Generation180

FIFTH EDITION
AUGUST 2024

Brighter Future

A Study on Solar in U.S. K-12 Schools

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Generation180

Generation180 is a national nonprofit working to inspire and equip people to take clean energy action in their homes and communities. We lead national campaigns to electrify homes, buildings, and transportation and reduce carbon emissions. We give people meaningful ways to take action toward a cleaner, healthier, and more equitable energy future.

Generation180 / Electrify Our Schools

Through our nationwide Electrify Our Schools program, Generation180 is working toward a future in which all of our K–12 schools are completely powered by clean energy. We are leading a nationwide movement supporting K–12 school leaders to invest in clean energy technologies that will reduce energy costs, enhance student learning, and foster healthier communities for all. The Electrify Our Schools program amplifies the positive effect that schools create by encouraging clean energy adoption throughout their communities and beyond.

Our campaign advances the transition to clean energy in the following ways:

Mapping the national movement / Generation180 tracks the fast-growing number of K–12 schools nationwide that tap into clean energy. The data are accessible through our interactive online map. This biennial national report, *Brighter Future: A Study on Solar in U.S. K–12 Schools*, analyzes trends and ranks states for solar adoption by U.S. K–12 schools.

Empowering and connecting school leaders / Generation180 supports and empowers a School Leadership in Clean Energy (SLICE) Network. This peer network connects superintendents, school board members, operations and facilities directors, and other leaders who champion clean energy in their schools and support the growth of renewables across the education sector.

Building a toolbox for going solar / Our library of free resources helps schools flip the switch to clean energy. The virtual Help Desk collects and organizes relevant resources, answers questions, and offers personalized support. Our *How-To Guide* provides step-by-step advice for going solar, and our *Solar Schools Campaign Toolkit* supports advocates who want to catalyze change at their schools.

Expanding equitable access to solar / Generation180 focuses on expanding opportunities for all schools to benefit from clean energy, regardless of their size, geography, or resources. We advocate for policies that remove financial and administrative barriers while providing support and technical assistance to disadvantaged and under-represented communities.

Inspiring a brighter future / Generation180 shares clean energy success stories and best practices from school districts around the country. Through reports, blogs, videos, presentations, and digital content, we help schools recognize the benefits of going solar and identify opportunities in their own communities.

ElectrifyOurSchools.org

Generation180
Generation180 recognizes and thanks the dedicated staff and team of research interns, writers, and consultants who contributed to the research, analysis, writing, design, and marketing of this fifth edition of the *Brighter Future* report. We extend our appreciation to Kristen Keim and Tish Tablan for their leadership on the project, and to Janet Conklin, Justin Yankow, and Yulin Wang for their contributions to the national census.

10-Year Anniversary of the *Brighter Future* Report
Generation180 is celebrating the 10-year anniversary of the first edition of this report, *Brighter Future: A Study on Solar in U.S. Schools*, which was published by The Solar Foundation in September 2014. In 2017, Generation180 partnered with The Solar Foundation and Solar Energy Industries Association (SEIA) to publish the second edition of the report. The second edition of the *Brighter Future* report, which kicked off Generation180's Solar for All Schools program. Generation180 has continued the biennial publication of the *Brighter Future* report. The development and dissemination of this report remain a cornerstone of our program supporting clean energy adoption by K-12 schools.

We acknowledge and thank The Solar Foundation, the original creator of this census and report that is now merged with the Interstate Renewable Energy Council (IREC). We recognize the U.S. Department of Energy for supporting the first edition with funding from the SunShot Solar Outreach Partnership Program, and SEIA for leading the data collection and analysis for the first two report editions.

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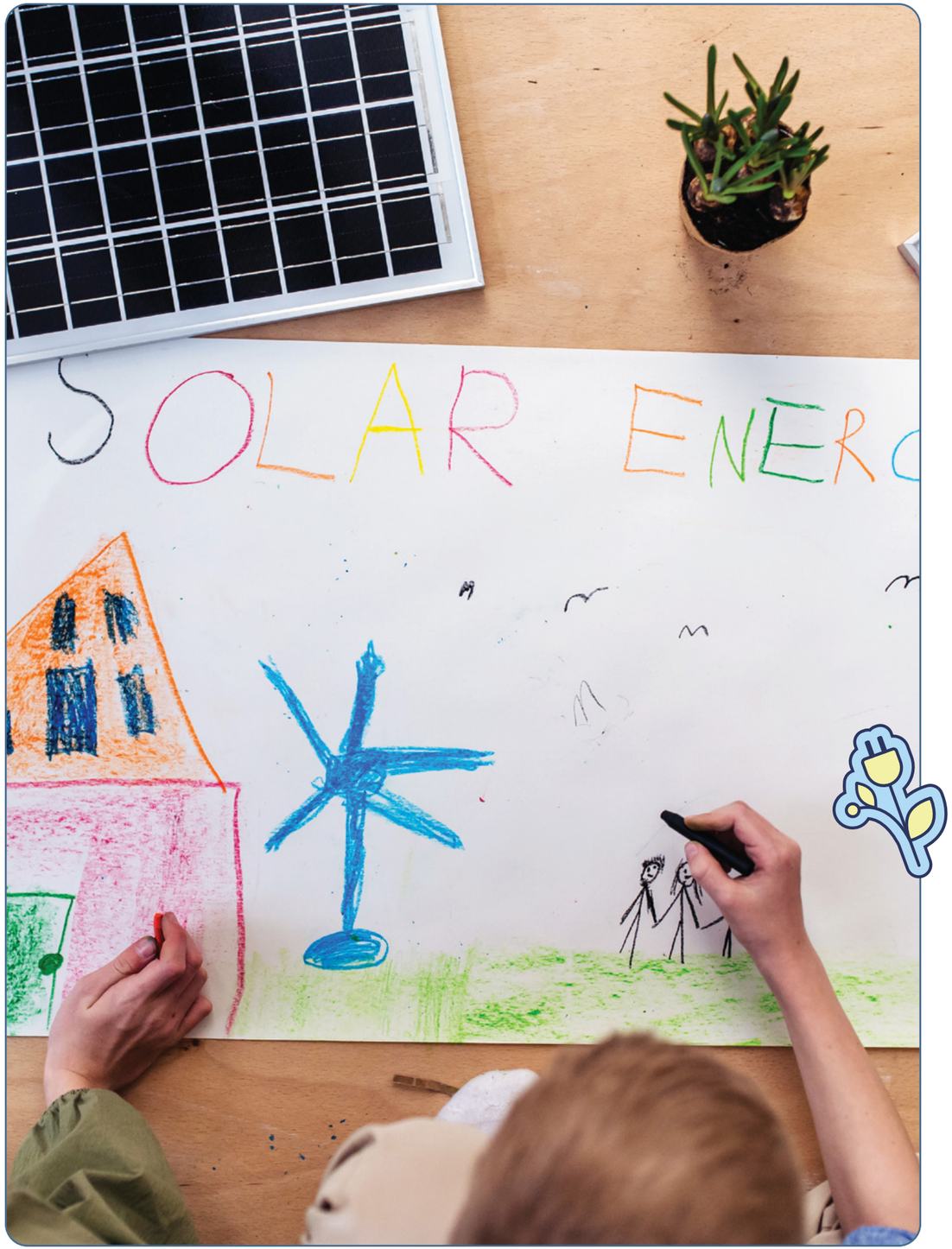


