Site Management Periodic Review Report and

IC/EC Certification Submittal

Excelsior Steel Ball Company, 303 Woodward Ave, Tonawanda, NY

NYSDEC Site No. V00685

Location:

303 Woodward Ave.

Tonawanda, New York 14150

NYSDEC Site No. V00685

Reporting Period: January 01, 2018 to January 31, 2024

Prepared by:

Erie County Department of Environment and Planning

95 Franklin Street, Room 1053

Buffalo, New York 14202

Table of Contents

1.0 EXECUTIVE SUMMARY

This Periodic Review Report (PRR) is provided for the former Excelsior Steel Ball Company site, located at 303 Woodward Ave, Tonawanda, NY -NYSDEC Site No. V00685. This New York State Voluntary Cleanup Program site was remediated in accordance with Voluntary Cleanup Agreement (VCA) Index No. B9-0648-03-10), which was executed on January 28, 2004. The selected remedy included a two-foot cover of clean fill over the site surface and deed restriction that specifies only commercial/industrial use of the site and prohibition of use of groundwater. Periodic reporting to NYSDEC is required to verify adherence to the stipulations and criteria in place for the reuse of the 303 Woodward Ave. property. The Reporting Period for this report January 01, 2018 to January 01, 2024.

During this reporting period, Erie County entered into an agreement with Montante Solar to install a 450kw-dc/ 300kw-ac Solar Array on the site. Montante provided specifications and drawings for the facility that included minimal surface disturbance and received a building Permit from Erie County in 2020 (Appendix 2). Montante's contractor, ACS, developed a soil management plan (SMP) (Appendix 4a) for the solar array installation that proposed minimal surface disturbance and was approved by the NYSDEC in October 2020 (Appendix 4b). Copies of the permit and SMP approval are provided in Appendix 4. Construction of the array began in July 2021 and was completed in January 2022. The site cover was restored to pre-installation condition. An installation summary with pictures and diagrams is provided as (Appendix 4e). Erie County and Montante have entered into a five year lease agreement with options to extend for the operation of the solar array in place at the site. Site inspections are conducted annually.

1.1 Site Summary

The property known as the former Excelsior Steel Ball site NYSDEC VCP #V00685, is an approximately 2.190-acre site located in an industrial area at 303 Woodward Avenue in the Town of Tonawanda, Erie County. It is bounded by railroad lines to the east and industrial facilities to the north, south and west.

The site was a former ball bearing manufacturing facility and formerly housed several manufacturing and storage buildings. Underground Storage Tanks (USTs), transformers and various industrial wastes and fill materials were potential contaminant sources at the site.

Through the State Voluntary Cleanup Program, Erie County and the Town of Tonawanda completed Remedial Investigations and Remedial Actions at the site to allow for future commercial/industrial re-use. The remedial action was completed in 2004. The remedy for the site included removal and disposal of contaminated soils, demolition and disposal of site buildings, removal of USTs and covering of the site with clean soil and the filing of a deed restriction with the Town and County. Copies of these remediation reports are available at the NYSDEC Infolocator site page linked here:

https://www.dec.ny.gov/cfmx/extapps/derexternal/haz/details.cfm?ProgNo=V00685

In 2020 Erie County and the Town of Tonawanda issued an RFP for the development of solar array's on various underutilized County owned parcels, including the 303 Woodward Avenue site. Montante Solar was awarded the contract and submitted plans and specifications for the installation of the solar facilities on the site in accordance with the permitted site use and deed restrictions that were in place as elements of the site Voluntary Cleanup Agreement with NYSDEC (Index No. B9-0648-03-10).

Plans for a 450kw-dc/ 300kw-ac Solar Array and a site Soil Management Plan were developed, presented, approved and permitted for the 303 Woodward Avenue property with minimal surface disturbance as a key project element. Any activities related to the installation of the solar array at the aforementioned site were in conformance with the New York State Voluntary Cleanup Program Final Remedial Report, dated September 2004 and prepared by EnSol, Inc., and the Soil Management Plan, dated October 2020 and prepared by ACS. Each of the activities that involved ground disturbance are further explained in the site remediation actions in Section 2.2.

1.2 Effectiveness of Remedial Program

Based on a recent inspection of the Site, the engineering and institutional controls are in place, are performing properly, and remain effective and protective of public health and the environment.

1.3 Non-Compliance

No areas of non-compliance regarding the major elements of the SMP were identified during the preparation of this PRR.

1.4 Recommendations

Overall, the remedial program is viewed to be effective in achieving the remedial objectives for the

Sites. No changes to the SMP or the frequency of PRR submissions are recommended at this time.

2.0 SITE OVERVIEW

2.1 Site Description

The property known as the former Excelsior Steel Ball site NYSDEC VCP #V00685, is an approximately 2.190 acre site located in an industrial area at 303 Woodward Avenue in the Town of Tonawanda, Erie County. It is bounded by railroad lines to the east and industrial facilities to the north, south and west.

The site was a former ball bearing manufacturing facility and formerly housed several manufacturing and storage buildings. Underground Storage Tanks (USTs), transformers and various industrial wastes and fill materials were potential contaminant sources at the site.

Through the State Voluntary Cleanup Program, Erie County and the Town of Tonawanda completed Remedial Investigations and Remedial Actions at the site to allow for future commercial/industrial re-use. The remedial action was completed in 2004. The remedy for the site included removal and disposal of contaminated soils, demolition and disposal of site buildings, removal of USTs and covering of the site with clean soil and the filing of a deed restriction with the Town and County. These activities are described in further detail in the *New York State Voluntary Cleanup Program Final Remedial Report for 303 Woodward Avenue, Town of Tonawanda*, September 2004.

2.2 Summary of Remedial Actions

The design of the solar array that was installed on the site was developed to minimalize ground disturbance. Drawing E051 calls out above-ground conduit installation details that were installed within the clean top soil of the cap without disturbing or exposing any remaining any potential contaminated remaining capped site materials. Groundwater was not encountered during the excavation activities. Activities related to the installation of the solar array at the site were developed in conformance with the New York State Voluntary Cleanup Program Final Remedial Report, dated September 2004 and prepared by EnSol, Inc., and the Soil Management Plan, dated October 2020 and prepared by ACS. Each of the activities that involved ground disturbance are further explained below:

Pile Installation – 7/29/21 – 8/9/21

Mechanical and electrical components of the solar array were installed using a vibratory hammer mounted on an excavator. Piles were driven through the cap and were at no point pulled out once installed. Piles that did not reach proper embedment were cut off and a concrete base was poured per design detail. Bottom of base is 18-20” below grade, putting it within the clean material of the cap. The small amount of excavated clean soil from the cap was side cast on site adjacent to the arrays.

Electrical Trenching – 9/13/21 – 9/16/21

Conduits were installed in an open cut trench along the east edge of the array. Depth of excavation was limited to 18” below grade, putting it within the clean soil of the cap, and the trench was backfilled with concrete. The small amount of excavated clean soil from the cap was side cast on site adjacent to the arrays.

Utility Pole Sleeve – 1/11/22 – 1/12/22

A corrugated metal pipe (CMP) was installed to a depth of 9' below finished grade to provide a clean corridor for the utility to install their pole. Approximately 10 yds of excavated material was directly loaded into a dumpster and disposed of at Waste Management Chaffee LF (app 6d). The CMP was backfilled, both outside and inside, with clean #1A stone from Lafarge (app 6e). Excavated material appeared consistent with what was described in the Final Remedial Report, and no odors or sheens were observed.

Solar Panel Materials

The solar panels installed at the site were manufactured by Canadian Solar and all photovoltaic module designs undergo Toxicity Characteristic Leaching Procedure (TCLP) testing to monitor the presence of any toxic metal substances (arsenic, barium, cadmium, chromium, lead, mercury, selenium, silver) according to TCLP Standard EPA Test Method 1311, as issued by the U.S. Environmental Protection Agency (EPA) under the Toxic Substances Control Act (TSCA) for landfill disposal of modules. The Solar modules and system solutions comply with the European Union's REACH (Registration, Evaluation, Authorization, and Restriction of Chemicals) regulation for chemicals (EC) No. 1907/2006, as well as its implementation guidelines issued by the European Chemical Agency (ECHA). The products, classified as "articles" within the REACH directive, do not release any chemical substances under normal or reasonably foreseeable conditions of use. Information on the solar panels is included in Appendix 3a.

3.0 PERFORMANCE, EFFECTIVENESS & PROTECTIVENESS OF THE REMEDY

All remedial actions prescribed in the VCP agreement for the Site were completed and the remedial goals were accomplished through the installation of the Site-wide cover systems to prevent exposure to remaining contamination in the subsurface.

As indicated below in Section 4.1.2, the cover systems were inspected on January 19, 2022, April 5, 2023 and January 31, 2024. Based on the inspections, the cover systems are intact, functioning effectively throughout the Site and are protective of public health and the environment.

4.0 INSTITUTIONAL/ENGINEERING CONTROL (IC/EC) PLAN COMPLIANCE REPORT

4.1 IC/EC Requirements and Compliance

4.1.1 IC Requirements-Site Restrictions

In accordance with the SMP, a series of Institutional Controls (ICs) have been established for the Site. Adherence to these ICs is required by the Environmental Easements. The Environmental Easements are described within the Final Engineering Report, included within Appendix 1. These ICs are:

- Compliance with the environmental easement by the Owner and the Owner's successors and assigns;
- Environmental or public health monitoring must be performed as defined in the SMP;

- Data and information pertinent to site management of the Site must be reported at the frequency and in a manner defined in the SMP;
- All future activities on the property that will disturb remaining contaminated material must be conducted in accordance with the SMP;
- Monitoring to assess the performance and effectiveness of the remedy must be performed as defined in the SMP;
- Access to the Site must be provided to agents, employees or other representatives of the State of New York with reasonable prior notice to the property owner to assure compliance with the restrictions identified by the environmental easements.

Institutional Controls identified in the environmental easements may not be discontinued without an amendment to or extinguishment of the environmental easement. The Site has a series of ICs in the form of restrictions. Site restrictions that apply are as follows:

- The Site may only be used for industrial/commercial uses only;
- The use of groundwater underlying the Site is restricted as a source of potable or process water, without necessary water quality treatment, as determined by the New York State Department of Health or Erie County Health Department;
- Compliance with the SMP is required; and
- The owner of the Site is required to provide an IC/EC certification, prepared and submitted by a professional engineer or environmental professional acceptable to the NYSEC annually or for a period to be approved by the NYSDEC, which will certify that the ICs and ECs put in place are unchanged from the previous certification or that any changes to the controls were approved by the NYSDEC; and, nothing has occurred that impairs the ability of the controls to protect public health and environment or that constitute a violation or failure to comply with the SMP.

Erie County has concluded that the ICs are in force and are being adhered to with respect to the condition and use of the Sites and activities conducted thereon.

4.1.2 Engineering Control-Soil Cover System

Exposure to the remaining contamination in soil/fill at the Site is prevented by the cover systems that were previously placed over the Site. The cover system is comprised of a minimum of 24 inches of NYSDEC approved clean fill overlaying remaining buried material. The Soil Management Plan, which appears in Appendix B, outlines the procedures that are required to be implemented in the event the cover system is breached, penetrated or temporarily removed, and any underlying remaining contamination is disturbed. The cover system is a permanent control and the quality and integrity of this system will be inspected at defined, regular intervals in perpetuity.

On January 19, 2023, Erie County personnel conducted the annual Site inspections, which included traversing the Sites on foot to observe the current conditions. The Site Inspection Form is included herein as Appendix 2. Appendix 3 includes photographs taking during the Site inspection.

The Site consists of a fenced off parcel surrounding rows of solar arrays mounted on surface mounted racks. The cover systems at the time of the Site inspections were observed to be intact and functioning as intended.

4.2 IC/EC Certification

The IC/EC Certification Forms for the Sites are included in Appendix 5 and includes the NYSDEC Site Management Periodic Review Report Notice-Institutional and Engineering Controls Certification Forms.

5.0 MONITORING PLAN COMPLIANCE REPORT

5.1 Requirements

The Monitoring Plan is included in Section 3.0 of the SMP and describes the measures for evaluating the performance and effectiveness of: the remedy to reduce or mitigate contamination at the Site, the soil cover systems, and all affected Site media.

The Monitoring Plan describes the methods to be used for:

- Monitoring the cover system;
- Assessing achievement of the remedial performance criteria;
- Evaluating Site information periodically to confirm that the remedy continues to be effective in protecting public health and the environment;
- Preparing the necessary reports for the various monitoring activities.

To adequately address these issues, the Monitoring Plan provides information on:

- Annual inspection and periodic certification.

5.2 Comparisons with Remedial Objectives

Cover system monitoring was performed in accordance with the SMP, and included the annual visual inspection of the cover system components. The cover system on the site was observed to be intact and functioning as intended, and is continuing to satisfy the remedial objectives for the Site. Copies of site inspection reports from 2022, 2023 and January 2024 are included in Appendix 4.

5.3 Monitoring Deficiencies

No monitoring deficiencies were noted or experienced during the inspection of the cover system or completion of the PRR.

5.4 Monitoring Conclusions and Recommendations

The procedures utilized to evaluate the performance and effectiveness of the cover system were conducted in accordance with the SMP and verified that the cover system is functioning as intended.

No changes to the monitoring plan are recommended.

6.0 OPERATION AND MAINTENANCE PLAN

The remedy for the Site does not rely on mechanical systems to protect public health and the environment. Therefore, no operation and maintenance requirements apply to the Site.

7.0 CONCLUSIONS AND RECOMMENDATIONS

Annual inspections of the Site were performed on January 19, 2022, April 5, 2023 and January 31, 2024 by Erie County personnel as prescribed in the SMP. The cover system on the remainder of the site was observed to be intact and functioning as intended, and is continuing to satisfy the remedial objectives for the Site.

The Site is in compliance with all elements of the VCP agreement , including the Soil Management Plan (SMP). No deficiencies or failures to satisfy the requirements of the SMP were identified.

Erie County has concluded that:

- The required EC/ICs are in place, are performing properly, and remain effective;
- The Site Monitoring Plan is being implemented;
- Operation and Maintenance activities are being conducted properly; and
- The remedy continues to be protective of public health and the environment and is performing as specified in the RAWP and FER.

No changes to the inspection, reporting or certification frequency prescribed in the SMP are recommended.

8.0 REFERENCES

DER-10/Technical Guidance for Site Investigation and Remediation, NYSDEC, May 3, 2010.

Voluntary Cleanup Agreement (Site #V00685-9, Index #B9-0648-03-10), January 2004.

New York State Voluntary Cleanup Program, Final Remedial Report for 303 Woodward Avenue Town of Tonawanda, September 2004.

Former Excelsior Steel Ball Site 303 Woodward Avenue, Tonawanda NY-NYSDEC Site # V00685, Soil Management Plan, October 2020.

FIGURE 1

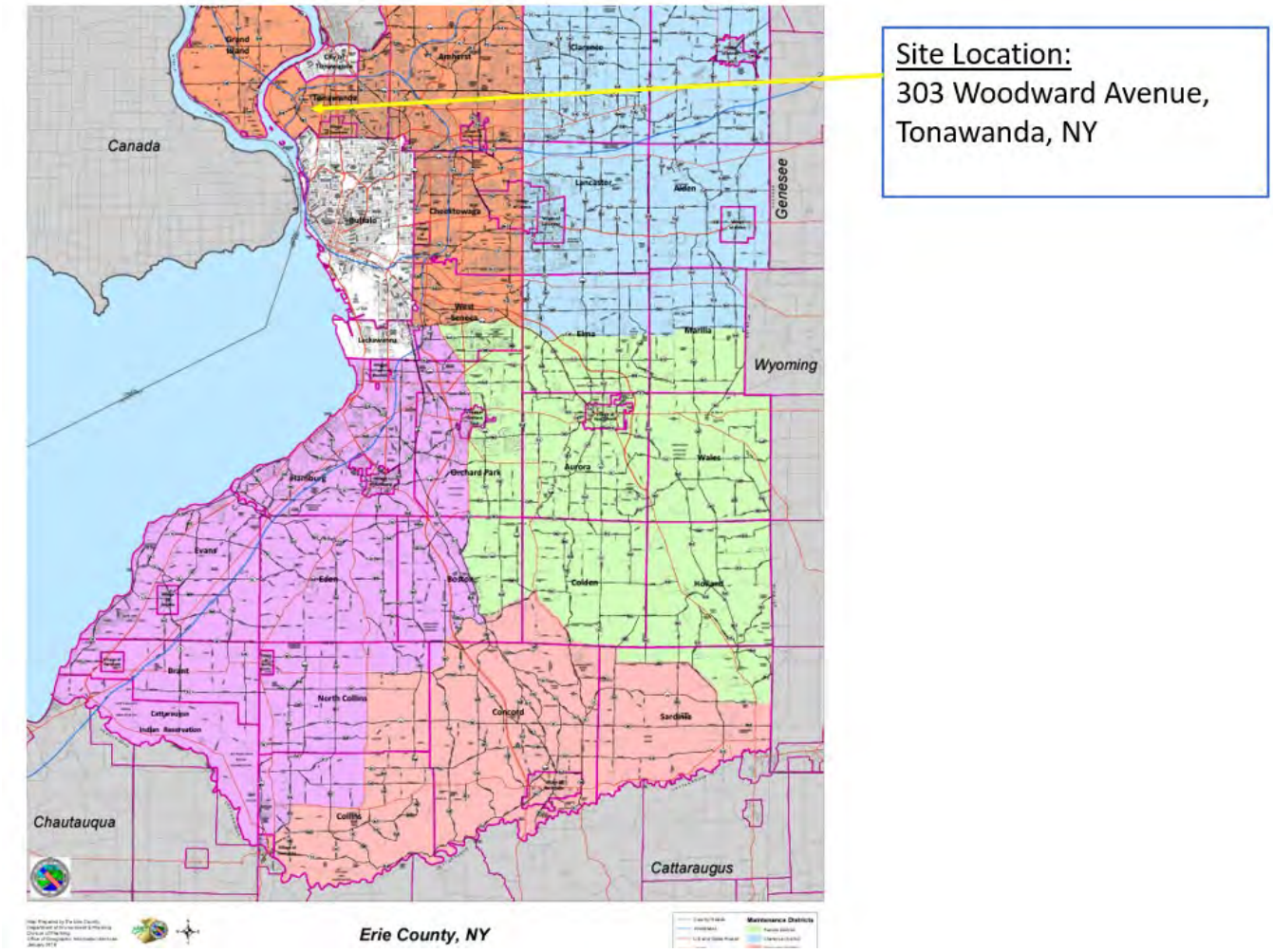

Figure 1-Site Location Map

FIGURE 2

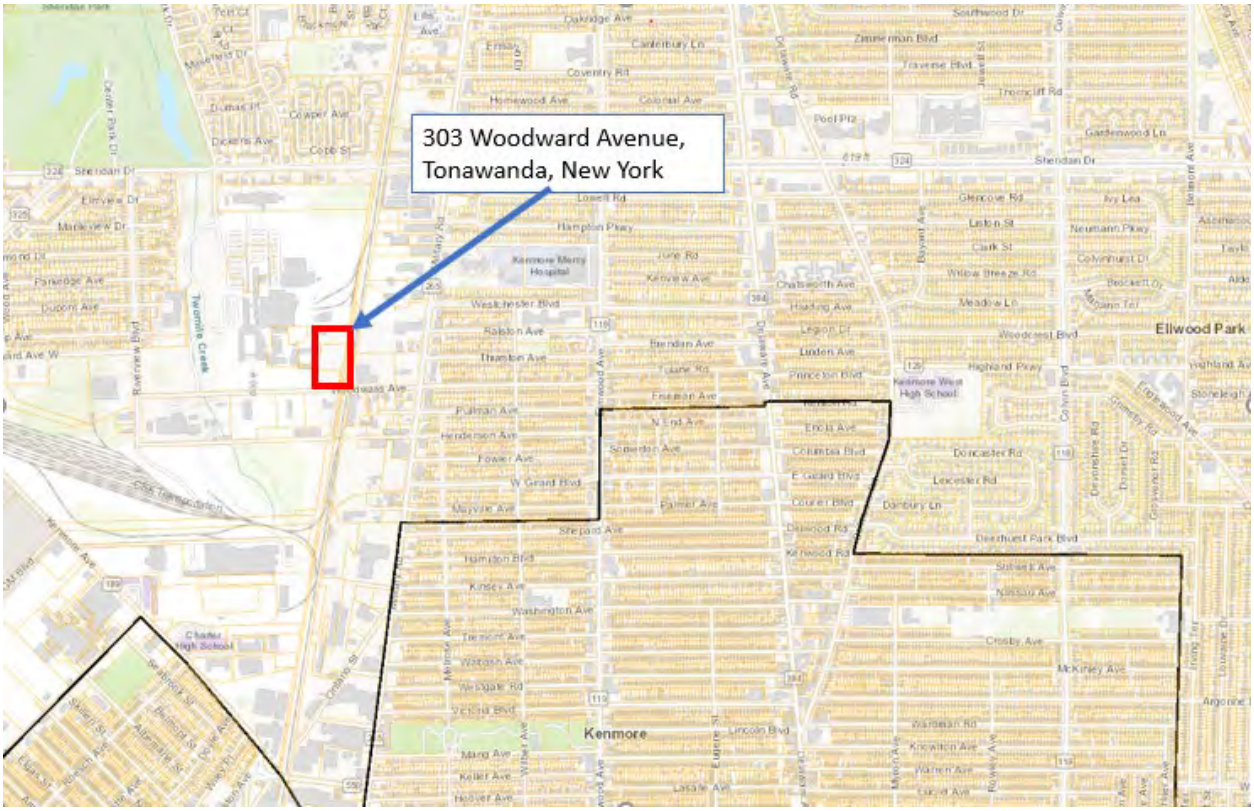

Figure 2-303 Woodward Ave, Tonawanda, NY

Appendix 1

DECLARATION of COVENANTS and RESTRICTIONS

THIS COVENANT is made the 15th day of December 2010, by the County of Erie, a municipal corporation formed under the laws of the State of New York, having its principal offices at 95 Franklin Street, in the City of Buffalo, New York, 14202.

WHEREAS, the Excelsior Steel Ball Company Site is the subject of Voluntary Agreement No. B9-0648-03-10 executed by the Town of Tonawanda and County of Erie, dated January 28, 2004, as part of the New York State Department of Environmental Conservation's (the "Department") Voluntary Cleanup Program, namely that parcel of real property located at 303 Woodward Avenue in the Town of Tonawanda, County of Erie, which is part of lands conveyed by tax foreclosure to The County of Erie by deed dated June 29, 2009 and recorded in the Erie County Clerk's Office on July 15, 2009 in Book 11165 of Deeds at Page 7533 (the "Property"); and

WHEREAS, the Department approved a remedy to eliminate or mitigate all significant threats to the environment presented by the contamination disposed at the Property and such remedy requires that the Property be subject to restrictive covenants.

NOW, THEREFORE, the County of Erie, for itself and its successors and/or assigns, covenants that:

First, the Property subject to this Declaration of Covenants and Restrictions is as shown on a map attached to this Declaration as Appendix "A" and made a part hereof, and consists of all that tract or parcel of land situate in the Town of Tonawanda, County of Erie and State of New York, being part of Lot Number 43, Township 12, Range 8 of the Holland Land Company's Survey, bounded and described as follows:

Beginning at a point in the northerly line of Woodward Avenue at the southeasterly corner of lands conveyed to Union Carbide Industrial Gases, Inc. by deed recorded in the Erie County Clerk's Office Liber 9978 of Deeds at Page 454. Thence easterly along said northerly line of Woodward Avenue, 20.36 feet to the westerly line of lands now or formerly owned by Niagara Mohawk Power Corporation. Thence northerly at an interior angle of 100° 49' 50" and along said Niagara Mohawk Power Corporation's lands, 514.16 feet to a corner of said lands conveyed to Union Carbide Industrial Gases, Inc. Thence along said lands of Union Carbide Industrial Gases, Inc. the following six courses:

Westerly at an interior angle of 79° 10' 10", 302.03 feet by record and 302.05 feet measured to a point.

Southerly at right angles 115 feet to a point.

774-3-1

230667

Westerly at right angles 50 feet to a point.

Southerly at right angles 188.67 feet to a point.

Easterly at right angles 273.59 feet to a point.

Southerly at an exterior angle of 79° 10' 10", 204.98 feet to the point or place of beginning, containing 2.2 acres of land, more or less

Second, unless prior written approval by the Department or, if the Department shall no longer exist, any New York State agency or agencies subsequently created to protect the environment of the State and the health of the State's citizens, hereinafter referred to as "the Relevant Agency," is first obtained, there shall be no construction, use or occupancy of the Property that results in the disturbance or excavation of the Property which results in unacceptable human exposure to contaminated soils.

Third, the owner of the Property shall prohibit the Property from ever being used for purposes other than for industrial/ commercial use (day care, child care, and medical care uses shall not be allowed) without the express written waiver of such prohibition by the Relevant Agency.

Fourth, the owner of the Property shall prohibit the use of the groundwater underlying the Property without treatment rendering it safe for drinking water or industrial purposes, as appropriate, unless the user first obtains permission to do so from the Relevant Agency.

Fifth, the owner of the Property shall continue in full force and effect any institutional and engineering controls required under the Voluntary Agreement and maintain such controls unless the owner first obtains permission to discontinue such controls from the Relevant Agency. The owner of the Property shall comply with the Soils Management Plan ("Soils Management Plan") contained in the "New York State Voluntary Cleanup Program Final Remedial Report for 303 Woodward Avenue Town of Tonawanda" September 2004. The Cover Page and Table of Contents are attached and the Soils Management Plan is incorporated into this Declaration and made enforceable hereto. The owner of the Property shall certify annually by the 1st day of January, commencing January 2011, to the Relevant Agency that all covenants and restrictions set forth in this Declaration have been complied with, and identify any excavation activities undertaken during the previous year.

Sixth, the owner of the Property shall allow the Department, its agents, employees, or other representatives of the State to enter and inspect the Property in a reasonable manner and at reasonable times to assure compliance with the above-stated restrictions.

Seventh, this Declaration is and shall be deemed a covenant that shall run with the land and shall be binding upon all future owners of the Property, and shall provide that the owner and its successors and assigns consent to enforcement by the Relevant Agency of the prohibitions and restrictions that Paragraph X of the Voluntary Agreement require to be recorded, and hereby covenant not to contest the authority of the Relevant Agency to seek enforcement.

Eighth, any deed of conveyance of the Property, or any portion thereof, shall recite, unless the Relevant Agency has consented to the termination of such covenants and restrictions, that said conveyance is subject to this Declaration of Covenants and Restrictions.

IN WITNESS WHEREOF, the undersigned has executed this instrument the day written below.

COUNTY OF ERIE

~~CHRIS COLLINS~~/JEFF HART
~~County Executive~~/Deputy County Executive

UNIFORM CERTIFICATE OF ACKNOWLEDGMENT

STATE OF NEW YORK)
COUNTY OF ERIE) ss:

On the 15th day of December, 2010, before me, the undersigned, personally appeared ~~Chris Collins, Erie County Executive~~/Jeff Hart, Deputy County Executive, personally known to me or proved to me on the basis of satisfactory evidence to be the individual whose name is subscribed to the within instrument and acknowledged to me that he executed the same in his capacity, and that by his signature on the instrument, the entity or individual upon behalf of which the individual acted, executed the instrument.

PATRICIA A. BENSON
Notary Public State of New York
No. 01BE6224514
Qualified in Erie County
My Commission Expires 7/6/20__

Notary Public

APPROVED AS TO CONTENT

Joseph L. Maciejewski
Director of Real Property Tax Services

Date: 11/24/10

APPROVED AS TO FORM:

Eric R. Ziobro
Assistant County Attorney
Document No.: 10-503-EP
Date: 11/24/10

I HEREBY CERTIFY that the within instrument is entitled to be filed, recorded or indexed in your office without charge, pursuant to the Provision of § 8017, C.P.L.R.

Return: Eric Ziobro
Erie County
95 Franklin
Room 1634
Buffalo NY 14202

New York State Voluntary Cleanup Program
Final Remedial Report

for

303 Woodward Avenue
Town of Tonawanda
Town Job #2651

Volume 1 of 2

Prepared For

Town of Tonawanda
Technical Support Department
2919 Delaware Avenue
Kenmore, New York 14217

and

Erie County
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Prepared By

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EnSol Project #: 04-0008
September 2004

Table of Contents

Volume 1

Table of Contents

Figures

Tables

Attachments

Sheets

Volume 2

8.0 Long-Term Site Management

As evidenced by the sampling and analysis, a two-foot cover of clean fill material would provide appropriate remediation of the site for the intended future use. As outlined in the Interim Remedial Measures to NYSDEC, the following measures will ensure the integrity and appropriateness of the remedial actions.

8.1 Institutional Controls

The property at 303 Woodward Avenue has been remediated by the Town of Tonawanda and Erie County under a Voluntary Cleanup Agreement (Site #V00685-9, Index #B9-0648-03-10) with the New York State Department of Environmental Conservation (NYSDEC). Finalization of the Agreement requires the imposition of institutional controls regarding future use of the property in consideration of contaminants that will remain on site subsequent to remediation. These institutional controls consist primarily of deed restrictions specifically prohibiting the use of the property for anything other than commercial/industrial activities without an express written waiver from the NYSDEC. In addition, the use of groundwater as a source for potable or industrial water without NYSDEC approval and proper treatment is strictly prohibited.

Additional provisions associated with the protecting the integrity of the remedial actions at the site include the Soils Management Plan and Site Reporting Requirements generally outlined in the following paragraphs.

8.2 Soils Management Plan

The remedial alternative selected for the voluntary cleanup at 303 Woodward Avenue included the placement of a two-foot layer of stone over the building footprint areas and a two-foot layer of clean soil over the remaining portions of the site that needed remediation. The purpose of the stone/soil cover was to eliminate potential exposures to original site soils that contain contaminants at levels below hazardous criteria. These contaminants include RCRA metals and semi-volatile compounds.

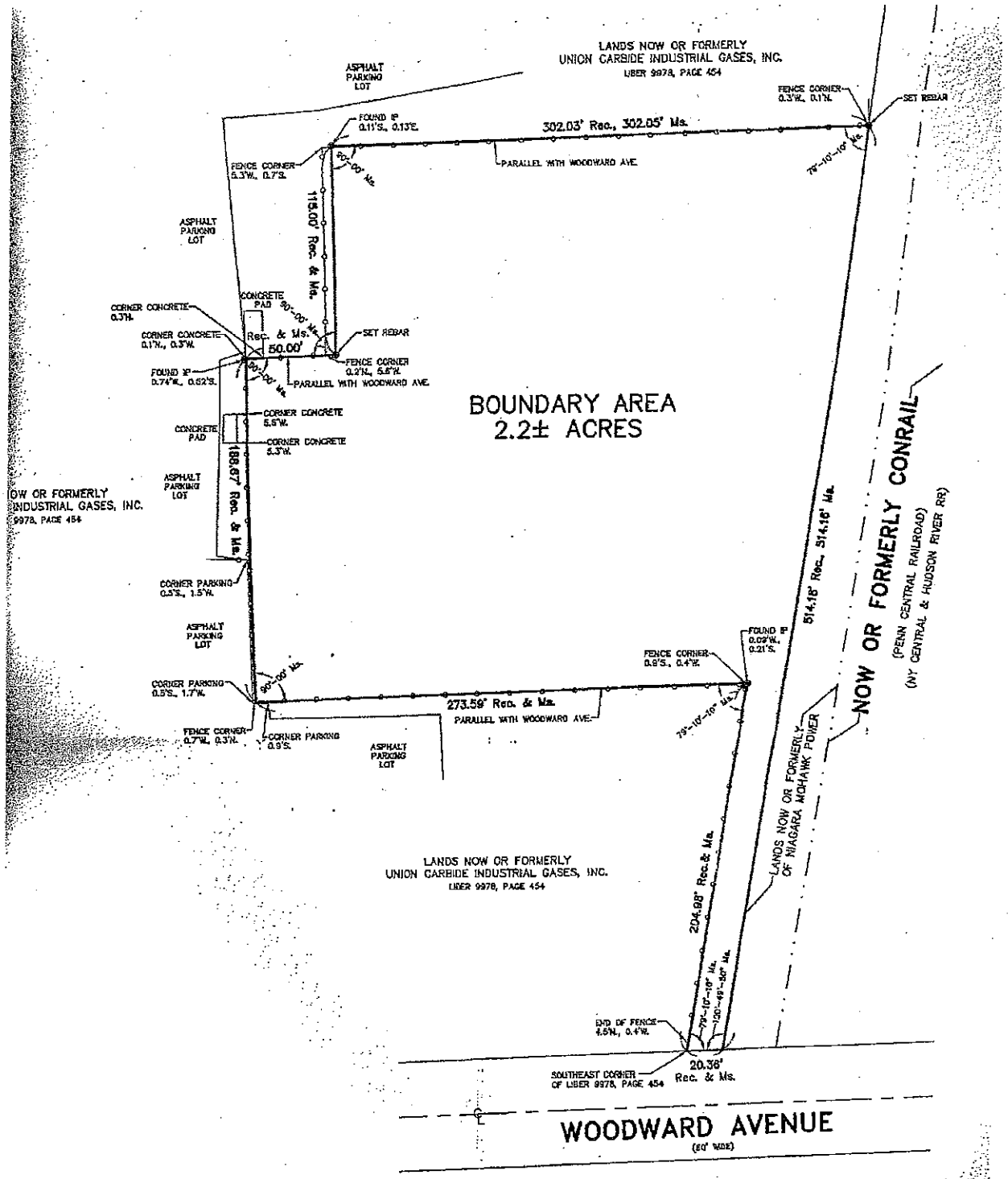
Future use of the site should preclude, wherever possible, excavation or disturbance of the remedial cover. Should any excavation be required where the depth of excavation exceeds two feet, a soils management plan would be required to minimize the risk of exposures, contaminant migration and to ensure proper soil disposal. The soils management plan must be submitted to the NYSDEC for approval prior to excavation. A soils management plan would include the following (as a minimum):

- The use of personal protective equipment by excavation workers to prevent exposures,
- The implementation of runoff control techniques,
- The implementation of dust monitoring and control techniques,
- Contingency plans for encountering suspected hazardous waste,
- The implementation of decontamination techniques for excavation equipment,
- Minimum of one foot of cover (clean fill, asphalt, soil) for excavated material that remains on site,
- Sample collection, and analysis, at a NYSDEC approved laboratory for soils destined for off-site disposal,

- Soil transportation and disposal at an appropriate NYSDEC approved landfill as dictated by soil sample results,
- Provisions for the restoration of the remedial cover to original pre-disturbance condition.

8.3 Site Reporting Requirements

To verify adherence to the stipulations and criteria in place for the reuse of 303 Woodward Avenue, an annual report must be prepared by the property owner and submitted to the NYSDEC Region 9 office. The annual report shall provide information on compliance with the soil management plan and stone/soil cover maintenance provisions as stated above. The report should include any soil sample results completed in the preceding year, along with a description of any soil disturbance and cover restoration conducted as part of the reuse of the site.



BOUNDARY SURVEY

LEASE AGREEMENT

303 Woodward Avenue, Erie County, New York Site

This LEASE AGREEMENT (this "Agreement") is made, dated and effective as of December ___, 2020 (the "Effective Date"), by and among Erie County, a municipal corporation having a principal place of business at 95 Franklin Street, Buffalo, New York 14202 ("County") and Erie Solar Gardens LLC a New York limited liability company with an address of 9085 East Mineral Circle, Suite 320, Centennial, Colorado 80112 ("Lessee"), in light of the following facts and circumstances:

RECITALS

WHEREAS, Lessee is in the business of developing, erecting and operating solar energy conversion systems and power generation facilities for the production and sale of electrical energy;

WHEREAS, the Solar Power Services Agreement dated as of December ___, 2020 (the "SPSA") by and between County and Lessee is attached hereto as Exhibit C. In the event that there is a conflict between the terms and conditions of this Agreement and the terms and conditions of the SPSA, the terms and condition of the SPSA shall be controlling.

WHEREAS, County owns and occupies certain real property comprising approximately four acres of land located in Erie County, New York, as more particularly described on Exhibit A attached hereto and by this reference made a part hereof (the "Property");

WHEREAS, County holds title to the Property for the uses and purposes of the County; and

WHEREAS, Lessee desires to lease the Property and to obtain other rights over the adjoining property owned by County, as more particularly described on Exhibit D attached hereto and by this reference made part hereof (the "Adjoining Property"), and County desires to grant such lease and rights, on the terms and conditions set forth herein.

AGREEMENT

NOW, THEREFORE, in consideration of the mutual obligations and covenants herein contained, and for other good and valuable consideration, the receipt and sufficiency of which are hereby mutually acknowledged, County and Lessee (each, a "Party" and together, the "Parties") hereby agree as follows:

1. Demise of Leasehold Estate.

1.1. Demise. County hereby leases, demises, lets and warrants to Lessee, and Lessee hereby leases, hires and takes from County, the Property for the purposes of developing, installing, operating and maintaining the Power Facilities, together with the right to all rents, royalties, credits and profits derived from solar and other energy generation via the Power Facilities upon, over and across the Property, on the terms provided herein.

1.2. Purpose. The foregoing leasehold estate and grant of rents, royalties, credits and profits created by this Agreement (collectively, the "Leasehold Estate") is for the production of solar energy and for any and all related or ancillary purposes, and not for any other purpose, and Lessee shall have the exclusive right to use the Property and the unobstructed receipt of and access to sunlight across the Property for solar energy purposes, to convert all of the solar resources of the Property and to derive all profits therefrom. For purposes of this Agreement, "solar energy" includes evaluating solar resources, developing solar energy, converting solar energy into electrical energy and collecting and transmitting the electrical energy so converted, together with any and all activities related thereto ("Development Activities"). Development Activities include:

(a) determining the feasibility of solar energy conversion and power generation on the Property, including studies of available sunlight and other data and extracting soil samples;

(b) constructing, reconstructing, erecting, installing, improving, replacing, relocating and removing from time to time, and maintaining, repairing, using and operating, any new, existing, additional or repowered (i) solar power generating equipment, inverters, mounting and tracking systems, monitoring systems, solar collectors, solar energy conversion systems and other power generation facilities, of any type or technology (the "Solar Equipment"); (ii) transmission facilities, including without limitation, overhead and underground transmission, distribution or collector lines, circuit breakers, conduits, foundations, footings, towers, poles, crossarms, guy lines, anchors and wires; (iii) overhead and underground control, communications and radio relay systems; (iv) substations, power blocks, interconnection and/or switching facilities and electric transformers; (v) energy storage facilities; (vi) sunlight measurement, research or development equipment; (vii) control, maintenance and administration buildings; (viii) utility installations; (ix) safety protection facilities; (x) laydown areas and maintenance yards; (xi) roads, road-related structures and erosion control facilities; (xii) signs (which shall be of a size, shape and design, and at a location or locations, approved by County and in conformance with any overall directional graphics or sign program established by County, including local ordinances, if applicable, and County's approval shall not be withheld unreasonably) and fences; and (xiii) other improvements, facilities, machinery and equipment in any way related to or associated with any of the foregoing (collectively, "Power Facilities"), on the Property;

(c) exercising rights of vehicular and pedestrian ingress and egress upon, over and across the Property, for purposes of conducting Development Activities and accessing Power Facilities (whether such Development Activities are conducted, or Power Facilities are located, on the Property, adjacent to the Property or elsewhere) upon, over and across any and all now existing or hereafter constructed access routes or such new or alternative access routes as Lessee shall determine, including the right to construct, reconstruct, install, and improve from time to time, and maintain, repair, use and operate, new, existing or additional routes, including roads, road-related structures and erosion control facilities, on the Property; and

(d) undertaking any other activities, whether accomplished by Lessee or a third party authorized by Lessee, that Lessee reasonably determines are necessary, useful or appropriate to accomplish any of the foregoing purposes.

1.3. Included Rights and Easements. The following rights and easements shall be included within the Leasehold Estate. Upon Lessee's request, County shall execute and deliver to

Lessee one (1) or more documents in recordable form, satisfactory in form and substance to County and Lessee, evidencing the rights and easements granted pursuant to this Section 1.3, and Lessee may cause such documents to be recorded in the official real estate records of the county in which the Property is located. Each easement shall be for a term that is coterminous with the Term plus 180 days for any deinstallation period.

(a) Sunlight Easement. An easement on the Adjoining Property for receipt of and access to sunlight throughout the Property. Any obstruction to the receipt of and access to sunlight throughout the entire area of the Property is prohibited, whether such obstruction is on the Property or on the Adjoining Property.

(b) Power Facility Effects. An easement for any audio, visual, view, light, noise, vibration, electromagnetic or other effect of any kind or nature whatsoever resulting, directly or indirectly, from any Development Activities conducted, or Power Facilities installed, upon the Property or the Adjoining Property, including but not limited to rights to cast shadows and reflect glare onto the Adjoining Property, from the Solar Equipment and/or any and all other Power Facilities, wherever located.

(c) Clearance Rights. An easement to trim, cut down and remove all trees (whether natural or cultivated), brush, vegetation and fire and electrical hazards now or hereafter existing on the Property which might obstruct receipt of or access to sunlight throughout the Property or interfere with or endanger the Power Facilities or Lessee's Development Activities, as determined by Lessee.

(d) Subjacent and Lateral Support. An easement for subjacent and lateral support on the Adjoining Property for Power Facilities located on or in the vicinity of the Property to whatever extent is necessary for the safe construction operation and maintenance of such Power Facilities, as reasonably determined by Lessee. County shall not excavate, nor permit excavation, so near the sides of or underneath the Power Facilities as to undermine or otherwise adversely affect their stability.

(e) Utility Lines. An easement across the Adjoining Property for the installation, maintenance, repair and use of utility lines and equipment, including, without limitation, for water, natural gas and electrical transmission.

(f) Signage. An easement to place signs or advertising related to solar energy on or proximate to Lessee's Power Facilities, such signs or advertising to be subject to those restrictions stated in Section 1.2(b)(xii) of this Agreement.

(g) Access. A non-exclusive easement across the Adjoining Property for access, ingress and egress to and from the Property, in such location as reasonably selected by Lessee and approved by County.

1.4 Utilities. Lessee shall have the right to use the utility service facilities located on the Property upon the Effective Date. Notwithstanding the forgoing, Lessee agrees to pay all cost of all utilities used by Lessee. In the event Lessee fails to pay any utility bill when due, County may at its option, pay the same and collect from Lessee the amounts so disbursed. Failure to pay such amounts within thirty (30) days after the due date shall constitute a default.

2. Term.

2.1. Original Term and Renewal Terms. This Agreement shall be for an initial term (the "Original Term") commencing on the Effective Date and continuing until the twentieth (20th) anniversary of the Operations Date (as defined below) unless the SPSA is extended for Renewal Terms. As used herein, "Term" shall mean the Original Term and any Renewal Terms (as defined below).

2.2. Operations Date. For purposes of this Agreement, "Operations Date" shall mean the date the Power Facilities are installed on the Property and begin delivering electricity (other than test electricity) to the County and shall be a date that is no later than the Operations Date set forth in the SPSA, subject to Force Majeure Events as set forth therein.

2.3. Renewal Terms. Lessee shall have the option, in its sole discretion, to extend and renew the term of this Agreement for up to one (1) period of five (5) years (the "Renewal Term"). Lessee may exercise such option by written notice delivered to County not later than thirty (30) days prior to the expiration of the Original Term. The annual fees payable by Lessee to County during the Renewal Term shall be the same as during the Original Term.

2.4. Termination of SPSA. If the SPSA is terminated during the Term of this Agreement, this Agreement shall terminate on the effective date of termination of the SPSA plus 180 days for any deinstallation period.

3. Payments to County. In consideration of the rights granted hereunder and the rights granted by the County pursuant to the terms and conditions of the SPSA, which specifically includes that Lessee shall sell all electricity generated by the Power Facilities to the County at the rates outlined in the SPSA attached hereto as Exhibit C, Lessee will pay County the amounts set forth in this Section 3.

3.1. Basic Payments and Fees.

(a) Prior to Operations Date. From the Effective Date until the Operations Date, Lessee shall pay County an annual fee equal to one Dollar ($1) per year. Such annual fees shall be payable each year, in arrears, within forty-five (45) days after the end of each calendar year.

(b) After Operations Date. Commencing with the Operations Date and continuing until the expiration or sooner termination of this Agreement, Lessee shall pay County an annual fee equal to one Dollar ($1) per year. Such annual fees shall be payable each year, in arrears, within forty-five (45) days after the end of each calendar year.

3.2. Late Payments. If Lessee fails to make any payment to County required of it hereunder when due, interest shall accrue on the overdue amount, from the date overdue until the date paid, at a rate equal to three percent (3%) per annum plus the prime lending rate as may be published from time to time by *The Wall Street Journal* under the "Money Rates" section; provided, however, that in no event shall such interest rate exceed the maximum rate permitted by law.

4. Ownership of Power Facilities. County shall have no ownership or other interest in any Power Facilities installed on the Property, or any profits derived therefrom, and Lessee may mortgage, sell, lease or remove any or all Power Facilities at any time. Except for the payments described in Section 3 above, County shall not be entitled to any payments, credits, benefits, emissions reductions, offsets, incentives, grants or allowances of any kind, howsoever entitled, attributable to the Power Facilities or the electric energy, capacity or other generator-based products produced therefrom, all of which shall accrue solely to the benefit of Lessee except as set forth in the SPSA. County shall have no ownership or other interest in any scientific or engineering data at any point in time or for any duration of time collected at the Power Facilities or on the Property. Such scientific or engineering data is the sole and exclusive property of Lessee. Possession of such data by County shall not constitute ownership of such data.

5. Taxes. Lessee shall pay all real and personal property taxes, assessments and charges, general and specific, that may be levied or assessed by reason of Lessee's use of the Property, Lessee's leasehold interest under this Agreement, or Lessee's use or ownership of the Power Facilities installed on the Property (collectively, "Taxes"). County shall pay when due any taxes attributable to (a) improvements or facilities installed by County or others (excluding Lessee) on the Property and (b) the underlying value of the Property; except that if an ad valorem or other property tax is imposed on the Solar Equipment, the Parties under the SPSA shall negotiate in good faith in an effort to agree on an adjustment to the Fixed Price under the SPSA to compensate Lessee for its increased cost over the remainder of the SPSA Term, provided, however, that if no agreement is reached, Provider may, within six months of the tax imposition, terminate the SPSA and this Agreement in its sole discretion. For avoidance of doubt, in developing the Fixed Price, Lessee has assumed the Solar Equipment will be exempt from property taxes for fifteen years from the Commercial Operation Date pursuant to New York State Real Property Tax Law Section 487 and the fact Lessee has received no responses from relevant taxing authorities regarding a payment in lieu of taxes (PILOT).

If County should fail to timely pay any taxes, assessments or other governmental charges for which County is responsible hereunder and foreclosure thereof shall be threatened, then, without limiting Lessee's other remedies under this Agreement or otherwise, Lessee may (but shall not be obligated to) pay the same, and County shall reimburse Lessee, or Lessee may set off against amounts due from Lessee to County under this Agreement, all such amounts paid, including any late fees or interest, together with any court costs and reasonable attorneys' fees incurred by Lessee in connection therewith.

6. Lessee's Representations, Warranties and Covenants. Lessee hereby represents, warrants and covenants as follows:

6.1. Insurance. Lessee shall, at its expense, prior to entering the Property to conduct Development Activities, have in place, and shall thereafter maintain, those insurance coverages and limits as required pursuant to Section 9.1 of the SPSA. All other provisions regarding Lessee's insurance obligations in Section 9 of the SPSA are hereby made part of this Agreement, as if they were contained in this Agreement, together with any conforming changes.

6.2. Indemnity. Lessee shall defend, indemnify and hold harmless County and its agents, employees, contractors, subcontractors, successors or assigns from and against losses, liabilities, damages, costs, claims, suits and causes of action, including losses or claims for physical damage to property and for physical injuries or death and including reasonable attorneys' fees and costs of litigation, in each case, to the extent arising out of Lessee's exercise of any rights granted to it under this Agreement or any actions of Lessee or its agents, employees, contractors, subcontractors, successors or assigns on, or use or operation of the Property or the Adjoining Property during the Term, including the construction, operation or removal of Power Facilities or other improvements placed on the Property by Lessee, except to the extent such damage or injury is caused by the negligence or willful misconduct of County or County's agents, employees, contractors, subcontractors, successors or assigns. The foregoing indemnity shall not extend to property damage or personal injuries attributable to risks of known and unknown dangers associated with electrical generating facilities, such as electromagnetic fields, and Lessee shall in no case be liable for losses of rent, business opportunities, profits or any other consequential damages that may result from the conduct of Lessee's Development Activities on the Property.

6.3. No Brokers. Except as may be set forth in the SPSA, no brokers' commission, finders' fees or other charges are due any broker, agent or other party in connection with Lessee's execution of this Agreement, or if any are now due or shall become due in the future, then Lessee shall promptly pay the same from its own funds and shall indemnify, hold harmless and defend County against any and all claims and demands therefor made by any such broker, finder, agent or other party, or any of their respective successors and assigns or other parties claiming through them. The representations made in this Section shall survive the expiration or earlier termination of this Agreement.

6.4. Requirements of Governmental Agencies. Lessee, at its expense, shall comply in all material respects with valid laws, ordinances, statutes, orders and regulations ("Applicable Law") of any governmental agency applicable to the Power Facilities. Lessee shall have the right, in its sole discretion, to contest by appropriate legal proceedings, the validity or applicability to the Property or Power Facilities of any law, ordinance, statute, order, regulation, property assessment or the like now or hereafter made or issued by any federal, state, local or other governmental agency or entity. County will not interfere or may choose to cooperate in every reasonable way in such contest, at no out-of-pocket expense to County. Any such contest or proceeding shall be controlled and directed by Lessee.

6.5. Construction Liens. Lessee shall keep the Property free and clear of all liens and claims of liens for labor and services performed on, and materials, supplies or equipment furnished to, the Property in connection with Lessee's use of the Property pursuant to this Agreement; provided, however, that if Lessee wishes to contest any such lien, Lessee shall, within ninety (90) days after it receives written notice of the filing of such lien, remove or bond over such lien from the Property pursuant to applicable law.

6.6. Hazardous Materials.

(a) Hazardous Materials shall include, without limitation, substances defined or classified as "hazardous substances", hazardous waste", or "toxic substances" under Applicable Law (collectively "Hazardous Materials").

(b) The Parties acknowledge that the Project Site has been remediated under the Voluntary Cleanup Program, which was formerly administered by the New York State Department of Environmental Conservation ("DEC"), and that it is listed on the DEC Environmental Site Remediation Database as the Excelsior Steel Ball Company, Site Code V00685 with a classification of "C". Remediation of the Project Site was completed in 2004 and included removal and disposal of contaminated soils, demolition and disposal of buildings, removal of underground storage tanks and the placement of clean soil. A Declaration of Covenants and Restrictions ("DEC Declaration") dated December 15, 2010 and recorded with the Erie County Clerk's Office on December 16, 2010 in Book 11194, Page 1745 restricts future use to commercial/industrial, and institutional controls including (but not limited to) a Site Management Plan and Soils Management Plan are in place. County shall be responsible for, and fully comply with, any and all reporting requirements of the DEC and the DEC Declaration.

(c) Lessee shall fully comply with all Applicable Law in effect, including requirements of the DEC Declaration and institutional controls, or which shall come into effect during the Term of this Agreement regarding the generation, use, storage, handling, transportation, and disposal of Hazardous Materials. Lessee shall indemnify and hold harmless the County from any and all liability, costs or expenses (including reasonable attorneys' fees) incurred by the County due to the presence of Hazardous Materials brought to the Property by the Lessee or its agents due to the acts, omissions or gross negligence of the Lessee or its employees, officers, agents, representatives, contractors, invitees, visitors or representatives or due to non-compliance with the DEC Declaration or institutional controls.

