Confidential
Final Report

Technical Due Diligence

China Assets

Prepared for
China Everbright Greentech Limited

April 7, 2017

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Contents

Contents

Contents

Contents

Contents

Contents

1.1 INTRODUCTION

Nexant, Inc. ("Nexant") was retained to provide an independent technical assessment (the "Assessment") to support the listing of China Everbright Greentech Limited (the "Company") shares on the Hong Kong Stock Exchange (the "Exchange"). Nexant was requested to review the technical and operational aspects of a portfolio of six Company facilities (the "Assets"). These consist of a number of different technologies including biomass power, biomass heat, hazardous waste incineration, hazardous waste landfill, solar energy, and wind power, and were selected to be representative of the Company's overall portfolio.

A summary of the selected Assets is shown in Table 1.1.

Table 1.1 Summary of Selected Company Assets

Project Name	Project Type	Capacity	Location	Status	COD (MM/YY)
Dangshan Biomass Power Generation	Biomass Power Plant	30 MW rated electric output	Dangshan, Anhui	Operational	09/11
Sucheng Biomass Heat Supply	Biomass Heat Supply	350,400 t/a steam supply	Sucheng, Jiangsu	Operational	09/16
Zibo Integrated Hazardous Waste Incineration	Hazardous Waste Incineration	9,900 t/a of waste incineration	Zibo, Shandong	Operational	01/16
Guanyun Hazardous Waste Landfill	Hazardous Waste Landfill	20,000 t/a of process capacity	Guanyun, Lianyungang	Operational	04/16
Zhenjiang Rooftop Solar	Solar Photovoltaic (PV)	8.3 MW rated electric output	Zhenjiang, Jiangsu	Operational	12/11
Ningwu Wind	Wind Power	48 MW rated electric output	Xinzhou, Shanxi	Operational	09/15

COD = Commercial Operation Date
MW = megawatt
t/a = tons per annum

Source: Company Information

Figure 1.1 shows the location of the six Assets that Nexant evaluated.

Figure 1.1 Company Assets Location

Source: Company Information

1.2 SCOPE OF WORK

To conduct an Independent Technical Assessment ("Assessment") in order to provide an Independent Technical Opinion ("Opinion"), Nexant performed the following activities:

- An assessment of the six (6) Assets to determine if they are representative of the entire portfolio of Company assets currently in operation
- Visited the sites of the six Assets to visually inspect and review of external plant and equipment condition of the Assets and interview available key staff and operations and maintenance (O&M) personnel
- Reviewed each Asset's mechanical, civil, and electrical designs
- Reviewed the historical performance of each Asset:
  - — Production and availability
  - — Unplanned outages and unplanned maintenance
  - — Environmental performance

- Reviewed material changes to the following for each Asset
  - — Technology
  - — Major equipment/systems
  - — Reviewed the O&M practices relative to generally accepted industry practices
  - — Reviewed Health, Safety, and Environment (HSE) performance

Nexant's scope of work did not include addressing the following:

- Internal conditions of any plant equipment, auxiliaries and/or ancillaries
- Any "solar insolation" regime or related data or information for the Zhenjiang Rooftop Solar Asset
- Any "wind" regime or related data or information for the Ningwu Wind Power Asset
- Any executed Power Purchase Agreements (PPAs), any environmental, fiscal, financial and/or regulatory policies

During the course of its review, Nexant posed questions to the Company and reviewed technical information and reports provided by the Company. Information gathered and key findings and conclusions from this review are summarized in this report (Report).

1.3 APPROACH AND METHODOLOGY

Nexant prepared an Information Request in advance of each site visit for review by the Company, its key responsible staff, and operations and maintenance (O&M) personnel. Nexant conducted site visits to all six Assets between December 26 and December 29, 2016. The site visits included meetings between the Company representatives and Nexant, followed by a site tour. The purpose of the site tour was to gather information from operations personnel as well as to visually inspect the physical condition of the Assets and auxiliary facilities. Additional conference calls were held and data requests submitted as necessary. As required and as applicable, Nexant utilized the Company's information as the core information source for its analysis.

The Report was prepared in accordance with the Consulting Services Agreement (Ref: P16-0019397) (the "Agreement") between the Company and Nexant, dated December 23, 2016.

1.4 PRINCIPAL ASSUMPTIONS

In completing this assessment, Nexant used and relied upon certain information provided by the Company and its advisors. Nexant believes the information provided was accurate and true for the purposes of this Report.

In developing its opinions, Nexant has identified the information it relied upon, and the assumptions made. The following is a summary of principal assumptions made in developing the opinions expressed herein:

- Biomass and hazardous waste supplies and associated transportation will continue to be available in the quantities and qualities required by the biomass and hazardous waste management projects

- The solar and wind resources as described by the dataset utilized in the performance evaluation will continue to be available at the solar and wind sites

- No additional natural or man-made shading elements that will impact the energy production will be placed on lands adjacent to the solar projects

- All projects will be operated and maintained in accordance with good industry practices, with required renewals and replacements made in a timely manner

- Equipment will not be operated in a manner to cause it to exceed equipment manufacturer's ratings or recommendations

- All contracts, agreements, rules, and regulations will be fully enforceable in accordance with their respective terms and all parties will comply with the provisions of their respective agreements

- All licenses, permits and approvals, and permit modifications (if necessary) will be obtained and/or renewed on a timely basis; any such renewals will not contain conditions that adversely impact the O&M costs

1.5 INDEPENDENCE OF NEXANT

Nexant has an established track record of providing independent technical as well as commercial due diligence to Sponsors for over four decades.

This analysis performed for this engagement was prepared on behalf of the Company. Nexant was compensated for the effort associated with performing the services.

As an Independent Technical consultant, the Nexant team is technology-neutral, and does not hold any business or financial interest associated with:

- Any technology providers or equipment manufacturers
- The Company
- The six Assets that were the subject of the technical assessment
- The outcome of the IPO listing

Before the final issuance of the Report, the Company and its advisors were provided with drafts of the Report only for the purpose of confirming the factual accuracy of the materials relied on.

1.6 OVERVIEW OF NEXANT

Nexant is an engineering, technology, and management consultancy with over forty years of experience providing transactional support to the world's leading banking institutions and industry participants.

Nexant was formed from a core group of approximately 130 professionals drawn from Bechtel Engineering Corporation's Advanced Technology and Consulting Group. In 2001, ChemSystems, a consultancy founded in 1964 with a focus on the energy and chemicals industries, was acquired and became the foundation of Nexant's Energy and Chemicals Advisory business unit which provided the consulting services for this engagement.

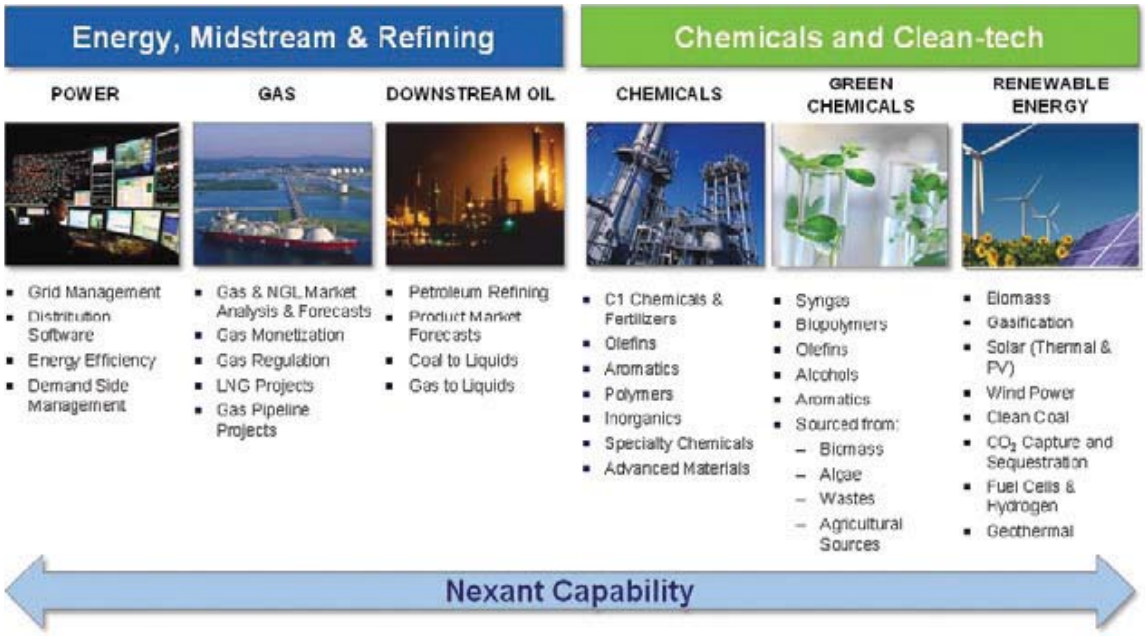
Nexant's experience covers broad aspects of project development relating to major power, refinery, petrochemical, polymer, and renewable investments, ranging from grassroots plants to revamps of existing process units. Nexant's key offices serving the petrochemical and downstream oil sectors are located in Shanghai, Kuala Lumpur, Bangkok, New York, San Francisco, Washington D.C., London, and Bahrain. A complete set of offices is shown in Figure 1.2.

Figure 1.2 Nexant Office Locations

With offices around the world and a staff of over 600, Nexant has grown organically and through acquisitions into a global advisor to the energy and chemical industries. Nexant has completed more than 3,000 assignments in more than 100 countries. Our clientele ranges from major utilities, oil and chemical companies, national as well as regional governments, development agencies, investors, financial institutions, regulators, and law firms.

In terms of product coverage, Nexant provides consulting services to the energy, coal, gas, refining, chemical, polymer, power, and renewable energy industries as illustrated in Figure 1.3.

Figure 1.3 Breadth of Nexant's Industrial Focus



Working team in this Assessment includes the following key professionals:

- Bruce F. Burke — Senior Vice President: Project Executive
- Marios Hatzikyriakou — Senior Consultant: Project Manager. Reviewed the Dangshan Biomass, Sucheng Biomass, and Zibo Waste assets
- Pat Sonti — Senior Consultant: Reviewed the Guanyun Hazardous Waste, Ningwu Wind, and Zhenjinag Rooftop Solar assets
- Yonglai Liu — Consultant: Visited the Zibo Waste, Ningwu Wind, and Zhenjinag Rooftop Solar assets
- Ruoxin Li — Senior Analyst: Visited the Dangshan Biomass, Sucheng Biomass, Guanyun Hazardous Waste assets
- Victor Zheng — Analyst: Translation of Company documents and research.

1.7 CONCLUSIONS

On the basis of the review and analyses described in this Report, Nexant has developed the following conclusions.

1.7.1 Company Portfolio

The Company selected the six operating Assets that Nexant performed its technical and operational review on the basis summarized in Table 1.2. Nexant confirms that these six assets are representative of the Company's portfolio of operating assets.

Table 1.2 Company's Basis for Selecting Reviewed Assets

Project Name	Project Type	Company's Basis for Selection
Dangshan Biomass Power Generation	Biomass Power Plant	First operating biomass project utilizing a water-cooled vibrating grate boiler and also the part of the Company's first integrated project
Sucheng Biomass Heat Supply	Biomass Heat Supply	First operating biomass heat supply project utilizing a circulating fluidized bed boiler
Zibo Integrated Hazardous Waste Incineration	Hazardous Waste Incineration	Largest operating hazardous waste incineration project utilizing a rotary kiln
Guanyun Hazardous Waste Landfill	Hazardous Waste Landfill	New operating hazardous waste landfill project located in shoal area which can best demonstrate the Company's ability to construct and operate such projects in challenging geological conditions which require advanced technologies
Zhenjiang Rooftop Solar	Solar Photovoltaic (PV)	Largest operating solar energy project
Ningwu Wind	Wind Power	Only operating wind power project

Source: Company Information

1.7.2 Dangshan Biomass Power Generation

Nexant has conducted an independent technical assessment of Dangshan Biomass operations and concludes the following:

- Has not identified material changes in technology or major equipment/systems from the original design basis for the operation
- Has not identified issues for major systems including process, mechanical, and civil design
- Has not identified issues in production and availability, unplanned outages, and environmental performance
- Has not identified issues in operation, maintenance, and staffing. The Company's 2017 target for total operating days is greater than the facility design operation days, which is an aggressive plan

- Has not identified any lost-time incidents

- Nexant has identified issues with superheater leakage. It has not been made clear to Nexant what will be done to alleviate the issue. However, if not addressed Nexant expects that the issue will potentially lead to higher unplanned downtime as well as a shortened life for the superheater

1.7.3 Sucheng Biomass Heat Supply

Nexant has conducted an independent technical assessment of the Sucheng Biomass operations and concludes the following:

- No material changes in technology or major equipment/systems from the original design basis for the operation have been identified

- No issues associated with major systems, including process, mechanical, and civil design, have been identified

- Sucheng Biomass is still ramping up production, and thus design production has not yet been achieved

- No issues associated with unplanned outages or environmental performance have been identified

- The facility has not experienced any lost-time incidents

- Nexant has not identified any material equipment risks

- No staffing issues have been identified

- The Company's 2017 monthly targets are approximately double the production capacity that has recently been achieved by the facility.

1.7.4 Zibo Integrated Hazardous Waste Incineration

Nexant has conducted an independent technical assessment of the Zibo Waste facilities and concludes the following:

- No material changes in technology or major equipment/systems from the original design basis for the operation have been identified

- No issues with the hazardous waste quality have been identified, although the Company has identified chlorides in the waste feed as a potential issue

- There are issues with the rotary kiln and secondary incineration chamber refractories that the Company is proactively working to address

- No issues with the waste heat boiler, flue gas treatment system as well as slag and ash handling have been identified

- Zibo Waste has achieved design levels of production

- No issues associated with environmental performance have been identified

- The facility has not experienced any lost-time incidents

- No staffing issues have been identified.

1.7.5 Guanyun Hazardous Waste Landfill

Nexant has conducted an independent technical assessment of the Guanyun HWL facility operations and concludes the following:

- There have been no changes in technology or major equipment/systems since the facility started up in April 2016

- No issues have been identified for major systems including process, mechanical, and civil design

- No issues have been identified for historical performance data for disposal handling, unplanned outages and unplanned maintenance and environmental performance. In addition, no environmental incidents have been reported

- No issues have been identified for operations, maintenance and staffing

- Nexant recommends that the Guanyun HWL facility should develop a spare parts management plan

- No major Health, Safety, and Environmental (HSE) incidents have occurred in the reporting period at the Guanyun HWL facility

1.7.6 Zhenjiang Rooftop Solar

Nexant has conducted an independent technical assessment of the Zhenjiang Solar facilities and concludes the following:

- There have been no changes in technology or major equipment/systems from the original design basis for the operation
- No issues have been identified with the mechanical systems, civil and structural, or electrical design
- Other than limited and reduced utilization hours due to bad weather and high particulate pollution levels, no issues have been identified with the historical performance data for monthly energy production
- No issues have been identified with unplanned outages and unplanned maintenance and environmental performance
- No issues have been identified with operations, maintenance and staffing
- No major Health, Safety, and Environmental (HSE) incidents have occurred in the reporting period

1.7.7 Ningwu Wind

Nexant has conducted an independent technical assessment of the Ningwu Wind facilities operations and concludes the following:

- There have been no changes in technology or major equipment/systems from the original design basis for the operation
- No issues have been identified with the mechanical, civil and structural, and electrical design
- Monthly energy production at Ningwu Wind facilities is subject to adverse weather conditions. Accordingly, Nexant concludes that the wind turbine generators operate continually during the entire year and energy production and utilization is directly dependent upon prevailing climatic conditions

- The Auxiliary plant power consumption typically ranges from 0.83 percent to 1.94 percent which is in accordance with wind industry levels. In some months, the consumption typically ranges from 2.01 percent to 2.24 percent which is higher than wind industry levels

- The wind turbine generator utilization rate at Ningwu Wind facilities varies from 92.26 percent to 100 percent which is high and in accordance with wind industry levels. Accordingly, Nexant concludes that in order to maintain overall grid stability, the national grid and dispatch control requires that the Ningwu Wind facility not operate the plant beyond its design capacity and limits utilization and energy dispatch

- No major issues have been identified with respect to unplanned outages, unplanned maintenance and environmental performance

- Other than impact of adverse weather conditions, no other issues have been identified with operations, maintenance and staffing

- No major Health, Safety, and Environmental (HSE) incidents have occurred in the reporting period

2.1 OVERVIEW

Nexant visited the Dangshan Biomass Power Generation Project ("Dangshan Biomass") on December 27, 2016. Dangshan Biomass is the Company's first operating biomass project utilizing a water-cooled vibrating grate boiler. Dangshan Biomass has been operational since September 2011 and has an installed electrical generation capacity of 30 MW. The facility is located in Dangshan Economic Development Zone, 100 kilometers (km) northwest of Suzhou City in Auhui Province.

There is a waste incineration power plant owned by Everbright International next to the Dangshan biomass power plant. There is no integration of production facilities between the two plants, but they share the same access to the power grid. The two plants share the same management team but the operating teams for each facility are separate.

Table 2.1 presents the system description for Dangshan Biomass.