Progress Toward a Brighter Future

Since 2014, the *Brighter Future* report has tracked the nation's progress toward a brighter future with our schools powered by 100% clean energy. This fifth edition of the report marks the 10-year anniversary of the first national census on solar adoption by K–12 schools.

Substantial progress has been made during the last ten years:

- Cumulative solar capacity at U.S. schools **more than quadrupled** from 422 MW to 1,814 MW.
- The number of solar-powered schools **more than doubled** from 3,727 to 8,971 schools.
- The average system size installed at schools **grew by 50%** from 134 kW to 202 kW.
- The number of students attending a solar-powered school **more than doubled** from 2.8 million to 6.2 million.

Today, more than 1 in 9 students in the country attends a K–12 school powered by solar energy. [01]

While great progress has been made throughout the past decade, less than 10% of K–12 schools are currently reaping the financial, educational, and community benefits of onsite solar energy. Reaching our goal of powering every K–12 school in the country with 100% clean energy will require removing barriers and lowering the financial burden for schools.

During the past ten years, the falling installation price made going solar an affordable option for more schools. Between 2014–2024, the cost to install solar dropped by 40%,[02] and the number of solar-powered schools grew by 150%. Now, schools can take advantage of new federal programs that provide funding opportunities and financial incentives to make solar energy accessible to even more schools, including those in environmental justice, disadvantaged, and underrepresented communities. More states are offering grant programs to bring down the cost of solar and providing options to go solar with no upfront capital costs.

There has never been a better time for schools to flip the switch to clean energy.

State of Solar Adoption by U.S. Schools

Today, at least one in nine students in the U.S. attends a K-12 school powered by solar energy.[03]

6,220,123
Number of Students Attending a Solar School

8,971
Number of Solar Schools

1,814 MW
Cumulative Solar Capacity

202 kW
Average System Size per School

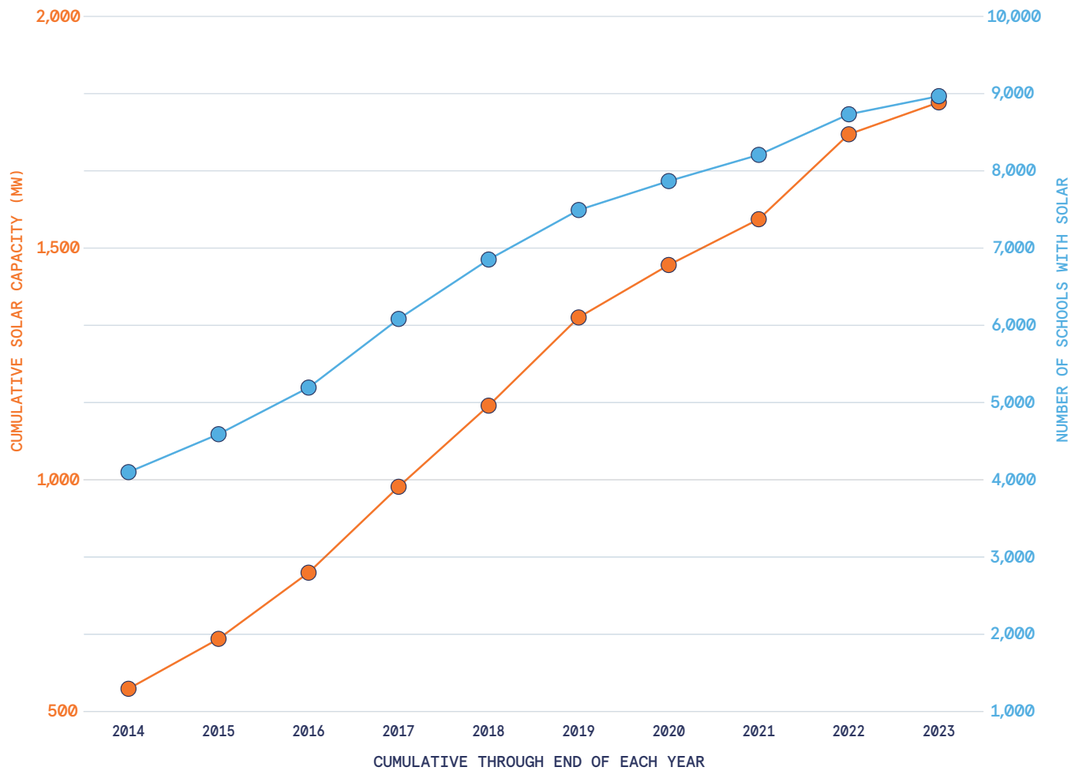
Our nation's K-12 schools generate enough solar energy to power the electricity use of all the households in Denver, Colorado (over 330,000 homes).[04]

Growth of Solar Capacity at U.S. Schools

In 2022-2023, 800+ K-12 schools added solar arrays. That is enough for at least one school to go solar every day for the last two years.

