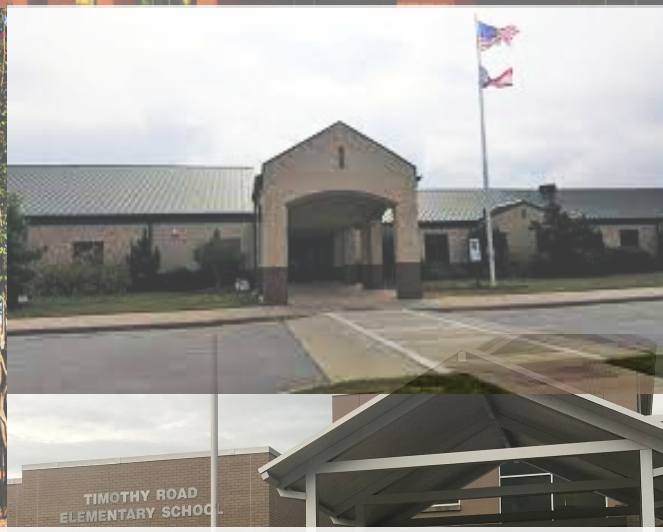

Clarke County School District Considerations For School Solar

Southern Sustainability INSTITUTE

EDUCATIONAL ENERGY COLLECTIVE
EMPOWERING THE FUTURE

Clarke County School District
Better Together

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Executive Summary

In recent years, the cost of renewable energy sources, particularly solar, has significantly decreased, prompting a growing number of public institutions to explore and invest in these clean energy alternatives. Georgia, a state with abundant sunshine and low construction costs, is particularly well-positioned to take advantage of solar energy. The trend toward renewables has accelerated with the introduction of the Inflation Reduction Act, which offers public institutions, including schools, opportunities to significantly reduce solar installation costs. This legislation has leveled the playing field, allowing schools to tap into financial incentives previously only available to private developers.

This report is a call to examine the feasibility of solar installations in the Clarke County School District (CCSD), taking into account the unique financial landscape provided by the Inflation Reduction Act and Georgia-specific project costs by outlining the potential benefits and financing options.

Solar Project Overview

What is solar?

Solar energy systems convert sunlight into electricity, generating clean and renewable energy. The three main types of solar installations commonly used in schools and other public institutions are rooftop systems, solar carports (parking canopies), and ground-mount systems.

Rooftop Solar	Parking Canopy	Ground-Mount
$1.50/W	$2.50/W	$1.10/W
Standard design approach for schools with available rooftop space.	More expensive to install, but provides additional benefits such as shade and electric vehicle (EV) charging.	Cheap to install and maintain, but requires unused land.

Capital cost data estimated from NREL 2022 benchmarks, with minor adjustments for scale and regional prices

Rooftop solar installations involve mounting solar panels on the roofs of school buildings. These systems are space-efficient because they use existing infrastructure without occupying additional land. However, the size and energy generation potential of rooftop installations can be limited by the available roof area and structural factors, such as roof angle and shading.

Solar carports are canopies with solar panels installed on top, providing shade and protection for parked vehicles while generating electricity. These installations serve a dual purpose, using parking areas for energy generation without the need for

additional land. However, the cost per watt of solar carports can be higher than rooftop or ground-mount installations due to the additional structural requirements.

Ground-mount solar installations are freestanding structures placed on the ground, usually on unused land within the school premises. These systems offer greater flexibility in terms of size and orientation, allowing for optimal energy production. The primary trade-off is the land requirement, which may compete with other uses or expansion plans.

How Solar Projects Save Money

Solar projects reduce a school's dependence on grid-supplied electricity, leading to substantial decreases in energy costs over the long term. Schools in CCSD will use either the SCH-16 or SCH-20 electric tariffs from Georgia Power[1]; by offsetting consumption through solar energy generation, schools can achieve significant savings on their electricity bills.

The cost of grid electricity has been increasing at a faster rate in recent years, creating higher costs for school districts. Investing in solar can serve as a hedge against these rising prices, providing schools with a stable and predictable energy expense. By generating their own electricity, schools can avoid fluctuations in energy prices and achieve more control over their long-term operational costs. Additionally, solar installations often have low maintenance costs and long lifespans, further contributing to overall cost savings.