Table 2.1 Details of Dangshan Biomass

Parameter	Description
Capacity (MW)	30.0
Fuel Type	Biomass
Design Annual Electricity Generation (gigawatt-hour (GWh))	210
Design Operating Hours	7,000

Source: Nexant Site Visit & Company Information

2.2 MAJOR SYSTEM ASSESSMENT

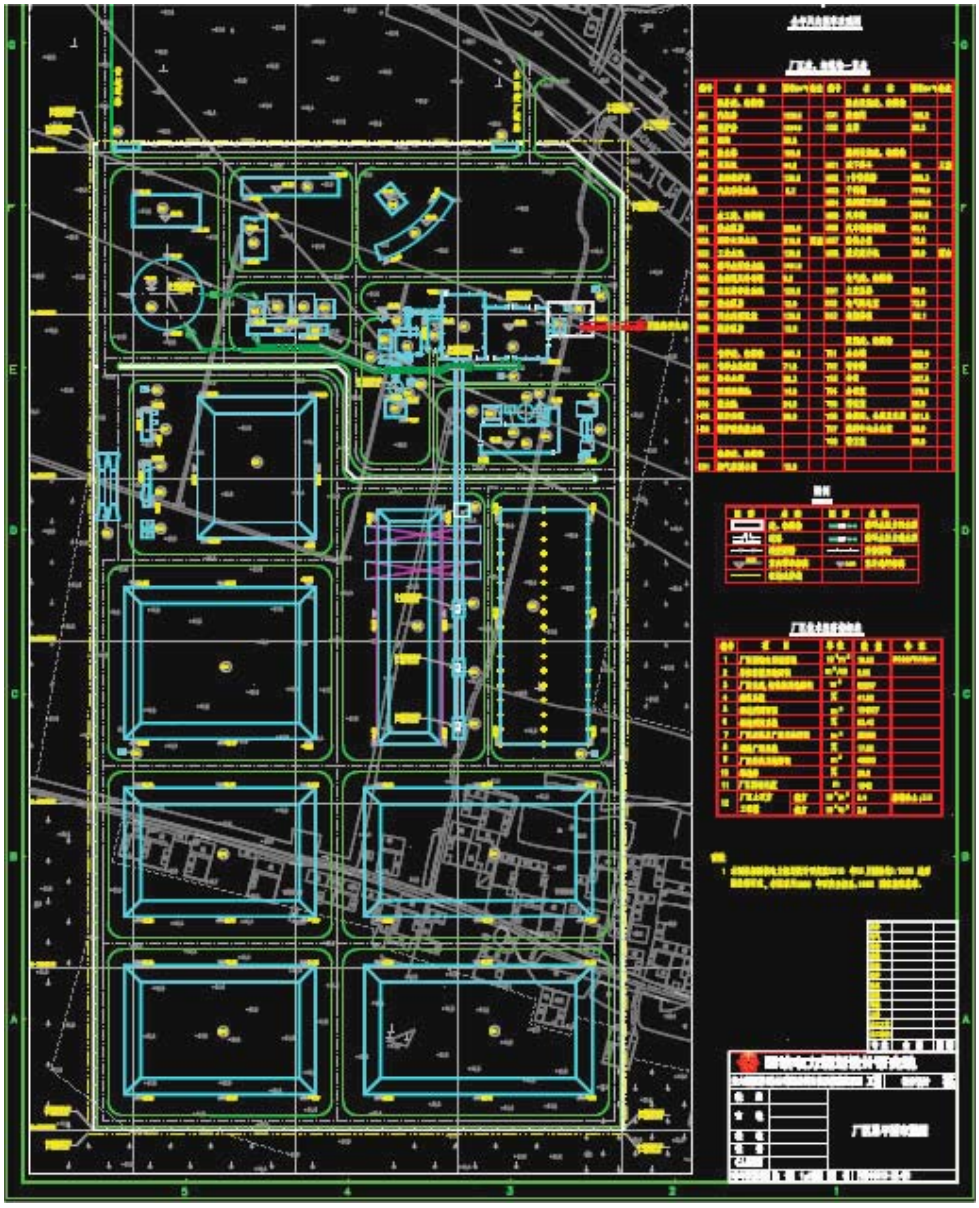
Dangshan Biomass' major systems include:

- 130 tons per hour (t/h) boiler with a water cooled vibrating grate combustion system located inside a boiler furnace
- Steam turbine
- 30 MW capacity generator
- Fuel handling
- Flue gas treatment
- Ash handling

The overall design of Dangshan Biomass was carried out by the State Nuclear Electric Power Planning Design and Research Institute (SNPTC).

Figure 2.1 shows the plot layout for Dangshan Biomass.

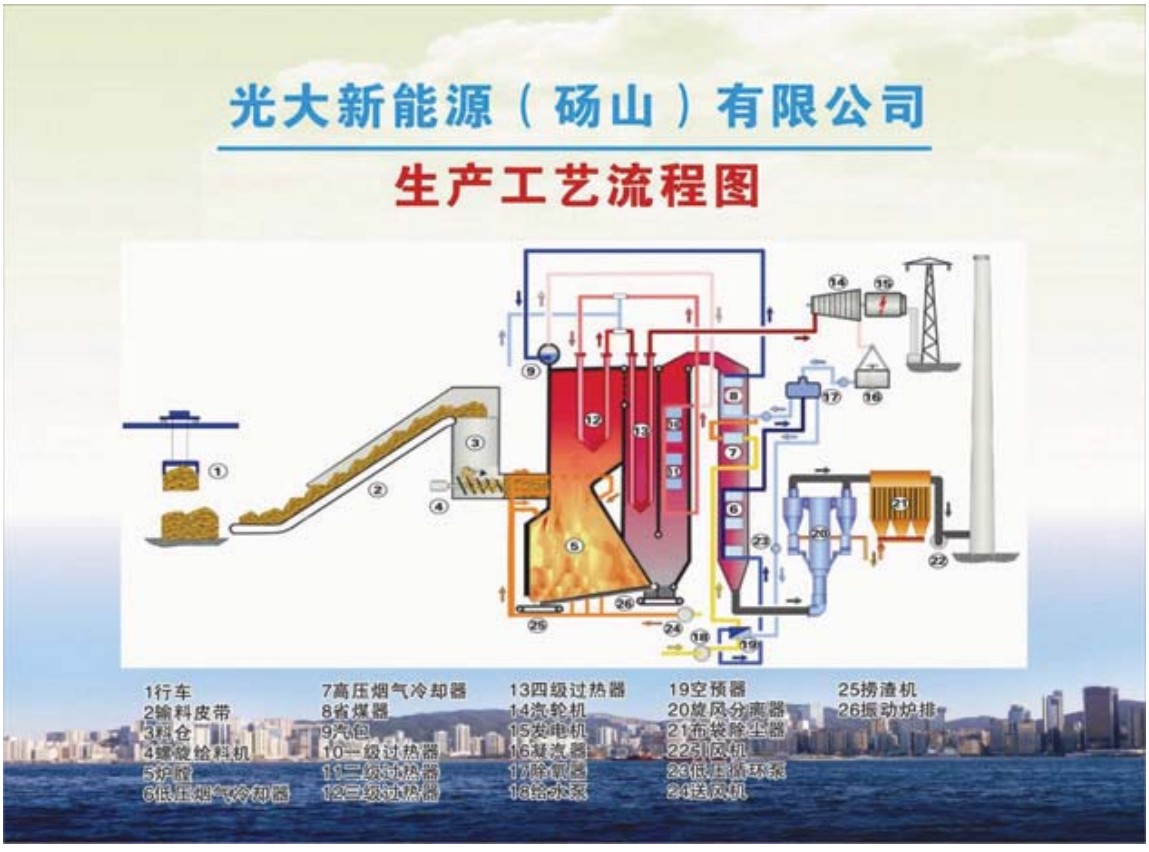
Figure 2.1 Dangshan Biomass Plot Layout



Source: Company Information

Figure 2.2 presents a simplified process flow scheme for Dangshan Biomass.

Figure 2.2 Simplified Process Flow Scheme



Source: Company Information

2.2.1 Biomass Quality

Dangshan Biomass uses rich biomass resources from the neighboring regions with prevalent agriculture and forestry activities. There are numerous small suppliers. The plant purchases biomass from both traders and peasants in neighboring regions. The supply volume of a typical supplier is only about 3,000 to 4,000 tons per year. The annual purchased volume of biomass in 2016 was 245.9 thousand tons.

The biomass consists of a variety of woody material such as fruit and poplar trees, cotton stover, tree branches, bark and roots (classified as grey chips) and agricultural residues including peanut shells, wheat straw, rice straw, and fungi spawn(classified as yellow chips). The design biomass fuel for the facility is a mixture of wood chips derived from fruit and poplar trees, at a ratio of 80:20. Table 2.2 summaries the analysis for the design and two alternative biomass fuels.

Table 2.2 Dangshan Biomass Fuels

Description	Unit	Design Biomass Fuel	Alternative Biomass Fuel 1	Alternative Biomass Fuel 2
Fruit tree derived	percent	80	75	75
Poplar tree derived	percent	20	15	15
Wheat straw derived	percent	—	10	—
Maize straw derived	percent	—	—	10
Water	percent	35.0	40.0	40.0
Ash	percent	4.0	5.0	7.0
Evaporation	percent	52.2	51.3	50.5
Carbon	percent	30.5	28.0	26.2
Hydrogen	percent	3.8	3.5	3.1
Nitrogen	percent	0.12	0.14	0.10
Oxygen	percent	26.54	23.24	23.40
Sulfur	percent	0.04	0.05	0.04
Chlorine	percent	0.02	0.07	0.08
Total	**percent**	**100.0**	**100.0**	**100.0**
Lower Calorific Value (LCV)	kcal/kg	2,525.0	2,226.4	2,138.5

Source: Company Information

Depending on the source, the biomass LCV can range from 1,600 to 3,700 kcal/kg (before mixture). The grey chip has a density of 0.20 to 0.35 tons per cubic meter (t/m3) and the yellow chip 0.06 to 0.07 t/ m3. The grey chips and/or grey chips with yellow chips are mixed at the correct ratio before being fed to the bunker above the furnace.

According to the Company, the mixed fuel is sampled and tested regularly, and the range of values shown in Table 2.3 has been recorded in terms of moisture, ash, and calorific value.

Table 2.3 Dangshan Biomass Quality after Mixing

Description	Unit	Value
Moisture	percent, as received	35.4 – 40.9
Ash	percent, as received	13.5 – 23.1
LCV	kcal/kg	1,830 – 2,131
Inherent Moisture	percent, air dried	2.9 – 3.4

Source: Company Information

Nexant has not identified any issues with the biomass quality.

2.2.2 Biomass Fuel Handling

Biomass fuel enters the Dangshan Biomass facility where it is first weighed and then subsequently delivered to one of eight storage areas. Storage areas 3 and 4 are sheltered areas. Storage areas 1, 2, and 8 have a waterproof canvas covering. A summary of the storage areas is shown in Figure 2.4.

Table 2.4 Dangshan Biomass Storage Areas

	Area 1	Area 2	Area 3	Area 4	Area 5	Area 6	Area 7	Area 8
Storage capacity (tons)	5,800	9,400	4,000	5,500	8,200	9,700	8,200	9,700
Stack height (meters)	5	5	4	4	5	5	5	5
Days of consumption (at BMCR)	7.5	12.0	5.0	7.0	10.5	12.5	10.5	12.5

Source: Company Information

According to the Company, the total storage capacity of the crops will be sufficient for 77 days of normal operation at the boiler maximum continuous rating (BMCR).

There are two main operating modes for biomass fuel handling

1. Fuel → Gantry crane → Screw feeder → Belt Conveyor → Preheating silo

2. Fuel → Straw special loader → Screw feeder → No.1 belt conveyor → Preheating silo

Storage area 3 has openings in the floor to allow the crops to be fed to the screw conveyors underneath. The crops are moved by overhead crane to the fuel opening, from which they are transported by belt conveyor to a fuel receipt bunker above the boiler furnace. Under the bunker bottom are a screw conveyor and a discharge chute with a pneumatic gate at the end. When the gate opens, the fuel is fed to the grates.

Nexant has not identified any issues with the biomass fuel handling.

2.2.3 Boiler

The boiler design was carried out by DP CleanTech Co., Ltd, which selected the technology of the Danish company Bioener. The boiler is of "N" vertical design, with four flue gas shaft passages, and the center elevation of the drum is 23.45 meters. The boiler was manufactured by the Jinan Boiler Group Co., Ltd. The useful life of the boiler is 30 years.

The boilers parameters are summarized in Table 2.5.

Table 2.5 Dangshan Biomass Boiler Specifications

Parameter	Description
Boiler rated evaporation (tons/hr)	130
Rated steam pressure (MPa)	9.2
Rated steam temperature (°C)	540
Rated water temperature (°C)	220
Primary air preheating temperature (°C)	190
Preheat temperature of secondary air (°C)	190
Exhaust gas temperature (°C)	135
Boiler thermal efficiency	89 percent
Serial number	YG-130/9.2 2-T2
Boiler Arrangement	Semi-open Type

Source: Company Information

Nexant has not identified any issues with the boiler.

2.2.4 Grates

There are four vibrating grates in the furnace located side by side in four column divisions. The two grates in the middle vibrate simultaneously in the same direction with the same amplitude, while the grates on the two sides vibrate simultaneously in opposite directions in order to maintain the balance of movement.

Details of the grate arrangement are shown in Table 2.6.

Table 2.6 Dangshan Biomass Grate Arrangement Details

Description	Unit	Design Value
Grating Quantity	Unit	Four column divisions
Vibrating Direction	Degree	Middle two columns: 0-180 Column at each side: 180-0
Grating Inclination	Degree	5
Vibrating Direction	Degree	20
Amplitude	mm	10(±5)
Oscillation (50 Hz)	rpm	450
Range of Frequency	Hz	35-55
Vibrating Motor Power	kW	36.9
Vibrating Duration	Seconds	20
Vibrating Interval	Seconds	200

Source: Company Information

Nexant has not identified any issues with the grates.

2.2.5 Steam Turbine

The steam turbine, Model Number 30-8.83, is a standard product from Qingdao Jieneng Steam Turbine Group Co., Ltd, with a rated power output of 30 MW. It is a high temperature, high pressure, single cylinder, and single shaft condensing steam turbine. The useful life of the steam turbine was not provided.

The specification of the steam turbine is shown in Table 2.7.

Table 2.7 Dangshan Biomass Steam Turbine Specification

Description	Unit	Design Value
Fixed Steam Inlet Flow	t/h	114
Fixed Power Output Efficiency	MW	30
Main Steam Inlet Pressure	MPa	8.83 ±0.490
Main Steam Inlet Temperature	Degree Celsius	535 (+5/-10)
Cooling Water Temperature	Degree Celsius	20
Fixed Extraction Flow Rate	t/h	45.5
Fixed Back Pressure	kPa	4.90
Rotation Speed	rpm	3,000

Source: Company Information

Nexant has not identified any issues with the steam turbine.

2.2.6 Generator

The generator is a standard product from Jinan Power Equipment Factory that has a rated electricity power output of 30 MW. The useful life of the generator was not provided.

The specification of the generator is shown in Table 2.8.

Table 2.8 Dangshan Biomass Generator Specification

Description	Unit	Design Value
Fixed Power Output	MW	30
Generator Rating	MVA	35.3
Fixed Voltage	kV	10.5
Frequency	Hz	50
Rotation Speed	rpm	3,000
Power Factor	—	0.85
Fixed Power Output	MW	30
Generator Rating	MVA	35.3

Source: Company Information

Nexant has not identified any issues with the generator.

2.2.7 Flue Gas Treatment

The flue gas treatment process is comprised of cyclone dust separators and bag filters that were designed to originally comply with the requirements in GB 13223-2003 Emission Standard of Air Pollutants for Thermal Power Plants (GB 13223-2003).

However, the Chinese government Environmental Bureau stated on July 1, 2014 that this standard must be updated to the 2011 version. Therefore, to comply, Dangshan Biomass was required to install a selective non-catalytic reduction (SNCR) system to comply with the revised 2011 version (GB 13223-2011) of this standard enforced by the Chinese government Environmental Bureau.

Table 2.9 Emission Standard GB 13223-2011

Description	Unit	Design Value
Dust	mg/m^3	30
SO_2	mg/m^3	200
NOx (based on NO_2)	mg/m^3	200
Hg and Other Chemicals	mg/m^3	0.03

Source: Company Information

SNCR is a mature, high-temperature process that uses an agent to reduce NOx to N2 as a means of controlling oxides of nitrogen (NOx) emissions. Installation was completed and the equipment tested in August 2015. The implementation was found to be have good performance, with stable and reliable operation. The thermal control protection, thermal control automatic, and I/O measuring point input rates were 100 percent. The SNCR was accepted by the Environmental Bureau officially on November 13, 2015.

The Company takes a number of measures for smoke pollution prevention and control:

- The use of cyclone dust collector + bag filter results in dust removal efficiency of not less than 99.9 percent
- The use of a height of 80 meter, outlet diameter 2.8 meter chimney to reduce emission pollutants
- The installation of flue gas continuous monitoring device for real-time atmospheric pollutants

Nexant has not identified any issues with flue gas treatment.

2.2.8 Ash Handling

Nexant has not identified any issues with ash handling.

2.2.8.1 Bottom Slag

There are two slag outlets from the furnace which are connected to a water trough provided with a scraper conveyor for collecting the slag. The slag is then conveyed to the slag collection pit (15.50 m (Length) by 6.1 m (Width) by 1.5 m (Diameter)) with an effective volume of 130 m3. This storage is equivalent to 8 to 10 days under normal plant operation. The slag is eventually taken away for disposal. The bottom slag is priced at 3 RMB/ton and is used for making brick.

2.2.8.2 Fly Ash

The fly ash handling system consists of two cyclone separators and four bag filters. Underneath each of the two separators is an ash collecting bin. Ash from the bag filters is relatively less in quantity than that collected from the separators. Therefore, ash from the bag filters is initially collected in the discharge chute and then pneumatically conveyed to the collecting bin. The ash from the collecting bin is then transported to the 200 m3 ash storage silo. The fly ash is priced at 3 RMB/ton and is used for additives in cement production.

2.2.9 Electrical Installation and Connection

The distributed control system (DCS) supplied by Zheda Zhongkong is located in the central control room. The boiler, turbine, generator, and its auxiliary equipment, as well as all electrical systems, are monitored and controlled by the DCS.

The generated power is sold to the power grid company, except for the power supplied to the project auxiliary electrical system.

The generator terminal voltage is stepped up to 110 kilovolts (kV) through the generator circuit breaker (GCB) and main transformer and connected directly to the 110 kV system in the Longhai Substation by a 3 km transmission line. The project is furnished with complete relay protection, power grid communication, and a remote terminal unit (RTU). The operational data is sent to the local grid dispatch center and then forwarded to the Anhui Province dispatch center. According to the Power Purchase Agreement (PPA), redundant revenue meters are located on the project side of the 110 kV transmission line. Therefore, any transmission loss is not borne by the project.

The auxiliary power system supplies all electrical loads of Dangshan Biomass and is designed with two voltage levels:

- 10 kV
- 400V

Two 10 kV incoming feeders are designed for this auxiliary power system. One is connected to the low voltage (LV) side of the main transformer to serve as normal/standby power supply to the 10 kV and 400V power systems. The other is connected to the local grid 10 kV system and provides emergency power for safely stopping an operational generator in case a normal/standby power supply fails. The two 10 kV incoming feeders can be automatically transferred by an automatic transfer switch (ATS) device when there is a 10 kV normal/standby power failure. A direct current system (with battery and charger) and uninterruptible power supply (UPS) are used for dc power loads, emergency lighting, electrical control and protection, automation devices, and the instrumentation and control (I&C) system.

Nexant has not identified any issues with electrical installation and connection.

2.2.10 Civil and Structural

The Dangshan Biomass site was designed for the following parameters as summarized in Table 2.10.

Table 2.10 Dangshan Biomass General Civil and Structural Design Parameters

Parameter	Description
Seismic design intensity	6 degree (0.05 g)
Seismic site classification	Grade III
Wind pressure (50 year mean recurrence interval)	0.35 kN/m^2
Snow pressure (50 year mean recurrence interval)	0.40 kN/m^2

Source: Company Information

The groundwater is noncorrosive to concrete and reinforcement but is weakly corrosive to rebar within the concrete according to the geotechnical report and design description. Therefore, almost all buildings/ structures used prestressed high strength concrete (PHC) piling foundations.

Most structures use a concrete structure enclosed by building blocks or bricks, with the exception of the roof of the steam turbine house and biomass storage. The stack has a height of 80 meters and has firebrick lining and hydrophobic perlite board insulation.

