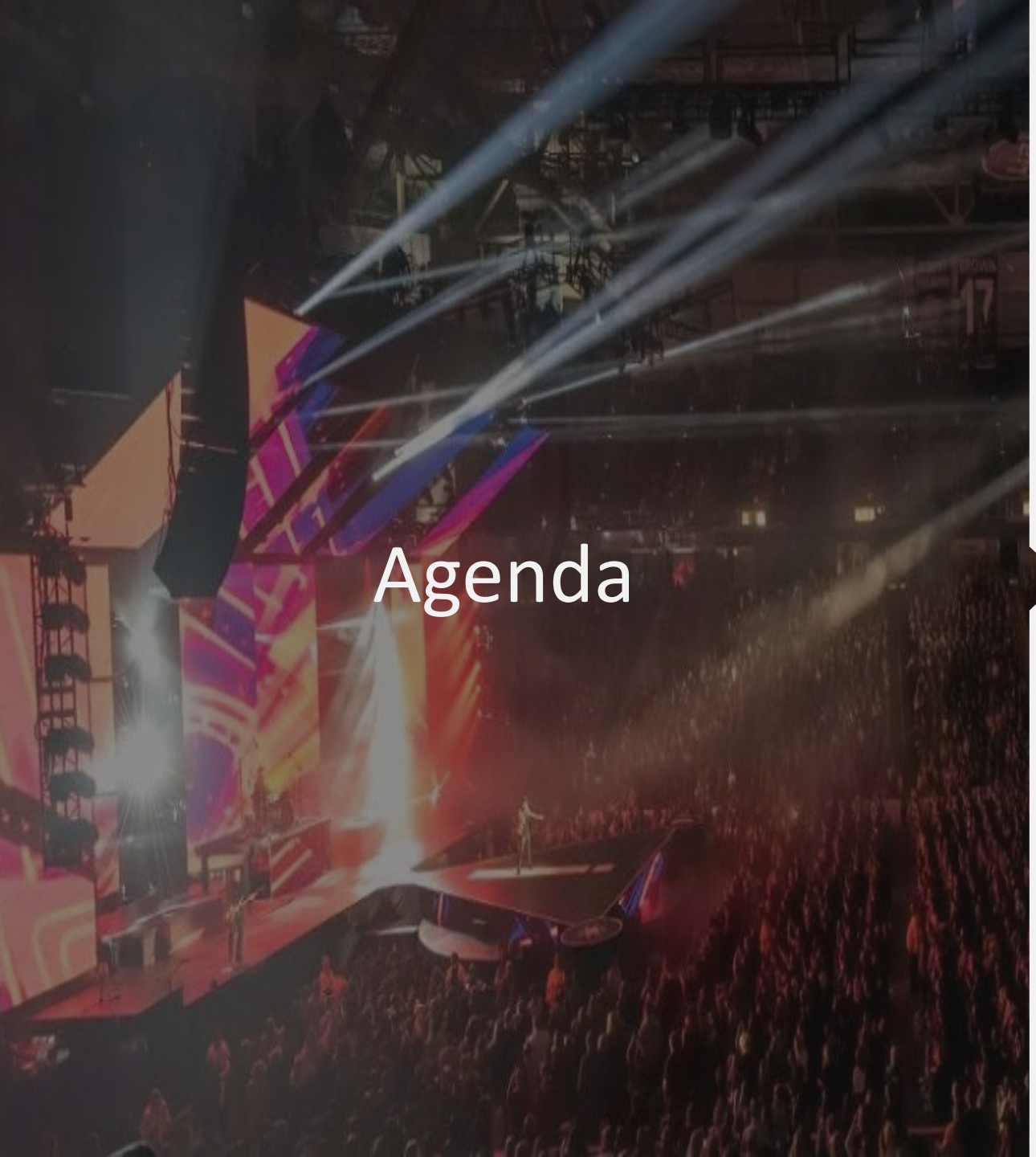
centrica
Business Solutions


Prepared by Centrica Business Solutions

# MVP Arena Parking Garage Solar PV Canopy and EV Placement

November 13, 2024



# Agenda

MVP ARENA

- Project Goals
- Solar Photovoltaic (PV) Scope & System Overview
- Electric Vehicle (EV) Charging Scope & Placement Overview
- Project Assumptions
- Financials & Cash Flows
- Next Steps: Project Timeline

# Project Goals

**Supporting New York's Clean Energy Standard with renewable sourced energy, along with the County's commitment to "going green" and decarbonization. The need for EV charging based on County's clean fleet commitment to allow for full fleet changeover as well as public access to charging. The MVP Arena parking garage is an ideal location for this type of project.**


Proposed Project:

- ☑ Solar PV
- ☑ Electric Vehicle Charging Stations

**Estimated Greenhouse Gas (GHG) reduction of 19,142 metric tons of CO2**

# Solar PV System

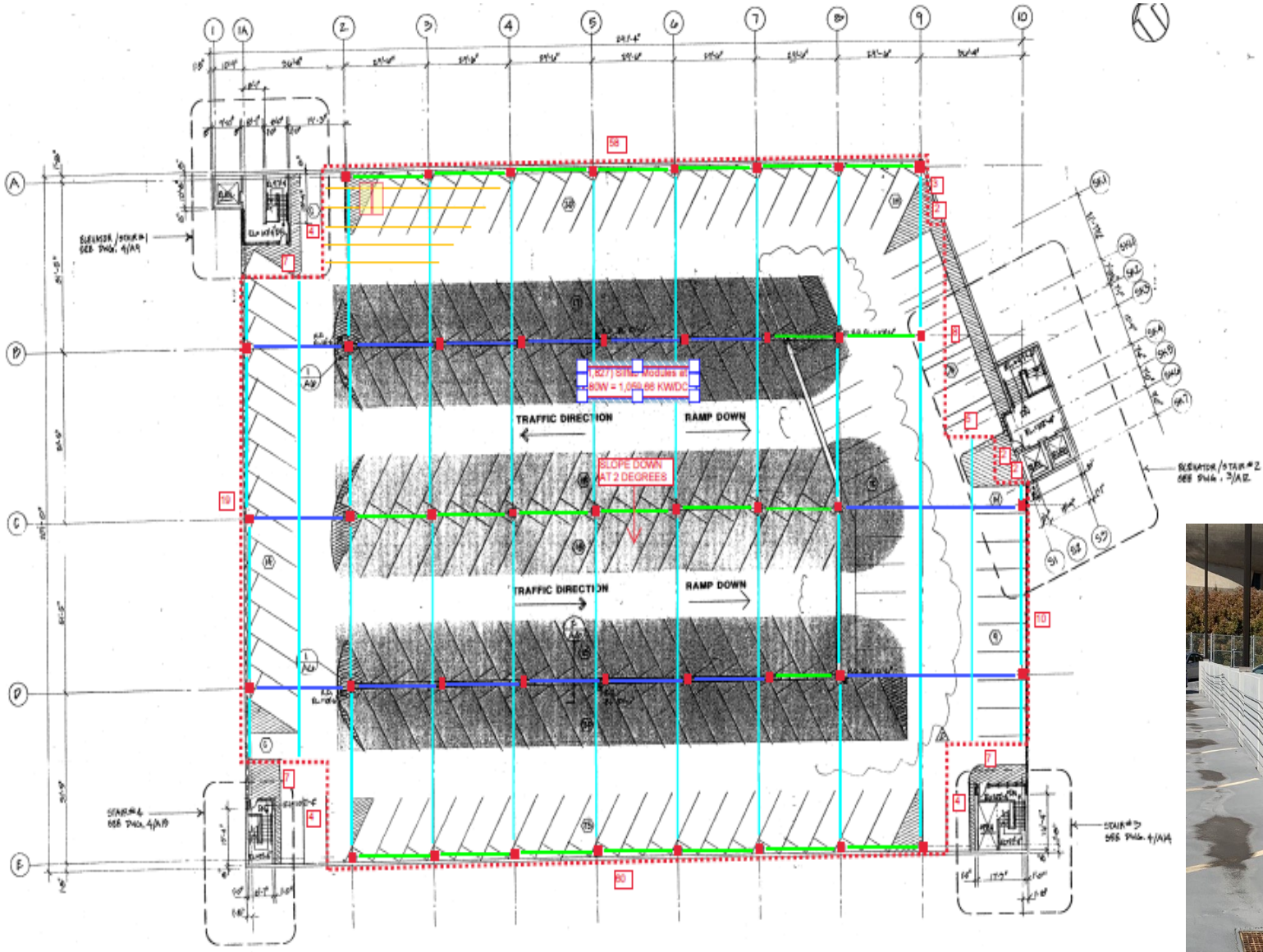
# Solar PV: Scope & Overview

Carport canopy spanning 6th floor of parking garage with snow guards

- **Ancillary equipment located on ground floor adjacent to southwest side of parking garage**
- **(1,827) 580W modules for a 1.06 MW DC system**
- **(12) 60KW inverters for a 720 KW AC system**
- **Estimated 1.15 GWH generated in Year 1**
- **Estimated Year 1 Cost Savings using VDER: $154,552**
- **NYSERDA NY-Sun Rebate: $52,983**
- **Total IRA 40% Direct Pay with Domestic Content Adder: $1,997,635**

# Solar PV: Framing Design

- Most cost-effective design the most efficient foundations for this unique project.
- Structural analysis completed August 2023.
- Southwest edge of canopy height 8’ with northern edge at approximately 20’.
- Under canopy LED lighting included.
- Framing structure (steel) complies with Domestic Content requirements.
- Column Type – Long Span Super Structure.
- Preliminary design per Occupancy Classification S-2 Low-Hazard Storage Open Parking Garage.
- NYS Building Code 2020.




