation

Effluent in 2 category. One is organic & other is inorganic. For Inorganic effluent , there is different systems to neutral HF effluent , H_2O_2 / H_3PO_4 effluent . Inorganic waste water treatment unit has neutralization tank , PH adjustment tank , polyelectrolyte ,HCL and calcium hydroxide tank .All these tanks have stirrer fixed for proper mixing of the liquid The unit has filter press where water from neutralization tank is pumped and it converted in cake and neutral water will discharge to outside the FAB as per MPCB norms. Organic waste water treated by aerobic & anaerobic process. Aerobic process use to reduce nitrogen content & reduce BOD & COD from waste water. Neutralize water then discharge to outside the FAB.

Solid Waste Generation

LCD process

Process waste will generate 0.315 T/day and ETP sludge will generate 2.974T/day. Waste generated through process which is glass will be recycled and hazardous waste will be discharged through CHWTSD (Common Hazardous waste Treatment Storage and Disposal facility).

Power plant

Ash Handling

Bottom ash will be collected in dry form and disposed in ash disposal area. The dry fly ash, stored in the silos will be transported through covered/closed trucks. Bottom ash

slurry from bottom ash hopper will be conveyed to ash slurry sump by the jet pumps below the bottom ash hopper.

The Ash Handling System for the proposed station would comprise wet extraction system by jet pumps for Bottom Ash (BA) to be collected in Bottom Ash Hoppers and subsequent disposal through slurry disposal. For fly ash (FA) extraction and pneumatic handling from hoppers up to fly ash intermediate surge hopper and pressurized conveying of fly ash to terminal ash silo. Ash from the silos will be evacuated in closed trucks. Ash will be used for manufacturing bricks. The Fly ash generated will be 360 TPD i.e. Basic technologies, as well as initial expert advice for using fly ash in making bricks.

ENVIRONMENT MONITORING PROGRAMME

The environmental monitoring is important to assess performance of pollution control equipment installed in the proposed project of M/s. TwinStar Display Technologies Limited. The proposed project is for LCD manufacturing unit along with coal based Captive Thermal Power Plant. The sampling and analysis of environmental attributes including monitoring locations will be as per the guidelines of the Central Pollution Control Board.

Environmental monitoring will be conducted on regular basis by M/s. TwinStar Display Technologies Limited to assess the pollution level in the proposed plant. Therefore, regular monitoring program of the environmental parameters is essential to take into account the environmental pollutant of the study area.

The objective of monitoring is:

- To verify the result of the impact assessment study in particular with regards to new developments;
- To follow the trend of parameters which have been identified as pollutants;
- To check or assess the efficiency of the controlling measures;

- To ensure that new parameters, other than those identified in the impact assessment study, do not become critical due to the commissioning of proposed facilities;
- To check assumptions made with regard to the development and to detect deviations in order to initiate necessary measures;

The attributes, which needs regular monitoring, are specified below:

- Air quality
- Water and wastewater quality;
- Noise levels;
- Soil quality;

Environmental Management Plan

Air Environment

The sources of air pollution are raw material handling system, materials transportation, raw materials feeding to the operating equipments. Stacks of adequate process vent & CPP vent height of 30 m and 60 m is proposed for proper dispersion of flue gases. The following Environmental Management Plan will be implemented to control air emissions. Stack of 30 m height from ground level attached to scrubber and 60 m height for CFBC Boiler of 1x 80MW and 1 x 70MW (total 150 MW) for proper dispersion of pollutants will be installed.

Diesel Generators: Emissions from the DG Set during operation phase may cause some localized impact on ambient air quality for emergency, as it will be operated during power failure only. Stack of adequate height and acoustic enclosure will be provided with the DG Set as per guidelines of CPCB.

Action Plan to Control of Fugitive Emission

- The dust generated from coal handling plant will be suppressed by providing adequate water spraying systems
- Periodic checking of vehicles and machinery to ensure compliance to emission standards

- Jet Pulse bag filters will be provided at all the points like material conveying and transfer points;
- The control of the airborne fugitive emissions from the ash pond will be achieved through maintaining a permanent blanket of water cover on the ash pond
- Attenuation of pollution/protection of receptor through green belts/green cover
- Avenue plantation and green belt development will be undertaken in the operation phase.

Stack Gas Monitoring

The emissions from the stack will be monitored continuously for exit concentration of the PM₁₀ and PM_{2.5}, SO₂ and NO_x. The probes will indicate if the concentration of the pollutants if exceeds the limits, necessary control measures will be taken by management. Sampling ports will be provided in the stacks as per CPCB guidelines.

Noise Environment

- By providing padding at various locations to avoid sharp noise due to vibration.
- Other than the regular maintenance of the various equipment, ear plugs/muffs are recommended for the personnel working close to the noise generating units;
- All the openings like covers, partitions will be designed properly
- Inlet and outlet mufflers will be provided which are easy to design and construct.
- All rotating items will be well lubricated and provided with enclosures as far as possible to reduce noise transmission.
- The insulation provided for prevention of loss of heat and personnel safety will also act as noise reducers.

Water Environment

The total water requirement for the proposed activities is 18 MLD for LCD manufacturing and 9 MLD for captive power plant. Make up water requirement in LCD manufacturing unit is 18 MLD. Effluent in 2 category. One is organic & other is inorganic. Wastewater generated will be about 16 MLD. There are two types of waste organic (8.2 MLD) and inorganic (8.4 MLD). For Inorganic effluent, there are different systems to neutral HF effluent, H₂O₂ / H₃PO₄ effluent. Inorganic waste water treatment unit has neutralization tank, pH adjustment tank, polyelectrolyte, HCL and calcium hydroxide tank . All these tanks have stirrer fixed for proper

mixing of the liquid. The unit has filter press where water from neutralization tank is pumped and it converted in cake and neutral water will discharge to outside the FAB as per MPCB norms. Organic waste water treated by aerobic & anaerobic process. Aerobic process use to reduce nitrogen content & reduce BOD & COD from waste water. 50% of the water will be recycled in plant premises.

Treated Effluent Characteristics

F	15ppm
H ₂ O ₂	0 ppm
BOD	200 ppm
COD	1200 ppm
TDS	2100 ppm

The necessary design parameters and material of construction for cooling system including cooling towers will be selected in such a way that they are able to utilize water from the clarifier.

Management Plan of Solid waste

LCD process

- Process waste will generate 0.315 T/day and ETP sludge will generate 2.974T/day. Waste generated through process which is glass will be recycled and hazardous waste will be discharged through CHWTSD (Common Hazardous waste Treatment Storage and Disposal facility).

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Socio Economic Environment

M/s Twin Star Display Technologies Ltd. would aid in the overall social and economic development of the region. The plant will give direct employment to about it will require over 14500 employees of local area. In order to mitigate the adverse impacts likely to arise in the proposed project activities and also to minimize the apprehensions to the local people, it is necessary to formulate an affective EMP for smooth initiation and functioning of the project. The suggestions are given below:

- Communication with the local people will be established regular basis by project authority to provide an opportunity for local youth.
- Project authorities will undertake regular environmental awareness program on environmental management.
- Job opportunities are the most demanding factor, the local people depending upon their qualification and work experience in relevant field will be employed.
- For social welfare activities to be undertaken by the project authorities, collaboration should be sought with the local administration, gram panchayat, block development office etc for better coordination.

Occupational Safety & Health Management

M/s Twin Star Display Technologies Ltd. will provide all necessary provisions under Factory Act. In addition a Safety officer will be appointed as per Factory Act. All personal protect equipments like Safety shoes, helmet & uniform will be issued to each employee based on the nature of job involved.