Nexant has not identified any issues with civil and structural.

2.3 PERFORMANCE

The following section provides Nexant's findings and opinions with respect to the performance of Dangshan Biomass based on available data. Nexant obtained and reviewed the historical performance data for production and availability, environmental performance, and unplanned outages and unplanned maintenance.

2.3.1 Performance

The key performance indicators are shown in Table 2.11. The installed electrical generation capacity is 30 MW. The load factor from January 2016 to December 2016 was 98.2 percent. The load factor is the ratio of the average electricity load to the electrical generation capacity.

Table 2.11 Dangshan Biomass Key Performance Indicators

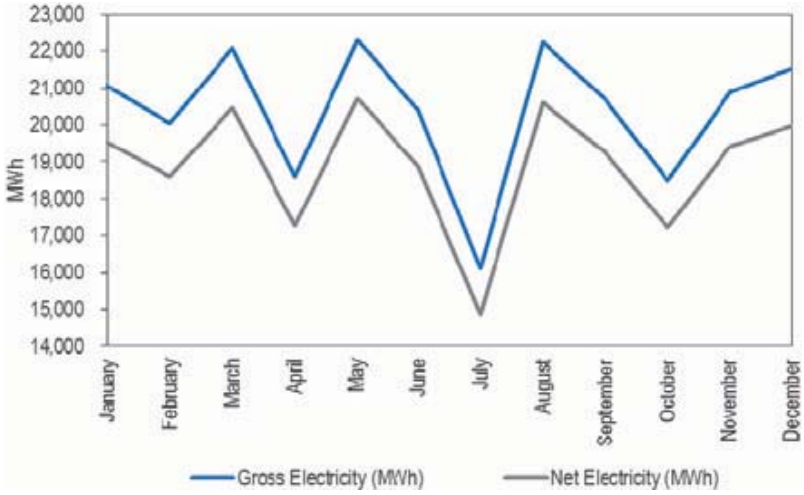
Period	Gross Electricity (MWh)	Net Electricity (MWh)	Biomass Incinerated (Tons)
Jan 2016 – Dec 2016	244,445.0	226,799.0	245,934.0

MWh = megawatt-hours

Source: Company Information

The electricity generated monthly is shown in Figure 2.3.

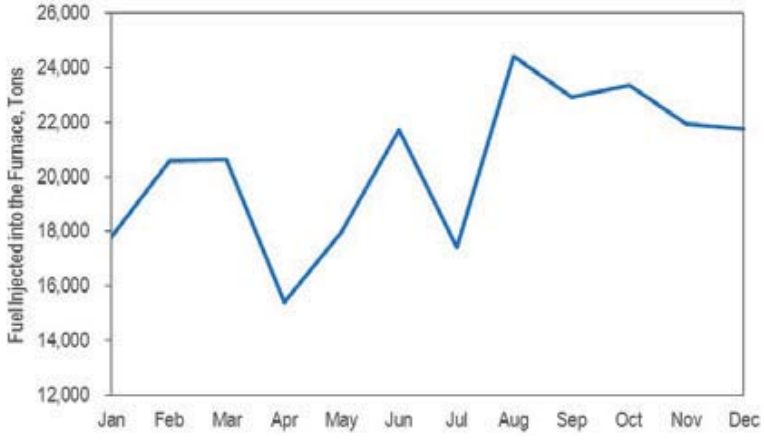
Figure 2.3 Dangshan Electricity Generated — 2016



Source: Company Information

The biomass incinerated monthly is shown in Figure 2.4.

Figure 2.4 Dangshan Biomass Incinerated — 2016



Source: Company Information

Nexant has not identified any issues with performance and availability.

2.4 UNPLANNED OUTAGE

The total planned and unplanned outage between January 2016 and November 2016 was 468 hours. The company did not provide information about any unplanned outages in December. The dates of major outages during 2016 are shown in Table 2.12.

Table 2.12 Outages and Causes (January — November 2016)

Dates	Cause
April 4, 2016 to April 8, 2016	Grade D maintenance — Planned
July 8, 2016 to July 16, 2016	Grade B maintenance — Planned
July 29, 2016 to July 30, 2016	Check on bag filters
September 14, 2016 to September 15, 2016	Water cooled wall leakage
October 9, 2016 to October 10, 2016	Water cooled wall leakage
October 11, 2016 to October 13, 2016	Grade D maintenance — Planned
November 12, 2016 to November 13, 2016	Tube of grate leakage

Source: Company Information

According to the Company, superheater leakage has been an issue that ultimately will need to be addressed. In 2015, superheater leaks resulted in 169 hours of unplanned downtime. The superheater leakage is a consequence of a design defect as the superheater pipes are too close which results in increased abrasion during operation. A stainless steel shield was added to some of the pipe edges as part of the major overhaul of the project in April 2014. There was no superheater leakage in 2016.

Nexant has identified issues with superheater leakage which if not addressed will potentially lead to higher unplanned downtime as well as a shortened life for the superheater.

2.5 ENVIRONMENTAL PERFORMANCE

Dangshan Biomass was designed to comply with an emissions standard (GB 13223-2003). The GB 13223-2003 standard emissions were:

- SO_2: 800 mg/m^3
- NOx: 450 mg/m^3
- Particulate matter: 200 mg/m^3

The emissions standard became more stringent on July 1, 2014 with revised GB 13223-2011 standard which has standards as follows:

- SO_2: 200 mg/m^3
- NOx: 200 mg/m^3
- Particulate matter: 30 mg/m^3

The Company added an SNCR system to reduce NOx emissions and this was accepted by the Environmental Bureau officially on 13 November 2015. The upgraded SNCR now complies with the new standard, as shown in Table 2.13. The Company did not provide mercury emissions for Nexant's review.

Table 2.13 Dangshan Biomass Emissions Record since January 2014

	2014			2015			2016		
Month	SO_2 (mg/m^3)	NO_x (mg/m^3)	Part. Matter (mg/m^3)	SO_2 (mg/m^3)	NO_x (mg/m^3)	Part. Matter (mg/m^3)	SO_2 (mg/m^3)	NO_x (mg/m^3)	Part. Matter (mg/m^3)
Jan	2	240	32	2	208	25	6	157	17
Feb	13	262	33	16	250	31	3	109	24
Mar	280	N/A	34	18	241	27	2	104	18
Apr	9.	316	32	10	177	25	16	89	18
May	27	275	15	10	174	24	13	109	22
Jun	19	262	12	21	97	20	36	72	27
Jul	16	259	15	15	179	24	11	119	19
Aug	8	270	14	31	121	16	16	136	13
Sep	7	253	13	8	161	18	4	172	10
Oct	7	270	24	13	131	25	21	148	13
Nov	7	259	16	—	—	—	5	125	13
Dec	6	233	18	—	—	—	4	174	15

Source: Nexant Site Visit & Company Information

Nexant has not identified any issues with environmental performance.

2.6 OPERATIONS AND MAINTENANCE

Nexant reviewed Dangshan Biomass' facilities management with respect to operations, maintenance and staffing. Nexant also reviewed the O&M practices and concludes that the facility is being operated in accordance with generally accepted industry practices.

2.6.1 Operations

Based on Nexant's site visit, the following observations were made:

- The Company's staff perform all operations of the Dangshan Biomass project
- There have been no lost-time incidents

Nexant reviewed the operating target for 2016 during the site visit. Overall, the target gross energy production at Dangshan Biomass in 2016 was 231.2 GWh/year. The actual gross energy production at Dangshan Biomass in 2016 was 244.5 GWh/year.

The Dangshan Biomass facility operated for 8,148.35 hours during all of 2016, which was equal to the design level of operation for the plant.

The Company's 2017 operation targets are:

- Total operation days: 340
- Load factor: 94.4 percent
- Maintenance days: 25

The Company's 2017 targeted total operating days is greater than the facility design operation days, which is aggressive.

In summary, Nexant has not identified any issues with operations.

2.6.2 Maintenance

The maintenance at Dangshan Biomass is classified into four maintenance Grades A, B, C, D as shown in Table 2.14.

Table 2.14 Dangshan Biomass Maintenance Levels

Maintenance Level	Description	Duration	Term
A	Complete dismantling and repair of the main equipment of the project company to maintain, restore or improve the performance of the equipment	About 18-21 days	Every 3 to 4 years
B	B-level maintenance can be based on the state of the main equipment assessment results, targeted implementation of the A-level maintenance projects or regular rolling maintenance projects.	About 10-15 days	Every 2 Years
C	The main operation of the main equipment of the project company is normal, according to the equipment wear and aging laws. Focus on the main equipment and auxiliary equipment inspection, assessment, repair, and cleaning. C-level maintenance can be a small number of parts replacement, the elimination of equipment, adjustment, preventive testing and other operations and the implementation of some A-level maintenance projects or regular rolling maintenance projects.	About 7-10 days	Every year
D	The main equipment of the project company is in good working condition, the auxiliary equipment and auxiliary equipment of the main equipment are removed in a centralized manner, and the key parts of the heating surface are cleaned. D-level maintenance In addition to ancillary systems and equipment to eliminate the gap, but also according to the equipment status assessment results and arrange some C-level maintenance projects.	About 3-5 days	Every 2-8 months

Source: Nexant Site Visit & Company Information

The first and most recent major, large-scale maintenance (Grade A) of Dangshan Biomass since commercial operation began was in 2014. Overhaul included the maintenance of the following:

- Turbine
- Boiler
- Retrofit bag house
- Retrofit flue gas system

The next Grade A maintenance may be conducted in 2018. It is expected that Dangshan Biomass will manage and engage third parties to undertake major overhauls. Dangshan Biomass's routine maintenance has been contracted to Anhui No. 2 Electric Power Engineering & Construction Corporation, according to the maintenance agreement dated May 2015.

There will be a Grade B maintenance conducted in 2017. The next Grade B maintenance thereafter will be planned based on the findings. From the information provided by the Company to Nexant, the company has not performed Grade C maintenance since operations commenced. In Nexant's opinion regular and diligent maintenance minimizes the frequency of major overhauls and unplanned outages.

According to the Company, the budgeted maintenance days in 2017 are 25 days. Maintenance for 2017 includes three Grade D and one Grade B. The 2017 maintenance cost is forecast to be 4.584 million yuan.

Nexant has not identified any issues with maintenance.

2.6.3 Staffing

Dangshan Biomass has its own operations team consisting of 48 technical staff that are responsible for executing the production operations, routine inspection, management of contractors, and safety. The facility operates on three shifts with four teams. Each shift has eight people including seven people at the central control room and one person at the dry material shed (biomass feeding).

According to the Company, all the staff have the relevant certificates and qualifications.

Nexant has not identified any issues with staffing.

2.7 RISK AND MAINTENANCE ASSESSMENT

2.7.1 Superheater Leakage

According to the Company, through an analysis of the superheater design as well as the performance during operations, it was determined that the design of the superheater has the following issues:

- Insufficient horizontal pitch
- Insufficient vertical spacing between pipe rows
- Installation of superheater fixed tube row

The company has identified a number of potential solutions, but acknowledges that the superheater issue has not been resolved. Potential solutions include:

- Increase distance between the original longitudinal pipe direction
- Replace the original tube superheater tube bundle
- Improve the quality of the biomass fuel
- Improve best practices and operation of superheater
- Soot blower maintenance to prevent ashes from coming in contact with heating surface.

It has not been made clear to Nexant what will be done to alleviate the issue. However, if not addressed Nexant expects that the issue will potentially lead to higher unplanned downtime as well as a shortened life for the superheater.

This issue is a risk and may hinder the facility to sustain design production.

2.8 CONCLUSIONS

Nexant has conducted an independent technical assessment of Dangshan Biomass operations and concludes the following:

- Has not identified material changes in technology or major equipment/systems from the original design basis for the operation
- Has not identified issues for major systems including process, mechanical, and civil design
- Has not identified issues in production and availability, unplanned outages, and environmental performance
- Has not identified issues in operation, maintenance, and staffing. The Company's 2017 target for total operating days is greater than the facility design operation days, which is an aggressive plan
- Has not identified any lost-time incidents
- Nexant identified an issue with superheater leakage during 2015, but there were no occurances during 2016. This issue is due to a design flaw which Nexant recommends be addressed since, if not addressed Nexant expects that it potentially will lead to higher unplanned downtime as well as a shortened life for the superheater

3.1 OVERVIEW

Nexant conducted a general site visit to the Sucheng Biomass Heat Supply Plant ("Sucheng Biomass") on December 28, 2016. Sucheng Biomass is the Company's first operating biomass heat supply project utilizing a circulating fluidized bed boiler.

Sucheng Biomass is located in the development zone in Sucheng District which is about 3 km from the downtown of Suqian city. The total area of the facility is approximately 47,000 square meters.

Sucheng Biomass has two 20 ton per hour biomass circulating fluidized bed boilers that generate a total of 40 tons per hour of steam heat to neighboring industries. Sucheng Biomass has recently completed construction and the facility was targeting to begin operations in May 2016. However, the desulfurization tower equipment was not able to meet the design requirements, the boiler hood had to be re-installed, and due to the economic downturn in 2016, the number of heating users was not large enough. The company is still expanding and developing its business in the heating supply market. The facility began commercial operation in September 2016 after receiving the official operation license from the Chinese Government to supply steam heat to industries along the 7.62 km steam supply pipeline.

The facility has set aside an area for a future third boiler expansion to the site that will generate an additional 45 tons of steam.

Table 3.1 presents the system description for Sucheng Biomass.

Table 3.1 System Description — Sucheng Biomass

Parameter	Description
Heat Supply Capacity (ton/hour)	40.0
Fuel Type	Biomass
Steam Supply (MPa/°C)	1.25/280
Design Annual Steam Supply (tons)	350,400
Plant Water Consumption (ton/year)	656,000
Electricity Consumption (MWh)	807
Biomass Pellets (ton/year)	81,600
Design Operating Days (days)	330

Source: Company Information

3.2 MAJOR ASSESSMENT

Biomass raw materials, after crushing, mixing, extrusion, drying and other processes, are rendered into particles or other forms suitable for direct combustion in a boiler to produce steam for heating.

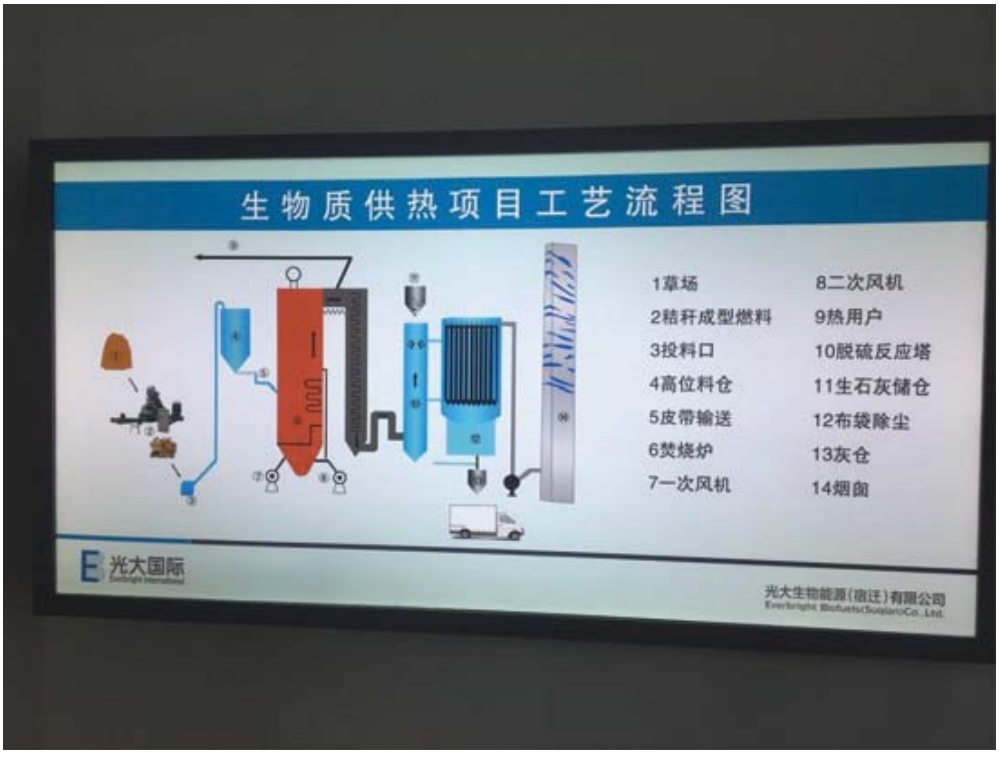
Figure 3.1 shows the plot layout for Sucheng Biomass.

Figure 3.1 Sucheng Biomass Plot Layout

Source: Company Information

Figure 3.2 presents a simplified process flow scheme for Sucheng Biomass.

Figure 3.2 Simplified Process Flow Scheme



Source: Nexant Site Visit & Company Information

3.2.1 Biomass Quality

Sucheng Biomass uses rich biomass sources (mainly rice and wheat straw) in neighboring regions for heat supply to industries in the local vicinity. Other biomass sources include: straw, wheat straw, corn stalks, cotton stalks, rapeseed rods, sawdust, etc. Sucheng Biomass has reached a fuel supply agreement with various vendors for the provision of biomass pellets made from straw. Sucheng Biomass requests that the pellets have a lower calorific value (LCV) over 3,200 kcal/kg and a moisture content of less than 10 percent.

The Company engaged a third party to test the content of the biomass fuel proposed for Sucheng Biomass in May 2014. The test results are shown in Table 3.2.

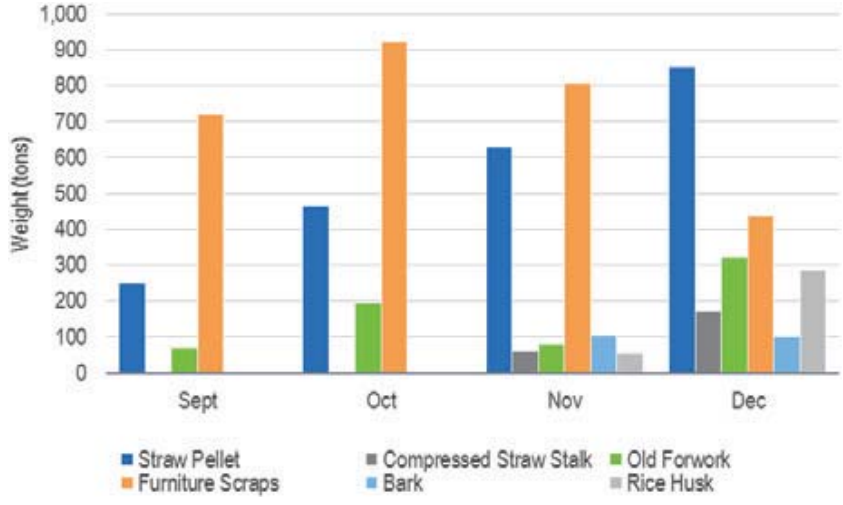
Table 3.2 Sucheng Biomass Pellet Quality

Parameter	Unit	Value
Volatile Matter	percent, dry-ash free basis	79.5
Ash	percent, dry	17.5
Inherent Moisture	percent, air dried	6.4
Fixed Carbon	percent, dry	16.9
Sulfur	percent, dry	1.2
Total Moisture	percent	11.1
Lower Calorific Value (LCV)	kcal/kg	3,131
Higher Calorific Value (HCV)	kcal/kg	3,833

Source: Company Information

A third party pellet quality test for heat value and moisture content is performed once every year. The May 2014 test was for the initial stage research. The most recent third party test was conducted on December 2, 2016 for rice husk. Each batch of biomass is tested internally to check if the results meet contract requirements. If not, Sucheng Biomass rejects the batch. For the months of September 2016 through December 2016 the biomass sources and their respective weights processed are shown in Figure 3.3.