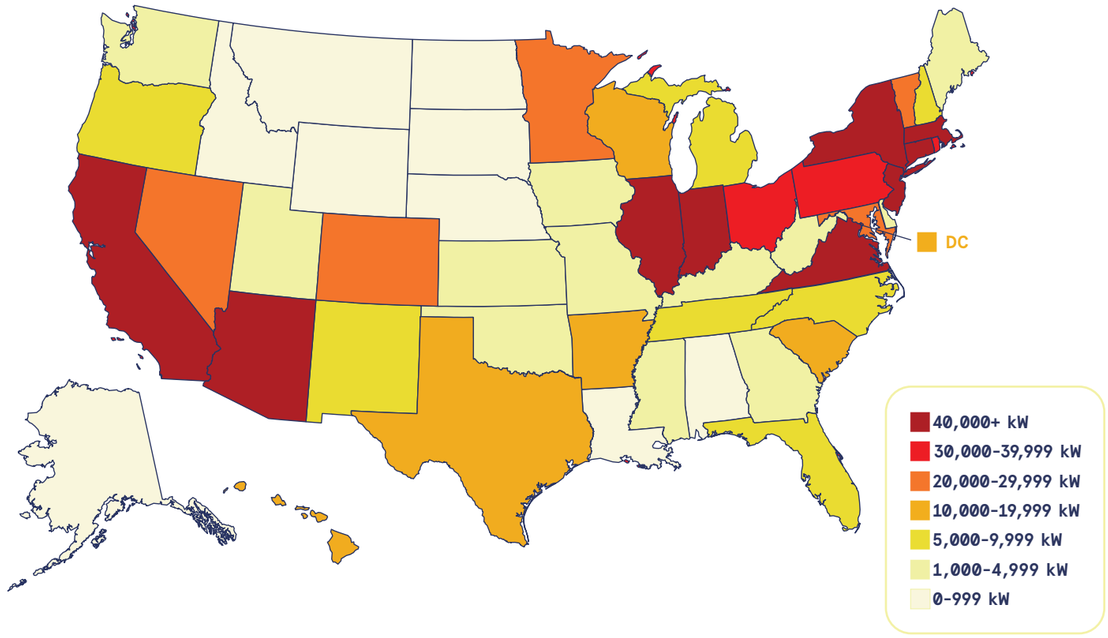
Over the last ten years, the amount of solar capacity at K-12 schools has more than quadrupled.

Growth in Solar Adoption by U.S. K-12 Schools



Solar Adoption by State

Cumulative Solar Capacity at K-12 Schools



CUMULATIVE CAPACITY TOP 10 STATES

STATE	kW
CALIFORNIA	723,409
NEW JERSEY	211,972
ARIZONA	127,537
MASSACHUSETTS	85,105
CONNECTICUT	69,782
ILLINOIS	66,028
INDIANA	61,331
NEW YORK	59,436
VIRGINIA	55,423
PENNSYLVANIA	38,812

CUMULATIVE CAPACITY BOTTOM 10 STATES

STATE	kW
SOUTH DAKOTA	0
ALABAMA	28
ALASKA	38
NEBRASKA	69
NORTH DAKOTA	80
WYOMING	232
LOUISIANA	365
RHODE ISLAND	366
IDAHO	616
MONTANA	747

CAPACITY GROWTH* TOP 10 STATES

STATE	kW
CALIFORNIA	143,178
ILLINOIS	44,678
VIRGINIA	42,629
NEW JERSEY	28,561
CONNECTICUT	26,737
NEW YORK	20,945
PENNSYLVANIA	20,746
INDIANA	15,839
MASSACHUSETTS	13,682
ARKANSAS	13,157

*2020-2023

SEE COMPLETE STATE RANKINGS IN APPENDIX A.

Quantity of K-12 Schools with Solar

OF SOLAR SCHOOLS TOP 10 STATES

STATE	#
CALIFORNIA	2,815
NEW JERSEY	696
ILLINOIS	568
ARIZONA	411
CONNECTICUT	336
NEW YORK	325
MASSACHUSETTS	309
WISCONSIN	285
FLORIDA	280
MARYLAND	197

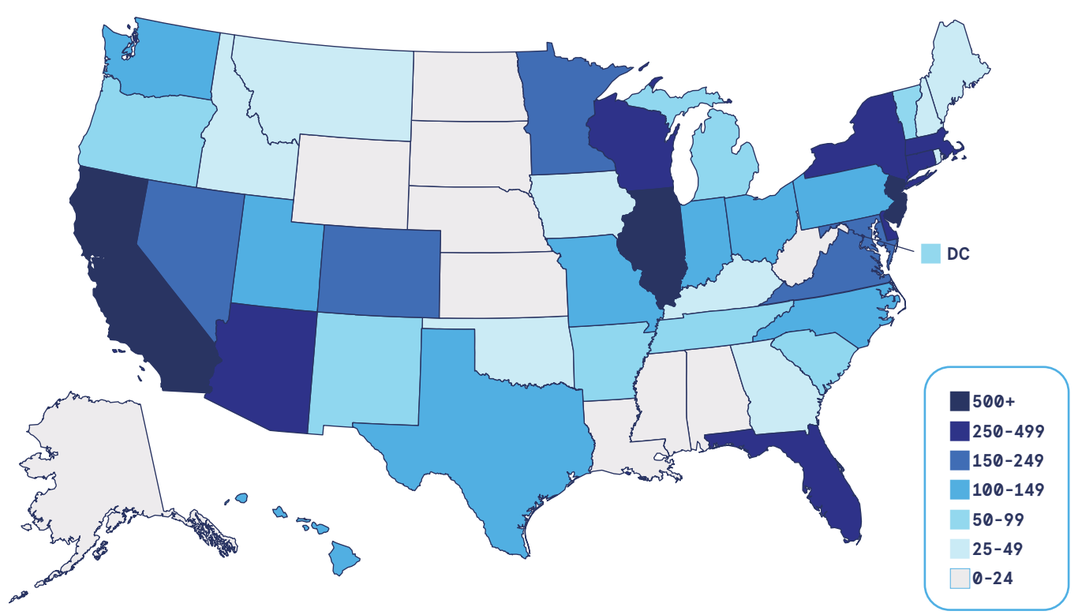
% OF SOLAR SCHOOLS TOP 10 STATES

STATE	%
HAWAII	30%
CONNECTICUT	27%
WASHINGTON, D.C.	24%
CALIFORNIA	22%
VERMONT	22%
NEW JERSEY	21%
NEVADA	19%
ARIZONA	15%
MASSACHUSETTS	13%
ILLINOIS	11%