# Solar PV: American Made!

- Silfab 580W Tier I Solar Modules – Manufactured in the USA
- Silfab bifacial module for increased power output.
- Silfab glass is tempered and anti-reflective coated.
- Silfab offers a 30-Year Power Performance Warranty
- Silfab offers a 12-Year Product Workmanship Warranty extendable to 25 Years.
- TerraSmart - Meets the Build America Buy America Act standards.
- TerraSmart steel is 100% sourced and manufactured in Cincinnati, Ohio.
- TerraSmart 20-Year Limited Warranty.

SILFAB SOLAR®

SILFAB COMMERCIAL NTC

NEXT-GENERATION N-TYPE CELL TECHNOLOGY

**Manufactured exclusively in the USA.**

- Improved Shade Tolerance
- Improved Low-Light Performance
- Increased Performance in High Temperatures
- Efficient Bifacial Energy Yield
- Enhanced Durability
- Reduced Degradation Rate
- 25-Year Product Warranty/ 30-Year Performance Warranty

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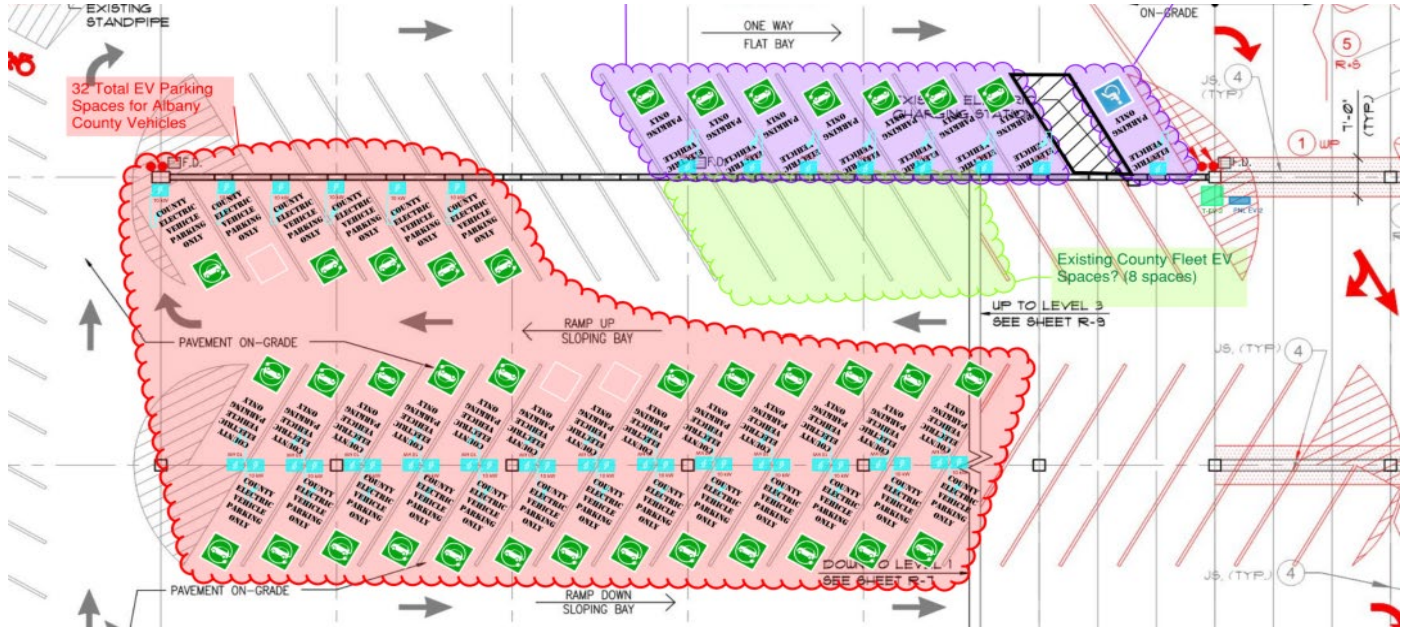
White Plains, NY project

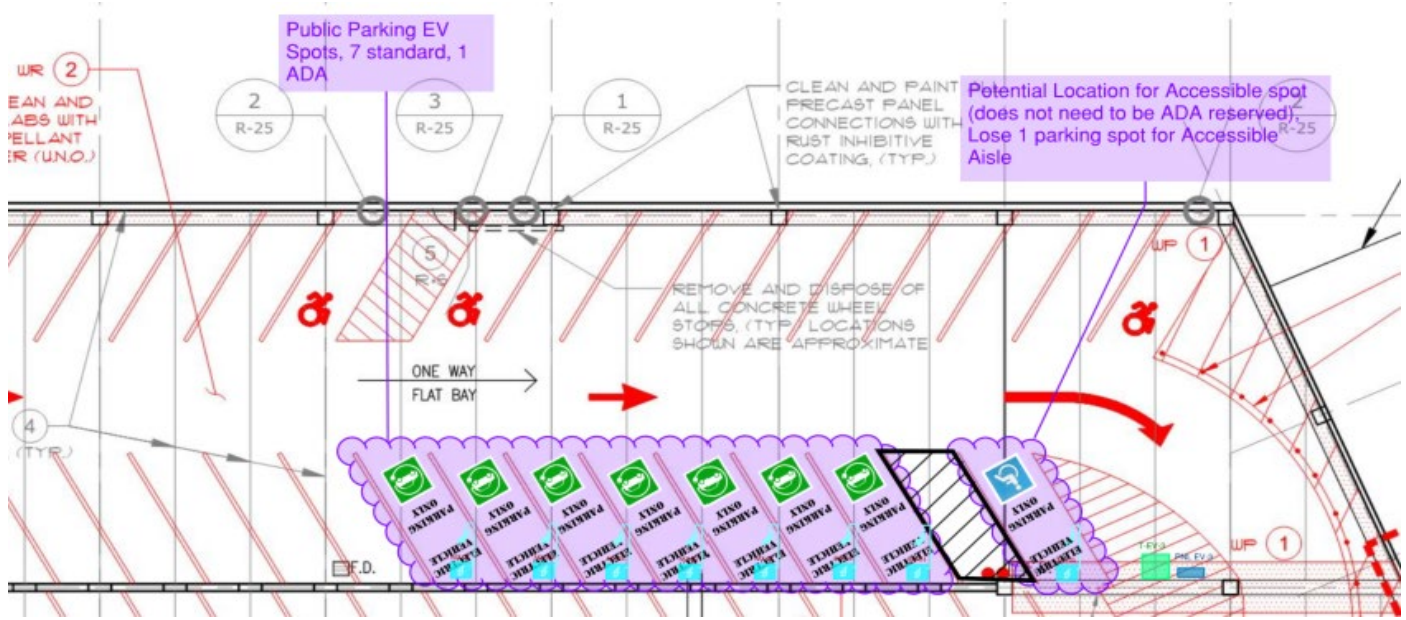
# EV Charging System

# EV Placement: Overview

52 EV charging stations installed with infrastructure to support a total of 72 EV charging stations

- **32 EV charging stations for County fleet on bottom floor**
- **4 public EV charging stations per floor (floors 2-6) with infrastructure to support a total of 8 per floor**
- **48A Stations, able to output maximum of 9.9kW**
- **Estimated Rebates: $488,691**
- **Estimated IRA Federal Refueling Direct Pay : $686,407**
- **Estimated Annual Fuel Cost Savings: $16,941**