Figure 3.3 Sucheng Biomass Sources during Operation



Source: Company Information

Nexant has not identified any issues with the biomass quality.

3.2.2 Fuel Handling

The Sucheng Biomass site has an 8,000 square meter sheltered storage yard with a storage capacity of 19,000 tons of biomass pellets at an average stack height of five meters. There is sufficient biomass pellet storage for three months of normal operation. The design pellet density is 0.7 tons/m3.

Pellets that will be processed are transferred from the storage area via a double screw conveyer underneath the floor opening in the sheltered storage area and then via a vertical bucket conveyer to two bunkers (2 x 100 m3) above the fluidized bed boiler.

Nexant has not identified any issues with the fuel handling system.

3.2.3 Boiler

The boiler was designed and manufactured by Jianglian Heavy Industry Co., Ltd., and consists of two steam generating fluidized bed boilers each capable of generating 20 tons per hour of superheated steam at 280 °C. The useful life of the boiler is 30 years.

The boilers parameters are summarized in Table 3.3.

Table 3.3 Sucheng Biomass Boiler Specifications

Parameter	Description
Fixed steam generation (tons/hr)	20
Annual biomass consumption (2 x 20t/h) (tons/yr)	81,600 (calculated based on 8,160 hours)
Rated steam pressure (MPag)	1.25
Rated steam temperature (°C)	280
Feed water temperature (°C)	104
Exhaust air at the excess air coefficient of	1.33
Boiler exhaust temperature (°C)	2
Sewage Rate (percent)	2
Air preheater inlet air temperature (°C)	20
Boiler design thermal efficiency	89 percent
Design fuel consumption (kg/h)	4,320.1kg/h
Serial number	DHF20-1.25/280-SW
Boiler Arrangement	Fluidized Bed

Source: Company Information

Nexant has not identified any issues with the boiler.

3.2.4 Steam Supply Piping

Sucheng Biomass has two once-through steam supply pipes:

- Main pipe: 350 mm inner diameter
- Secondary pipe: 250 mm inner diameter

The majority of the steam supply pipes are supported on low level pipe racks 500 mm high. The remainder is mostly buried underground at a minimum 0.8 m below the surface.

Nexant has not identified any issues with the steam supply piping.

3.2.5 Flue Gas Treatment

Sucheng Biomass high-temperature flue gas produced by the combustion of the fuel in the boiler passes through the desulfurization tower, the bag dust removal system, and the induced draft fan into the 60 meter steel chimney to the atmosphere. The chimney has sufficient capacity for a future boiler.

The flue gas desulfurization system removes SO2. After the flue gas is discharged from the fluidized bed to the reaction tower, it reacts with the chemical calcium hydroxide and removes sulfur trioxide and hydrogen chloride. The system includes the following:

- Chemical injection system
- Reaction tower
- Recirculation system
- Auto control system

Ash in the flue gas will be filtered in the bag filter system, which will remove about 99.9 percent of the ashes before exhaust to the chimney.

The design of the flue gas treatment system is summarized in Table 3.4.

Table 3.4 Flue Gas Treatment Design Parameters

Parameter	Unit	Value
SO_2 Concentration at Inlet of Desulfurization System	mg/Nm^3	≤300
Designed Desulfurization Efficiency	percent	≥85
Guaranteed Desulfurization Efficiency	percent	≥85
Desulfurized Gas SO2 Concentration	mg/Nm^3	≥50
Design Ash Concentration at Inlet of Bag Filter System	g/Nm^3	≤40
Ash Removal Efficiency	percent	≥99.9
Guaranteed Ash Concentration at Outlet of Bag Filter System	mg/Nm^3	<30

Source: Company Information

Nexant has not identified any issues with flue gas treatment.

3.2.6 Ash Handling

Nexant has not identified any issues with ash handling.

3.2.6.1 Bottom Slag

The product of incomplete combustion is termed slag. The slag produced will be diverted to the outlet of the boiler bottom, collected by a rotary valve, and cooled down by water. The cooled slag will then be transferred to the central slag silo pending transportation off-site by truck.

3.2.6.2 Fly Ash

Ash filtered in the bag filter system will be collected in the chute under the system and eventually transferred by compressed air to the 540 m3 central ash storage silo. The ash can be sold as fertilizer.

3.2.7 Electrical Installation and Connection

The auxiliary power system is designed with two voltage levels to supply all the electrical loads in Sucheng Biomass:

- 10 kV
- 400V

One 10 kV incoming feeder is connected to the local 10 kV power grid to serve as normal power supply to the 400V power system. The other incoming 10 kV feeder is from the neighboring third party waste-to- energy power plant and serves as standby power that can be automatically transferred when the 10 kV normal power fails.

Nexant has not identified any issues with electrical installation and connection.

3.2.8 General Civil and Structural

The Sucheng Biomass site was designed with the parameters as summarized in Table 3.5.

Table 3.5 Sucheng Biomass General Civil and Structural Design Parameters

Parameter	Description
Seismic design intensity	8 degree (0.30 g)
Seismic site classification	Grade III
Wind pressure (50 year mean recurrence interval)	0.35 kN/m^2
Snow pressure (50 year mean recurrence interval)	0.35 kN/m^2

Source: Company Information

According to the geotechnical report and the design description, seismic liquefaction at the site is potentially serious. The groundwater is noncorrosive to concrete and rebar. Therefore, almost all buildings/structures use Pre-stressed High-strength Concrete type piling foundations.

Almost all buildings in Sucheng Biomass consist of concrete structures enclosed by building bricks.

Nexant has not identified any issues with civil and structural.

3.3 PERFORMANCE

The following section provides Nexant's findings and opinions with respect to the performance of Sucheng Biomass based on available data. Nexant obtained and reviewed the historical performance data for production and availability, environmental performance, and unplanned outages and unplanned maintenance.

3.3.1 Production

The facility began commercial operation in September 2016 through December 2016. Key monthly performance indicators are shown in Table 3.6.

Table 3.6 Sucheng Biomass Key Performance Indicator

	Unit	Fuel consumption (tons)	Production capacity (tons)	Water supply (tons)	Running hours (hours)	Heat load rate (percent)	Mechanical load rate (percent)
September	1 # boiler	1,463.6	6,707.5	7,511.5	597	56.2	49.0
2016	2 # boiler	381.9	1,887.0	1,954.23	157	60.1	48.6
	Total / Average	1,845.4	8,594.5	9,465.73	754	58.1	48.8
October	1 # boiler	1,033.6	4,853.8	5,053.1	338	71.8	61.2
2016	2 # boiler	1,145.5	5,177.6	5,255.2	407	63.6	56.3
	Total / Average	2,179.1	10,031.4	10,308.3	745	67.7	58.7
November	1 # boiler	445.4	2,385.3	2,363.1	167	71.4	53.
2016	2 # boiler	1,896.3	9,429.7	9,511.9	554	85.1	68.5
	Total / Average	2,341.6	11,815.0	11,875.0	721	78.3	60.9
December	1 # boiler	0	0	0	0	—	—
2016	2 # boiler	2,208.8	12,361.5	12,660.2	744	83.1	59.4
	Total / Average	2,208.8	12,361.5	12,660.2	744	—	—

Source: Company Information

The average heat load factor is calculated using the following formula:

Heat load factor = Heat production volume / (Operating hour * Designed capacity)

The average mechanical load factor is calculated using the following formula:

Mechanical load factor = Biomass Consumption / (Operating hour * Designed feeding capacity)

The design feeding capacity of each boiler is 5 tons per hour. As shown, the Sucheng Biomass facility is still ramping up production and has not yet reached design production levels. Boiler #1 was not in operation during December 2016 since the number of heating users was not large enough and the Boiler #2 capacity alone was able to meet the demand.

3.3.2 Unplanned Outages

The Company reports no unplanned outages since commercial operation began.

3.3.3 Environmental Performance

Sucheng Biomass was designed to comply with the following emissions standard:

- SO2: 300 mg/m^3

- NOx: 300 mg/m^3
- Particulate matter: 50 mg/m^3

The emissions record since commercial operation began is shown in Table 3.7 and indicates that the facility has operated in compliance with the relevant standards.

Table 3.7 Sucheng Biomass Emissions Record since Commercial Operation Began

	2016		
Month	SO_2 (mg/m^3)	NOx (mg/m^3)	Part. Matter (mg/m^3)
Sep	19	160	18
Oct	5	140	8
Nov	10	155	7
Dec	11	135	5

Source: Company Information

Nexant has not identified any issues with environmental performance.

3.4 OPERATIONS AND MAINTENANCE

Nexant reviewed Sucheng Biomass' facilities management with respect to operations, maintenance and staffing. Nexant also reviewed whether the O&M practices are in accordance with generally accepted industry practices and whether the Company generally operates Sucheng Biomass in a sound, viable and sustainable manner.

3.4.1 Operations

The following observations were made during Nexant's site visit:

- The Company's staff perform all operations of the Sucheng Biomass project
- There have been no lost-time incidents

The Company's 2017 operations targets are:

- Heating Steam Production: 307,000 tons per year
- Biomass Fuel Quantity: 75,516 tons per year

Nexant notes that the Company's 2017 monthly targets are approximately double the production capacity that has recently been achieved by the facility.

3.4.2 Maintenance

Maintenance is provided by a contractor, which is the Jiangsu Wanyuan Electricity Company. The interval for major maintenance (plant turnaround) is 3 years, during which the production will be stopped for about 10 days.

Smaller on-going maintenance will be conducted once every year for about 3 days, based on the operating situation.

Prior to commercial operation:

- The Company spent 450,000 yuan to solve the issue with the desulfurization tower not meeting design requirements. Through discussion with the supplier, the supplier agreed to re-design and replace the equipment. The current equipment can meet the requirement and will not affect the current production.

- Due to an installation error by the construction company, the construction company reinstalled the boiler cap at no charge. This problem does not affect the current production.

3.4.3 Staffing

Sucheng Biomass has 42 employees in five departments as summarized in Table 3.8.

Table 3.8 Staffing

Department	Number of Employees
Management	2
Integrated Management Department	5
Financial Management Department	2
Production Management Department	29
Department of Fuel and Marketing	4

Source: Company Information

Nexant has not identified any issues with staffing.

3.5 RISKS AND MITIGATION ASSESSMENT

Nexant has not identified any significant technical risks.

3.6 CONCLUSIONS

Nexant has conducted an independent technical assessment of the Sucheng Biomass operations and concludes the following:

- No material changes in technology or major equipment/systems from the original design basis for the operation have been identified
- No issues associated with major systems, including process, mechanical, and civil design, have been identified
- Sucheng Biomass is still ramping up production, and thus design production has not yet been achieved
- No issues associated with unplanned outages or environmental performance have been identified
- The facility has not experienced any lost-time incidents
- Has not identified any significant technical risks
- No staffing issues have been identified
- Nexant notes that the Company's 2017 monthly targets are approximately double the production capacity that has recently been achieved by the facility

Section 4 Zibo Integrated Hazardous Waste Incineration Project

4.1 OVERVIEW

Nexant visited the Zibo Integrated Hazardous Waste Treatment Phase I Project ("Zibo Waste") on December 27, 2016. Zibo Waste is the Company's newest operating hazardous waste landfill project which came into operation in 2016.

Zibo Waste is located in Qilu Chemical Industry Park at the intersection of Xinghui Road and Fenbei Road, Linzi District, Zibo City. Construction was completed in March 2015. Zibo Waste began commercial operation in January 2016, but the facility was in a test run period until September 2016 when the facility obtained the operation license from the Chinese Government on August 23, 2016.

Per Nexant's discussion with company management, Zibo Waste is conducting preliminary work for Phase II which is a capacity expansion of 15,000 tons per year. The total capacity of the facility then will be approximately 25,000 tons per year. Phase II will utilize plasma technology from a U.S. supplier. To be confirmed, a power generation unit may be installed during Phase II since it is expected that the site will have sufficient steam. This review covers the existing Phase I facility.

Table 4.1 presents key characteristics of the Zibo Waste facility.

Table 4.1 Zibo Integrated Hazardous Waste Treatment Project

Parameter	Description
Designed Average Daily Handling Rate (tpd)	30.0
Designed Annual Handling Capacity (tpy)	9,900.6
Designed Average Daily Waste Water Treatment (tpd)	50.0
Annual Operational Day (days)	330.0
Annual Natural Gas Consumption (Nm3/year)	570,000.0
Annual Diesel Consumption (tpy)	10.0
Annual Electricity Consumption (GWh/year)	3.94
Annual Water Consumption (m^3/y)	35,904

Source: Nexant Site Visit & Company information

4.2 MAJOR SYSTEM ASSESSMENT

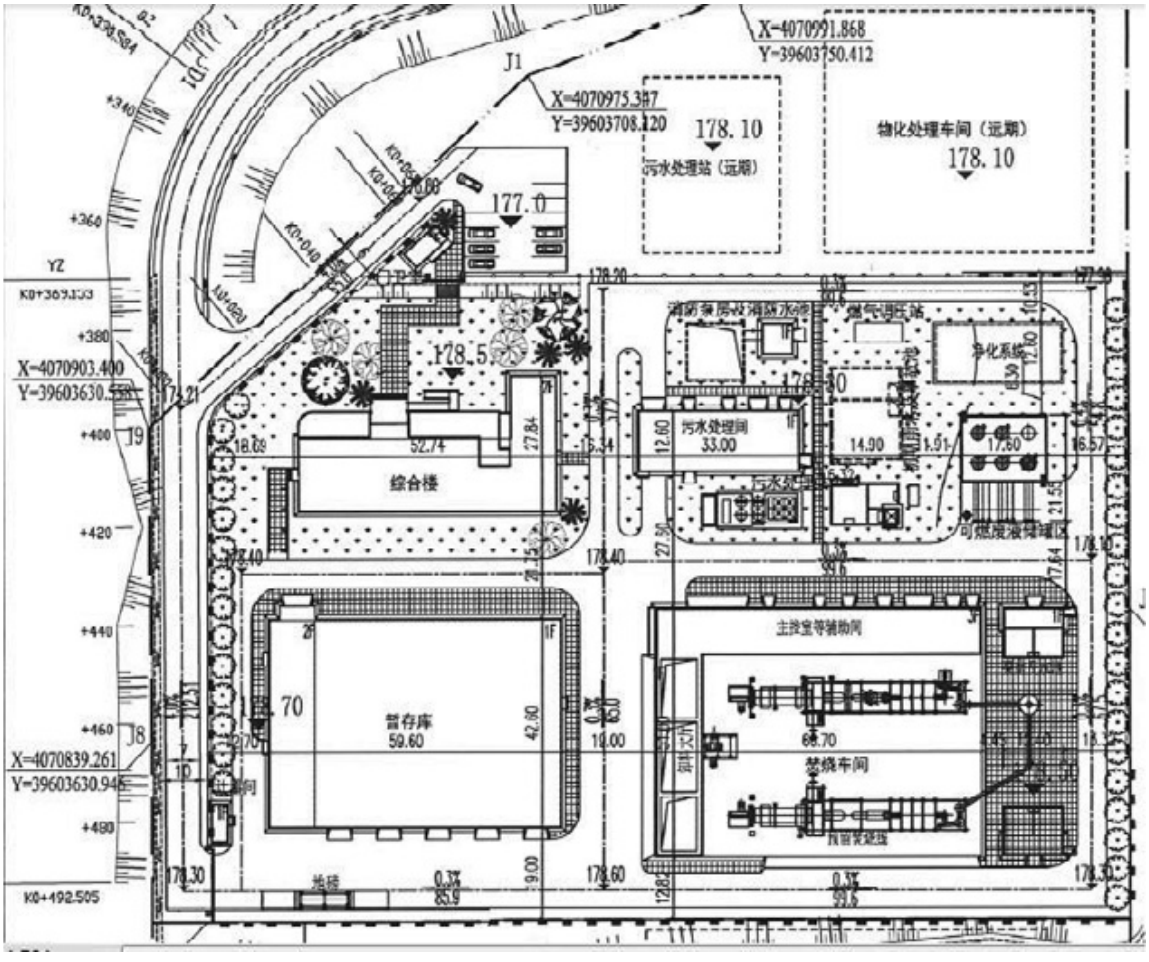
The Zibo Waste facility includes the following key areas:

- Raw material collection and transportation system: Includes special containers and transportation equipment used in the classification, collection, and transportation of hazardous waste

- Production facilities: Includes receiving, storage, incineration system (rotary kiln and secondary combustion chamber), waste heat boiler, and associated facilities
- Flue gas treatment
- Slag and ash handling

Figure 4.1 shows the plot layout for Zibo Waste.

Figure 4.1 Zibo Waste Plot Layout



Source: Company Information

Zibo Waste's design incineration capacity is 30 tpd. The Company may increase the capacity by 10 percent to a maximum incineration rate of 33 tpd.

Figure 4.2 presents a simplified process flow scheme for the Zibo hazardous waste incineration system.

Figure 4.2 Simplified Process Flow Scheme

Source: Company Information

4.2.1 Hazardous Waste Quality

According to the Company, the Zibo Waste facility has agreements with over 400 companies, but only approximately half of these have supplied waste to the facility so far. The existing waste suppliers are mainly petrochemical and pharmaceutical companies.

Zibo Waste has received approval for 19 categories of hazardous waste in accordance to the National Hazardous Waste Category Standard. Table 4.2 presents the approved categories of waste.

Table 4.2 Approved Categories of Waste for Zibo Waste

No.	Hazardous Waste	Description	No.	Hazardous Waste	Description
1	HW02	medical waste	11	HW13	organic resin waste
2	HW03	waste drugs, drugs	12	HW14	new chemical waste
3	HW04	pesticide waste	13	HW16	photographic material waste
4	HW05	wood preservative waste	14	HW37	organophosphorous compound waste
5	HW06	organic solvent waste	15	HW38	organic cyanide waste
6	HW07	heat treatment of waste containing cyanide	16	HW39	phenol containing waste
7	HW08	waste mineral oil	17	HW40	containing ether waste
8	HW09	oil / water / hydrocarbon / water mixture or emulsion	18	HW45	contains organic halide waste
9	HW11	fine steam distillation residue	19	HW49	other wastes
10	HW12	dyes, paint waste			

Source: Company Information

According to the Company, hazardous waste that arrives to the site often contains batches of irregular waste. Hazardous waste form different sources are therefore blended to a consistent standard with known chemical and physical properties.