(d) Lessee shall exercise due diligence in identifying the presence of Hazardous Materials at the Property and shall notify County of such discovery. Unless Lessee or its agents have exacerbated pre-existing Hazardous Materials through their acts or omissions, Lessee shall not be responsible for abating any pre-existing Hazardous Materials which shall remain the responsibility of County. If the County does not abate pre-existing Hazardous Materials, Lessee may judge, in its sole discretion, the Property as unsuitable for development of Power Facilities, and may decide to not build on such Property without triggering a Lessee Default or other adverse consequence under this Agreement.

(e) If, during the performance of this Agreement, Lessee is of the opinion that an event or condition exists at the Property relating to Hazardous Materials which must be reported to a governmental authority, Lessee shall immediately notify County and consult to make a determination as to County's obligation to notify under Applicable Law. Lessee is not authorized to provide any notification on behalf of County, but nothing herein shall preclude the Lessee or any of its agents or contractors from notifying a governmental authority if specifically required to do so under Applicable Law, provided that Lessee must immediately notify County of any and all notifications to the governmental authority.

6.7. Lessee's Authority. Lessee has the unrestricted right and authority to execute this Agreement. Each person signing this Agreement on behalf of Lessee is authorized to do so. When signed by Lessee, this Agreement constitutes a valid and binding agreement enforceable against Lessee in accordance with its terms.

6.8. No Development Undertaking. Nothing expressly stated or implied in this Agreement or represented to County shall be construed as requiring Lessee to undertake construction, installation or operation of any Power Facilities on the Property or elsewhere or prohibit Lessee from removing Power Facilities from the Property, and Lessee makes no representation or warranty as to the likelihood that Power Facilities will be installed upon the Property.

6.9. Improvements. All improvements made on the Property shall be made in accordance with the plans in accordance with the SPSA. The costs of improvements shall be borne solely by Lessee. Any improvements shall be constructed within the time period set forth in Section 2.2 above and in accordance with the requirements of the New York State Uniform Fire Prevention and Building Code, and in compliance with the rules, regulations and requirements of all departments of governmental authorities having jurisdiction with respect thereto. Any and all necessary permits for said construction shall be procured by Lessee, and County shall cooperate with Lessee for such purpose, at no cost to County.

6.10. Independent Contractor. In conducting its business hereunder, Lessee acts as an independent contractor and not as an agent of County or County. The selection, retention, assignment, direction and payment of Lessee's employees shall be the sole responsibility of Lessee, and County shall not attempt to exercise any control over daily performance of duties by Lessee's employees. However, County shall at all times have the right to enforce any statute, law, rule or regulation that County has authority to enforce. Furthermore, County, acting through the Erie County Manager and/or his/her designee, shall have the right to request the removal and replacement of any of Lessee's employees from the Property if the conduct of Lessee's employee becomes disruptive to the operation of the County. Any such request shall be accompanied by a written statement of the reasons for making the request. A request for removal and replacement shall, among other things, note that Lessee's employee was previously given an opportunity to cure and failed to do so. At least thirty (30) days prior to such a request for removal and replacement, County must give written notice to Lessee of the grounds for such recommendation of removal, and Lessee must be given reasonable opportunity to correct such grounds. Lessee may appeal any decision under this section to the Erie County Legislature. The vote of the Legislature will be final and binding.

6.11. Nondiscrimination. Notwithstanding any other provision of this Agreement, during the performance of this Agreement, Lessee, for itself, its heirs, personal representatives, successors in interest and assigns (except for any financing party assignee), as part of the consideration of this Agreement, does hereby covenant and agree that:

(a) Lessee shall not exclude any person from participation in, deny the benefits of, or otherwise subject to discrimination in the use of the Property, any person on the grounds of race, color, religion, sex or national origin.

(b) In the construction of any improvements on, over or under the Property, and the furnishing of services therein or thereon, Lessee shall not exclude any person from participation in, deny the benefits of, or otherwise subject to discrimination in the use of the Property, any person on the grounds of race, color, religion, sex or national origin.

(c) Lessee shall use the Property in compliance with all other requirements imposed by or pursuant to Title 49, Code of Federal Regulations ("C.F.R."), Department of Transportation, Subtitle A, Office of the Secretary, part 21, Nondiscrimination in Federally Assisted Programs of the Department of Transportation--Effectuation of Title VI of the Civil Rights Act of 1964, and as said regulations may be amended.

(d) In the event of an uncured breach of any of the above nondiscrimination covenants, County shall have the right to terminate this Agreement and to reenter and repossess the Property and hold same as if said Agreement had never been made or issued. For the purposes of this section, (i) a breach of said nondiscrimination covenants shall be determined by substantial proof in the form of a Federal or State Court decision or a Judicial Administrative Decision that is no longer subject to appeal, and (ii) County's termination right shall not apply if a claim or dispute is resolved by settlement.

(e) In the event this Agreement is terminated by County pursuant to Section 6.10(d), Lessee shall have the right to remove from the Property (or applicable portion thereof) the Power Facilities and other personal property owned, located, installed or constructed by or on behalf of Lessee thereon.

7. **County's Representations, Warranties and Covenants**. County hereby represents, warrants and covenants as follows:

7.1. Quiet Enjoyment. Lessee shall have the quiet use and enjoyment of the Property in accordance with the terms of this Agreement without any interference of any kind by County or any person claiming by, through or under County, subject, however, to the general rights herein reserved by County. County and its activities on the Property and any grant of rights County makes to any other person shall not interfere with any of Lessee's activities pursuant to this Agreement.

7.2. Title to Property. Except as disclosed on Exhibit B attached hereto and by this reference made a part hereof, County's fee simple title to the Property is free and clear of all liens, encumbrances, easements, leases, mortgages, deeds of trust, security interests, fractured interests, mineral, oil or gas rights, options to purchase or lease, claims and disputes (collectively, "Liens"), and, except for the County, there are no tenants on or other parties in possession of the Property. County shall fully cooperate with and assist Lessee in (i) obtaining a subordination agreement, non-disturbance agreement or other appropriate agreement from each party holding a Lien (recorded or unrecorded) or in possession of the Property that might interfere with Lessee's rights under this Agreement; and (ii) removing any Liens from County's fee simple title to the Property. A non-disturbance agreement is an agreement between Lessee and the holder of a Lien providing that the holder of the Lien shall not disturb Lessee's possession or rights under this Agreement or terminate this Agreement so long as County is not entitled to terminate this Agreement under the provisions of this Agreement. County shall not grant, create, allow or suffer any Lien or other encumbrance on title to the Property, except those matters set forth on Exhibit B.

7.3. Condition of Property. To the County's knowledge, there are no physical conditions of the Property, nor any other material adverse facts or conditions relating to the Property or any portion thereof, that could delay, interfere with or impair Lessee's operations or the exercise of any of Lessee's other rights under this Agreement, or which could, with the passage

of time, the giving of notice or both, have such an effect. County has disclosed to Lessee in writing any and all improvements existing on, under or over the Property, and no improvements currently exist on, under or over the Property that have been constructed or installed without all necessary and proper permits, licenses and approvals.

7.4. No Interference. County's activities and any grant of rights County makes to any person or entity, whether located on the Property or elsewhere, shall not, currently or prospectively, interfere with: the construction, installation, maintenance or operation of the Power Facilities, access over the Property to such Power Facilities; any Development Activities; or the undertaking of any other activities permitted hereunder. Without limiting the generality of the foregoing, County shall not engage in any activity that might cause a decrease in the output or efficiency of the Power Facilities.

7.5. Siting and Setbacks. County consents to Lessee's siting of Power Facilities at any location upon the Property in accordance with Exhibit A. To the fullest extent applicable and permitted by law, County waives enforcement of, and any and all rights it may have to pursue any remedies under, any state, zoning or local rules, ordinances or requirements related to siting of Power Facilities upon the Property, including setback requirements applicable to the Power Facilities from lot lines and improvements, and agrees not to bring any complaint, suit or action or intervene in any investigation or inquiry by any person or entity with respect thereto. County agrees, at no out-of-pocket expense to County, to use commercially reasonable efforts to assist, cooperate and participate in any proceeding and/or petition prepared by Lessee in connection with any modification or variance to an existing siting or setback requirement, including but not limited to bringing such action, or filing such petition, in the name of County.

7.6. Cooperation. County shall assist and fully cooperate with Lessee, at no out-of-pocket expense to County, in complying with or obtaining any land use permits and approvals, building permits, environmental impact reviews or any other approvals required for the financing, construction, installation, replacement, relocation, maintenance, operation or removal of Power Facilities, including execution of applications for such approvals. County shall make available to Lessee copies of all field tiling surveys, plans, entitlement-related studies, and other geotechnical and other site assessments, surveys, environmental assessments, reports, test results, correspondence to or from any governmental agency, and other such records of County relating to the Property in County's possession on the Effective Date.

7.7. Indemnity. County shall defend, indemnify and hold harmless Lessee and its agents, employees, contractors, subcontractors, successors or assigns from and against losses, liabilities, damages, costs, claims, suits and causes of action, including losses or claims for physical damage to property and for physical injuries or death and including reasonable attorneys' fees and costs of litigation, in each case, to the extent arising out of the actions of County or its agents, employees, contractors, subcontractors, successors or assigns on the Property or the Adjoining Property during the Term, except to the extent such damage or injury is caused by the negligence or willful misconduct of Lessee or Lessee's agents, employees, contractors, subcontractors, successors or assigns. County shall take reasonable safety measures to reduce the risk that County's activities will cause harm to Lessee or the public.

7.8. No Brokers. Except as may be set forth in the SPSA, no brokers' commission, finders' fees or other charges are due any broker, agent or other party in connection with County's execution of this Agreement, or if any are now due or shall become due in the future, then County shall promptly pay the same from its own funds and shall indemnify, hold harmless and defend Lessee against any and all claims and demands therefor made by any such broker, finder, agent or other party, or any of their respective successors and assigns or other parties claiming through them. The representations made in this Section shall survive the expiration or earlier termination of this Agreement.

7.9. No Litigation. No litigation is pending, and, to County's knowledge, no actions, claims or other legal or administrative proceedings are pending, threatened or anticipated with respect to, or that could affect, the Property, this Agreement or Lessee's rights hereunder.

7.10. Hazardous Materials.

(a) County represents and warrants to Lessee that the Property is not in any violation of any Environmental Laws, and County has not received any communication from any governmental authority alleging that the Property is in violation of any federal, state or local law, ordinance or regulation ("Environmental Laws") relating to the generation, manufacture, production, use, storage, release or threatened release, discharge, disposal, transportation or presence of any Hazardous Materials which is now or hereafter classified as hazardous or toxic or which is regulated under current or future Environmental Laws on or under the Property. County shall indemnify and hold Lessee harmless against any i) breach by County of the foregoing, representations and warranties, and ii) any violation of, or liability arising under, any Environmental Laws relating to the generation, manufacture, production, use, storage, release or threatened release, discharge, disposal, transportation or presence of any Hazardous Materials on or under the Property, except to the extent that such violation is a direct result of Lessee's activities on the Property.

(b) The Parties acknowledge that the Project Site has been remediated under the Voluntary Cleanup Program, which was formerly administered by the New York State Department of Environmental Conservation ("DEC"), and that it is listed on the DEC Environmental Site Remediation Database as the Excelsior Steel Ball Company, Site Code V00685 with a classification of "C". Remediation of the Project Site was completed in 2004 and included removal and disposal of contaminated soils, demolition and disposal of buildings, removal of underground storage tanks and the placement of clean soil. A Declaration of Covenants and Restrictions ("DEC Declaration") dated December 15, 2010 and recorded with the Erie County Clerk's Office on December 16, 2010 in Book 11194, Page 1745 restricts future use to commercial/industrial, and institutional controls including (but not limited to) a Site Management Plan and Soils Management Plan are in place. County shall be responsible for, and fully comply with, any and all reporting requirements of the DEC and the DEC Declaration.

(c) County shall indemnify and hold harmless the Lessee from any and all liability, costs or expenses (including reasonable attorneys' fees) incurred by the Lessee due to the presence of pre-existing Hazardous Materials on the Property, or brought to the Property by County or its agents, or for any actions or omissions by County or its agents pertaining to its responsibilities regarding Hazardous Materials, provided, however, that County shall have no obligation to indemnify or hold harmless Lessee in the event of Lessee or its agents' non-compliance with the DEC Declaration or

institutional controls. If the County does not abate pre-existing Hazardous Materials, Lessee may judge, in its sole discretion, the Property as unsuitable for development of Power Facilities, and may decide to not build on such Property without triggering a Lessee Default or other adverse consequence under this Agreement.

7.11. Certain Notifications. County shall promptly notify Lessee in writing of, and shall deliver to Lessee, immediately upon receipt, copies of any notices or communications received by County relating to: (i) compliance with or violation of laws, ordinances, statutes, orders and regulations applicable to the Power Facilities, the Property or Lessee's Development Activities; (ii) compliance with or violation of laws, ordinances, statutes, orders and regulations relating to Hazardous Materials on the Property; (iii) the filing or threatened filing of any construction or mechanic's lien against the Power Facilities or any interest in the Property, whether or not arising through Lessee; and (iv) any litigation or other proceeding filed or threatened in relation to the Power Facilities, Lessee's Development Activities on the Property, this Agreement or any interest of County or Lessee in the Property or hereunder.

7.12. County's Authority. County is the sole owner of the Property and holds marketable title to such Property. County has the right and authority, subject to the approval of the Erie County Legislature, to execute this Agreement and to grant to Lessee the rights granted hereunder. All persons having any ownership interest in the Property have signed this Agreement. Each person signing this Agreement on behalf of County is authorized to do so. When signed by County, and Lessee, this Agreement constitutes a valid and binding agreement enforceable against County in accordance with its terms. County hereby releases and waives all rights under and by virtue of any applicable homestead exemption laws as to the Leasehold Estate and other rights granted hereunder. County is not the subject of any bankruptcy, insolvency or probate proceeding.

8. Assignment.

8.1. Assignments by Lessee. Lessee shall at all times have the right to sell, assign, encumber, transfer or grant equal or subordinate rights and interests (including co-leases, separate leases, subleases, licenses or similar rights (however denominated)) in, the Leasehold Estate and/or any or all right or interest in this Agreement, or any or all right or interest of Lessee in the Property or in any or all of the Power Facilities that Lessee may now or hereafter install on the Property, to one or more persons (an "Assignee"), in each case without County's consent; provided, however, that any and all such transfers shall be subject to all of the terms, covenants and conditions of this Agreement. Lessee shall notify County in writing of any such sale, assignment, transfer or grant. Upon Lessee's assignment of its entire interest hereunder as to all or any portion of the Property or the Power Facilities, or as may otherwise be provided in the applicable sale, assignment, transfer or grant document, County shall recognize the Assignee as Lessee's proper successor, the Assignee shall have all of the assigned rights, benefits and obligations of Lessee under and pursuant to this Agreement, and Lessee shall be relieved of all of its obligations relating to the assigned interests under this Agreement that relate to acts or omissions that occur or accrue following the effective date of such sale, assignment, transfer or grant.

8.2. Assignments by County. The burdens of this Agreement and other rights contained herein shall run with and against the Property and shall be a charge and burden thereon for the

duration of this Agreement and shall be binding upon and against County and its successors and assigns. County shall notify Lessee in writing of any sale, assignment or transfer of any of County's interest in the Property, or any part thereof. Until such notice is received, Lessee shall have no duty to any successor owner, and Lessee shall not be in default under this Agreement if it continues to make all payments to the County before notice of sale, assignment or transfer is received. County agrees it will not assign the rights to payments due to County under this Agreement except to a successor owner of the Property, and in no case shall County sever or attempt to sever the Property's solar energy rights or interests from the Property's fee title or otherwise convey, assign or transfer or attempt to convey, assign or transfer this Agreement, except to a successor owner of the Property.

9. Mortgagee Protection. In the event that any mortgage, deed of trust or other security interest in this Agreement or any Power Facilities is entered into by Lessee or an Assignee, including a sale-leaseback (*i.e.*, a transaction in which Lessee sells its interest in this Agreement and/or the Power Facilities and then leases those interests back from the purchaser) (a "Leasehold Mortgage"), then any person who is the mortgagee or beneficiary of a Leasehold Mortgage, including the purchaser in a sale-leaseback transaction (a "Leasehold Mortgagee") shall, for so long as its Leasehold Mortgage is in existence and until the lien thereof has been extinguished, be entitled to the protections set forth in this Section 9 as long as the actions of such Leasehold Mortgagee do not create a default under the SPSA. Lessee or any Leasehold Mortgagee shall send written notice to County of the name and address of any such Leasehold Mortgagee, as well as any change of the name or address of any Leasehold Mortgagee.

9.1. Leasehold Mortgagee's Right to Possession, Right to Acquire and Right to Assign. A Leasehold Mortgagee shall have the absolute right: (a) to assign its security interest; (b) to enforce its lien and acquire title to the Leasehold Estate by any lawful means; (c) to take possession of and operate the Power Facilities, the Leasehold Estate or any portion thereof and to perform all obligations to be performed by Lessee hereunder, or to cause a receiver to be appointed to do so; and (d) to acquire the Leasehold Estate by foreclosure or by an assignment in lieu of foreclosure and thereafter to assign or transfer the Leasehold Estate to a third party. County's consent shall not be required for the acquisition of the encumbered leasehold or sub-leasehold estate by a third party who acquires the same by or subsequent to foreclosure or assignment in lieu of foreclosure.

9.2. Notice of Default; Opportunity to Cure. As a precondition to exercising any rights or remedies as a result of any alleged default by Lessee, County shall give written notice of the default to each Leasehold Mortgagee concurrently with delivery of such notice to Lessee, specifying in detail the alleged event of default and the required remedy. In the event County gives such a written notice of default, the following provisions shall apply:

(a) A "monetary default" means failure to pay when due any fee, payment, taxes, insurance premiums or other monetary obligation of Lessee under this Agreement; any other event of default is a "non-monetary default."

(b) The Leasehold Mortgagee shall have the same period after receipt of notice of default, the option, but not the obligation, to remedy the default, or cause the same to be remedied, as is given to Lessee after Lessee's receipt of notice of default, plus, in each instance, the following additional time periods: (i) sixty (60) days, for a total of one hundred twenty (120)

days after receipt of the notice of default in the event of any monetary default; and (ii) sixty (60) days, for a total of one hundred twenty (120) days after receipt of the notice of default in the event of any non-monetary default, provided that such one hundred twenty (120) day period shall be extended for the time reasonably required to complete such cure, including the time required for the Leasehold Mortgagee to perfect its right to cure such non-monetary default by obtaining possession of the Property (including possession by a receiver) or by instituting foreclosure proceedings, provided the Leasehold Mortgagee acts with reasonable and continuous diligence. The Leasehold Mortgagee shall have the absolute right to substitute itself for Lessee and perform the duties of Lessee hereunder for purposes of curing such defaults. County expressly consents to such substitution, agrees to accept such performance, and authorizes the Leasehold Mortgagee (or its employees, agents, representatives or contractors) to enter upon the Property to complete such performance with all the rights, privileges and obligations of the original Lessee hereunder. County shall not, and shall have no right to, terminate this Agreement prior to expiration of the cure periods available to a Leasehold Mortgagee as set forth above.

(c) During any period of possession of the Property by a Leasehold Mortgagee (or a receiver requested by such Leasehold Mortgagee) and/or during the pendency of any foreclosure proceedings instituted by a Leasehold Mortgagee, the Leasehold Mortgagee shall pay or cause to be paid all other monetary charges payable by Lessee hereunder which have accrued and are unpaid at the commencement of said period and those which accrue thereafter during said period. Following acquisition of Lessee's Leasehold Estate by the Leasehold Mortgagee or its assignee or designee as a result of either foreclosure or acceptance of an assignment in lieu of foreclosure, or by a purchaser at a foreclosure sale, this Agreement shall continue in full force and effect and the Leasehold Mortgagee or party acquiring title to Lessee's Leasehold Estate shall, as promptly as reasonably possible, commence the cure of all defaults hereunder and thereafter diligently process such cure to completion, whereupon County's right to terminate this Agreement based upon such defaults shall be deemed waived; provided, however, the Leasehold Mortgagee or party acquiring title to Lessee's Leasehold Estate shall not be required to cure those non-monetary defaults, if any, which are not reasonably susceptible of being cured or performed by such party ("Non-Curable Defaults"). Non-Curable Defaults shall be deemed waived by County upon completion of foreclosure proceedings or acquisition of Lessee's interest in this Agreement by such party.

(d) Any Leasehold Mortgagee or other party who acquires Lessee's Leasehold Estate pursuant to foreclosure or assignment in lieu of foreclosure shall not be liable to perform the obligations imposed on Lessee by this Agreement incurred or accruing after such party no longer has ownership of the Leasehold Estate or possession of the Property.

(e) Neither the bankruptcy nor the insolvency of Lessee shall be grounds for terminating this Agreement as long as the rent and all other obligations of Lessee hereunder are paid or performed by or on behalf of Lessee or the Leasehold Mortgagee in accordance with the terms of this Agreement.

(f) Nothing herein shall be construed to extend this Agreement beyond the Term or to require a Leasehold Mortgagee to continue foreclosure proceedings after the default has been cured. If the default is cured and the Leasehold Mortgagee discontinues foreclosure proceedings, this Agreement shall continue in full force and effect.

9.3. New Lease Agreement. If this Agreement terminates because of Lessee's default or if the Leasehold Estate is foreclosed, or if this Agreement is rejected or disaffirmed pursuant to bankruptcy law or other law affecting creditors' rights, County shall, upon written request from any Leasehold Mortgagee within ninety (90) days after such event, enter into a new lease agreement for the Property, on the following terms and conditions:

(a) The term of the new lease agreement shall commence on the date of termination, foreclosure, rejection or disaffirmance and shall continue for the remainder of the Term of this Agreement, at the same fees and payments and subject to the same terms and conditions as set forth in this Agreement.

(b) The new lease agreement shall be executed within thirty (30) days after receipt by County of written notice of the Leasehold Mortgagee's election to enter into a new lease agreement, provided said Leasehold Mortgagee: (i) pays to County all fees and payments and other monetary charges payable by Lessee under the terms of this Agreement up to the date of execution of the new lease agreement, as if this Agreement had not been terminated, foreclosed, rejected or disaffirmed; and (ii) performs all other obligations of Lessee under the terms of this Agreement, to the extent performance is then due and susceptible of being cured and performed by the Leasehold Mortgagee; and (iii) agrees in writing to perform, or cause to be performed, all non-monetary obligations which have not been performed by Lessee that are reasonably susceptible of being performed by the Leasehold Mortgagee and would have accrued under this Agreement up to the date of commencement of the new lease agreement. Any new lease agreement granted to the Leasehold Mortgagee shall enjoy the same priority as this Agreement over any lien, encumbrances or other interest created by County.

(c) At the option of the Leasehold Mortgagee, the new lease agreement may be executed by a designee of such Leasehold Mortgagee without the Leasehold Mortgagee assuming the burdens and obligations of Lessee thereunder.

(d) If more than one Leasehold Mortgagee makes a written request for a new lease agreement pursuant hereto, the new lease agreement shall be delivered to the Leasehold Mortgagee requesting such new lease agreement whose Leasehold Mortgage is prior in lien, and the written request of any other Leasehold Mortgagee whose lien is subordinate shall be void and of no further force or effect.

(e) The provisions of this Section 9 shall survive the termination, rejection or disaffirmance of this Agreement and shall continue in full force and effect thereafter to the same extent as if this Section were a separate and independent contract made by County, Lessee and such Leasehold Mortgagee, and, from the effective date of such termination, rejection or disaffirmation of this Agreement to the date of execution and delivery of such new lease agreement, such Leasehold Mortgagee may use and enjoy said Property without hindrance by County or any person claiming by, through or under County, provided that all of the conditions for a new lease agreement as set forth herein are complied with.

9.4. Leasehold Mortgagee's Consent to Amendment, Termination or Surrender. Notwithstanding any provision of this Agreement to the contrary, the parties agree that so long as there exists an unpaid Leasehold Mortgage, this Agreement shall not be modified or amended and County shall not accept a surrender of the Property or any part thereof or a cancellation or release

of this Agreement from Lessee prior to expiration of the Term without the prior written consent of the Leasehold Mortgagee. This provision is for the express benefit of and shall be enforceable by such Leasehold Mortgagee.

9.5. No Waiver. No payment made to County by a Leasehold Mortgagee shall constitute an agreement that such payment was, in fact, due under the terms of this Agreement; and a Leasehold Mortgagee having made any payment to County pursuant to County's wrongful, improper or mistaken notice or demand shall be entitled to the return of any such payment.

9.6. Further Amendments. At Lessee's request, County shall amend this Agreement to include any provision which may reasonably be requested by a proposed Leasehold Mortgagee; provided, however, that such amendment does not impair any of County's rights under this Agreement or materially increase the burdens or obligations of County hereunder. Upon request of any Leasehold Mortgagee, County shall execute any additional instruments reasonably required to evidence such Leasehold Mortgagee's rights under this Agreement.

10. Default and Termination.

10.1. Lessee's Right to Terminate. Notwithstanding anything to the contrary set forth in this Agreement, Lessee shall have the right to terminate this Agreement as to all or any part of the Property at any time, and without cause, effective upon thirty (30) days' prior written notice to County from Lessee. If such termination is as to only part of the Property, this Agreement shall remain in effect as to the remainder of the Property, and the payments due to County pursuant to Section 3 hereof shall be reduced in a pro rata fashion based upon the number of acres within the portion of the Property as to which this Agreement is terminated. In the event this Agreement is terminated by Lessee in accordance with this paragraph, County authorizes Lessee to execute and record a notice of termination evidencing such termination.

10.2. County's Right to Terminate. Except as qualified by any subsequent actions and approvals of County pursuant to Section 9, County shall have the right to terminate this Agreement if:

(a) (i) a material default in the performance of Lessee's obligations under this Agreement shall have occurred and remains uncured, (ii) County notifies Lessee in writing of the default, which notice sets forth in reasonable detail the facts pertaining to the default and specifies the method of cure, and (iii) the default shall not have been remedied within sixty (60) days after Lessee receives such written notice, or, if cure will take longer than sixty (60) days, Lessee has not begun to undertake steps to cure within the relevant time period and thereafter prosecute the cure to completion.

(b) Lessee's abandonment of the Property

(c) (Reserved)

(d) (Reserved)

(e) Lessee's default under the SPSA where such default has not been cured pursuant to the provisions of the SPSA.

(f) Lessee's failure to commence construction of the Power Facilities in accordance with the SPSA.

(g) In the event this Agreement is terminated by County in accordance with this paragraph, County and Lessee shall thereafter execute and record a notice of termination evidencing such termination. No termination of this Agreement pursuant to this paragraph shall be effective unless a notice of termination has been executed and recorded in accordance with this paragraph.

10.3. Effect of Termination or Expiration. Upon the termination or expiration of this Agreement, whether as to the entire Property or only as to part, Lessee shall, as soon as practicable thereafter, unless otherwise mutually agreed upon, (a) remove from the Property (or applicable portion thereof) all above surface grade Power Facilities and other personal property owned, located, installed or constructed by or on behalf of Lessee thereon, (b) remove (from the Property or applicable portion thereof) concrete footings, foundations and other fixtures of Lessee to a depth of two (2) feet below the surface grade, (c) cover up all pit holes, trenches and other borings and excavations made by or on behalf of Lessee on the Property (or applicable portion thereof) , (d) leave the surface of the Property (or applicable portion thereof) free from debris arising from the foregoing or from the operations or activities of Lessee and (e) otherwise restore any portion of the Property (or applicable portion thereof) disturbed by Lessee to a condition reasonably similar to its original condition, consistent with the uses permitted by this Agreement. Reclamation shall include, as reasonably required, repair or replacement of damaged drainage tile, leveling, terracing, mulching and other reasonably necessary measures to prevent soil erosion. County shall provide Lessee with reasonable access to the Property during the performance of such removal and other work by Lessee for a period of one hundred eighty (180) days following the termination or expiration of this Agreement. During such period, Lessee shall not be required to pay the amounts set forth in Section 3 or other rent. If Lessee fails to remove any Power Facilities within one hundred eighty days (180) days following the termination or expiration of this Agreement, or such longer period as County may provide by extension, County may do so, in which case Lessee shall reimburse County for reasonable and documented costs of removal and restoration incurred by County, net of any amounts reasonably recoverable by County with respect to the salvage value of any such Power Facilities.

10.4. County's Duty. Notwithstanding anything contained in this Agreement to the contrary, County shall use commercially reasonable efforts to mitigate its damages in the event that Lessee defaults hereunder.

10.5. Default by County. In the event that County fails to comply with or perform any or all of the obligations, covenants, warranties or agreements to be performed, honored or observed by County hereunder, or interferes with Lessee's use of the Property in accordance with the terms of this Agreement, which default continues for more than thirty (30) days after Lessee's delivery of written notice to County specifying such default, or if such default is of a nature to require more than thirty (30) days for remedy and continues beyond the time reasonably necessary to cure (and County has not undertaken procedures to cure such default within such thirty (30) day period and diligently pursued such efforts to complete such cure), Lessee may exercise any right or remedy available to Lessee at law or in equity, including but not limited to obtaining an injunction.

10.6. Intentionally Deleted.

11. Miscellaneous.

a. Force Majeure. If, after a good faith effort, Lessee is prevented from (i) complying with any express or implied covenant of this Agreement; (ii) constructing, or causing construction of, Power Facilities on the Property; (iii) producing or transmitting, or causing to be produced or transmitted, electricity; or (iv) performing any other activity reasonably related to and/or required by this Agreement by reason of war; weather; epidemic; fire; casualty; terrorism; rebellion; riots; strikes; acts of God; inability to secure materials, any valid order, rule, or regulation of governmental authority (e.g., a third-party contest to any governmental approval or any legal action intended to prevent issuance of a permit or approval); a utility delay or order; or similar events that are beyond the control of Lessee (collectively referred to as a "Force Majeure Condition"), then, while so prevented, restricted or delayed, Lessee's obligation to perform hereunder shall be suspended and excused to the extent of prevention, restriction or delay, and Lessee shall not be liable for damages for failure to comply with such obligation. For clarity, Lessee shall not be required to pay the amounts set forth in Section 3 or other rent to the extent a Force Majeure Condition prevents, restricts or delays Lessee's ability to sell and be paid for electricity from the Property. To the extent a Force Majeure Event or other action causes or results in an extension of the Term of the SPSA, the Term of this Agreement shall be extended for a corresponding period.

b. Condemnation; Casualty. All payments made on account of any taking or threatened taking of the Property or any part thereof in condemnation proceedings or by inverse condemnation by a government agency, governmental body or private party under the exercise of the right of eminent domain may be made to County, except that Lessee shall be entitled to, and County shall request that such condemning authority make payment directly to Lessee of: (i) any removal and relocation costs of the Power Facilities, (ii) any loss of or damage to any Power Facilities, (iii) the loss of use of any portion of the Property by Lessee (including impediments to or interference with the receipt of sunlight) and (iv) Lessee's lost profits, measured in each case with regard to the effect on Lessee's use of the Property and any effect on Lessee's use of other property. If such condemning authority makes all payments to County, then County shall forthwith make payment to Lessee of the award to which Lessee is entitled. Lessee shall have the right to participate in any condemnation settlement proceedings and County shall not enter into any binding settlement agreement without the prior written consent of Lessee, which consent shall not be unreasonably withheld. Should title to or possession of all of the Property be permanently taken, or should a partial taking render the remaining portion of the Property unsuitable for Lessee's use (as determined by Lessee), then Lessee may terminate this Agreement upon such vesting of title or taking of possession. In the event of a casualty that damages or destroys more than five percent (5%) of the Power Facilities, Lessee shall have the right to terminate this Lease upon written notice to County.

c. Intentionally Deleted.

d. Successors and Assigns. This Agreement shall inure to the benefit of and be binding upon County and Lessee and, to the extent provided in any assignment or other transfer under Section 8 hereof, any Assignee, and their respective heirs, transferees, successors and assigns, and all persons claiming under them, and shall be deemed covenants running with the land and be binding upon the Property. References to Lessee in this Agreement shall be deemed to include Assignees that hold a direct ownership interest in this Agreement.

e. Memorandum of Lease Agreement. County and Lessee shall execute in recordable form, and Lessee shall then record, a memorandum of this Agreement satisfactory in form and substance to County and Lessee. The parties shall split and pay equally all costs of recording such memorandum. County hereby consents to the recordation of the interest of an Assignee in the Property.

f. Notices. All notices or other communications required or permitted hereunder, including payments to County, shall, unless otherwise provided herein, be in writing, and shall be personally delivered, delivered by reputable overnight courier, or sent by registered or certified mail, return receipt requested and postage prepaid, addressed as follows:

If to County:

Erie County
95 Franklin St, 1400
Buffalo, NY 14202
Attn: Reed Braman
P:+1(716)858-8069
Reed.Braman@erie.gov
and

Erie County
95 Franklin St, 1634
Buffalo, NY 14202
Attn: Kristen Walder
P:+1(716)858-2222
Kristen.Walder@erie.gov

If to Lessee:

Erie Solar Gardens LLC
9085 East Mineral Circle, Suite 320
Centennial, CO 80112
Attention: Evan Christenson
720-257-7970
echristenson@rockwellfinance.com

Notices personally delivered shall be deemed given the day so delivered. Notices given by overnight courier shall be deemed given on the first business day following the mailing date. Notices mailed as provided herein shall be deemed given on the third business day following the mailing date. Any Party may change its address for purposes of this subsection by giving written notice of such change to the other Party in the manner provided in this subsection.

g. Further Assurances; Cooperation. County shall fully support and cooperate with Lessee in the conduct of its Development Activities and the exercise of its rights hereunder (including with Lessee's efforts to obtain from any governmental authority or any other person or entity any environmental impact review, use permit, building permit, any other permit of any nature, entitlement, approval, authorization or other rights to sell, assign, transfer or finance any Power Facilities or interest in the Leasehold Estate or under this Agreement or obtain any financing), and County shall perform all such acts (including executing and delivering maps, instruments and documents within ten (10) days after receipt of a written request made from time to time by Lessee) as Lessee may reasonably specify to fully effectuate each and all of the purposes and intent of this Agreement, provided such acts are at no cost to County. Without limiting the generality of the foregoing, within ten (10) days after receipt of a written request made from time

to time by Lessee, County shall: (a) enter into any reasonable amendment hereto (i) to correct an error in this Agreement, (ii) to amend the legal description attached hereto (including by replacing said legal description with a revised description prepared or provided by Lessee's surveyor or title company), (iii) that may be required by any Leasehold Mortgagee or in connection with the transfer by Lessee of any Power Facilities or interest in the Leasehold Estate or under this Agreement, provided, however, that such amendment does not impair any of County's rights under this Agreement or materially increase the burdens or obligations of County hereunder, or (iv) to cause this Agreement to comply with applicable law; (b) execute and deliver to Lessee any owner's affidavit reasonably requested by any title company or attorney reviewing title to the Property; (c) enter into any reasonable consent and non-disturbance agreement with any Leasehold Mortgagee, stating that County shall recognize the rights of the Leasehold Mortgagee and not disturb its possession of the Property so long as it is not in default under this Agreement, and stating such other things as such Leasehold Mortgagee may reasonably request; (d) join in any grants for rights-of-way, easements and leases for electric and other public utilities and facilities and any other electric power purpose (including any power transmission line) as Lessee may deem necessary or desirable for its development and use of the Property; (e) join with Lessee in the signing of any protest, petition, appeal or pleading that Lessee may deem advisable to file or in requesting any and all zoning changes or any waivers, variances, land use permits and/or approvals, in each case as Lessee may deem necessary or desirable for Lessee's development and use of the Property as contemplated by this Agreement; and (f) if because of the nature of this Agreement Lessee is unable to qualify for any tax credit, renewable energy credit, environmental credit or any other benefit or incentive for renewable energy established by any local, state or federal government associated with the Power Facilities or the Development Activities, amend this Agreement or convert Lessee's interest in the Property to a substantially similar interest that makes Lessee eligible for such credit, benefit or incentive (but only if such amendment does not materially adversely affect County's rights or obligations hereunder); and Lessee agrees to pay County's reasonable out-of-pocket expenses incurred by County in connection with County's cooperation pursuant to the foregoing provisions of this Section 11(g). Without limiting the generality of the foregoing, County shall not oppose, in any way, whether directly or indirectly, any application by Lessee for any permit, approval or entitlement at any administrative, judicial, legislative or other level, provided such application is made for the furtherance of the purposes of this Agreement, as set forth in Section 1.2.

h. Estoppel Certificates. County shall, within ten (10) days after a written request by Lessee, any Assignee or any Leasehold Mortgagee, execute, acknowledge and deliver to the requesting party such estoppel certificates (certifying as to such matters as may reasonably be requested, including, without limitation, that this Agreement is unmodified and in full force and effect (or modified and stating the modifications), the dates to which the payments and any other charges have been paid, and that there are no defaults existing (or that defaults exist and stating the nature of such defaults)) and/or consents to assignment (whether or not such consent is actually required) and/or non-disturbance agreements as Lessee, any Assignee or any Leasehold Mortgagee may reasonably request from time to time during the term of this Agreement. At Lessee's option, such certificates, consents and agreements may be recorded and County consents to such recording.

i. No Waiver; No Abandonment. No waiver of any right under this Agreement shall be effective for any purpose unless it is in writing and is signed by the Party hereto possessing the

right, nor shall any such waiver be construed to be a waiver of any subsequent right, term or provision of this Agreement. Further, (i) no act or failure to act on the part of Lessee shall be deemed to constitute an abandonment, surrender or termination of any interest under this Agreement, except upon recordation by Lessee of a quitclaim deed or release specifically conveying such Leasehold Estate or interest back to County, (ii) non-use of the Agreement or any lease or interest hereunder shall not prevent the future use of the entire scope thereof; and (iii) no use of or improvement to the Property, and no assignment, transfer or grant under Section 8 or otherwise, or use resulting from any such transfer or grant, shall, separately or in the aggregate, constitute an overburdening of this Agreement or any lease or interest hereunder.

j. No Merger. There shall be no merger of this Agreement, or of the Leasehold Estate created by this Agreement, with the fee estate in the Property by reason of the fact that this Agreement or the Leasehold Estate or any interest therein may be held, directly or indirectly, by or for the account of any person or persons who shall own the fee estate or any interest therein, and no such merger shall occur unless and until all persons at the time having an interest in the fee estate in the Property and all persons (including, without limitation, each Leasehold Mortgagee) having an interest in this Agreement or in the estate of County and Lessee shall join in a written instrument effecting such merger and shall duly record the same.

k. Entire Agreement. This Agreement, together with its attached exhibits, contains the entire agreement between the Parties with respect to the subject matter hereof, and any prior or contemporaneous agreements, discussions or understandings, written or oral (including any options or agreements for leases, confidentiality agreements, and/or access agreements previously entered into by the Parties with respect to the Property), are superseded by this Agreement and shall be of no force or effect. No addition or modification of any term or provision of this Agreement shall be effective unless set forth in writing and signed by each of the Parties.

l. Governing Law. The terms and provisions of this Agreement shall be interpreted in accordance with the laws of the State of New York, excluding New York's Choice of Law provisions.

m. Jurisdiction. Each Party agrees: (i) that any action or proceeding relating to this Agreement may (but need not) be brought in any court of competent jurisdiction in the State of New York, Erie County, and for that purpose now irrevocably and unconditionally submits to the jurisdiction of such court in the State of New York, Erie County; (ii) that it irrevocably waives any right to, and will not, oppose any such action or proceeding in the State of New York on any jurisdictional basis, including *forum non conveniens*; and (iii) not to oppose the enforcement against it in any other jurisdiction of any judgment or order duly obtained from a court of the State of New York.

n. Intentionally Deleted.

o. Interpretation. The Parties agree that the terms and provisions of this Agreement embody their mutual intent and that such terms and conditions are not to be construed more liberally in favor of, or more strictly against, either Party.

p. Partial Invalidity. Should any term or provision of this Agreement, or the application thereof to any person or circumstance, to any extent, be invalid or unenforceable, the remainder of this Agreement or the application of such term or provision to persons or

circumstances other than those to which it is held invalid or unenforceable, shall not be affected thereby, and each remaining term and provision of this Agreement shall be valid and enforceable to the fullest extent permitted by law. Notwithstanding any other provision of this Agreement, the parties agree that in no event shall the term of the Leasehold Estate or this Agreement be longer than the longest period permitted by applicable law; provided, however, that Lessee shall be entitled to record an instrument preserving the effectiveness or record notice of this Agreement.

q. Other General Provisions. Except with respect to the rights conferred hereunder upon Leasehold Mortgagees (which Leasehold Mortgagees and their respective successors and assigns are hereby expressly made third party beneficiaries hereof to the extent of their respective rights hereunder), the covenants contained herein are made solely for the benefit of the Parties and their respective successors and assigns, and shall not be construed as benefiting any person or entity who is not a Party to this Agreement. Neither this Agreement nor any agreements or transactions contemplated hereby shall be interpreted as creating any partnership, joint venture, association or other relationship between the Parties, other than that of landowner and lessee. Lessee's shareholders, directors, officers, partners and members shall not have any personal liability for any damages arising out of or in connection with this Agreement. The use of the neuter gender includes the masculine and feminine, and the singular number includes the plural, and vice versa, whenever the context so requires. The terms "include", "includes" and "including", as used herein, are without limitation. Captions and headings used herein are for convenience of reference only and do not define, limit or otherwise affect the scope, meaning or intent hereof.

r. Counterparts; Facsimiles or PDF. This Agreement may be executed and recorded in two or more counterparts, each of which shall be deemed an original and all of which, when taken together, shall constitute one and the same instrument. Each Party shall be entitled to rely upon executed copies of this Agreement transmitted by facsimile or electronic "PDF" to the same and full extent as the originals.

s. County Resolution. This Agreement is authorized pursuant to a Resolution adopted by the Erie County Legislature on _____.

t. Intentionally Deleted.

u. Intentionally Deleted.

[*Signature Page Follows Immediately*]

IN WITNESS WHEREOF, County and Lessee, acting through their duly authorized representatives, have executed this Agreement with the intent that it be effective as of the Effective Date, and certify that they have read, understand and agree to the terms and conditions of this Agreement.

COUNTY:

Erie County, New York

By: _____
Name: Mana Whyte
Title: Deputy County Executive

20-155-PW

LESSEE:

Erie Solar Gardens LLC
a New York limited liability company

By: _____
Name: Clay M. Biddinger
Title: Manager

EXHIBIT A

303 Woodward Avenue, Erie County, New York Site

The Property

ALL THAT TRACT OR PARCEL OF LAND situate in the Town of Tonawanda, County of Erie, State of New York, and described as follows:

303 Woodward
1103.8 E East Park
2.213A

SBL#: 65.12-1-1

DEED	--
MEASURE	50.00
FARMLOT	0043
SECTION	00
TOWN	12
RANGE	8

EXHIBIT B

303 Woodward Avenue, Erie County, New York Site

Title Matters

NONE

EXHIBIT C

303 Woodward Avenue, Erie County, New York Site

Solar Power Services Agreement

EXHIBIT D

303 Woodward Avenue, Erie County, New York Site

Easements – Adjoining Property

None.

New York State Department of State
Division of Corporations, State Records and Uniform Commercial Code
One Commerce Plaza, 99 Washington Avenue
Albany, NY 12231-0001
www.dos.ny.gov

Local Law Filing

(Use this form to file a local law with the Secretary of State.)

Text of law should be given as amended. Do not include matter being eliminated and do not use italics or underlining to indicate new matter.

☑ **County** ☐ **City** ☐ **Town** ☐ **Village**
(Select one:)

of Erie

Local Law No. 5 **of the year 20** 19

A local law entitled The Erie County Solar Power Improvement Act of 2019
(Insert Title)

Be it enacted by the Erie County Legislature **of the**
(Name of Legislative Body)

☑ **County** ☐ **City** ☐ **Town** ☐ **Village**
(Select one:)

of Erie **as follows:**

Section 1. Legislative Findings and Intent.

The Erie County Legislature is supportive of renewable energy and efforts by the Erie County government to reduce the County's carbon footprint through renewable energy initiatives such as the development of solar and wind resources to generate electricity and reduce County costs for utilities.

The Erie County Legislature hereby finds: (i) that portions of the property on parcels SBL 65.12-1-1, 235.00-1-19. 142.23-1-4, 150.50-1-1 and 52.20-2-5 (hereinafter referred to as the "Erie County Facilities parcels") and parcels SBL 81.02-1-1, 160.19-1-4.1, 160.16-1-12 and 161.00-5-1 (hereinafter referred to as the "Erie Community College Facilities parcels") are not currently needed for the County's purposes and that such parcels shall be best utilized to the County's benefit by permitting their lease to Montante Solar Corporation; and (ii) said parcels shall be used for the construction of solar photovoltaic (PV) systems, where Montante Solar Corporation would own, operate and maintain said systems and the County would purchase the electricity generated from the solar PV systems under a power purchase agreement.

(If additional space is needed, attach pages the same size as this sheet, and number each.)

Section 2: Authorization to Enter in Contract

The Legislature has already voted twice to allow solar PV projects with Montante Solar Corporation to commence.

On September 26, 2019, the Legislature approved Comm. 18E-18, "Authorization to Enter into Contract for the Purpose of a Solar Power Purchase Agreement." That resolution authorized the County Executive to enter into an agreement with Montante Solar for (1) their construction of solar arrays on five County properties, and then (2) a power purchase agreement with Montante Solar for the County's purchase of electricity generated from those five solar PV systems.

On October 24, 2019, the Legislature approved Comm. 20E-18, "SUNY Erie Campus-Wide 2019 Solar Power Purchase Agreement." That resolution authorized the County Executive to enter into an agreement with Montante Solar for (1) their construction of solar arrays at Erie Community College's (ECC) South Campus, and then (2) a power purchase agreement with Montante Solar for ECC's purchase of electricity generated from the solar PV systems at their South Campus.

As memorialized in Comm. 18E-18 and Comm. 20E-18, the County is authorized to enter into power purchase agreements with Montante Solar Corporation relating to such surplus space pursuant to the conditions set forth in those resolutions and pursuant to the conditions set forth in any section hereafter in this local law.

Section 3: Authorization of Extended Lease Length

Notwithstanding the provisions of Section 215 of New York State County Law or any special act or local law to the contrary, the County shall permit the lease to Montante Solar, for a period greater than five (5) years, of any unused portion of the above referenced parcels that are necessary for the power purchase agreements authorized pursuant to Comm. 18E-18 and Comm. 20E-18.

Section 4: Assignment of Rights

Should any portion of the Erie County Facilities parcels or Erie Community College Facilities parcels be subdivided, split, or suffixed, the rights provided for in this Local Law shall be transferred to the subdivided, split, or suffixed parcels.

Section 5: Effective Date

This Local Law shall take effect upon filing with the New York State Secretary of State.

Section 6: Severability

If any clause, sentence, paragraph, subdivision, section or part of this law or the application thereof to any person, individual, corporation, firm, partnership, or business shall be adjudged by any court of competent jurisdiction to be invalid or unconstitutional, such order or judgment shall

not affect, impair or invalidate the remainder thereof but shall be confined in its operation to the clause, sentence, paragraph, subdivision, section or part of this law, or in its specific application.

Sponsors:

Timothy Meyers
Lisa Chimera
Kevin Hardwick
Howard Johnson
April N.M. Baskin
John Bruso
Thomas Loughran

(Complete the certification in the paragraph that applies to the filing of this local law and strike out that which is not applicable.)

1. (Final adoption by local legislative body only.)
I hereby certify that the local law annexed hereto, designated as local law No. _____ of 20____ of the (County)(City)(Town)(Village) of _____ was duly passed by the _____ on _____ 20____, in accordance with the applicable *(Name of Legislative Body)*
provisions of law.

2. (Passage by local legislative body with approval, no disapproval or repassage after disapproval by the Elective Chief Executive Officer*.)
I hereby certify that the local law annexed hereto, designated as local law No. 5 of 20 19 of the (County)[redacted] of Erie was duly passed by the Erie County Legislature on December 19 20 19, and was (approved)(~~not approved~~) *(Name of Legislative Body)*
(~~repassed after disapproval~~) by the Erie County Executive and was deemed duly adopted *(Elective Chief Executive Officer*)*
on December 30, 20 1 9, in accordance w ith the applicable provisions of law.

3. (Final adoption by referendum.)
I hereby certify that the local law annexed hereto, designated as local law No. _____ of 20____ of the (County)(City)(Town)(Village) of _____ was duly passed by the _____ on _____ 20____, and was (approved)(not approved) *(Name of Legislative Body)*
(repassed after disapproval) by the _____ on _____ 20____. *(Elective Chief Executive Officer*)*

Such local law was submitted to the people by reason of a (mandatory)(permissive) referendum, and received the affirmative vote of a majority of the qualified electors voting thereon at the (general)(special)(annual) election held on _____ 20____, in accordance with the applicable provisions of law.

4. (Subject to permissive referendum and final adoption because no valid petition was filed requesting referendum.)
I hereby certify that the local law annexed hereto, designated as local law No. _____ of 20____ of the (County)(City)(Town)(Village) of _____ was duly passed by the _____ on _____ 20____, and was (approved)(not approved) *(Name of Legislative Body)*
(repassed after disapproval) by the _____ on _____ 20____. Such local *(Elective Chief Executive Officer*)*
law was subject to permissive referendum and no valid petition requesting such referendum was filed as of _____ 20____, in accordance with the applicable provisions of law.

* Elective Chief Executive Officer means or includes the chief executive officer of a county elected on a county-wide basis or, if there be none, the chairperson of the county legislative body, the mayor of a city or village, or the supervisor of a town where such officer is vested with the power to approve or veto local laws or ordinances.

5. (City local law concerning Charter revision proposed by petition.)
I hereby certify that the local law annexed hereto, designated as local law No. _____ of 20____ of the City of _____ having been submitted to referendum pursuant to the provisions of section (36)(37) of the Municipal Home Rule Law, and having received the affirmative vote of a majority of the qualified electors of such city voting thereon at the (special)(general) election held on _____ 20____, became operative.

6. (County local law concerning adoption of Charter.)
I hereby certify that the local law annexed hereto, designated as local law No. _____ of 20____ of the County of _____State of New York, having been submitted to the electors at the General Election of November _____ 20____, pursuant to subdivisions 5 and 7 of section 33 of the Municipal Home Rule Law, and having received the affirmative vote of a majority of the qualified electors of the cities of said county as a unit and a majority of the qualified electors of the towns of said county considered as a unit voting at said general election, became operative.

(If any other authorized form of final adoption has been followed, please provide an appropriate certification.)
I further certify that I have compared the preceding local law with the original on file in this office and that the same is a correct transcript therefrom and of the whole of such original local law, and was finally adopted in the manner indicated in paragraph 2 above.

_____
Clerk of the county legislative body, City, Town or Village Clerk or officer designated by local legislative body

(Seal)

Date: 12/30/2019

DOS-0239-f-l (Rev. 04/14)

A Public Hearing was held on the foregoing **Local Law Intro. No. 10-1-2019** on **December 30, 2019** due notice thereof having been published in the official newspapers of the County of Erie designated for this purpose, and after due deliberation thereon, I, MARK C. POLONCARZ, County Executive of Erie County, do hereby APPROVE and SIGN said Local Law this 30 day of December, 20 19.

Mark C. Poloncarz

A Public Hearing was held on the foregoing **Local Law Intro. No. 10-1-2019** on **December 30, 2019** due notice thereof having been published in the official newspapers of the County of Erie designated for this purpose, and after due deliberation thereon, I, MARK C. POLONCARZ, County Executive of Erie County, do hereby DISAPPROVE and VETO said Local Law this ____ day of _____, 20_____.