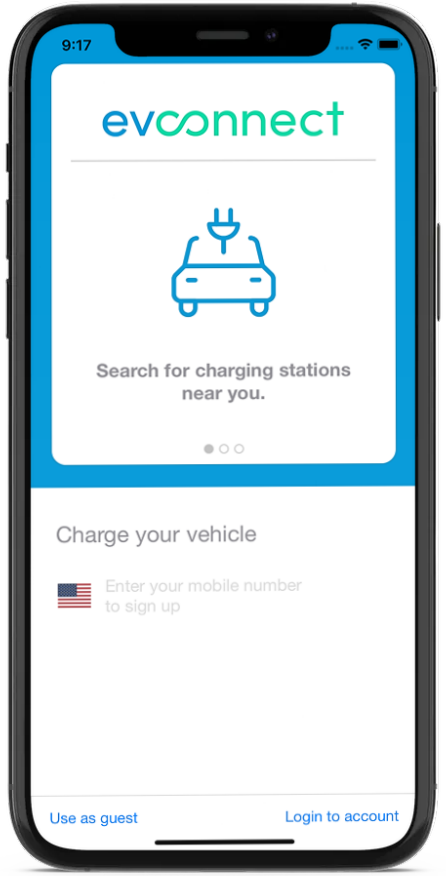


# EV:
# Ease of Use

Extended charging cables of 25’ to reach to either side of a vehicle

- **Cable Management retractable clamp on each pedestal to keep cables off ground**
- **Currently specifying J1772 port configuration, may adjust to a mix of NACS configurations when available (estimated mid-2025, based on County feedback)**
- **Fleet stations activated via RFID card**
- **Public stations payment processing via QR code and EVConnect app**
- **5-year O&M and software services included**

# Project Assumptions and Considerations

1. Centrica included Davis-Bacon labor rates for this County project with apprenticeship requirements on labor.
2. Project requires new National Grid services to be installed; the solar project is considered a “Behind-the-Meter” interconnection with upgrades as per the National Grid CESIR Study.
3. The Parking Garage Structural review determined that the existing structure could support the added weight of the proposed solar canopy, EV vehicles, and associated equipment with no structural upgrades.
4. EV – 5 Year Term - 24/7 driver support via app and phone number, 72-hour on-site repair dispatch, Automated alerts to EVConnect Support Team, Real Time Performance Management, Routine Network/Firmware updates and preventative maintenance.
5. NYSERDA - NY-SUN Rebate Block 21 At $.05/DCW or **$52,983**
6. National Grid EV Make-Ready Rebate: **$412,691**
7. NYSERDA EV Rebate: **$76,000**
8. Avoided utility savings is based on the NYSERDA Value of Distributed Energy (VDER) Calculator V3.1.
9. Inflation Reduction Act (IRA) – Centrica is showing base rate of 30% for EV and 40% for PV.

# Project Financials

***Cost includes National Grid costs along with Centrica costs to finish design and build**

****The County could be eligible for an extra 10% Direct Pay based on low-income area. Source: U.S. Department of Energy**

*****Centrica to provide annual O&M services on solar PV system**

| | |
|---|---|
| *Total Investment | $7,921,747 |
| Rebates Available | $541,674 |
| CEC Grant | $830,000 |
| **Solar PV IRA Direct Pay Value | $1,997,635 |
| EV IRA Refueling Property Direct Pay Value | $687,290 |
| Net Project Investment (After Rebates and Credits) | $3,865,148 |
| Annual Cost Savings | $168,392 |
| ***Annual O&M Services | ($8,954) |
| 30-Year Net Benefits | $3,288,383 |

# Cash Purchase - Cash Flow

| | UTILITY COST SAVINGS | | Financial Impact | | | | | | Inflation Reduction Act | | PROJECT CASH FLOW | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Year* | *Solar kWh* | *$/kWh Avoided Cost* | *IGA Capital Cost* | *Solar O&M Costs* | *State Incentives* | *EV Fuel Cost Savings* | *NYSERDA CEC Grant* | *Solar PV Avoided Cost Savings* | *40% IRA Solar PV Direct Pay* | *IRA EV Direct Pay* | *Annual* | *Cumulative* |
| 1 | 1,157,693 | $0.1335 | $ (7,921,747) | $ (8,954) | $ 541,674 | $ 8,471 | $ 830,000 | $ 154,552 | $ 1,997,635 | $ 687,290 | $ (3,690,829) | $ (3,690,829) |
| 2 | 1,134,539 | $0.1355 | $ - | $ (9,223) | $ - | $ 16,942 | | $ 153,730 | $ - | $ - | $ 182,307 | $ (3,508,522) |
| 3 | 1,130,795 | $0.1372 | $ - | $ (9,499) | $ - | $ 17,450 | | $ 155,145 | $ - | $ - | $ 184,579 | $ (3,323,943) |
| 4 | 1,127,064 | $0.1368 | $ - | $ (9,784) | $ - | $ 17,974 | | $ 154,182 | $ - | $ - | $ 184,500 | $ (3,139,443) |
| 5 | 1,123,344 | $0.1404 | $ - | $ (10,078) | $ - | $ 18,513 | | $ 157,718 | $ - | $ - | $ 188,944 | $ (2,950,499) |
| 6 | 1,119,637 | $0.1423 | $ - | $ (10,380) | $ - | $ 19,068 | | $ 159,324 | $ - | $ - | $ 191,488 | $ (2,759,011) |
| 7 | 1,115,942 | $0.1442 | $ - | $ (10,692) | $ - | $ 19,640 | | $ 160,919 | $ - | $ - | $ 194,047 | $ (2,564,964) |
| 8 | 1,112,260 | $0.1464 | $ - | $ (11,012) | $ - | $ 20,230 | | $ 162,835 | $ - | $ - | $ 196,957 | $ (2,368,007) |
| 9 | 1,108,589 | $0.1480 | $ - | $ (11,343) | $ - | $ 20,837 | | $ 164,071 | $ - | $ - | $ 199,217 | $ (2,168,790) |
| 10 | 1,104,931 | $0.1500 | $ - | $ (11,683) | $ - | $ 21,462 | | $ 165,740 | $ - | $ - | $ 201,940 | $ (1,966,850) |
| 11 | 1,101,285 | $0.1520 | $ - | $ (12,033) | $ - | $ 22,105 | | $ 167,395 | $ - | $ - | $ 204,682 | $ (1,762,168) |
| 12 | 1,097,650 | $0.1541 | $ - | $ (12,394) | $ - | $ 22,769 | | $ 169,148 | $ - | $ - | $ 207,553 | $ (1,554,615) |
| 13 | 1,094,028 | $0.1565 | $ - | $ (12,766) | $ - | $ 23,452 | | $ 171,215 | $ - | $ - | $ 210,773 | $ (1,343,843) |
| 14 | 1,090,418 | $0.1587 | $ - | $ (13,149) | $ - | $ 24,155 | | $ 173,049 | $ - | $ - | $ 213,793 | $ (1,130,050) |
| 15 | 1,086,820 | $0.1605 | $ - | $ (13,544) | $ - | $ 24,880 | | $ 174,435 | $ - | $ - | $ 216,401 | $ (913,649) |
| 16 | 1,083,233 | $0.1628 | $ - | $ (13,950) | $ - | $ 25,626 | | $ 176,350 | $ - | $ - | $ 219,575 | $ (694,073) |
| 17 | 1,079,658 | $0.1651 | $ - | $ (14,369) | $ - | $ 26,395 | | $ 178,252 | $ - | $ - | $ 222,773 | $ (471,300) |
| 18 | 1,076,095 | $0.1674 | $ - | $ (14,800) | $ - | $ 27,187 | | $ 180,138 | $ - | $ - | $ 225,996 | $ (245,304) |
| 19 | 1,072,544 | $0.1701 | $ - | $ (15,244) | $ - | $ 28,003 | | $ 182,440 | $ - | $ - | $ 229,673 | $ (15,631) |
| 20 | 1,069,005 | $0.1722 | $ - | $ (15,701) | $ - | $ 28,843 | | $ 184,083 | $ - | $ - | $ 232,733 | $ 217,102 |
| 21 | 1,065,477 | $0.1747 | $ - | $ (16,172) | $ - | $ 29,708 | | $ 186,139 | $ - | $ - | $ 236,249 | $ 453,350 |
| 22 | 1,061,961 | $0.1772 | $ - | $ (16,657) | $ - | $ 30,599 | | $ 188,180 | $ - | $ - | $ 239,793 | $ 693,143 |
| 23 | 1,058,457 | $0.1797 | $ - | $ (17,157) | $ - | $ 31,517 | | $ 190,205 | $ - | $ - | $ 243,366 | $ 936,509 |
| 24 | 1,054,964 | $0.1827 | $ - | $ (17,671) | $ - | $ 32,463 | | $ 192,742 | $ - | $ - | $ 247,498 | $ 1,184,007 |
| 25 | 1,051,482 | $0.1853 | $ - | $ (18,202) | $ - | $ 33,437 | | $ 194,840 | $ - | $ - | $ 251,239 | $ 1,435,246 |
| 26 | 1,048,013 | $0.1881 | $ - | $ (18,748) | $ - | $ 34,440 | | $ 292,940 | $ - | $ - | $ 351,031 | $ 1,786,276 |
| 27 | 1,044,554 | $0.1908 | $ - | $ (19,310) | $ - | $ 35,473 | | $ 300,732 | $ - | $ - | $ 360,566 | $ 2,146,842 |
| 28 | 1,041,107 | $0.1936 | $ - | $ (19,889) | $ - | $ 36,537 | | $ 308,732 | $ - | $ - | $ 370,361 | $ 2,517,203 |
| 29 | 1,037,671 | $0.1963 | $ - | $ (20,486) | $ - | $ 37,633 | | $ 316,945 | $ - | $ - | $ 380,422 | $ 2,897,625 |
| 30 | 1,034,247 | $0.1991 | $ - | $ (21,101) | $ - | $ 38,762 | | $ 325,376 | $ - | $ - | $ 390,758 | $ 3,288,383 |
| **Total** | **32,583,466** | | **$ (7,921,747)** | **$ (425,990)** | **$ 541,674** | **$ 774,569** | **$ 830,000** | **$ 5,841,550** | **$1,997,635** | **$ 687,290** | **$ 3,288,383** | |