The following hazardous wastes are not accepted at the disposal site:

1. Radioactive waste

2. Explosive wastes

3. Hazardous waste without known chemical and physical properties

Zibo Waste is designed to incinerate approximately 30 tpd of hazardous waste including solid waste, semi-solid waste, and liquid waste of approximately 7 tpd, 20 tpd, and 4 tpd, respectively.

Nexant has not identified any issues with the hazardous waste quality.

4.2.2 Hazardous Waste Reception and Pretreatment

Hazardous waste that arrives to Zibo Waste is sampled and sent for a preliminary laboratory analysis. The test report is used to verify that waste is consistent with the delivery description as well

as to further determine whether the waste can enter the disposal center. Waste that enters the facility undergoes a series of additional analyses. The hazardous waste is characterized based on the following key properties:

- Explosive
- Toxic (chronic, acute, biological, etc.)
- Corrosive
- Infectious
- Chemical reactivity (combustible, flammable, oxidizing, etc.)

Hazardous waste is stored using different containers according to the characteristics, composition, shape, yield, transportation mode, and treatment method. Some of the hazardous wastes such as acid and alkali wastes and toxic wastes are subject to physical and chemical treatment after separation.

The area for temporary storage is about 3,087 square meters and is divided into three areas, namely:

1. Combustible waste storage area
2. Second storage area of combustible waste
3. Toxic waste storage areas.

The storage area has a net height of 6 meters, double row layout, and has approximately 2 months of capacity for inbound hazardous waste. Surveillance cameras are provided in the storage room. Regular ventilation of the room allows for a minimum of six air changes per hour. In the event of an accident, the ventilation rate will be increased to 12 changes per hour. All waste is transferred to the dump pit ready for feeding to the incineration system.

The floor of the storage room has been sealed with acrylic resin DH1900. The flooring material above the resin sealing layer is marble for ease of cleaning. An emergency shower and eye wash basin is provided in the room.

The liquid waste to be incinerated consists mainly of waste organic solvent waste, waste mineral oil, and waste halogenated organic solvent. Hazardous liquid waste is kept in one of three tanks, each with a capacity of 20 m^3. The liquid waste is stored according to the different heating value of high and low calorific value. A spare tank is provided for standby use.

Solid and semi-solid hazardous wastes are fed to the rotary kiln by either grabbing the waste from the dump pit or via the bucket conveyor. Liquid waste is fed to the combustion chamber through a nozzle to the rotary kiln incinerator. High calorific value liquid waste can also be sent to the secondary combustion chamber alone for processing. After the waste is fed to the rotary kiln, the waste is completely burned at a temperature of approximately 850°C. The residence time of the waste in the kiln is approximately 60 minutes. Most of the slag from the rotary kiln is collected at the end of the kiln in a water trough. After the cooling of the slag, the scraper conveyor elevates the slag to the silo.

4.2.3 Incinerator

Hazardous waste incineration system uses high-temperature incineration technology for the disposal of hazardous waste.

Table 4.3 presents the design technical parameters of the incineration system.

Table 4.3 Incineration System Technical Design Parameters

Parameter	Description
Oxygen Content of Flue gas from the Incinerator Outlet (dry gas)	6 – 10 percent
Design Lower Heating Value (kcal/kg)	4,380
Expected LCV of Waste (kcal/kg)	3,585 – 5,975
Removal Rate of Burning	≥ 99.9 percent
Incineration Residue Burning Rate	≤ 5 percent
Designed Average Daily Handling Rate (tpd)	30.0
Annual Operational Day (days)	330.0
Design	
Furnace Type and Supplier	Rotary Kiln, BMEI Co., Ltd

Source: Company Information

Rotary kiln incineration temperature is maintained above 850°C and removal of harmful waste components is achieved with a decomposition rate of more than 99.9 percent. The rotary kiln is a steel hollow cylinder lined with refractory bricks. Waste materials are heated by the gases produced during the combustion process and the heat transferred from the kiln walls. Combustion is controlled by both the amount of air, amount of waste, and relative quality (viscosity, moisture, and particle size).

The partially combusted gas proceeds to the secondary combustion chamber. Natural gas can be added to keep the temperature of the secondary combustion chamber above 1,100°C, to ensure that the residence time of flue gas is more than 2 seconds to allow for removal of dioxins and other harmful components in the flue gas. Flue gas retention time is designed to be 3.9 seconds. When the LCV of the

waste is too low, i.e., lower than 2,796 kcal/kg, resulting in an inability to maintain the temperature of the rotary kiln and secondary incineration chamber at 850° C and 1,100° C, respectively, natural gas is used as supplementary fuel.

The rotary kiln and secondary incineration chamber are designed to incinerate 30 tons per day. The life expectancy of each was designed to be a minimum of 15 years, and the fireproof refractory was designed for at least two years before replacement. Per Nexant's discussion with the Company during the site visit, the refractories were overhauled in February 2016 (one month into operation) and are expected to be overhauled again in February 2017.

Nexant has identified that there is an issue with the rotary kiln and secondary incineration chamber refractories that the Company is proactively working to address with the objective to limit the impact on production.

4.2.4 Waste Heat Boiler

The temperature of the flue gas at the outlet of the secondary combustion chamber is above 1,100°C. In order to meet the requirement of the flue gas treatment in the subsequent stage and reduce the re-synthesis of dioxins the flue gas waste heat is utilized in the waste heat boiler. Waste heat boiler water equipment, including: deaerators, water tanks and pumps, according to the amount of water and evaporation set. All the equipment is arranged in the ancillary space of the incineration workshop. The manufacturer of the boiler was Beijing Beifang Jingjing Environmental Protection Equipment Co., Ltd.

Table 4.3 presents the design technical parameters of the waste heat boiler.

Table 4.4 Waste Heat Boiler Technical Design Parameters

Parameter	Description
Design steam outlet pressure (MPa)	1.3
Evaporation rate (kg/h)	4,000
Flue gas inlet temperature (°C)	1,150
Flue gas outlet temperature (°C)	550

Source: Company Information

Nexant has not identified any issues with the waste heat boiler.

4.2.5 Flue Gas Treatment

The flue gas treatment system at Zibo Waste is comparable to the system that is used in most power plants in the People's Republic of China. It consists of a SNCR denoxification system, wet and dry acid gas abatement, a bag filter system, and a stack.

SNCR is a mature, high-temperature (800-1,000°C) process that uses a reducing agent to reduce NOx to N_2. The manufacturer of the system at Zibo Waste was Wuxi Weixing Storage Tank Co., Ltd. SNCR does not require catalyst, but the reduction reaction temperature is much higher than the Selective Catalytic Reduction (SCR) method that is approximately 200-300°C. SNCR denitrification efficiency is about 30 to 50 percent. The target NOx emission target for SNCR is 200mg/Nm^3 as compared to 50mg/Nm^3 for the SCR process. The choice to use SNCR reduces that amount of catalyst needed and the overall operating costs of the project.(1)

A deacidification process that involves chemical reactions to neutralize NOx and HCl by ejecting urea is performed in the dry absorption denoxification tower. SO_2 is removed by $Ca(OH)_2$. Flue gas is treated for the removal of heavy metals through an adsorption process with activated carbon before entering the bag house filter. The system can achieve 75 percent and 80 percent removal of 2 and HCl, respectively.

The bag filter system is a mature ash/dust removal system widely adopted in power plants. In the bag filter system, particulates such as heavy metals are retained as the flue gas passes through the bags and treated with activated carbon. Particulates are collected for additional treatment. The Zibo Waste bag filter system was manufactured by Kelin Environmental Protection Equipment, Inc.

Acidic substances are further removed from the flue gas by ejecting sodium hydroxide (NaOH) in the wet scrubber. The wet scrubber is manufactured by BMEI Co., Ltd. Lastly, flue gas with high water content undergoes a heating process to minimize the risk of corrosion.

The chimney is 50 meters tall and has a continuous emissions monitoring system (CEMS) located at an elevation of 12 meters. In the chimney exhaust monitoring system, real-time monitoring of emissions to the atmosphere after burning the exhaust gas components such as NOx, CO, CO_2, SO_2, HCl, NH_3, dust, etc. When one of the indicators exceeds the limit interlock protection procedures are placed on the entire incineration system such that it is in normal working condition. Furthermore, it is equipped with a lighting protection system. The design life of the chimney is a minimum of 15 years.

Nexant has not identified any issues with the flue gas treatment system.

4.2.6 Slag and Ash Handling

Nexant has not identified an issue with the slag and ash handling.

4.2.6.1 Slag Handling

Bottom ash is disposed of off-site. Slag collected from the exit of the kiln falls into the water trough, where a scraper conveyor collects it and transfers it to a belt conveyor for elevation to the bottom ash silo.

(1) Company Information

4.2.6.2 Fly Ash

Fly ash is transferred to the silo by pneumatic conveying. Fly ash is collected from the following areas:

- Boiler drop-out collection hoppers
- Quenching tower
- De-acidification system
- Bag filter system (Has six ash collection hoppers connected to two screw conveyors)

4.2.7 Wastewater Treatment

The waste water treatment plant has a daily capacity of 50 cubic meters for day and designed to receive, neutralize and remove harmful chemicals from the water used to treat, purify, and recycled in the Zibo waste process.

The potential contaminates in the wastewater and leachate include:

- Heavy metals and even sometimes hexavalent chromium (Cr6+), which is a toxic and lethal substance
- Hg
- Divalent zinc ion (Zn_2+)
- Barium (Ba_2+)
- Plumbous (Pb_2+).

Handling of the wastewater and domestic effluent is carried out in two different processes.

- Wastewater is treated, after screening off the large debris, by passing it through the dissolved air flotation system, neutralization trough, and settlement tank
- Domestic effluent after screening off the large debris, domestic effluent enters the water collection tank and is diverted to the Gohigher bioreactor (GHBR) for biochemical treatment.

Mixed wastewater and domestic effluent is sand filtered and active carbon filtered in the filtration tank. After testing and acceptance, the water is reused in Zibo Waste or discharged to the municipal drainage system.

4.2.8 General Civil and Structural

The Zibo Waste site was designed based on the parameters summarized in Table 4.5.

Table 4.5 Zibo Waste General Civil and Structural Design Parameters

Parameter	Description
Seismic design intensity	7 degree (0.15 g)
Seismic site classification	Grade I1 to II
Seismic site liquefaction	Not considered
Wind pressure (50 year mean recurrence interval)	0.40 kN/m^2
Snow pressure (50 year mean recurrence interval)	0.45 kN/m^2

Source: Company Information

Underground water was not found, and the underground soil is noncorrosive to concrete and rebar according to the geotechnical report as well as design description

Nexant has not identified any issues with civil and structural.

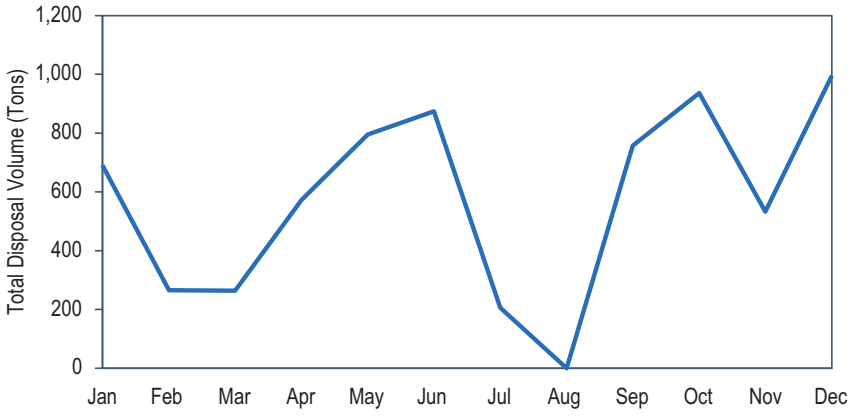
4.3 PERFORMANCE

The following section provides Nexant's findings and opinions with respect to the performance of Zibo Waste based on available data. For this analysis Nexant reviewed the historical performance data for production, environmental performance, and unplanned outages and unplanned maintenance.

4.3.1 Production

The Zibo Waste facility started up in January 2016 and was in a trial period until September 2016 when the facility obtained the operation license from the Chinese Government on August 23, 2016. Figure 4.3 shows the hazardous waste incinerated monthly at the Zibo Waste facility from January 2016 through December 2016.

Figure 4.3 Zibo Waste 2016 Hazardous Waste Incinerated



Source: Company Information

Table 4.6 compares the performance of the Zibo Waste facility during 2016 relative to the design of the facility.

Table 4.6 Zibo Waste 2016 Performance versus Design

Parameter	Design	Prorated Design (4 months)	Sep 2016 to Dec 2016
Designed Annual Handling Capacity (tpy)	9900.6	3300.2	3221.1
Annual Operational Day (days)	330.0	110	108
Annual Natural Gas Consumption (Nm3/year)	570,000	190,000	123,665
Annual Electricity Consumption (GWh/year)	3.94	1.31	0.86
Annual Water Consumption (m^3/y)	35,904	11,968	13,899

Source: Company Information

From September 2016 to December 2016, the actual average incineration capacity was 97.6 percent of the pro-rated four month design. Similarly, during this period the average on-stream time was 98.2 percent of design.

Nexant notes that the facility has achieved design levels of production during the short period that it has been in commercial operation.

4.3.2 Unplanned Outages

At Zibo Waste there were approximately 13 days of unplanned outages between September 2016 and December 2016. The dates of major unplanned outages during 2016 are shown in Table 4.7.

Table 4.7 Outages and Cause for 2016

Beginning Date	Days	Cause
January 12, 2016	2	Slag machine breakdown due to rotary kiln coking and chain derailment
January 23, 2016	1	Chain derailment
January 27, 2016	1	Slag machine breakdown
February 11, 2016	7	Stop of rotary kiln cooling
February 20, 2016	24	Incineration system breakdown
April 2, 2016	6	Rotary kiln coking
April 11, 2016	4	Rotary kiln catch breakdown
May 19, 2016	4	Boiler decoking
May 25, 2016	2	Secondary door missing
June 8, 2016	1	Feeding system failure
July 2, 2016	9	Maintenance based on schedule
July 17, 2016	46	Outage based on schedule
November 2, 2016	13	Rotary kiln refractory

Source: Company Information

4.3.3 Environmental Performance

On March 14, 2016, the facility received Zibo City acceptance of environmental protection approval from the Zibo City Environmental Protection Bureau. Furthermore, on August 23, 2016, the facility obtained a hazardous waste business license for compliance of its operations.

The local environmental bureau has online meters at the plant. According to the Company during the Site Visit discussion, the facility has been in compliance since it began operating.

Nexant has not identified any issues with environmental performance.

4.4 OPERATIONS AND MAINTENANCE

Nexant reviewed Zibo Waste's facilities management with respect to operations, maintenance and staffing. Nexant also reviewed whether the O&M practices are in accordance with generally accepted industry practices and whether the Company generally operates Zibo Waste in a sound, viable and sustainable manner.

4.4.1 Operations

Based on Nexant's site visit, the following observations were made:

- The Company's staff perform all operations of the Zibo Waste project
- There have been no lost-time incidents

The operations staff consists of 32 members which has decreased by 3 individuals over the last year. The operations team is responsible for execution of the production operations, routine inspection, management of contractors, and safety. Several modifications to the facility have been made primarily to how waste is fed in order to guarantee the safety of the operators.

The operation and maintenance expenditure between January 2016 and December 2016 was a total expenditure of 27.344 million yuan.

According the Company, the key operational issue is the incinerator refractories. The Company expects that the refractories can meet the design requirements, but is considering replacing them during February 2017.

4.4.2 Maintenance

Zibo Waste's routine maintenance is carried out by in-house staff, and the frequency of the regular maintenance is categorized as monthly, quarterly, every two quarters, and yearly.

According to the Company during the site visit, the Company has sufficient spare parts and has allocated budget for these items.

For 2016, the target scheduled maintenance was 60 days for the entire year, but actual performance was 9 days of scheduled maintenance and 111 days of unplanned outages.

4.4.3 Staffing

Zibo Waste's O&M was developed during 2016. The facility operates 24 hours a day on three shifts (8AM to 5PM, 5PM to 1AM, 1AM to 8AM). The total number of staff on-site is 48 and is profiled in Table 4.8.

Table 4.8 Staffing

Description	Quantity
General Management	5
Accounting	2
Test	4
Sales	5
Production (mechanical and operators)	32

Source: Nexant Site Visit & Company Information

According to the Company, all the staff have the relevant certificates and qualifications.

Nexant has not identified any issues with staffing.

4.5 RISK AND MITIGATION ASSESSMENT

The only technical area of concern identified by Nexant is with the refractories utilized in the Rotary Kiln and Secondary Combustion Incinerator. The need to replace the refractories so soon after start of operations is not normal. According to the Company, it has identified 1) frequent start-up and shutdowns during the trial period between January 2016 through receiving the operation license at the end of August 2016 as well as 2) chlorides in the waste feed as potential sources of the refractory issues.

Zibo Waste refractories will be replaced in February 2017. The Company in 2016 signed a supply contract for the rotary kiln refractory in preparation for the February 2017 refractory replacement. The stated warranty period will be 14 months starting from the acceptance date. During the warranty period, if the Company finds the refractories do not meet the requirements due to the seller responsibilities, the supplier should replace or repair the equipment with no additional charge as soon as it has received the documents from the Company. In addition, the supplier should cover all the cost related to this issue.

Since September 2016 the company has been targeting steady-state design production. Minimizing unplanned downtime as well as operating the facility within the design range of conditions and hazardous waste quality will help prolong the life of both incinerators.

4.6 CONCLUSIONS

Nexant has conducted an independent technical assessment of the Zibo Waste facilities and concludes the following:

- No material changes in technology or major equipment/systems from the original design basis for the operation have been identified
- No issues with the hazardous waste quality have been identified, although the Company has identified chlorides in the waste feed as a potential issue
- There are issues with the rotary kiln and secondary incineration chamber refractories that the Company is proactively working to address as well as limit the impact on production
- No issues with the waste heat boiler, flue gas treatment system as well as slag and ash handling have been identified
- Zibo Waste has achieved design levels of production
- No issues associated with environmental performance have been identified
- The facility has not experienced any lost-time incident
- No staffing issues have been identified

5.1 OVERVIEW

Nexant visited the Guanyun Hazardous Waste Landfill Project ("Guanyun HWL") on December 29, 2016. Based on the Company's Information, Guanyun HWL commenced commercial operation in April 2016 and is the most recent started-up project among four (4) hazardous waste landfill projects operated by the Company. In addition, Guanyun HWL is the selected representative of the Company's hazardous waste landfill projects.