_____
Mark C. Poloncarz

Appendix 2

COUNTY OF ERIE

MARK C. POLONCARZ
COUNTY EXECUTIVE

WILLIAM E. GEARY, JR.
COMMISSIONER

DEPARTMENT OF PUBLIC WORKS
RATH BUILDING ROOM 1400

TELEPHONE: 716.858.8300
FAX: 716.858.8303

March 17, 2021

Montante Solar
2760 Kenmore Ave
Tonawanda, NY 14150

BUILDING PERMIT FOR GENERAL CONSTRUCTION

Re: Erie County Woodward Avenue Solar Array
DPW Project #: 2019-999-06

Cameron McLaurin,

Attached is an original Building Permit for the Erie County Woodward Avenue Solar Array project located at 303 Woodward Avenue, Tonawanda, NY 14150. Work shall be performed in accordance with the design and construction documents prepared by LaBella Associates dated January 2021 and modifications thereafter.

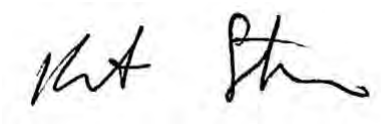
Montante will be required to conform to all future comments from the Town of Tonawanda and the County is under the assumption as Montante has previously confirmed that the site plan shown within the construction documents has been prepared in accordance with Town of Tonawanda Codes.

In addition to the work shown on the drawings, the contractor shall apply for and pay for all required fees for obtaining a third party Electrical Inspection Certificate, issued by a licensed electrical inspection agency. Certificate shall be delivered to the Owner prior to final inspection and issuance of Certificate of Acceptance.

Contractors shall call our office at least 72 hours in advance of start of work for inspections so that County can schedule construction inspections. This work is being performed in an occupied facility and the contractor is required to notify the Owner or their designated representative when work will be done and coordinate required shutdowns for fire alarm, smoke detectors, utilities, etc. The contractor's failure to notify the building user and/or owner and cause a false fire alarm system activation or other building damage from utilities or contractor's action, the County shall backcharge the contractor for any and all costs incurred.

Also attached hereto and made a part of the building permit is an "Inspections Requirement & Procedures" sheet indicating our requirements for inspections.

Sincerely,



Kristofer Straus, PE
Senior Construction Project Manager

Attachments

Cc: William Geary
Tim Elling
Reed Braman
Thomas Boechel
File copy

MARK C. POLONCARZ

WILLIAM E. GEARY
COMMISSIONER

This notice, which must be prominently displayed on the property or premises to which it pertains, indicates that a

Building Permit

Has been issued to

Montante Solar
2760 Kenmore Ave
Tonawanda, NY 14150

Permitting

General Construction Work

Associated with but not limited to

Erie County Woodward Avenue Solar Array

Located at

303 Woodward Avenue
Tonawanda, NY 14150

All work shall be executed in strict compliance with the building permit application as approved by ECDPW and with the Uniform Fire Prevention and Building Construction code of New York State (UFPBC), 2020 edition, and all other laws, rules, and regulations which apply. The building permit does not constitute authority to build in violation of federal, state, or local law or any other pertinent rule or regulation.

Special notes (if any):

A Building Permit application was submitted by Montante Solar on December 16, 2020. Plans and Specifications were prepared by LaBella Associates and dated January 2021 and as amended thereto.

Permission is hereby granted to proceed with the work as set forth in the specific plans or statements now on file in this Department. Any amendments made to the plans and specifications must be submitted for approval.

Permit #:	2019-999-06
Date Issued:	March 17, 2021
Date Expires:	December 31, 2021
Permit Extension:	

Kristofer Straus, P.E.
Senior Construction Project Manager

Erie County
Department of Public Works
Phone (716) 858-8301 Fax (716) 858-8303

Inspection Requirements and Procedures

1) PROVISIONS SHALL BE MADE FOR INSPECTION OF THE FOLLOWING ELEMENTS OF THE CONSTRUCTION PROCESS, WHERE APPLICABLE:

    a. Work site prior to the issuance of a permit
    b. Fire rated construction
    c. Footings and foundations
    d. Fire rated penetrations
    e. Preparation for concrete slab
    f. Solid fuel burning heating appliances, chimneys, flues or gas vents
    g. Framing
    h. Energy code compliance
    i. Rough-in of all building systems, including but not limited to: Electrical, Plumbing, Gas or Fuel Piping, Security, HVAC, Temperature Controls, etc.
    j. A final inspection after all work authorized by the building permit has been completed

2) DO NOT PROCEED TO THE NEXT STEP OF CONSTRUCTION WHERE WORK IS TO BE CONCEALED IF IT HAS NOT BEEN INSPECTED. Otherwise, work may need to be removed, at the contractor's expense, to conduct the interior inspection. Close coordination, with the Erie County Department of Public Works and a 72 Hour advance notice, will greatly reduce this possibility.

3) Contractor must stage and pre-test areas to be inspected. This will ensure that any disruptions are kept to a minimum. If a test fails or contractor is not ready or available, a new inspection date must be arranged and the contractor will be responsible for all costs including Erie County inspector's time.

4) All permitted electrical work to be performed requires a third party electrical inspection certificate to be paid by the contractor.

5) The facility user hereby agrees to allow the Erie County Department of Public Works to inspect the work being done pursuant to the building permit, provided that such inspection is limited to the scope of work described in the building permit application.

6) New York State law requires contractors to maintain Worker's Compensation and Disability Insurance for their employees.

7) If a Certificate of Occupancy is required, the space shall not be occupied until said certificate has been issued.

8) Work undertaken pursuant to the building permit is conditioned upon and subject to any Local, State, and Federal regulations relating to Asbestos and any other Hazardous Material.

Erie County
Department of Public Works
Phone (716) 858-8301 Fax (716) 858-8303

Inspection Requirements and Procedures continued

9) This permit does not include any privilege of encroachment in, over, under, or upon any city street or right-of-way.

10) The building permit must be displayed so as to be visible at the site of the work being conducted.

11) Work conducted pursuant to a building permit must be visually inspected by the Code Enforcement Official and must conform to the New York State Uniform Fire Prevention and Building Code, and all applicable Local, County of Erie, State and Federal laws, codes, rules and regulations.

12) The Erie County Department of Public Works must be notified immediately of any changes to the scope of work on an approved building permit. Drawings and Specifications describing the new scope of work must be filed with the Department of Public Works as well.

13) Prior to the start of Demolition activities, the potential for exposure to asbestos and any other hazardous materials must be identified. Accordingly, an abatement plan that complies with New York State Department of Labor rules must be implemented.

14) It is the Contractor's/Facility User's responsibility to contact the Erie County Department of Public Works at least 72 hours in advance of any inspection. This is especially important for concealed work which will eventually be covered (i.e. electrical wiring to be permanently covered).

Erie County Department of Public Works

Phone: (716) 858-8301 (Monday through Friday from 8:00 am to 4:00 pm)

Inspections will be performed by appointment only. More than one inspection may be necessary.

Appendix 3

1 E050 ELECTRICAL SITE PLAN
1" = 40'-0"

EROSION AND SEDIMENT CONTROL NOTES:

A. ALL EROSION CONTROL MEASURES SHALL BE IN ACCORDANCE WITH NEW YORK STANDARDS AND SPECIFICATIONS FOR EROSION AND SEDIMENT CONTROL, AND LOCAL GOVERNING SOIL AND WATER CONSERVATION AGENCY RECOMMENDATIONS AND STANDARDS. CONTRACTOR SHALL SUBMIT PROPOSED EROSION CONTROL PLAN INCLUDING SEQUENCING OF WORK TO THE ENGINEER FOR REVIEW PRIOR TO START OF WORK.

B. UTILIZE CONSTRUCTION METHODS/TECHNIQUES, WHICH WILL LIMIT THE EXPOSED EARTHEN AREAS AND MINIMIZE THE EFFECT OF EARTH DISTURBANCE ACTIVITIES ON SOIL EROSION. THE AREA OF DISTURBANCE SHALL BE LIMITED TO A MAXIMUM OF 5 ACRES UNLESS OTHERWISE APPROVED BY THE ENGINEER.

C. ALL SEDIMENTATION BARRIERS AND OTHER TEMPORARY OR PERMANENT MEASURES SHALL BE IN PLACE PRIOR TO THE START OF CONSTRUCTION. PLANS SHOW THE SUGGESTED MINIMUM MEASURES REQUIRED.

D. REMOVAL OF ALL TEMPORARY EROSION AND SEDIMENTATION CONTROL MEASURES SHALL BE COMPLETED AT THE APPROVAL OF THE OWNER AND ENGINEER. THE COST OF REMOVING THESE MEASURES SHALL ALSO BE INCLUDED IN THE BID PRICE.

E. FOR THE DURATION OF THE PROJECT, THE CONTRACTOR SHALL PROTECT ALL ON-SITE, ADJACENT AND/OR DOWNSTREAM STORM/SANITARY SEWERS, AND/OR OTHER WATER COURSES FROM CONTAMINATION BY WATER BORNE SILTS, SEDIMENTS, FUELS, SOLVENTS, LUBRICANTS OR OTHER POLLUTANTS ORIGINATING FROM ANY WORK DONE ON, OR IN SUPPORT OF THIS PROJECT.

F. DURING CONSTRUCTION NO WET OR FRESH CONCRETE OR LEACHATE SHALL BE ALLOWED TO ESCAPE INTO STORM/SANITARY SEWERS, DITCHES OR OTHER WATERS OF NEW YORK STATE. NOR SHALL WASHINGS FROM CONCRETE TRUCKS, MIXERS OR OTHER DEVICES BE ALLOWED TO ENTER ANY STORM/SANITARY SEWERS, DITCHES, RIVERS, OR WATER COURSES.

G. ALL EXCAVATED OR IMPORTED EARTHEN STOCKPILES SHALL BE SUITABLY STABILIZED AND PROTECTED BY SILT FENCE SO THAT IT CANNOT REASONABLY ENTER ANY WATER BODY, OR STORM OR SANITARY SEWER.

H. ALL METHODS AND EQUIPMENT PROPOSED BY THE CONTRACTOR TO ACCOMPLISH THE WORK FOR EROSION AND POLLUTION CONTROL SHALL BE SUBJECT TO APPROVAL OF THE ENGINEER.

I. THE CONTRACTOR SHALL BE REQUIRED TO TREAT TRAVELED AREAS TO CONTROL DUST. WATER SHALL BE APPLIED TO SUCH TRAVELED AREAS AS THE ARCHITECT/ENGINEER OR OWNER'S DESIGNATED REPRESENTATIVE MAY DESIGNATE. THE NUMBER OF APPLICATIONS AND THE AMOUNT OF WATER SHALL BE BASED UPON FIELD AND WEATHER CONDITIONS.

J. ALL AREAS OF SOIL DISTURBANCE RESULTING FROM THIS PROJECT WHICH WILL NOT BE SUBJECT TO FURTHER EARTHWORK OR CONSTRUCTION ACTIVITIES SHALL BE PERMANENTLY SEEDED TO ESTABLISH GRASS, AND MULCHED WITH HAY OR STRAW WITHIN ONE WEEK OF FINAL DISTURBANCE. MULCH SHALL BE MAINTAINED UNTIL A SUITABLE VEGETATIVE COVER IS ESTABLISHED.

K. CONTRACTOR STAGING AREAS AND CONSTRUCTION ENTRANCE LOCATIONS SHALL BE COORDINATED WITH THE OWNER PRIOR TO START OF CONSTRUCTION. STABILIZED CONSTRUCTION ENTRANCE(S), AS SHOWN ON THE PLANS SHALL BE PROVIDED. ALL DISTURBED AREAS SHALL BE RESTORED.

L. ALL CATCH BASINS/DRAINAGE INLETS SHALL HAVE STONED INLET PROTECTION AROUND THEM AND GEOTEXTILE FABRIC OVER THE GRATE TO PREVENT SEDIMENTATION FROM ENTERING THE STORM SYSTEM.

M. TILL ALL COMPACTED SOILS LOCATED IN LAWN AREAS TO RESTORE THE ORIGINAL PROPERTIES OF THE SOIL PRIOR TO SEEDING.

GENERAL NOTES:

A. APPROXIMATE LOCATIONS OF ALL MEDIUM VOLTAGE EQUIPMENT SHOWN FOR PURPOSES OF INTERCONNECT APPLICATION. STRING INVERTER AND COMBINER BOX LOCATIONS NOT SHOWN.

B. CUSTOMER OWNED OVERHEAD LINE POLES ARE SPACED AT LEAST 50'-0" APART.

PROJECT NOTES:

A. ALL SITE DISTURBANCE SHALL CONFORM TO NYSDEC TECHNICAL GUIDANCE FOR SITE INVESTIGATION AND REMEDIATION (DER-10) AND THE APPROVED SITE MANAGEMENT PLAN (SMP).

B. THE CONTRACTOR ALONE SHALL BE RESPONSIBLE TO LOCATE UTILITIES OUTSIDE THE RIGHT-OF-WAY INCLUDING PRIVATE ROADS.

C. SITE DRAINAGE, INCLUDING THE PROJECT SITE AND ADJACENT PRIVATE AND PUBLIC ROADWAYS, DRIVES, PARKING AREAS OR PROPERTIES SHALL BE MAINTAINED THROUGHOUT THE CONSTRUCTION PERIOD.

D. THE CONTRACTOR SHALL BE RESPONSIBLE FOR SUPPLYING ALL MATERIALS, TOOLS AND EQUIPMENT, INCLUDING SPECIAL CUTTING DEVICES, NECESSARY TO PERFORM THE WORK CONTAINED IN THIS CONTRACT.

E. THE SIZES AND MATERIAL OF CONSTRUCTION OF WATER MAINS, SANITARY SEWERS AND STORM SEWERS TO REMAIN ARE REPUTED. THE CONTRACTOR SHALL VERIFY SIZES OF ALL UTILITIES WHERE CONNECTIONS TO SAID EXISTING UTILITIES ARE REQUIRED. EXCAVATION TO VERIFY THESE UTILITIES SHALL BE MADE AT NO ADDITIONAL COST TO THE OWNER.

F. THE CONTRACTOR SHALL PROTECT ALL EXISTING SITE AMENITIES NOT DESIGNATED FOR REMOVAL.

G. UNLESS OTHERWISE INDICATED ON THE PLANS OR DIRECTED BY THE ARCHITECT/ENGINEER, THE CONTRACTOR IS RESPONSIBLE FOR PRESERVING AND PROTECTING FROM DAMAGE ALL TREES, SHRUBS AND PLANTS IN THE VICINITY OF THE PROPOSED WORK.

H. THE CONTRACTOR SHALL PROTECT AND SUPPORT ALL EXISTING UTILITIES DESIGNATED TO REMAIN FOR THE DURATION OF THE CONTRACT.

I. ANY SITE AMENITY, UTILITY, STREET APPURTENANCE, OR OTHER ITEM WHICH BECOMES DAMAGED AS A RESULT OF THE CONTRACTOR'S OPERATIONS SHALL BE REPAIRED OR REPLACED IN-KIND BY THE CONTRACTOR AS DETERMINED BY THE PROJECT MANAGER OR ARCHITECT/ENGINEER AND AT NO ADDITIONAL COST TO THE OWNER.

SITE DATA	
SYSTEM PRODUCTION SUMMARY	
AC PLANT PEAK PRODUCTION:	300 KW
DC PLANT PEAK PRODUCTION:	450.0 KW
DC/AC POWER RATIO:	1.5
INTERCONNECTING UTILITY INFORMATION	
UTILITY:	NATIONAL GRID
SUBSTATION:	WILLOWDALE & BARTON
CIRCUIT #:	36_01_5669
LINE VOLTAGE:	4.16 KV
EQUIPMENT SUMMARY	
SOLAR PV MODULE	
MANUFACTURER:	CANADIAN SOLAR
MODEL:	CS3U-375MB-AG
NOMINAL MAX. DC POWER:	375 W
INTER-ROW SPACING (FT):	16.7
PANEL ORIENTATION:	LANDSCAPE
TILT ANGLE:	25°
STRING SIZE (TYPICAL):	18 MODULES
TOTAL PV MODULE QUANTITY:	1,200
SOLAR INVERTER	
MANUFACTURER:	CPS
MODEL:	SCA50KTL-DO/US-480
NOMINAL MAX. AC POWER:	50 KW / 50 KVA
NOMINAL AC VOLTAGE:	480 V
MAX. AC CURRENT:	60.2 A
TOTAL INVERTER QUANTITY:	6

N

SITE COORDINATES:
42.974323, -78.890424

GRAPHIC SCALE 1" = 40'
80 70 60 50 40 30 20 10 0 20 40 60 80

PAPER SIZE: 24" x 36"

LaBella
Powered by partnership.
300 State Street, Suite 201
Rochester, NY 14614
585-454-6110
labellapc.com

STATE OF NEW YORK · BRIAN JOSEPH BOURKE · 099075 · LICENSED PROFESSIONAL ENGINEER

STATE OF NEW YORK · JAMES C. TARBETT · No. 093132 · LICENSED PROFESSIONAL ENGINEER

MONTANTE SOLAR
2760 KENMORE AVENUE
TONAWANDA, NY 14150

303 WOODWARD AVE SOLAR PROJECT

300 KW ARRAY

303 WOODWARD AVENUE
TONAWANDA, NY 14150

GPS COORDINATES:
42.974323, -78.890424

NO:	DATE:	DESCRIPTION:
--	--	--
REVISIONS		

PROJECT NUMBER: PROJECT NUMBER
DRAWN BY: BJB
REVIEWED BY: SJB
ISSUED FOR: PERMIT
DATE: JANUARY 2021
DRAWING NAME: SITE LAYOUT
DRAWING NUMBER: E050

1 E051 ELECTRICAL CONNECTION DIAGRAM
1" = 40'-0"

GENERAL NOTES:

1. REFER TO CABLE SIZES AS ⟨X⟩ ON SHEET E-701.
2. REFER TO DETAIL 3 ON SHEET E-501 FOR ABOVE-GROUND CONDUIT INSTALLATION DETAILS. NO TRENCHING OR EXCAVATION IS ALLOWED AT THIS SITE.

SITE DATA	
SYSTEM PRODUCTION SUMMARY	
AC PLANT PEAK PRODUCTION:	300 KW
DC PLANT PEAK PRODUCTION:	450.0 KW
DC/AC POWER RATIO:	1.5
INTERCONNECTING UTILITY INFORMATION	
UTILITY:	NATIONAL GRID
SUBSTATION:	WILLOWDALE & BARTON
CIRCUIT #:	36_01_5669
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TOTAL PV MODULE QUANTITY:	1,200
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MANUFACTURER:	CPS
MODEL:	SCA50KTL-DO/US-480
NOMINAL MAX. AC POWER:	50 KW / 50 KVA
NOMINAL AC VOLTAGE:	480 V
MAX. AC CURRENT:	60.2 A
TOTAL INVERTER QUANTITY:	6

N

SITE COORDINATES:
42.974323, -78.890424

GRAPHIC SCALE 1" = 40'
80 70 60 50 40 30 20 10 0 20 40 60 80
PAPER SIZE: 24" x 36"

Date & Time: 12/3/2020 3:14 PM By: 2
Path: \\PROJECTS2\Projects\NZTM Montante Solar Dev\2200652 - Erie County DPW Sites\2200652.03 - Woodward Ave Solar Array\Drawings\MEEP - Sample Project\TM Montante - 303 Woodward Ave - Site Layout.dwg

LaBella
Powered by partnership.

300 State Street, Suite 201
Rochester, NY 14614
585-454-6110

labellapc.com

MONTANTE SOLAR

2760 KENMORE AVENUE
TONAWANDA, NY 14150

303 WOODWARD AVE SOLAR PROJECT

300 KW ARRAY

303 WOODWARD AVENUE
TONAWANDA, NY 14150

GPS COORDINATES:
42.974323, -78.890424

NO:	DATE:	DESCRIPTION:
--	--	--

REVISIONS

PROJECT NUMBER: PROJECT NUMBER

DRAWN BY: BJB

REVIEWED BY: SJB

ISSUED FOR: SIR SUBMISSION

DATE: DECEMBER 2020

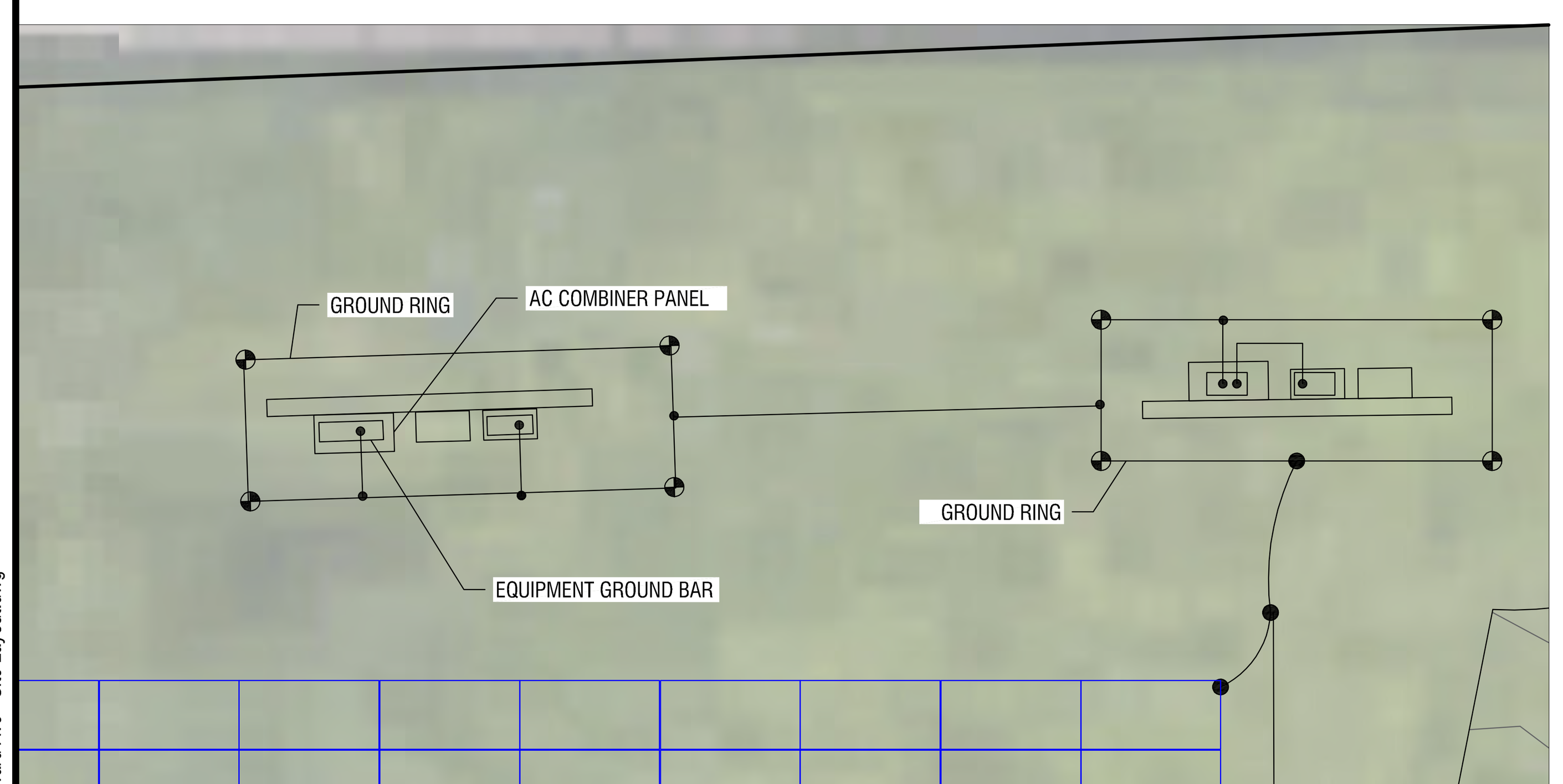
DRAWING NAME:

ELECTRICAL CONNECTION DIAGRAM

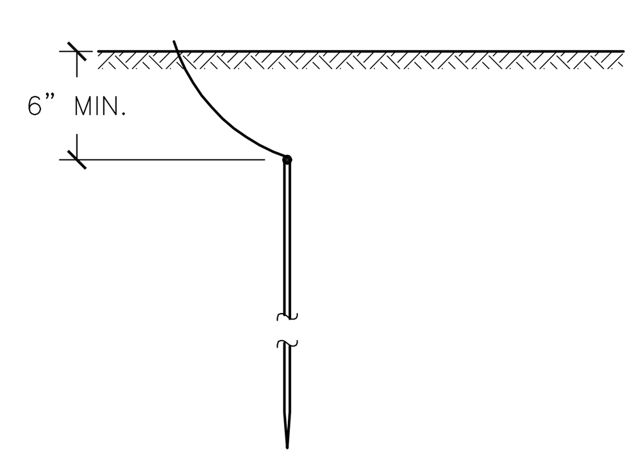
DRAWING NUMBER:

E051

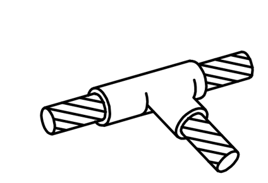
1 ELECTRICAL GROUNDING DIAGRAM
E052 1" = 40' - 0"



2 ELECTRICAL GROUNDING DIAGRAM
E052 N.T.S.



3 GROUND ROD DETAIL
E052 N.T.S.



4 TEE DETAIL
E052 N.T.S.

DRAWING GENERAL NOTES:

A. ALL CAD WELDS TO BE DIRECT BURIAL RATED AND IRREVERSIBLE IN NATURE.

B. ALL CONDUITS TO BE INSTALLED WITH GROUND CONDUCTORS. SIZES AS CALLED FOR ON THREE LINE.

C. ALL PARALLEL CABLE SETS TO BE INSTALLED WITH GROUND CONDUCTORS IN EACH CONDUIT.

D. ALL GROUNDING SYSTEM MATERIALS AND WORKMANSHIP TO COMPLY WITH NFPA 70 ARTICLES 250 AND 690, PART IV.

E. HYDRAULICALLY COMPRESSED FITTINGS ACCEPTABLE ALTERNATIVE TO CADWELDS. PROPERLY SIZED FITTINGS AND MATCHING DIES TO BE USED.

KEYNOTES:

1 GROUND CONNECTIONS TO PV MODULE AND INVERTER RACKING STRUCTURES TO BE MADE WITH WEEB 6.7 CONNECTORS.

SITE DATA	
SYSTEM PRODUCTION SUMMARY	
AC PLANT PEAK PRODUCTION:	300 KW
DC PLANT PEAK PRODUCTION:	450.0 KW
DC/AC POWER RATIO:	1.5
INTERCONNECTING UTILITY INFORMATION	
UTILITY:	NATIONAL GRID
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CIRCUIT #:	36_01_5669
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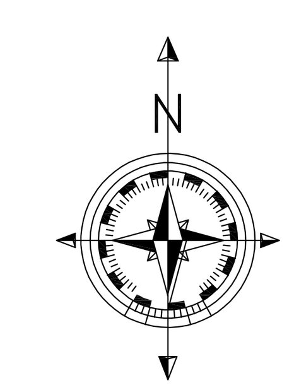
EQUIPMENT SUMMARY	
SOLAR PV MODULE	
MANUFACTURER:	CANADIAN SOLAR
MODEL:	CS3U-375MB-AG
NOMINAL MAX. DC POWER:	375 W
INTER-ROW SPACING (FT):	16.7
PANEL ORIENTATION:	LANDSCAPE
TILT ANGLE:	25°
STRING SIZE (TYPICAL):	18 MODULES
TOTAL PV MODULE QUANTITY:	1,200
SOLAR INVERTER	
MANUFACTURER:	CPS
MODEL:	SCA50KTL-DO/US-480
NOMINAL MAX. AC POWER:	50 KW / 50 KVA
NOMINAL AC VOLTAGE:	480 V
MAX. AC CURRENT:	60.2 A
TOTAL INVERTER QUANTITY:	6



SITE COORDINATES:
42.974323, -78.890424

GRAPHIC SCALE 1" = 40'
80 70 60 50 40 30 20 10 0 20 40 60 80
PAPER SIZE: 24" x 36"

Date & Time: 12/2/2020 11:08 AM By: 2
Path: \\PROJECTS2\Projects\NZ\TM Montante Solar Dev\2200652 - Erie County DPW Sites\2200652.03 - Woodward Ave Solar Array\Drawings\MEP - Sample Project\TM Montante - 303 Woodward Ave - Site Layout.dwg

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MONTANTE SOLAR

2760 KENMORE AVENUE
TONAWANDA, NY 14150

303 WOODWARD AVE SOLAR PROJECT

300 KW ARRAY

303 WOODWARD AVENUE
TONAWANDA, NY 14150

GPS COORDINATES:
42.974323, -78.890424

NO:	DATE:	DESCRIPTION:
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REVISIONS

PROJECT NUMBER: PROJECT NUMBER

DRAWN BY: BJB

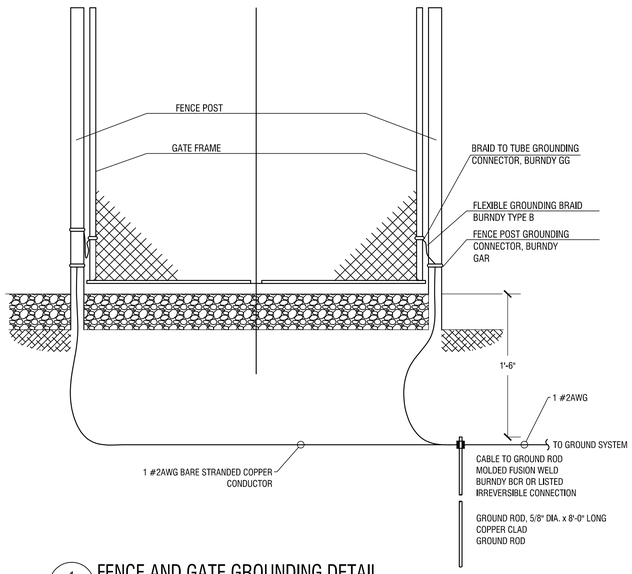
REVIEWED BY: SJB

ISSUED FOR: SIR SUBMISSION

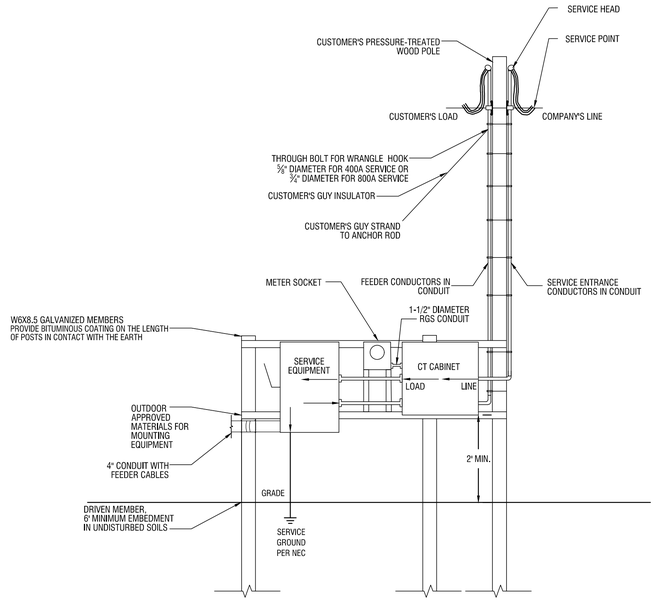
DATE: NOVEMBER 2020

DRAWING NAME: GROUNDING DIAGRAM

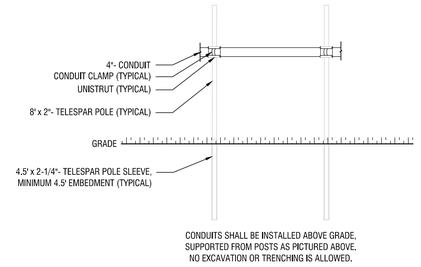
DRAWING NUMBER: E052



1 E501 FENCE AND GATE GROUNDING DETAIL
N.T.S.



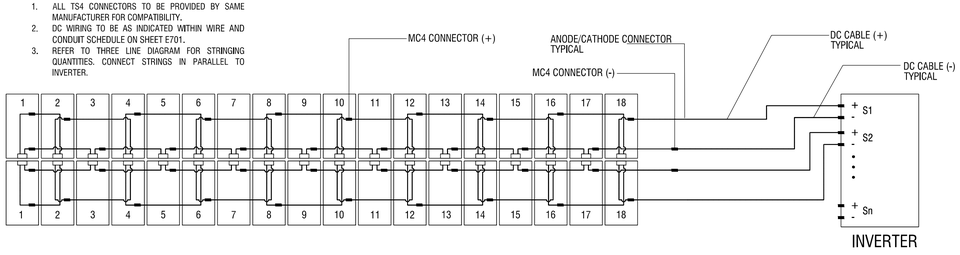
2 E501 SERVICE METERING PEDESTAL DETAIL
N.T.S.



3 E501 TYPICAL CONDUIT INSTALLATION DETAIL
N.T.S.

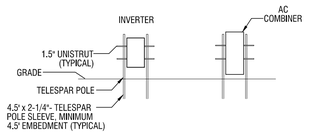
DC STRING WIRING NOTES:

1. ALL TS4 CONNECTORS TO BE PROVIDED BY SAME MANUFACTURER FOR COMPATIBILITY.
2. DC WIRING TO BE AS INDICATED WITHIN WIRE AND CONDUIT SCHEDULE ON SHEET E701.
3. REFER TO THREE LINE DIAGRAM FOR STRINGING QUANTITIES. CONNECT STRINGS IN PARALLEL TO INVERTER.



4 E501 PV MODULE DC STRING WIRING DETAILS
N.T.S.

5 E501 SOLAR MODULE INSTALLATION AND RACKING DETAIL
N.T.S.



DETAIL GENERAL NOTES

A. DC CABLE AND CONDUITS NOT SHOWN ON DETAILS.

B. PROVIDE A WEATHER HEAD ON EXPOSED CONDUIT ENDS FOR CONDUITS PENETRATING GRADE FROM UNDERGROUND.

6 E501 INVERTER INSTALLATION DETAILS
N.T.S.

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BRIAN JOSEPH BERKE
LICENSED PROFESSIONAL ENGINEER
099807

MONTANTE SOLAR
2760 KENMORE AVENUE
TONAWANDA, NY 14150

303 WOODWARD AVE SOLAR PROJECT

300 KW ARRAY

303 WOODWARD AVENUE
TONAWANDA, NY 14150

GPS COORDINATES:
42.974323, -78.890424

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NO:	DATE:	DESCRIPTION:
REVISIONS		

PROJECT NUMBER: PROJECT NUMBER
DRAWN BY: BJB
REVIEWED BY: SJB
ISSUED FOR: PERMIT
DATE: JANUARY 2021
DRAWING NAME:

DISTRIBUTED GENERATION DETAILS

DRAWING NUMBER:

E501

AC FEEDERS																			
FEEDER RUN		CONDUCTOR						FEEDER						VOLTAGE DROP		CONDUIT FILL			
FROM	TO	TYPE	MATERIAL	SIZE			IMPEDANCE/PU (NEC TABLES)	NUMBER OF PARALLEL SETS	FEEDER AMPACITY	TOTAL FEEDER LENGTH	FEEDER IMPEDANCE	MAXIMUM CURRENT	SYSTEM VOLTAGE (L-L)	VD (L-N)	VD (%)	CONDUIT SIZE	CONDUIT AREA	AREA OF ALL COND IN CDT	FILL (NEC 40%)
				PHASE	NEUTRAL	GROUND	PHASE	-	AMPS	FT	OHMS	AMPS	VOLTS	VOLTS	%	INCH	IN^2	IN^2	%
				KCMIL/AWG	AWG	AWG	OHMS/1000FT									PVC			
INV1	PANEL	THWN-2	CU	4	4	8	0.31	1	95	90	0.0279	64	480	0.607	0.13%	1.5	1.986	0.2838	14%
INV2	PANEL	THWN-2	CU	4	4	8	0.31	1	95	110	0.0341	64	480	0.742	0.15%	1.5	1.986	0.2838	14%
INV3	PANEL	THWN-2	CU	4	4	8	0.31	1	95	190	0.0589	64	480	1.282	0.27%	1.5	1.986	0.2838	14%
INV4	PANEL	THWN-2	CU	4	4	8	0.31	1	95	220	0.0682	64	480	1.485	0.31%	1.5	1.986	0.2838	14%
INV5	PANEL	THWN-2	CU	4	4	8	0.31	1	95	290	0.0899	64	480	1.957	0.41%	1.5	1.986	0.2838	14%
INV6	PANEL	THWN-2	CU	4	4	8	0.31	1	95	320	0.0992	64	480	2.160	0.45%	1.5	1.986	0.2838	14%
PANEL	DISC SWITCH	THWN-2	CU	700	700	2	0.048	1	520	40	0.00192	480	480	0.571	0.12%	4	12.554	3.0819	25%
DISC SWITCH	CT CABINET	THWN-2	CU	700	700	2	0.048	1	520	10	0.00048	480	480	0.143	0.03%	4	12.554	3.0819	25%

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303 WOODWARD AVE SOLAR PROJECT

300 KW ARRAY

303 WOODWARD AVENUE
TONAWANDA, NY 14150

GPS COORDINATES:
42.974323, -78.890424

NO:	DATE:	DESCRIPTION:
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REVISIONS

PROJECT NUMBER: PROJECT NUMBER

DRAWN BY: BJB

REVIEWED BY: SJB

ISSUED FOR: SIR SUBMISSION

DATE: DECEMBER 2020

DRAWING NAME:

AC FEEDERS TABLE

DRAWING NUMBER:

E601

DC CIRCUITS																										
CKT RUN		CONDUCTOR						CIRCUIT										VOLTAGE DROP		CONDUIT FILL						
FROM MODULE STRING	TO INVERTER	TYPE	MATERIAL	SIZE	OUTSIDE DIAMETER	DC RESISTANCE PU	AMPACITY	QTY OF COND/CKT	QTY OF CKTS/CONDUIT	QTY OF COND/CONDUIT	DE-RATING FACTOR	CIRCUIT AMPACITY	CIRCUIT LENGTH	CKT CONDUCTOR LENGTH	CIRCUIT RESISTANCE	MPP CURRENT	MPP VOLTAGE	VD	VD (%)	SINGLE COND AREA	AREA OF ALL COND IN CDT	CONDUIT SIZE	CONDUIT AREA	FILL
				AWG	INCH	OHMS/1000FT	AMPS	-			%	AMPS	FT	FT	OHMS	AMPS	VOLTS	VOLTS	%	IN^2	IN^2	INCH	IN^2	%
S1.1	INV1	PV (XLP)	CU	10	0.311	1.24	35	2	4	8	70%	24.5	80	160	0.20	12.5	1000	2.49	0.25%	0.076	0.608	2	3.291	18.5%
S1.2	INV1	PV (XLP)	CU	10	0.311	1.24	35	2	4	8	70%	24.5	80	160	0.20	12.5	1000	2.49	0.25%	0.076	0.608	2	3.291	18.5%
S1.3	INV1	PV (XLP)	CU	10	0.311	1.24	35	2	4	8	70%	24.5	140	280	0.35	12.5	1000	4.35	0.43%	0.076	0.608	2	3.291	18.5%
S1.4	INV1	PV (XLP)	CU	10	0.311	1.24	35	2	4	8	70%	24.5	140	280	0.35	12.5	1000	4.35	0.43%	0.076	0.608	2	3.291	18.5%
S1.5	INV1	PV (XLP)	CU	10	0.311	1.24	35	2	4	8	70%	24.5	200	400	0.50	12.5	1000	6.21	0.62%	0.076	0.608	2	3.291	18.5%
S1.6	INV1	PV (XLP)	CU	10	0.311	1.24	35	2	4	8	70%	24.5	200	400	0.50	12.5	1000	6.21	0.62%	0.076	0.608	2	3.291	18.5%
S1.7	INV1	PV (XLP)	CU	10	0.311	1.24	35	2	4	8	70%	24.5	260	520	0.64	12.5	1000	8.08	0.81%	0.076	0.608	2	3.291	18.5%
S1.8	INV1	PV (XLP)	CU	10	0.311	1.24	35	2	4	8	70%	24.5	260	520	0.64	12.5	1000	8.08	0.81%	0.076	0.608	2	3.291	18.5%
S1.9	INV1	PV (XLP)	CU	10	0.311	1.24	35	2	4	8	70%	24.5	100	200	0.25	12.5	1000	3.11	0.31%	0.076	0.608	2	3.291	18.5%
S1.10	INV1	PV (XLP)	CU	10	0.311	1.24	35	2	4	8	70%	24.5	100	200	0.25	12.5	1000	3.11	0.31%	0.076	0.608	2	3.291	18.5%
S1.11	INV1	PV (XLP)	CU	10	0.311	1.24	35	2	4	8	70%	24.5	160	320	0.40	12.5	1000	4.97	0.50%	0.076	0.608	2	3.291	18.5%
S1.12	INV1	PV (XLP)	CU	10	0.311	1.24	35	2	4	8	70%	24.5	160	320	0.40	12.5	1000	4.97	0.50%	0.076	0.608	2	3.291	18.5%
S2.1	INV2	PV (XLP)	CU	10	0.311	1.24	35	2	4	8	70%	24.5	220	440	0.55	12.5	1000	6.84	0.68%	0.076	0.608	2	3.291	18.5%
S2.2	INV2	PV (XLP)	CU	10	0.311	1.24	35	2	4	8	70%	24.5	220	440	0.55	12.5	1000	6.84	0.68%	0.076	0.608	2	3.291	18.5%
S2.3	INV2	PV (XLP)	CU	10	0.311	1.24	35	2	4	8	70%	24.5	280	560	0.69	12.5	1000	8.70	0.87%	0.076	0.608	2	3.291	18.5%
S2.4	INV2	PV (XLP)	CU	10	0.311	1.24	35	2	4	8	70%	24.5	280	560	0.69	12.5	1000	8.70	0.87%	0.076	0.608	2	3.291	18.5%
S2.5	INV2	PV (XLP)	CU	10	0.311	1.24	35	2	4	8	70%	24.5	100	200	0.25	12.5	1000	3.11	0.31%	0.076	0.608	2	3.291	18.5%
S2.6	INV2	PV (XLP)	CU	10	0.311	1.24	35	2	4	8	70%	24.5	100	200	0.25	12.5	1000	3.11	0.31%	0.076	0.608	2	3.291	18.5%
S2.7	INV2	PV (XLP)	CU	10	0.311	1.24	35	2	4	8	70%	24.5	160	320	0.40	12.5	1000	4.97	0.50%	0.076	0.608	2	3.291	18.5%
S2.8	INV2	PV (XLP)	CU	10	0.311	1.24	35	2	4	8	70%	24.5	160	320	0.40	12.5	1000	4.97	0.50%	0.076	0.608	2	3.291	18.5%
S2.9	INV2	PV (XLP)	CU	10	0.311	1.24	35	2	4	8	70%	24.5	220	440	0.55	12.5	1000	6.84	0.68%	0.076	0.608	2	3.291	18.5%
S2.10	INV2	PV (XLP)	CU	10	0.311	1.24	35	2	4	8	70%	24.5	220	440	0.55	12.5	1000	6.84	0.68%	0.076	0.608	2	3.291	18.5%
S2.11	INV2	PV (XLP)	CU	10	0.311	1.24	35	2	4	8	70%	24.5	280	560	0.69	12.5	1000	8.70	0.87%	0.076	0.608	2	3.291	18.5%
S2.12	INV2	PV (XLP)	CU	10	0.311	1.24	35	2	4	8	70%	24.5	280	560	0.69	12.5	1000	8.70	0.87%	0.076	0.608	2	3.291	18.5%
S3.1	INV3	PV (XLP)	CU	10	0.311	1.24	35	2	4	8	70%	24.5	80	160	0.20	12.5	1000	2.49	0.25%	0.076	0.608	2	3.291	18.5%
S3.2	INV3	PV (XLP)	CU	10	0.311	1.24	35	2	4	8	70%	24.5	80	160	0.20	12.5	1000	2.49	0.25%	0.076	0.608	2	3.291	18.5%
S3.3	INV3	PV (XLP)	CU	10	0.311	1.24	35	2	4	8	70%	24.5	140	280	0.35	12.5	1000	4.35	0.43%	0.076	0.608	2	3.291	18.5%
S3.4	INV3	PV (XLP)	CU	10	0.311	1.24	35	2	4	8	70%	24.5	140	280	0.35	12.5	1000	4.35	0.43%	0.076	0.608	2	3.291	18.5%
S3.5	INV3	PV (XLP)	CU	10	0.311	1.24	35	2	4	8	70%	24.5	200	400	0.50	12.5	1000	6.21	0.62%	0.076	0.608	2	3.291	18.5%
S3.6	INV3	PV (XLP)	CU	10	0.311	1.24	35	2	4	8	70%	24.5	200	400	0.50	12.5	1000	6.21	0.62%	0.076	0.608	2	3.291	18.5%
S3.7	INV3	PV (XLP)	CU	10	0.311	1.24	35	2	4	8	70%	24.5	260	520	0.64	12.5	1000	8.08	0.81%	0.076	0.608	2	3.291	18.5%
S3.8	INV3	PV (XLP)	CU	10	0.311	1.24	35	2	4	8	70%	24.5	260	520	0.64	12.5	1000	8.08	0.81%	0.076	0.608	2	3.291	18.5%
S3.9	INV3	PV (XLP)	CU	10	0.311	1.24	35	2	4	8	70%	24.5	100	200	0.25	12.5	1000	3.11	0.31%	0.076	0.608	2	3.291	18.5%
S3.10	INV3	PV (XLP)	CU	10	0.311	1.24	35	2	4	8	70%	24.5	100	200	0.25	12.5	1000	3.11	0.31%	0.076	0.608	2	3.291	18.5%
S3.11	INV3	PV (XLP)	CU	10	0.311	1.24	35	2	4	8	70%	24.5	160	320	0.40	12.5	1000	4.97	0.50%	0.076	0.608	2	3.291	18.5%
S3.12	INV3	PV (XLP)	CU	10	0.311	1.24	35	2	4	8	70%	24.5	160	320	0.40	12.5	1000	4.97	0.50%	0.076	0.608	2	3.291	18.5%
S4.1	INV4	PV (XLP)	CU	10	0.311	1.24	35	2	4	8	70%	24.5	130	260	0.32	12.5	1000	4.04	0.40%	0.076	0.608	2	3.291	18.5%
S4.2	INV4	PV (XLP)	CU	10	0.311	1.24	35	2	4	8	70%	24.5	130	260	0.32	12.5	1000	4.04	0.40%	0.076	0.608	2	3.291	18.5%
S4.3	INV4	PV (XLP)	CU	10	0.311	1.24	35	2	4	8	70%	24.5	190	380	0.47	12.5	1000	5.90	0.59%	0.076	0.608	2	3.291	18.5%
S4.4	INV4	PV (XLP)	CU	10	0.311	1.24	35	2	4	8	70%	24.5	190	380	0.47	12.5	1000	5.90	0.59%	0.076	0.608	2	3.291	18.5%
S4.5	INV4	PV (XLP)	CU	10	0.311	1.24	35	2	4	8	70%	24.5	90	180	0.22	12.5	1000	2.80	0.28%	0.076	0.608	2	3.291	18.5%
S4.6	INV4	PV (XLP)	CU	10	0.311	1.24	35	2	4	8	70%	24.5	90	180	0.22	12.5	1000	2.80	0.28%	0.076	0.608	2	3.291	18.5%
S4.7	INV4	PV (XLP)	CU	10	0.311	1.24	35	2	4	8	70%	24.5	150	300	0.37	12.5	1000	4.66	0.47%	0.076	0.608	2	3.291	18.5%
S4.8	INV4	PV (XLP)	CU	10	0.311	1.24	35	2	4	8	70%	24.5	150	300	0.37	12.5	1000	4.66	0.47%	0.076	0.608	2	3.291	18.5%
S4.9	INV4	PV (XLP)	CU	10	0.311	1.24	35	2	4	8	70%	24.5	210	420	0.52	12.5	1000	6.52	0.65%	0.076	0.608	2	3.291	18.5%
S4.10	INV4	PV (XLP)	CU	10	0.311	1.24	35	2	4	8	70%	24.5	210	420	0.52	12.5	1000	6.52	0.65%	0.076	0.608	2	3.291	18.5%
S4.11	INV4	PV (XLP)	CU	10	0.311	1.24	35	2	4	8	70%	24.5	270	540	0.67	12.5	1000	8.39	0.84%	0.076	0.608	2	3.291	18.5%
S4.12	INV4	PV (XLP)	CU	10	0.311	1.24	35	2	4	8	70%	24.5	270	540	0.67	12.5	1000	8.39	0.84%	0.076	0.608	2	3.291	18.5%
S5.1	INV5	PV (XLP)	CU	10	0.311	1.24	35	2	4	8	70%	24.5	70	140	0.17	12.5	1000	2.17	0.22%	0.076	0.608	2	3.291	18.5%
S5.2	INV5	PV (XLP)	CU	10	0.311	1.24	35	2	4	8	70%	24.5	70	140	0.17	12.5	1000	2.17	0.22%	0.076	0.608	2	3.291	18.5%
S5.3	INV5	PV (XLP)	CU	10	0.311	1.24	35	2	4	8	70%	24.5	130	260	0.32	12.5	1000	4.04	0.40%	0.076	0.608	2	3.291	18.5%
S5.4	INV5	PV (XLP)	CU	10	0.311	1.24	35	2	4	8	70%	24.5	130	260	0.32	12.5	1000	4.04	0.40%	0.076	0.608	2	3.291	18.5%
S5.5	INV5	PV (XLP)	CU	10	0.311	1.24	35	2	4	8	70%	24.5	190	380	0.47	12.5	1000	5.90	0.59%	0.076	0.608	2	3.291	18.5%
S5.6	INV5	PV (XLP)	CU	10	0.311	1.24	35	2	4	8	70%	24.5	190	380	0.47	12.5	1000	5.90	0.59%	0.076	0.608	2	3.291	18.5%
S5.7	INV5	PV (XLP)	CU	10	0.311	1.24	35	2	4	8	70%	24.5	250	500	0.62	12.5	1000	7.77	0.78%	0.076	0.608	2	3.291	18.5%
S5.8	INV5	PV (XLP)	CU	10	0.311	1.24	35	2	4	8	70%	24.5	250	500	0.62	12.5	1000	7.77	0.78%	0.076	0.608	2	3.291	18.5%
S5.9	INV5	PV (XLP)	CU	10	0.311	1.24	35	2	4	8	70%	24.5	100	200	0.25	12.5	1000	3.11	0.31%	0.076	0.608	2	3.291	18.5%
S5.10	INV5	PV (XLP)	CU	10	0.311	1.24	35	2	4	8	70%	24.5	100	200	0.25	12.5	1000	3.11	0.31%	0.076	0.608	2	3.291	18.5%
S5.11	INV5	PV (XLP)	CU	10	0.311	1.24	35	2	4	8	70%	24.5	160	320	0.40	12.5	1000	4.97	0.50%	0.076	0.608	2	3.291	18.5%
S5.12	INV5	PV (XLP)	CU	10	0.311	1.24	35	2	4	8	70%	24.5	160	320	0.40	12.5	1000	4.97	0.50%	0.076	0.608	2	3.291	18.5%
S6.1	INV6	PV (XLP)	CU	10	0.311	1.24	35	2	4	8	70%	24.5	180	360	0.45	12.5	1000	5.59	0.56%	0.076	0.608	2	3.291	18.5%
S6.2	INV6	PV (XLP)	CU	10	0.311	1.24	35	2	4	8	70%	24.5	180	360	0.45	12.5	1000	5.59	0.56%	0.076	0.608	2	3.291	18.5%
S6.3	INV6	PV (XLP)	CU	10	0.311	1.24	35	2	4	8	70%	24.5	240	480	0.60	12.5	1000	7.46	0.75%	0.076	0.608	2	3.291	18.5%
S6.4	INV6	PV (XLP)	CU	10	0.311	1.24	35	2	4	8	70%	24.5	240	480	0.60	12.5	1000	7.46	0.75%	0.076	0.608	2	3.291	18.5%
S6.5	INV6	PV (XLP)	CU	10	0.311	1.24	35	2	4	8	70%	24.5	100	200	0.25	12.5	1000	3.11	0.31%	0.076	0.608	2	3.291	18.5%
S6.6	INV6	PV (XLP)	CU	10	0.311	1.24	35	2	4	8	70%	24.5	100	200	0.25	12.5	1000	3.11	0.31%	0.076	0.608	2	3.291	18.5%
S6.7	INV6	PV (XLP)	CU	10	0.311	1.24	35	2	4	8	70%	24.5	160	320	0.40	12.5	1000	4.97	0.50%	0.076	0.608	2	3.291	18.5%
S6.8	INV6	PV (XLP)	CU	10	0.311	1.24	35	2	4	8	70%	24.5	160	320	0.40	12.5	1000	4.97	0.50%	0.076	0.608	2	3.291	18.5%
S6.9	INV6	PV (XLP)	CU	10	0.311	1.24	35	2	4	8	70%	24.5	220	440	0.55	12.5	1000	6.84	0.68%	0.076	0.608	2	3.291	18.5%
S6.10	INV6	PV (XLP)	CU	10	0.311	1.24	35	2	4	8	70%	24.5	220	440	0.55	12.5	1000	6.84	0.68%	0.076	0.608	2	3.291	18.5%