SOLAR SCHOOL GROWTH* TOP 10 STATES

STATE	#
CALIFORNIA	389
ILLINOIS	127
VIRGINIA	111
WISCONSIN	108
CONNECTICUT	89
NEW JERSEY	78
NORTH CAROLINA	58
NEW YORK	57
ARKANSAS	43
INDIANA	41

*2020-2023



SEE COMPLETE STATE RANKINGS IN APPENDIX A.

Funding Solar for Schools

How K-12 Schools Are Funding the Switch to Solar

Schools interested in solar power need to explore potential sources of funding for their project and to decide whether to own the solar panels. Direct ownership, or choosing to purchase and own the solar array, can maximize energy bill savings, lower the cost of project financing, and open opportunities for additional grants and tax credits. (For more on tax credits, see "Elective Pay" on page 14.) However, direct ownership requires school leaders to secure upfront capital funds for the project — a common barrier for schools — and to take responsibility for long-term maintenance and repairs.

To date, K-12 schools have used third-party ownership models — including power purchase agreements (PPAs), leases, and energy service agreements — as the primary means to fund solar projects. Choosing a third-party partner to fund, install, own, and maintain the solar energy system for a contracted time reduces the workload placed on a school's finance and operations staff. Effective third-party ownership agreements remove the barrier of upfront capital costs, stabilize long-term electricity prices, and generate immediate energy bill savings.

According to the available data on solar financing type, 80% of the cumulative solar capacity installed at K-12 schools is primarily funded by third-party ownership models, such as PPAs and leases (FIGURE 1). The remaining 20% is directly owned by K-12 schools, with nearly half receiving funding from grants, donations, and/or government sources.

Direct Ownership
The property owner purchases, owns, and maintains the solar array.

Third-Party Ownership
A third-party purchases, owns, and maintains the solar array for the property owner during the agreed term. Examples include power purchase agreements, leases, and energy service agreements.

80% of the cumulative solar capacity installed at K-12 schools is primarily funded by third-party ownership models.

JOHN LEWIS ELEMENTARY SCHOOL | WASHINGTON, DC
PHOTO CREDIT: PERKINS EASTMAN | JOSEPH ROMEO

Sources of Solar Funding Used by K-12 Schools

FIGURE 1
Cumulative Solar Capacity by Funding Type

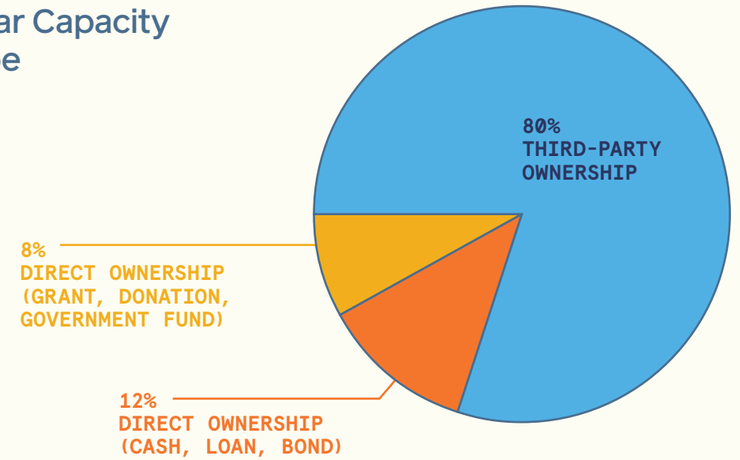
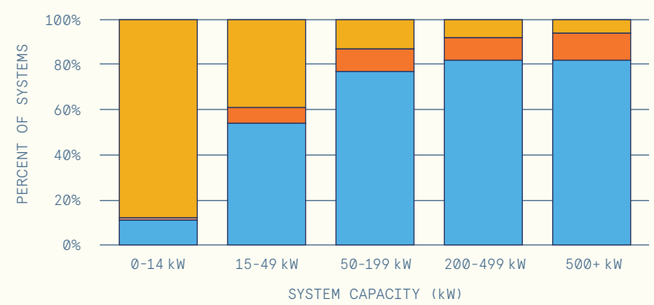


FIGURE 2
System Capacity Distribution by Funding Type



■ DIRECT OWNERSHIP
- GRANT
- DONATION
- GOVERNMENT FUND

■ DIRECT OWNERSHIP
- CASH
- LOAN
- BOND

■ THIRD-PARTY OWNERSHIP
- POWER PURCHASE AGREEMENT
- LEASE
- ENERGY SERVICE AGREEMENT
- OFF-SITE COMMUNITY SOLAR

FIGURE 2 shows that system capacity is positively correlated with the percentage of systems funded by third-party ownership. For projects under 15 kW, only 11% are financed by third-party ownership, with almost all the rest paid for by grants, donations, and government funds. For systems between 15 kW and 49 kW, use of third-party ownership increases to 54%. For systems above 50 kW, third-party ownership accounts for approximately 80% of the solar projects.

State Policies Supporting Solar for Schools

Power Purchase Agreement Policies

A power purchase agreement (PPA) is a third-party ownership model frequently used by K-12 schools. In a typical PPA, the customer agrees to buy electricity produced by the solar energy system at a predetermined rate for a selected time period, often ranging from 7 to 25 years. Typically, the customer pays a lower rate than what the utility charges and benefits from immediate electricity bill savings. Excess energy generation can be sold back to the utility through a net metering arrangement.