Guanyun HWL is located in the Harbour Industrial Zone of Guanyun County, Lianyungang City. The total capacity of the landfill is 500,000 m^3 and is planned in two (2) phases. The current storage capacity of the first phase is 300,000 cubic meters (m^3)[(2)]. The second phase of 200,000 m^3 is planned for construction. The design life of the first phase is fifteen (15) years based on an annual disposal handling capacity of 20,000 m^3 (approximately 1,667 tons per month).

(2) Based on Environment Impact Assessment Report, the storage capacity is 344,000 m^3.

The overall site plot plan is shown in Figure 5.1. The Guanyun HWL area is divided into four (4) equal zones. Currently, Zone No. 1 is operating.

Figure 5.1 Site Plot Plan — Guanyun HWL

Source: Nexant Site Visit & Company Information

5.2 MAJOR SYSTEM ASSESSMENT

Specific data and information on the major systems is summarized in Table 5.1.

Table 5.1 Summary of Major Systems for Guanyun HWL

(Key Parameters)

Description	Details
Design Volume	300,000 cubic meter (m^3)
Operating Life	15 years
Annual Hazardous Waste Handling System	20,000 Tons
Annual Waste Solidification	28,423 Tons
Annual Landfill	29,923 Tons
Annual Wastewater Treatment	32,807 Tons

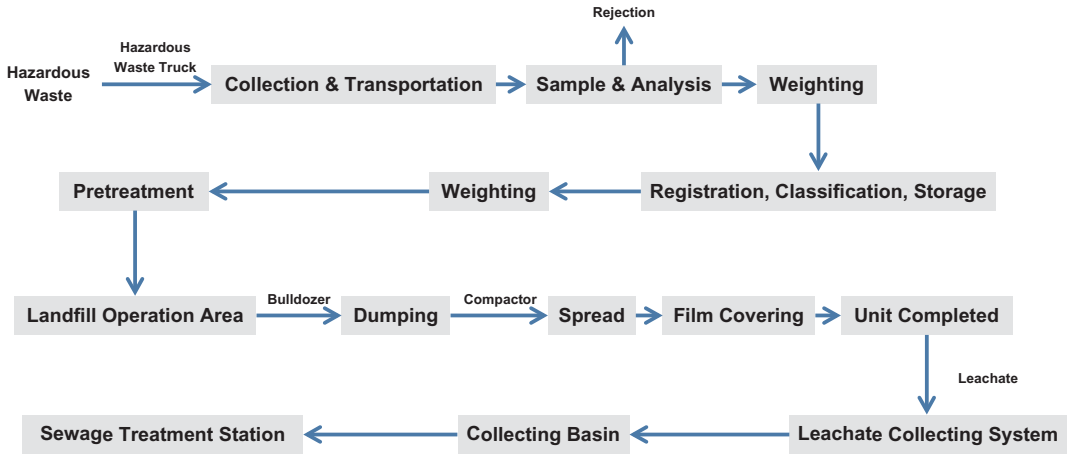
Source: Nexant Site Visit & Company Information

Nexant undertook a visual inspection and review of the plant and equipment conditions, and reviewed the technical data and information for the process, mechanical, and civil design for the facility.

5.2.1 Process & Mechanical Equipment

The current scope of major hazardous wastes handled at Guanyun HWL consists of a wide range of solid, semi-solid, and powder wastes from chemical plants, wastewater treatment plants, waste incineration plants and other industries in the vicinity of the Harbour industry zone. Figure 5.2 is a schematic representation of the conventional closed-loop hazardous waste process utilized at Guanyun HWL.

Figure 5.2 Process Flow at Guanyun HWL



Source: Nexant Site Visit & Company Information

The conventional closed-loop hazardous waste landfill process at Guanyun HWL facility consists of key steps as follows:

- Hazardous waste collection trucks arrive from various local industries at the Guanyun HWL facility
- Upon initial sampling, analysis and weighing, registration classification and storage is undertaken
- Any wastes with analyses not complying with the receiving requirements are delivered to a pretreatment process prior to landfill
- In the pretreatment area, two (2) key processes are carried out to treat the hazardous waste before landfilling (i.e.) physicochemical treatment and solidification
- If the waste complies with the requirements, it is delivered to the landfill directly
- After landfilling the waste, bulldozing, dumping, compacting, wide spread distribution is carried out prior to film covering via a high density polyethylene (HDPE) membrane being placed over the waste as a cover to prevent ingress of rainwater to reduce the quantity of leachate
- Once the unit is completed, leachate is collected in the drainage system embedded in the landfill and is pumped to the collection tank for further sewage treatment

Nexant concludes that the hazardous waste landfill process utilized at Guanyun HWL facility is in accordance with the hazardous waste landfill industry.

The variety of hazardous wastes processed at Guanyun HWL facility include cyanide substances, fly ash, metallic substances, chemicals, inorganic fluorine substances, and inorganic cyanide substances. Specifically these wastes include; wastes from heat treatment containing cyanide; waste from surface treatment; residues of incinerating disposal; metal carbonyl compound wastes; beryllium wastes; chromium wastes; copper wastes; zinc wastes; arsenic wastes; selenium wastes; cadmium wastes; antimony waste; tellurium wastes; thallium wastes; lead wastes; waste from inorganic fluoride; waste alkali; asbestos waste; nickel compound wastes; barium compound waste and; other wastes.

Based on Nexant's site visit, the Guanyun HWL facility maintains flexibility on the composition of wastes being handled as well as any changes in the composition ratio of wastes. The Company performs random tests at its customer industries in the vicinity of the Harbour industry zone and thereafter performs subsequent batch tests of wastes upon arrival at the Guanyun HWL facility.

Examples of major plant equipment are shown in Figure 5.3.

Figure 5.3 Examples of Site Plant Equipment

Feed Inlet of Pre-treatment

Sewage Station — Sludge Tank

Mixers for Pre-treatment

Storage of Material for Pre-Treatment

Source: Nexant Site Visit & Company Information

Guanyun HWL facility is in its first year of commercial operation and Nexant confirms that the process and mechanical equipment are in good condition. Nexant has not identified any issues with the process and mechanical equipment at the Guanyun HWL facility.

5.2.2 Civil and Structural

Based on Nexant's site visit, the Guanyun HWL facility's landfill areas are constructed with the following ten (10) layers (from surface-to-bottom) to prevent contamination of underground water.

- **Surface To Bottom**
  - — Layer 1: 300 mm thick crushed stones
  - — Layer 2: 200 grams per square meter (g/m^2), polypropylene nonwoven fabric
  - — Layer 3: 700 mm thick compacted soil
  - — Layer 4: 500 mm clay
- **Primary Leachate Collection**
  - — Layer 5: 1.5 mm thick HDPE membrane

— Layer 6: 6.3 mm thick geogrid

- **Secondary Leachate Collection**

— Layer 7: 2.0 mm thick HDPE membrane

— Layer 8: 600 g/m^2 polyester geotextile

— Layer 9: 5.2 mm geotechnical composite drainage net

— Layer 10: 300 mm thick crushed stones

Nexant has not identified any issues with the civil and structural aspects of the Guanyun HWL facility. In addition, Nexant concludes that the method of construction meets conventional civil and structural requirements and is consistent with accepted Chinese industry standards.

5.3 PERFORMANCE

The following section provides Nexant's findings and conclusions with respect to the performance of the Guanyun HWL facility based on available data. Nexant obtained and reviewed the historical performance data for disposal handling, unplanned outages and unplanned maintenance, and environmental performance.

5.3.1 Disposal Handling

For 2016, the monthly waste disposal handling volumes for the Guanyun HWL facility is shown in Table 5.2 Based on Nexant's site visit and review of design and operating information, Nexant has not identified any issues with the disposal handling capacity for the Guanyun HWL facility, but notes there is considerable volatility in the monthly activity.

Table 5.2 Guanyun HWL Facility — Monthly Waste Disposal Handling Capacity

(Tons)

Month	Quantity	Percent of Annual Design Disposal Capacity, %
May 2016	1,345	6.73
June 2016	3,691	18.46
July 2016	2,181	10.91
August 2016	1,377	6.89
September 2016	1,492	7.46
October 2016	1,080	5.40
November 2016	1,931	9.65
December 2016	1,976	9.8
Total	**15,074**	**75.37%**

Source: Nexant Site Visit & Company Information

5.3.2 Unplanned Outages and Unplanned Maintenance

Nexant reviewed technical data related to unplanned outages and unplanned maintenance for Guanyun HWL facility. Nexant has not identified any issues with unplanned outages and unplanned maintenance at the facility. In addition, Nexant concludes there have been no unplanned outages and unplanned maintenance.

5.3.3 Environmental Performance

The Company conducts environmental performance testing at the Guanyun HWL facility with samples taken from surface water, groundwater, leachate, flue gas, landfill hazardous waste, and soil. No environmental incidents have been reported since the facility started up. Based on Nexant's site visit and review of design and operating information, Nexant has not identified any issues with the environmental performance at the facility.

5.4 OPERATIONS AND MAINTENANCE

Nexant reviewed the Guanyun HWL facility management with respect to operations, maintenance and staffing. Nexant also reviewed the O&M practices. Accordingly, Nexant has not identified any issues with the O&M practices at the Guanyun HWL facility.

5.4.1 Operations

Based on Nexant's site visit, the following observations were made:

- Company's staff perform all operations of the Guanyun HWL facility

- The main plant system is suitable for operating properly in the local environment

- There are no fuels, feedstocks, by-products, or steam consumption required for this operation. Leachates, waste treatment compounds and utilities are consumed on a periodic basis in accordance with the O&M manuals

- All underground water for the Guanyun HWL facility is supplied from internal on-site bore-well

- There are no major Health, Safety, and Environmental (HSE) incidents that have occurred in the reporting period in the Company information

Nexant has not identified any issues with the operations program.

5.4.2 Maintenance

Based on Nexant's site visit and review of relevant information, the following observations were made:

- Company's O&M personnel routinely check and maintain the entire main plant, auxiliary and ancillary systems in accordance with the O&M manuals

- The wastewater treatment facility is still within the warranty period and, as required, the Company's O&M personnel undertake daily maintenance

- Guanyun HWL facility annual maintenance is carried out on the last 2-3 days of the calendar year

- Solidification equipment is not operating continuously and the required maintenance must be scheduled

Nexant has not identified any issues with the maintenance program at the Guanyun HWL facility.

5.4.3 Staffing

Based on Nexant's site visit, the following observations were made:

- The total number of staff on-site is twenty-three (23) persons and is profiled in Table 5.3.

Table 5.3 Staffing

Description	Quantity
Production Management	1
Production Supervisor	1
Production Goods Management	1
Operators	2
Process Supervisor	1
Analyst	1
Wastewaster Treatment	1
Electrical Equipment	1
Support Staff (Administration, Finance, Accounting, Customer Service)	14
Total	**23**

Source: Nexant Site Visit & Company Information

- According to the Company, all the staff have the relevant certificates and qualifications

- The entire O&M team operates on one (1) day shift

Nexant has not identified any issues with the staffing level(s) at the Guanyun HWL facility.

5.5 RISKS AND MITIGATION ASSESSMENT

Table 5.4 provides a summary of issues identified for the Guanyun HWL facility operation and potential mitigation measures.

Table 5.4 Summary of Issues Identified and Potential Mitigation Measures

Issues Identified	Potential Mitigation Measures
Lack of a Spare Parts Management Plan (*Based on information provided by the Company, Guanyun HWL facility currently does not have a spare parts management plan)*	Nexant recommends that Company review current warranty period(s) with OEMs and develop a comprehensive spare parts management plan and program. This includes, but is not limited to, review of all variable and fixed operating expenses (OPEX)

Source: Nexant Site Visit & Company Information

5.6 CONCLUSIONS

Nexant has conducted an independent technical assessment of the Guanyun HWL facility operations and concludes the following:

- There have been no changes in technology or major equipment/systems since the facility started up in April 2016
- No issues have been identified for major systems including process, mechanical, and civil design
- No issues have been identified for historical performance data for disposal handling, unplanned outages and unplanned maintenance and environmental performance. In addition, no environmental incidents have been reported
- No issues have been identified for operations, maintenance and staffing
- The only recommendation that Nexant has is that the Guanyun HWL facility should develop a spare parts management plan
- There are no major Health, Safety, and Environmental (HSE) incidents that have occurred in the reporting period at the Guanyun HWL facility.

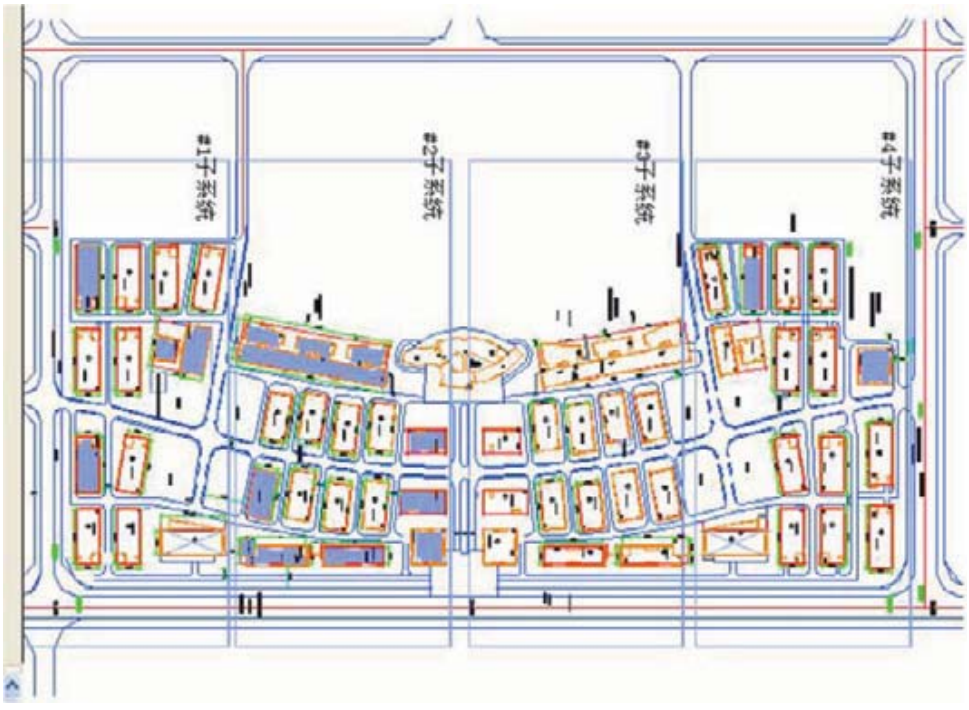
6.1 OVERVIEW

Nexant visited the Zhenjiang Rooftop Solar Energy Project or Zhenjiang Solar Phase II ("Zhenjiang Solar") on December 23, 2016. Based on the Company's Information, Zhenjiang Solar is the largest solar energy asset in terms of power generation design capacity in the entire portfolio of the Company's solar energy projects.

Zhenjiang Solar is located in Sipingshan Road, Zhenjiang Technology New Town, which is approximately twenty (20) kilometers (km) east of the city of Zhenjiang in Jiangsu Province.

The Company is operating the site located in an industrial park spanning over the rooftops of eight-one (81) commercial office buildings with site plot plan as shown in Figure 6.1. Zhenjiang Solar site started up in December 2011.

Figure 6.1 Site Plot Plan for Zhenjiang Solar Facilities



Source: Nexant Site Visit & Company Information

6.2 MAJOR SYSTEM ASSESSMENT

Specific data and information of the major systems are summarized in Table 6.1.

Table 6.1 Summary of Major Systems for Zhenjiang Solar Facilities

(Key Parameters)

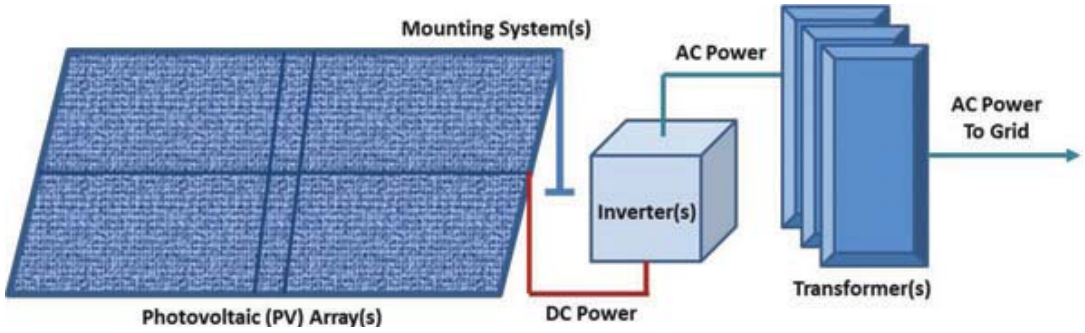
Description	Details
DC Power Rating at Standard Test Conditions (STC)[3]	8.7 Megawatt-Peak (MWp)
AC Power Rating	8.3 Megawatt Alternating Current (MWac)
Module Model(s)	Tianwei Model No. TW240(28)P Jinko Model No. JKM235P-60
Module Rating at STC	240 Watt-Peak (Wp)
Modules per String / Number of Strings	20 Modules per String
Number of Modules	Tianwei Model No. TW240(28)P: 30,040 numbers Jinko Model No. JKM235P-60: 6,340 numbers
Inverter Model / Number of Inverters	Sungrow Model No. SG500KTL: 14 numbers Samil Power Solar Lake Model No. 15000TL: 80 numbers
Inverter Nameplate AC Rating	500 kilowatt Alternating Current (kWac)
Inverter Loading Ratio	1.05
DC Voltage	1,000
PV Array Pitch	0.9 meters (m)
PV Array Tilt	5 and 28 degrees
PV Array Azimuth	0 degrees (Azimuth defined with 0° being due South and positive numbers to the West)
PV Array Mounting System	Fixed Tilt Structure

Source: Nexant Site Visit & Company Information

Nexant undertook a visual inspection and review of the plant and equipment conditions. Figure 6.2 is a schematic representation of the major systems for Zhenjiang Solar facilities.

[3] Standard Test Conditions (STC): Solar Irradiance 1000 Watts/meter^2; Module Temperature 25 °C; Air Mass (AM) 1.5 spectrum

Figure 6.2 Typical Design Configuration for Zhenjiang Solar Facilities



Source: Nexant Site Visit & Company Information

Nexant reviewed the technical data and information for the mechanical, civil and structural, and electrical design for the facility. Examples of major plant equipment are shown in Figure 6.3.

Figure 6.3 Examples of Site Plant Equipment
(Typical Inverter and Electrical System)

Source: Nexant Site Visit & Company Information

6.2.1 PV Modules

Based on Nexant's site visit and review of technical design data, all of the currently utilized PV modules are manufactured and assembled with polycrystalline cells. Each PV Module manufactured by Tianwei has a power rating of 240 Watts-Peak (Wp) and each PV Module manufactured by Jinko has a power rating of 240 Watts-Peak (Wp). Nexant undertook a visual inspection of the PV module arrays installed at Zhenjiang Solar site as shown in Figure 6.4.

