

SOLARone

GREEN WORKFORCE

Training for Jobs in the Clean Energy Economy

Solar One's Green Workforce Program offers hard-skill technical training and environmental sustainability education tied to the high growth areas of energy efficiency, renewable energy, and green building operations and maintenance.

We design and deliver our courses in active, hands-on formats in our training lab, guaranteeing a learning environment that is engaging and inclusive. Solar One is a BPI-approved Testing Center; an EPA RRP and 608 provider; an Urban Green USGBC GPRO trainer; and NABCEP PV Associate accredited.

Why Green Jobs?

The New York City metro region has significant potential for job growth in the energy efficiency, renewable energy and green building maintenance and operations sectors. The city is proving itself as an international leader in advancing the green industry sector through aggressive programs to curb carbon emissions and energy use. New York's Climate Leadership and Community Protection Act, passed in 2019, is driving demand for clean energy jobs in New York City in both the short and long term.

Through this set of legislation, **more than 200,000 jobs** are projected to be created in the broader clean energy sector over the next decade.



Our Courses:
HVAC and Green Building
Operations + Maintenance

Solar Panel Installation

Green Construction: Carpentry,
Electrical, and Plumbing



Our Instructors:

Solar One's instructors have a combined 30+ years of teaching experience. They are certified by BPI, NABCEP, USGBC Urban Green GPRO, EPA, NCEER and more instructional bodies. By keeping class sizes to 20 or less, instructors can commit valuable one-on-one time with students to teach them both theory and hands-on skills across all fields of curriculum.

Our Students:

Our training has reached **more than 5,000 students**. Trainees include unemployed and underemployed individuals that participate in workforce training programs. We work with our partners to achieve a **75 percent job placement rate** or higher for Solar One trainees, with over **80 percent of those entering the green job sector**. Program graduates are working in construction, solar PV, HVAC and building electrification, building operations and maintenance, and more.

Our Facilities:

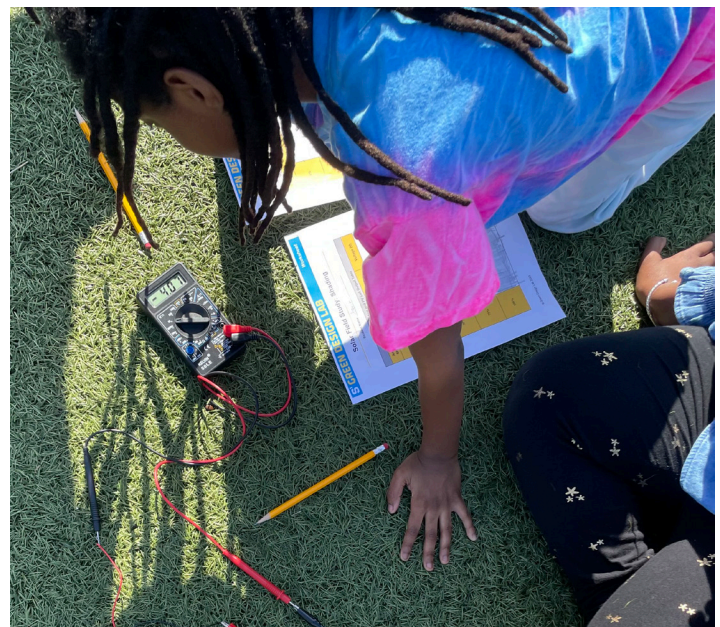
The Solar One Green Workforce training lab is outfitted with classrooms, hands-on training areas and equipment: high efficiency boiler and furnace simulators; exposed wall cavities for practicing air sealing, foam and cellulose insulation techniques; drywall repair; general plumbing, HET toilets and other water conservation measures; electrical retrofitting equipment; lead, renovation, repair and painting equipment; replaceable windows and doors; a simulated roof for solar PV panel installation; and heat pump units for hands-on HVAC training.