In the states where PPAs are allowed, they have been an effective funding mechanism. As of 2024, 29 states plus Washington, D.C. have state policies that explicitly allow third-party ownership of solar through PPAs.[05] Together, these states have nearly 11 times more solar capacity at K-12 schools than states that prohibit PPAs or have unclear policies. **States that allow PPAs make up 92% of the cumulative solar capacity at all K-12 schools, while the remaining 21 states that prohibit or have unclear policies regarding PPAs contribute only 8%.**

Featured below are examples of two states where the adoption of state policies enabling third-party ownership significantly improved access to solar for K-12 schools.

Power Purchase Agreement

A financing arrangement in which a solar developer funds, owns, and maintains the solar energy system for a set period. The property owner agrees to buy the electricity produced by the solar energy system, typically at a lower rate than what the utility charges.

Arkansas

In 2019, Arkansas was one of the U.S. states with the fewest K-12 schools powered by solar; just seven schools had installed a combined 1.8 MW of solar capacity. That year, Arkansas passed **Act 464**,[06] which enabled third-party financing for solar projects of tax-exempt entities and raised the capacity limit to 1 MW for commercial customers. As of January 1, 2024, the cumulative solar capacity at Arkansas schools had increased eightfold. Together, 50 K-12 schools have installed 15 MW of solar power. All the solar projects installed at Arkansas schools since 2019 were financed through third-party ownership.

↗ Visit **Generation180.org/Blog/Batesville** to read more about Batesville School District in Arkansas, which used solar energy savings to raise teacher salaries.

Virginia

In 2013, Virginia passed **Senate Bill 1023**[07] to create a pilot program enabling third-party PPAs for Dominion Energy customers. Once the 50 MW limit for the pilot program was met, the **Virginia Clean Economy Act of 2020**[08] passed. The law raised Virginia's PPA limit to 1,000 MW in Dominion Energy territory and 40 MW in Appalachian Power territory. Since PPAs were first enabled, Virginia schools have installed over 55 MW of solar capacity. That is a 100-fold growth in the last ten years, more than 85% of which was financed through third-party ownership.

↗ Visit **Generation180.org/Electrify-Our-Schools/Virginia** to view a map of Virginia's solar schools.

State Funding Policies

States can play an important role in making clean energy more accessible to schools. A few leading states have established funding programs to specifically support solar adoption at K-12 schools. Model programs in states, such as Pennsylvania, Maryland, and Minnesota, can be replicated in other states to expand access to solar nationwide.

Generation180 advocated for the Solar for Schools Act and supported Representative Elizabeth Fiedler in hosting solar tours at schools.

Pennsylvania

In July 2024, Pennsylvania passed the **Solar for Schools Act,**[09] creating a $25 million grant program to fund solar energy projects at public K-12 schools, community colleges, and career technical schools in the state. Schools in disadvantaged communities and within 50 miles of a recently closed coal-powered electric generation plant will be prioritized to receive these funds. The grant funds will provide up to 50% of the total solar project cost and can be stacked on top of other donations, grants, and federal funds.

WILDE LAKE MIDDLE SCHOOL | COLUMBIA, MD
PHOTO CREDIT: JAMES POSEY ASSOCIATES

Maryland

In 2022, the Maryland Energy Administration (MEA) launched the **Decarbonizing Public Schools Program**,[10] which provided $700,000 to K-12 schools for energy management and net zero energy planning. In fiscal year 2024, the MEA expanded the program with $26.6 million to fund solar energy, LED lighting, heating electrification, geothermal heat pumps, and net zero energy projects. The state granted over $8 million for solar projects at schools, prioritizing those in underserved and overburdened communities. Awarded school districts each received up to $1 million to purchase and own the array or up to $750,000 for an array owned by a third party. The ongoing Decarbonizing Public Schools Program funding comes out of the state's Strategic Energy Investment Fund (SEIF), which receives proceeds from the state's participation in the Regional Greenhouse Gas Initiative.[11]

SNAIL LAKE KINDERGARTEN CENTER
SHOREVIEW, MN | PHOTO CREDIT: IPS SOLAR

Minnesota

In 2021, the Minnesota State Legislature established the **Solar for Schools grant program**. All eligible schools are encouraged to apply for grants worth 40%–70% of the cost to purchase and install a solar energy system. The maximum grants are $500,000 outside of Xcel service territory and $675,000 within Xcel service territory. Grantees are encouraged to integrate renewable energy use into the school curriculum. The Minnesota Department of Commerce reports that the program is on track to nearly double the number of solar schools in the state within three years (2022-2024).[12]

Federal Policies Supporting Clean Energy for Schools

Inflation Reduction Act and Elective Pay

The Inflation Reduction Act (IRA)[13] of 2022 enabled the largest investment in U.S. history in fighting climate change and building a domestic clean energy economy – estimated to exceed $370 billion. The landmark commitment includes grants, financing, and tax credits that K-12 schools can receive to support new clean energy projects.

One of the most significant opportunities that the IRA created for K-12 schools and other tax-exempt entities is the ability to receive cash reimbursements for clean energy projects through Elective Pay (also known as Direct Pay).[14]

Prior to the IRA, schools could not directly receive tax credits because they do not have tax liability. Now, schools can receive direct payments from the Internal Revenue Service as cash reimbursements for purchases of clean energy technologies. Unlike grant programs, the tax credits are non-competitive, and there is no cap on the amount that can be received through Elective Pay.

There are several clean energy tax credits that are applicable to K-12 schools through Elective Pay. Through the Investment Tax Credit, schools can receive a payment ranging up to 70% of the cost to purchase and install a solar energy system and up to 50% of project costs for battery storage or ground-source heat pumps. (See more on the Investment Tax Credit on page 16.) The Commercial Clean Vehicle Credit provides up to $40,000 for the purchase of electric school buses and up to $7,500 for electric vehicles under 14,000 lbs.[15] The Alternative Fuel Vehicle Refueling Property Credit pays 6-30% of the cost of electric vehicle chargers and infrastructure upgrades located in low-income and rural areas.[16] The credit can increase to 30% if prevailing wage and apprenticeship requirements are met. The credit is limited to $100,000 per property.