Figure 6.4 Photovoltaic (PV) Module Arrays

Source: Nexant Site Visit & Company Information

Specific data and information for the PV Modules are summarized in Table 6.2.

Table 6.2 Key Parameters for PV Modules

Description	Tianwei TW240P60	Tianwei TWY240P60	Jinko JKM235P-60
Maximum Power	240 Wp	240 Wp	240 Wp
Cell Technology / Material	Polycrystalline	Polycrystalline	Polycrystalline
Module Efficiency	14.76 percent	14.76 percent	14.35 percent
Output Power Tolerance	0 to +3 percent	0 to +3 percent	0 to +3 percent
Current at Maximum Power	7.61 Amps (A)	7.7 Amps (A)	7.78 Amps (A)
Voltage at Maximum Power	30.9 Volts (V)	31.2 Volts (V)	29.6 Volts (V)
Current at Short Circuit	8.4 A	8.47 A	8.35 A
Voltage at Open Circuit	37.2 V	37.3 V	36.8 V
Maximum System Voltage	1,000 V (IEC) DC	1,000 V (IEC) DC	1,000 V (IEC) DC
Operating Temperature Range	-40 °C to +85 °C	-40 °C to +85 °C	-40 °C to +85 °C

Source: Nexant Site Visit & Company Information, Tianwei Website http://www.twnesolar.com, Jinko Website http://www.jinkosolar.com

Based on Nexant's site visit and review of technical design data, the PV module arrays are suitable to meet the Zhejiang Solar facilities design parameters.

Based on information provided by the Company, there were some PV modules with broken glass and these have been subsequently replaced. Further, the Company purchased insurance policy(s) for potential adverse weather conditions such as thunder, lightning, storms, and hail.

The daytime hours of utilization for the PV module arrays are limited and reduced due to bad weather such as cloudy and rainy conditions. Further, on dry weather days due to increased ambient pollution conditions, there are large amounts of particulate matter deposits on the PV module arrays which further limit and reduce daytime hours of utilization. The local temperature in Zhenjiang varies between -10 °C to 40 °C and the PV module array system is suitable for operating at lower temperatures of -20 °C.

Other than limited and reduced utilization hours due to bad weather and pollution conditions, Nexant has not identified any issues with the PV modules. In addition, Nexant concludes that all of the PV modules at the Zhenjiang Solar facilities are in good condition.

6.2.2 Civil and Structural

Based on Nexant's site visit, the Zhenjiang Solar site is located in an industrial park on the roofs of commercial office buildings and shares the drainage system with the buildings. The PV module arrays are fastened to a fixed-tilt supporting structure with a tilt angle of approximately five (5) degrees facing south. In addition, each mounting system frame has two (2) rows of PV modules in "landscape" layout and configuration. The mounting supporting structures are made from hot dip galvanized steel jointed together by bolt and nut connection and placed on reinforced concrete block.

Nexant has not identified any issues with the civil and structural aspects of the systems at the Zhenjiang Solar facilities. In addition, Nexant concludes that the mounting system and support structure meet conventional PV industry standards.

6.2.3 Electrical

Based on the Company's Information and Nexant's site visit, Zhenjiang Solar facilities utilize fourteen (14) sets of Sungrow 500 kilo Watt (kW) centric inverters and eighty (80) sets of string inverters with power rating of 15 kW supplied by Samil Power. The Sungrow inverters used are the SG500KTL model. The Samil string inverter used for Zhenjiang Solar is the SolarLake model. Specific data and information for each of the Inverters is summarized in Table 6.3.

Table 6.3 Key Parameters for Inverters

Description	Sungrow SG500KTL	Samil 15000TL
Maximum Input Voltage	880	1,000
MPPT Voltage Range	450 – 820	400 – 850
Maximum Input Current	1,200	21
AC Output Power	500	15
AC Output Voltage	270	230 V
Maximum Output Current	1,070	22
Power Factor (at nominal power)	0.99 at Rated Power	1 at Rated Power
	>0	0.8 at Leading/Lagging
Total Harmonic Distortion (at nominal power)	<3	<3
Maximum Efficiency	98.7	98.2
CEC Efficiency	98.5	97.5
Operating Ambient Temperature Range	-25°C to 5°C	-25°C to 60°C
Cooling System	Forced Fan	Air Cooling
Enclosure	IP20 (Indoor)	IP65 (Outdoor)

Volts Alternating Current (Vac); Volts Direct Current (Vdc); Maximum Power Point Tracking (MPPT); California Energy Commission (CEC)

Source: Nexant Site Visit & Company Information, Sungrow Website http://en.sungrowpower.com, Samil Website http://www.samilpower.com

Based on the Company's Information and Nexant's site visit, the PV module arrays are connected in a string of twenty (20) pieces to increase the direct current (DC) voltage up to 1,000 Volts (V). The DC current from the PV module array strings is connected to the inverters by smart combiner boxes with a data transmission function. The DC power generated by the PV module arrays directly feeds into fourteen (14) sets of 500 kilo Watt DC (kWDC) central inverters manufactured by Sungrow and eight (80) sets of string inverters with a capacity of 15 kWDC manufactured by Samil. The inverters convert the DC electricity into AC electricity. Thereafter, AC voltage is increased to 10 kilo Volt (kV) through a 500 kW step-up transformer manufactured by Hainan Jinpan Electric Co., Ltd. The generated AC power flows through two (2) 10 kV transmission lines to a 10 kV substation owned by the national grid. The length of the transmission lines are 200 meters and 1,500 meters, respectively. The energy tariff meter is located at the Company's side of the 10 kV transmission line resulting in negligible transmission losses.

Nexant has not identified any issues with the Inverters at the Zhenjiang Solar facilities. In addition, Nexant concludes that the Inverters meet conventional PV industry standards.

6.3 PERFORMANCE

The following section provides Nexant's findings and conclusions with respect to the performance of the Zhenjiang Solar facilities based on available data. Nexant obtained and reviewed the historical performance data for monthly energy production, auxiliary plant power consumption, unplanned outages and unplanned maintenance and environmental performance.

6.3.1 Energy Production & Auxiliary Plant Power Consumption

Based on Nexant's site visit, the Company's Information and updated key performance indicators was reviewed. For 2016, the monthly energy production data for the Zhenjiang Solar facilities is shown in Table 6.4.

Table 6.4 Monthly Energy Production

Month	Production (MWh)
January 2016	412.8
February 2016	684.0
March 2016	753.6
April 2016	845.7
May 2016	815.3
June 2016	705.6
July 2016	843.4
August 2016	1018.6
September 2016	745.3
October 2016	394.4
November 2016	470.3
December 2016	520.4

Source: Nexant Site Visit & Company Information

Based on Nexant's site visit and review of design and operating information, Nexant identified that monthly energy production at Zhenjiang Solar facilities is subject to solar irradiance or insolation levels. Accordingly, the PV module arrays operate continually during the entire year and actual energy production is directly dependent upon prevailing climatic conditions. Accordingly, Nexant concluded that for the Zhenjiang Solar facilities, the daytime hours of utilization for the PV module arrays are limited and reduced due to bad weather such as cloudy and rainy conditions. Further, on dry weather days due to increased ambient pollution conditions, there are large amounts of particulate matter deposits on the PV module arrays which further limit and reduce daytime hours of utilization.

For 2016, the monthly auxiliary plant power consumption rate data for the Zhenjiang Solar facilities is shown in Table 6.5.

Table 6.5 Monthly Auxiliary Plant Power Consumption

Month	Auxiliary Plant Power Consumption (MWh)	Auxiliary Plant Power Consumption Rate (%)
January 2016	23.8	5.76 percent
February 2016	21.4	2.63 percent
March 2016	24.1	3.19 percent
April 2016	26.6	3.14 percent
May 2016	26.6	3.26 percent
June 2016	25.2	3.57 percent
July 2016	25.9	3.07 percent
August 2016	27.4	2.68 percent
September 2016	25.9	3.47 percent
October 2016	26.3	6.67 percent
November 2016	26.3	5.39 percent
December 2016	26.0	4.99 percent

Source: Nexant Site Visit & Company Information

Nexant identified that the auxiliary plant power consumption for Zhenjiang Solar facilities varied from 2.63 percent to 5.76 percent. The auxiliary plant power consumption rate is evaluated typically on an annual basis and the rate varies month-to-month depending upon monthly energy production and external influencing factors such as weather conditions and ambient pollution conditions. Nexant concludes that the auxiliary plant power consumption is in accordance with PV industry levels.

6.3.2 Unplanned Outages & Unplanned Maintenance

Nexant reviewed technical data related to unplanned outages and unplanned maintenance for Zhenjiang Solar facilities as shown in Table 6.6. Nexant concludes that the incidents identified have been solely caused due to external factors and not directly resultant from any definitive issues with the main plant system.

Table 6.6 Summary of Unplanned Outages & Unplanned Maintenance

Timeframe	Cause and Information
May 24, 2016 9:30 am to 1:30 pm	Main Plant System stopped in order to support maintenance electric power line by distribution company
November 16, 2016 9:00 am to 1:00 pm	Main Plant System stopped due to maintenance of internet cable line

Source: Nexant Site Visit & Company Information

6.3.3 Environmental Performance

Based on Nexant's site visit and review of design and operating information, Nexant has not identified any issues with the environmental performance of Zhenjiang Solar facilities. In addition, no environmental incidents have been reported since the facility started up.

6.4 OPERATIONS AND MAINTENANCE

Nexant reviewed Zhenjiang Solar facilities management with respect to operations, maintenance and staffing.

6.4.1 Operations

Based on Nexant's site visit, the following observations were made:

- Company's staff perform all operations of the Zhenjiang Solar facilities
- The main plant system is suitable for operating properly in the local environment
- Total annual utilization hours are limited and reduced due to bad weather conditions and particulate pollution
- There are no fuels, feedstocks, byproducts, water consumption, or steam consumption required for this operation. Lubricants are consumed on a periodic basis in accordance with the O&M manuals
- There are no major Health, Safety, and Environmental (HSE) incidents that have occurred in the reporting period in the Company's Information

Other than limited and reduced utilization hours and replacement of "film" PV modules, Nexant has not identified any issues with the operations program of the Zhenjian Solar facilities.

6.4.2 Maintenance

Based on Nexant's site visit and review of relevant information, the following observations were made:

- Based on the Company's Information, the equipment warranty period for Zhenjiang Solar is fifty-four (54) months. In addition, the Original Equipment Manufacturer (OEM) guarantees that the efficiency of PV Modules decrease less than ten percent (10%) in

ten (10) years and decrease less than twenty percent (20%) in twenty-five (25) years. The warranty of the PV Module which needs to be replaced or repaired due to the OEM's responsibilities is sixty-six (66). Nexant concludes this is in accordance with PV industry standards

- Based on the Company's Information, the Company's management system currently includes spare part management. Accordingly, during the warranty period, the Company analyzes the spare parts utilization based on current actual operations and conditions. When the warranty period is completed, the Company conducts spare parts management based on equipment operations and conditions. On an annual basis, the Company prepares the spare parts budget for the specific asset based on the equipment operations and conditions. Nexant concludes that this methodology and approach is in accordance with PV industry standards

- Nexant reviewed the PV module cleaning frequency and maintenance plan and has not identified any issues

- Company's O&M personnel check and maintain the PV module arrays and frequency depends upon bad weather conditions

Nexant has not identified any issues with Zhenjiang Solar facilities maintenance program.

6.4.3 Staffing

Based on Nexant's site visit, the following observations were made:

The total number of staff on-site is five (5) persons and is profiled in Table 6.7.

Table 6.7 Staffing

Description	Quantity
General Manager	1
Technical Manager	1
Engineers	2
Support Staff (Driver, Office Administration)	1
Total	5

Source: Nexant Site Visit & Company Information

- According to the Company, all the staff have the relevant certificates and qualifications

Nexant has not identified any issues with the staffing levels at Zhenjiang Solar facilities. Nexant concludes that the staffing meets the applicable O&M requirements.

6.5 RISKS AND MITIGATION ASSESSMENT

Table 6.8 provides a summary of issues identified for the Zhenjiang Solar facilities operation and potential mitigation measures.

Table 6.8 Summary of Issues Identified & Potential Mitigation Measures

Issues Identified	Potential Mitigation Measures
Tianwei New Energy PV Module Co., Ltd is bankrupt (*Based on information provided by the Company*)	Nexant recommends that Company reviews any post-bankruptcy "successors" or owners to Tianwei and renew or extend the applicable OEMs warranty period(s) for the required duration in accordance with OEM requirements and generally accepted industry standards. If otherwise, the Company may need to consider alternative and/or remedial measures and contingencies to preclude any technical and commercial lapses which may occur during the economic life of Zhenjiang Solar facilities

Source: Nexant Site Visit & Company Information

6.6 CONCLUSIONS

Nexant has conducted an independent technical assessment of the Zhenjiang Solar facilities and concludes the following:

- No changes in technology or major equipment/systems from the original design basis for the operation
- No issues have been identified with the mechanical systems, civil and structural, or electrical design
- Other than limited and reduced utilization hours due to bad weather and high particulate pollution levels, no issues have been identified with the historical performance data for monthly energy production
- No issues have been identified with unplanned outages and unplanned maintenance and environmental performance
- No issues have been identified with operations, maintenance and staffing
- There are no major Health, Safety, and Environmental (HSE) incidents that have occurred in the reporting period.

7.1 OVERVIEW

Nexant visited the Ningwu Wind Project, consisting of the Changfang Mountain Wind Project (Phase I) and the Zhaojia Mountain Wind Power Project (Phase I), on December 23, 2016. Both wind power generating facilities are at the same location with the same power generation design capacity. Based on the Company's Information, Ningwu Wind facilities are the only wind power project in the Company's entire portfolio of wind energy projects.

Ningwu Wind facilities are located in Ningwu County, which is approximately sixty (60) km northwest of Xinzhou City in Shanxi Province. Ningwu Wind facilities, as shown in Figure 7.1, consist of forty-eight (48) total units of Gamesa G97 wind turbine generators. Each wind turbine generator has a rated capacity of 2.0 MWe and is connected via a 110 kV transmission line to the regional grid.

The Company started to measure wind resources in 2011, preliminary work began in 2013, and construction started in June 2014. Ningwu Wind facilities have been in operation since August 2015.

Figure 7.1 Ningwu Wind Turbine Generators

Source: Nexant Site Visit & Company Information

7.2 MAJOR SYSTEMS ASSESSMENT

Specific data and information of the major systems are summarized in Table 7.1.

Table 7.1 Summary of Major Systems for Ningwu Wind Facilities

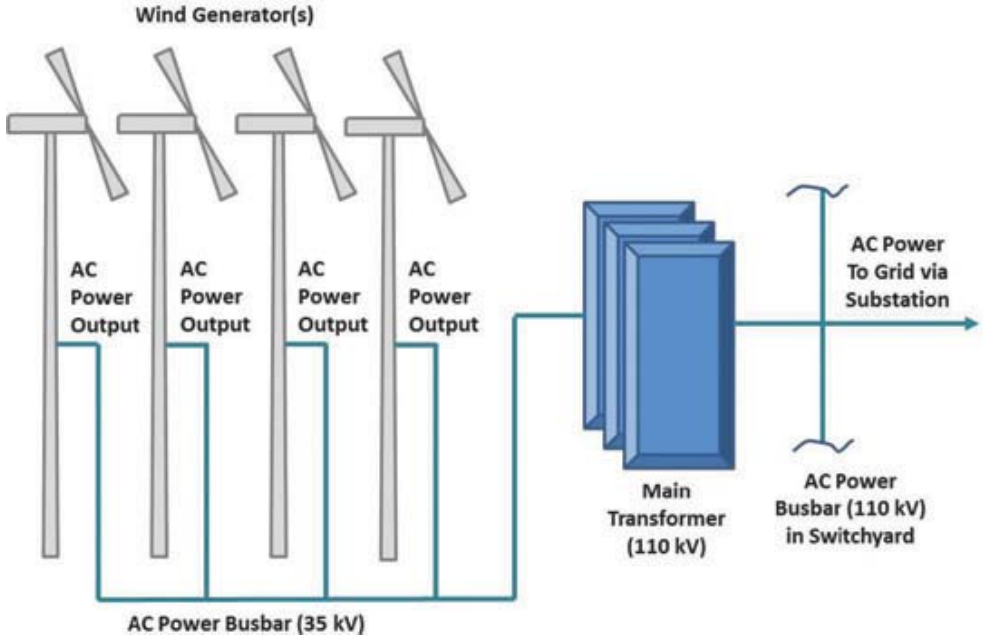
(Key Parameters at Changfang Mountain and Zhaojia Mountain)

Description	Details
Installed Capacity	48 Megawatts (MWe) at each site or Total 96 MWe
Wind Turbine Generator Model and Rating	Gamesa G97
Wind Turbine Generator Model Rating	2.0 MWe
Number of Wind Turbine Generators	24 numbers at each site or Total 48 numbers
Hub Height	78 Meters (M)
Feasibility Annual Power Generation	117.0 Gigawatt-hours (GWh) (*from micrositing report of the site*)

Source: Nexant Site Visit & Company Information

Nexant undertook a visual inspection and review of the plant and equipment conditions. Figure 7.2 is a schematic representation of the Ningwu Wind facilities operation.

Figure 7.2 Typical Design Configuration for Ningwu Wind Facilities

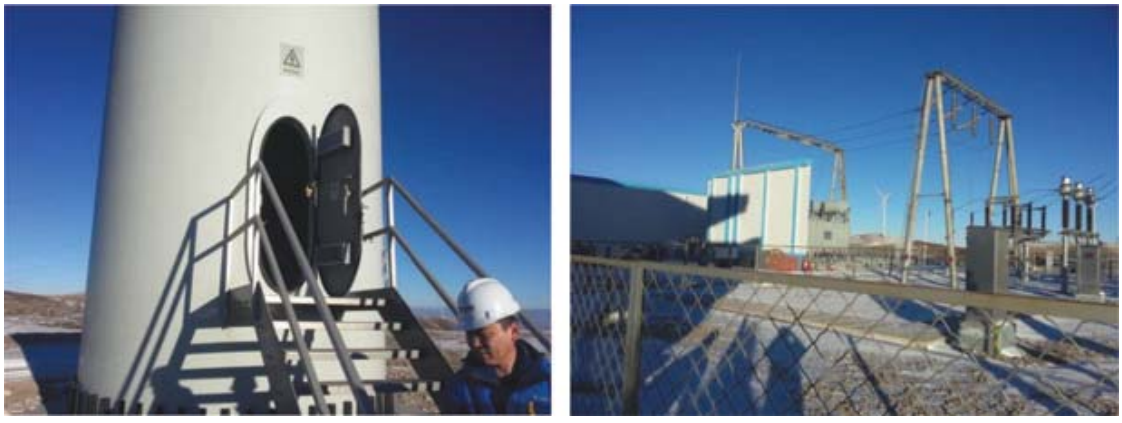


Source: Nexant Site Visit & Company Information

Nexant reviewed the technical data and information for the mechanical, civil and structural, and electrical design for the facility. Examples of major plant equipment are shown in Figure 7.3.