Educating Youth to Combat the Climate Crisis

Solar One's K-12 Education Program: Green Design Lab™ – explores urban environmental sustainability and climate action through place-based STEAM programming and curriculum. Solar One's curriculum provides teachers with hands on lessons and resources to increase environmental knowledge around Energy, Water, Materials Science, and Food. Solar One's K-12 programs include classroom residencies that blend science with climate justice, co-teaching that trains students and teachers in clean energy and solar hard skills, professional development trainings that prepare teachers to bring renewable energy to life in their classrooms, green career internships that support youth leadership and workshops that turn students into advocates for sustainability in their schools and communities.

Key Program Offerings:

- **Classroom Residencies:** Solar One offers classroom residencies to schools who are looking to bring climate action to life in their classrooms. Our hands-on lessons strengthen students' STEM skills while making connections to local sustainability initiatives. Lessons include: Solar Oven Challenge, Fun with Circuits, Building Batteries, Energy Conservation, Solar Powered Cars, and Designing a Wind Turbine. Classroom residencies can be implemented during school or out-of-school time and we offer anywhere from one-10 sessions. All hands-on supplies are included in our pricing.
- **Green Design Lab:** Providing environmental STEM education and Solar Career and Technical Training to students and teachers, nurturing sustainability awareness, and career readiness.
- **CareerCLUE:** In 2016, Solar One was the founding partner with the NYC DOE's Office of Community Schools and the Summer Youth Employment Program to launch CareerCLUE. Solar One's CareerCLUE provides youth with a unique summer experience that blends for-credit academics, leadership development, and engagement in environmental sustainability through career exploration and service learning.
- **CareerSTEP:** During 2021, Solar One launched CareerSTEP which extends CareerCLUE from summer into the school year and leads to placement in industry internships during the summer. This paid, afterschool work-based learning program takes an in-depth dive into sustainability careers that are in demand, featuring sectors such as solar, energy efficiency, environmental policy, climate communication, environmental education, public health, and urban agriculture. CareerSTEP consists of 1:1 career mentoring, guest speakers, sector-aligned projects, and community needs assessments.



- **Youth Advisory Council:** A new component to Solar One's education department, the YAC will integrate young leaders at NYC high schools into the visioning, planning, and implementation of Solar One initiatives across multiple departments to incorporate youth voice into pre-existing curriculum and programs.



Educating Youth to Combat the Climate Crisis

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Workshops for Students:	Student Program Options	Cost
<ul style="list-style-type: none"> • Delivery of one, three, or six sessions of GDL lessons for up to four classes per day • Hands-on activities • Remote and Hybrid options available 	After school workshop: 1.5 Hours of a GDL Lesson or StuyCove Field Trip	\$412
<p>Workshops Include:</p> <ul style="list-style-type: none"> • Materials for hands-on projects such as building solar race cars, wind turbine design, energy auditing and much more! • Planning and preparation with participating teacher 	Single Session Workshop: 4 classes in 1 day	\$1,017
	3 Session Workshop: 4 classes in 1 day per week over 3 weeks	\$2,900
	6 Session Workshop: 4 classes in 1 day per week over 6 weeks	\$5,800
	Customizable Workshop: Please contact us for more information.	TBD

Professional Development:	Professional Development Options	Cost
<p>Solar One educators provide custom professional development training for teachers focused on exploring hands-on activities that are aligned with NGSS and the updated NYS P-12 Science Standards. (Virtual or In-Person options)</p> <p>Workshops Include: GDL Curriculum Access and Post Session resources</p>	Half Day PD: 3-hour PD including GDL Curriculum access	\$559
	Full Day PD: One full day, or two half-day PD workshops for teachers. All teachers will receive curriculum access and ongoing support from Solar One educators as needed.	\$1,118

In-School or Afterschool Offerings

Intro to Energy:

Students gain an understanding of basic energy concepts including energy efficiency and the law of conservation of energy. In small groups, students perform experiments to transform different forms of energy such as radiant using solar panels, sound energy using tuning forks and mechanical energy using motors.

Activity - Energy Transfer Lab **3-12**

Fossil Fuel Extraction:

Students are introduced to the basics of fossil fuel creation and extraction and will discuss the negative impacts of fossil fuels on public health and the environment. Students participate in a simulation where chocolate chip cookies are used to model the environmental damage that occurs through fossil fuel extraction.