Inflation Reduction Act
A federal law passed in 2022 that enabled the nation's largest investment in fighting climate change and building a domestic clean energy economy.

Elective Pay
The Inflation Reduction Act enacted Elective Pay (or Direct Pay), a process for schools and other tax-exempt entities to access clean energy tax credits as a refund payment from the Internal Revenue Service.

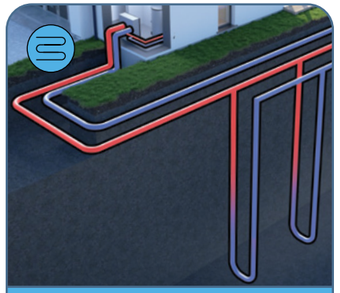
Overview of the Elective Pay Process

1. Determine your tax year (calendar year or fiscal year).
2. Satisfy all tax credit requirements for the given tax year.
3. Complete pre-filing with the IRS and obtain a registration number.
4. File tax return (Form 990-T and associated forms) with the IRS by the due date.
5. Receive elective payment from the IRS.

Elective Pay Provides Access to Tax Credits for the Purchase of these Clean Energy Technologies


Solar Photovoltaics

CREDIT: CALLIE FAUSEY, SANTA BARBARA UNIFIED SCHOOL DISTRICT
Energy Storage


Ground-Source Heat Pumps

CREDIT: STOCKTON UNIFIED SCHOOL DISTRICT
Electric Vehicles


Charging Infrastructure

Tax Credits Available to Schools Through Elective Pay

Investment Tax Credit
- Up to 70% of the total project cost for solar photovoltaic systems
- Up to 50% of the total project cost for energy storage and ground-source heat pumps

INTERNAL REVENUE CODE SECTION 48

WWW.ENERGY.GOV/EERE/SOLAR/FEDERAL-SOLAR-TAX-CREDITS-BUSINESSES

Alternative Vehicle Fuel Refueling Property Credit
- 6% of total costs for electric vehicle charging equipment (30% if prevailing wage and apprenticeship requirements are met)
- Must be located in designated low-income or non-urban census tracts. Maximum of $100,000 per eligible property.

INTERNAL REVENUE CODE SECTION 30C

WWW.IRS.GOV/CREDITS-DEDUCTIONS/ALTERNATIVE-FUEL-VEHICLE-REFUELING-PROPERTY-CREDIT

Commercial Clean Vehicle Credit
- Up to $40,000 per electric school bus
- Up to $7,500 per electric vehicle (< 14,000 lbs)

INTERNAL REVENUE CODE SECTION 45W

WWW.IRS.GOV/CREDITS-DEDUCTIONS/COMMERCIAL-CLEAN-VEHICLE-CREDIT

Inflation Reduction Act and Investment Tax Credit

In addition to enabling schools to take advantage of tax credits through Elective Pay, the Inflation Reduction Act expanded the Investment Tax Credit. Under the IRA, the ITC offers a potential refund of up to 70% of the eligible project costs for solar energy systems by combining base credits and bonus credits. Solar energy projects are eligible for a 30% base credit if the capacity is under 1 MW or if the project meets prevailing wage and apprenticeship requirements (PWA), as determined by the U.S. Department of Labor.[17] Energy storage devices with a minimum capacity rating of five kilowatt-hours (kWh) and ground-source heat pumps are also eligible for a 30% base credit when these requirements are met. Otherwise, the base credit is 6% of the eligible project costs.

There are up to three bonus credits (Domestic Content, Energy Community, and Low-Income Communities) that can be stacked on top of the base credit for a solar project to be eligible for the maximum 70% credit. Projects with energy storage or ground-source heat pumps are eligible for a credit up to 50% of the project costs by obtaining the 30% base credit along with the Domestic Content Bonus Credit (10%) and Energy Community Bonus Credit (10%). The Low-Income Communities Bonus Credit Program applies only to solar and wind projects.

Domestic Content Bonus Credit (10%): Projects that meet domestic content minimums are eligible for a 10 percentage point increase. To qualify, all structural steel or iron products used must be produced in the United States, and a required percentage of the total costs of manufactured products (including components) of the facility need to be mined, produced, or manufactured in the United States.[18] The Internal Revenue Service provides detailed guidance on the domestic content requirements.[19]

Energy Community Bonus Credit (10%): Projects that are located in federally designated energy communities are eligible for an additional 10 percentage point increase. The U.S. Department of Energy (DOE) annually updates the map of eligible energy communities[20] that meet at least one of the requirements for minimum unemployment rate, employment in the fossil fuel industry, a census tract with a closed coal mine or coal plant, or eligible brownfield sites.[21]

Low-Income Communities Bonus Credit (10-20%): This is the only bonus credit for the ITC that requires a separate application and approval for solar project owners. Applications to the program must fall within the program's capacity limits per year and be pre-approved prior to installation of the project.[22] Solar facilities installed in qualifying low-income communities or on federally designated Indian land are eligible for a 10 percentage point increase. Projects that are part of a qualified low-income economic benefit project, such as a community solar project that serves low-income residents, are eligible for a 20 percentage point increase.[23] The U.S. Department of Energy maintains a map of the eligible census tracts that meet the requirements for this program.[24]

The Investment Tax Credit rules described above apply to solar energy and energy storage projects that commence construction (with at least 5% of final qualifying project costs incurred) before January 1, 2025. The Investment Tax Credit will be phased out and replaced by the Clean Electricity Investment Credit (Section 48E of the Internal Revenue Code) for solar energy and energy storage projects that begin construction and are placed in service after December 31, 2024.[25]

Sample of Clean Energy Projects Eligible for the Investment Tax Credit

School District, State	Project Scope	Year Installed	Potential Credit Value
Buncombe County Schools, NC	2.4 MW solar capacity at 4 schools	2023	$500,000
Maize Unified School District 266, KS	150 kW solar array at 1 elementary school	2023	$103,500
Manchester Public Schools, CT[26]	Solar array and ground-source heat pump at 1 elementary school	2023	$2.5 million
Seattle Public Schools, WA[27]	Solar arrays and ground-source heat pumps at 3 elementary schools	2023	$7.5 million

Tax Credit Trailblazers
Clean energy projects put in service in 2023 are the first to be eligible for tax credits using Elective Pay. The table above includes examples of projects that meet eligibility requirements for the Investment Tax Credit, based on the project scope and year of installation. The potential credit values listed are estimates. The IRS due date for the first Elective Pay filings is November 15, 2024, and the school districts listed above had not received an elective payment as of the time of publication.