# Bond Financing - Cash Flow

| | UTILITY COST SAVINGS | | Financial Impact | | | | | | Inflation Reduction Act | | PROJECT CASH FLOW | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | Solar kWh | $/kWh Avoided Cost | O&M Costs | Bond Payment | State Incentives | NYSERDA CEC Grant | EV Fuel Cost Savings | Solar PV Avoided Cost Savings | 34% IRA Solar PV Direct Pay | IRA EV Direct Pay | Annual | Cumulative |
| 1 | 1,157,693 | $0.1335 | $ (8,954) | $ (576,051) | $ 541,674 | $ 830,000 | $ 8,471 | $ 154,552 | $ 1,697,990 | $ 687,290 | $ 2,667,932 | $ 2,667,932 |
| 2 | 1,134,539 | $0.1355 | $ (9,223) | $ (576,051) | $ - | | $ 16,942 | $ 153,730 | | | $ (393,744) | $ 2,274,188 |
| 3 | 1,130,795 | $0.1372 | $ (9,499) | $ (576,051) | $ - | | $ 17,450 | $ 155,145 | | | $ (391,471) | $ 1,882,717 |
| 4 | 1,127,064 | $0.1368 | $ (9,784) | $ (576,051) | $ - | | $ 17,974 | $ 154,182 | | | $ (391,551) | $ 1,491,165 |
| 5 | 1,123,344 | $0.1404 | $ (10,078) | $ (576,051) | $ - | | $ 18,513 | $ 157,718 | | | $ (387,106) | $ 1,104,059 |
| 6 | 1,119,637 | $0.1423 | $ (10,380) | $ (576,051) | $ - | | $ 19,068 | $ 159,324 | | | $ (384,563) | $ 719,496 |
| 7 | 1,115,942 | $0.1442 | $ (10,692) | $ (576,051) | $ - | | $ 19,640 | $ 160,919 | | | $ (382,003) | $ 337,493 |
| 8 | 1,112,260 | $0.1464 | $ (11,012) | $ (576,051) | $ - | | $ 20,230 | $ 162,835 | | | $ (379,094) | $ (41,601) |
| 9 | 1,108,589 | $0.1480 | $ (11,343) | $ (576,051) | $ - | | $ 20,837 | $ 164,071 | | | $ (376,834) | $ (418,435) |
| 10 | 1,104,931 | $0.1500 | $ (11,683) | $ (576,051) | $ - | | $ 21,462 | $ 165,740 | | | $ (374,111) | $ (792,545) |
| 11 | 1,101,285 | $0.1520 | $ (12,033) | $ (576,051) | $ - | | $ 22,105 | $ 167,395 | | | $ (371,369) | $ (1,163,914) |
| 12 | 1,097,650 | $0.1541 | $ (12,394) | $ (576,051) | $ - | | $ 22,769 | $ 169,148 | | | $ (368,498) | $ (1,532,412) |
| 13 | 1,094,028 | $0.1565 | $ (12,766) | $ (576,051) | $ - | | $ 23,452 | $ 171,215 | | | $ (365,278) | $ (1,897,691) |
| 14 | 1,090,418 | $0.1587 | $ (13,149) | $ (576,051) | $ - | | $ 24,155 | $ 173,049 | | | $ (362,258) | $ (2,259,948) |
| 15 | 1,086,820 | $0.1605 | $ (13,544) | $ (576,051) | $ - | | $ 24,880 | $ 174,435 | | | $ (359,650) | $ (2,619,598) |
| 16 | 1,083,233 | $0.1628 | $ (13,950) | $ (576,051) | $ - | | $ 25,626 | $ 176,350 | | | $ (356,475) | $ (2,976,074) |
| 17 | 1,079,658 | $0.1651 | $ (14,369) | $ (576,051) | $ - | | $ 26,395 | $ 178,252 | | | $ (353,277) | $ (3,329,351) |
| 18 | 1,076,095 | $0.1674 | $ (14,800) | $ (576,051) | $ - | | $ 27,187 | $ 180,138 | | | $ (350,055) | $ (3,679,406) |
| 19 | 1,072,544 | $0.1701 | $ (15,244) | $ (576,051) | $ - | | $ 28,003 | $ 182,440 | | | $ (346,378) | $ (4,025,783) |
| 20 | 1,069,005 | $0.1722 | $ (15,701) | $ (576,051) | $ - | | $ 28,843 | $ 184,083 | | | $ (343,318) | $ (4,369,101) |
| 21 | 1,065,477 | $0.1747 | $ (16,172) | $ - | $ - | | $ 29,708 | $ 186,139 | | | $ 236,249 | $ (4,132,853) |
| 22 | 1,061,961 | $0.1772 | $ (16,657) | $ - | $ - | | $ 30,599 | $ 188,180 | | | $ 239,793 | $ (3,893,060) |
| 23 | 1,058,457 | $0.1797 | $ (17,157) | $ - | $ - | | $ 31,517 | $ 190,205 | | | $ 243,366 | $ (3,649,694) |
| 24 | 1,054,964 | $0.1827 | $ (17,671) | $ - | $ - | | $ 32,463 | $ 192,742 | | | $ 247,498 | $ (3,402,196) |
| 25 | 1,051,482 | $0.1853 | $ (18,202) | $ - | $ - | | $ 33,437 | $ 194,840 | | | $ 251,239 | $ (3,150,957) |
| 26 | 1,048,013 | $0.1881 | $ (18,748) | $ - | $ - | | $ 34,440 | $ 292,940 | | | $ 643,970 | $ (2,506,987) |
| 27 | 1,044,554 | $0.1908 | $ (19,310) | $ - | $ - | | $ 35,473 | $ 300,732 | | | $ 661,298 | $ (1,845,689) |
| 28 | 1,041,107 | $0.1936 | $ (19,889) | $ - | $ - | | $ 36,537 | $ 308,732 | | | $ 679,093 | $ (1,166,596) |
| 29 | 1,037,671 | $0.1963 | $ (20,486) | $ - | $ - | | $ 37,633 | $ 316,945 | | | $ 697,367 | $ (469,229) |
| 30 | 1,034,247 | $0.1991 | $ (21,101) | $ - | $ - | | $ 38,762 | $ 325,376 | | | $ 716,133 | $ 246,904 |
| **Total** | **32,583,466** | | **$ (425,990)** | **$ (11,521,015)** | **$ 541,674** | **$ 830,000** | **$ 774,569** | **$5,841,550** | **$ 1,697,990** | **$ 687,290** | **$ 246,904** | |