Activity - Cookie Mining **3-8**

Climate and the Carbon Cycle:

Through an interactive game, students explore the different carbon reservoirs and explore how human activity is causing an imbalance in the carbon cycle leading to climate change.

Activity - Carbon Cycle Game **7-12**

Design a Turbine Lab:

Students explore the benefits and challenges of wind power in NYC. In a hands-on experiment, students design and construct model wind turbines, measure the power they produce, and then refine their designs to optimize output.

Activity- Designing Wind Turbines **3-12**

Design a Turbine Lab:

Through hands-on experiments using small solar panels, students will observe how different variables, such as angle and shading affect electricity production. Students can then apply this knowledge to real world solar installations.

Activity - Energy Transfer Lab **3-12**
Note: Activity is Best Outdoors

Fun with Circuits Lab:

Through class discussion and hands-on exploration, students are introduced to the concepts of energy conservation and efficiency. Students will learn how much electricity is used by common electrical appliances and will identify phantom loads in their classroom.

Activity- Play-Doh Circuits **3-12**

Energy Conservation:

Through class discussion and hands-on exploration, students are introduced to the concepts of energy conservation and efficiency. Students will learn how much electricity is used by common electrical appliances and will identify phantom loads in their classroom.

Activity - Watt Game and Energy Audit **3-12**

Energy Storage:

Students gain an understanding of the importance of energy storage to the future of renewable energy implementation. Students learn how a battery works and will design and construct an aluminum air battery using non-toxic household materials.

Activity - Building Batteries **3-12**

Solar Ovens:

Students gain an understanding of the importance of energy storage to the future of renewable energy implementation. Students learn how a battery works and will design and construct an aluminum air battery using non-toxic household materials.

Activity - Building Solar Ovens **3-12**
Session can be 90 minutes and over 2 days

Racing Solar Cars:

Students explore how solar photovoltaics work. They will also design and construct mini solar powered cars with a motor that they can take home.

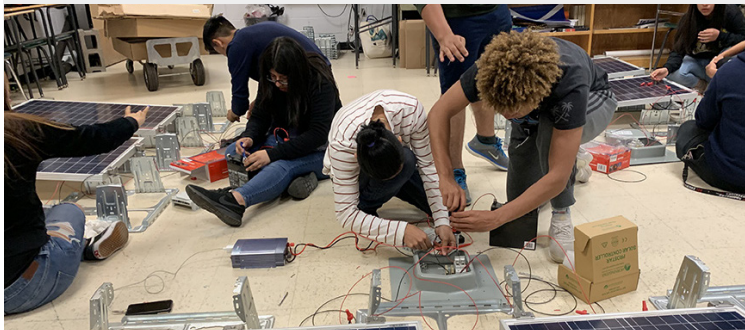
Activity - Solar Cars **3-12**
Session can be 90 minutes and over 2 days

Environmental STEM Education Programs for NYC Schools

How can we prepare the next generation to build a more sustainable future? Solar One is a nonprofit environmental education organization that provides K-12 education, workforce training, and solar technical support in the tristate area. Solar One's K-12 Green Design Lab (GDL) supports schools through student programs, curricular resources, and teacher professional development. The program engages students using hands-on interactive activities focused on climate, energy, and the environment.

About the Curriculum:

The GDL curriculum includes background readers for teachers, lesson plans, and worksheets. The lessons are modular and designed to be incorporated into a teacher's existing curriculum. Green Design Lab is designed to support students to solve real-world environmental challenges through sustainable design and engineering. All activities are aligned to the Next Generation Science Standards.



Program Offerings:

- **Energy Classroom Residency Program:** Participating schools work with a Solar One Educator who will visit the school and co-teach with a classroom teacher for the duration of the program. Classroom residency programs focus on Solar One's GDL energy curriculum, which explores the basics of energy, circuits, energy efficiency, electricity production, climate change, and renewable energy. All residency programs include curricular resources, all materials for hands-on projects, and planning and preparation with participating teachers.
- **Stem After-School Programs:** Solar One collaborates with existing after-school programs to provide hands-on environmental STEM activities. Programs are typically 60-90 minutes. All after-school programs include materials for hands-on projects, printed materials for students, and planning and preparation with participating teachers/leaders.
- **Professional Development Training For Teachers:** During a Solar One training, teachers participate in hands-on activities from the Green Design Lab curriculum and work collaboratively on lesson planning. All participating teachers are provided access to all 200 lessons and activities in the Green Design Lab curriculum.