MAIZE HIGH SCHOOL | MAIZE, KS

Energy Storage at Schools

Pairing battery storage with solar energy systems can provide several benefits to schools. Excess energy produced by the solar panels can be stored for later use. The stored energy can be discharged to the grid when electricity rates are peaking, resulting in utility bill savings. During grid outages, energy storage can be used to power the building and keep the school operating for students or as a community shelter during natural disasters. Albuquerque Public Schools (NM), Santa Barbara Unified School District (CA), and Pittsburg Unified School District (CA) are a few of the trailblazing districts that have operational energy storage systems that are delivering cost savings and energy resilience.

Benefits of Energy Storage

- Storage of excess solar energy for later use
- Ability to save costs by discharging stored energy when electricity rates are high
- Back-up energy supply that can keep the school operating during grid outages

Energy storage is still an emerging technology for K-12 schools. As of January 2024, approximately 40 schools across six states had installed battery storage with a cumulative power capacity of 7.7 MW. To expand adoption of energy storage, schools will need additional support to navigate questions about financing options, leveraging the Investment Tax Credit, impact on utility rates, and interconnection to the grid.

More than three-fourths of the installed battery projects on schools are in California, totaling 6 MW of battery power capacity. California has one of the longest-running storage incentive programs in the country, the Self-Generation Incentive Program (SGIP),[28] which provides a financial incentive for energy storage systems that either stand alone or are paired with on-site renewables. The state also provides 0% loans to school districts and charter schools for energy storage systems.[29]

Massachusetts has the second highest number of schools with battery storage: three schools with 820 kW of combined battery power capacity. Massachusetts schools are also eligible for a financial incentive for adding energy storage to their solar system projects through the Solar Massachusetts Renewable Target (SMART) Program.[30]

Other states offer financial incentives that are available to K-12 schools for battery storage projects — including Colorado, Minnesota, New Hampshire, New Jersey, New York, Ohio, and Rhode Island. The incentives come in the form of rebates, grants, tax credits, PACE financing, and loans, and they could be stacked on top of the federal Investment Tax Credit to further bring down the cost.

Building momentum toward a clean energy future

This report highlights the current state of solar adoption by U.S. K-12 schools and the funding and policy structures that have been supporting solar growth to date. It includes data on new solar projects that primarily began planning and development before the Bipartisan Infrastructure Law (BIL) and the Inflation Reduction Act (IRA) were enacted and then became operational in 2022-2023. This edition's research leaves off before the full effects of the new landmark federal programs and clean energy incentives could be captured in the collection of data on operational solar arrays.

However, momentum is building as many more schools are now accessing federal clean energy grants and planning new projects that will leverage clean energy tax credits.

- Schools have begun new clean energy infrastructure projects with federal funding allocated by the BIL, including over $3.1 billion in funding already awarded to K-12 public schools through the EPA Clean School Bus Program and Department of Energy's Renew America's Schools Program.
- The first clean energy tax credit payments, enabled by the Elective Pay provision in the IRA, will be issued to schools in 2024. Schools are learning about the new tax filing process and how to plan new clean energy projects that leverage this noncompetitive pool of federal dollars.
- The installation of battery storage and ground-source heat pumps at schools has been growing, since the IRA made these technologies eligible for up to a 50% refund through the Investment Tax Credit.
- States are creating new funding programs to encourage communities to install clean energy infrastructure and leverage available federal dollars. Pennsylvania, Maryland, and Minnesota are the latest states to start grant programs specifically to support solar for schools.

These federal and state investments have the potential to significantly grow clean energy investments at K-12 schools. To scale adoption quickly across the country, school leaders will need considerable education and support to understand the funding opportunities available and be equipped to move forward with new clean energy infrastructure projects. Generation180 will continue to support school leaders, track the progress, and share the impacts that these new federal and state programs are bringing to school communities as we work together to build a brighter future for all of us.

State Rankings for Solar Schools

Rank	Cumulative Solar Capacity on K-12 Schools (kW)		Number of Schools with Solar		Number of Students Attending a Solar School	
	STATE	TOTAL kW	STATE	TOTAL	STATE	TOTAL
01	CA	723,409	CA	2,815	CA	2,302,977
02	NJ	211,972	NJ	696	NJ	437,748
03	AZ	127,537	IL	568	IL	340,943
04	MA	85,105	AZ	411	FL	295,072
05	CT	69,781	CT	336	AZ	243,073
06	IL	66,028	NY	325	NY	212,352
07	IN	61,331	MA	309	MA	198,065
08	NY	59,436	WI	285	CT	186,218
09	VA	55,423	FL	280	MD	141,944
10	PA	38,812	MD	197	WI	141,134
11	OH	31,451	MN	193	VA	128,350
12	MD	25,939	VA	180	TX	126,782
13	MN	24,185	NV	167	MN	117,140
14	CO	20,925	CO	166	CO	108,610
15	VT	20,805	TX	140	PA	101,707
16	NV	20,433	IN	135	WA	88,257
17	WI	18,070	UT	123	NV	86,079
18	AR	15,271	HI	118	UT	85,099
19	DC	13,981	WA	118	IN	82,221
20	SC	12,816	PA	114	HI	79,773
21	TX	12,428	OH	107	NC	77,736
22	HI	11,983	NC	105	MO	61,348
23	NM	9,259	MO	104	OH	51,227
24	NC	8,112	VT	86	OR	50,091
25	NH	7,926	MI	82	MI	48,783
26	TN	6,927	OR	79	GA	45,921
27	MI	6,558	DC	71	SC	40,784
28	OR	6,052	SC	64	NM	38,078
29	FL	5,811	TN	64	TN	35,533
30	IA	4,963	NM	57	DC	30,328
31	WA	4,139	AR	50	VT	26,946
32	ME	3,905	GA	49	AR	26,165
33	UT	3,822	IA	47	KY	21,239
34	KY	3,603	MT	47	MT	18,063
35	MO	3,555	NH	42	ID	17,702
36	GA	2,881	ME	40	NH	17,467
37	OK	2,002	KY	37	IA	16,738
38	DE	1,516	ID	35	ME	15,812
39	WV	1,466	OK	25	OK	15,657
40	KS	1,229	RI	25	RI	15,268
41	MS	1,046	WV	16	WV	10,339
42	MT	747	KS	13	KS	9,157
43	ID	616	MS	12	DE	7,256
44	RI	366	DE	11	MS	6,415
45	LA	365	LA	7	LA	5,230
46	WY	232	NE	7	NE	3,112
47	ND	80	WY	5	WY	1,913
48	NE	69	AK	4	AL	1,061
49	AK	38	AL	3	AK	1,019
50	AL	28	ND	1	ND	191
51	SD	0	SD	0	SD	0