# Next Steps: Project Timeline

| MVP Arena milestones to Close plan / Timeline | Owner | Date | Albany County | Centrica | National Grid |
|---|---|---|---|---|---|
| National Grid deliver CEISR Study results | National Grid | 9/9/2024 | | | x |
| National Grid provides EV make-ready work costs | National Grid | 11/7/2024 | | | x |
| IGA Approval | Centrica | 11/8/2024 | | x | |
| Present UESC Proposal to County | Centrica | 11/13/2024 | | x | |
| PW Committee Meeting - Project Introduction | Albany County | 11/26/2024 | x | | |
| Leg. Approval | Albany County | 12/9/2024 | x | | |
| National Grid Task Order execution | Albany County/Centrica/National Grid | 12/16/2024 | x | x | x |
| National Grid Interconnection - Deposit | Centrica/National Grid | 12/20/2024 | | x | x |
| Prepare 100% design docs - carport & electrical (KMB) | Centrica | 2/17/2025 | | x | |
| Interconnection Pre-work begins | Centrica | 2/17/2025 | | x | x |
| Subcontractor Contracts | Centrica | 3/10/2025 | | x | |

# Thank you

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# Additional Documentation

# Equipment & Systems Warranties

- Silfab Modules: **30-Year** Power Performance Warranty
  12-Year Product Warranty, extendable to 25-Years
- TerraSmart Canopy: 20-Year Limited Warranty
- Chint Power Systems Inverters: 10-Year Warranty
- EV Equipment: 5-Year Material & Labor
- EV O&M and Software: 5-Year prepaid software and service
- Centrica Solar PV Workmanship Warranty: 5-Years

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CPS

ZEROVA

evconnect

# GHG Reductions

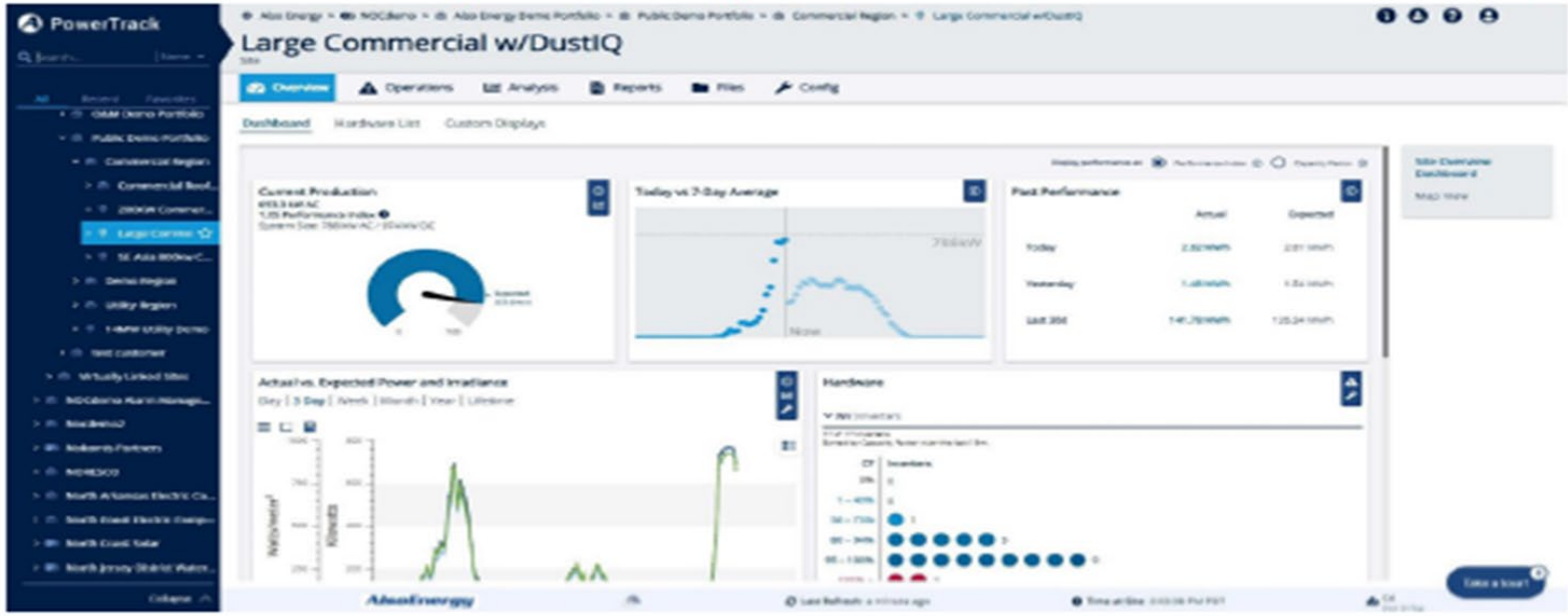
19,142 metric tons of CO2 offset over the lifetime of the system, equivalent to:

# O&M Services

**System Monitoring and Dashboard**

All projects that Centrica installs under this initiative will have full monitoring and production reporting capabilities via the easy to access Also-Energy Power Track Dashboard. Both Centrica and Also-Energy will monitor the system(s) to ensure maximum performance. Offering NYP piece of mind that their renewable generation assets are accomplishing what they were put in service to do.

*Figure 7: Also-Energy Power Track Dashboard*



# Project Timeline – Full Schedule

| MVP Arena milestones to Close plan / Timeline | Owner | Date | Albany County | Centrica | National Grid |
|---|---|---|---|---|---|
| National Grid deliver CEISR Study results | National Grid | 9/9/2024 | | | x |
| National Grid provides EV make-ready work costs | National Grid | 11/7/2024 | | | x |
| IGA Approval | Centrica | 11/8/2024 | | x | |
| Present UESC Proposal to County | Centrica | 11/13/2024 | | x | |
| PW Committee Meeting - Project Introduction | Albany County | 11/26/2024 | x | | |
| Leg. Approval | Albany County | 12/9/2024 | x | | |
| National Grid Task Order execution | Albany County/Centrica/National Grid | 12/16/2024 | x | x | x |
| National Grid Interconnection - Deposit | Centrica/National Grid | 12/20/2024 | | x | x |
| Prepare 100% design docs - carport & electrical (KMB) | Centrica | 2/17/2025 | | x | |
| Interconnection Pre-work begins | Centrica | 2/17/2025 | | x | x |
| Subcontractor Contracts | Centrica | 3/10/2025 | | x | |
| Submittals | | | | | |
| Structural Shop drawings | Centrica | 3/31/2025 | | x | |
| MV Equipment | Centrica | 3/31/2025 | | x | |
| LV Equipment | Centrica | 3/31/2025 | | x | |
| Wire and Conduit Runs | Centrica | 4/28/2025 | | x | |
| Permitting | Centrica | 5/12/2025 | | x | |
| Major Equipment Procurement | | | | x | |
| Structural | Centrica | 6/24/2025 | | x | |
| Solar Panels | Centrica | 7/23/2025 | | x | |
| MV Yard Equipment | Centrica | 12/8/2025 | | x | |
| PV Yard Equipment | Centrica | 12/8/2025 | | x | |
| EV Chargers | Centrica | 12/8/2025 | | x | |
| Construction | | | | x | |
| Mobilization | Centrica | 6/10/2025 | | x | |
| Structural Steel Erection Start | Centrica | 6/25/2025 | | x | |
| Structural Steel Erection Complete | Centrica | 8/25/2025 | | x | |
| PV Panel Installation Complete | Centrica | 9/3/2025 | | x | |
| Canopy Lighting Complete | Centrica | 9/25/2025 | | x | |
| PV Low Voltage Work Start | Centrica | 9/25/2025 | | x | |
| PV Low Voltage Work Complete | Centrica | 12/31/2025 | | x | |
| MV Electrical Installation Start | Centrica | 6/25/2025 | | x | |
| MV Electrical Install Complete | Centrica | 3/17/2026 | | x | |
| Interconnection EV | Centrica | 3/24/2026 | | x | x |
| Interconnection PV | Centrica | 3/31/2026 | | x | x |
| Commissioning and Billing Set up | Centrica | 4/14/2026 | x | x | |
| Closeout | Centrica | 5/7/2026 | x | x | x |

# Spec Sheets

# SILFAB COMMERCIAL NTC

SIL-580 XM+
**BIFACIAL**

SILFAB SOLAR

## NEXT-GENERATION N-TYPE CELL TECHNOLOGY

**Manufactured exclusively in the USA.**

- Improved Shade Tolerance
- Improved Low-Light Performance
- Increased Performance in High Temperatures
- Efficient Bifacial Energy Yield
- Enhanced Durability
- Reduced Degradation Rate
- 25-Year Product Warranty/ 30-Year Performance Warranty