[1] Note: Georgia Power may not be the only provider. Others would be under Walton EMC or Jackson EMC.

Regional Case Studies

Schools across Georgia have successfully implemented solar projects, demonstrating that frameworks existed for their financing even prior to IRA funding opportunities. These case studies illustrate the financial and environmental benefits of solar installations and serve as a testament to the feasibility and effectiveness of such projects in the local context.

Belair K-8 School, Augusta, GA



The Belair K-8 school district implemented two active solar fields in 2018, and they plan to build more capacity in 2024. The system is meeting expectations, producing energy at around 96% targeted goal despite some panels requiring replacement due to hail damage. Funding came from tax revenue similar to Athens' E-SPLOST.

The system produces 240 kilowatts with around 790 panels. Any electricity needed beyond that provided by solar energy is provided by Georgia Power.

The school system plans to incorporate solar fields as part of the construction of the New West Middle and New South Elementary schools.

Frank Long Elementary School, Hinesville, GA

Most recently, Frank Long Elementary School in Hinesville, GA, has installed a 40-kilowatt solar panel system that provides around 10% of the school's energy usage, saving the school district around $6,000 per year in energy costs. The solar panel system was fully funded by a Georgia Environmental Finance Authority grant worth $170,000. The new solar panels provide a renewable energy option that helps teach children the importance of being conservators of the environment. The school leaders are now planning to install monitors in places like the cafeteria and the library for students to track energy usage numbers in real time. The principal also noted that the solar panel system is fueling student innovation as teachers are incorporating the system's data into their science lessons. The solar panels also provide a backup energy source in case of an outage, preventing the loss of important information.

Solar in Schools: Mapping the Solar Schools Movement

Brighter Future: A Study on Solar in U.S. K-12 Schools Fourth Edition 2022[2] by the nonprofit organization Generation180[3], analyzes trends and ranks states for solar adoption by K-12 schools nationwide. The report's interactive online map[4] helps those interested in learning more to identify solar schools and learn more about their systems, including the installer, system size, and funding mechanisms.

[2] Solar Energy Industries Association (SEIA) & New Buildings Institute (NBI) , 'Brighter Future: A Study on Solar in U.S. K-12 Schools Fourth Edition 2022', *Generation180*, USA, Generation180, 1022, https://generation180.org/wp-content/uploads/2022/12/BrighterFuture2022.pdf, (accessed 23 April 2023).
[3] https://generation180.org/pathways/solar-schools/
[4] https://gen180-map.netlify.app/

"Generation180" lists more than 45 schools in Georgia that have solar panels of some type. A sample of recent school solar projects include:

School Name	School District	City	Solar System Size (KW)	Year Installed	Funding Type	Funding Subtype
Dublin High School	Dublin City	Dublin	1000	2013	Third Party Ownership	PPA/ Lease/ FIT
Darlington School		Rome	900	2016	Third Party Ownership	PPA/ Lease/ FIT
Belair K-8 School	Richmond County	Augusta	240	2018	Direct Ownership	Grant/ Donation/ Govt Funding
Cliff Valley School		Atlanta	63	2017		
Atlanta Neighborhood Charter - Elementary	Atlanta Public Schools	Atlanta	41	2017	Direct Ownership	Grant/ Donation/ Govt Funding
Frank Long Elementary	Liberty County	Hinesville	40	2023	Direct Ownership	Georgia Environmental Finance Authority Grant
Gadsden Elementary School	Savannah-Chatham County	Savannah	30	2019		

PPA: Power purchase agreement; FIT: feed-in-tariff

The list is not comprehensive; however, solar on Georgia schools has been tracked as early as 2005 according to the Generation180 report. Since 2005, prices have reduced considerably and with new incentives at play, solar has become economically attractive for more schools to consider.

Financing Solar Projects

Assessing the financial opportunities is key in achieving the most savings for CCSD. The big players are listed below but numerous grants are also available and should be investigated.

Inflation Reduction Act (IRA) and Direct Pay Opportunities

The Inflation Reduction Act (IRA) provides a suite of monetary incentives to help reduce the cost of developing renewable energy infrastructure. Schools in particular stand to benefit, as the IRA provides a direct pay incentive which helps partially finance new projects.