Methodology

The methodology used for collecting and analyzing data for this report was developed and iteratively improved by Generation180 for its national census and report *Brighter Future: A Study on Solar in U.S. Schools*. The process outlined below builds on the methodology developed by Solar Energy Industries Association and The Solar Foundation that was used for the first two editions of the *Brighter Future* report.

School Data Collection

The census includes all public, private, and independent K-12 schools in the United States. The National Center for Education Statistics (NCES), the primary federal entity for collecting and analyzing data related to education, was the primary source of information on schools used in this report. NCES databases provided comprehensive lists of all U.S. public and private K-12 schools, with corresponding geographic and demographic information. The NCES list of U.S. public schools with corresponding data were sourced from the Common Core of Data for the 2022-2023 school year. Private school data were obtained through the Elementary/Secondary Information System and sourced from Private School Survey data, which were available through the 2021-2022 school year.

Solar Data Collection and Analysis

Our nationwide census of solar schools includes data on operational solar energy systems that were installed prior to January 1, 2024. To be included, the solar installation must either be installed on the property of or be providing electricity to a public school, private school, or educational center that services students in grades pre-K to 12. In cases where a school district installed a solar array or subscribed to an offsite community solar array that is intended to power multiple buildings or the energy is used to offset the district's total electricity consumption, then all applicable schools in the district are included in the census data as a school with solar. For arrays delivering solar power to a whole district, unless known otherwise, the total kW provided to the district is distributed evenly across all schools in the district to ensure that all schools benefiting from solar power are included in the census. For buildings affiliated with K-12 schools but not regularly hosting students — such as bus garages, administrative buildings, and athletic facilities — system capacity is included, but sites are not counted as school buildings or included in the number of solar schools nationwide.

Data for this report were collected primarily between fall 2023 and spring 2024 from a variety of online sources, including state databases, utility lists, solar developer websites, press releases, school websites, and newspaper articles. Schools and solar installers across the country were contacted for additional data collection and verification.

All new data were integrated into Generation180's existing national database for solar schools. Data were cross-checked across sources and database editions to prevent double-counting and to verify new information.

The iterative nature of our data collection process, in addition to building on data published in previous editions of the *Brighter Future* report, looks to continually verify the accuracy of our historic data. Data from all report editions were updated as needed to account for school closures, decommissioned solar systems, and other changes to solar capacity and operating status.

Generation180 accepts and verifies solar data that it receives from the public on an ongoing basis through its website. Readers are encouraged to submit any new information on solar installations by U.S. K-12 schools at Generation180.org/Electrify-Our-Schools/Solar-for-All-Schools.

We would like to acknowledge and thank the following organizations for their support in verifying our data for this report

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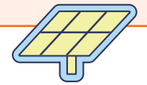
- Entegrity Energy Partners
- Florida Solar Energy Center, UCF
- Greenskies Clean Focus
- Idaho Power
- Ideal Energy
- Illinois Clean Energy Community Foundation
- Illinois Solar For All
- Madison Energy Infrastructure
- Magic Valley Electric LLC
- Midwest Renewable Energy Association
- Performance Services
- Pivot Energy
- PSG Energy Group LLC
- Red Lion Renewables
- SfL+a Architects
- The Alabama Division of Construction Management
- The Idaho Department of Education
- The Ohio Facilities Construction Commission
- TMI Energy Solutions



Disclaimer on Data Collection

While we aim for a comprehensive count of all solar schools in the country, our identification and validation processes are constrained to data that are publicly available or directly shared by developers, architects, installers, or entities with otherwise proprietary information. While our search is exhaustive of the data that are available to us, we believe the available data are not comprehensive of all solar schools in the country. Namely, as we have watched the popularity of solar schools grow across the country, the incidence of news articles and press releases reporting on solar schools has waned. Therefore, we are increasingly relying on developers and installers with public project portfolios and statewide databases. We are incredibly grateful to those collecting and publishing information on solar schools.

Disclaimer on Funding Data

The funding data presented in this report are based on information available for around 55% of the schools in our dataset. Specifically, funding source trends were analyzed using data from 4,904 out of the 8,971 schools that have installed solar panels. We lack funding data for the remaining schools.

To assess the extent to which schools with known funding data are representative of the solar school population as a whole, we conducted a comparative analysis of descriptive statistics and subgroups between the schools with funding data and those without. This analysis aimed to determine if the schools *with known data* shared enough demographic and characteristic data with schools *without known data* to extend our funding trends analysis to the entire sample of solar schools.

While this analysis between projects with known funding data and projects without suggests some differences between the groups, similarities in student numbers, solar system sizes, and public versus private status indicate that projects with known data provide valuable insights. However, readers should exercise caution in generalizing these trends to the whole population. Any conclusions drawn about funding patterns should be interpreted with an understanding of this limitation.

Endnotes

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