SILFABSOLAR.COM

| ELECTRICAL SPECIFICATIONS | | 580 | | |
|---|---|---|---|---|
| Test Conditions | | STC | BSTC | NOCT |
| Module Power (Pmax) | Wp | 580 | 632.8 | 428.2 |
| Maximum power voltage (Vpmax) | V | 44.27 | 44.27 | 40.73 |
| Maximum power current (Ipmax) | A | 13.10 | 14.29 | 10.51 |
| Open circuit voltage (Voc) | V | 52.27 | 52.32 | 48.08 |
| Short circuit current (Isc) | A | 13.85 | 15.11 | 11.12 |
| Module efficiency | % | 22.4% | | |
| Maximum system voltage (VDC) | V | 1500 | | |
| Series fuse rating | A | 30 | | |
| Power Tolerance | Wp | 0 to +10 | | |
| Bifaciality Factor | % | 80±5 | | |

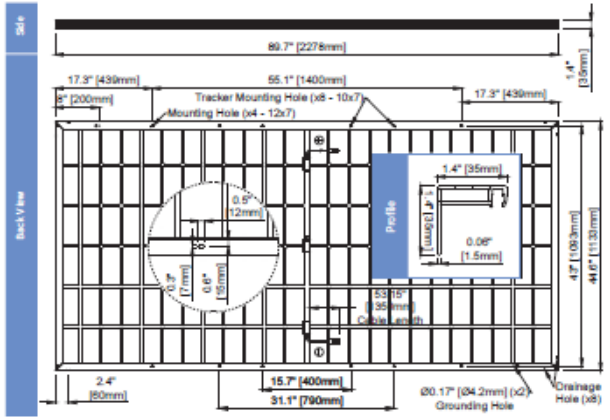
Performance conditions: Measurement tolerance ± 2% • Standard Test Conditions (STC): 1000 W/m², AM 1.5, Temperature 25 °C • Nominal Operating Cell Temperature (NOCT): 800 W/m², AM 1.5 • Bifacial Standard Test Conditions (BSTC): 1000 W/m2 + φ * 125 W/m2 , φ = 80 % , AM 1.5 • Electrical characteristics may vary by ±5%.

| MECHANICAL PROPERTIES / COMPONENTS | METRIC | IMPERIAL |
|---|---|---|
| Module weight | 28.5 kg ±0.2 kg | 62.8 lbs ±0.4 lbs |
| Dimensions (H x L x D) | 2278 mm x 1133 mm x 35 mm | 89.7 in x 44.6 in x 1.4 in |
| Maximum surface load (wind/snow)* | 2400 Pa rear load / 5400 Pa front load | 50.1 lb/ft² rear load / 112.8 lb/ft² front load |
| Hail impact resistance | ø 25 mm at 83 km/h | ø 1 in at 51.6 mph |
| Cells | 144 Half cells - N-Type Silicon solar cell 182 mm x 91 mm | 144 Half cells - N-Type Silicon solar cell 7.16 in x 3.58 in |
| Glass | 3.2 mm high transmittance, tempered, anti-reflective coating | 0.126 in high transmittance, tempered, anti-reflective coating |
| Cables and connectors (refer to installation manual) | 1350 mm, ø 5.7 mm, EVO2 from Staubli | 53.1 in, ø 0.22 in (12 AWG), EVO2 from Staubli |
| Backsheet | High durability, superior hydrolysis and UV resistance, multi-layer dielectric film, transparent PV backsheet | |
| Frame | Anodized Aluminum (Silver) | |
| Junction Box | UL 3730 Certified, IEC 62790 Certified, IP68 rated, 3 diodes | |

| TEMPERATURE RATINGS | | WARRANTIES | |
|---|---|---|---|
| Temperature Coefficient Isc | 0.04 %/°C | Module product workmanship warranty | 25 years** |
| Temperature Coefficient Voc | -0.24 %/°C | Linear power performance guarantee | 30 years<br>≥ 98% end 1st yr<br>≥ 94.7% end 12th yr<br>≥ 90.8% end 25th yr<br>≥ 89.3% end 30th yr |
| Temperature Coefficient Pmax | -0.29 %/°C | | |
| NOCT (± 2°C) | 45 °C | | |
| Operating temperature | -40/+85 °C | | |

| CERTIFICATIONS | | SHIPPING SPECS | |
|---|---|---|---|
| Product | UL 61215***, UL 61730***, CSA C22.2#61730***, IEC 61215***, IEC 61730***, IEC 61701 (Salt Mist Corrosion), IEC 62716 (Ammonia Corrosion), CEC Listing***, UL Fire Rating: Type 1 | Modules Per Pallet: | 29 |
| | | California (Pallets per load) | 21 |
| Factory | ISO9001:2015 | Others (Pallets per load) | 22 |

* ⚠ Warning. Read the Safety and Installation Manual for mounting specifications and before handling, installing and operating modules.
** 12 year extendable to 25 years subject to registration and conditions outlined under "Warranty" at silfabsolar.com.
PAN files generated from 3rd party performance data are available for download at: silfabsolar.com/downloads.
*** Certification and CEC listing in progress.





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# 50/60 kW, 1000 Vdc String Inverters for North America

The 50 & 60 kW (55 & 66 kVA) medium-power CPS three-phase string inverters are designed for ground mount, large rooftop and carport applications. The units are high performance, advanced and reliable inverters designed specifically for the North American environment and grid. High efficiency at 98.8% peak and 98.5% CEC, wide operating voltages, broad temperature ranges and a NEMA Type 4X enclosure enable this inverter platform to operate at high performance across many applications.

The CPS 50/60KTL products ship with either the Standard Wire-box or the Rapid Shutdown Wire-box, each fully integrated and separable with touch-safe fusing, monitoring, and AC and DC disconnect switches. The integrated PLC transmitter in the Rapid Shutdown Wire-box enables PVRSS certified module-level rapid shutdown when used with APS RSD-S-PLC/RSD-D products. The CPS FlexOM Gateway enables monitoring, controls and remote product upgrades.

CPS SCA50KTL-DO/US-480
CPS SCA60KTL-DO/US-480

## Key Features

- NEC 2017/2020 PVRSS certified for rapid shutdown
- 55 & 66 kVA rating allows max rated active power @ ±0.91 PF
- Selectable max AC apparent power of 50/55 kVA and 60/66 kVA
- NEC compliant and UL listed arc-fault circuit protection
- 15-90° mounting orientation for low profile roof installs
- Optional FlexOM Gateway enables remote firmware upgrades
- Integrated AC and DC disconnect switches
- 3 MPPTs with 5 inputs each for maximum flexibility
- NEMA Type 4X outdoor rated enclosure
- UL 1741-SA certified to CA Rule 21, including SA8 - SA18
- UL 1741-SB and IEEE 1547-2018 certified
- Separable wire-box design for fast service
- Standard 10-year warranty with extensions up to 20 years

50/60KTL Standard Wire-box

50/60KTL Rapid Shutdown Wire-box



Chint Power Systems America
1380 Presidential Drive, Suite 100, Richardson, TX 75081
Tel: 855-584-7168 Mail: AmericaSales@chintpower.com Web: www.chintpowersystems.com