Date & Time: 12/2/2020 3:10 PM, By: Z
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MONTANTE SOLAR

2760 KENMORE AVENUE
TONAWANDA, NY 14150

303 WOODWARD AVE SOLAR PROJECT

300 KW ARRAY

303 WOODWARD AVENUE
TONAWANDA, NY 14150

GPS COORDINATES:
42.974323, -78.890424

NO:	DATE:	DESCRIPTION:
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REVISIONS		

PROJECT NUMBER: PROJECT NUMBER

DRAWN BY: BJB

REVIEWED BY: SJB

ISSUED FOR: SIR SUBMISSION

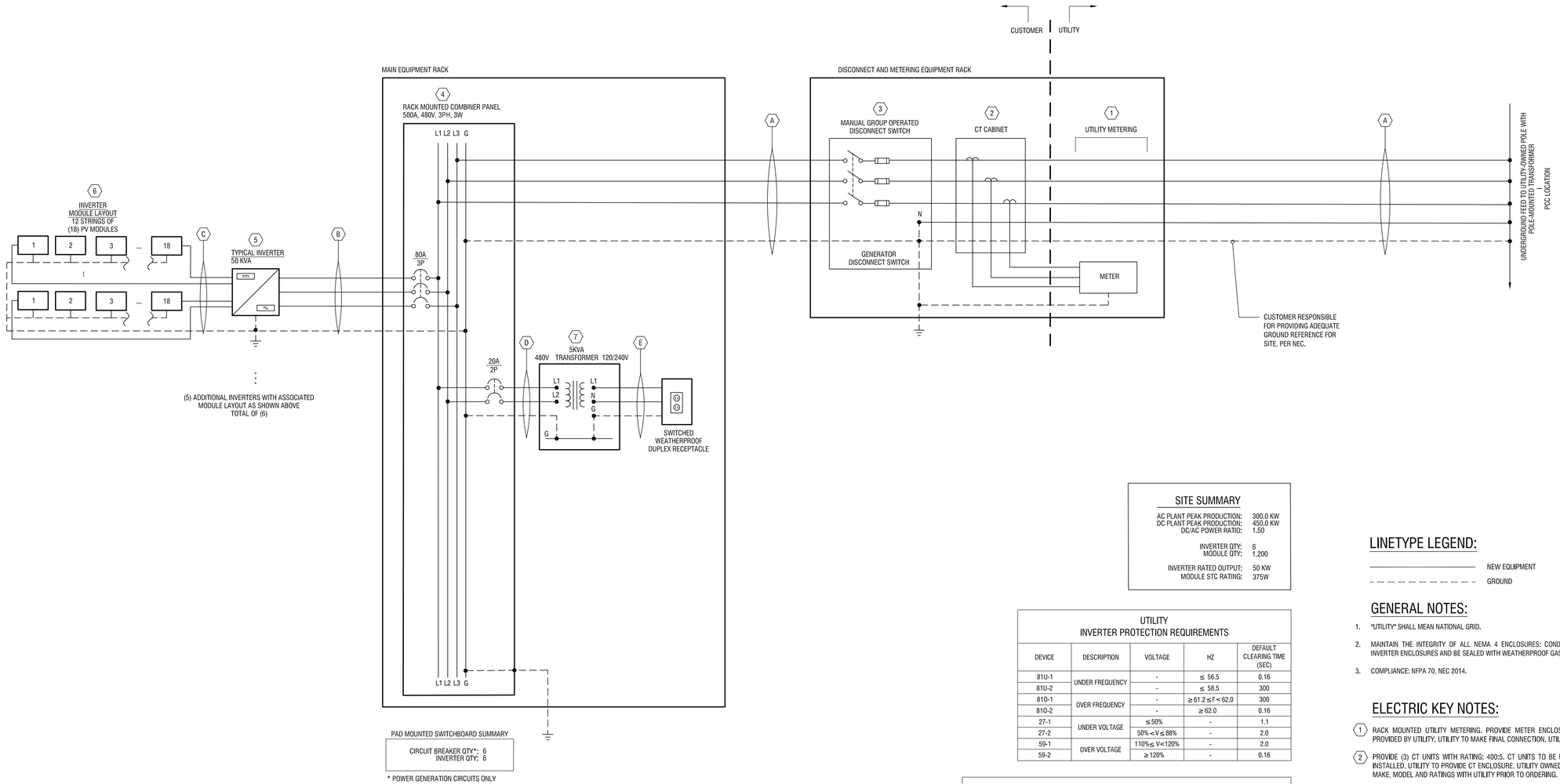
DATE: DECEMBER 2020

DRAWING NAME:

DC FEEDERS TABLE

DRAWING NUMBER:

E602



SITE SUMMARY

AC PLANT PEAK PRODUCTION:	300.0 KW
DC PLANT PEAK PRODUCTION:	450.0 KW
DC/AC POWER RATIO:	1.50
INVERTER QTY:	6
MODULE QTY:	1,200
INVERTER RATED OUTPUT:	50 KW
MODULE STC RATING:	375W

LINETYPE LEGEND:

NEW EQUIPMENT

GROUND

UTILITY
INVERTER PROTECTION REQUIREMENTS

DEVICE	DESCRIPTION	VOLTAGE	HZ	DEFAULT CLEARING TIME (SEC)
81U-1	UNDER FREQUENCY	-	≤ 56.5	0.16
81U-2		-	≤ 58.5	300
81O-1	OVER FREQUENCY	-	≥ 61.2 ≤ F < 62.0	300
81O-2		-	≥ 62.0	0.16
27-1	UNDER VOLTAGE	≤ 50%	-	1.1
27-2		50% < V ≤ 88%	-	2.0
59-1	OVER VOLTAGE	110% ≤ V < 120%	-	2.0
59-2		≥ 120%	-	0.16

EQUIPMENT SCHEDULE

QUANTITY	DESCRIPTION	MANUFACTURER	PN
1, 200	SOLAR MODULE	CANADIAN SOLAR	CS3U-375MB-AG
6	PV INVERTER	CPS	SCA50KTL-DO/US-480
1	AC SWITCHBOARD	TBD	TBD

AC WIRE AND CONDUIT SCHEDULE

DESIGNATION	MINIMUM CONDUCTOR VOLTAGE	CONDUCTORS/ WIRE SCHEDULE (90 DEGREE C RATED)	MINIMUM CONDUCTOR INSULATION	CONDUIT SIZE
A	480V 3PH	(3) 700 KCMIL CU THWN-2 + #2 KCMIL CU GROUND	600V	4"
B	480V 3PH	(3) #4 AWG CU THWN-2 + #8 AWG CU GROUND	600V	1 1/2"
C	1500V DC	(2) #10 AWG CU USE-2	1500V	3/4"
D	480V 1PH	(2) #12 AWG CU THWN-2 + #12 AWG CU GROUND	600V	3/4"
E	120V 1PH	(2) #12 AWG CU THWN-2 + #12 AWG CU GROUND	600V	3/4"

WIRE AND CONDUIT SCHEDULE NOTES:

1. LISTED PIN ADAPTERS OR COMPRESSION LUGS SHALL BE PERMITTED FOR USE WITH ALUMINUM CONDUCTORS. CONDUCTOR SHALL BE PREPARED AND TERMINATED PER MANUFACTURERS GUIDELINES.
2. ELECTRICAL CONTRACTOR SHALL IDENTIFY SOURCE WIRING WITH MARKING TAPE OR OTHER APPROVED METHOD. POSITIVE SHALL BE MARKED RED AND NEGATIVE MARKED BLACK. CONDUCTORS 4 AWG AND LARGER SHALL BE IDENTIFIED AT ALL TERMINATIONS. PROVIDE COMPRESSION LUGS AT BUS TERMINATIONS.
3. ALL PARALLEL CABLE SETS TO BE INSTALLED WITH GROUND CONDUCTORS IN EACH CONDUIT.
4. CABLES NOT SIZED FOR VOLTAGE DROP

GENERAL NOTES:

1. "UTILITY" SHALL MEAN NATIONAL GRID.
2. MAINTAIN THE INTEGRITY OF ALL NEMA 4 ENCLOSURES: CONDUIT TO ENTER PANEL AND INVERTER ENCLOSURES AND BE SEALED WITH WEATHERPROOF GASKETING.
3. COMPLIANCE: NFPA 70, NEC 2014.

ELECTRIC KEY NOTES:

1. RACK MOUNTED UTILITY METERING. PROVIDE METER ENCLOSURE AND SOCKET. METER PROVIDED BY UTILITY. UTILITY TO MAKE FINAL CONNECTION. UTILITY OWNED AND OPERATED.
2. PROVIDE (3) CT UNITS WITH RATING: 400:5. CT UNITS TO BE UTILITY GRADE. DEVELOPER INSTALLED. UTILITY TO PROVIDE CT ENCLOSURE. UTILITY OWNED AND OPERATED. VERIFY CT MAKE, MODEL AND RATINGS WITH UTILITY PRIOR TO ORDERING.
3. GENERATOR DISCONNECT SWITCH. WALL MOUNTED LOAD BREAK FUSED DISCONNECT SWITCH: MANUAL, GROUP OPERATED, VISIBLE OPEN, GROUNDABLE, LOCKABLE WITH 24/7 ACCESS. RATINGS: 480V, 500A, 18 KAIC. DEVELOPER OWNED AND INSTALLED. DEVELOPER AND UTILITY OPERATED. FUSE RATINGS: 500A, 480V.
4. 500A, 480V, 3PH, 3W, 18 KAIC MAIN DISTRIBUTION PANEL. ENCLOSURE IS NEMA 3R RATED.
5. INVERTER OUTPUT (AC) RATINGS: 50KVA, 480V, 60.2A. ALL INVERTERS TO BE SET TO 1.0 PF WITH 50KW MAXIMUM OUTPUT. INVERTERS ARE UL1741 LISTED, IEEE1547 COMPLIANT, RATED TO 1000 VDC. THE INVERTERS HAVE INTEGRAL, MANUAL DC DISCONNECTING MEANS. THE INVERTER IS EQUIPPED WITH UL1741 APPROVED GROUND FAULT DETECTION DEVICE THAT MEETS NFPA 70 ARTICLE 250.122 REQUIREMENTS FOR EQUIPMENT GROUNDING.
6. MODULES ARE UL1703 LISTED, RATED TO 1050 VDC. EACH MODULE INCLUDES OUTDOOR RATED QUICK CONNECTS FOR MODULE INTERCONNECTION. DO NOT REMOVE THE QUICK CONNECTS, OTHERWISE THE MODULE WARRANTY AND UL LISTING MAY BE INVALIDATED. QUICK CONNECTS SHALL COMPLY WITH NFPA 70 ARTICLE 690.33(C).
7. 5KVA ENCAPSULATED NEMA 3R TRANSFORMER. PRIMARY: 480V SINGLE PHASE; SECONDARY: 120/240V SINGLE PHASE. TRANSFORMER TO BE MOUNTED ON EQUIPMENT RACK.

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LICENSED PROFESSIONAL ENGINEER

MONTANTE SOLAR

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300 KW ARRAY

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TONAWANDA, NY 14150

GPS COORDINATES:
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REVISIONS		

PROJECT NUMBER: PROJECT NUMBER

DRAWN BY: BJB

REVIEWED BY: SJB

ISSUED FOR: SIR SUBMISSION

DATE: DECEMBER 2020

DRAWING NAME:

THREE LINE DIAGRAM

DRAWING NUMBER:

E701

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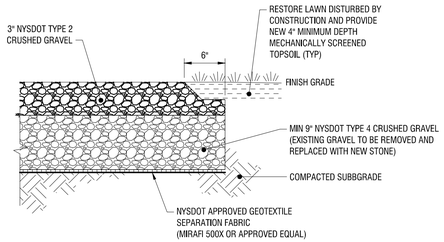
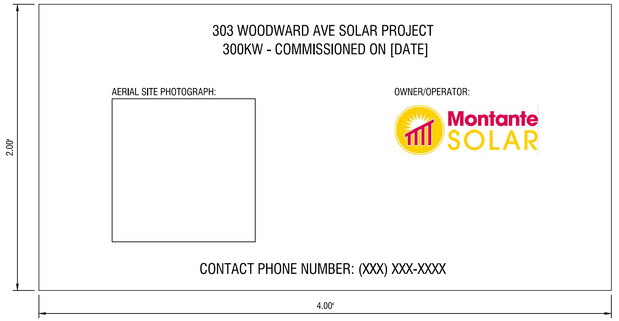


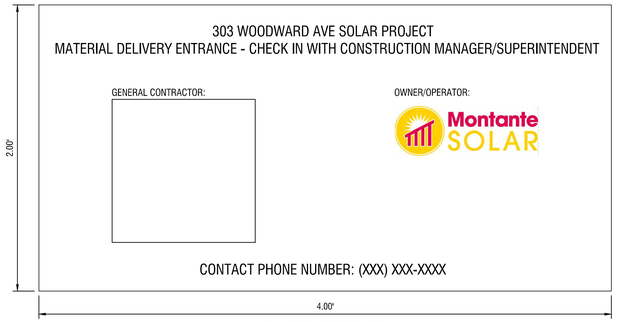
NOTES:

1. STONE SHALL BE INSTALLED IN LIFTS NO GREATER THAN 6".
2. STONE SHALL BE COMPACTED TO 95%.

4 C501 GRAVEL PAVEMENT SECTION

N.T.S.





TEMPORARY SIGNAGE

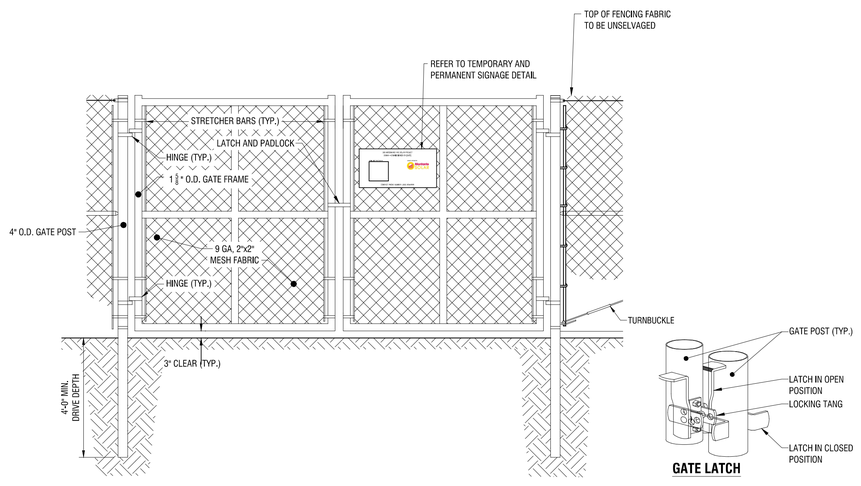
NOTES:

PERMANENT SIGNAGE

1. PERMANENT SIGNAGE TO BE INSTALLED ON GATE AFTER ARRAY HAS BEEN COMMISSIONED.
2. TEMPORARY SIGNAGE TO BE INSTALLED ALONG GRAVEL DRIVE PRIOR TO CONSTRUCTION.
3. TEMPORARY SIGNAGE TO BE REMOVED AFTER ARRAY HAS BEEN COMMISSIONED AND BEFORE PERMANENT SIGNAGE IS INSTALLED.

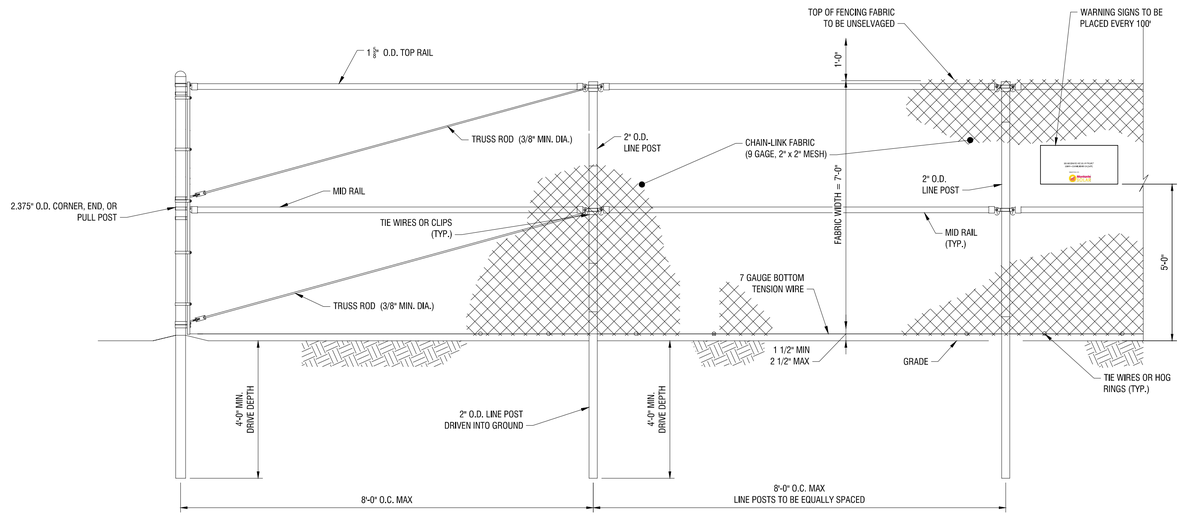
3 C501 TEMPORARY AND PERMANENT SIGNAGE

N.T.S.



2 C501 7' TALL 12' WIDE DOUBLE SWING GATE

N.T.S.



1 C501 7' HIGH CHAIN LINK FENCE

N.T.S.

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NO:	DATE:	DESCRIPTION:
REVISIONS		

PROJECT NUMBER: 2200652.03

DRAWN BY: MCP

REVIEWED BY: JT

ISSUED FOR: SIR SUBMISSION

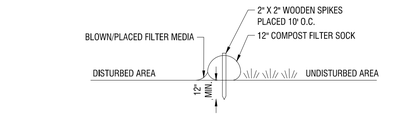
DATE: DECEMBER 2020

DRAWING NAME:

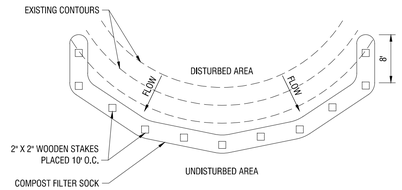
SITE DETAILS

DRAWING NUMBER:

C501



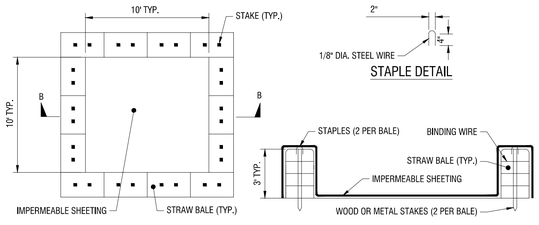
SECTION VIEW



PLAN VIEW

5 C502 COMPOST FILTER SOCK

NYS DEC DETAIL: COMPOST FILTER SOCK



PLAN

SECTION B-B

NOTE:

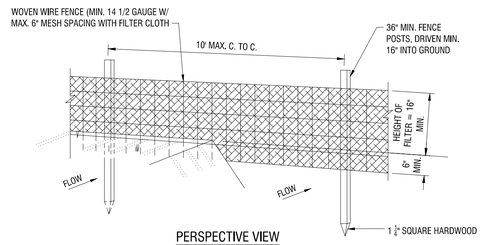
1. CAN BE TWO STACKED BALES OR PARTIALLY EXCAVATED TO REACH 3 FT DEPTH

CONSTRUCTION SPECIFICATIONS

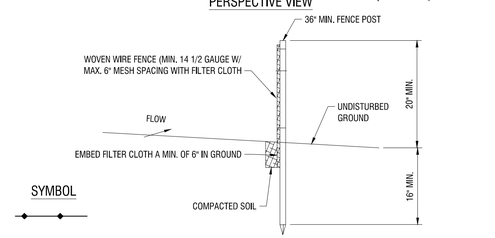
1. LOCATE WASHOUT STRUCTURE A MINIMUM OF 100 FEET AWAY FROM OPEN CHANNELS, STORM DRAIN INLETS, SENSITIVE AREAS, WETLANDS, BUFFERS AND WATER COURSES AND AWAY FROM CONSTRUCTION TRAFFIC.
2. SIZE WASHOUT STRUCTURE FOR VOLUME NECESSARY TO CONTAIN WASH WATER AND SOLIDS AND MAINTAIN AT LEAST 4 INCHES OF FREEBOARD. TYPICAL DIMENSIONS ARE 10 FEET X 10 FEET X 3 FEET DEEP.
3. PREPARE SOIL BASE FREE OF ROCKS OR OTHER DEBRIS THAT MAY CAUSE TEARS OR HOLES IN THE LINER. FOR LINER, USE 10 MIL OR THICKER UV RESISTANT, IMPERMEABLE SHEETING, FREE OF HOLES AND TEARS OR OTHER DEFECTS THAT COMPROMISE IMPERMEABILITY OF THE MATERIAL.
4. PROVIDE A SIGN FOR THE WASHOUT IN CLOSE PROXIMITY TO THE FACILITY.
5. KEEP CONCRETE WASHOUT STRUCTURE WATER TIGHT. REPLACE IMPERMEABLE LINER IF DAMAGED (E.G., RIPPED OR PUNCTURED). EMPTY OR REPLACE WASHOUT STRUCTURE THAT IS 75 PERCENT FULL, AND DISPOSE OF ACCUMULATED MATERIAL PROPERLY. DO NOT REUSE PLASTIC LINER. WET-VACUUM STORED LIQUIDS THAT HAVE NOT EVAPORATED AND DISPOSE OF IN AN APPROVED MANNER. PRIOR TO FORECASTED RAINSTORMS, REMOVE LIQUIDS OR COVER STRUCTURE TO PREVENT OVERFLOWS. REMOVE HARDENED SOLIDS, WHOLE OR BROKEN UP, FOR DISPOSAL OR RECYCLING. MAINTAIN RUNOFF DIVERSION AROUND EXCAVATED WASHOUT STRUCTURE UNTIL STRUCTURE IS REMOVED.

3 C502 CONCRETE WASHOUT AREA WITH STRAW BALES

N.T.S.



PERSPECTIVE VIEW



SYMBOL

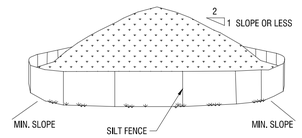
SECTION VIEW

NOTES:

1. WOVEN WIRE FENCE TO BE FASTENED SECURELY TO FENCE POSTS WITH WIRE TIES OR STAPLES. POSTS SHALL BE STEEL EITHER "T" OR "U" TYPE OR HARDWOOD.
2. FILTER CLOTH TO BE FASTENED SECURELY TO WOVEN WIRE FENCE WITH TIES SPACED EVERY 24" AT TOP AND MID SECTION. FENCE SHALL BE WOVEN WIRE, 6" MAXIMUM MESH OPENING.
3. WHEN TWO SECTIONS OF FILTER CLOTH ADJOIN EACH OTHER THEY SHALL BE OVER-LAPPED BY SIX INCHES AND FOLDED. FILTER CLOTH SHALL BE EITHER FILTER X, MIRAFI 100X, STABLINKA 140N, OR APPROVED EQUAL.
4. PREFABRICATED UNITS SHALL BE GEOFAB, ENVIROFENCE, OR APPROVED EQUAL.
5. MAINTENANCE SHALL BE PERFORMED AS NEEDED AND MATERIAL REMOVED WHEN "BULGES" DEVELOP IN THE SILT FENCE.

2 C502 SILT FENCE

NYS DEC DETAIL: SILT FENCE

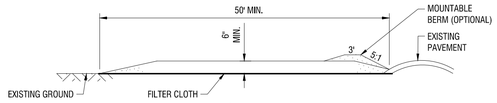


NOTES:

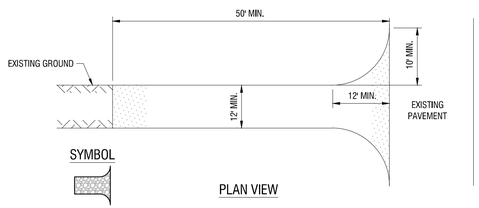
1. AREA CHOSEN FOR STOCKPILING OPERATIONS SHALL BE DRY AND STABLE.
2. MAXIMUM SLOPE OF STOCKPILE SHALL BE 1V:2H.
3. UPON COMPLETION OF SOIL STOCKPILING, EACH PILE SHALL BE SURROUNDED WITH SILT FENCING, THEN STABILIZED WITH VEGETATION OR COVERED.
4. SEE SPECIFICATIONS AND DETAIL FOR INSTALLATION OF SILT FENCE.

4 C502 TEMPORARY SOIL STOCKPILE

N.T.S.



PROFILE VIEW



SYMBOL

PLAN VIEW

CONSTRUCTION SPECIFICATIONS:

1. STONE SIZE - USE 1-4 INCH STONE, OR RECLAIMED OR RECYCLED CONCRETE EQUIVALENT.
2. LENGTH - NOT LESS THAN 50 FEET.
3. THICKNESS - NOT LESS THAN SIX (6) INCHES.
4. WIDTH - TWENTY-FOUR (24) FOOT IF SINGLE ENTRANCE TO SITE.
5. GEOTEXTILE - WILL BE PLACED OVER THE ENTIRE AREA PRIOR TO PLACING OF STONE.
6. SURFACE WATER - ALL SURFACE WATER FLOWING OR DIVERTED TOWARD CONSTRUCTION ACCESS SHALL BE PIPED BENEATH THE ENTRANCE. IF PIPING IS IMPRACTICAL, A MOUNTABLE BERM WITH 5:1 SLOPES WILL BE PERMITTED.
7. MAINTENANCE - THE ENTRANCE SHALL BE MAINTAINED IN A CONDITION WHICH WILL PREVENT TRACKING OR FLOWING OF SEDIMENT ONTO PUBLIC RIGHT OF WAY. ALL SEDIMENT SPILLED, DROPPED, WASHED, OR TRACKED ONTO PUBLIC RIGHTS OF WAY MUST BE REMOVED IMMEDIATELY.
8. WHEN WASHING IS REQUIRED, IT SHALL BE DONE ON AN AREA STABILIZED WITH STONE AND WHICH DRAINS INTO AN APPROVED SEDIMENT TRAPPING DEVICE.
9. PERIODIC INSPECTION AND NEEDED MAINTENANCE SHALL BE PROVIDED AFTER EACH RAIN EVENT.

1 C502 STABILIZED CONSTRUCTION ENTRANCE

N.YS DEC DETAIL: STABILIZED CONSTRUCTION ACCESS

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JAMES C. TARANTELLA
No. 093331
LICENSED PROFFESSIONAL ENGINEER

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PROJECT NUMBER: 2200652.03

DRAWN BY: MCP

REVIEWED BY: JT

ISSUED FOR: SIR SUBMISSION

DATE: DECEMBER 2020

DRAWING NAME:

EROSION CONTROL DETAILS

DRAWING NUMBER:

C502

NEW

CanadianSolar

BiKu MODULE

NEW GENERATION BIFACIAL MODULE

FRONT POWER RANGE: 375W ~ 400W

UP TO 30% MORE POWER FROM THE BACK SIDE

CS3U-375|380|385|390|395|400MB-AG

5BB cell MBB cell

* Both 5BB and MBB modules will be supplied.

MORE POWER

EXTRA POWER — Up to 30% more power from the back side

41°C — Low NMOT: 41 ± 3 °C
Low temperature coefficient (Pmax): -0.36 % / °C

Better shading tolerance

MORE RELIABLE

Lower internal current, lower hot spot temperature

Minimizes micro-crack impacts

*** — Heavy snow load up to 5400 Pa, wind load up to 2400 Pa *

30 years — **linear power output warranty***

12 years — **enhanced product warranty on materials and workmanship***

*According to the applicable Canadian Solar Limited Warranty Statement.

MANAGEMENT SYSTEM CERTIFICATES*

ISO 9001:2015 / Quality management system
ISO 14001:2015 / Standards for environmental management system
OHSAS 18001:2007 / International standards for occupational health & safety

PRODUCT CERTIFICATES*

IEC 61215 / IEC 61730: VDE / CE / MCS / INMETRO
UL 1703 / IEC 61215 performance: CEC listed (US) / FSEC (US Florida)
UL 1703: CSA / IEC 61701 ED2: VDE / IEC 62716: VDE / IEC 60068-2-68: SGS
Take-e-way

* As there are different certification requirements in different markets, please contact your local Canadian Solar sales representative for the specific certificates applicable to the products in the region in which the products are to be used.

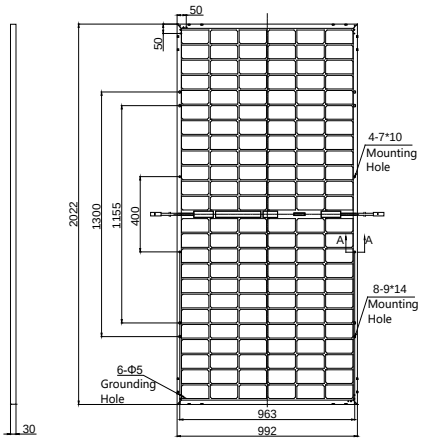
CANADIAN SOLAR INC. is committed to providing high quality solar products, solar system solutions and services to customers around the world. No. 1 module supplier for quality and performance/price ratio in IHS Module Customer Insight Survey. As a leading PV project developer and manufacturer of solar modules with over 40 GW deployed around the world since 2001.

* For detailed information, please refer to Installation Manual.

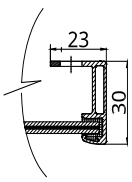
CANADIAN SOLAR INC.
545 Speedvale Avenue West, Guelph, Ontario N1K 1E6, Canada, www.canadiansolar.com, support@canadiansolar.com

ENGINEERING DRAWING (mm)

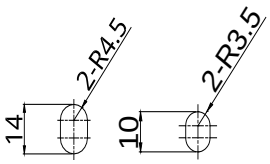
Rear View



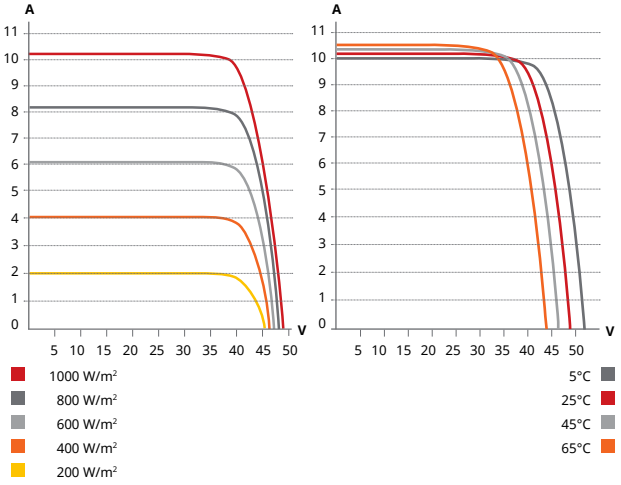
Frame Cross Section A-A



Mounting Hole



CS3U-390MB-AG / I-V CURVES



ELECTRICAL DATA | STC*

		Nominal Max. Power (Pmax)	Opt. Operating Voltage (Vmp)	Opt. Operating Current (Imp)	Open Circuit Voltage (Voc)	Short Circuit Current (Isc)	Module Efficiency
CS3U-375MB-AG		375 W	39.8 V	9.43 A	47.6 V	9.93 A	18.7%
Bifacial Gain**	5%	394 W	39.8 V	9.90 A	47.6 V	10.43 A	19.6%
	10%	413 W	39.8 V	10.37 A	47.6 V	10.92 A	20.6%
	20%	450 W	39.8 V	11.32 A	47.6 V	11.92 A	22.4%
	30%	488 W	39.8 V	12.26 A	47.6 V	12.91 A	24.3%
CS3U-380MB-AG		380 W	40.0 V	9.50 A	47.8 V	10.01 A	18.9%
Bifacial Gain**	5%	399 W	40.0 V	9.98 A	47.8 V	10.51 A	19.9%
	10%	418 W	40.0 V	10.45 A	47.8 V	11.01 A	20.8%
	20%	456 W	40.0 V	11.40 A	47.8 V	12.01 A	22.7%
	30%	494 W	40.0 V	12.35 A	47.8 V	13.01 A	24.6%
CS3U-385MB-AG		385 W	40.2 V	9.58 A	48.0 V	10.09 A	19.2%
Bifacial Gain**	5%	404 W	40.2 V	10.06 A	48.0 V	10.59 A	20.1%
	10%	424 W	40.2 V	10.54 A	48.0 V	11.1 A	21.1%
	20%	462 W	40.2 V	11.50 A	48.0 V	12.11 A	23.0%
	30%	501 W	40.2 V	12.45 A	48.0 V	13.12 A	25.0%
CS3U-390MB-AG		390 W	40.4 V	9.66 A	48.2 V	10.17 A	19.4%
Bifacial Gain**	5%	410 W	40.4 V	10.14 A	48.2 V	10.68 A	20.4%
	10%	429 W	40.4 V	10.63 A	48.2 V	11.19 A	21.4%
	20%	468 W	40.4 V	11.59 A	48.2 V	12.2 A	23.3%
	30%	507 W	40.4 V	12.56 A	48.2 V	13.22 A	25.3%
CS3U-395MB-AG		395 W	40.6 V	9.73 A	48.4 V	10.25 A	19.7%
Bifacial Gain**	5%	415 W	40.6 V	10.22 A	48.4 V	10.76 A	20.7%
	10%	435 W	40.6 V	10.70 A	48.4 V	11.28 A	21.7%
	20%	474 W	40.6 V	11.68 A	48.4 V	12.3 A	23.6%
	30%	514 W	40.6 V	12.65 A	48.4 V	13.33 A	25.6%
CS3U-400MB-AG		400 W	40.8 V	9.81 A	48.6 V	10.33 A	19.9%
Bifacial Gain**	5%	420 W	40.8 V	10.30 A	48.6 V	10.85 A	20.9%
	10%	440 W	40.8 V	10.79 A	48.6 V	11.36 A	21.9%
	20%	480 W	40.8 V	11.77 A	48.6 V	12.40 A	23.9%
	30%	520 W	40.8 V	12.75 A	48.6 V	13.43 A	25.9%

* Under Standard Test Conditions (STC) of irradiance of 1000 W/m², spectrum AM 1.5 and cell temperature of 25°C.
** Bifacial Gain: The additional gain from the back side compared to the power of the front side at the standard test condition. It depends on mounting (structure, height, tilt angle etc.) and albedo of the ground.

ELECTRICAL DATA | NMOT*

	Nominal Max. Power (Pmax)	Opt. Operating Voltage (Vmp)	Opt. Operating Current (Imp)	Open Circuit Voltage (Voc)	Short Circuit Current (Isc)
CS3U-375MB-AG	280 W	37.2 V	7.54 A	44.8 V	8.01 A
CS3U-380MB-AG	284 W	37.4 V	7.60 A	45.0 V	8.07 A
CS3U-385MB-AG	288 W	37.6 V	7.66 A	45.1 V	8.14 A
CS3U-390MB-AG	292 W	37.7 V	7.72 A	45.3 V	8.20 A
CS3U-395MB-AG	295 W	37.9 V	7.78 A	45.5 V	8.26 A
CS3U-400MB-AG	299 W	38.1 V	7.84 A	45.7 V	8.33 A

* Under Nominal Module Operating Temperature (NMOT), irradiance of 800 W/m², spectrum AM 1.5, ambient temperature 20°C, wind speed 1 m/s.

MECHANICAL DATA

Specification	Data
Cell Type	Mono-crystalline
Cell Arrangement	144 [2 X (12 X 6)]
Dimensions	2022 × 992 × 30 mm (79.6 × 39.1 × 1.18 in)
Weight	25.9 kg (57.1 lbs)
Front / Back Glass	2.0 mm heat strengthened glass
Frame	Anodized aluminium alloy
J-Box	IP68, 3 diodes
Cable	4.0 mm² (IEC), 12 AWG (UL)
Cable Length (Including Connector)	Portrait: 400 mm (15.7 in) (+) / 280 mm (11.0 in) (-); landscape: 1400 mm (55.1 in); leap-frog connection: 1670 mm (65.7 in)*
Connector	T4 series or H4 UTX or MC4-EVO2
Per Pallet	33 pieces
Per Container (40' HQ)	726 pieces or 594 pieces (only for US)

* For detailed information, please contact your local Canadian Solar sales and technical representatives.

ELECTRICAL DATA

Operating Temperature	-40°C ~ +85°C
Max. System Voltage	1500 V (IEC/UL) or 1000 V (IEC/UL)
Module Fire Performance	TYPE 3 (UL 1703) or CLASS C (IEC 61730)
Max. Series Fuse Rating	25 A
Application Classification	Class A
Power Tolerance	0 ~ + 10 W
Power Bifaciality*	70 %

* Power Bifaciality = $Pmax_{rear}$ / $Pmax_{front}$, both $Pmax_{rear}$ and $Pmax_{front}$ are tested under STC, Bifaciality Tolerance: ± 5 %

TEMPERATURE CHARACTERISTICS

Specification	Data
Temperature Coefficient (Pmax)	-0.36 % / °C
Temperature Coefficient (Voc)	-0.29 % / °C
Temperature Coefficient (Isc)	0.05 % / °C
Nominal Module Operating Temperature	41 ± 3°C

PARTNER SECTION

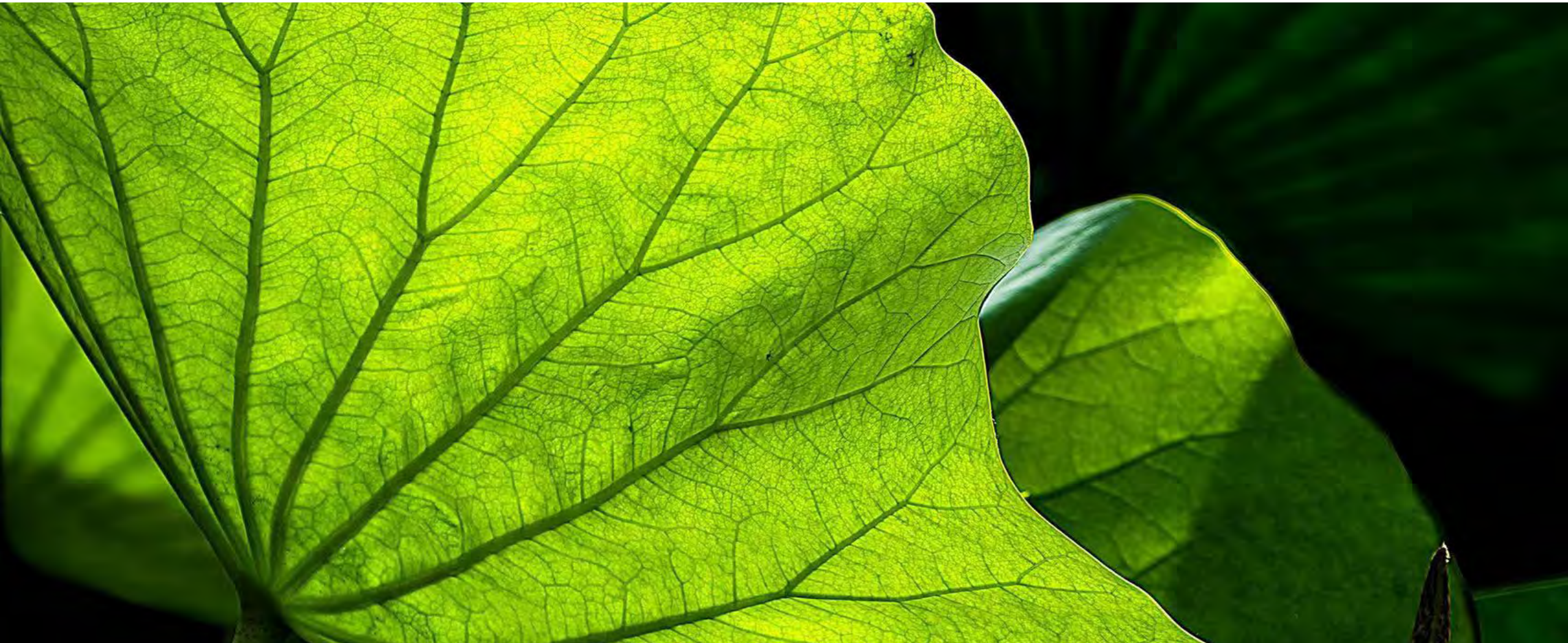
* The specifications and key features contained in this datasheet may deviate slightly from our actual products due to the on-going innovation and product enhancement. Canadian Solar Inc. reserves the right to make necessary adjustment to the information described herein at any time without further notice.
Please be kindly advised that PV modules should be handled and installed by qualified people who have professional skills and please carefully read the safety and installation instructions before using our PV modules.

CANADIAN SOLAR INC.
545 Speedvale Avenue West, Guelph, Ontario N1K 1E6, Canada, www.canadiansolar.com, support@canadiansolar.com

2021 ESG

Sustainability Report

CanadianSolar
MAKE THE DIFFERENCE



Forward Looking Statements

This report has been prepared by Canadian Solar Inc. (the "Company" or "Canadian Solar") solely to facilitate the understanding of the Company's performance and strategies on sustainability-related topics.

The information contained in this report has not been independently verified. None of the Company or any of its affiliates, advisers, or representatives will be liable (in negligence or otherwise) for any losses incurred from any use of this report or its contents or otherwise arising in connection with the report.

Certain statements in this report are forward-looking statements that involve a number of risks and uncertainties that could cause actual results to differ materially. These statements are made under the "Safe Harbor" provisions of the U.S. Private Securities Litigation Reform Act of 1995. Forward-looking statements may be marked by such terms as "believes," "expects," "anticipates," "intends," "estimates," or other comparable terminology. Though we consider our expectations expressed in such forward-looking statements reasonable, we cannot guarantee their realization. We refer you to a more detailed discussion of the risks and uncertainties contained in the Company's annual report on Form 20-F, as well as other documents filed with the Securities & Exchange Commission. In addition, all information provided in this report, including these forward-looking statements, is as of the date of this report's release on the Company's website unless otherwise stated, and the Company undertakes no duty to update such information except as required under applicable law.

Contents

Message from the Chief Executive and Chief Sustainability Officers

Effectively navigating the risks posed by climate change, social injustices, and other, ever more pressing global issues will require continuous, proactive efforts from businesses like our own.

As part of the green energy revolution, we at Canadian Solar recognize the crucial role we will play in those efforts. Our commitments to environmental sustainability, human rights, and positive social impact thus represent both our efforts to safeguard our shared future and our dedication to building long-term value for all our stakeholders.

In last year's report, we reaffirmed our longstanding commitment to reducing our environmental impact while empowering our customers to do the same. Our use of more comprehensive environmental standards has helped us deliver more energy and materially efficient products with lower carbon footprints in all stages of production, such as our BiHiKu6 and BiHiKu7 modules, unveiled in 2021. Likewise, despite expanding production output, we achieved year-on-year improvements in energy intensity, water intensity, and waste intensity in 2021 and kept increases in GHG emissions intensity within 4% even after recalculating our environmental metrics using more holistic calculation standards. Overall, we remain on track to meeting our goal of using 100% renewable energy in our operations before 2030.

We aim to help future leaders from diverse backgrounds thrive, both within Canadian Solar and across the solar industry. In 2021, we hosted recruiting events with organizations that support underrepresented groups in the solar industry, such as BlackOak. To bring us closer to gender parity at all levels of employment, we have also partnered with Cornell University to offer female leaders in our company critical leadership training and mentorship to accelerate their career advancement. And we added Women in CSI Solar to the ranks of our existing development groups for women in renewable energy industries, hosting events such as the Women's Career Development Forum in 2021 for female employees at all different levels of seniority.

Finally, we continuously work to ensure ethical labor practices in our own operations and those of our suppliers, conducting supplier ESG audits and establishing our interdepartmental Anti-Modern Slavery Task Force in 2021. To further solidify these commitments, our Board passed a resolution in May 2022 mandating a third-party assessment, at reasonable cost, on the extent to which Canadian Solar's policies and procedures effectively protect against forced labor in its operations, supply chains, and business relationships.

We are proud of these achievements but recognize that continued success requires continued vigilance. We continuously work towards newer, more stringent, and more holistic calculation standards for our social and environmental metrics. As we focus our strategy to prioritize long-term resilience, we have also adjusted our environmental targets to match. These adjustments will allow us to more effectively control quality, manage raw material usage, and hold to our commitments to worker safety & equitable labor standards.

SHAWN QU
Chairman and Chief Executive Officer

HANBING ZHANG
Chief Sustainability Officer

Last year, we at Canadian Solar reaffirmed our pledge to model responsible stewardship for our global community, or, as in our company motto, to "Make the Difference." By making sustainability a pivotal aspect of our strategic action in the face of global challenges, we hope to continue doing just that.

We are hugely grateful for your interest and look forward to engaging with you further.

Shawn Qu
Chairman and
Chief Executive Officer

Hanbing Zhang
Chief Sustainability Officer

Highlights

100%
Revenues related to renewable energy

21-year
track record as a **global tier 1 player** in the solar industry

Over **6.6 GWp** of solar projects energized globally

36% of workforce is female, with 25% of middle management positions and 8% of senior management positions filled by women in 2021

Approximately **13,500** employees

1 year

GHG payback time of crystalline solar modules, after which they become carbon negative assets that typically last for 30 years or longer

Over **71 GW** of solar modules delivered to customers globally, equivalent to displacing approximately 188 million tons of CO_2 emissions or powering over 18 million households

From 2017 to 2021:

53% decrease in water intensity

18% decrease in energy intensity

36% decrease in waste intensity

17% decrease in GHG emissions intensity

Positive Impact on **UN SDGs** of: Climate Action; Affordable and Clean Energy; Industry, Innovation and Infrastructure; Peace, Justice and Strong Institutions; Reduced Inequalities; Good Health and Wellbeing; Gender Equality; Partnership for Goals

Committed to and on track to powering global operations with **100%** renewable electricity before 2030

1 About Canadian Solar

7 AFFORDABLE AND CLEAN ENERGY

Founded in Canada in 2001, Canadian Solar Inc. (the "Company" or "Canadian Solar") is one of the world's largest solar technology and renewable energy companies.

Canadian Solar is a manufacturer of solar photovoltaic modules, provider of solar energy and battery storage solutions, and developer of utility-scale solar power and battery storage projects with a geographically diversified pipeline consisting of projects in various stages of development. Over the past 21 years, Canadian Solar has delivered around 71 GW of premium quality, solar photovoltaic modules to customers across the world. Since entering the project development business in 2010, Canadian Solar has developed, built, and connected over 6.6 GWp in over 20 countries across the world. As of March 2022, the Company has 800 MWp of projects in operation, 5.3 GWp of projects under construction or in backlog (late-stage), and an additional 18.5 GWp of projects in pipeline (mid- to early- stage). Canadian Solar is one of the most bankable companies in the solar and renewable energy industry and has been publicly listed on the NASDAQ since 2006.

4 MW Residential Solar Rooftop System, Jiangxi, China

Canadian Solar has two business segments: CSI Solar and Global Energy.

The **CSI Solar** segment ("CSI Solar") develops, manufactures, and sells solar modules and provides total system solutions, including inverters, solar system kits, and EPC (engineering, procurement, and construction) services. CSI Solar also includes the Company's battery storage integration business, delivering bankable, end-to-end turnkey battery storage solutions for utility-scale, commercial and industrial, and residential applications. These storage systems solutions are complemented by long-term service agreements, which include future battery capacity augmentation services. Canadian Solar currently owns approximately 80% of CSI Solar's shares and expects to hold approximately 64% of CSI Solar's shares after the planned initial public offering on the Shanghai Stock Exchange in China.

The **Global Energy** segment ("Global Energy") develops and constructs solar power and energy storage projects in over 20 markets worldwide. The Company develops both stand-alone solar and stand-alone battery storage projects, as well as hybrid solar plus storage projects. Its monetization strategies vary between develop-to-sell, build-to-sell, and build-to-own depending on business strategies and market conditions with the goal of maximizing returns, accelerating cash turn, and minimizing capital risk. It is also responsible for delivering operation and maintenance services globally both to projects developed by us and by third parties.

North America

Canada
Guelph: Global HQ
Calgary
U.S.
Austin: North America HQ
Walnut Creek
New York City
Princeton

Europe

Germany
Munich: EMEA CSIS HQ
Netherlands
Amsterdam
France
Toulouse
U.K
London
Italy
Milan
Spain
Madrid: EMEA GE HQ
Poland
Warsaw

Asia Pacific

P.R. China
Suzhou: China HQ,
Beijing
Shanghai
Changshu
Funing
Yancheng
Dafeng
Luoyang
Baotou
Jiaxing
Jiuqian
Suqian
Xining
Hong Kong, SAR
Taiwan, China
Hsinchu
Japan
Tokyo
Osaka
Fukuoka
Sendai
Nagoya
Kawaguchi
South Korea
Seoul
India
New Delhi
Thailand
Chonburi
Vietnam
Hai Phong
Malaysia
Kuala Lumpur
Singapore
Singapore
Australia
Melbourne
Sydney

Latin America

Brazil
São Paulo
Mexico
Mexico City
Colombia
Bogota
Chile
Santiago

Middle East and Africa

U.A.E
Abu Dhabi
Dubai
South Africa
Cape Town

Strong presence in 25 countries

- **CSI Solar:** 17 countries
- **Global Energy:** 19 countries

16 factories in 4 countries

Sustainability at Canadian Solar

As a global leading renewable energy company, Canadian Solar aims to power the world with solar energy and to create a cleaner Earth for future generations.

The total electricity generated by the 71 GW of solar modules we shipped over the past 21 years is equivalent to displacing approximately 188 million tons[1] of CO_2 emissions or powering over 18 million households.

At Canadian Solar, we incorporate ESG, or environmental, social, and governance factors, across our business and in our strategic decision-making and continuously make efforts to improve our practices to ensure long-term sustainability.