Sample Activities Include:

- **Building Solar Race Cars:** Students learn about the various types of solar energy including photovoltaics and design and construct mini solar powered racers.
- **Wind Turbine Design Lab:** In a hands-on experiment, students design and construct model wind turbines, measure the power they produce, and then refine their designs to optimize output.
- **Building Batteries:** Students learn about the importance of energy storage for the future of renewable energy and are challenged to build a battery that will power a small motor using only household materials.



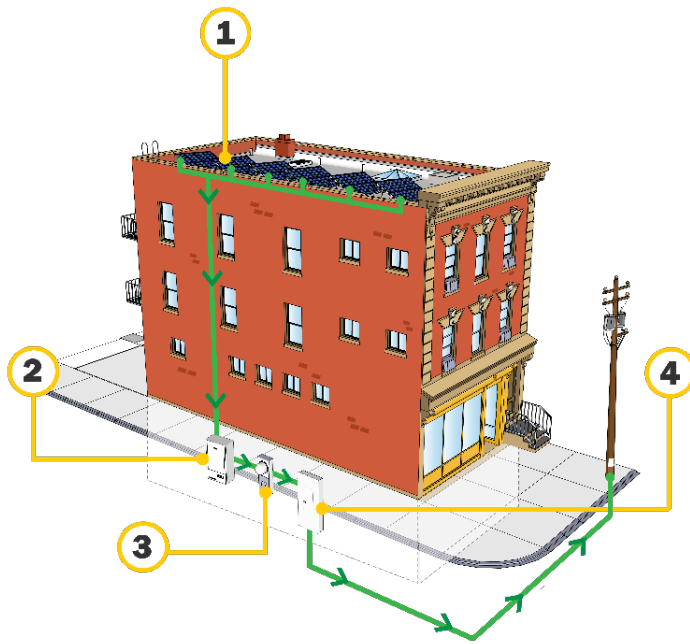
Solar One Program Highlights:

- **CareerCLUE:** Solar One in partnership with the NYC Department of Education (DOE) and the NYC Department of Youth and Community Development (DYCD) offer a unique credit-bearing Summer Youth Employment Program (SYEP) called CareerCLUE (Community Learning, Understanding, and Experience). CareerCLUE components provide students with an innovative experience exploring hands-on activities such as building solar USB chargers, career readiness, field trips, and a student-led service learning project focused on the environment and the local community.
- **NYC Solar Schools Education:** The NYC DOE is working with the Department of Citywide Administrative Services, Division of Energy Management (DCAS DEM) to install 100 MW of solar on City-owned buildings by 2025. In order to connect solar installations to classroom education, NYC DOE partnered with Solar One to develop the Solar Schools Education Program. Connecting solar installations on school buildings to curriculum allows teachers to use solar as a tool for students to learn about renewable energy and sustainability. The NYC program includes professional development training for teachers, in-school classroom residencies with students, and a Career and Technical education program where Solar One educators train students studying electrical, engineering, or construction to install solar PV.

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HERE COMES SOLAR

How Solar Works



- 1 - Sunlight is turned into electricity by solar panels.
- 2 - The inverter converts direct current electricity into alternating current electricity for use in the building.
- 3 - A meter measures the amount of electricity your solar system produces.
- 4 - Any unused electricity is sent back to the utility in exchange for credits on your bill.

Kilowatts vs Kilowatt-Hours:

Kilowatt (kW) - A solar energy system's capacity is the amount of power that the system could produce in an instant under ideal conditions. System Capacity is measured in Watts, or kilowatts, like lightbulbs.

Kilowatt Hours (kWh) - Over time, solar arrays produce a flow of energy, measured in kilowatt hours. One kilowatt hour of solar energy offsets the need to purchase one kilowatt hour from the utility.