| Model Name | CPS SCA50KTL-DO/US-480 | CPS SCA60KTL-DO/US-480 |
|---|---|---|
| **DC Input** | | |
| Max. PV power | 90 kW (33 kW per MPPT) | |
| Max. DC input voltage | 1000 Vdc | |
| Operating DC input voltage range | 200-950 Vdc | |
| Start-up DC input voltage / power | 330 V / 80 W | |
| Number of MPP trackers | 3 | |
| MPPT voltage range @ PF>0.99 | 480-850 Vdc | 540-850 Vdc |
| Max. PV short-circuit current (Isc x 1.25) | 204 A (68 A per MPPT) | |
| Number of DC inputs | 15 inputs, 5 per MPPT | |
| DC disconnection type | Load-rated DC switch | |
| DC surge protection | Type II MOV | |
| **AC Output** | | |
| Rated AC output power @ PF>0.99 to ±0.91[1] | 50 kW | 60 kW |
| Max. AC apparent power (selectable) | 50 / 55 kVA | 60 / 66 kVA |
| Rated output voltage | 480 Vac | |
| Output voltage range[2] | 422 - 528 Vac | |
| Grid connection type | 3Φ / PE / N (Neutral optional) | |
| Max. AC output current @ 480 Vac | 60.2 / 66.2 A | 72.2 / 79.4 A |
| Rated output frequency | 60 Hz | |
| Output frequency range[2] | 57 - 63 Hz | |
| Power factor | >0.99 (±0.8 adjustable) | |
| Current THD @ rated load | <3% | |
| Max. fault current contribution (1 cycle RMS) | 64.1 A (1.06/0.88 PU) | |
| Max. OCPD rating | 110 A | 125 A |
| AC disconnection type | Load-break rated AC switch | |
| AC surge protection | Type II MOV | |
| **System and Performance** | | |
| Topology | Transformerless | |
| Max. efficiency | 98.8% | |
| CEC efficiency | 98.5% | |
| Stand-by / night consumption | <1 W | |
| **Environment** | | |
| Enclosure protection degree | NEMA Type 4X | |
| Cooling method | Variable speed cooling fans | |
| Operating temperature range[3] | -22°F to +140°F / -30°C to +60°C | |
| Non-operating temperature range[4] | No low temp minimum to +158°F / +70°C maximum | |
| Operating humidity | 0 to 100% | |
| Operating altitude | 13123 ft / 4000 m (derating from 9843 ft / 3000 m) | |
| Audible noise | <60 dBA @ 1 m and 25°C | |
| **Display and Communication** | | |
| User interface and display | LCD+LED | |
| Inverter monitoring | SunSpec, Modbus RS485 | |
| Site-level monitoring | CPS FlexOM Gateway (1 per 32 inverters) | |
| Modbus data mapping | CPS | |
| Remote diagnostics / firmware upgrade functions | Standard / (with FlexOM Gateway) | |
| **Mechanical** | | |
| Dimensions (H x W x D) | 39.4 x 23.6 x 10.24 in (1000 x 600 x 260 mm) | |
| Weight | Inverter: 123.5 lbs (56 kg); Wire-box: 33 lbs (15 kg) | |
| Mounting / installation angle[5] | 15 to 90 degrees from horizontal (vertical or angled) | |
| AC termination | M8 stud type terminal block (wire range: #6 - 3/0 AWG CU/AL; lugs not supplied) | |
| DC termination[6] | Screw clamp, neg. busbar (RSD version[8]) wire range: #14 - #6 AWG CU | |
| Fused string inputs (5 per MPPT)[7] | RSD[6] and Standard Wire-box: 20 A fuses provided (fuse values up to 30 A acceptable) | |
| **Safety** | | |
| Certifications and standards | UL 1741-SA/SB Ed. 3, UL 1699B, UL 1998, CSA-C22.2 NO.107.1-01, IEEE 1547-2018, FCC PART15 | |
| Selectable grid standard | IEEE 1547a-2014, IEEE1547-2018[8], CA Rule 21, ISO-NE, HECO | |
| Smart-grid features | Volt-RideThru, Freq-RideThru, Ramp-Rate, Specified-PF, Volt-VAR, Freq-Watt, Volt-Watt | |
| **Warranty** | | |
| Standard | 10 years | |
| Extended terms | 15 and 20 years | |

1) Active power derating begins at PF = ±0.91 to ±0.80 when max AC apparent power is set to 55 or 66 kVA.
2) The "output voltage range" and "output frequency range" may differ according to the specific grid standard.
3) Active power derating begins at 40°C when PF = ±0.9 and MPPTaVmin; at 45°C when PF = 1 and MPPTaVmin; and at 50°C when PF = 1 and MPPTa700 Vdc.
4) See user manual for further requirements regarding non-operating conditions.
5) Shade cover accessory required for installation angles of 75 degrees or less.
6) RSD wire-box only includes fuses and fuse holders on the positive polarity, compliant with NEC 2017/2020.
7) Fuse values above 20 A have additional spacing requirements or require the use of the Y-Comb Terminal Block. See user manual for more details.
8) Firmware version 17.0 or later required.

# Garage Canopy

terrasmart™

**Building a solar canopy on top of a parking garage is an effective way to increase the presence of renewable energy systems in urban environments. Beyond the benefit of solar, canopies also provide shading for vehicles parked on the top level of the garage. Canopy structures are designed to be minimally invasive, meaning existing parking spaces will not be impacted in any way.**

## Collaborative Design

- With backgrounds in architectural engineering, our team of designers is there to assist you beginning at the conceptual design phase of a project.
- Whether the project is being planned on an existing parking garage or one that is going to be constructed, our team can generate custom design specifications to be meet any unique project requirements.
- In collaboration with our experienced project management team, we can run through multiple design options on a project to achieve a specific project goal.
- As licensed structural engineers, our team can provide signed and sealed drawings, along with any other documentation required for permitting.

## Full Project Support Staff

- Customized features such as underdecking, water management, and finishing can transform any structure into an aesthetic focal point.
- Our scope of services can include full structural installation, beginning at the columns and all the way through attaching PV modules.
- Dedicated project managers provide material delivery and installation schedules, along with daily construction updates throughout the process.
- Structural installation is minimally invasive, allowing parking garages to remain operational during construction.

AlsoEnergy

The operating system for the grid of the future

# AlsoEnergy Commercial & Industrial Solution

Pull all data onto a single, shared platform for a 360° view of project and portfolio performance and the power to optimize outcomes.


**Optimize energy harvest**
- Improve understanding of projects and portfolios
- Identify and address areas of low performance
- Utilize advanced diagnostics and analytics

**Streamline workflow**
- Integrate project design data, track activities, report on performance
- Extend to all management systems
- Stay connected with mobile apps

**Avoid unnecessary costs**
- Identify and address high-impact issues first
- Automate repetitive tasks
- Avoid truck rolls leveraging smart two-way communications technology

## Maximize value

Hone in on key performance indicators to manage project lifecycles and portfolios more effectively.

**Optimize financial process**
- Combined financial and management data
- Unified recordkeeping
- On-the-fly analysis

**Simplify accounting**
- Protect assets
- Improve performance
- Monitor entire chain of responsibility

**Mitigate risk**
- Manage risk and compliance
- Cross-portfolio analysis
- Audit trails to maintain data quality

## Keep collaborative work on track and under control

Share the latest information to eliminate resource waste.

**Expert support**
- Accelerate innovation
- Easy, flexible implementation
- On-site, cloud resources

**Future-proof platform**
- Work with Big Data
- Stable and reliable architecture
- Enable partnerships and integrations

**3rd-party resource management**
- Streamline process
- Take advantage of proactive intervention
- Analyze and understand drivers of profitability

## One comprehensive view of the entire asset portfolio

Increase productivity and reduce maintenance costs.

**Maximum resource uptime**
- Pinpoint and address areas of low performance
- Drive maintenance with CMMS
- Analyze and identify poor performance trends early

**Exception-based alerting**
- Real-time insight, anywhere, anytime
- Minimized nuisance alerts
- Automated or on-demand reports

**Management mapping**
- Achieve high-performance verification
- Flag deficiencies instantly
- Collaborate throughout the organization

## Transform and modernize the supply chain

Open pathways for real-time feedback and resource optimization.

**Seamless procurement**
- End-to-end business process
- Streamline and automate documentation
- Adapt to engineering changes quickly

**Optimized commissioning, installation**
- Increase productivity
- Reduce waste
- Manage project risk

**Specialized C&I service**
- Control solutions for C&I sites that need active management
- Accelerate plant validation
- Automate performance analytics

## Harmonize data to attain operational excellence

Knock down data silos, bringing all project and portfolio information together to form a single version of the truth.

**Practice proactive management**
- Empower users to manage large portfolios
- Identify and apply corrective actions quickly
- Tie costs back to specific events

**Control the health of your portfolio**
- Rapid response time
- Notifications on occurrence or schedule
- Device, plant, or portfolio-level diagnosis

**Run the business your way**
- Custom displays to match business needs
- A single platform to manage all sites
- Third-party software integration

## Intelligent planning, maintenance and documentation

Get the right information to the right person at the right time for efficient service in the field.

**Act quickly and efficiently**
- Simplify processes
- Schedule and report on tickets directly
- Use field technician-focused mobile app

**Accurate alerts**
- Scheduled maintenance or an immediate truck roll
- Priority for maintenance technician activities
- Easy alert-to-ticket creations

**Specialized customer support**
- Remote and on-site training
- Localized support from regional offices
- Extensible architecture supports third-party integration

## Maximize value with actionable insights

Drive process innovation to make better decisions faster.