Working sustainably within our planetary boundaries

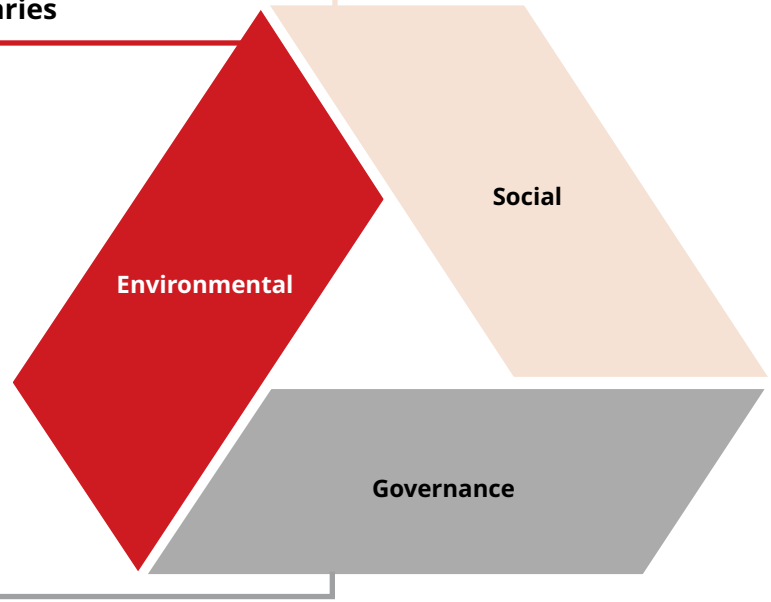
- GHG emissions and manufacturing energy intensity
- Commitment to 100% renewable energy before 2030
- Solar PV system carbon payback time of 1 year
- Water intensity management
- Material use, waste, and circularity
- Environmental stewardship in project development
- Assessing climate risks and opportunities

Demonstrating responsible conduct

- Governance foundation for business ethics
- Policies and procedures
- Board oversight – Sustainability Committee
- Chief Sustainability Officer responsible for sustainability strategy and implementation
- Appropriate due diligence processes
- Responsible supply chain
- Transparency and risk management
- Robust ESG reporting

Committing to socially responsible and equitable outcomes

- Human rights
- Equal opportunity employer
- Equity, diversity, and inclusion
- Talent strategy, training, and development
- Freedom of association and collective bargaining
- Health and safety
- Community commitments and partnerships



The following Corporate Policies provide a framework for Canadian Solar's sustainability commitments:

Environmental

- *Environment, Occupational Health, and Safety Policy* (link)

Social

- *Labor and Human Rights Policy (link)*
- *Equal Employment Opportunity Policy (link)*
- *Anti-Modern Slavery Policy (link)*
- *Global Diversity Policy (link)*
- *Supplier Code of Conduct (link)*
- *Conflict Minerals Policy (link)*

Governance

- *Code of Business Conduct and Ethics (link)*
- *Whistleblower Policy (link)*
- *Insider Trading Policy (link)*
- *Related-Party Transactions (link)*
- *Prohibition against Giving Bribes (link)*
- *Prohibition against Accepting Bribes (link)*

[1] Actual CO_2 net avoided emissions depend on specific PV project location, application, and grid electricity mix. The estimate presented here provides an approximate value for PV energy production's impact on slowing climate change. Calculations are based on the utility PV annual average capacity factor and avoided CO_2 emissions rate reported by the U.S. Environmental Protection Agency (EPA). GHG emissions from PV modules and balance-of-systems (BOS) manufacturing, as well as transport, construction, operation, and decommissioning, have been taken into account. Please see EPA website for further details (link).

Approach to Environment, Health, and Safety (EHS)

Canadian Solar is committed to providing a safe and enriching work environment for all our employees and contractors, striving to reduce the environmental impact of our business activities.

Our EHS strategy is incorporated in our solar products and services, from product design and production to delivery.

We standardized our EHS goals to drive continuous, measurable improvements across our business. We abide by international standards certified under ISO14001 environmental and ISO45001 occupational health and safety management systems. These certifications cover waste reduction, energy conservation, injury reduction, and other environmental, safety, and health objectives.


10kW Domingo Residential Solar System, Spain

Compliance with Environmental Regulations

We have obtained all necessary environmental permits, including those relating to air emissions, wastewater discharge, the handling and disposal of solid and hazardous waste and chemicals, etc., to conduct business at existing manufacturing facilities and continuously monitor regulatory changes where we operate to remain in compliance with environmental laws.

Noise, wastewater, air emissions, and other industrial waste are produced from our manufacturing operations. We have obtained all necessary environmental permits, including those relating to air emissions, wastewater discharge, the handling and disposal of solid and hazardous waste and chemicals, etc., to conduct business at existing manufacturing facilities and continuously monitor regulatory changes where we operate to remain in compliance with the applicable environmental laws. We also conduct extensive environmental studies during the development phase of our solar and battery storage projects to assess and reduce their environmental impact. In 2021, we have further increased our scrutiny of our suppliers on ESG requirements and implemented ESG compliance audits across our supply chain.

At the product level, our solar modules and system solutions comply with the European Union's REACH (Registration, Evaluation, Authorization, and Restriction of Chemicals) regulation for chemicals (EC) No. 1907/2006, as well as its implementation guidelines issued by the European Chemical Agency (ECHA). Our products, classified as "articles" within the REACH directive, do not release any chemical substances under normal or reasonably foreseeable conditions of use. Our system solutions, including string inverters, also comply with the European Union's RoHS (Restriction of Hazardous Substances) Directive 2011/65/EU and its amendments[2]. Our photovoltaic modules are exempted from CLP (Classification, Labelling, and Packaging of substances and mixtures) regulation according to (EC) No. 1272/2008.

All our photovoltaic module designs undergo Toxicity Characteristic Leaching Procedure (TCLP) testing to monitor the presence of any toxic metal substances (arsenic, barium, cadmium, chromium, lead, mercury, selenium, silver) according to TCLP Standard EPA Test Method 1311, as issued by the U.S. Environmental Protection Agency (EPA) under the Toxic Substances Control Act (TSCA) for landfill disposal of modules. We also closely monitor any changes in regulations under the EPA's TSCA, which aims to regulate the manufacturing and use of chemical substances in the U.S. Our photovoltaic modules comply with the latest ruling requirements over PBT (Persistent, Bioaccumulative, and Toxic) Chemicals under the TSCA.

[2] Solar PV modules are exempted from European Restriction of Hazardous Substances (RoHS) legislation (link) as part of the European Commission's decision to ensure achievement of energy renewable targets. Per article 2 of the RoHS directive, "This directive does not apply to: [...] photovoltaic panels intended to be used in a system that is designed, assembled and installed by professionals for permanent use at a defined location to produce energy from solar light for public, commercial, industrial and residential applications."

2 Environmental Metrics and Targets

12 RESPONSIBLE CONSUMPTION AND PRODUCTION

As a technology-driven company, Canadian Solar has produced many groundbreaking innovations over the years that have firmly established solar PV as the most promising solution in decarbonizing electricity production across markets worldwide.

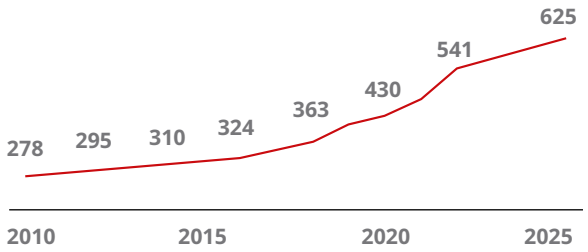
These innovations have helped reduce the LCOE (Levelized Cost of Energy) of solar systems to unprecedentedly low levels by improving durability and lowering manufacturing costs for solar modules. They have also enabled significant improvements in the environmental payback time of solar modules, as measured in GHG emissions and energy use, as well as other key environmental metrics, such as water and waste intensities.

In 2016, we designed the first half-cell solar modules in the industry, which improved solar module power output, performance, and durability. In the years following, we successfully launched polycrystalline Passivated Rear Emission Contact (PERC) cells and overcame the 400W module wattage limit by mass-producing 166mm wafer size modules, firsts for the industry. All these technological improvements contributed meaningfully to improving the performance and reliability of solar energy while reducing its cost.

More recently, we have introduced even larger wafers and have continued to make product design and efficiency improvements, increasing our solar module efficiencies from 13.9% in 2010 to 21.2% in 2021. These improvements have allowed us to more than double our module power output from 278W in 2010 to 660W in 2021 (larger utility module type HiKu7). Continuous technological innovations have allowed us to reduce silicon usage and increase the power output of our solar modules, thereby reducing both the environmental footprint of our production on a per watt basis and the BOS (balance of systems) costs for solar projects.

Average module wattage

(W)



5.5 MW Muda Commercial Solar Rooftop System, Malaysia

Understanding the Environmental Impact of Manufacturing

To fully comprehend the environmental results and targets reported in the following sections, it is important to understand the impact of our manufacturing operations structure on defined environmental metrics, which can be evaluated through the following framework:

- **Scale of production & process efficiency.** The more we produce, the more energy and water we consume and the more waste and GHG emissions we release. However, the more efficient our processes are, the smaller our energy and water consumption and the lower our waste and GHG production will be per unit produced. As such, energy efficiency has been one critical parameter for selecting manufacturing processes and equipment.

- **Level of manufacturing vertical integration.** Crystalline silicon PV manufacturing comprises of the processes of ingot, wafer, cell, and module production. We may outsource the production of such materials, and each production process has different environmental impact intensities. Changes to our own manufacturing capacity structure would thus directly impact our total environmental footprint. For example, the higher our level of manufacturing vertical integration is, the more energy we would consume in-house to produce a given volume of module products.

- **Product technologies.** To a large extent, the choice of product technologies defines the environmental impact of our manufacturing process. For instance, Heterojunction (HJT) cell manufacturing consumes roughly 30% less energy than the competing TOPCon technology. At the same time, products based on new technologies have higher conversion efficiency, helping reduce per-watt energy, water, and material consumption, as well as waste and GHG emissions, when in operation.

11.2 MW Qujing Zhanyi Utility Solar Plant, China

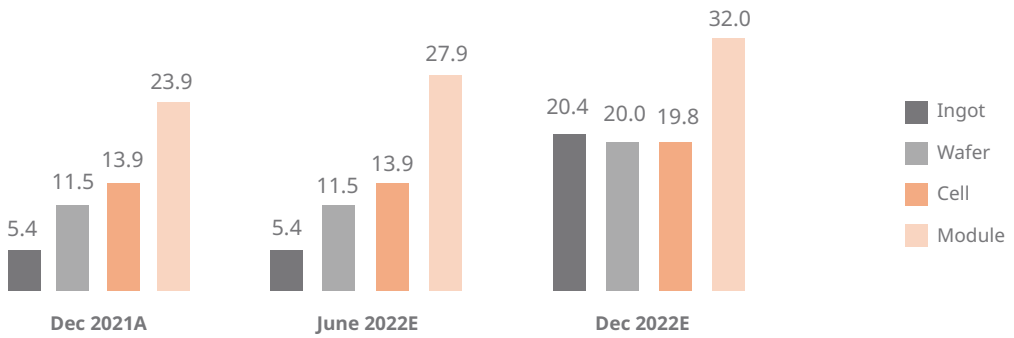
Manufacturing Capacity Expansion Roadmap

In 2021, we increased our level of vertical integration, ramping up manufacturing capacities of crystalline ingots, wafers, cells, and modules to 5.4 GW, 11.5 GW, 13.9 GW, and 23.9 GW, respectively. The combined production output of our manufacturing operations, once converted to a common unit in Megawatts (MW), rose by 37% year-over-year, with actual production outputs of our ingot, wafer, cell, and module operations increasing by 91%, 56%, 14%, and 40%, respectively. The increase in production scale, along with the shift to monocrystalline ingoting technology, led to higher absolute energy consumption, water withdrawal, and waste production in 2021.

In 2022, we are transitioning to a trapezoid-shaped manufacturing capacity structure by increasing our ingot, wafer, and cell capacities each to around 20 GW and our module capacity to 32 GW. We thus expect our environmental metrics, in particularly energy consumption, to increase next year purely due to the magnitude of our increase in production scale despite continued decreases in the energy intensity of our manufacturing processes. To offset this change in the coming years, we plan to prioritize capacity expansions for products that use more efficient and less energy-intensive N-type technologies.

Manufacturing Capacity

(GW)



Well on track to achieve the goal of powering all our operations with 100% renewable energy before 2030

	2020	2021	2026	2030
Renewable energy %	20%	23%	69%	100%
Total Electricity Consumption (MWh)	1,127,000	1,434,000		

We are committed to achieving the goal of powering our global operations with 69% renewable electricity by 2026 and 100% before 2030.

To achieve this goal, we will reduce our electricity and energy consumption while increasing the use of renewable energy.

Around 94% of our total Scope 1 and 2 carbon emissions (see definitions on p.12-14) come from the energy consumed by our manufacturing operations, for which electricity accounts for approximately 99% of total energy consumption. Therefore, one of our priorities is to reduce the carbon emissions of the electricity we use in manufacturing operations.

We will reduce our energy intensity by leveraging our expertise and strength in product technologies, manufacturing process know-how, and energy savings while we continue to grow our business.

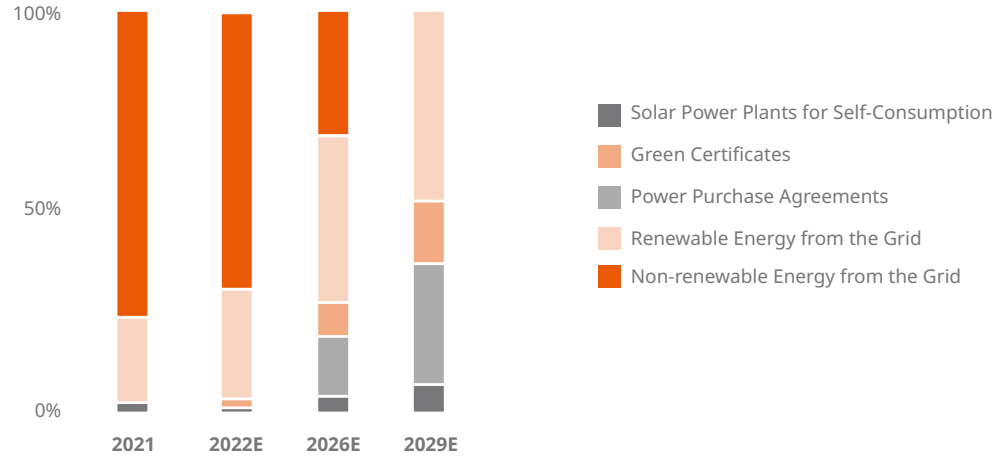
On the energy supply side, the paths we follow to decarbonize the electricity we use are, in order of priority, installing distributed solar on the rooftops of our factories, signing renewable power purchase agreements (PPAs), and purchasing green electricity from the spot market.

Most of our manufacturing facilities are in China, where solar energy has reached grid parity. In 2021, Chinese regulations endorsed PPAs signed directly between renewable energy producers and electricity users (link), and carbon-emission trading became mandatory for power producers to facilitate the price-setting of renewable PPAs (link). Altogether, renewable PPAs are expected to be a market norm in two years and will become one of our major sources of renewable energy from 2024 onwards.

Just as importantly, we expect the grid's renewable mix will continue to increase due to increased penetration of renewable energy, which will help us speed up our decarbonization progress.

Total Electricity Consumption

(%)



47 MW Marville Utility Solar Plant, France

Key Environmental Achievements Over 2017-2021

17% reduction
GHG Emissions Intensity

18% reduction
Manufacturing Energy Intensity

53% reduction
Manufacturing Water Intensity

36% reduction
Manufacturing Waste Intensity

In the following sections, we report detailed environmental intensity metrics covering all our global manufacturing operations, including ingot, wafer, cell, and module operations. For each manufacturing process, weighted average intensity metrics are calculated with respect to the actual production output of each manufacturing site.

Greenhouse Gas Emissions

Since 2021, Canadian Solar has been quantifying and reporting Greenhouse Gas (GHG) emissions covering all our global manufacturing operations by following the latest and strictest ISO14064-1:2018 standard (Specification with Guidance at the Organization Level for Quantification and Reporting of Greenhouse Gas Emissions and Removals).

To provide a more holistic understanding of our GHG footprint, we present GHG emission metrics from multiple angles, providing data on total GHG emissions (direct and indirect) and GHG intensity associated with manufacturing activities, as well as estimations of net avoided GHG emissions for representative project applications. We adhere to a variety of different methodologies to evaluate our environmental performance more rigorously, such as French CRE standards and Life Cycle Assessment (LCA) analysis per ISO14040/44:2006 environmental management standards.

Methodology

In 2021, we expanded the scope of our greenhouse gas inventory to include the following:

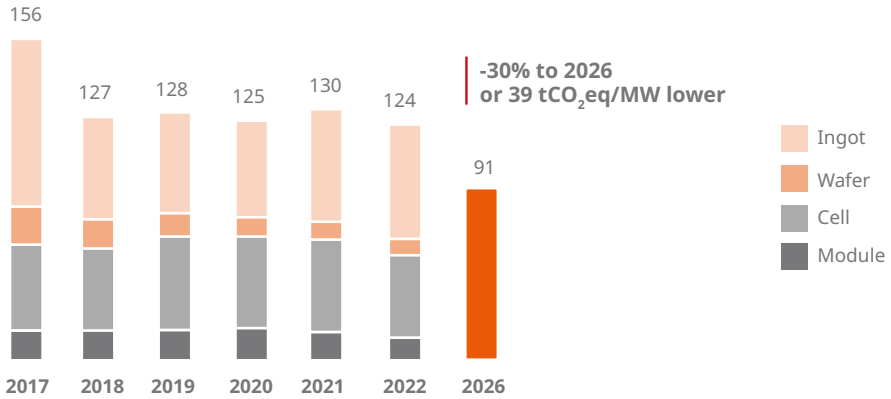
1. Organizational boundaries: we included two new module assembly facilities and one new wafer facility, and extended coverage to our auxiliary materials manufacturing, which includes the production of solder-coated copper ribbons, various encapsulation recipes, photovoltaic junction boxes, and connectors.
2. Reporting boundaries: we included methane emissions from anaerobic wastewater treatment, which are considered type 2 indirect emissions under ISO14064-1:2018, following a refinement in our cut-off criteria and increase in emissions share of this source.
3. Emissions factors (the average emission rate of a source): we updated our gasoline emission factor in accordance with the 2021 China Energy Statistical Yearbook, our electricity emission factor for operations in China in accordance with the Chinese National Development and Reform Commission[3], our electricity and fuel emission factors for operations in Thailand and Vietnam according to the UK Environmental Agency 2021 updated data[4], and all our Global Warming Potential (GWP) values based on the most recent IPCC 2021 report AR6[5].

Based on these changes, we recalculated our carbon emissions for the period from 2017 to 2020, particularly for our base year of 2020.

[3] https://www.ccchina.org.cn/archiver/ccchinacn/UpFile/Files/Default/20140923163205362312.pdf (link)
[4] https://www.gov.uk/government/publications/greenhouse-gas-reporting-conversion-factors-2021 (link)
[5] https://www.ipcc.ch/report/ar6/wg1/#FullReport (link)

GHG emissions intensity

(tCO_2eq/MW)



To simplify comparison across different years, we use GHG emissions intensity or carbon intensity (emissions per MWp) as our main reporting metric. In 2021, we were able to keep our increase in carbon intensity within 4% while still bolstering production output and switching to more energy-intensive monocrystalline ingoting technology. Improvements in cell and module efficiency, faster adoption of thinner wafers, and deployment of new, less energy-intensive production tools helped realize a 16% (1.6 tCO_2e/MWp) and 3% (1.7 tCO_2e/MWp) reduction in our wafer and cell operations carbon intensities, respectively.

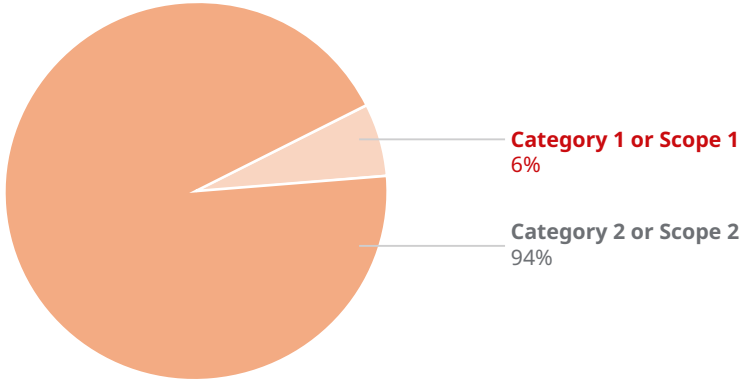
In 2022, we plan to achieve a moderate decrease in our carbon intensity of around 5% (6 tCO_2e/MWp) as the share of monocrystalline ingot production continues increasing, pushing up our ingot operations energy consumption. Accordingly, we have updated our 5-year rolling goals to reflect greater contributions to our GHG emissions from our upstream ingot operations, with our carbon intensity reduction goal now down to 30% (39 tCO_2e/MWp) by 2026.

The targeted emissions reductions will be primarily driven by further improvements in module efficiency and manufacturing yields and more proactive energy conservation measures focusing on our cell and ingot facilities. We will also continue to ramp up manufacturing capacity of our high efficiency BiHiKu7 modules (210mm wafer size) and improving silicon usage (watts by grams of silicon).

In 2021, we successfully launched our next generation of solar PV modules based on N-type HJT cells. The technology offers a greater uplift in energy conversion efficiency, minimal degradation, and simpler, less energy intensive manufacturing processes. However, given the additional R&D work required to fully commercialize HJT technologies at a GW-scale, we have taken a conservative approach and have not included the potential environmental upside that N-type modules could contribute to our corporate emissions reduction targets.

Carbon Emissions in 2021

(tCO_2e)



Category 1 or Scope 1		
Stationary combustion	9,801	***1%***
Mobile combustion	493	***0%***
Process emissions	16,468	***2%***
Fugitive emissions	35,184	***3%***
Total	**61,946**	***6%***

Category 2 or Scope 2		
Imported Electricity	959,436	***93%***
Imported Steam	11,579	***1%***
Total	**971,014**	***94%***

Total carbon emissions in 2021 amounted to 1,032,960 tCO_2e, or tons of CO_2 equivalent, which include Category 1 direct GHG emissions (referred to as "Scope 1") and Category 2 indirect GHG emissions from imported energy (referred to as "Scope 2"), as defined in the ISO14064-1:2018 standard. A detailed breakdown of our emissions is shown in the chart above.

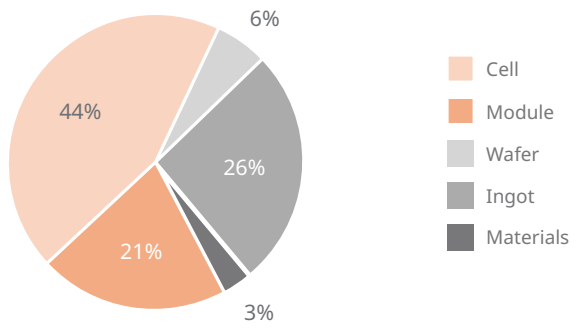
Our GHG emissions are primarily driven by Category 2 (Scope 2) indirect emissions, i.e., emissions generated from the electricity purchased and other forms of imported energy used in our operations, which contributed to approximately 94% of total GHG emissions. Emissions in 2021 increased by 37% from the year 2020, mainly driven by the establishment of new production sites (+13% contribution) and increased production output in our existing factories (+24% contribution). A detailed comparison with our 2020 GHG emissions, broken down into sub-categories, can be found in the table below.

Within Category 1 or Scope 1 emissions, we observed an increase in process emissions related to a new cell manufacturing process we deployed in 2021. While this translated to an approximately 2% increase in our cell process carbon intensity, this new process could also significantly improve our cell efficiency by around 0.5%, largely offsetting the additional carbon emissions from this source by reducing silicon usage per watt. Overall, we expect this new process to thereby reduce the carbon intensity of our upstream ingoting activities.

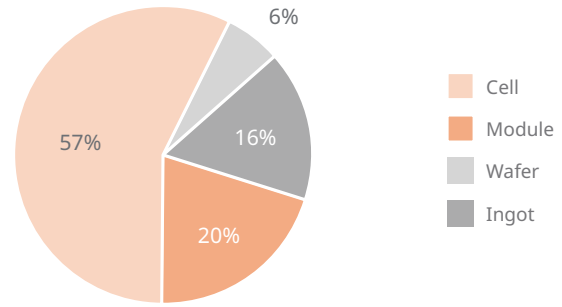
We also report how each manufacturing operation stage impacted our total GHG emissions and how these proportions changed between 2020 and 2021. As shown in the pie charts, our ingot manufacturing operations contributed 10% more to our total carbon emissions in 2021 than in 2020. The change was driven by an increase in monocrystalline production output following our strategic shift from 166mm polycrystalline to 210mm monocrystalline wafers. New to the reporting scope, our auxiliary materials manufacturing operations accounted for 3.3% of the total emissions in 2021.

GHG emissions (tCO_2e)	2021			2020
Emissions category	**Existing factories**	**New factories**	**Total**	**Total**
Category 1 or Scope 1	**44,285 (+132%)**	**17,658 (+92%)**	**61,946 (+224%)**	**19,117**
Stationary combustion	9,627	173	9,801	2,946
Mobile combustion	359	132	493	198
Process emissions	16,468	0	16,468	1,108
Fugitive emission	17,831	17,353	35,184	14,865
Category 2 or Scope 2	**888,524 (+21%)**	**82,491 (+12%)**	**971,014 (+33%)**	**732,528**
Imported electricity	877,172	82,263	959,436	714,533
Imported steam	11,351	227	11,579	17,995
Total	932,809 (+24%)	110,149 (+13%)	***1,032,958 (+37%)***	**751,645**

Carbon Emissions in 2021



Carbon Emissions in 2020



1.1 MW Yamaguchi Aio2 Utility Solar Plant, Japan

Case Study: Solar PV System's GHG Payback Time (Generally 1+ Years)

When evaluating a technology's potential against global warming, the most comprehensive metric remains net GHG emissions avoided.

For solar systems, net emissions avoided are calculated by multiplying total GHG-free energy production by the local electricity grid emissions rates, then discounting the solar system's carbon footprint, which takes into consideration the GHG emissions from its entire life cycle, including those from manufacturing solar modules and components, transportation, construction, operation, and decommissioning.

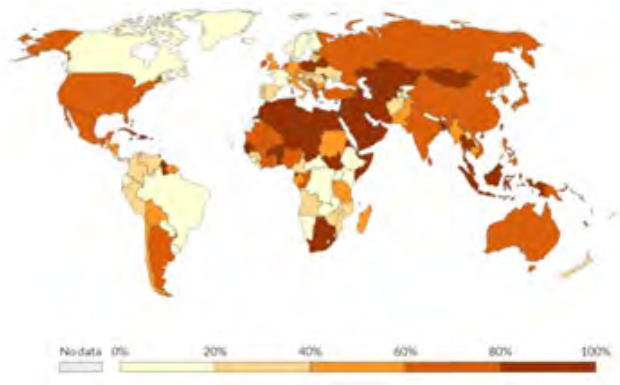
For illustrative purposes, we estimate the net GHG avoided emissions and the GHG payback time—the time it takes for excess GHG emissions associated with the system's production and installation to be offset by the system's net GHG avoided emissions—of our systems using two utility-scale solar projects that are 200 MWp each, one located in Texas, the United States, and the other in Côte d'Azur, France. Both are built with Canadian Solar's BiHiKu7 bifacial modules, use single-axis solar trackers, and are assumed to produce electricity for 30 years before decommissioning. We compare the GHG payback time of this baseline scenario with a project using a specialty low-carbon long-lifetime module design.

The solar plant in Texas is reflective of the GHG payback time of most markets, as the share of fossil fuels in Texas's electricity mix amounts to approximately to 65%, compared to the global average of 62%[7]. The projected Texas GHG payback time of one year coheres with the GHG payback times typical in countries with larger populations and the highest electricity consumptions (China, US, India, Russia, Japan), further supporting these results. This means that after 12 months or so of electricity generation, plants like the Texas plant will generate close to 100% emissions-free electricity for the remainder of their useful lives.

Even in markets whose energy grids are already decarbonized, such as France (the French electricity grid relies mostly on nuclear energy, a non-renewable low-carbon energy source), GHG payback times may only increase to just over 10 years, which remains attractive from a decarbonization standpoint given that the lifetime of fuels-based electricity production assets usually exceeds 40 years. As research in photovoltaics continues, the development of less energy-intensive and more durable systems, along with electricity decarbonization, will further decrease GHG payback times. Our system installed with specialty low-carbon modules with a 40-year lifespan, for example, has a 20-month shorter GHG payback time when installed in France than the baseline system.

Did you know?

According to the U.S. SEIA (Solar Energy Industries Association), the US installed 23.6 gigawatts (GWp) of solar PV capacity in 2021 to reach 121.4 GWp of total installed capacity. This corresponds to an annual net avoided emissions amount of up to 155,000,000 tCO_2, or about 0.45% of annual global GHG emissions (34.8 $GtCO_2$).



Share of electricity production from fossil fuels, 2021

System Life Cycle Analysis

Project Location	Texas, US	Cote d'Azur, France		Unit
System carbon footprint	1,146	1,146	966	$kgCO_2/kWp$
	229,200	229,200	193,200	tCO_2
Project lifetime	30	30	40	Years
Total production	12,554,054	10,139,812	13,480,392	MWh
GHG PAE (Potential Avoided Emissions)				
Gross avoided emissions[6]	227,207	21,632	21,569	tCO_2/year
Net avoided emissions	219,567	13,992	16,739	tCO_2/year
Net avoided emissions (lifetime)	6,587,024	419,748	669,545	tCO_2
GHG payback time	1.0	10.6	8.9	Years

[6] Avoided emission rates and capacity factors sources: the U.S. Environmental Protection Agency (link), and the French CRE.
[7] Source: Our World in Data based on BP Statistical Review of World Energy, Ember Global Electricity Review (2022) & Ember European Electricity Review (2022)

Module Carbon Footprint Improvement

We have been developing and offering our customers PV modules with an optimized carbon footprint supply chain in compliance with the French Energy Regulation Committee (CRE) solar tender requirements since 2015.

The CRE module carbon footprint analysis is more comprehensive than the corporate GHG emissions intensity analysis, as it also includes the indirect GHG emissions from the upstream manufacturing of raw materials, up to material mining.

When we expanded our competitive low carbon footprint supply chain to include our BiHiKu6 and BiHiKu7 products in 2021, we also implemented new third party Life Cycle Assessment (LCA) analysis in our most recent production facilities in accordance with ISO14040/44:2006 environmental management standards. LCA methodology requires analysis of all stages of product manufacturing, including raw material extraction and making of materials used; transportation of raw materials and intermediate products; manufacturing of all components, including packaging, energy and water consumption, emissions, and waste, as well as infrastructure dedicated to product manufacturing.

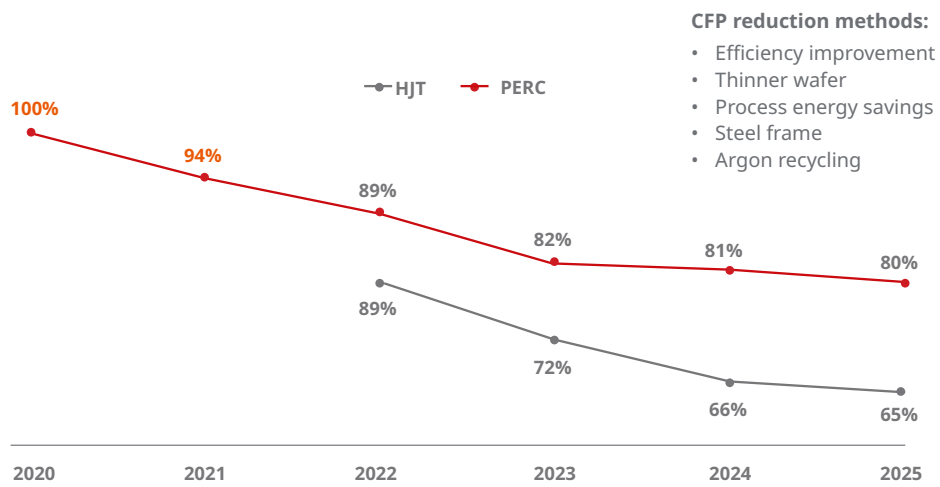
Under this comprehensive framework, our latest ingot, wafer, and module manufacturing facilities were granted reduced Global Warming Potential (GWP) factors by the French Agency for Ecological Transition (ADEME – Agence de l'Environnement et de la Maitrise de l'Energie). Compared to our previous HiKu product generation, our HiKu6 module carbon footprint has decreased to 500 tCO_2e/MW, 6.0% lower than that of our prior HiKu product[8].

The chart on the right presents our short-term roadmap to further bring down our modules' carbon footprint calculations based on French CRE methodology, with 2020 as the base year for our roadmap. These calculations include gate-to-gate carbon emissions for a standard double glass module design.

Meanwhile, we are progressing with our first Environmental Product Declaration (EPD) certifications, expanding our analysis to a full-lifecycle carbon emission evaluation, which involves consideration of downstream transportation, solar plant construction, operations and maintenance, and end-of-life disposal. This will provide a more complete picture of how our products contribute during their whole life cycles, allowing us to develop tools to guide our customers, particularly by empowering solar plant owners to calculate their projects' GHG payback time.

[8] Per the French CRE methodology, the reported carbon footprint numbers exclude the impact of aluminum frame production.

Product carbon footprint reduction roadmap



1.4 MW Jersey Estate Utility Solar Plant, Zimbabwe

Air Emissions Breakdown

We comply with local and international laws and regulations related to emissions. We monitor and assess all relevant emissions regularly and employ sophisticated exhaust and filtration technology in all manufacturing facilities to minimize emissions. The table below shows a detailed breakdown of our air emissions.

As our main cell factories transitioned from poly- to monocrystalline, our processes generated less nitric acid, which in turn led to a strong reduction of our NOx emissions. From 2020 to 2021, our total air emissions remained roughly constant, totalling 91.3 tons, while our various operations grew in volume.

Air emissions[9] (global, metric tons)	2017	2018	2019	2020	2021
Nitrogen oxides (NOx)	28.1	37.4	38.2	33.9	13.6
Sulfur oxides (SOx)	0.1	0.2	0.1	0.1	0.1
Fine dust (PM10)	3.7	7.4	9.1	14.8	15.7
Hazardous air pollutants (HAP)	0.2	0.9	0.6	6.6	10.1
Volatile organic compounds (VOC)	12.2	4.1	16.4	13.7	17.5
Persistent organic pollutants (POP)	0	0	0	0	0
Other standard air emissions[10]	3.4	23.2	16.2	23.3	30.2

[9] Certain historical figures contain measurement abnormalities which we cannot revise given the amount of time that has lapsed. Consider 2020-2021 figures as the most accurate and reflective measurements of our actual air emissions. While the Company's emissions already comply fully with local regulations, the Company is making significant efforts to further treat and reduce air emissions.

[10] From 2020, ammonia NH3 emissions have been included in "other standard air emissions" as per relevant Chinese air quality control regulations.

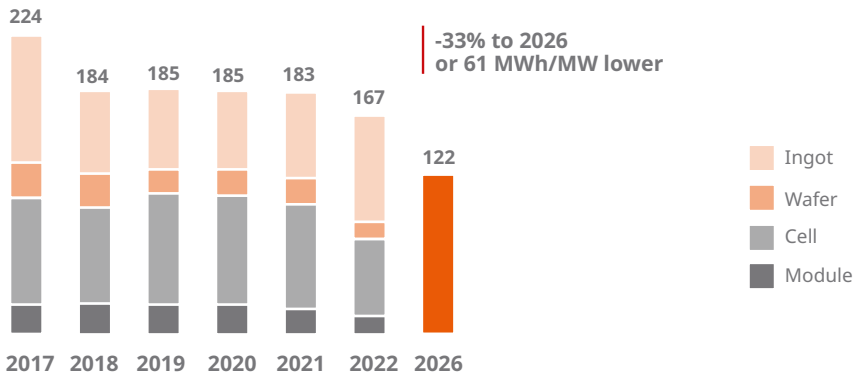
Energy Intensity

We use production-weighted averages to track our energy intensity through our ingot, wafer, cell, and module manufacturing operations. Such methodology, while allowing for an accurate and representative snapshot of the energy intensity of our global manufacturing operations, tends to underrepresent the potential energy savings from newer production workshops, as production at these sites is ramped up over the course of the calendar year.

Overall, we achieved year-on-year energy intensity savings of 23%, 5%, and 8% for our wafer, cell, and module manufacturing operations, respectively, which translates to a combined total of about 100 GWh of absolute energy savings in 2021 (assuming that energy intensities did not change from 2020, but using 2021 wafer, cell, and module production volumes).

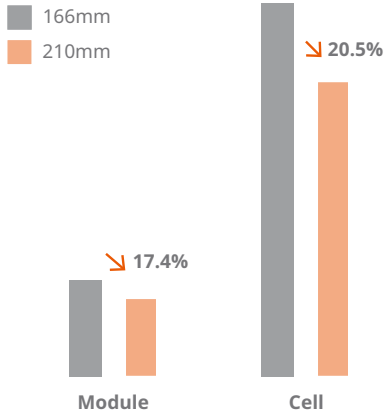
Energy Intensity

(MWh/MW)



To give some perspective, the chart below compares the energy intensities of our new 210mm cell and module workshops in Jiangsu Province relative to the incumbent 166mm production facilities based on 2021 data. The observed energy savings were in line with our expectations for new efficient production tools and demonstrate how we might meet our renewed 2022 target as we continue to upgrade our production tools to larger 182mm and 210mm wafer sizes.

210mm vs. 166mm energy intensity



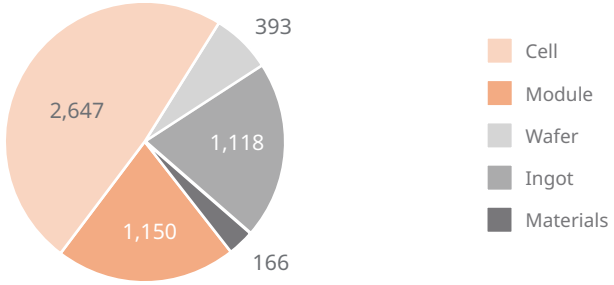
In the second half of 2021, certain factories in China faced power curtailment, which affected the capacity utilization rate. This was further affected by our accelerated shift from poly- to monocrystalline wafer production. Due to the combination of systemic and company-specific factors, our ingot manufacturing saw an increase in energy intensity of 15% in 2021.

Additionally, our monocrystalline wafer and ingoting operation output grew 1.6 and 1.9 times, respectively, from 2020 to 2021, shifting our energy consumption share between the different business units. In 2021, we significantly expanded our bill-of-materials manufacturing capacity, with new capacity extensions at our Jiaxing manufacturing hub, and accordingly started reporting this new business unit's contribution to our total energy consumption (3%), as shown on the charts to the right.

With our 210mm production capacity now fully ramped up, we are well positioned to deliver on our 2022 target, with an expected 246 GWh savings on our total energy consumption.

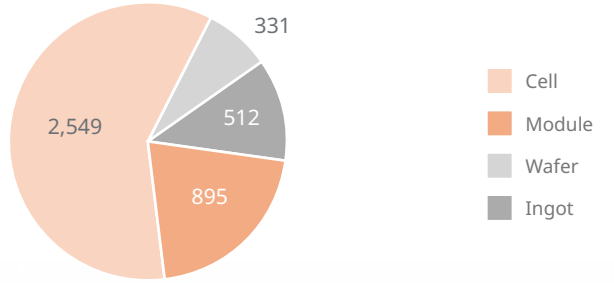
Energy consumption in 2021

(TJ)



Energy consumption in 2020

(TJ)



Energy Consumption Breakdown[11]

Global	2017	2018	2019	2020	2021
Total energy consumption (GJ)	***2,002,393***	***2,701,707***	***3,757,188***	***4,286,130***	***5,473,504***
Gas	11,295	24,020	40,249	59,001	192,332
Diesel	2,536	2,455	2,162	3,164	4,321
Gasoline	3,737	700	857	2,535	1,786
Steam	133,523	136,874	166,942	165,157	112,433
Grid electricity	1,800,956	2,474,601	3,484,479	3,972,449	5,078,445
Self-generated solar PV electricity	50,346	63,056	62,500	83,824	84,187

[11] Numbers reported in this table may differ slightly from previous sustainability report editions. We have revised historical calculations for accuracy and prior report estimations should no longer be considered. Self-generated PV electricity share has been revised in accordance with SASB (Sustainability Accounting Standard Board) standard reporting practices.

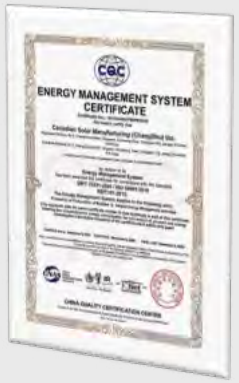
CASE STUDY: CHANGSHU MODULE AND YANGCHENG CELL

Energy management measures

- Following the publication of China's 14th Five-Year Plan (2021-2025), we started implementing two energy management pilot programs in our Changshu module and Yangcheng cell factories. Both programs followed the ISO 50001 international standard.

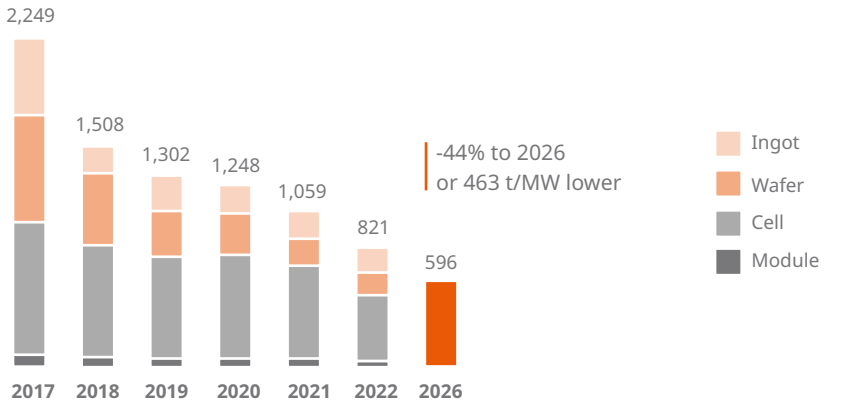
Project achievements

- Both factories were granted ISO50001 energy management certification.
- Changshu module energy consumption per unit product has been certified at 22.2 MWh/MW and was granted the "Green Factory" award by China Quality Certification Center
- In 2022, the ISO50001 management system framework will be extended to all our manufacturing sites.



146 MW Orange Grove Utility Solar Plant, Australia

Water Intensity



Water intensity is defined as the total amount of water withdrawn from all sources per MW produced. We use production-weighted averages across all our manufacturing units to track our water intensity, as shown in the chart above.

We achieved a 15% year-on-year reduction in water intensity between 2020 and 2021, mainly driven by the incremental deployment of new large size 210mm wafer and cell operations, as well as further decreases in silicon use (down to 2.5 g/W by the end of the year), which allowed us to reduce water use per watt of production.

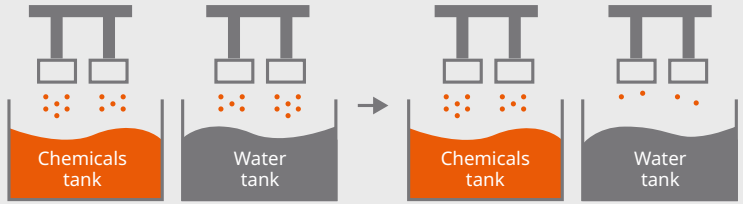
The photovoltaic industry supply chain and integrated manufacturing can be water intensive, particularly as more and more complex cell technologies gain market share, increasing demand for ultra-pure water quality. At Canadian Solar, we have been cognizant of the challenges this may pose to our long-term operations and sustainability. Our water conservation and recycling schemes, combined with the improvements in module efficiency and production yield, helped drive a 53% reduction in manufacturing water intensity between 2017 and 2021. Over the same period, absolute water withdrawal increased by only 57% despite our global module shipments more than doubling, saving 8,339 million liters of water in 2021 due to the decrease in water intensity from 2017.

Did you know?

According to the U.S. Environmental Protection Agency, an average American family uses more than 300 gallons of water per day at home (approx. 1.25 tons). The average U.S. residential solar system is around 7 kW. By these metrics, it takes the same amount of water as an American family uses in five days to manufacture the solar modules in an average residential system in the U.S. The amount of water used is lower for most other regions, although residential solar systems are also smaller outside of North America (3-5 kW).

CASE STUDY: FUNING 210MM CELL WORKSHOP

- **Improvements in cell front side texturing and rear side polishing processes**
- **Water conservation measures:**
  - Optimize and standardize water inflow rate over each equipment (305 t/day).
  - Reduce cross-contamination between process chemicals and pure water tanks (887 t/day).



- **Project achievements**
  - Manufacturing water intensity reduced by 125 t/MW (~23%).
  - 2022 annual expected water withdrawal savings up to 580 thousand m^3

Water Risk Management Strategy

Water conservation is one of the top priorities in our sustainability initiatives.

As such, we constantly seek to improve process utilization rates and reduce water withdrawal in our water management strategy. When designing production processes, we maximize water utilization rates by considering the water quality requirements for each process and recycling discharged water flows the appropriate number of times to achieve that quality.

In 2021, 100% of our water withdrawals came from municipal freshwater supplies. All statistics on water withdrawals and discharges, as shown on the table on the right, are based on invoices provided by water and wastewater utilities, respectively. Recycled water quantities are based on direct meter measurements within our various facilities.

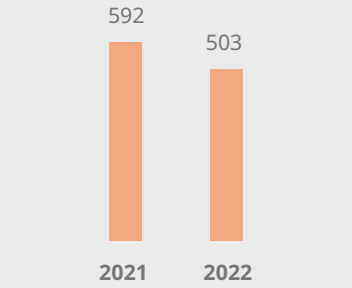
Our wafer and cell manufacturing operations accounted for 79% of our total water withdrawals in 2021. Thanks to our water intensity reduction achievements (35% and 10% for wafer and cell operations, respectively), our total water withdrawal increase was limited to roughly 7% (609,000 m^3, of which 118,000 m^3 was used in our auxiliary materials manufacturing facilities). More importantly, our total water consumption decreased by approximately 27%, a change driven by more efficient production tools and stricter water conservation management. Our total water recycling rate went down to 21% in 2021, primarily due to our rapid transition from poly- to monocrystalline upstream wafer and ingot manufacturing. The closure of our Suzhou cell factory during the first half of 2021 exacerbated this decrease, as this site has historically had the highest water recycling rate among our cell operations (about 45%). In 2022, we expect our corporate aggregated water recycling rate to significantly improve, exceeding 35%, which, alongside our other water conservation measures, will reduce our water intensity by an additional 22%. Our China cell operations are currently performing trials to deploy new processes for recycling dilute acid wastewater to support our water conservation efforts.

	2020	2021
Total water withdrawals (thousand m^3)	8,418	9,027
Withdrawals within high baseline water stress areas (%)	45	34
Total water consumption (thousand m^3)	3,634	2,653
Consumptions within high baseline water stress areas (%)	57	30
Total water recycling (thousand m^3)	2,480	1,930
Water recycling rate (%)	30	21

CASE STUDY: YANCHENG CELL WORKSHOP

- **Water conservation measures:**
  - Recycling of dilute acid wastewater with high fluoride content.
- **Project expectations:**
  - Manufacturing water consumption reduced by 1600 t/day.
  - 2022 annual expected water withdrawal savings up to 292 thousand m^3

Annual water intensity
(t/MW)

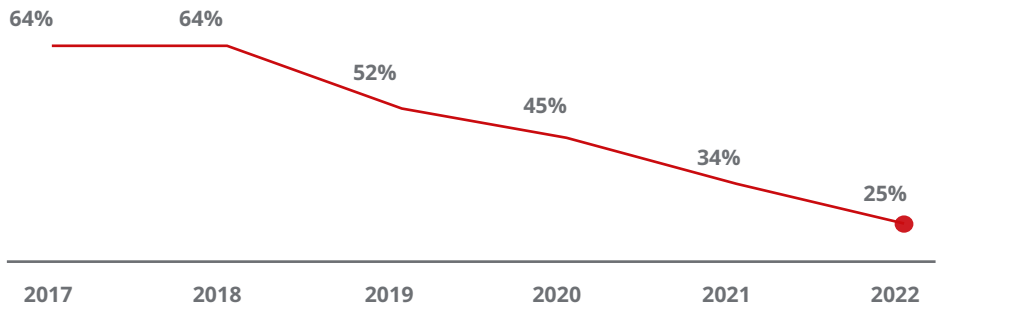


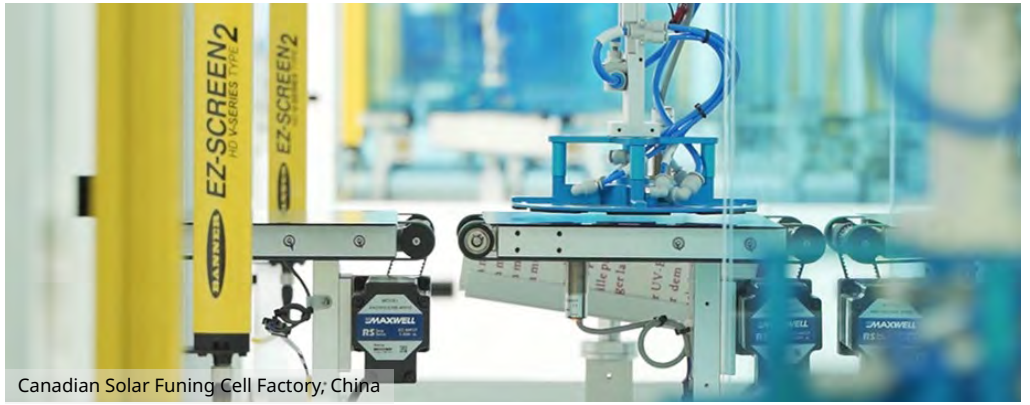
In the past five years, strategic re-deployment of our water-intensive activities to regions with lower baseline water stress (BWS), as classified by the World Resources Institute (WRI) Water Risk Atlas tool, Aqueduct, have also allowed us to significantly decrease our water access risk. In particular, we focused on transferring our manufacturing base from regions with high to moderate or lower baseline water stress. A detailed breakdown of our operations' withdrawals from high BWS areas for our module, cell, wafer, and ingot manufacturing operations is shown in the table here:

Overall, the share of our total water withdrawal in such areas decreased from 64% (3,570 thousand m^3) in 2017 to 34% (3,100 thousand m^3) in 2021, of which 608 thousand m^3 came from groundwater and 2,492 thousand m^3 came from surface water. We expect a further decrease to 25% (2,402 thousand m^3) in 2022, not including withdrawals associated with the ramping up of our new ingot facility in Xining, Qinghai province, China, which will help reduce water access risk for our ingot manufacturing operations starting in 2023.

Water withdrawals in high or extremely high Baseline Water Stress locations (thousands m^3)	2017	2021
Modules	337 (6%)	457 (5%)
Cells	1,587 (28%)	554 (6%)
Wafers	1,429 (26%)	1,181 (13%)
Ingots	217 (4%)	790 (9%)
Auxiliary materials	-	118 (1%)

Share of water withdrawals in regions with high or extremely high baseline water stress
(BWS)





Canadian Solar Funing Cell Factory, China

Water Pollutants and Effluents

Our goal is to ensure safe, reliable, and sustainable water access not just for our own operations, but also for the local communities that we may impact.

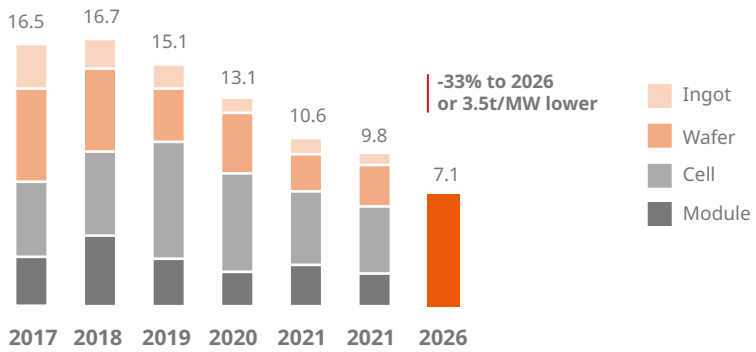
We observe applicable local and international laws and regulations related to wastewater pollutants. We also perform thorough analyses and plan out measures to reduce our impact on local water resources and on other water users. Wastewater from production is collected and treated internally first and then sent to local wastewater treatment facilities for clean up until it meets water discharge requirements. The table below shows a detailed breakdown of our wastewater relevant pollutants and effluents:

Wastewater pollutants (global, metric tons)	2020	2021
Fluoride	11.7	12.9
Chemical Oxygen Demand (COD)	341.0	288.3
Suspended Solids (SS)	109.6	186.6
Ammonia Nitrogen	28.4	23.6
Total Nitrogen	62.2	65.2

Waste Intensity

Waste Intensity

(t/MW)



In 2021, we exceeded our original waste intensity reduction target of 10.9 t/MW, realizing a 19% year-on-year reduction in our manufacturing operations waste intensity.