Three Types of Solar Installations



Ballasted Array:

- Low profile
- Limited roof penetrations
- Cheaper and easier for low-rise buildings <100 ft



Mechanically Attached Planar Array:

- More solar production
- No inter-row spacing
- Best for space-constrained roofs



Raised Canopy Array:

- Raised at least 9' above roof
- Can cover entire roof area
- Most expensive, but has co-benefits

Solar Operations and Maintenance

- Almost no maintenance for solar arrays and inverters
- Online monitoring allows remote diagnosis of performance issues
- Solar company should do walkthrough with building staff
- 25-year panel warranty
- Five-to-ten-year workmanship warranties
- Solar company can work with roofer to maintain existing roof warranty

Solar Financials

\$/Watt increases when:

- Smaller System
- Mechanically integrated system
- Prevailing Wage
- Creative System designs like canopy

\$/Watt decreases when:

- Larger system
- Ballasted installation
- Competitive and bulk procurement
- Solar-Ready design

Sample System Costs				
System Size	Mounting Method	\$/Watt	Turnkey Price	Annual Savings
8 kW	Planar	\$5.00	\$40,000	\$2,000
30kW	Ballasted	\$3.50	\$105,000	\$8,000
40kW	Canopy	\$4.50	\$116,000	\$11,000

Available Solar Incentives

Building Type	NYSERDA	Federal Tax Credit	State Tax Credit	Accelerated Depreciation	NYC Property Tax Abatement
	NY-SUN Incentive (paid directly to installer)	(30% of system cost)	(25% of system cost)	(Federal and State Bonus Depreciation)	(30% of system cost)
OWNER-OCUPIED COOP/ CONDO	\$1.60-\$2/Watt for affordable housing \$1.00-1.20/Watt for market rate	Likely distributed to shareholders	Must be distributed to shareholders	Only available to businesses	Only eligible if taxes are owed, not compatible with some other abatements
FOR-PROFIT RENTAL	\$1.60-\$2/Watt for affordable housing \$1.00-1.20/Watt for market rate	Commercial Tax Credit can be taken	N/A (homeowners only)	Available, pending owners' income tax liability	Only eligible if taxes are owed, not compatible with some other abatements
NON-PROFIT RENTAL	\$1.60-\$2/Watt for affordable housing \$1.00-1.20/Watt for market rate	Commercial Tax Credit can be taken through Direct Pay	N/A (homeowners only)	No tax liability	No tax liability

**Federal Investment Tax Credit is 30% + adders for certain buildings in low-income census tract or projects benefiting low-income tenants. For some sites it may be possible to sell tax credits through transferability. See Inflation Reduction Act IRS guidance.*

Questions?

Solar One is a 501(c)(3) not-for-profit organization whose mission is to design and deliver innovative education, training, and technical assistance that fosters sustainability and resiliency in diverse urban environments. Our programs help individuals and communities explore new ways of living and working that are more adaptive to a climate-change impacted world. The official IRS 501c3 designation is CEC Stuyvesant Cove, Inc.

Affordable buildings can receive free technical assistance from Solar One and the NYC Dept of Housing Preservation and Development by emailing affordable@solar1.org. We can also serve any NYC building larger than 5,000 square feet through the NYC Accelerator — contact info@accelerator.nyc for more details.

SOLAR ONE HERE COMES SOLAR

Reduce Your Operating Costs with Solar Power

Solar One, through its Here Comes Solar program, provides comprehensive technical assistance to low-income communities - including multifamily buildings, homeowners, community organizations, and renters - to make solar cost-effective and accessible to all. We focus on low-income communities and communities of color who face disproportionate challenges to accessing the economic benefits of solar. HCS works to develop solar projects that reduce operating expenses for multifamily buildings (helping to preserve NYC's scarce affordable housing stock), and low-income homeowners, as well as community solar enrollment for renters. These projects provide direct utility bill savings and employment opportunities to low-income households and vulnerable communities.

Since 2014, the HCS solar technical assistance team has facilitated 31 megawatts (MW) of solar across 880 buildings, including 520 affordable housing properties (14.6 MW).