Figure 7.3 Examples of Site Plant Equipment

(Typical Wind Tower Structure and Power Switchgear System)



Source: Nexant Site Visit & Company Information

7.2.1 Wind Turbine Generators

Based on Nexant's site visit and review of technical design data, the wind turbine generators have high flexibility and are suitable to meet Ningwu Wind facilities design and weather parameters. The design of the wind turbine generators is based upon operating in wind speeds of 3-25 meters per second (m/s), angle 5 to 90 degrees and temperature of -30 to 45 °C. Key technical data for the wind turbine generators are summarized in Table 7.2. Based on information provided by the Company, the wind turbine generators are supplied by Gamesa of Spain, one of the leading wind turbine manufacturers in the global market. As of 2013, Gamesa had installed over 28,000 MW of wind turbine generators worldwide. Nexant has not identified any issues with the wind turbine generators at Ningwu Wind facilities. In addition, the wind turbine generators meet current wind energy industry requirements and standards.

Table 7.2 Key Parameters of Wind Turbine Generators

Description	Details
Rated Power	2,000 kilowatts (kWe)
Hub Height	78.90 Meters (m)
Number of Rotor Blades	3
Rotor Diameter	97.0 Meters (m)
Swept Area	7,390 Square Meters (m^2)
Rotor Orientation	Upwind
Rotor Speed	9 - 19 revolutions per minute (rpm)
Rated Wind Speed	12 meters / second (m/s)
Cut-in Wind Speed	3 m /s
Cut-out Wind Speed	25 m/ s[(4)]
Design Life	20 years

Source: Nexant Site Visit & Company Information and Gamesa Website http://www.gamesacorp.com

7.2.2 Civil and Structural

Table 7.3 presents key design parameters for the Ningwu Wind facilities.

Table 7.3 Ningwu Wind General Civil and Structural Design Parameters

Parameter	Description
Seismic design intensity	7 degree (0.15 g)
Seismic site classification	Grade I1 to II

Source: Nexant Site Visit & Company Information

Based on Nexant's site visit and review of the design and operating information, Nexant has not identified any issues with the civil and structural design at Ningwu Wind facilities. In addition, Nexant concludes that the wind turbine generator structural towers utilized meet current wind energy industry requirements and standards.

7.2.3 Electrical

At Ningwu Wind facilities, each wind turbine generator's output is at 690 Volts (V) AC and is increased to 35 kilo Volts (kV) in the generator voltage transformer located at the bottom of each wind turbine generator. The output power is then transported via a common 35 kV busbar to the main transformer and increased to 110 kV. It is then connected via common 110 kV busbar in the switchyard and thereafter interconnected with power exported via one (1) 110 kV transmission line and sold into the national grid.

(4) Gamesa G97 has a progressive cut-out that reduces output to below rated power, from 22 to 25 m/s

Based on the information provided by the Company, Ningwu Wind facilities electrical system includes three levels:

- 110 kV
- 35 kV
- 400V

Based on Nexant's site visit and review of design and operating information, Nexant has not identified any issues with the electrical system design. In addition, Nexant concludes that the electrical system design meets current wind energy industry requirements and standards.

7.3 PERFORMANCE

The following section provides Nexant's findings and conclusions with respect to the performance of the Ningwu Wind facilities based on available data. Nexant obtained and reviewed the historical performance data for monthly energy production, auxiliary plant power consumption, wind turbine generator availability rate, unplanned outages and unplanned maintenance and environmental performance.

7.3.1 Monthly Energy Production, Auxiliary Plant Power Consumption & Wind Turbine Generator Availability

Following end of construction in mid-2015, and commissioning and stabilization in the second half of 2015, stable production began during 2016. Monthly energy production, auxiliary plant power consumption and wind turbine generator availability for Ningwu Wind facilities is presented in Table 7.4 for Changfang Mountain and Table 7.5 and Zhaojia Mountain respectively.

Table 7.4 Ningwu Wind Facilities — Changfang Mountain

(Monthly Energy Production, Auxiliary Plant Power Consumption, Wind Turbine Generator Availability)

Month	Monthly Energy Production (MWh)	Percentage of Annual Target Production (%)	Auxiliary Plant Power Consumption Rate (%)	Wind Turbine Generator Availability (%)
January 2016	14,163	15.15 percent	1.62 percent	95.76 percent
February 2016	8,023	23.66 percent	2.47 percent	96.31 percent
March 2016	12,560	37.13 percent	1.23 percent	96.92 percent
April 2016	14,358	52.54 percent	0.85 percent	100.00 percent
May 2016	14,681	68.33 percent	0.88 percent	99.87 percent
June 2016	6,798	75.64 percent	1.22 percent	99.77 percent
July 2016	10,416	86.81 percent	1.24 percent	99.23 percent
August 2016	7,348	75.73 percent	2.01 percent	99.44 percent
September 2016	6,552	85.26 percent	1.94 percent	99.18 percent
October 2016	11,565	95.67 percent	1.09 percent	99.09 percent
November 2016	15,842	109.93 percent	1.05 percent	99.04 percent
December 2016	8,543	117.57 percent	0.83 percent	Not Available

Source: Nexant Site Visit & Company Information

Table 7.5 Ningwu Wind Facilities — Zhaojia Mountain

(Monthly Energy Production, Auxiliary Plant Power Consumption, Wind Turbine Generator Availability)

Month	Monthly Energy Production (MWh)	Percentage of Annual Target Production (%)	Auxiliary Plant Power Consumption (%)	Wind Turbine Generator Availability (%)
January 2016	12,511	13.44 percent	1.25 percent	100.00 percent
February 2016	6,938	20.85 percent	1.64 percent	96.00 percent
March 2016	12,467	Not Available	0.22 percent	Not Available
April 2016	12,147	47.26 percent	0.97 percent	93.04 percent
May 2016	13,116	61.36 percent	0.97 percent	95.26 percent
June 2016	5.048	66.75 percent	1.84 percent	92.26 percent
July 2016	8,835	76.21 percent	1.54 percent	98.87 percent
August 2016	6,602	66.60 percent	2.19 percent	99.36 percent
September 2016	6,364	75.52 percent	1.91 percent	99.33 percent
October 2016	11,443	85.82 percent	1.18 percent	99.27 percent
November 2016	14,095	98.51 percent	1.45 percent	99.02 percent
December 2016	7,399	105.14 percent	1.39 percent	Not Available

Source: Nexant Site Visit & Company Information

Based on Nexant's site visit and review of design and operating information, Nexant notes the following:

- Monthly energy production at Ningwu Wind facilities is subject to adverse weather conditions. Accordingly, Nexant concludes that the wind turbine generators operate continually during the entire year and energy production and utilization is directly dependent upon prevailing climatic conditions

- The Auxiliary plant power consumption typically ranges from 0.83 percent to 1.94 percent which is in accordance with wind industry levels. In some months, the consumption typically ranges from 2.01 percent to 2.24 percent which is higher than wind industry levels

- The wind turbine generator availability rate at Ningwu Wind facilities varies from 92.26 percent to 100 percent which is high availability and in accordance with wind industry levels. Accordingly, Nexant concludes that in order to maintain overall grid stability, the national grid and dispatch control requires that the Ningwu Wind facility not operate the plant beyond its design capacity and limits utilization and energy dispatch

7.3.2 Unplanned Outages and Unplanned Maintenance

Nexant reviewed technical data related to unplanned outages and unplanned maintenance for the Ningwu Wind facilities as shown in Table 7.6 and Table 7.7 for the Changfang Mountain Wind Project and Zhaojia Mountain Wind Power Project, respectively. Nexant concludes that the incidents identified have been caused due to adverse weather conditions, regular and planned maintenance, external factors and not directly resultant from any definitive issues with the main plant equipment or systems.

Table 7.6 Summary of Unplanned Outages and Unplanned Maintenance for Changfang Mountain Wind Project (Phase I)

Timeframe	Cause and Information
June 2016	Due to yearly maintenance
July 24, 2016 to July 26, 2016	Due to strong wind and thunder, seven (7) wind turbines were shut down
August 6, 2016 to August 8, 2016	Due to strong wind and thunder, seven (7) wind turbines were shut down

Source: Nexant Site Visit & Company Information

Table 7.7 Summary of Unplanned Outages and Unforeseen Maintenance for Zhaojia Mountain Wind Power Project (Phase I)

Timeframe	Cause and Information
January 23, 2016 to January 27, 2016	Due to strong wind, fog and heavy snow, fourteen (14) wind turbine generators were shut down
February 13, 2016 to February 28, 2016	Due to strong wind, fog and heavy snow, twelve (12) wind turbines were shut down
June 6, 2016 to June 17, 2016	Motianling Wind Station underwent maintenance
July 20, 2016	Trip was caused by strong wind and heavy rain
September 25, 2016	Trip was caused by animal (cat)
November 19, 2016 to November 20, 2016	Repairs to 35kV Collector Line II B1- #4

Source: Nexant Site Visit & Company Information

7.3.3 Environmental Performance

Based on Nexant's site visit and review of design and operating information, Nexant has not identified any issues with the environmental performance of Ningwu Wind facilities. No environmental incidents have been reported since the facility started up.

7.4 OPERATIONS AND MAINTENANCE

Nexant reviewed Ningwu Wind facilities management with respect to operations, maintenance and staffing.

7.4.1 Operations

Based on Nexant's site visit, the following observations were made:

- The Company's staff perform all operations at the Ningwu Wind facilities
- In order to maintain overall grid stability, the national grid and dispatch control requires that the Ningwu Wind facility not operate the plant beyond its design capacity
- There are no fuels, feedstocks, by-products, water consumption, or steam consumption required for this operation. Lubricants are consumed on a periodical basis in accordance with the O&M manuals
- Ningwu Wind facilities operations team face challenging weather conditions during the rainy season with thunder, lightning and other resulting issues

- During the course of Ningwu Wind facilities operations there have been no major technical modifications since start-up in August 2015

- There are no major Health, Safety, and Environmental (HSE) incidents that have occurred in the reporting period in the Company information

Nexant has not identified any issues with the operations program of the Ningwu Wind facilities.

7.4.2 Maintenance

Based on Nexant's site visit and review of relevant information, the following observations were made:

- The Company conducts routine reviews and basic-level maintenance on a daily basis

- Major maintenance is conducted quarterly, semi-annually and annually

- The next plant facility turnaround is scheduled for July 2017

- Based on information provided by the Company, the wind turbine generators are in the warranty period and Gamesa, the Original Equipment Manufacturer (OEM), provides the wind turbine generator maintenance. Based on the Company's Information, the equipment warranty period for Ningwu Wind facilities is two (2) years for the main equipment (blade, electric generator, gear case, main shaft, transformer and yaw system). Nexant concludes this is in accordance with wind industry standards

- Based on the Company's Information, the Company's management system currently includes spare part management. Accordingly, during the warranty period, the Company analyzes the spare parts utilization based on current actual operations and conditions. When the warranty period is completed, the Company conducts spare parts management based on equipment operations and conditions. On an annual basis, the Company prepares the spare parts budget for the specific asset based on the equipment operations and conditions. Nexant concludes that this methodology and approach is in accordance with wind industry standards

- Unplanned maintenance incidents have primarily been caused by weather conditions (lightning, thunder, and severe weather). The Company has obtained insurance policy(s) to cover such weather conditions

Nexant has not identified any issues with Ningwu Wind facilities maintenance program.

7.4.3 Staffing

Based on Nexant's site visit, the following observations were made:

- The total number of staff on-site is twenty-seven (27) persons and is profiled in Table 7.8.

Table 7.8 Staffing

Description	Quantity
General Management / Sales	4
Accounting	2
Operations	14
Equipment & Maintenance	5
Others (Chef & Cleaner)	2
Total	27

Source: Nexant Site Visit & Company Information

- According to the Company, all the staff have the relevant certificates and qualifications

Nexant has not identified any issues with the staffing levels at Ningwu Wind facilities. Nexant concludes that the staffing meets the applicable O&M requirements.

7.5 RISKS AND MITIGATION ASSESSMENT

Table 7.9 provides a summary of issues identified for the Ningwu Wind facilities operation and potential mitigation measures.

Table 7.9 Summary of Issues Identified & Potential Mitigation Measures

Impact of abnormal weather conditions	Nexant recommends that Company reviews with various stakeholders (management, OEMs, staff, O&M personnel, national grid and national / provincial authorities) and incorporate mitigation measures covering aspects of design, operational safety, and hazards

Infrasound[5]	Nexant recommends that Company reviews any potential issues with infrasound with the OEMs and take appropriate course of corrective action to ensure compliance with generally accepted industry standards and national / state regulations, if any
Hazards to Animals, Birds and Endangered Species[6]	Nexant recommends that Company reviews any potential issues with hazards to animals, birds and endangered species with the OEMs and take appropriate course of corrective action to ensure compliance with generally accepted industry standards and national / state regulations, if any

Source: Nexant Site Visit & Company Information

7.6 CONCLUSIONS

Nexant has conducted an independent technical assessment of the Ningwu Wind facilities operations and concludes the following:

- There have been no changes in technology or major equipment/systems from the original design basis for the operation
- No issues have been identified with the mechanical, civil and structural, and electrical design
- Monthly energy production at Ningwu Wind facilities is subject to adverse weather conditions. Accordingly, Nexant concludes that the wind turbine generators operate continually during the entire year and energy production and utilization is directly dependent upon prevailing climatic conditions

(5) Large wind turbines can generate very low frequency sounds and "infrasound" (below 20 Hz) when wind driving them is turbulent. The amount of infrasound depends on many factors, including wind turbine generator design, Original Equipment Manufacturers (OEMs), wind speed, power output, local topography, and presence of nearby turbines (increasing when wake from one turbine enters blades of another). Infrasound cannot be heard and is unrelated to loudness of sound that is heard. Infrasound can only be measured with a sound level meter capable of detecting it (and not using the A-weighted scale)

(6) Globally, there is growing concern about danger to bats, raptors (hawks, eagles, falcons, owls, and vultures) - many of them already endangered - and other large birds, such as ducks, geese, swans, and cranes. Risk of collision not only threatens individual birds but also augments existing threats to their populations. Cumulative effect of multiple facilities may threaten viable breeding of several species already in decline. Some national / state jurisdictions have issued siting guidelines which recommend that wind turbines should not be installed near wetlands, on mountain ridges, near shorelines, or in other locations known as concentration areas for wildlife or at sites subject to frequent fog or low-lying clouds during spring and fall migrations

- The Auxiliary plant power consumption typically ranges from 0.83 percent to 1.94 percent which is in accordance with wind industry levels. In some months, the consumption typically ranges from 2.01 percent to 2.24 percent which is higher than wind industry levels

- The wind turbine generator availability rate at Ningwu Wind facilities varies from 92.26 percent to 100 percent which is high availability and in accordance with wind industry levels. Accordingly, Nexant concludes that in order to maintain overall grid stability, the national grid and dispatch control requires that the Ningwu Wind facility not operate the plant beyond its design capacity and limits utilization and energy dispatch

- No major issues have been identified with respect to unplanned outages, unplanned maintenance and environmental performance

- Other than impact of adverse weather conditions, no other issues have been identified with operations, maintenance and staffing

- There are no major Health, Safety, and Environmental (HSE) incidents that have occurred in the reporting period.

Appendix A Acronym List

A	Amps
AC	Alternating Current
AM	Air Mass
ATS	Automatic Transfer Switch
Ba2+	Barium
BMCR	Boiler Maximum Continuous Rating
Ca[OH]2	Calcium Hydroxide
CEC	California Energy Commission
The Company	China Everbright Greentech Limited
CEMS	Continuous Emissions Monitoring System
COD	Commercial Operation Date
Cr6+	Hexavalent Chromium
Dangshan Biomass	Dangshan Biomass Power Generation Project
DC	Direct Current
DCS	Distributed Control System
GB Standard	Chinese National Standard
GCB	Generator Circuit Breaker
GHBR	Gohigher Bioreactor
Guanyun HWL	Guanyun Hazardous Waste Landfill Project
g/m2	Grams per Square Meter
GW	Gigawatt
GWh	Gigawatt-Hour
HCl	Hydrogen Chloride
HCV	Higher Calorific Value
HDPE	High-Density Polyethylene
Hg	Mercury
HSE	Health Safety & Environmental
The Exchange	Hong Kong Stock Exchange
Hz	Hertz
I&C	Instrumentation and Control
IEC	International Electrotechnical Commission
kcal/kg	Kilocalories per Kilogram
kg/h	Kilograms per Hour
km	Kilometers
kN/m^2	Kilonewton per Square Meter
kPa	Kilopascal
kV	Kilovolts
kW	Kilo Watt
kWac	Kilowatt Alternating Current
kWdc	Kilowatt Direct Current
kWe	Kilowatt Electric

LCV	Lower Calorific Value
LV	Low Voltage
m	Meters
m/s	Meters per Second
m^2	Square Meters
m^3	Cubic Meters
m^3/d	Cubic Meters per Day
mg/m^3	Milligrams per Cubic Meter
MJ/kg	Megajoules per Kilogram
mm	Millimeter
MPa	Megapascal
MPPT	Maximum Power Point Tracking
MVA	Megavolt-Ampere
MW	Megawatt
MWac	Megawatt Alternating Current
MWe	Megawatt Electric
MWh	Megawatt-Hours
MWp	Megawatt-Peak
NaOH	Sodium Hydroxide
Nexant	Nexant
Ningwu Wind	Ningwu Changfangshan Phase I Wind Project
$Nm^3/year$	Normal Cubic Meters per Year
NOx	Oxides of Nitrogen
OEM	Original Equipment Manufacturer
O&M	Operations and Maintenance
OPEX	Operating Expenditure
Pb2+	Plumbous
PHC	Prestressed High Strength Concrete
PPA	Power Purchase Agreement
PV	Photovoltaic
rpm	Revolutions per Minute
RTU	Remote Terminal Unit
SCADA	Supervisory Control and Data Acquisition
SNCR	Selective Noncatalytic Reduction
SNPTC	State Nuclear Power Planning Design & Research Institute
SO_2	Sulfur Dioxide
SO_3	Sulfur Trioxide
STC	Standard Test Conditions
Sucheng Biomass	Sucheng Biomass Heat Supply Project
t/a	Ton per Annum
t/h	Ton per Hour

t/m^3	Ton per Cubic Meter
tpd	Ton per Day
UPS	Uninterruptible Power Supply
UV	Ultraviolet
V	Volts
Vac	Volts Alternating Current
Vdc	Volts Direct Current
Wp	Watt Peak
Zhenjiang Rooftop Solar	Zhenjiang Rooftop Solar Project
Zibo Waste	Zibo Integrated Hazardous Waste Treatment Phase I Project
Zn2+	Divalent Zinc Ion