Strong reductions were achieved on our ingot and cell operations, with 36% and 32% reductions, respectively. The deployment of new and more efficient manufacturing equipment for the manufacturing of the larger 210mm cell format, coupled with an aggressive recycling and waste reduction management program driven at the corporate level, were critical to making these achievements possible. For a concrete example of these changes, see the study case presented on the right.

We were thus able to contain our total waste generation increase to around 10kt (approximately +10%) in 2021 while maintaining a strong increase in the production output of all our manufacturing operations. The total percentage of waste we recycled or reused also increased from 78% (72kt) to 82% (85kt)[12].

While our total waste generation increased, this was offset by progress made in reducing our total hazardous waste[13] generation. Notably, total hazardous waste generation decreased from 13.9kt in 2020 to 3.8kt in 2021 and total disposed hazardous waste decreased from 943kg (1.0% total waste) in 2020 to 738kg (0.7%) in 2021.

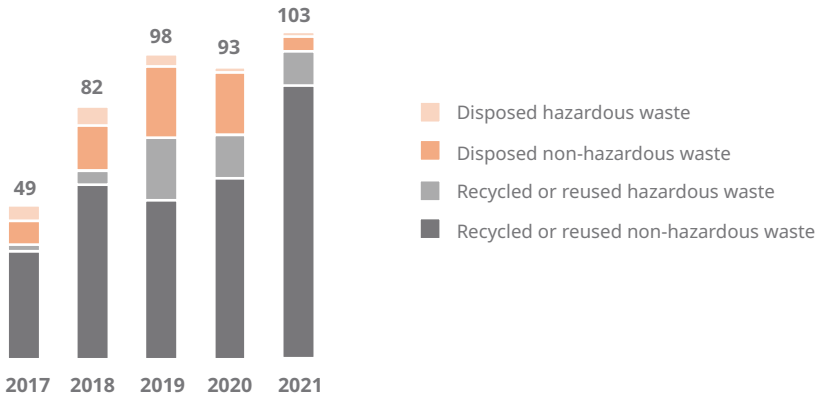
CASE STUDY: MODULE MANUFACTURING OPERATIONS

- **Hazardous waste reduction measure**
  - Implemented improvement of silicone sealant packaging (bucket and plastic bag) through all module assembly facilities, including residual silicone sealant savings and strict reuse of packaging.
- **Project achievements**
  - Disposed waste intensity reduced by 7kg/MW (weighted average).
  - Corresponding hazardous waste in 2021 reduced by 116 metric tons.

Canadian Solar Funing Module Factory, China

Waste by type and disposal

(kt)



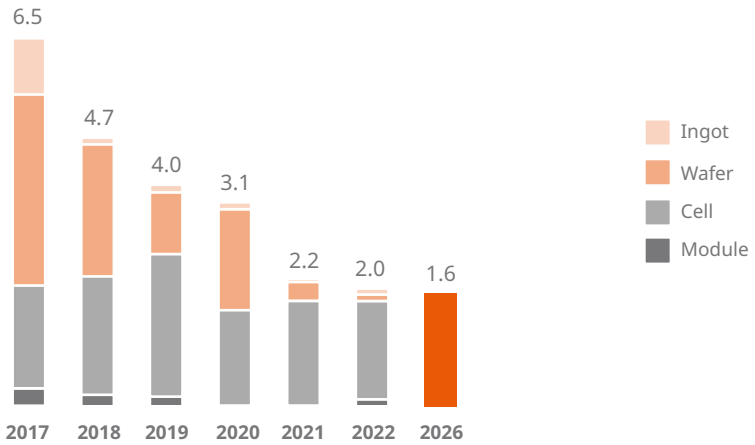
[12] Numbers reported in this chart may differ slightly from previous sustainability report editions. For part of our operations, we have revised historical waste accounting methods and boundaries for greater accuracy.

[13] Hazardous waste, classified according to the definitions used by the countries in which we operate (such as the Solid Waste Pollution Prevention and Control Law 2020 in China, Law No. 55/2014/QH13 on Environmental Protection in Vietnam; and Notification of the Ministry of Industry about How to Dispose Waste, 2006 in Thailand), is disposed of safely to specialized and accredited local treatment facilities.

This year, we include data for disposed (landfilled or incinerated) waste intensity, a metric intended to replace the currently reported waste intensity metric. We believe this metric will provide a more meaningful target for our progress towards greener solar manufacturing.

Disposed waste intensity

(t/MW)



114.3 MW Jaiba I Utility Solar Plant, Brazil

Product End-of-Life Management and Recycling

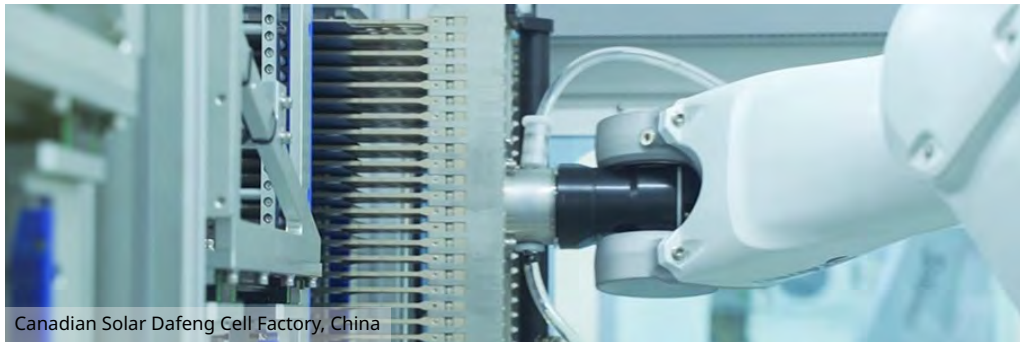
Canadian Solar strictly abides by the e-waste management laws and regulations of the countries in which we operate and advocates for both recycling and reuse of end-of-life products.

Our solar PV modules have complied with the WEEE (Waste of Electric and Electronic Equipment) European Directive, which regulates the disposal of solar modules in all EU countries, since February 2014. Canadian Solar works closely with recycling service providers such as PV CYCLE (link) and Rinovasol Group (link) to ensure full compliance with all legal WEEE obligations and appropriate market import actions are followed. In 2021, around 184,882 pieces of Canadian Solar modules (totaling 40 MW, or approximately 3.4 tons) were repaired for reuse by Rinovasol Group, and around 5,719 pieces, or 1.2 MW, were recycled by PV CYCLE.

In Australia, Canadian Solar partners with Reclaim PV Recycling (link) for solar module end-of-life management activities. In 2021, 3,209 pieces of modules totaling 0.7 MW, or 0.6 tons, were recycled through Reclaim PV Recycling. The aluminum frames were disassembled and sold to aluminum recycling companies, and the remaining module parts were broken down into parts using thermal deconstruction. The recovered components were sorted and delivered to relevant materials companies for reuse or safe disposal.

The longer the solar modules last, the fewer will be replaced or recycled. As such, the total pieces of solar module reused or recycled decreased in 2021 from 2020 as we continue to enhance incoming material quality control and implement more strict testing standards.

We are committed to minimizing the environmental impact of our products from design and manufacturing to installation and end-of-life management. We are developing new technologies that optimize product design, simplify the recycling process, and extend the useful life of a solar module to 40 years. The new technologies we are working on include fluorine-free back sheets and lead-free solder trips that can enhance module recyclability. We plan to apply more environment friendly materials to module production in coming years.



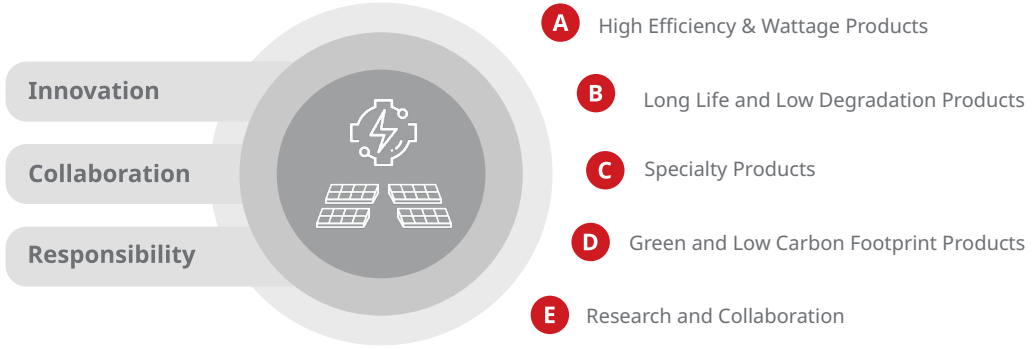
Canadian Solar Dafeng Cell Factory, China

Did you know?

Typically, there are 5 layers in a crystalline silicon PV module: a front cover (tempered glass), the electrical circuit (solar cells matrix) in between two encapsulant layers (front/back), and a back cover (backsheet or tempered glass). Aluminum metal frames are used to improve mechanical resistance of the PV modules and facilitate installation. Approximately 75% of a solar module's weight is tempered glass, 10% is plastic parts, 8% is aluminum, 5% is silicon, and 1% is other materials. Thus, 95% of the materials used in a typical silicon solar module can be disassembled, sorted, processed, and recycled.

Research & Development Roadmap

Investing in technological innovation is critical to Canadian Solar's competitive advantage.



We continue our efforts in product research, development, and designs to continuously increase the efficiency of our products, reduce the environmental impact of our manufacturing activities and products, and contribute to global decarbonization goals.

Our technology roadmap for the period of 2022 to 2025 is highlighted below, along with the expected contributions to various key environmental metrics of the most critical projects.

1. We successfully launched our high efficiency N-type Heterojunction (HJT) module in 2021. Targeting residential and commercial rooftop applications, the HJT modules use about 20% less silicon, generate 20W higher module power, and significantly lower energy consumption compared to PERC modules due to lower cell processing temperatures. The carbon footprint of our HJT modules is expected to fall below 400 tCO_2e/MW, which is well below the carbon footprint of our existing PERC modules of approximately 500 tCO_2e/MW. The technology offers a greater uplift in energy conversion efficiency, minimal degradation, and simpler, less energy intensive manufacturing processes.

2. Mass production of our new generation N-type TOPCon modules is slated to begin in the second half of 2022. Especially developed for bifacial utility applications, this product line will further increase the module wattage output from around 690W in 2022 to 715W by 2025 over the incumbent PERC module technology. The production process of N-type TOPCon modules will also decrease our energy and water use intensity.

3. After more than two years of extensive reliability research, we have completed the development of our long lifetime modules, which are expected to reach 40 years. Long lifetime modules are designed for utility-scale applications and are expected to decrease photovoltaic systems' carbon emissions by more than 33% due to the modules' longer warranty and higher performance.

4. Manufacture of our modules' aluminum frames currently accounts for around 10% of our total module carbon footprint and is one of the main contributors to PV modules' shipment density. In the second half of 2022, we will introduce a highly engineered frame with reduced material consumption, decreasing downstream module shipment emissions by up to 5%. We also launched several R&D programs aiming to develop innovative steel frame designs, which could further reduce our module carbon footprint by at least 30 tCO_2e/MW.

5. While most of the materials in PV modules can be recycled, it is highly costly to do so. To decrease recycling costs and improve the recyclability of PV modules, we plan to introduce the first fluoride- and lead-free module design in 2024, aiming at recycling rates above 95%. We have also started working with various partners to research easier-to-recycle module designs, innovative recycling methods, and opportunities to reuse modules that have reached the end of their lifespans and lengthen their useful periods.

6. Our main research around ingoting methods includes increasing pulling speed and the number of ingots produced in a single pull (up to 9 ingots) while reducing oxygen content and increasing minority carrier lifetime. These methodologies will contribute to reducing energy intensity by at least 3% per year. We have also started recycling the specialized argon gas used in the process, which will further reduce the carbon footprint of our ingot process by an estimated 5%.

7. Wafering technologies are accelerating towards even thinner diamond wire and innovations in new alloy-based wires. We anticipate these technologies will bring wire diameter down to 30 μm or lower, resulting in more pieces of wafer being cut per kilo of ingot. Altogether, we expect these developments to directly drive 5% annual reductions in energy and cooling water consumption intensity.

Beyond PV modules, our power electronics products development focuses on the integration of PV panel, inverter, and energy storage. Our ready-to-install solar system kits have been deployed in various markets worldwide, with most of our own residential inverter volume shipping to the Latin and North America markets in 2021. In 2022, we will continue to boost our system integration capabilities with the development of our own energy monitoring platform. While the solar inverter manufacturing process is by nature less energy intensive compared to PV module manufacturing, the development of high energy density residential inverters and competitive energy storage solutions will be critical in further reducing the LCOE of solar systems and enabling higher clean, solar energy grid penetration.

Canadian Solar Jiaxing Module Factory, China

Environmental Stewardship in Project Development

Canadian Solar is one of the world's largest solar and energy storage project developers. The projects we develop contribute to the world's adoption of solar energy and thus have a positive impact on the environment and social development. Project development activities, however, may have an adverse environmental and ecological impact, including visual impacts on land, habitat disruption, and construction noise. Canadian Solar is committed to proactively minimizing these impacts while we develop projects and monitor progress and results.

Early in the project development process, we integrate the evaluation of environmental and ecological impacts, as well as community engagement into our internal approval process for each solar and battery storage project we develop. These impact assessments require extensive environmental and ecological studies, as well as community engagement. These evaluations are conducted as part of the Investment Committee (IC) approval process, and teams are required to submit detailed assessments of the environmental and ecological impacts expected throughout the full lifecycle of a project. Some of our environmental and ecological efforts include:

- Investigation of new technologies, such as mixed-use projects incorporating agriculture and PV ("Agro-PV")
- Contractors hired by Canadian Solar must have a site-specific Environmental and Safety plan to begin construction
- Environmental and safety performance of a project is integrated into the KPIs of Canadian Solar's EPC and O&M teams
- Utilizing sheep for vegetation management around a project where permitted
- Compensation land Canadian Solar has acquired during project development to support native species, which are protected and maintained for at least 20 years to ensure a healthy habitat for native plant and animal species
- Module recycling on project sites where modules have been damaged during installation. These activities help ensure waste is not sent to landfills, but to recycling facilities where the materials can be recovered and reused

These efforts have helped us achieve zero project delays related to environmental and ecological impacts or community engagement in 2021, as these factors were already considered during the project planning phase.

Climate-Related Risks and Opportunities

Climate-related risks pose a serious threat to human wellbeing and societal development.

Canadian Solar is proud that 100% of our revenues are derived from clean, renewable energy, which is crucial to achieving the global decarbonization goals established in the Paris Agreement. However, our operations, especially our manufacturing activities, do have environmental impacts. To manage these impacts, we have established an Environmental Management System to measure these impacts and set up 5-year rolling targets on environmental metrics to reduce the impacts.

Climate-Related Risks

We have identified the following climate-related risks associated with the development of our business. These risks include but are not limited to:

Please refer to our annual report Form 20-F (link) filed with the US Securities and Exchange Commission for a more detailed discussion of the risks associated with our business.

Climate-Related Risks	Time Horizon	Potential Impacts	Estimated Financial Implications	Management Method
Compliance with climate-related regulations and initiatives	Short to long term	There may be increased costs and administrative responsibilities due to changes in regulations and policies in the areas of climate, energy, and environment	These may change depending on how the regulations and initiatives will evolve and how they will impact our business	Monitor and comply with the development of the regulations and initiatives in an efficient way
Environmental impact from our operations	Short to long term	Although 100% of our revenues are related to renewable energy, our operations, especially our manufacturing activities, have impacts on the environment from the perspective of GHG emissions, energy and water consumption, and waste generation	Our environmental related expenditure for 2021 was around US$33mn, including capital expenditures and other expenses. The environmental related expenditure depends on the scale of expansion of our business, and we expect it will increase in 2022, considering we are significantly expanding our manufacturing capacities	We have established an Environmental Management System to measure these impacts and set 5-year rolling targets on environmental metrics to reduce the impacts
Environmental and ecological impact on solar and battery storage project development	Short to long term	Environmental and ecological impact on the community where we develop the projects, including visual impacts, habitat disruption, wildlife fatalities, and construction noise	Project development related expenses are expected to increase to optimize project design to minimize visual impacts, optimize project locations to minimize risk of habitat disruption, and minimize noise resulting from construction activities	We have integrated the environmental and ecological risks associated with each of the project we develop into our internal project review and approval process to minimize the impacts
Product end of life management	Short to long term	Environmental impact of our solar modules after they come to end of life	It increases our R&D expenses in terms of module recycling related technologies and technologies to prolong module's lifetime	Work on module recycling related R&D
Environmental impact among our supply chain	Short to long term	Our suppliers' manufacturing activities have impacts on the environment from the perspective of GHG emissions, energy and water consumption, and waste generation		We conduct supply chain ESG audit to make sure our suppliers comply with our standards on ESG. We aim to leverage this exercise to reduce the environmental impact from our suppliers

Climate-Related Opportunities

The widespread adoption of renewable energy, including solar, is critical to meeting global decarbonization goals.

Meanwhile, solar has become the cheapest source of energy with the most competitive Levelized Cost of Energy (LCOE) across global major power markets, according to Lazard's 2021 LCOE Report (link). Therefore, market forces serve as a tailwind to global adoption of solar energy.

According to calculations by the International Renewable Energy Agency (IRENA) (link), to reach the 1.5 degree Celsius Paris Agreement goal, solar PV's global installed capacity needs to reach 5,200 GW by 2030 and 1.4 TW, or 14,000 GW, by 2050 from approximately 950 GW by the end of 2021. This implies an average of 500 GW of annual solar installations. Meanwhile, solar energy remains significantly underpenetrated, accounting for only 3% of the global energy mix. Therefore, the growth opportunity for solar is immense, and we are only at the early stages of the structural growth trend.

Likewise, we believe the value and demand for energy storage will increase significantly with the greater adoption of clean renewable energy, including solar. The increasing penetration of renewable energy lowers power costs and decarbonizes the power grid but creates price volatility and affects grid stability. Energy storage can mitigate the uncertainties of renewable energy on the grid; as such, energy storage has entered a phase of exponential market growth. According to Wood Mackenzie estimates, the cumulative capacity for energy storage could reach 1.3 TWh by 2031 from 24 GWh in 2021.

For Canadian Solar, the significant growth visibility for both solar and energy storage represents major growth opportunities in both the short and long term, as the nature of our business and strategy is directly aligned with providing clean solar energy and integrated end-to-end energy storage solutions.

We have identified the following climate change-related opportunities associated with the development of our business. These opportunities include but are not limited to:

Climate-Related Opportunities	Time Horizon	Potential Impacts	Estimated Financial Implications	Management Method
Growing demand for solar modules	Short to long term	Growth of our solar manufacturing business	2022 revenue contribution is expected to be US$7.0-7.5 billion. 100% of our revenue is associated with solar energy. Long-term revenue growth is expected, as we aim to increase our global market share to 15% in 3-5 years from 9% in 2021	Continue to invest in technology R&D to further increase efficiency of solar cells and modules and product quality and reliability
Growing demand for battery storage system solutions	Short to long term	Growth of our battery storage system solutions business		Continue to invest in R&D of battery storage system solutions
Growing demand for solar power plants	Short to long term	Growth of our project development business and O&M business		Capture market opportunities and expand solar project pipeline
Growing demand for battery storage plants	Short to long term			Capture market opportunities and expand battery storage project pipeline
Green financing to support the development of our business	Short and long term	Supporting the growth of our project development business	In 2021, we successfully issued a EUR30 million green bond (link) to support the development of our solar and battery storage projects in the EMEA region Also in 2021, we received JPY8.1 billion (US$75 million) through the issuance of Green Project Bonds in Japan to support the construction and operation of the 43 MWp Ibaraki and Hiroshima projects developed by us. We received the "Green Bond of the Year" award (link) from Environmental Finance, an online news and analysis services headquartered in London for this green project bond We expect to receive further support in green financing as the demand for solar and battery storage increases to achieve decarbonization goals	Maintain good relationship with financial institutions as we execute on and expand our project pipelines

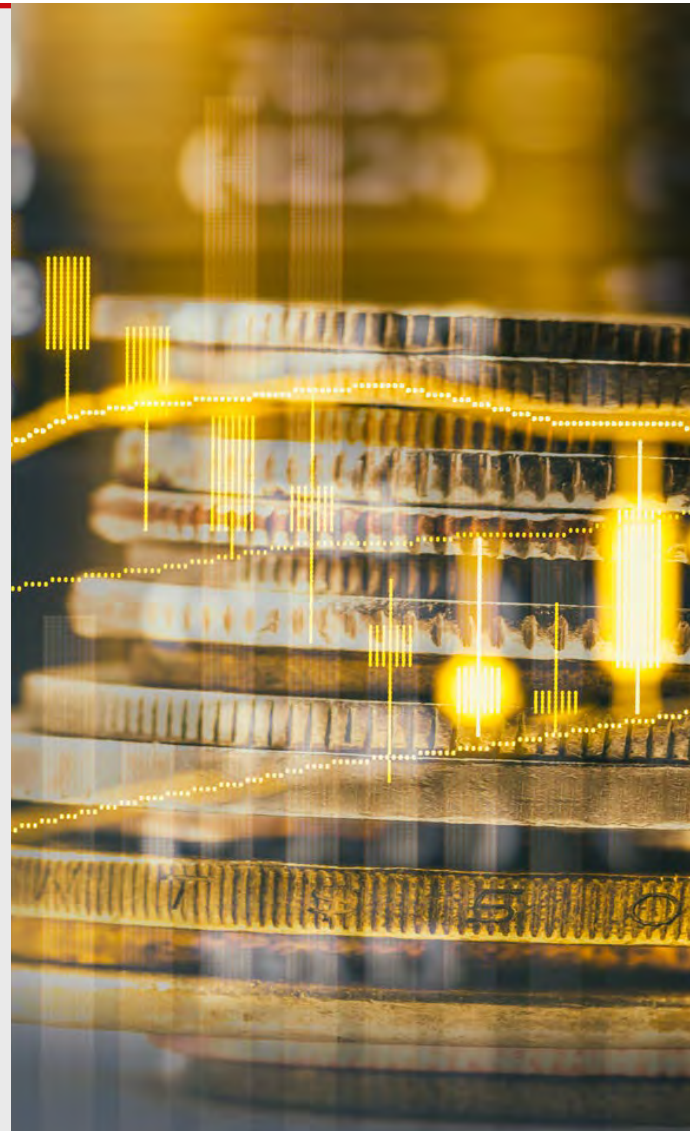
CASE STUDY: CANADIAN SOLAR INFRASTRUCTURE FUND

- Canadian Solar captures climate-related opportunities not only in EMEA, but also in Japan. Canadian Solar owns approximately 15% of CSIF, Japan's largest publicly listed solar infrastructure fund (TSE: 9284). CSIF invests in renewable energy power generation facilities in Japan and embraces ESG (link) as a core tenet to enhance shareholder value. Canadian Solar's subsidiary, Canadian Solar Asset Management K.K. ("CSAM"), serves as the asset manager of CSIF and became a signatory of the UN PRI (United Nations Principles for Responsible Investment) in 2019. CSAM is committed to fulfilling its social responsibilities as an asset management company and integrates ESG factors into its investment and ownership decisions. CSAM was the first asset manager of a listed infrastructure fund on the Tokyo Stock Exchange to adopt this approach to sustainable investing.

- The table below details green finance that has been secured by CSIF:

Date	Amount (JPY billion)	Type of Debt	Agency	Rating
2017.11.22	15.7	Green Loan	JCR	Green 1
2020.5.11	N/A	Green Finance Framework (Corporate)	JCR	Green 1
2021.1.26	3.8	Green Investment Bond	JCR	Green 1
2021.3.8	17	Green Loan	JCR	Green 1
		Green Loan	Shinsei	Shinsei Green

- CSIF's Corporate Green Finance Framework is based on ESG investment guidelines such as the Green Bond Principles (2018 Edition) published by the International Capital Markets Associations, and the Green Bond Guidelines (2020 Edition) published by the Ministry of Environment in Japan. CSIF's Green Finance Framework, as well as its other bonds and loans, have received the **highest rating of Green 1** from the Japan Credit Rating Agency, Ltd. (JCR).



3 Social Responsibility

As one of the world's largest solar technology and renewable energy companies, Canadian Solar aims to power the world with solar energy and to create a cleaner Earth for future generations.

To meet our company goals, we strive to "Make the Difference" in our work by cultivating a corporate culture of equity, diversity, and inclusion, and creating a lasting positive impact on society and the communities where we operate. Our culture and people are our most important assets and a key source of our competitive advantage.

Mission
Lead the energy revolution and create a brighter future together

Vision
Power the world with solar energy and create a better and cleaner Earth for future generations

Slogan
Make the difference

Core Values
Customer Success, Innovation, Grit, Excellence

Working at Canadian Solar

As of December 31, 2021, Canadian Solar had 13,535 employees, including 13,124 full-time employees, 68 trainees, and other part-time employees. 12,924 of these employees work for CSI Solar and 611 work for the Company's Global Energy business.

Equity, Diversity, and Inclusion

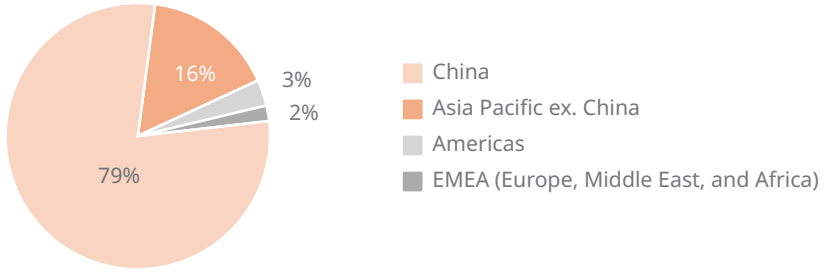
Our culture has always been to put people first and treat everyone with dignity.

We promote equity, diversity, and inclusion, as we believe a diverse workforce is the driver of creativity and innovation and is critical to our long-term success. Best practices are implemented locally in keeping with our global strategies across our operating operations, from manufacturing to sales and project development.

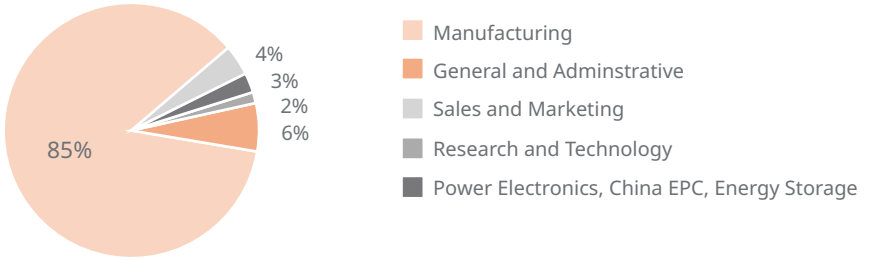
Canadian Solar is an **equal employment opportunity employer** (link) and does not tolerate discrimination of any kind, including, but not limited to, race, color, ethnicity, gender, religion, political or other opinion, sexual orientation, age, disability status, or other distinguishing characteristics. We hire, promote, and reward employees based on their qualifications, experience, development potential, and performance, and also take diversity into account, with the goal of assembling a group of talented and skillful individuals with diverse backgrounds, experiences, and perspectives. Likewise, we follow and go beyond what is required by the employment laws and regulations in the jurisdictions where we operate. We have filed the **Equal Employment Opportunity Form** or **EEO form** (link) for our operations in the US, which provides a demographic breakdown of our workforce in the US by race and gender.

We are committed to ensuring that all employees and persons related to our business are treated fairly, respectfully, and with dignity. **Canadian Solar's Labor and Human Rights Policy** (link) sets forth our labor and human rights standards and the rights our employees are entitled to, including, but not limited to, sick leave, parental leave, special leave, and annual holidays.

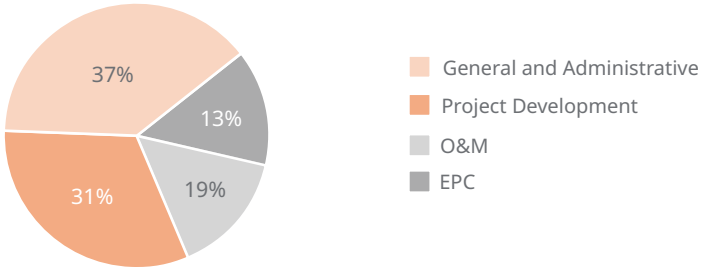
Employee Breakdown by Region



CSI Solar



Global Energy



Promoting Equity, Diversity, and Inclusion in all Human Capital Management Areas

Diversity and inclusion are among our top priorities. The word cloud above was created directly from qualitative responses in our most recent employee engagement survey, conducted in the first quarter of 2022. The bigger and bolder a word is, the more often it was mentioned by our employees and the more important it is to our corporate culture.

As of 2021, 36% of our total workforce is female, exceeding the renewable energy industries' average of 32%[14], and 25% of middle management is female. 46% of our U.S.-based employees are from an ethnic minority.

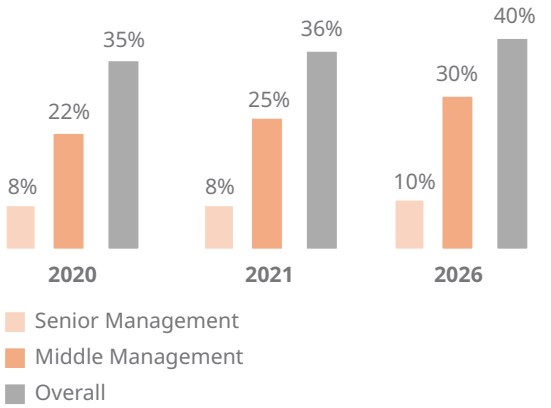
Hiring targets: We track our hiring practices to monitor their effectiveness in being inclusive of women, people of underrepresented racial groups or ethnic minorities, and people with disabilities. We aim to increase female representation in our global workforce to 40% and in our middle management to 30% by 2026. We also aim to increase the share of employees with special needs to 1-2% in 2026 from 0.8% in 2021.

Recruiting channels: To attract a more diverse range of candidates, we have partnered with networking organizations that support underrepresented groups in our industry. One of them is BlackOak, a networking organization in the U.S. that aims to build a formal home for the many Black environmental communities in the Washington Metropolitan Area. In 2021, we met with a BlackOak representative once a month to discuss networking opportunities and keep our job postings current. In 2022, we plan to run a networking event for members of the organization. We also have sponsored Women in Cleantech and Sustainability (WCS), a Bay Area-based non-profit organization that supports women in the career fields of renewable energy, cleantech, and sustainability.

Raising Awareness: We regularly organize events and workshops to raise employee and management awareness of the importance of equity, diversity, and inclusion. For example, we celebrate International Women's Day at Canadian Solar and use it as an opportunity to raise awareness on the importance of diversity and promote real inclusivity.

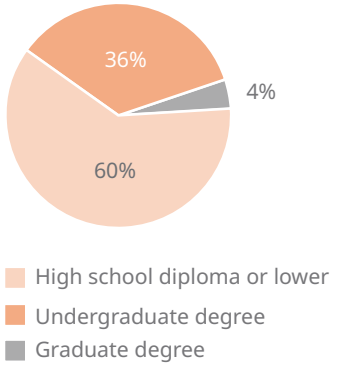
Female employees

(%)



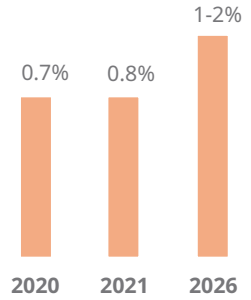
Qualification of total workforce

(%)



Employees with special needs

(%)



[14] Renewable Energy: A Gender Perspective, published by International Renewable Energy Agency in 2019

Implementing unconscious bias training across our global operations has also been a major part of Canadian Solar's push for more inclusivity in the workplace. Some of the trainings we have provided include:

- "Micromessaging," led by Stephen Young, one of the U.S.'s foremost experts on diversity and inclusion
- "Diversity and Inclusion," led by Anjali Bindra Patel, a speaker, author, lawyer, and expert on diversity and inclusion strategies

Accountability: We have made diversity and inclusion part of our team leaders' key performance metrics to ensure accountability in creating a diverse and inclusive workplace in our teams.

Gender Equity

At Canadian Solar, we believe gender equality is important not just from a human rights perspective, but also from a business standpoint.

Encouraging and attracting women to join our talented workforce strengthens and diversifies our talent pool, as women offer crucial perspectives for decision making, thereby improving the efficiency and results of execution. Given that the renewable energy sector as a whole is significantly under-indexed in female talent, we have made gender equity a priority at Canadian Solar.

Equitable pay: We engage external parties to conduct pay equity studies, including periodical pay equity reviews, to ensure that our female employees are paid fairly and equally to male counterparts who have similar responsibilities and achievements. This is a periodic auditing and improvement process to help us ensure we are rewarding all our employees equitably.

Women in leadership program: In 2022, we are partnering with Cornell University to launch a comprehensive women in leadership program, which will provide training content specifically tailored to guiding women on their leadership journeys. Currently, we are working with regional leadership to identify key women in leadership positions across the company to participate. Upon completion of the three-month training program, each member of the cohort will be assigned an executive sponsor who will serve as her champion. The goal of the women in leadership program is to accelerate the development of our female leaders, thereby enhancing female representation in senior leadership.

Development Groups

WIRE: Women in Renewable Energy

Recurrent Energy, Canadian Solar's wholly owned subsidiary for North America's project development business, founded Women in Renewable Energy (WIRE), an internal affinity group focused on supporting women in renewable energy, in the U.S in 2015. WIRE was expanded to cover all female employees of Canadian Solar after Recurrent Energy's acquisition during the same year. WIRE's steering committee organizes many events during the year that include initiatives to attract female talent, leadership development, and group discussions. International Women's Day's celebrations are also part of WIRE's annual programming.

WISE: Women in Solar Energy

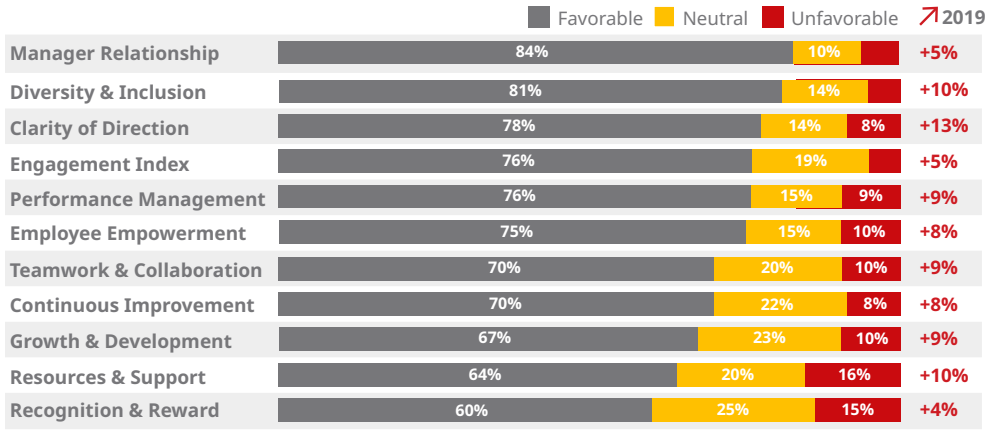
In 2019, Canadian Solar founded Women in Solar Energy (WISE), an industry association that promotes the participation and career development of women in the solar industry in China. WISE's membership includes female executives who come from different companies in the industry. WISE regularly organizes events to discuss solar technology and industry trends, aiming to provide mentorship and resources to female talent in the solar industry.

Women in CSI Solar

In 2021, CSI Solar, Canadian Solar's majority owned subsidiary, founded Women in CSI Solar, an internal group that provides development support and psychological assistance and organizes events on diversity for female employees. In 2021, we organized a Women's Career Development Forum that was attended by more than 70 female employees across different levels of seniority.

Employee Engagement

We conduct engagement surveys every two years to gauge our employee engagement level relative to internal and industry benchmarks and to consider employees' feedback on areas of positive performance and areas for improvement.



Our Q1 2022 engagement survey was conducted by Perceptyx, an employee listening and people analytics platform headquartered in Temecula, California. Our Q1 2022 survey had a 71% response rate across the Company and found that the Company had delivered improvements in all categories compared to our 2019 survey results. We are proud of these improvements, particularly in the wake of the challenges presented by the global pandemic.

84% of respondents rated their relationship with their manager favorably, the highest scoring category. Diversity and Inclusion was the second highest scoring category, with 81% of respondents rating Canadian Solar's performance favorably, a 10% increase over the 2019 survey results. The most significant improvement from the previous survey was in the Clarity of Direction category, whose favorability rating increased by 13% from 2019, with 78% respondents rating CSI's performance favorably.

The engagement survey also informed one of our key areas of focus: recognition and reward. One of the most important drivers for engagement for our company was whether employees felt valued in their positions, the area with the greatest gap between highly engaged employees and disengaged employees. We will focus our efforts on addressing these gaps and ensuring all our employees are appropriately recognized for the work they do.

Talent Strategy, Training, and Development

Our people are our most important asset.

They are the driver of our sustainable competitiveness and key to achieving our goals and mission. As such, we recalibrate our talent strategy and monitor progress annually to ensure that we remain on track with our short, medium, and long-term goals.

Talent Review and Succession Planning

To prioritize talent skillsets that we have identified as critical for the long-term success of our business, we build out and review our talent pipeline on a regular basis. Our human capital development team helps employees develop skills and knowledge sets that may not be readily available in the market. We have also established a succession planning process based on business needs, talent availability, and employee feedback.

In 2022, we partnered with Development Dimension International, a global leadership and human resources consulting firm, to adopt a more methodical approach to evaluating our talent potential and capability for succession planning purposes. This approach has been an effective tool for identifying and nurturing talent for key management positions worldwide.

Leadership and Key Talent Development Programs

As demand for solar grows, our succession planning calls for a robust leadership development program.

Initiatives such as the Business Leader Development Program, where we partner with prestigious universities to provide online lectures, webinars, and project assignments, meet this need by providing training and development opportunities for all different levels of leadership. We also have a Middle Manager Development Program and a Frontline Leadership Program, where we partner with Franklin Covey to deliver leadership, individual effectiveness, and business execution training to our business leaders.

In addition, we demonstrate our commitment to high potential, top performing employees by accelerating their career development and providing opportunities for long-term growth.

Our key talent development program utilizes a tailored approach based on individual qualities and contributions. Individualized development actions can include professional assessments, 360-degree feedback, coaching, targeted training, and development stretch assignments.

Canadian Solar University

Canadian Solar University, or CSU, aims to help employees gain a broader understanding of our business, drive innovation, and stimulate more effective collaboration within the company.

It also helps further develop employees' expertise across disciplines, both within and across business functions. CSU provides employees of our Global Energy business with learning resources covering all key business functions, including project development, project sales, energy storage, asset management, O&M, and EPC management. Each topic will eventually have different levels, from entry level 101 courses to expert level 401 courses. In 2021, we designed and launched eleven 201 courses with an employee satisfaction score of 4.5 out of 5.

Major courses launched in 2021 include:

- Project Sales 201: Case Study Session
- Project Finance 201: Financial Modeling
- Development 201: Multi-Discipline Approach
- PPA 201: Global Power Markets & EMEA Case Studies
- PPA 201: Global Power Market & North America Case Studies
- EPC 201: System Design – Energy Modeling
- EPC 201: Inverter & Power Electronics Technology - Advanced Course
- Energy Storage 201: Storage Values & Demystifying Revenue Streams
- Asset Management 301: Overview – Basic to Intermediate

For 2022, we have designed and plan to launch 40 courses on key workstreams such as project sales, storage, business development, asset management, PPA, O&M, procurement, risk management, etc. We have also designed and expect to launch certification programs such as EPC project management and construction management. Currently, we are in the process of developing a curriculum focused on solar module products and R&D, which is expected to launch later this year.

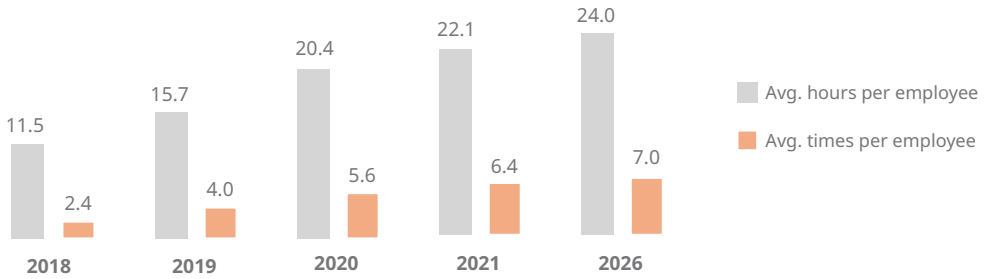
Internal Trainer Program

We developed and launched a series of internal trainer-led courses on project management, public speaking, and time management. A total of 11 courses have been implemented so far with an average employee satisfaction score of 4.4 out of 5.

On the Job Training

Canadian Solar also provides regular on-the-job training on EHS, compliance, markets and industrial development, professional skills, and trade knowledge to all employees of our CSI Solar business.

On-the-Job Training



Our employees received an average of 22.1 hours of training in 2021. A total of 22 courses were delivered, either online or in person, covering five categories: general courses, professional courses, special skill courses, compulsory courses, and leadership courses.

	Quantity	2020
General Course	10	Efficient office skills, project management skills
PV Industry Professional Course	30	Quality tools, new material knowledge, greenhouse gas emission standards
Special Skill Course and Projects	8	New Power Camp, school enrollment talent cultivating project, IEC 62941 photovoltaic module manufacturer quality system
Compulsory Course	6	Annual compliance training, EHS fire-fighting skills and fire evacuation drill, quality awareness, information security awareness
Leadership Course	10	Leadership of middle and senior managers, women's leadership

Freedom of Association and Collective Bargaining

Canadian Solar strictly abides by the employment laws and regulations in the jurisdictions where we operate. We respect employees' rights to form or join a labor union or equivalent organizations of their choice and respect our employees' rights to collective bargaining in support of their interests. Canadian Solar's **Labor and Human Rights Policy** (link) sets forth our employees' rights of freedom of association and collective bargaining.

Grievance Procedure and Zero Tolerance for Retaliation

As part of our commitment to providing our employees with a safe and inclusive environment, we have established internal procedures to protect our employees from acts of discrimination and other misconduct. We have a robust complaint and investigation process outlining how to file a complaint, the stages of the investigation process, and our zero-tolerance policy for retaliation. We regularly promote awareness of these support mechanisms to encourage our staff to confidentially submit grievances regarding policy breaches, bullying, discrimination, harassment, or any other sensitive issues that may arise. As such, we are confident in our ability to take immediate action to address grievances should they arise, thereby mitigating risk, limiting the impact of violations, and reinforcing a healthy and positive work environment.

Occupational Health and Safety

At Canadian Solar, employee safety is our top priority.

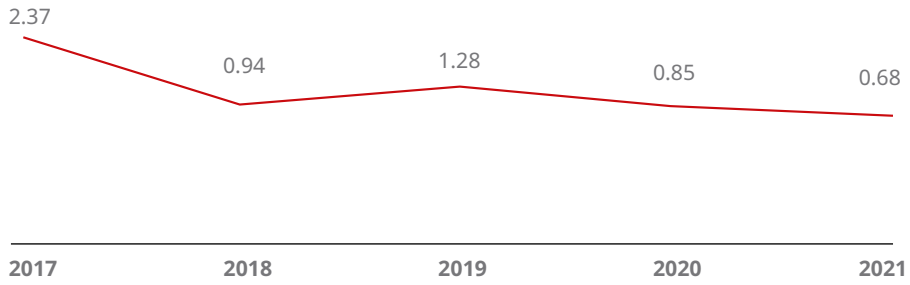
In 2008, we implemented the ISO45001 occupational health and safety management system (formerly OHS18001). Since 2011, our factories have been certified under ISO45001.

Our safety policies require that a Safety Committee and dedicated Safe Operation Management Team are in place before a factory starts operating. The Safety Committee meets regularly to review, discuss, and decide on safety-related measures. Employees receive regular trainings and are required to pass related tests prior to starting work. They are also equipped with appropriate personal protective equipment (PPE). Safety incidents, including "near misses," are reported and addressed in accordance with our strict safety protocols. Any lost time incidents must be reported within one hour of occurrence. We conduct internal investigations into all such incidents and enforce solid corrective and preventive measures to avoid future accidents.

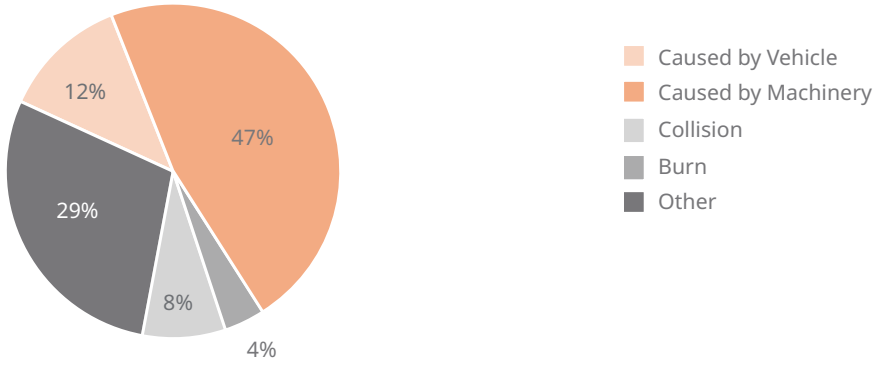
Our rigorous safety policies and procedures have helped us maintain a low rate of safety-related incidents. In 2021, our recordable injury (any injuries requiring medical treatment) rate was 0.68 cases per million working hours, our lowest rate in the past five years.

Recordable injury rate

(per million working hours)



Types of injuries



Hazardous Materials and Environmental Management

Canadian Solar Funing Cell Factory, China

Our environmental management system (ISO14001) and occupational health and safety management system (ISO45001) both cover chemical and operating equipment safety management to ensure that hazards in the workplace are systematically identified and evaluated and that relevant control measures are put in place.

Hazardous materials and dangerous chemicals are allowed within our facilities only after a formal review and approval process, which includes the Safety Data Sheet (SDS) review and a potential hazards and risks review. All relevant employees receive tailored training on the risks of handling hazardous chemicals and are required to strictly follow safety precautions while handling hazardous chemicals. We also provide general training programs to employees, including mandatory EHS training for all new employees and regular EHS refresh trainings. Warning signs are clearly posted, and relevant employees are required to have unimpeded access to information regarding hazardous materials. Medical checks are provided to employees working in relevant sites that may be exposed to occupational hazardous agents.

Our safety procedures in all factories include Hazard Identification and Assessment, Management of Changes, Contractor Safety, Emergency Response Management, Confined Space, etc. When building a new factory, we conduct Equipment Safety Reviews to ensure all equipment deployed are intrinsically safe.

We require our key suppliers and contractors to sign a Supplier's EHS Agreement before commencing deliveries and services.

Response to COVID-19

Canadian Solar developed a COVID-19 response plan in line with recommendations and policies issued by local health authorities and governments to provide guidance to all our global offices.

Emotional support: We organized various online activities to help ease the emotional stress of the pandemic. Events such as Online Coffees, the CSI Talent Show, and What's Cooking at CSI received positive feedback from employees.

Office safety: We prepared for office re-openings by rearranging office floorplans and setting up new office protocols and policies to ensure that employees could safely return to the office.

Volunteer service: Our employees in China participated in local volunteer activities, providing support and service to communities in need.

Work-life balance: We have continued our practice of providing a hybrid working model to relevant office-based employees, in which they can split their time between working onsite and at home. Based on employee feedback and our internal assessment, this hybrid model provides greater work flexibility, work-life balance, and employee satisfaction while also improving individual and collective productivity.

Connecting Employees with Company Mission

Sustainability is a core part of Canadian Solar's mission a mission in which we hope all our employees can share.

We have adopted the following approaches to engage our employees in the company's vision.

Advocacy

Our annual Earth Day celebration and Canadian Solar's founding anniversary remind all employees of the importance of sustainability and of fighting climate change. As part of these celebrations, we organize a variety of educational workshops and teambuilding events to promote sustainability and ways to live a greener life. We also hold brainstorming sessions in which hundreds of employee participants volunteer to work together and come up with a multitude of ideas on how we can help advocate for and participate in the changes necessary to protect our environment. In 2022, we are planning to further expand our advocacy activities to local communities, making these educational resources and events publicly accessible.

Volunteering

As part of Canadian Solar's coordinated effort to engage with and give back to local communities, employees around the globe have engaged in various sustainability-related volunteer activities, such as tree planting and river, beach, and street cleanups. Before the pandemic, we also partnered with GRID Alternatives to build solar roofs for local affordable housing. We not only donated panels to GRID, but our employee volunteers also received training on how to install solar on the roofs and worked to complete rooftop solar projects.

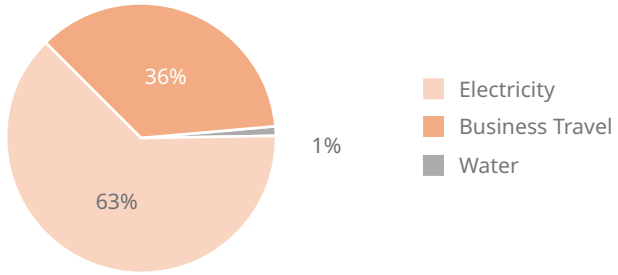
Zero Waste Office

In the first quarter of 2022, we launched our **Zero Waste Office Program** (link) in our offices around the world. Reducing electricity consumption and energy on transportation, purchasing eco-friendly and reusable supplies, and recycling as much as possible are some of the many ways we are systematically transitioning to a Zero Waste organization.

Sales offices GHG

In 2021, we initiated a global campaign to decarbonize all our global offices. We assessed the Categories 1 and 2 (Scope 1 and 2) carbon emissions of 10 global offices accommodating 364 employees and spanning sales, marketing, technical support, product management, order fulfilment, logistics, planning, HR, and administrative functions. We estimated that the total GHG emissions across these offices were 350 tons equivalent of CO_2, averaging 0.96 tons per employee per year, or approximately 20% of reported global CO_2 emissions per capita (4.79 tons per capita per year)[15]. Most of these emissions came from office electricity consumption and business travel. Accordingly, we are working with our local sales teams to implement carbon emission reduction or compensation measures. Examples of such changes include reducing business travel by holding video conferences instead, utilizing natural light instead of electric light, and encouraging use of public transportation as much as possible.

Sales offices carbon emission composition



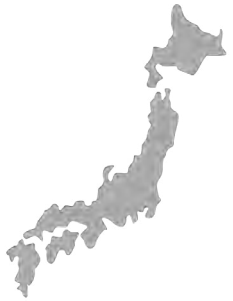
[15] As reported by https://www.worldometers.info/co2-emissions/co2-emissions-per-capita/

Making the Difference through Community Commitment

Our goal is to cultivate long-term relationships that enable us to work together in the communities where we operate, making a difference through a positive contribution to society and the environment.

We recognize that when communities thrive, everyone benefits, which is why we are committed to working closely with all stakeholders in the communities where we develop projects. From local grid experts to first responders, we strive to partner with local organizations to ensure we are able to fully integrate solar and battery storage projects into existing energy infrastructure and surrounding communities.