Solar Assessment:

Is solar an attractive option for your building(s)? We will find out for you by completing remote and optional onsite technical assessment. During an onsite technical assessment we will visit your property to do an assessment on the rooftop to understand the solar potential of your building(s).

Building Decision-Maker Education:

Here Come Solar (HCS) staff provides free consultation, empowering building decision-makers and project champions with information regarding solar technology, costs, incentives and savings potential.

Financing Options Consultation

HCS staff will prepare a detailed estimate that outlines the costs, incentives and financing options available for solar on your building(s). HCS staff will meet with you to explain the financing options that can make solar affordable, even for organizations or co-ops with limited reserves.

Contractor Engagement

After you decide to move forward with a solar project, HCS staff will work with you to prepare a request for proposals and solicit competitive bids from qualified local solar installation companies.

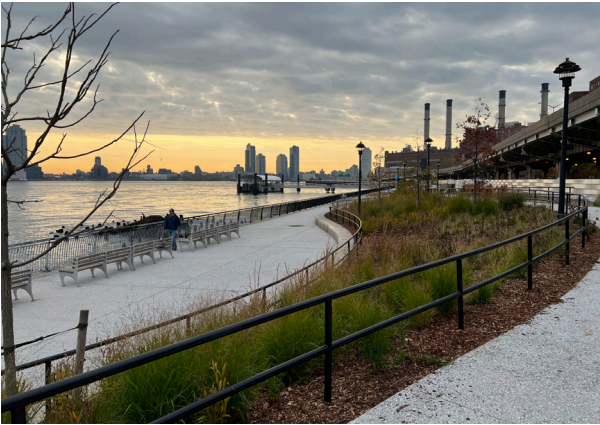
Enjoy Clean, Affordable Power:

After your system is installed, it will produce clean, affordable energy for 25 years, reducing your long-term operating costs.



Get started today by completing the contact form at: solar1.org/herecomessolar/contact

Here Comes Solar envisions a just, renewable, and resilient energy future where communities disproportionately impacted by social and environmental injustices have equitable access to the benefits of solar energy. We provide education and technical guidance to make solar accessible, collaborating with local communities to build an inclusive energy transition. Since 2014 the Here Comes Solar team has facilitated 32 MW of solar for more than 900 buildings.



Stuy Cove Park is a Lower Manhattan greenspace and educational hub for conversations on food, climate, and social justice. Built atop a former industrial site on stolen Lenape land, this city-owned property is managed by Solar One in partnership with the NYC Economic Development Corporation.

Located along the East River between 18th and 23rd streets, it provides our community with a unique and beautiful green space for relaxing, picnicking, exercising, and more. Sustainability is a founding principle at Stuy Cove, and we are dedicated to providing a model of park maintenance that has minimal environmental impact both locally and globally.

Our Mission:

We are living in a time of compounding crises: grievous class and race inequity, deadly pandemics, climate chaos and more, but at Stuy Cove Park we have learned that storytelling— particularly through the lens of food and food culture— can help people think critically and act decisively; to reflect and respond as interdependent stewards of planet earth.

To that end we host conversations that increase literacy and competency on complex issues through immersive community activations with land. By welcoming folks of intersecting identities to see, taste, smell and feel the many gifts planet Earth has to offer, we can increase our collective agency in building a just and sustainable future. We hope you'll join us for one of our volunteer projects, hands-on workshops, educational field trips, or wild food events.

Volunteer at the Park:

Volunteers are essential to Stuyvesant Cove Park. We work with many dedicated local residents, schools, summer programs, and nonprofit and corporate groups comprised of people of all ages and abilities. Volunteers gain experience in all aspects of perennial plant propagation and care, as well as maintenance of our public urban permaculture gardens. There is no better way to get to know someone than to work beside them. Connect with fellow volunteers as you learn about ethnobotany, restoration agriculture, and cultivation of native plants, or quietly benefit from the grounding experience of working the earth.

In 2012 Hurricane Sandy hit lower Manhattan hard with a 13-foot storm surge. As a result construction began in 2020 for the East Side Coastal Resiliency (ESCR) Project, which razed and rebuilt the park's entire footprint while also installing a 10-foot flood wall to protect lower Manhattan communities from the oncoming impacts of sea level rise. As our planet and community continue to transform, Stuy Cove Park will serve as a space for community, ecology and social repair in America's most diverse and densely populated city.