**Flexible technology platform**
- Extend solutions around machine learning, other emerging technologies
- Scale up service as your business grows
- Expand built-in performance modeling capability

**Optimized design**
- Detailed historical and real-time analysis
- Rapid retrieval of commonly used charts and reports

**Unparalleled decision support**
- View projects and portfolios from all angles
- Leverage real-time data
- Increase productivity

AlsoEnergy Commercial & Industrial

## Solution Components

**Software**
- PowerTrack Web
- Analytics
- Diagnostics
- Reports
- PowerTrack Mobile
- CMMS Solutions
- Asset Management Solutions
- Portfolio Aggregation Solutions
- Public displays
- Cybersecurity and remote access solutions
- Export control supervisory dashboards

**Hardware**
- PowerLogger 1000 / dataloggers
- Weather stations / sensors
- Revenue-grade meters
- Field I/O
- Site Controllers
- UPS
- Cell modem & plan
- Networking equipment
- Weatherproof enclosures

**Professional Services**
- Expert support
- Portfolio aggregation / site migration
- Hardware testing, configuration, assembly support
- Hardware warranty management
- Third-party hardware integration
- Third-party API app integration
- Agency reporting
- Software configuration and customization
- System modeling
- System engineering
- On-site or remote commissioning support
- Switchgear interfacing
- Telemetry
- Project management
- Project consultation and planning
- Deployment and implementation management
- SCADA system design

To find out more or schedule a demo, contact us at alsoenergy.com



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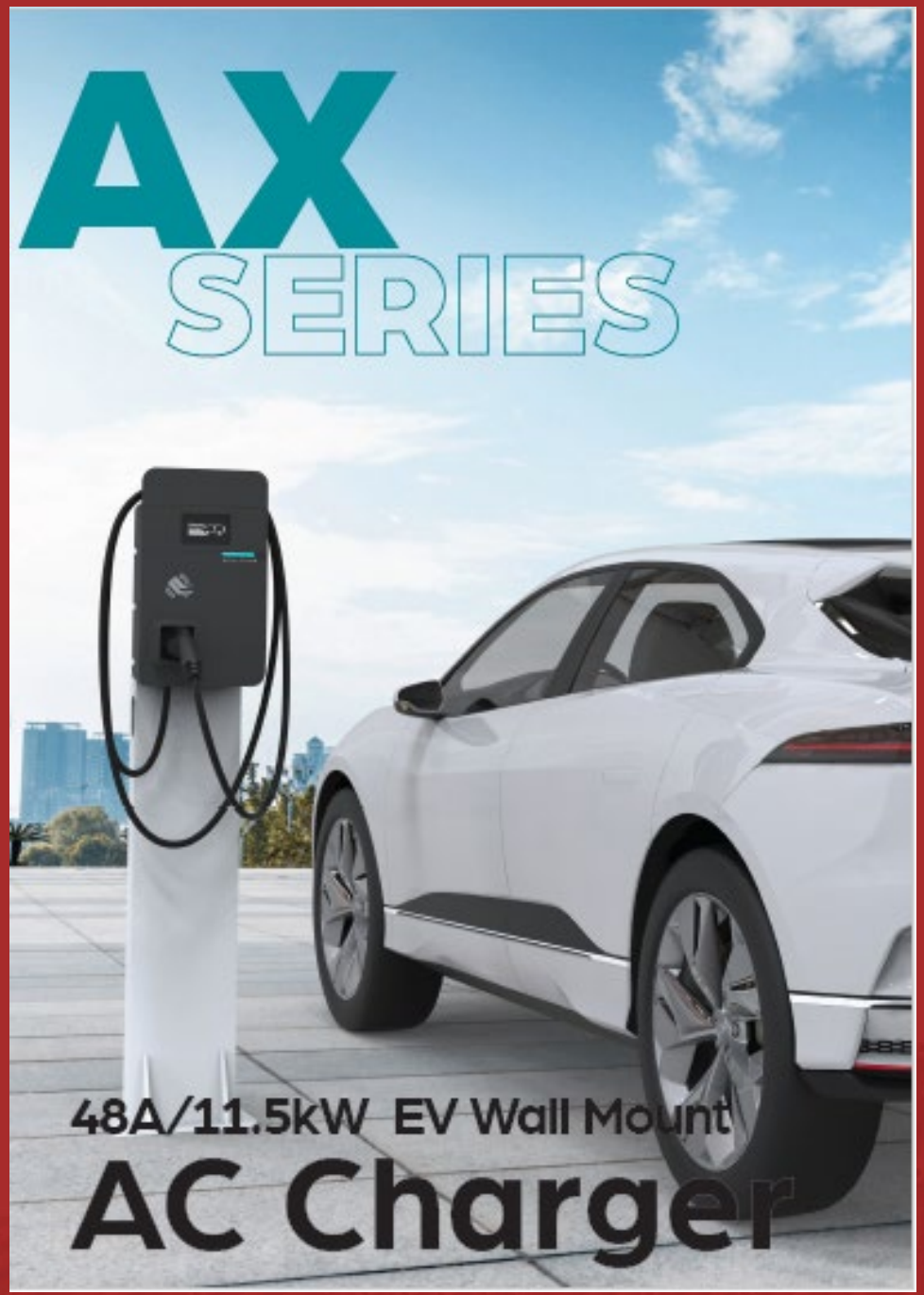
# AX SERIES



48A/11.5kW EV Wall Mount

# AC Charger

ZEROVA

## FEATURES

- Residential and Commercial EV Charging
- Wired/Wireless Connection for Central Management System
- Supports RFID Card, QR Code and Optional Third Party Payment System
- Input: 200Vac~240Vac
- Modern, Ergonomic and Customizable Design
- 5-Inch LCD Display, Optional Non-Display
- IP56/NEMA 4 Rated for Indoor/Outdoor Applications
- Charging Interface: SAE J1772 (Type 1)/IEC 62196-2 (Type 2)
- OCPP 1.6 JSON (Upgradeable to 2.0 OTA)
- ISO 15118 Protocol (Plug&Charge, Bi-Directional)
- OCPP or Local Load Management (Parent/Child)
- Over the Air Technology
- Energy Star, CTEP and NTEP (NIST Handbook 44)

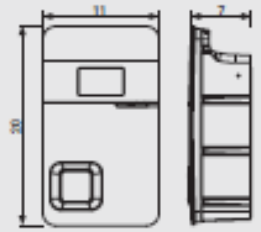
For information on the optional pedestal, please refer to the accessory section.

## INDUSTRY

Residential/MUD | Commercial | Retail | Parking + Fleet

EV WALL MOUNT AC CHARGER

## SPECIFICATION

| | |
|---|---|
| Model Name | AXLU111 |
| Safety | UL/CuL |
| Outline (in) |  |



### Power Specification

| | | |
|---|---|---|
| AC Input | Input Rating | Single-Phase: 200~240Vac |
| | AC Input Connection | L1, L2, GND or L, N, PE |
| | Input Current | 48A |
| | Frequency | 50Hz/60Hz |
| AC Output | Output Current | 48A |

### User Interface & Control

| | |
|---|---|
| Display | LED Indicator (Standard), 5" LCD Display (Optional) |
| User Authentication | RFID, Smart Phone App, QR Code Optional Third Party Payment System |
| Meter | Meter IC (1% Accuracy) |

### Communication

| | |
|---|---|
| Vehicle to Grid Communication Interface | ISO 15118 (Plug&Charge, Bi-Directional) |
| Network Interface | Ethernet + Wi-Fi (IEEE802.11 b/g/n) (standard)<br>Ethernet + Wi-Fi (IEEE802.11 b/g/n) + 4G (optional) |
| Charging Protocol | OCPP 1.6 JSON (Upgradeable to 2.0 OTA) |

ZEROVA

### Environmental

| | |
|---|---|
| Operating Temperature | -22°F~122°F (-30°C to +50°C) |
| Humidity | < 85% ( RH) @122°F (50°C) |
| Altitude | ≤6562ft (2000m) |
| IP Level | NEMA TYPE 4/IK08 |
| Cooling Method | Natural Cooling |

### Mechanical

| | |
|---|---|
| Dimensions (WxDxH) | 11 x 7 x 20in (280 x 178 x 508mm) |
| Weight | <22lbs (10kg) |
| Cable Length | 16.4ft (5m) or 25ft (7.5m) with Optional Cable Management |

### Protection

| | |
|---|---|
| RCD/CCID | CCID 20 |
| Input | UVP, OVP, Surge Protection, Ground Fault |
| Output | OCP, Control Pilot Fault, Residual Current Protection |
| Internal | OTP, Relay Welding Detection, CCID Self-Test, MCU Function Fault Detection |

### Regulation

| | |
|---|---|
| Certification | UL2594,<br>UL2231-1/-2<br>Energy Star<br>CTEP<br>NTEP (NIST Handbook 44) |
| Wireless Certification | FCC/IC |
| Charging Interface | SAEJ1772<br>Type 1 Plug |