Below are examples of how we work to mitigate risks when integrating solar and battery technology into existing infrastructure, as well as our community engagement, ecological focus, and energy policy efforts.



North America

We actively engage with local, state, and federal agencies early in the development cycle to assess and mitigate any risks. Significant resources are invested early in the development process to thoroughly vet projects for potential fatal flaws. Further, our business has a true commitment to community values and local ecological concerns. We actively engage with communities to seek development opportunities where environmental and permitting obstacles are minimized or avoided.

United Kingdom

We are committed to helping the UK achieve its target of carbon neutrality by 2050 through our deployment of solar and storage solutions that follow the highest engineering standards. We identify any impacts our projects may have on both stakeholders and the environment to inform the design, construction, and operation of our projects. Community engagement, careful design, and thorough planning drive our work towards our end goals of minimizing negative impacts and optimizing benefits over each project's life.

Upgrades to the national energy transmission system and its operating procedures are a key part of the energy transition in the UK, and while complex, they have made viable grid connections available for our projects. While the contractual arrangements and technical solutions for these connections are continuously evolving in design, the integration of co-located solar and storage projects are becoming increasingly common, which lowers the risk and maximizes benefits to the grid system and the energy market, as both the renewable energy industry and grid operators prefer the pairing of the two technologies. We will continue to work closely with technical and grid experts to ensure that our grid connections are fit for their purpose and are delivered on time and at an appropriate cost.

Japan

The Japanese government announced a target goal of carbon neutrality by 2050, a goal that requires more sustainable solutions for Japan's grid. We expect that deregulations will be announced to boost the installation of renewable energy to meet this goal. Wind and solar are variable resources whose power output cannot be controlled; therefore, transmission system operators must expertly navigate the demand and supply of power within their grid system to ensure resilience. Our solar solutions, combined with battery storage, are thus ideal for this market.

At the project level, ongoing consultation with local communities and government officials is crucial throughout the development, construction, and operation phases of our projects. Project development adheres to rigorous design protocols, including the implementation of extensive drainage and storm water prevention measures to ensure water in and near the project site avoids contamination. The mountainous terrain of Japan adds another level of complexity, a contingency we have developed expertise successfully navigating over the past 10 years.

Australia

As a result of Australia's Net Zero by 2050 objectives and large pipeline of renewable energy projects, the energy network in Australia is undergoing rapid change and investment. The grid was built to service large loads from large generation centers in each state, creating a grid connection problem for renewable projects, which are sited in remote areas with weak grid infrastructure. To address this issue, we complete multiple studies for each project with the network service provider, as well as ensuring that our equipment will integrate with the system and that commissioning and construction activities are detailed in our contracts. Further, marginal loss factor and curtailment during project operation can impact the asset's lifetime generation. As a prerequisite to any investment, and as requested

during our financing process, we thus commission reputable firms to produce long-term forecasts, which are vetted by technical advisors and financiers.

In the development process, we actively engage rule-making bodies, such as the Australian Energy Market Commission, as well as monitoring any energy policy changes that are proposed by the State and Federal Government. Our goal is to advocate for the most cost-effective energy transition to a lower emissions electricity network that will increasingly focus on solar and hybrid projects that incorporate energy storage and technical innovations not previously featured in the Australian network.

Given the rapid renewable energy and electrification targets in Australia, it is increasingly important for communities and stakeholders to be a primary focus of our development. Constant engagement with these stakeholders allows us to comprehensively address local concerns during the project development process. Project sites are chosen to minimize potential impact to native flora and fauna, farmland, tree removal, and local wildlife. If complete avoidance is not possible, biodiversity offsets are created or purchased to ensure no net loss to the environment.

Brazil

Social work and hiring in local communities are always performed whenever possible. For example, our Salgueiro project is located in a local community where quilombola (descendants of former enslaved Africans) reside. We built a community center with computers and printers and soccer fields, and organized social activities, such as dance classes and gardening.

47 MW Marville Utility Solar Plant, France

Non-Governmental Organizations and Memberships

Country	Organization
Australia	Australian Institute of Energy
	Business Renewables Centre
	Clean Energy Council
	Clean Energy Investor Group
	Smart Energy Council
	The Australian Industry Group
Brazil	Brazilian Solar Photovoltaic Energy Association (ABSOLAR)
	Brazilian Association of Distributed Generation
Chile	The Canadian Chamber of Commerce in Chile
	The Chilean Association of Renewable Energies and Storage
China	China Chamber of Commerce for Import and Export of Machinery and Electronic Products (CCCME)
	China Photovoltaic Industry Association (CPIA)
	SEMI Standards
	Society of Entrepreneurs & Ecology (SEE)
	Women in Solar Energy (WISE)
Columbia	The Association of Renewable Energies Colombia
Costa Rica	The Costa Rican Solar Energy Association
France	CEMATER
	ENERPLAN
	The Renewable Energies Syndicate
Italy	Alliance for Photovoltaics[1]
	Future Electricity
	The Association of the Italian Solar PV Community

(1) Membership only valid for 2021

Country	Organization
Japan	Asia Pacific Real Assets Association Limited (APREA)
	Japan Association of Asset Management (JAAM)
	Japan Builders Network (JBN)
	Japan Climate Initiative (JCI)
	Japan Climate Leaders' Partnership (JCLP)
	Japan Electrical Manufacturers' Association (JEMA)
	Japan Photovoltaic Energy Association (JPEA)
	Principles for Responsible Investment (PRI) Signatory
	Renewable Energy Association for Sustainable Power Supply (REASP)
	Investment Trusts Association, Japan (JITA)
Mexico	The Mexican Solar Energy Association
	The Canadian Chamber of Commerce in Mexico
Middle East and Northern Africa	Middle East Solar Industry Association (MESIA)
Netherlands	Holland Solar
Portugal	The Portuguese Renewable Energy Association
Puerto Rico	Solar and Energy Storage Association (SESA)
South Africa	South African Photovoltaic Industry Association (SAPVIA)
Spain	Spanish Photovoltaic Union
USA	American Clean Power
	Kentucky Solar Industries Association (KYSEIA)
	Mid-Atlantic Renewable Energy Coalition (MAREC)
	Solar Energy Industries Association (SEIA)[2]
	Southern Renewable Energy Association (SREA)
	Tennessee Solar Energy Industries Association (TenneSEIA)
	Texas Solar Power Association

(2) Membership renewed in 2022 after suspension in 2021

Canadian Solar Suzhou Module Factory, China

Spotlight on Memberships

Smart Energy Council is an independent organization committed to building connections within the Australian smart energy industry, building momentum, and unlocking the barriers that hold people back from embracing a smart energy future. It delivers tailored solutions for the members, delivering practical help to meet all members' individual needs to grow Australia's renewable and smart energy industries. As a member of the council, Canadian Solar joined its 2021 Solar PV Market Update webinar to present on solar's large-scale global outlook and trends.

Society of Entrepreneurs & Ecology (SEE) is an environmental conservation NGO in China with corporate executives and entrepreneurs as members. SEE is dedicated to restoring the ecologies of deserts and major water bodies. Canadian Solar is strongly committed to environmental protection and conservation, and actively supports SEE.

In November 2021, SEE Tai Lake Center organized a meeting for the Green Supply Chain Program in Tai Lake Basin, hosted by Dr. Shawn Qu, CEO of Canadian Solar, and Vice Chairman of the Center.

4 Responsible Supply Chain

Canadian Solar prioritizes responsible procurement of materials in all parts of our business, from module manufacturing to project development.

Over the years, CSI Solar, Canadian Solar's majority-owned manufacturing subsidiary, which works with various third-party suppliers of raw materials and components, has entered into a range of supply agreements with suppliers of solar silicon, ingot, wafer, cell, PV glass, aluminum, silver metallization paste, back sheet, ethylene vinyl acetate encapsulant (EVA), and lithium iron phosphate battery cells in its manufacturing process for crystalline silicon solar modules and supply of battery storage solutions. To better control our supply chain, we are now significantly increasing our in-house ingot, wafer, cell, and module manufacturing capacities, which will allow us to better control our costs and product quality.

Our Global Energy business uses centralized procurement strategies to ensure adequate supply, quality, consistency, and cost-effectiveness of components for solar and battery storage projects we develop across the world. We have developed strong management systems for global procurement of solar modules, inverters, trackers, mounting hardware, grid interconnection and power stability equipment, and other key equipment. Our scale of operations and centralized procurement help us maintain the stability of supply, innovation, quality control, and economies of scale we need to maximize the performance and competitiveness of our projects.

1.2MW Huaxia Commercial Solar Rooftop System, China

Canadian Solar Funing Cell Factory, China

ESG Integration in Supply Chain Management Strategy

Our Procurement Management Strategy follows a centralized procurement approach, controlled at group level, and supported by each division.

We implement Canadian Solar's supply chain related policies, screening our supplier base and conducting a supplier auditing program, aiming to establish a sustainable, efficient, and healthy supply chain that meets the development needs of the Company and the interests of our stakeholders.

Anti-Modern Slavery Initiatives

Canadian Solar does not tolerate forced labor or any form of modern slavery and is committed to ensuring that modern slavery does not take place anywhere in our business, including our supply chain.

To achieve this goal, we have established anti-forced labor measures, including policy development, trainings, execution, and compliance, to prevent modern slavery in our operations and supply chain.

Policy Development, Communication, Training, and Compliance

Canadian Solar has formed teams dedicated to developing anti-modern slavery policies and enforcing these policies and processes.

At the Company level:

- Legal Department, led by the Group General Counsel and Legal Senior Directors
- Human Resources, led by the Group Head of HR
- Internal Audit, led by the Global Director of Internal Audit
- Global Compliance, led by the Chief Compliance Officer

- Anti-Modern Slavery Policy (link)
- Labor and Human Rights Policy (link)
- Supplier Code of Conduct (link)
- Code of Business Conduct and Ethics (link)
- Environmental, Health and Safety Policy (link)
- Conflict Minerals Policy (link)
- Whistleblower Policy (link)

In October 2021, for example, Canadian Solar established a dedicated Anti-Modern Slavery Task Force to bolster group-wide efforts to prevent modern slavery, such as forced labor. The task force is responsible for developing and communicating anti-modern slavery policies and procedures and implementing trainings and conducting due diligence to ensure the effectiveness of our anti-modern slavery efforts.

Members of this Task Force include management employees from HR, Legal, Compliance, Procurement, Customer Services/Tech, and Safety, Quality, and Environment.

Supplier Code of Conduct

To maintain a responsible supply chain, Canadian Solar require our suppliers to adhere to Canadian Solar's **Supplier Code of Conduct** (link), which establishes our standards on human rights, environmental protection, health, safety, and business ethics.

We use the Code as part of our due diligence to assess new suppliers, who are required to sign this Code. We also require our suppliers to require their own suppliers to act in adherence to the standards and requirements set forth in the Code.

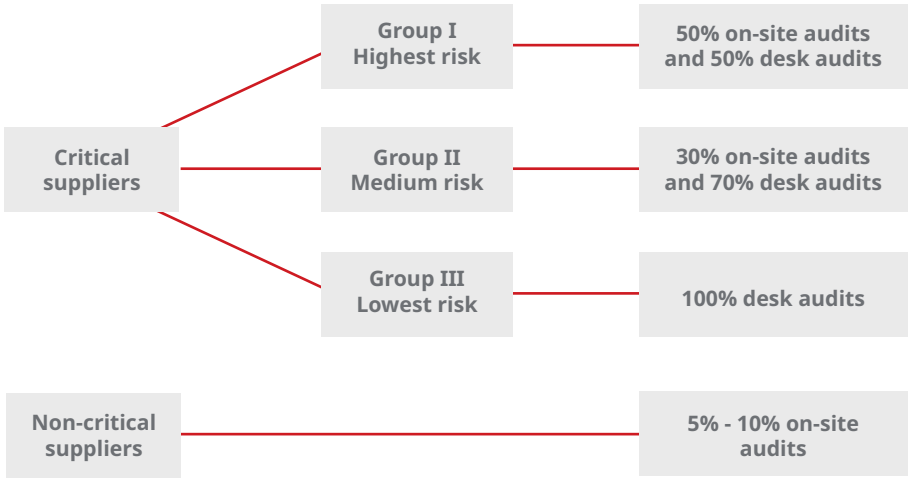
In addition, we also include clauses related to anti-modern slavery, including no forced labor, in the purchase agreement with which our supplier must comply, such that any deviance from our established labor standards may be met with legal consequences.

Supplier ESG Audits

We actively monitor our suppliers through an ESG auditing program, including onsite and desk audits.

Our supplier audits cover quality control, environment, health, safety, human rights, business ethics, and other sustainability aspects based on our Supplier Code of Conduct. Failure to meet Canadian Solar's standards or Code may result in termination of the business relationship, especially if warnings are not properly addressed. Canadian Solar provides suppliers with trainings on compliance with the Code and consultations on how to improve in line with ESG priorities.

We map our supplier base on an annual basis to identify critical suppliers based on purchase volumes and potential ESG risks associated with suppliers' industry sector, size, and type of work performed. We also split critical suppliers into three groups based on their ESG risks, as shown in the following table.



We conduct onsite or desk audits to all our critical suppliers and 5-10% of our non-critical suppliers on an annual basis.

On-site and desktop ESG audits are conducted in the form of supplier questionnaires supported by evidentiary documentation. Canadian Solar reviews the answers and supporting documents either on-site or remotely.

The audits evaluate suppliers on a range of criteria divided between *veto* and *scored* criteria. *Veto* criteria are evaluated on a *yes or no* basis (i.e., the supplier is either qualified or not). Any negative answers automatically disqualify suppliers from conducting business with us. For example, the potential presence of forced or child labor based on our audit would automatically render the supplier ineligible to work with Canadian Solar.

Scored factors require suppliers to achieve a minimum total score of 60 to qualify to work with us. We issue warnings to suppliers that fall below minimum scoring requirements and provide them with consultations to address the identified issues. We will terminate the business relationship with any suppliers who fail to meet our standards within a certain period varying from 1 month to 6 months after consultation has been provided.

Conflict Minerals

Conflict minerals refer to certain mineral resources that are produced in the Democratic Republic of the Congo and its neighboring countries.

According to the U.S. Department of State, serious human rights abuses have been inflicted by local armed forces that mine and trade those minerals to finance their armed conflicts. To address this problem, the U.S. Securities and Exchange Commission adopted a mandate by the Dodd-Frank Wall Street Reform and Consumer Protection Act (Section 1502), requiring companies listed on U.S. stock markets to disclose information about the usage of columbite-tantalite (coltan), cassiterite, gold, wolframite, and their derivatives, which are limited to tantalum, tin, and tungsten.

We are committed to keeping our supply chain free of these conflict minerals, as explained in our **Conflict Minerals Policy** (link). This is one of the key criteria for selecting new suppliers that we screen in supplier audits. All of our suppliers are required to sign the Declaration of Conflict-Free Minerals before contracting with us, especially suppliers of tin-containing products, as after reviewing all the materials used during the production of our products, we determined that tin was the only conflict mineral necessary to the functionality or production of products that we manufacture or contract to be manufactured from January 1, 2021 to December 31, 2021. We require our suppliers to describe the source of the tin used in their products and provide confirmation statement to ensure the tin used is not sourced from the Democratic Republic of the Congo or an adjoining country. We do not make purchases of raw ore or unrefined conflict minerals and makes no purchases in the Democratic Republic of the Congo or adjoining countries.

After taking the aforementioned measures, we have no reason to believe that the tin we use may have originated in the Democratic Republic of the Congo or an adjoining country. As such, and as we procure the tin that we use directly from suppliers in China, we are confident that our production is free of conflict minerals. We file a Specialized Disclosure Report, or Form SD, with the U.S. SEC annually regarding conflict minerals. A copy of our filed Form SD can be found on SEC or our website (link).

5 Governance

Canadian Solar's Board of Directors ("the Board") is responsible for managing and supervising the business and affairs of the Company.

Our Board is composed of 9 directors, including 6 independent non-executive directors. Together, our Board brings a broad range of skills and industry knowledge to overseeing management performance, doing critical work to ensure the success of our business and create long-term value for stakeholders.

Each director is required to stand for election at every annual general meeting (AGM). Our **Corporate Governance Guidelines** (link) are intended to serve as a framework within which the Board may conduct its business.

Board Committees

Our Board has established five committees to discharge its duties. **The chairs and members of the Audit Committee, Compensation Committee and Nominating and Corporate Governance Committee are all independent board members.** Board committees meet periodically with the Company's senior management team and external auditor to review business performance and risk management practices.

Below is a summary of all the Board committees:

- **Sustainability Committee**: Reviews sustainability (including climate)-related risks and opportunities associated with our strategy and business development; monitors progress, advises, and assists the Board on strategic measures related to the Company's long-term sustainability; and oversees the progress and execution of ESG plans. The Sustainability Committee meets at least twice a year to review ESG matters. In addition to Sustainability Committee members, all other Board members join Sustainability Committee meetings to ensure that the full board remains aware of the latest ESG-related issues.
- **Audit Committee:** Oversees the Company's accounting and financial reporting processes and the audit of the financial statements of the Company.
- **Compensation Committee:** Reviews, evaluates, and if necessary, revises compensation plans, policies, and programs of the Company.
- **Nominating and Corporate Governance Committee**: Identifies qualified candidates to become Board members; selects nominees for election as directors at the next annual meeting of shareholders; selects candidates to fill any vacancies of the Board; develops and recommends to the Board of a set of corporate governance guidelines and principles applicable to the Company; oversees the evaluation of the Board and Company management and monitors compliance with the Company's Code of Business Conduct and Ethics.
- **Technology Committee**: Reviews, gives guidance, and makes recommendations to management of the Company and the Board relating to the Company's technology strategy, initiatives, and investments in support of the Company's overall strategy and performance.

13.6 MW Ibaraki Kasama Utility Solar Plant, Japan

Summary of Board Members and Duties

		Age	Board Tenure	Audit Committee*	Compensation Committee	Nominating & Governance Committee	Technology Committee	Sustainability Committee	Independent / Non-Independent
	**Dr. Shawn (Xiaohua) Qu**	58	16				Member		Non-Independent
	**Dr. Harry E. Ruda**	63	11	Member	Member		Chair		Independent
	**Andrew (Luen Cheung) Wong**	64	8		Chair	Member			Independent
	**Lap Tat Arthur Wong**	62	3	Chair		Member			Independent
	**Lauren C. Templeton**	46	2		Member	Chair			Independent
	**Karl E. Olsoni**	64	2	Member				Chair	Independent
	**Leslie Li Hsien Chang**	67	2			Member		Member	Independent
	**Yan Zhuang**	58	2						Non-Independent
	**Dr. Huifeng Chang**	56	2					Member	Non-Independent
	Average	60	5						

*Mr. Arthur Lap Tat Wong qualifies as an “audit committee financial expert” as required by the SEC. Each of Messrs. Olsoni and Dr. Ruda is “financially literate” as required by the NASDAQ rules.

Board Diversity

Canadian Solar believes having diversity on the Board, including in terms of gender, race, ethnicity, religion, cultural and social background, age, language, nationality, and sexual orientation, brings diverse viewpoints that can enhance the Board's effectiveness in overseeing the Company.

As such, we continuously make efforts to improve the diversity of our board of directors and strive to further improve diversity at the board level and meet the NASDAQ New Rule 5605(f) for Diverse Board Representation in the specified time frame, including based on gender, nationality, ethnicity, age, and expertise. The Board considers diversity in the nominating process and evaluates each candidate in the context of the whole Board's composition.

The Company's **Corporate Governance Guidelines** (link) and **Nominating and Corporate Governance Committee Charter** (link) were modified in December 2021 to incorporate these commitments to diversity.

Below is our Board Diversity Matrix based on self-determined identity:

Board Diversity Matrix (As of April 15, 2022)

Country of Principal Executive Offices	Canada			
Foreign Private Issuer	Yes			
Disclosure Prohibited Under Home Country Law	No			
Total Number of Directors	9			
	Female	**Male**	**Non-Binary**	**Did Not Disclose Gender**
Part I: Gender Identity				
Directors	1	7	0	1
Part II: Demographic Background				
Underrepresented Individual in Home Country Jurisdiction	7			
LGBTQ+	0			
Did Not Disclose Demographic Background	2			

Board Expertise and Training

Our Board has a broad range of skillsets and industry knowledge, with experts in solar technology, strategy, global operations, corporate finance, auditing, accounting, corporate reporting, capital markets, investing, mergers and acquisitions, risk management, marketing management, and corporate branding.

See our annual report on **Form 20-F** (link) for more details.

We also provide directors with training in various areas, including training on securities laws in both the U.S., where the Company is listed, and Canada, where the Company is legally domiciled; training on directors' duties; training on different aspects of the solar industry, such as high-efficiency cell and storage technologies; and training on piercing the corporate veil. Those trainings are designed to ensure our board has the right skillset and knowledge to act in our stakeholders' best interests.

Board Meeting Attendance

In 2021, our board of directors held 12 meetings and passed 51 resolutions by unanimous written consent. Board meeting attendance rate was 99%.

Third-Party Audit of the Corporation's Operation and Supply Chain

In May 2022, our Board passed a resolution mandating a third-party assessment, at reasonable cost, on the extent to which Canadian Solar's policies and procedures effectively protect against forced labor in its operations, supply chains, and business relationships.

The assessment will draw upon international standards such as the UN Guiding Principles on Business and Human Rights, ILO Declaration on Fundamental Principles and Rights at Work, and ILO Forced Labor Convention, 1930 (No. 29).
We have initiated our efforts to search for a reputable, international auditing firm to conduct this assessment at reasonable cost and expect to report back to the Board on the results of the audit in due course.

Executive Management

Our Chief Sustainability Officer (CSO), Ms. Hanbing Zhang, is responsible for our sustainability strategy and implementation. She leads an ESG working group with members from the Company's Strategy, R&D, Product Reliability, EHS, Human Resources, Global Energy, Investor Relations, and Global Marketing teams. The ESG working group receives guidance from external advisors on ESG strategies and implementation, and on the latest standards on disclosures and reporting GHG emissions. The ESG team works closely with the Company's management teams to integrate ESG strategy into the Company's strategic decision-making process, including by incorporating sustainability targets, such as targets on environmental metrics, into operation teams' KPIs.

Our CSO reports to the Board Sustainability Committee at least twice a year.

Executive Management Team

		Work Experience
	**Dr. Shawn (Xiaohua) Qu** Chairman and CEO	• Founded Canadian Solar in 2001 with NASDAQ IPO in 2006 • Director and VP at Photowatt International S.A. • Research scientist at Ontario Hydro (Ontario Power Generation)
	**Yan Zhuang** President, CSI Solar Co., Ltd.	• Head of Asia of Hands-on Mobile, Inc. • Asia Pacific regional director of marketing planning and consumer insight at Motorola Inc.
	**Dr. Huifeng Chang** Senior VP and Chief Financial Officer	• Co-Head of Sales & Trading at CICC US in New York • CEO of CSOP Asset Management in Hong Kong • Vice President of Citigroup Equity Proprietary Investment in New York
	**Ismael Guerrero Arias** Corporate VP and President of Global Energy	• President, Head of Origination and COO at TerraForm Global • Vice President of Global Projects at Canadian Solar • Director of Operations for Asia at the Global Sustainable Fund
	**Jianyi Zhang** Senior VP, General Counsel and Chief Compliance Officer	• Senior advisor to several Chinese law firms • Senior assistant general counsel at Walmart Stores, Inc. • Managing Partner, Hong Kong office, Troutman Sanders LLP
	**Guangchun Zhang** Senior VP, CSI Solar Co., Ltd.	• Vice President for R&D and Industrialization of Manufacturing Technology at Suntech Power Holdings • Centre for Photovoltaic Engineering at the University of New South Wales and Pacific Solar Pty. Limited
	**Hanbing Zhang** Corporate VP and Chief Sustainability Officer, CSI Solar Co., Ltd.	• Global Head of Marketing at Canadian Solar • Founder and President of Women in Solar Energy (WISE)

Ethical Business Conduct

Canadian Solar is committed to upholding the highest standards of business ethics. Our Code of Business Conduct and Ethics applies to all directors, officers and employees of Canadian Solar and its subsidiary entities.

Below is a summary of our key governance documents and guidelines:

Policy	Description
Code of Business Conduct and Ethics (link)	• Environment, health, and safety • Harassment and discrimination • Employment practices, including anti-discrimination, freedom of association, privacy, and collective bargaining • Conflict of interests • Confidential information • Competition and fair trading • Gifts and entertainment expenses
Whistleblower Policy (link)	• Provides a 24/7 reporting channel where internal and external stakeholders can report their concerns on financial reporting and disclosure, fraudulent activity, breaches of compliance policies, etc. to the Board • Protection from retaliation for whistleblowers • Anonymous reporting and confidentiality
Insider Trading Policy (link)	• Procedure for preventing insider trading
Related-Party Transactions (link)	• Policy and procedures on reporting, approval and disclosure of related-party transactions
Anti-Corruption Policies	• Prohibition against giving bribes (link) • Prohibition against accepting bribes (link)


5.5 MW Muda Commercial Solar Rooftop System, Malaysia

Policy	Description
Anti-Modern Slavery Policy (link)	• Measures taken to ensure modern slavery does not occur anywhere in Canadian Solar's business, including through its supply chain
Labor and Human Rights Policy (link)	• Labor and human rights standards to which Canadian Solar's employees are entitled
Equal Employment Opportunity Form (link)	• Canadian Solar's commitment to providing an equal opportunity and discrimination-free workplace
Global Diversity Policy (link)	• Emphasizes our commitment to diversity at all levels, including its senior management and board of directors
EHS Policy (link)	• Canadian Solar's guiding principles and objectives for environmental preservation and providing a healthy and safe workplace for employees
Supplier Code of Conduct (link)	• Canadian Solar's standards on human rights, environmental protection, health, safety, and business ethics for our suppliers and their suppliers
Conflict Minerals Policy (link)	• Measures taken to ensure Canadian Solar's supply chain remains free of conflict minerals illegally produced in the Democratic Republic of the Congo and its neighbors

Business Ethics Awareness and Compliance Trainings

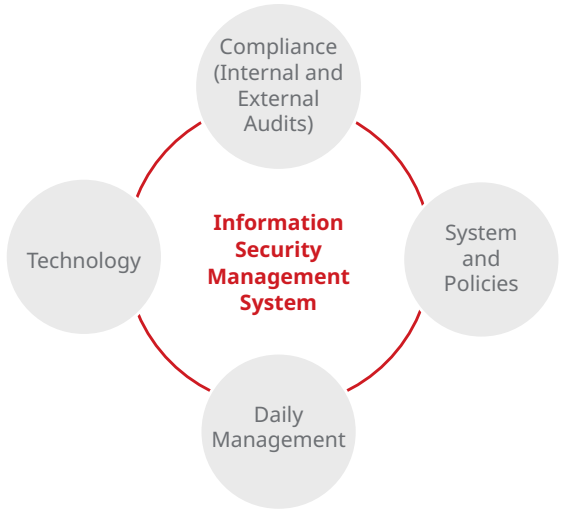
All Canadian Solar employees are informed and trained on our compliance policies, which are publicly accessible on our website (link).

We conduct trainings on policies to our employees on an annual basis and to new employees on a quarterly basis. Trainings may cover major definitions, Canadian Solar employees' responsibilities, supplier expectations, etc., and may include tests to ensure employees' successful completion of each training.

Below are examples of business ethics awareness and compliance trainings we provide to our employees:

Training/ Result Review	Scope	Frequency
Business ethics training, including Foreign Corrupt Practices Act (FCPA)	All employees	Annual or quarterly for new employees
Anti-modern slavery training	All employees	Annual or quarterly for new employees
Compliance declaration and questionnaire, declaring conflict of interest, if any, and the acknowledgement and adherence to Canadian Solar's policies and procedures	All employees from Sales, Business Development and Procurement departments, and employees of manager or above levels from other departments	Annual
Compliance test of compliance awareness and Canadian Solar's policies and procedures	All employees	Annual

Information Security and Privacy Protection



Canadian Solar highly values privacy protection and information security.

We have established an Information Security Committee responsible for information security management of the Company, including the development and implementation of information security strategy and policies and the provision of information security measures training to employees. The Information Security Committee is led by the heads of Information Technology (IT) Departments of both CSI Solar and Global Energy.

In addition to complying with laws and regulations that are applicable to our businesses, this committee has helped establish a sound information security management system covering all our subsidiaries. Our information security system has passed annual third-party audits and verifications.

Policies: Information Technology Security Strategy Policy, Information Technology Security Management Procedure, Information Technology Security Incidents Management Policy, Employee Handbook.

Information Security Technology: Multi-dimensional technology from workstations, servers, networks, and physical applications to ensure information security, completeness, and usability.

Failure to comply with Canadian Solar's information security policies will lead to disciplinary and legal actions, including termination of employment. Canadian Solar has had no breach of information security incidents in the past three years.

6 About this Report

Canadian Solar's Sustainability Report was developed in accordance with the Task Force on Climate-Related Disclosures (TCFD), the Sustainability Accounting Standards Board (SASB) framework under Solar Technology & Project Developers standards, and the Global Reporting Initiative's (GRI) Core Sustainability Reporting Standard.

This report was designed to highlight our ESG strategy and disclosures based on feedback from the investment community and other stakeholders. The reporting period of this report is from January 1, 2021 to December 31, 2021, unless otherwise specified.

We did not seek third-party verification for this report. However, the data collection and calculation of our greenhouse gas emissions inventories of scope 1 and scope 2 sources were based on the methodology advised by SGS, a qualified, well-known, and international inspection, verification, testing and certification organization.

To provide feedback on our sustainability report, please contact:

support@canadiansolar.com

Acknowledgements: This report was produced as a collective effort across various departments in Canadian Solar. I would like to express gratitude to every individual who contributed to the production of this report, namely Jean-Nicholas Jaubert, Isabel Zhang, Mary Ma, Emily Du, Natasha Tang, Raffaella Balzaretti, Holly Zhang, Heidi Peng, Shaoting Wan, Katherine Xiong, Xiaobin Zhang, Angela Zhang, Jianyi Zhang, Antonio Adami, Pauline Wong, Annie Sun, Stella Su, Xianglun Wang, Rain Yao, and Bernie Jungreithmayr. I would also like to thank the members of the Board including Sustainability Committee members for their constructive guidance.

Hanbing Zhang

Chief Sustainability Officer

13.6 MW Ibaraki Kasama Utility Solar Plant, Japan

Materiality Assessment and Stakeholder Engagement

Both internal and external stakeholders were involved in our materiality assessment. Internal stakeholders included our board of directors, executive management, and employees across our global operations. External stakeholders included our customers, suppliers, investors, and creditors, with insights drawn from local communities, industry associations, NGOs, media reporting, and the scientific community as well.

This sustainability report presents the key ESG topics, our strategies and actions based on our materiality analysis, and has been reviewed by our CSO and the Sustainability Committee. The results of the assessment helped us define opportunities, mitigate risks, and better integrate ESG into our business.

The chart on the right describes Canadian Solar's approach to stakeholder engagement.

Stakeholders	Engagement Methods	Engagement Frequency	Focus Areas
Employees	Training, meetings, emails, surveys, townhalls	Ongoing	Company performance, environmental impact and social responsibility
Customers	Meetings, emails, conferences, trade shows, technical workshops	Ongoing	Company performance, product quality, social responsibility, supplier assessments
Suppliers	Meetings, emails, conferences, trade shows, technical workshops, surveys, audits	Ongoing	Company performance, product quality, procurement practices
Investors / Shareholders	Meetings, earnings calls, emails, conferences, roadshows	Ongoing	Company performance, ESG performance
Creditors	Meetings, emails, conferences, trade shows	Ongoing	Company performance, credit quality, key risks, ESG performance
Rating agencies	Meetings, emails, conferences	Ongoing	Company performance, credit quality, key risks, ESG performance
Media	Interviews, emails, meetings, trade shows	Ongoing	Company performance, ESG performance
Local communities	Community presentations and meetings, local tours, training programs	Ongoing	Environmental and ecological impacts, job creation, occupational health & safety
NGOs	External surveys, emails, partnerships, meetings, workshops	Ongoing	Environmental, ecological, and social impacts
Scientific community	Conferences, emails, standards development meetings, technical workshops	Ongoing	Product quality, environmental impacts, social responsibility, job creation, supplier assessment

APPENDIX: Alignment with Standardized Reporting Frameworks

Task Force on Climate-Related Financial Disclosures (TCFD)

Canadian Solar follows TCFD recommendations and provides disclosures on its climate-related financial risks and opportunities, aiming to contribute to the global transition to a more stable and sustainable economy.

TCFD Recommended Disclosures	Response
Governance	
A) Describe the board's oversight of climate-related risks and opportunities	2021 Sustainability Report 1) Environmental Metrics and Targets, Climate-Related Risks and Opportunities, p. 28-29 2) Governance, Sustainability Committee, p.49
B) Describe management's role in assessing and managing risks and opportunities.	2021 Sustainability Report, Governance, Executive Management, p.52
Strategy	
A) Describe the climate-related risks and opportunities the organization has identified over the short, medium, and long term.	2021 Sustainability Report Environmental Metrics and Targets, Climate-Related Risks and Opportunities, p. 28-29
B) Describe the impact of climate-related risks and opportunities on the organization's businesses, strategy, and financial planning.	2021 Sustainability Report Environmental Metrics and Targets, Climate-Related Risks and Opportunities, p. 28-29
C) Describe the resilience of the organization's strategy, taking into consideration different climate-related scenarios, including a 2°C or lower scenario.	2021 Sustainability Report Environmental Metrics and Targets, Climate-Related Risks and Opportunities, p. 28-29

TCFD Recommended Disclosures	Response
Risk Management	
A) Describe the organization's processes for identifying and assessing climate-related risks.	2021 Sustainability Report 1) Environmental Metrics and Targets, Climate-Related Risks and Opportunities, p. 28-29 2) Governance, Executive Management, p.52
B) Describe the organization's processes for managing climate-related risks.	2021 Sustainability Report 1) Environmental Metrics and Targets, Climate-Related Risks and Opportunities, p. 28-29 2) Governance, Executive Management, p.52
C) Describe how processes for identifying, assessing, and managing climate-related risks are integrated into the organization's overall risk management.	2021 Sustainability Report, Governance 1) Sustainability Committee, p. 49 2) Executive Management, p.52
Metrics and Targets	
A) Disclose the metrics used by the organization to assess climate-related risks and opportunities in line with its strategy and risk management process.	2021 Sustainability Report, Environmental Metrics and Targets, p.9-27
B) Disclose Scope 1, Scope 2, and, if appropriate, Scope 3 greenhouse gas (GHG) emissions, and the related risks.	2021 Sustainability Report, Environmental Metrics and Targets, Greenhouse Gas Emissions, p.12-14
C) Describe the targets used by the organization to manage climate-related risks and opportunities and performance against targets.	1) 2021 Sustainability Report, Environmental Metrics and Targets, p.9-24 2) Target to achieve powering our global operations with 100% renewable energy before 2030

Sustainability Accounting Standards Board (SASB) Content Index

Topic	Accounting Metric	Category	Unit of Measure	Code	Response
Energy Management in Manufacturing	(1) Total energy consumed	Quantitative	Gigajoules (GJ)	RR-ST-130a.1	5,473,504
	(2) percentage grid electricity		Percentage (%)		92.8
	(3) percentage renewable		Percentage (%)		1.5 (only including solar energy generation on site for self-consumption. The percentage would be 23% if including renewable electricity from the grid)
Water Management in Manufacturing	(1) Total water withdrawn	Quantitative	Thousand cubic meters (m^3)	RR-ST-140a.1	9,027
	(1) Total water consumed		Thousand cubic meters (m^3)		2,653
	(2) Total water withdrawn, percentage of each in regions with High or Extremely High Baseline Water Stress		Percentage (%)		34.3%
	(2) Total water consumed, percentage of each in regions with High or Extremely High Baseline Water Stress		Percentage (%)		30.3%
	Description of water risks management and discussion of strategies and practices to mitigate those risks	Discussion and Analysis	n/a	RR-ST-140a.2	2021 Sustainability Report, Environmental Metrics and Targets, Water Risk Management Strategy, p. 21-22
Hazardous Waste Management	Amount of hazardous waste generated	Quantitative	Metric tons (t)	RR-ST-150a.1	3,826
	Hazardous waste percentage recycled	Quantitative	Percentage (%)	RR-ST-150a.1	80.7
	Number and the aggregate quantity of reportable spills		Number		0
	Spills quantity recovered		Kilograms (kg)		0
Ecological Impacts of Project Development	Number and duration of project delays related to ecological impacts	Quantitative	Number, Days	RR-ST-160a.1	None
	Description of efforts in solar energy system project development to address community and ecological impacts	Discussion and Analysis	n/a	RR-ST-160a.2	2021 Sustainability Report, Environmental Metrics and Targets, Environmental Stewardship in Project Development, p.27

Topic	Accounting Metric	Category	Unit of Measure	Code	Response
Management of Energy Infrastructure Integration & Related Regulations	Description of risks associated with integration of solar energy into existing energy infrastructure and discussion of efforts to manage those risks	Discussion and Analysis	n/a	RR-ST-410a.1	2021 Sustainability Report, Social Responsibility, Making the Difference through Community Commitment, p. 40-42
	Description of risks and opportunities associated with energy policy and its impact on the integration of solar energy into existing energy infrastructure	Discussion and Analysis	n/a	RR-ST-410a.2	2021 Sustainability Report, Social Responsibility, Making the Difference through Community Commitment, p.40-42
Product End-of-life Management	Percentage of products sold that are recyclable or reusable	Quantitative	Percentage (%)	RR-ST-410b.1	2021 Sustainability Report, Environmental Metrics and Targets, Product End-of-Life Management and Recycling, p.25
	Weight of end-of-life material recovered, percentage recycled	Quantitative	Metric tons (t), Percentage (%)	RR-ST-410b.2	2021 Sustainability Report, Environmental Metrics and Targets, Product End-of-Life Management and Recycling, p.25
	Percentage of products by revenue that contain IEC 62474 declarable substances, arsenic compounds, antimony compounds, or beryllium compounds	Quantitative	Percentage (%)	RR-ST-410b.3	Our modules are free of IEC 62474 declarable substances except for lead, which is a material used for soldering crystalline PV modules. Lead accounts for 0.03% of a solar module's weight. One of our top R&D and sustainability priorities over the coming years is to reduce lead content in our modules. IEC 62474 is an international standard for material declarations for the electrical and electronics industry and its suppliers. It provides requirements for material declarations including a Declarable Substance List and a material declaration procedure.
	Description of approach and strategies to design products for high-value recycling	Quantitative	n/a	RR-ST-410b.4	2021 Sustainability Report, Environmental Metrics and Targets, Product End-of-Life Management and Recycling, p.25
Materials Sourcing	Description of the management of risks associated with the use of critical materials	Discussion and Analysis	n/a	RR-ST-440a.1	Polysilicon manufacturing processes involve the use of volatile or dangerous chemicals and waste. Those chemicals are required to be handled with proper training provided. Wastewater and waste gas are processed through various treatments so that they meet the respective discharge standards. Most solid waste generated during the manufacturing process can be reused and does not contain hazardous materials. Pollution control systems are set in place to reduce, treat, and recycle the waste generated in the manufacturing process. Furthermore, laws and regulations are in place to govern water, air, solid waste, and noise pollution, as well as hazardous chemicals, among other regulations, in places where the upstream polysilicon suppliers operate. Polysilicon suppliers are required to obtain all the necessary environmental permits to conduct business and are subject to regulation and periodic monitoring by local environmental protection and work safety authorities. Where there are environmental non-compliance incidents, the polysilicon suppliers are subject to substantial fines and potentially suspension of production or cease operations.
	Description of the management of environmental risks associated with the polysilicon supply chain	Discussion and Analysis	n/a	RR-ST-440a.2	

Global Reporting Initiative (GRI) Metrics

General Disclosures		
GRI 102: Organizational Profile		
102-1	Name of the organization	Canadian Solar Inc.
102-2	Activities, brands, products, and services	2021 Sustainability Report, About Canadian Solar, p.5-6
102-3	Location of headquarters	Guelph, Ontario, Canada
102-4	Location of operations	Operates in 25 countries, including CSI Solar offices in 17 countries, Global Energy offices in 19 countries, and 16 manufacturing facilities in 4 countries; 2021 Sustainability Report, "About Canadian Solar", p.6
102-5	Ownership and legal form	Investor-owned corporation, NASDAQ: CSIQ. 2021 Annual Report, Share Ownership, p.96-97
102-6	Markets served	Delivered 71 GW of solar modules to customers across the world; built and connected over 6.6 GWp solar power projects in over 20 countries, 2021 Sustainability Report, "About Canadian Solar", p. 5-6
102-7	Scale of the Organization	2021 Sustainability Report, Working at Canadian Solar, p.32, About Canadian Solar, p.5-6 2021 Annual Report, Results of Operations, p.69
102-8	Information on employees and other workers	2021 Sustainability Report, Social Responsibility, Working at Canadian Solar, p.32
102-9	Supply chain	2021 Sustainability Report, Responsible Supply Chain, Supply Chain Management, p.45-48 2021 Annual Report, Supply Chain Management, p.45
102-10	Significant changes to the organization and its supply chain	In 2022, we ceased to operate as a business under the Business Corporations Act (British Columbia) (BCBCA) and will be continued under the Business Corporations Act (Ontario) (OBCA)
102-11	Precautionary Principle or approach	2021 Sustainability Report, Social Responsibility, Occupational Health and Safety, p.37-38
102-12	External Initiatives	2021 Sustainability Report, Social Responsibility, Non-Governmental Organizations and Memberships p.43-44
102-13	Membership of associations	2021 Sustainability Report, Social Responsibility, Non-Governmental Organizations and Memberships p.43-44
GRI 102: Strategy		
102-14	Statement from senior decision-maker	2021 Sustainability Report, Message from the Chief Executive and Chief Sustainability Officers, p.3
102-15	Key impacts, risks, and opportunities	2021 Sustainability Report, Environmental Metrics and Targets, Climate-Related Opportunities and Risks, p.7-30
GRI 102: Ethics & Integrity		
102-16	Values, principles, standards and norms of behavior	2021 Sustainability Report Social Responsibility, p.31, 37 Governance, Ethical Business Conduct, p.53
102-17	Mechanisms for advice and concerns about ethics	Whistleblower Policy
GRI 102: Governance		
102-18	Governance structure	2021 Sustainability Report, Governance, p.49-52 2021 Annual Report, p.91-93
102-20	Executive-level responsibility for economic, environmental, and social topics	2021 Sustainability Report, Governance, Executive Management, p.52
102-21	Consulting stakeholders on economic, environmental, and social topics	2021 Sustainability Report, Materiality Assessment and Stakeholder Engagement, p.56
102-29	Identifying and managing economic, environmental, and social impacts	2021 Sustainability Report, Climate-Related Risks and Opportunities, p. 28-29; Governance, p. 49-53; Materiality Assessment and Stakeholder Engagement, p.56
102-31	Review of economic, environmental, and social topics	2021 Sustainability Report, Climate-Related Risks and Opportunities, p. 28-29; Governance, p. 49-53
102-32	Highest governance body's role in sustainability reporting	Sustainability Committee of the Board 2021 Sustainability Report, Governance, Board Committees, p.49

GRI 102: Stakeholder Engagement		
102-40	List of stakeholder groups	2021 Sustainability Report, Materiality Assessment and Stakeholder Engagement, p.56
102-41	Collective bargaining agreements	2021 Sustainability Report, Social Responsibility, Freedom of Association and Collective Bargaining, p.37
102-42	Identifying and selecting stakeholders	2021 Sustainability Report, Materiality Assessment and Stakeholder Engagement, p.56
102-43	Approach to stakeholder engagement	2021 Sustainability Report, Social Responsibility, Making the Difference through Community Commitment, p.40-42 Materiality Assessment and Stakeholder Engagement, p.56
102-44	Key topics and concerns raised	2021 Sustainability Report, Materiality Assessment and Stakeholder Engagement, p.56
GRI 102: Reporting Practice		
102-45	Entities included in the organization's consolidated financial statements	2021 Annual Report, Organizational Structure, p.59
102-46	Defining report content and topic boundaries	2021 Sustainability Report, About this Report, p.55
102-47	List of material topics	2021 Sustainability Report, Materiality Assessment and Stakeholder Engagement, p.56
102-48	Restatements of information	2021 Sustainability Report, Environmental Metrics and Targets, Air Emissions Breakdown, p.17 Energy Consumption Breakdown, p.19 Waste by type and disposal. p.23
102-49	Changes in reporting	2021 Annual Report, Item 5, Operating and Financial Review and Prospects, p.61
102-50	Reporting period	January 1 to December 31, 2021, unless otherwise noted
102-51	Date of most recent report (if any)	July 2021
102-52	Reporting cycle	Annual
102-53	Contact point for questions regarding the report	support@canadiansolar.com
102-54	Claims of reporting in accordance with the GRI Standards	Core
102-55	GRI Content Index	GRI Content Index
102-56	External assurance	2021 Sustainability Report, About this Report, p.55
Economic		
GRI 201: Economic Performance		
201-1	Direct economic value generated and distributed	2021 Annual Report, Results of Operations, p.69
201-2	Financial implications and other risks and opportunities due to climate change	2021 Sustainability Report, Environmental Metrics and Targets, Climate-Related Opportunities and Risks, p. 28-29
GRI 203: Indirect Economic Impacts		
203-1	Infrastructure investments and services supported	2021 Annual Report, p.42-45-50, 63, 65-67, 69-71; Notes to the Consolidated Statements, p.F-4, F-13, F-15, F-20, F60-62
GRI 205: Anti-Corruption		
205-1	Operations assessed for risks related to corruption	2021 Sustainability Report, Governance, Ethical Business Conduct, p.53
205-2	Communication and training about anti-corruption policies and procedures	2021 Sustainability Report, Governance, Ethical Business Conduct, p.53
Environment		
GRI 301: Materials		
301-2	Recycled input materials used	2021 Sustainability Report, Environmental Metrics and Targets, Water Intensity, p.21 Waste Intensity, p.23, 25

GRI 302: Energy		
302-1	Energy consumption within the organization	Unit: Gigajoules (GJ) Total energy consumption: 5,473,504 Gas: 192,332 Diesel: 4,321 Gasoline: 1,786 Steam: 112,433 Grid electricity: 5,078,445 Solar PV electricity: 84,187
302-3	Energy intensity	Unit: MWh/MW Ingot production: 67.5 Wafer production: 15.1 Cell production: 79.4 Module production: 20.7
302-4	Reduction of energy consumption	2021 Sustainability Report, Environmental Metrics and Targets, Energy Intensity, p.17-19
GRI 303: Water and Effluents		
303-3	Water withdrawal	9,027 thousand cubic meters (m^3)
303-4	Water discharge	6,374 thousand cubic meters (m^3)
303-5	Water consumption	2,653 thousand cubic meters (m^3)
GRI 305: Emissions		
305-1	Direct (Scope 1) GHG emissions	61,946 metric tons of CO_2 equivalent (tCO_2eq)
305-2	Energy Indirect (Scope 2) GHG emissions	971,014 metric tons of CO_2 equivalent (tCO_2eq)
305-4	GHG emissions intensity	Unit: tCO_2eq/MW Ingot production: 58.6 Wafer production: 8.5 Cell production: 49.1 Module production: 13.8
305-7	Nitrogen oxides (NOx), sulfur oxides (SOx), and other significant air emissions	Unit: metric tons (t) Nitrogen oxides (NOx): 13.6 Sulfur oxides (SOx): 0.1 Fine dust (PM10): 15.7 Hazardous air pollutants (HAP): 10.1 Volatile organic compounds (VOC): 17.5 Persistent organic pollutants (POP): 0 Other standard air emissions: 30.2
GRI 306: Waste		
306-3	Waste generated	Unit: Metric kilotons (kt) Disposed hazardous waste: 0.7 Recycled or reused hazardous waste: 3.1 Disposed non-hazardous waste: 17.8 Recycled or reused non-hazardous: 81.8
GRI 307: Environmental Compliance		
307-1	Non-compliance with environmental laws and regulations	None
GRI 308: Supplier Environmental Assessment		
308-1	New suppliers that were screened using environmental criteria	2021 Sustainability Report, Supplier ESG Audits, p.47
308-2	Negative environmental impacts in the supply chain and actions taken	We terminated the cooperation with 1 supplier in 2021 as it did not pass our EHS standards and audit
Social		
GRI 403: Occupational Health & Safety		
403-1	Occupational health and safety management system	2021 Sustainability Report, Social Responsibility, Occupational Health and Safety, p.37
403-2	Hazard identification, risk assessment, and incident investigation	2021 Sustainability Report, Social Responsibility, Hazardous Materials and Environmental Management, p.38
403-3	Occupational health services	2021 Sustainability Report, Social Responsibility, Occupational Health and Safety, p.37-38

403-4	Worker participation, consultation, and communication on occupational health and safety	2021 Sustainability Report, Social Responsibility, Occupational Health and Safety, p.37-38
403-5	Worker training on occupational health and safety	2021 Sustainability Report, Social Responsibility, Occupational Health and Safety, p.37-38
403-6	Promotion of worker health	2021 Sustainability Report, Social Responsibility, Occupational Health and Safety, p.37-38
403-9	Work-related injuries	2021 Sustainability Report, Social Responsibility, Occupational Health and Safety, p.37-38
GRI 404: Training & Education		
404-1	Average hours of training per year per employee	22.1 hours per employee for 2021 2021 Sustainability Report, Social Responsibility, On the Job Training, p.36
404-2	Programs for upgrading employee skills and transition assistance programs	2021 Sustainability Report, Social Responsibility, Talent Strategy, Training and Development, p.35-37
404-3	Percentage of employees receiving regular performance and career development reviews	100% of full-time employees
GRI 405: Diversity & Equal Opportunity		
405-1	Diversity of governance bodies and employees	2021 Sustainability Report, Social Responsibility, Equity, Diversity and Inclusion, p.32-34 Governance, Board Diversity, p.51
GRI 407: Freedom of Association & Collective Bargaining		
407-1	Operations and suppliers in which the right to freedom of association and collective bargaining may be at risk	2021 Sustainability Report, Social Responsibility, Freedom of Association and Collective Bargaining, p.37 Responsible Supply Chain, p.47, Supplier Code of Conduct

GRI 408: Child Labor		
408-1	Operations and suppliers at significant risk for incidents of child labor	None
GRI 409: Forced or Compulsory Labor		
409-1	Operations and suppliers at significant risk for incidents of forced or compulsory labor	None, we have been taking action to prevent this 2021 Sustainability Report, Responsible Supply Chain, Anti-Modern Slavery Initiatives, p46 Supplier Code of Conduct, p.47
GRI 413: Local Communities		
413-1	Operations with local community engagement, impact assessments, and development programs	2021 Sustainability Report, Environmental Metrics, Environmental Stewardship in Project Development, p.27 Social Responsibility, Making the Difference through Community Commitment, p.40-42
413-2	Operations with significant actual and potential negative impacts on local communities	None
GRI 414: Supplier Social Assessment		
414-1	New suppliers that were screened using social criteria	2021 Sustainability Report, Responsible Supply Chain, p.47
414-2	Negative social impacts in the supply chain and actions taken	2021 Sustainability Report, Responsible Supply Chain, p.45-48

Canadian Solar Inc.
545 Speedvale Avenue West
Guelph, Ontario, N1K 1E6

Phone +1 519 837 1881
Fax +1 519 837 2550

www.canadiansolar.com
support@canadiansolar.com

Appendix 4

Annual Site Inspection Form

Former Excelsior Steel Ball Company Site
303 Woodward Avenue, Tonawanda, New York 14150
NYSDEC Site No. **V00685**

Date: April 5, 2023

Inspector: John Hood

Weather: Overcast, 35 degrees F

1. Compliance with all ICs, including site usage:

SITE USAGE: Use of the Site is limited to Commercial & Industrial Uses. Indicate if any other type of use is occurring at the Site.