SOLARone

CLEAN COMMUNITIES

Clean Energy Communities Program in NYC

The Clean Energy Communities (CEC) Program was launched in 2016 through NYSERDA (New York State Energy Research and Development Authority). The program was created to incentivize municipalities across the State of New York to implement clean energy initiatives and projects that will advance the state’s goals of decarbonization. Each municipality has designated coordinators to support them in completing high impact actions and unlocking grants.



About Us:

Solar One is NYSERDA’s implementation partner for CEC in New York City and Long Island. In New York City, Solar One seeks to engage with community-based organizations to deploy campaigns focused on decarbonization resources. Furthermore, Solar One has embedded staff at the NYC Mayor’s Office of Climate and Environmental Justice (MOCEJ) and the Department of Buildings (DOB) to support emissions reduction initiatives. These full-time coordinators work on high impact efforts, including:

- Expanded benchmarking and energy efficiency solutions for private buildings;
- Developing and launching equitable electrification policies and programs;
- Working with NYC’s public agencies to implement plans for public sector emissions reduction.



Program Offerings:

As the implementation partner for CEC in New York City, we provide:

- Expertise in launching clean energy projects and campaigns
- Grant opportunities to support clean energy projects or campaigns
- Engagement with community based organizations and city agencies to reach decarbonization goals

Project Highlights:

- In January 2023, Solar One launched the Re-Grant Program to support low-income building owners located in the South Bronx, Upper Manhattan, and Central Brooklyn. The program is in partnership with the NYC Accelerator Program to promote their program offerings and technical assistance to building owners seeking help to implement clean energy upgrades. The city was able to unlock \$160,000 in grants from CECP to support five building energy projects and two CBOs to market the Accelerator program.
- In December 2021, \$150,000 in grant funding was secured from CECP. Solar One supported MOCEJ in applying to use the funding for energy upgrades at St. George Library Center in Staten Island, N.Y. The proposed initiative included installing a building management system (BMS), installing thermostatic controls on existing fan coil baseboard units, retrofitting air handling unit supply fans with variable speed drives, and retrofitting chilled/hot water pumps with variable speed drives.
- Our event series, Clean Energy Connections, features a panel discussion on emerging trends in the state of the industry and aims to engage a variety of stakeholders across the clean energy transition space. This in-person event hopes to spark dialogue and increase outreach on the efforts being made to decarbonize New York City.

Founded in 2004, Solar One is a 501(c)(3) not-for-profit organization whose mission is to design and deliver innovative education, training, and technical assistance that fosters sustainability and resiliency in diverse urban environments.

Solar One's programs include:

- **Green Workforce Training:** Offering hard skills and career pathways for individuals facing employment barriers.
- **Here Comes Solar:** Facilitating solar projects in underserved communities through technical assistance.
- **New Jersey Solar Education:** Solar One's New Jersey program launched in 2017 as a year-long environmental STEM education program at a Newark Public High School. Since then, we have grown to offer professional learning for teachers, paid summer internships for Newark youth focused on green career exploration and solar hard skills training for students who attend vocational high schools. In 2022, Solar One was awarded a NOAA Environmental Literacy Program grant to develop the Newark Resilient Solar Initiative (RSI). The RSI works closely with the Newark Office of Sustainability to expand our hard skills solar training and climate literacy programming, build stand-alone solar chargers across communities in Newark who are most vulnerable to climate emergencies and educate Newarkers on emergency preparedness at community engagement events.



EDUCATION



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WORKFORCE



Community Partnerships:

Solar One collaborates with local organizations, including Newark Public Schools, Newark Office of Sustainability, Newark's Summer Youth Employment Program, among others.

Future Outlook:

Between 2023 and 2024, Solar One aims to provide Climate Literacy and Emergency Preparedness knowledge to:

800 Newark Residents

400 Community Members

150 Adults

Their journey lights the path to a more sustainable and equitable future for Newark and its residents.