Site is used for a surface mount solar array installation.

GROUNDWATER USAGE: Use of groundwater underlying the Site is prohibited without treatment. Indicate whether groundwater use is occurring at the Site along with any treatment measures being applied.

Groundwater is not used.

COMPLIANCE WITH SMP: List Site activities and indicate compliance or non-compliance with SMP.

During this reporting period, Erie County entered into an agreement with Montante Solar to install a 450kw-dc/ 300kw-ac Solar Array on the site.

2. **An evaluation of the condition and continued effectiveness of the ECs:**
SITE COVER CONDITION: Good, Fair, or Poor

Based on the inspections, the cover systems are intact, functioning effectively throughout the Site and are protective of public health and the environment.

SITE COVER EFFECTIVNESS: As Intended or Needs Repair

The site cover system is functioning as Intended.

3. **General site conditions at the time of the inspection:**

Acceptable

Appendix 5

Appendix 5

Photos from Dec 16, 2022

Photos from Jan 31, 2024

Appendix 6

ACS

Former Excelsior Steel Ball
303 Woodward Avenue, Tonawanda NY
NYSDEC Site # V00685

Soil Management Plan

TM Montante Solar Development LLC
2760 Kenmore Avenue, Suite 100
Tonawanda, New York 14150
P: (716) 876-8899

October 2020

1.0 INTRODUCTION

The former Excelsior Steel Ball Company was located at 303 Woodward Avenue, Tonawanda NY. The site was remediated under a voluntary Cleanup Agreement (Site # Voo685-9) with the NYSDEC.

ACS Inc. has prepared this Contaminated Material Handling Plan (CMHP) for the T M Montante Solar project for any soil material handling activities to be conducted at the 303 Woodward Solar Project This Plan specifies requirements for the excavation and management of potentially contaminated soils at the site.

TM Montante intends to have very minimal soil disturbance in the ground, the most disturbance will be the installation of a utility pole (maximum 5 yards of material). The supports for solar panels will be direct push into the ground and all electrical conduit will be above ground.

2.0 NOTIFICATIONS

At least 7 calendar days prior to commencing work in known contaminated areas, ACS will prepare and submit advance notification letters to the NYSDEC Engineer.

3.0 SOIL MANAGEMENT PROCEDURES

ACS will provide an on-site Contaminated Material Manager, who will coordinate the staging, characterization, off-site transportation and disposal of excavated contaminated material generated from this project. Staging or stockpiling will be conducted in a manner that facilitates continued excavation activities and ensures that the different waste streams generated are continuously segregated. The Contaminated Material Manager will document all excavation activities within a field log book. Information such as, material type (i.e., soil, concrete, gravel, etc.), location, visual observations (i.e., odors, debris, staining), lift depth, waste stream, etc. shall be documented. ACS will be responsible for the segregation, staging, testing, and management of all excavated contaminated materials from the site.

Dedicated on-site equipment will be used for the excavation activities. The management of excavated materials will utilize procedures to promote material segregation and minimize contact between potentially contaminated and clean material. These procedures will also ensure that potentially contaminated materials do not migrate off-

site into including adjacent properties and roadways. All potentially contaminated equipment will be decontaminated prior to leaving the site.

A Hydrovac machine will be used for excavating materials in will be screened or scanned and the materials will be directly transported to the landfill.

4.0 FIELD SCREENING

Excavated materials suspected of contamination will be visually inspected for evidence of contamination and screened for total volatile organic vapors using a field calibrated Rae Systems photo ionization detector (PID). These petroleum or other contaminated impacted soils that are not contaminated will be segregated from both clean and contaminated material. The PID will be field calibrated daily using isobutylene gas. The results of all screening (i.e., visual, elevated PID readings, etc.) will be documented in the field log book.

5.0 FIELD DOCUMENTATION

All excavation activities (i.e., excavation, soil quantity, visual observations, sampling, etc.) will be documented in a field logbook or equal.

6.0 SEGREGATION AND STORAGE

ACS will notify the NYSDEC immediately if material is discovered that appears to contain unknown contaminants or material that varies significantly from the type of contamination identified in the contract documents. In the event that unexpected conditions occur (unusual soil coloration, unusual, etc.) all work in the area will be stopped until a thorough evaluation (i.e., soil analysis) has been completed. The staged material will be covered daily and during precipitation events. The covered material will be secured during inclement weather and during periods of inactivity.

6.1 Trucks and Disposal Containers

ACS will prepare and maintain trucks and disposal containers as follows:

At the end of each work day, the Hydrovac will directly dispose of any of the

contaminated soils at the landfill. The intent is to not store any of soils on site in dumpsters or dump trucks.

7.0 SOIL SAMPLING

This section presents a description of the soil sampling activities that will be performed at the site to properly characterize excavated material prior to off-site transportation and disposal.

Samples will be collected according to protocols defined in this plan, document field observations and sampling procedures, and follow chain-of-custody (COC) procedures. Thee frequency selected will be approved by the New York State Department of Environmental Conservation (NYSDEC) and be based upon volume of anticipated waste and disposal facility waste acceptance criteria. Sample and Document Custody procedures, including sample identification criteria, labeling, and COC, are specified below.

Samples will be submitted for analysis to an ELAP-approved and commercially approved chemistry laboratory, as applicable. The sample turnaround time for the project, from receipt of samples at the laboratory, is dependent on the field activities and urgency of the data. All soil samples will be analyzed in accordance to approved United States Environmental Protection Agency (USEPA) Solid Waste 846 (SW846) methodology and NYSDEC. Specifically, pH, TCLP Metals, VOC, SVOC, herbicides , pesticides and PCB's.

7.1 Sampling Equipment and Materials

All necessary equipment and materials will be assembled prior to initiating sampling activities.

Each sample will be uniquely identified in such a manner that the sample number identifies the location of the sample collection point (i.e. station number, address, etc.) and type of sample. This system will apply to samples collected during the excavation activities, which are to be transmitted to the analytical laboratory**.**

7.2 Sample Containers and Preservation

Appropriate sample containers, preservation methods, and laboratory holding times shall be maintained as appropriate.

The analytical laboratories will supply appropriate sample containers, as well as sample labels, preservatives if necessary, and coolers for sample shipment. The field personnel will be responsible for properly labeling containers and preserving samples, as appropriate.

7.3 Sample Labeling

All sample labels shall be completed legibly with indelible ink, affixed to the sample container, and covered with clear tape, as appropriate.

7.4 Chain of Custody Forms

Documentation of the sample COC is provided by the use of forms which record the sampling location, the type and number of samples collected, requested analyses, the date and time of sample collection, the name(s) of the person(s) responsible for sample collection, the date and time of all custody transfers, the signature of the person relinquishing and accepting sample custody, and other pertinent information.

A COC record will be initiated in the field and will accompany each group of samples during shipment to the laboratory. Each time custody of the sample changes, the new custodian will sign the record and indicate the dates of transfer. The COC forms will be completed and signed.

8.0 TRANSPORTATION AND DISPOSAL

Contaminated material will not be transported off site until sampling and analysis is performed and completed, and the material is in compliance with disposal facility waste acceptance criteria.

8.1 Transportation Off-Site

The Hydrovac will be covered with secured and waterproof to prevent water infiltration, evaporation of contaminants and spillage of contaminated material.

Contaminated material will be transported in vehicles with valid waste transporter permits for New York State (and other required permits/licenses from any other states as applicable). ACS will assure that required shipping papers, labeling, placarding, weighing/load measurements is completed and copies will be provided to the NYSDEC.

8.2 Waste Manifests and Shipping Documentation

Waste manifests if required, will be used to ship the waste for off-site treatment, storage, or disposal. The manifest is a multiple-copy tracking document required by USDOT and EPA/NYSDEC.

Manifest Tracking and Retention - Once the chain is complete, the TSD facility returns a signed copy of the manifest to the generator within 45 days of the date the waste was accepted. Manifests will be copied to the NYSDEC with all other transportation documentation.

8.3 Disposal/Treatment

Contaminated material will be disposed of by the methods and procedures described in this plan. Material characterization information, field identification and confirmation laboratory analyses, if included in the contract, will be used to determine appropriate classification and category of material for disposal. Each category of surplus or waste material shall be handled and disposed of based upon its characterization in accordance with the requirements for the following waste categories:

- Uncontaminated material;
- Contaminated waste;

Efforts will be made by project personnel to transport contaminated material to the proper disposal facility on a daily basis. At the current time, the following disposal facilities are anticipated to be used for this project.

Contaminated Material

Ensol – Tonawanda Landfill

Uncontaminated Materials- Apply to Surfaces

Steve Erck

From: Raj Chopra <rschopra@yahoo.com>
Sent: Friday, October 30, 2020 3:52 PM
To: Steven Erck
Subject: Fwd: 303 Woodward Avenue - Soil Management Plan - October 2020
Attachments: 303 Woodward avenue r.3_Soils Management Plan_Final.pdf

Begin forwarded message:

From: "Sadowski, Brian (DEC)" <brian.sadowski@dec.ny.gov>
Subject: 303 Woodward Avenue - Soil Management Plan - October 2020
Date: October 30, 2020 at 3:06:05 PM EDT
To: "rschopra@yahoo.com" <rschopra@yahoo.com>
Cc: "May, Glenn (DEC)" <glenn.may@dec.ny.gov>

Dear Mr. Chopra,

The Department has reviewed the attached Soil Management Plan for the Former Excelsior Steel Ball Site, NYSDEC Number V00685. We approve the plan.

Regards,
Brian Sadowski

Raj Chopra
PO Box 986
Grand Island NY 14072
(716) 480-2125
rschopra@yahoo.com

Advanced Contracting Services

January 30, 2023

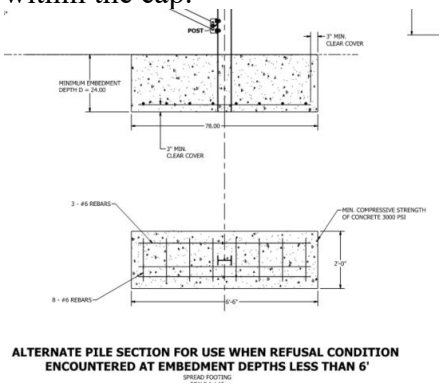
To whom it may concern:

RE: V00685 – Excelsior Steel Ball Company
Solar Array Installation

Please allow this letter to serve as confirmation that activities related to the installation of the solar array at the aforementioned site were in conformance with the New York State Voluntary Cleanup Program Final Remedial Report, dated September 2004 and prepared by EnSol, Inc., and the Soil Management Plan, dated October 2020 and prepared by ACS. Each of the activities that involved ground disturbance are further explained below:

Pile Installation – 7/29/21 – 8/9/21

Mechanical and electrical components of the solar array were installed using a vibratory hammer mounted on an excavator. Piles were driven through the cap and were at no point pulled out once installed. Piles that did not reach proper embedment were cut off and a concrete base was poured per design detail. Bottom of base is 18-20" below grade, putting it within the cap.



ALTERNATE PILE SECTION FOR USE WHEN REFUSAL CONDITION ENCOUNTERED AT EMBEDMENT DEPTHS LESS THAN 6'

Electrical Trenching – 9/13/21 – 9/16/21

Conduits were installed in an open cut trench along the east edge of the array. Depth of excavation was limited to 18" below grade, putting it within the cap, and the trench was backfilled with concrete.

PO Box 986. Grand Island NY 14072 (716) 480-2125 phone email: rschopra@yahoo.com

Advanced Contracting Services

Utility Pole Sleeve – 1/11/22 – 1/12/22

A corrugated metal pipe (CMP) was installed to a depth of 9' below finished grade to provide a clean corridor for the utility to install their pole. Excavated material was directly loaded into a dumpster and disposed of at Waste Management Chaffee. The CMP was backfilled, both outside and inside, with clean #1A stone from Lafarge. Excavated material appeared was consistent with what was described in the Final Remedial Report, and no odors or sheens were observed.

WM WASTE MANAGEMENT

Waste Management Chaffee LF
10860 Olean Rd
Chaffee, NY, 14030
Ph: (716) 496-5000

Reprint
Ticket# 707213

Customer Name WM-CLIROLLOFF WM-CLI ROLL OFF Carrier WM WASTE MANAGEMENT
Ticket Date 02/09/2022 Vehicle# 413332- 200 Volume
Payment Type Credit Account Container
Manual Ticket# Driver
Hauling Ticket# 629198 Check#
Route Billing # 0000001
State Waste Code Gen EPA ID N/A
Manifest 21013
Destination
PO
Profile 124358NY (SOIL)
Generator 190-TMMONTANTE303WOODWARD TN MONTANTE SOLAR DEVELOPMENT

	Time	Scale	Operator	Inbound		
In	02/09/2022 07:39:09	INBOUND	JChapma7		Gross	53100 lb
Out	02/09/2022 08:10:41	OUTBOUND	JChapma7		Tare	34000 lb
					Net	19100 lb
					Tons	9.55

Comments CEM 629198

Product	LD%	Qty	UOM	Rate	Fee	Amount	Origin
1 Cont Soil RCG-Tons 100		9.55	Tons				ERI

Total Fees
Total Ticket

Driver's Signature _____ OL2P1H5-1600

Waste Management of New York, LLC
10860 Olean Road
Chaffee, New York 14030-9799
(716) 496-5000

Permit 9A
WASTE MANIFEST
No. 021013

Date: 1-19-22 Time: _____
Generator: CEM
Ticket # 629198

Waste Description: Contaminated Soil Profile # 124358NY
Location: 303 woodward Tennessee Quantity: 20 YDS 27-456
Driver: Robert Wilson Truck #: 413467

TSDF Facility: WM Chaffee LF 707213
Received By: _____ Date: 2-9-22

If you have any questions please contact me at (716) 480-2125

Sincerely,

Raj Chopra

Raj Chopra
rschopra@yahoo.com

WASTE MANAGEMENT

Waste Management Chaffee LF
10860 Olean Rd
Chaffee, NY, 14030
Ph: (716) 496-5000

Reprint
Ticket# 707213

Customer Name WM-CLIROLLOFF WM-CLI ROLL OFF
Ticket Date 02/09/2022
Payment Type Credit Account
Manual Ticket#
Hauling Ticket# 629198
Route
State Waste Code
Manifest 21013
Destination
PO
Profile 124358NY (SOIL)
Generator 190-TMMONTANTE303WOODWARD TM MONTANTE SOLAR DEVELOPMENT

Carrier WM WASTE MANAGEMENT
Vehicle# 413332- 200 Volume
Container
Driver
Check#
Billing # 0000001
Gen EPA ID N/A

	Time	Scale	Operator	Inbound		
In	02/09/2022 07:39:09	INBOUND	JChapma7		Gross	53100 lb
Out	02/09/2022 08:10:41	OUTBOUND	JChapma7		Tare	34000 lb
					Net	19100 lb
					Tons	9.55

Comments CEM 629198

Product	LD%	Qty	UOM	Rate	Fee	Amount	Origin
1 Cont Soil RCG-Tons	100	9.55	Tons				ERI

Total Fees
Total Ticket

Driver`s Signature _____ OL2P1H5-1600

Waste Management of New York, LLC
10860 Olean Road
Chaffee, New York 14030-9799
(716) 496-5000

Permit 9A
WASTE MANIFEST
No. 021013

Date: 1-19-22 Time: ____

Generator: CEM

TICKET # 629198

Waste Description: Contaminated Soil PROFILE # 124358NY

Location: 303 Woodward Tonawanda Quantity: 20 YDS 21-456

Driver: ROBERT WILSON Truck #: 413467

TSDF Facility: WM Chaffee LF 707213

Received By: [signature] Date: 2-9-22

PARADIGM

Analytical Report For

ACS

For Lab Project ID

213941

Referencing

303 Woodward

Prepared

Wednesday, September 8, 2021

Any noncompliant QC parameters or other notes impacting data interpretation are flagged or documented on the final report or are noted below.

Certifies that this report has been approved by the Technical Director or Designee

179 Lake Avenue • Rochester, NY 14608 • (585) 647-2530 • Fax (585) 647-3311 • ELAP ID# 10958

PARADIGM
ENVIRONMENTAL SERVICES, INC.

Lab Project ID: 213941

Client: **ACS**

Project Reference: 303 Woodward

Sample Identifier:	303		
Lab Sample ID:	213941-01	**Date Sampled:**	8/30/2021
Matrix:	Soil	**Date Received:**	8/31/2021

Ignitability

Analyte	Result	Units	Qualifier	Date Analyzed
Ignitability	No Burn	mm / sec		9/1/2021

Method Reference(s): EPA 1030

PCBs

Analyte	Result	Units	Qualifier	Date Analyzed
PCB-1016	< 0.151	mg/Kg		9/2/2021 05:56
PCB-1221	< 0.151	mg/Kg		9/2/2021 05:56
PCB-1232	< 0.151	mg/Kg		9/2/2021 05:56
PCB-1242	< 0.151	mg/Kg		9/2/2021 05:56
PCB-1248	< 0.151	mg/Kg		9/2/2021 05:56
PCB-1254	< 0.151	mg/Kg		9/2/2021 05:56
PCB-1260	< 0.151	mg/Kg		9/2/2021 05:56
PCB-1262	< 0.151	mg/Kg		9/2/2021 05:56
PCB-1268	< 0.151	mg/Kg		9/2/2021 05:56

Surrogate	Percent Recovery	Limits	Outliers	Date Analyzed
Tetrachloro-m-xylene	**50.6**	18.5 - 93.4		9/2/2021 05:56

Method Reference(s): EPA 8082A
EPA 3546

Preparation Date: 9/1/2021

PARADIGM ENVIRONMENTAL SERVICES, INC.

Lab Project ID: 213941

Client: ACS

Project Reference: 303 Woodward

Sample Identifier:	303		
Lab Sample ID:	213941-01A	**Date Sampled:**	8/30/2021
Matrix:	TCLP Extract	**Date Received:**	8/31/2021

TCLP Semi-Volatile Organics

Analyte	Result	Units	Regulatory Limit	Qualifier	Date Analyzed
1,4-Dichlorobenzene	< 40.0	ug/L	7500		9/7/2021 18:36
2,4,5-Trichlorophenol	< 40.0	ug/L	400000		9/7/2021 18:36
2,4,6-Trichlorophenol	< 40.0	ug/L	2000		9/7/2021 18:36
2,4-Dinitrotoluene	< 40.0	ug/L	130		9/7/2021 18:36
Cresols (as m,p,o-Cresol)	< 80.0	ug/L	200000		9/7/2021 18:36
Hexachlorobenzene	< 40.0	ug/L	130		9/7/2021 18:36
Hexachlorobutadiene	< 40.0	ug/L	500		9/7/2021 18:36
Hexachloroethane	< 40.0	ug/L	3000		9/7/2021 18:36
Nitrobenzene	< 40.0	ug/L	2000		9/7/2021 18:36
Pentachlorophenol	< 80.0	ug/L	100000		9/7/2021 18:36
Pyridine	< 40.0	ug/L	5000		9/7/2021 18:36

Surrogate	Percent Recovery	Limits	Outliers	Date Analyzed
2,4,6-Tribromophenol	**95.3**	55.4 - 111		9/7/2021 18:36
2-Fluorobiphenyl	**78.6**	30.9 - 98.1		9/7/2021 18:36
2-Fluorophenol	**68.4**	10 - 105		9/7/2021 18:36
Nitrobenzene-d5	**73.3**	49.6 - 104		9/7/2021 18:36
Phenol-d5	**55.4**	10 - 105		9/7/2021 18:36
Terphenyl-d14	**93.1**	56.5 - 118		9/7/2021 18:36

Method Reference(s): EPA 8270D
EPA 1311 / 3510C
Preparation Date: 9/7/2021
Data File: B56746.D

TCLP Mercury

Analyte	Result	Units	Regulatory Limit	Qualifier	Date Analyzed
Mercury	< 0.00200	mg/L	0.2		9/7/2021 08:05

Method Reference(s): EPA 7470A
EPA 1311
Preparation Date: 9/3/2021
Data File: Hg210907B

PARADIGM ENVIRONMENTAL SERVICES, INC.

Lab Project ID: 213941

Client: **ACS**

Project Reference: 303 Woodward

Sample Identifier:	303		
Lab Sample ID:	213941-01A	**Date Sampled:**	8/30/2021
Matrix:	TCLP Extract	**Date Received:**	8/31/2021

TCLP RCRA Metals (ICP)

Analyte	Result	Units	Regulatory Limit	Qualifier	Date Analyzed
Arsenic	< 0.500	mg/L	5		9/2/2021 20:08
Barium	**0.849**	mg/L	100		9/2/2021 20:08
Cadmium	< 0.0250	mg/L	1		9/2/2021 20:08
Chromium	< 0.500	mg/L	5		9/2/2021 20:08
Lead	< 0.500	mg/L	5		9/2/2021 20:08
Selenium	< 0.200	mg/L	1		9/2/2021 20:08
Silver	< 0.500	mg/L	5		9/2/2021 20:08

Method Reference(s): EPA 6010C
EPA 1311 / 3005A
Preparation Date: 9/2/2021
Data File: 210902B

TCLP Volatile Organics

Analyte	Result	Units	Regulatory Limit	Qualifier	Date Analyzed
1,1-Dichloroethene	< 20.0	ug/L	700		9/3/2021 13:32
1,2-Dichloroethane	< 20.0	ug/L	500		9/3/2021 13:32
2-Butanone	< 100	ug/L	200000		9/3/2021 13:32
Benzene	< 20.0	ug/L	500		9/3/2021 13:32
Carbon Tetrachloride	< 20.0	ug/L	500		9/3/2021 13:32
Chlorobenzene	< 20.0	ug/L	100000		9/3/2021 13:32
Chloroform	< 20.0	ug/L	6000		9/3/2021 13:32
Tetrachloroethene	< 20.0	ug/L	700		9/3/2021 13:32
Trichloroethene	< 20.0	ug/L	500		9/3/2021 13:32
Vinyl chloride	< 20.0	ug/L	200		9/3/2021 13:32

PARADIGM
ENVIRONMENTAL SERVICES, INC.

Lab Project ID: 213941

Client: **ACS**

Project Reference: 303 Woodward

Sample Identifier:	303		
Lab Sample ID:	213941-01A	**Date Sampled:**	8/30/2021
Matrix:	TCLP Extract	**Date Received:**	8/31/2021

Surrogate	Percent Recovery	Limits	Outliers	Date Analyzed	
1,2-Dichloroethane-d4	**121**	83 - 120	*	9/3/2021	13:32
4-Bromofluorobenzene	**103**	65.5 - 118		9/3/2021	13:32
Pentafluorobenzene	**104**	91.2 - 109		9/3/2021	13:32
Toluene-D8	**93.3**	79.7 - 112		9/3/2021	13:32

Method Reference(s): EPA 8260C
EPA 1311 / 5030C

Data File: z03928.D

Analytical Report Appendix

The reported results relate only to the samples as they have been received by the laboratory.

Each page of this document is part of a multipage report. This document may not be reproduced except in its entirety, without the prior consent of Paradigm Environmental Services, Inc.

All soil/sludge samples have been reported on a dry weight basis, unless qualified "reported as received". Other solids are reported as received.

Low level Volatiles blank reports for soil/solid matrix are based on a nominal 5 gram weight. Sample results and reporting limits are based on actual weight, which may be more or less than 5 grams.

The Chain of Custody provides additional information, including compliance with sample condition requirements upon receipt. Sample condition requirements are defined under the 2003 NELAC Standard, sections 5.5.8.3.1 and 5.5.8.3.2.

NYSDOH ELAP does not certify for all parameters. Paradigm Environmental Services or the indicated subcontracted laboratory does hold certification for all analytes where certification is offered by ELAP unless otherwise specified. Aliquots separated for certain tests, such as TCLP, are indicated on the Chain of Custody and final reports with an "A" suffix.

Data qualifiers are used, when necessary, to provide additional information about the data. This information may be communicated as a flag or as text at the bottom of the report. Please refer to the following list of analyte-specific, frequently used data flags and their meaning:

"<" = Analyzed for but not detected at or above the quantitation limit.
"E" = Result has been estimated, calibration limit exceeded.
"Z" = See case narrative.
"D" = Sample, Laboratory Control Sample, or Matrix Spike Duplicate results above Relative Percent Difference limit.
"M" = Matrix spike recoveries outside QC limits. Matrix bias indicated.
"B" = Method blank contained trace levels of analyte. Refer to included method blank report.
"J" = Result estimated between the quantitation limit and half the quantitation limit.
"L" = Laboratory Control Sample recovery outside accepted QC limits.
"P" = Concentration differs by more than 40% between the primary and secondary analytical columns.
"NC" = Not calculable. Applicable to RPD if sample or duplicate result is non-detect or estimated (see primary report for data flags). Applicable to MS if sample is greater or equal to ten times the spike added. Applicable to sample surrogates or MS if sample dilution is 10x or higher.
"" = Indicates any recoveries outside associated acceptance windows. Surrogate outliers in samples are presumed matrix effects. LCS demonstrates method compliance unless otherwise noted.*
"(1)" = Indicates data from primary column used for QC calculation.
"A" = denotes a parameter for which ELAP does not offer approval as part of their laboratory certification program.
"F" = denotes a parameter for which Paradigm does not carry certification, the results for which should therefore only be used where ELAP certification is not required, such as personal exposure assessment.

GENERAL TERMS AND CONDITIONS
LABORATORY SERVICES

These Terms and Conditions embody the whole agreement of the parties in the absence of a signed and executed contract between the Laboratory (LAB) and Client. They shall supersede all previous communications, representations, or agreements, either verbal or written, between the parties. The LAB specifically rejects all additional, inconsistent, or conflicting terms, whether printed or otherwise set forth in any purchase order or other communication from the Client to the LAB. The invalidity or unenforceability in whole or in part of any provision, tern or condition hereof shall not affect in any way the validity or enforceability of the remainder of the Terms and Conditions. No waiver by LAB of any provision, term, or condition hereof or of any breach by or obligation of the Client hereunder shall constitute a waiver of such provision, term, or condition on any other occasion or a waiver of any other breach by or obligation of the Client. This agreement shall be administered and interpreted under the laws of the state which services are procured.

Warranty. Recognizing that the nature of many samples is unknown and that some may contain potentially hazardous components, LAB warrants only that it will perform testing services, obtain findings, and prepare reports in accordance with generally accepted analytical laboratory principles and practices at the time of performance of services. LAB makes no other warranty, express or implied.

Scope and Compensation. LAB agrees to perform the services described in the chain of custody to which these terms and conditions are attached. Unless the parties agree in writing to the contrary, the duties of LAB shall not be construed to exceed the services specifically described. LAB wi use LAB default method for all tests unless specified otherwise on the Work Order.
Payment terms are net 30 days from the date of invoice. All overdue payments are subject to an interest charge of one and one-half percent (1-1/2%) per month or a portion thereof. Client shall also be responsible for costs of collection, including payment of reasonable attorney fees if such expense is incurred. The prices, unless stated, do not include any sale, use or other taxes. Such taxes will be added to invoice prices when required.

Prices. Compensation for services performed will be based on the current Lab Analytical Fee Schedule or on quotations agreed to in writing by the parties. Turnaround time based charges are determined from the time of resolution of all work order questions. Testimony, court appearances or data compilation for legal action will be charged separately. Evaluation and reporting of initial screening runs may incur additional fees.

Limitations of Liability. In the event of any error, omission, or other professional negligence, the sole and exclusive responsibility of LAB shall be to re-perform the deficient work at its own expense and LAB shall have no other liability whatsoever. All claims shall be deemed waived unless made in writing and received by LAB within ninety (90) days following completion of services.
LAB shall have no liability, obligation, or responsibility of any kind for losses, costs, expenses, or other damages (including but not limited to any special, direct, incidental or consequential damages) with respect to LAB's services or results.
All results provided by LAB are strictly for the use of its clients and LAB is in no way responsible for the use of such results by clients or third parties. All reports should be considered in their entirety, and LAB is not responsible for the separation, detachment, or other use of any portion of these reports. Client may not assign the lab report without the written consent of the LAB.
Client covenants and agrees, at its/his/her sole expense, to indemnify, protect, defend, and save harmless the LAB from and against any and all damages, losses, liabilities, obligations, penalties, claims, litigation, demands, defenses, judgments, suits, actions, proceedings, costs, disbursements and/or expenses (including, without limitation attorneys' and experts' fees and disbursements) of any kind whatsoever which may at any time be imposed upon, incurred by or asserted or awarded against client relating to, resulting from or arising out of (a) the breach of this agreement by this client, (b) the negligence of the client in handling, delivering or disclosing any hazardous substance, (c) the violation of the Client of any applicable law, (d) non-compliance by the Client with any environmental permit or (e) a material misrepresentation in disclosing the materials to be tested.

Hazard Disclosure. Client represents and warrants that any sample delivered to LAB will be preceded or accompanied by complete written disclosure of the presence of any hazardous substances known or suspected by Client. Client further warrants that any sample containing any hazardous substance that is to be delivered to LAB will be packaged, labeled, transported, and delivered properly and in accordance with applicable laws.

Sample Handling. Prior to LAB's acceptance of any sample (or after any revocation of acceptance), the entire risk of loss or of damage to such sample remains with Client. Samples are accepted when receipt is acknowledged on chain of custody documentation. In no event will LAB have any responsibility for the action or inaction of any carrier shipping or delivering any sample to or from LAB premises.
Client authorizes LAB to proceed with the analysis of samples as received by the laboratory, recognizing that any samples not in compliance with all current DOH-ELAP-NELAP requirements for containers, preservation or holding time will be noted as such on th final report.
Disposal of hazardous waste samples is the responsibility of the Client. If the Client does not wish such samples returned, LAB may add storage and disposal fees to the final invoice. Maximum storage time for samples is 30 days after completion of analysis unless modified by applicable state or federal laws. Client will be required to give the LAB written instructions concerning disposal of these samples.
LAB reserves the absolute right, exercisable at any time, to refuse to receive delivery of, refuse to accept, or revoke acceptance of any sample, which, in the sole judgment of LAB (a) is of unsuitable volume, (b) may be or become unsuitable for or may pose a risk in handling, transport, or processing for any health, safety, environmental or other reason whether or not due to the presence in the sample of any hazardous substance, and whether or not such presence has been disclosed to LAB by Client or (c) if the condition or sample date make the sample unsuitable for analysis.

Legal Responsibility. LAB is solely responsible for performance of this contract, and no affiliated company, director, officer, employee, or agent shall have any legal responsibility hereunder, whether in contract or tort including negligence.

Assignment. LAB may assign its performance obligations under this contract to other parties, as it deems necessary. LAB shall disclose to Client any assignee (subcontractor) by ELAP ID # on the submitted final report.

Force Majeure. LAB shall have no responsibility or liability to the Client for any failure or delay in performance by LAB, which results in whole or in part from any cause or circumstance beyond the reasonable control of LAB. Such causes and circumstances shall include, but not limited to, acts of God, acts or orders of any government authority, strikes or other labor disputes, natural disasters, accidents, wars, civil disturbances, difficulties or delays in transportation, mail or delivery services, inability to obtain sufficient services or supplies from LAB's usual suppliers, or any other cause beyond LAB's reasonable control.

Law. This contract shall be continued under the laws of the State of New York without regard to its conflicts of laws provision.

CHAIN OF CUSTODY

ACS

REPORT TO:		INVOICE TO:		LAB PROJECT ID
CLIENT:	ACS	CLIENT:	Same	213941
ADDRESS:	P.O. Box 986	ADDRESS:		Quotation #:
CITY:	Grand Island STATE: NY ZIP: 14072	CITY:	STATE: ZIP:	Email:
PHONE:	716-480-2125	PHONE:		rschopra@yahoo.com
ATTN:	Raj Chopra	ATTN:		

PROJECT REFERENCE

303 Woodward

Matrix Codes:

AQ - Aqueous Liquid; NQ - Non-Aqueous Liquid; WA - Water; WG - Groundwater; DW - Drinking Water; WW - Wastewater; SO - Soil; SL - Sludge; SD - Solid; PT - Paint; WP - Wipe; CK - Caulk; OL - Oil; AR - Air

REQUESTED ANALYSIS

DATE COLLECTED	TIME COLLECTED	COMPOSITE	GRAB	SAMPLE IDENTIFIER	MATRIX CODES	NUMBER OF CONTAINERS	VOC	SVOC	Metals	Herb / Pesticides	PCB's	pH	Ignitability	TPH	Cyanide and Sulf		REMARKS	PARADIGM LAB SAMPLE NUMBER		
8/30/21		X		303	SO	3	X	X	X		X		X				TCLP	O	I	A
																	A for TCLP extract. @ 8/31/21			

Turnaround Time		Report Supplements			
Availability contingent upon lab approval; additional fees may apply.					
Standard 5 day	X	Batch QC		Basic EDD	
Rush 3 day		Category A		NYSDEC EDD	
Rush 2 day		Category B			
Rush 1 day					
Other please indicate:		Other please indicate:		Other EDD please indicate:	

Sampled By	8/31/21 Date/Time	Total Cost:
Relinquished By	8/30/21 Date/Time	
Received By Brian Zach	8/31/21 9:00 Date/Time	P.I.F.
Received @ Lab By	8/31/21 14:59 Date/Time	

4°C iced 8/31/21 14:50

See additional page for sample condition

PARADIGM

Chain of Custody Supplement

Client: ACS **Completed by:** Glenn Pezzulo

Lab Project ID: 213941 **Date:** 8/31/21

Sample Condition Requirements

Per NELAC/ELAP 210/241/242/243/244

Condition	NELAC compliance with the sample condition requirements upon receipt: Yes	No	N/A
Container Type	X		
Comments			
Transferred to method-compliant container			X
Headspace (<1 mL)		X TCLP VOA	X
Comments			
Preservation			X
Comments			
Chlorine Absent (<0.10 ppm per test strip)			X
Comments			
Holding Time	X		
Comments			
Temperature	X		X Metals
Comments	4 °C iced		
Compliant Sample Quantity/Type	X		
Comments			

NEW YORK STATE
DEPARTMENT OF ENVIRONMENTAL CONSERVATION

Request to Import/Reuse Fill or Soil

*This form is based on the information required by DER-10, Section 5.4(e). Use of this form is not a substitute for reading the applicable Technical Guidance document. *

SECTION 1 – SITE BACKGROUND

The allowable site use is: Commercial or Industrial Use

Have Ecological Resources been identified? no

Is this soil originating from the site? no

How many cubic yards of soil will be imported/reused? 0-50

If greater than 1000 cubic yards will be imported, enter volume to be imported:

SECTION 2 – MATERIAL OTHER THAN SOIL

Is the material to be imported gravel, rock or stone? yes

Does it contain less than 10%, by weight, material that would pass a size 10 sieve? yes

Does it contain less than 10%, by weight, material that would pass a size 100 sieve? yes

Is this virgin material from a permitted mine or quarry? yes

Is this material recycled concrete or brick from a DEC registered processing facility? no

SECTION 3 - SAMPLING

Provide a brief description of the number and type of samples collected in the space below:This request is for 2 crushed rock. This material meets the DER-10 section 5.4 (e)5 requirement.

No samples collected

Example Text: 5 discrete samples were collected and analyzed for VOCs. 2 composite samples were collected and analyzed for SVOCs, Inorganics & PCBs/Pesticides.

If the material meets requirements of DER-10 section 5.4(e)5 (other material), no chemical testing needed.

SECTION 3 CONT'D - SAMPLING

Provide a brief written summary of the sampling results or attach evaluation tables (compare to DER-10, Appendix 5):

N/A

Example Text: Arsenic was detected up to 17 ppm in 1 (of 5) samples; the allowable level is 16 ppm.

If Ecological Resources have been identified use the "If Ecological Resources are Present" column in Appendix 5.

SECTION 4 – SOURCE OF FILL

Name of person providing fill and relationship to the source:

David Youngblood_Lafarge Lockport

Location where fill was obtained:

400HinmanRd,Lockport,NY14094

Identification of any state or local approvals as a fill source:

If no approvals are available, provide a brief history of the use of the property that is the fill source:

Virgin stone or crushed limestone from Holcim (former Lafarge) quarry in Lockport, NY

The information provided on this form is accurate and complete.

Steven Erck Digitally signed by Steven Erck
DN: C=US, E=serck@montante.com, O=Montante Solar, OU=Montante Solar, CN=Steven Erck
Date: 2023.01.31 13:37:53-05'00'

Signature

1/31/23

Date

Steven Erck

Print Name

Montante Solar

Firm

Revised August 2014

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

60-Day Advance Notification of Site Change of Use, Transfer of Certificate of Completion, and/or Ownership

Required by 6NYCRR Part 375-1.11(d) and 375-1.9(f)

To be submitted at least 60 days prior to change of use to:

Chief, Site Control Section
New York State Department of Environmental Conservation
Division of Environmental Remediation, 625 Broadway
Albany NY 12233-7020

I. Site Name: Excelsior Steel Ball Company **DEC Site ID No.** V00685

II. Contact Information of Person Submitting Notification:

Name: John Hood

Address1: Erie County-Department of Environment and Planning

Address2: 95 Franklin Street

Phone: 716-858-7897 E-mail: john.hood@erie.gov

III. Type of Change and Date: Indicate the Type of Change(s) (check all that apply):

- ☐ Change in Ownership or Change in Remedial Party(ies)
- ☐ Transfer of Certificate of Completion (CoC)
- ☑ Other (e.g., any physical alteration or other change of use)

Proposed Date of Change (mm/dd/yyyy): 10/30/2020

IV. Description: Describe proposed change(s) indicated above and attach maps, drawings, and/or parcel information.

The proposed project involves the installation of 1,200 ground mounted solar panels for a 450 kW solar array on the remediated vacant land. Montante Solar was awarded the project through a competitive RFP process facilitated by Erie County. Copies of the site Soil Management Plan and project drawings are attached.

If "Other," the description must explain and advise the Department how such change may or may not affect the site's proposed, ongoing, or completed remedial program (attach additional sheets if needed).

As described in the NYSDEC approved site Soil Management Plan, the proposed site work involving installation of ground mounted solar arrays is designed to have very minimal soil disturbance in the ground, with the most disturbance expected with the installation of a utility pole (maximum 5 yards of material). The supports for solar panels will be direct pushed into the ground and all electrical conduit will be above ground.

V. Certification Statement: Where the change of use results in a change in ownership or in responsibility for the proposed, ongoing, or completed remedial program for the site, the following certification must be completed (by owner or designated representative; see §375-1.11(d)(3)(i)):

I hereby certify that the prospective purchaser and/or remedial party has been provided a copy of any order, agreement, Site Management Plan, or State Assistance Contract regarding the Site's remedial program as well as a copy of all approved remedial work plans and reports.

Name: _____ 1/13/2023
(Signature) (Date)

John Hood
(Print Name)

Address1: Erie County Department of Environment and Planning

Address2: 95 Franklin Street

Phone: 716-858-7897 E-mail: john.hood@erie.gov

VI. Contact Information for New Owner, Remedial Party, or CoC Holder: If the site will be sold or there will be a new remedial party, identify the prospective owner(s) or party(ies) along with contact information. If the site is subject to an Environmental Easement, Deed Restriction, or Site Management Plan requiring periodic certification of institutional controls/engineering controls (IC/ECs), indicate who will be the certifying party (attach additional sheets if needed).

☐ Prospective Owner ☐ Prospective Remedial Party ☐ Prospective Owner Representative

Name: _____

Address1: _____

Address2: _____

Phone: _____ E-mail: _____

Certifying Party Name: _____

Address1: _____

Address2: _____

Phone: _____ E-mail: _____

VII. Agreement to Notify DEC after Transfer: If Section VI applies, and all or part of the site will be sold, a letter to notify the DEC of the completion of the transfer must be provided. If the current owner is also the holder of the CoC for the site, the CoC should be transferred to the new owner using DEC's form found at http://www.dec.ny.gov/chemical/54736.html. This form has its own filing requirements (see 6NYCRR Part 375-1.9(f)).

Signing below indicates that these notices will be provided to the DEC within the specified time frames. If the sale of the site also includes the transfer of a CoC, the DEC agrees to accept the notice given in VII.3 below in satisfaction of the notice required by VII.1 below (which normally must be submitted within 15 days of the sale of the site).

Within 30 days of the sale of the site, I agree to submit to the DEC:

1. the name and contact information for the new owner(s) (see §375-1.11(d)(3)(ii));
2. the name and contact information for any owner representative; and
3. a notice of transfer using the DEC's form found at http://www.dec.ny.gov/chemical/54736.html (see §375-1.9(f)).

Name: _____ _____

(Signature) (Date)

_____

(Print Name)

Address1: _____

Address2: _____

Phone: _____ E-mail: _____

Continuation Sheet

☐ Prospective Owner/Holder ☐ Prospective Remedial Party ☐ Prospective Owner Representative
Name: ____________________
Address1: ____________________
Address2: ____________________
Phone: ____________________ E-mail: ____________________

☐ Prospective Owner/Holder ☐ Prospective Remedial Party ☐ Prospective Owner Representative
Name: ____________________
Address1: ____________________
Address2: ____________________
Phone: ____________________ E-mail: ____________________

☐ Prospective Owner/Holder ☐ Prospective Remedial Party ☐ Prospective Owner Representative
Name: ____________________
Address1: ____________________
Address2: ____________________
Phone: ____________________ E-mail: ____________________

☐ Prospective Owner/Holder ☐ Prospective Remedial Party ☐ Prospective Owner Representative
Name: ____________________
Address1: ____________________
Address2: ____________________
Phone: ____________________ E-mail: ____________________

☐ Prospective Owner/Holder ☐ Prospective Remedial Party ☐ Prospective Owner Representative
Name: ____________________
Address1: ____________________
Address2: ____________________
Phone: ____________________ E-mail: ____________________

☐ Prospective Owner/Holder ☐ Prospective Remedial Party ☐ Prospective Owner Representative
Name: ____________________
Address1: ____________________
Address2: ____________________
Phone: ____________________ E-mail: ____________________

New York State Department of Environmental Conservation

Instructions for Completing the 60-Day Advance Notification of Site Change of Use, Transfer of Certificate of Completion (CoC), and/or Ownership Form

Submit to: Chief, Site Control Section, New York State Department of Environmental Conservation, Division of Environmental Remediation, 625 Broadway, Albany NY 12233-7020

Section I	**Description**
Site Name	Official DEC site name. (see http://www.dec.ny.gov/cfmx/extapps/derexternal/index.cfm?pageid=3)
DEC Site ID No.	DEC site identification number.

Section II	**Contact Information of Person Submitting Notification**
Name	Name of person submitting notification of site change of use, transfer of certificate of completion and/or ownership form.
Address1	Street address or P.O. box number of the person submitting notification.
Address2	City, state and zip code of the person submitting notification.
Phone	Phone number of the person submitting notification.
E-mail	E-mail address of the person submitting notification.

Section III	**Type of Change and Date**
Check Boxes	Check the appropriate box(s) for the type(s) of change about which you are notifying the Department. Check all that apply.
Proposed Date of Change	Date on which the change in ownership or remedial party, transfer of CoC, or other change is expected to occur.

Section IV	**Description**
Description	For each change checked in Section III, describe the proposed change. Provide all applicable maps, drawings, and/or parcel information. If "Other" is checked in Section III, explain how the change may affect the site's proposed, ongoing, or completed remedial program at the site. Please attach additional sheets, if needed.

Section V Certification Statement

This section must be filled out if the change of use results in a change of ownership or responsibility for the proposed, ongoing, or completed remedial program for the site. When completed, it provides DEC with a certification that the prospective purchaser has been provided a copy of any order, agreement, or State assistance contract as well as a copy of all approved remedial work plans and reports.

Name	The owner of the site property or their designated representative must sign and date the certification statement. Print owner or designated representative's name on the line provided below the signature.
Address1	Owner or designated representative's street address or P.O. Box number.
Address2	Owner or designated representative's city, state and zip code.
Phone	Owner or designated representative's phone number.
E-Mail	Owner or designated representative's E-mail.

Section VI Contact Information for New Owner, Remedial Party, and CoC Holder (if a CoC was issued)

Fill out this section only if the site is to be sold or there will be a new remedial party. Check the appropriate box to indicate whether the information being provided is for a Prospective Owner, CoC Holder (if site was ever issued a COC), Prospective Remedial Party, or Prospective Owner Representative. Identify the prospective owner or party and include contact information. A Continuation Sheet is provided at the end of this form for additional owner/party information.

Name	Name of Prospective Owner, Prospective Remedial Party or Prospective Owner Representative.
Address1	Street address or P.O. Box number for the Prospective Owner, Prospective Remedial Party, or Prospective Owner Representative.
Address2	City, state and zip code for the Prospective Owner, Prospective Remedial Party, or Prospective Owner Representative.
Phone	Phone number for the Prospective Owner, Prospective Remedial Party or Prospective Owner Representative.
E-Mail	E-mail address of the Prospective Owner, Prospective Remedial Party or Prospective Owner Representative.

If the site is subject to an Environmental Easement, Deed Restriction, or Site Management Plan requiring periodic certification of institutional controls/engineering controls (IC/EC), indicate who will be the certifying party(ies). Attach additional sheets, if needed.

Certifying Party	
Name	Name of Certifying Party.
Address1	Certifying Party's street address or P.O. Box number.
Address2	Certifying Party's city, state and zip code.
Phone	Certifying Party's Phone number.
E-Mail	Certifying Party's E-mail address.

Section VII Agreement to Notify DEC After Property Transfer/Sale

This section must be filled out for all property transfers of all or part of the site. If the site also has a CoC, then the CoC shall be transferred using DEC's form found at http://www.dec.ny.gov/chemical/54736.html

Filling out and signing this section of the form indicates you will comply with the post transfer notifications within the required timeframes specified on the form. If a CoC has been issued for the site, the DEC will allow 30 days for the post transfer notification so that the "Notice of CoC Transfer Form" and proof of it's filing can be included. Normally the required post transfer notification must be submitted within 15 day (per 375-1.11(d)(3)(ii)) when no CoC is involved.

Name	Current property owner must sign and date the form on the designated lines. Print owner's name on the line provided.
Address1	Current owner's street address.
Address2	Current owner's city, state and zip code.

Appendix 7

Enclosure 2

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
Site Management Periodic Review Report Notice
Institutional and Engineering Controls Certification Form

Site Details **Box 1**

Site No. **V00685**

Site Name Excelsior Steel Ball Company

Site Address: 303 Woodward Avenue Zip Code: 14150
City/Town: Tonawanda
County: Erie
Site Acreage: 2.190

Reporting Period: January 01, 2018 to January 01, 2023

	YES	NO
1. Is the information above correct?	☒	☐
If NO, include handwritten above or on a separate sheet.		
2. Has some or all of the site property been sold, subdivided, merged, or undergone a tax map amendment during this Reporting Period?	☒	☐
3. Has there been any change of use at the site during this Reporting Period (see 6NYCRR 375-1.11(d))?	☒	☐
4. Have any federal, state, and/or local permits (e.g., building, discharge) been issued for or at the property during this Reporting Period?	☒	☐
If you answered YES to questions 2 thru 4, include documentation or evidence that documentation has been previously submitted with this certification form.		
5. Is the site currently undergoing development?	☐	☒

Box 2

	YES	NO
6. Is the current site use consistent with the use(s) listed below? Commercial and Industrial	☒	☐
7. Are all ICs in place and functioning as designed?	☒	☐

IF THE ANSWER TO EITHER QUESTION 6 OR 7 IS NO, sign and date below and DO NOT COMPLETE THE REST OF THIS FORM. Otherwise continue.

A Corrective Measures Work Plan must be submitted along with this form to address these issues.

Signature of Owner, Remedial Party or Designated Representative Date

SITE NO. V00685 **Box 3**

Description of Institutional Controls

Parcel	Owner	Institutional Control
65.12-1-1	County of Erie	Ground Water Use Restriction Soil Management Plan Landuse Restriction

Unless prior written approval by the Department; there shall be no construction, use or occupancy of the Property that results in the disturbance or excavation of the Property which results in unacceptable human exposure to contaminated soils.

Institutional Control Details for Site No. V00685
Parcel: 65.12-1-1

Voluntary Agreement No. B9-0468-03-10

Declaration of Convenants and Restrictions filed January 5, 2011. Summarized and pertains to and as follows:

1. Parcel; 65.12-1-1 as bounded and described on the survey; in portion or whole to current and future owners. Deed book:11165. Deed page:7533.
2. Unless prior written approval by the Department; there shall be no construction, use or occupancy of the Property that results in the disturbance or excavation of the Property which results in unacceptable human exposure to contaminated soils.
3. Owner of the Property shall prohibit the Property from ever being used for purposes other than industrial/commercial use (day care, child care, and medical care uses shall not be allowed) without written waiver of such from the Department or Relevant Agency.
4. Owner of the Property shall prohibit the use of the groundwater without treatment rendering it safe for drinking water or industrial purposes, as appropriate, unless the user first obtains to do so from the Relevant Agency or the Department.
5. Owner shall continue in full force and in effect with maintenance of any and all Institutional and Engineering Controls including compliance with the Soils Management Plan.
6. Owner shall allow the Department, its agents, employees, or other representatives of the State to enter and inspect the Property in a reasonable manner and at reasonable times to assure compliance with the above stated restrictions.

Box 4

Description of Engineering Controls

Parcel	Engineering Control
65.12-1-1	Cover System

Two foot Cover System.

Box 5

Periodic Review Report (PRR) Certification Statements

1. I certify by checking "YES" below that:

   a) the Periodic Review report and all attachments were prepared under the direction of, and reviewed by, the party making the Engineering Control certification;

   b) to the best of my knowledge and belief, the work and conclusions described in this certification are in accordance with the requirements of the site remedial program, and generally accepted engineering practices; and the information presented is accurate and compete.

YES	NO
☒	☐

2. For each Engineering control listed in Box 4, I certify by checking "YES" below that all of the following statements are true:

   (a) The Engineering Control(s) employed at this site is unchanged since the date that the Control was put in-place, or was last approved by the Department;

   (b) nothing has occurred that would impair the ability of such Control, to protect public health and the environment;

   (c) access to the site will continue to be provided to the Department, to evaluate the remedy, including access to evaluate the continued maintenance of this Control;

   (d) nothing has occurred that would constitute a violation or failure to comply with the Site Management Plan for this Control; and

   (e) if a financial assurance mechanism is required by the oversight document for the site, the mechanism remains valid and sufficient for its intended purpose established in the document.

YES	NO
☒	☐

IF THE ANSWER TO QUESTION 2 IS NO, sign and date below and DO NOT COMPLETE THE REST OF THIS FORM. Otherwise continue.

A Corrective Measures Work Plan must be submitted along with this form to address these issues.

Signature of Owner, Remedial Party or Designated Representative

Date

IC CERTIFICATIONS
SITE NO. V00685

Box 6

SITE OWNER OR DESIGNATED REPRESENTATIVE SIGNATURE

I certify that all information and statements in Boxes 1,2, and 3 are true. I understand that a false statement made herein is punishable as a Class "A" misdemeanor, pursuant to Section 210.45 of the Penal Law.

I John Hood (print name) at 95 Franklin St, Buffalo, NY 14202 (print business address),

am certifying as Owner Designated Representative (Owner or Remedial Party)

for the Site named in the Site Details Section of this form.

Signature of Owner, Remedial Party, or Designated Representative Rendering Certification

May 18, 2023
Date

EC CERTIFICATIONS

Box 7

Qualified Environmental Professional Signature

I certify that all information in Boxes 4 and 5 are true. I understand that a false statement made herein is punishable as a Class "A" misdemeanor, pursuant to Section 210.45 of the Penal Law.

I Steven Erck (print name) at 2760 Kenmore Ave, Tonawanda, NY 14150 (print business address),

am certifying as a Qualified Environmental Professional for the TM Montante Solar Developments (Owner or Remedial Party)

As it relates to installation of utility pole sleeve and conduit installed as part of the solar project only

Signature of Qualified Environmental Professional, for the Owner or Remedial Party, Rendering Certification	Stamp (Required for PE)	May 22, 2023 Date