A direct pay program provides funds to renewable energy project developers, such as schools, in lieu of tax credits. This allows schools to receive immediate cash payments for their solar panel installations, rather than waiting for tax credits to be realized over several years.

Direct pay opportunities for solar on schools can provide a number of benefits, including:

1. **Improved Cash Flow**: Direct pay programs help schools improve their cash flow by providing immediate payments for their solar panel installations.
2. **Reduced Financial Risk**: Direct pay programs reduce the financial risk associated with solar panel installations by providing a guaranteed source of funding.
3. **Increased Access to Financing**: Direct pay programs make it easier for schools to access financing for their solar panel installations by providing a steady source of income that can be used to secure loans.

The Inflation Reduction Act and direct pay opportunities for solar on schools provides schools a powerful tool for financing their solar panel installations. By taking advantage of these programs, schools promote sustainability, reduce their energy costs, and improve their financial position.

E-SPLOST grants for educational institutions

Per Clarke County School District E-SPLOST website, "the Education SPLOST (E-SPLOST) program is designed to help us, as a community of teachers and learners, build facilities and acquire technologies that support the educational process in our schools both today and in the future."[5]

E-SPLOST funds could appropriately be used to cover some of the cost of solar panel construction. Since energy costs are paid from the operations budget lines, the upside of using E-SPLOST money for solar panels is that the energy savings could be used to offset other expenses. The idea would be to understand the savings and grants available first and fund the balance using E-SPLOST.

Green Bank loans and other financing options

Green Bank loans[6] are another type of financing option that can be used to fund solar panel installations on schools. A Green Bank is a public or quasi-public financial institution that is dedicated to accelerating the deployment of clean energy technologies, including solar energy, by providing affordable financing options to individuals, businesses, and organizations.

Green Banks typically offer loans at lower interest rates than traditional financing options, making them an attractive option for schools looking to invest in solar energy. Some Green Banks may also offer other financing options, such as leasing or power purchase agreements, which can help schools finance their solar panel installations with little or no upfront costs.

[5] https://www.clarke.k12.ga.us/Page/184
[6] https://www.epa.gov/statelocalenergy/green-banks

Power Purchase Agreement (PPA)

Another option for financing solar panels is the Power Purchase Agreement. Under a PPA, the school system enters into a contract with a third-party solar provider to purchase the electricity generated by the solar panels on a school's roof. Pros and cons of using a PPA for financing solar for schools include:.

Pros:

1. **No upfront costs:** One of the significant benefits of using a PPA is that the school pays no upfront costs to install the solar panels. The solar provider covers all of the costs associated with the installation, including equipment, maintenance, and repair.
2. **Lower electricity bills**: With a PPA, the school agrees to purchase the electricity generated by the solar panels at a fixed rate that is usually lower than the local utility rates. As a result, the school can save a considerable amount of money on electricity bills.
3. **Long-term savings**: A PPA usually has a long-term contract that can last 20-25 years. During this period, the school enjoys stable electricity prices and avoids any price fluctuations in the energy market. This can result in significant long-term savings for the school.

Cons:

1. **Limited control:** The school has limited control over the solar system installed on its premises. The solar provider is responsible for maintenance and repairs, and the school has to rely on the provider to ensure that the system is functioning correctly.
2. **Long-term commitment:** A PPA is a long-term commitment, and the school has to continue purchasing electricity from the solar provider for the entire contract period. If the school wants to terminate the contract early, there may be termination fees.
3. **Possible rate escalation:** While the electricity rate under a PPA is fixed for the contract period, there is a possibility of rate escalation clause in the contract

if the energy market experiences significant changes. This can result in higher electricity bills for the school.

4. **Not suitable for all schools:** A PPA may not be suitable for all schools, especially those that have limited roof space or shading issues that can affect solar panel performance. Schools in areas with low electricity rates may also not benefit significantly from a PPA which may be the case for CCSD schools based on the power rate agreements already in place with Georgia Power and other CCSD energy providers.

Using a PPA for financing solar for schools includes pros and cons. While a PPA can provide significant cost savings, schools need to carefully evaluate the contract terms and ensure that it is the right fit for their specific needs. In light of the IRA benefits available, PPAs become less attractive.

Required Information for Preliminary System Analysis

In order to optimize the system's effectiveness, minimize costs, and maximize savings there are several important considerations that must be taken into account.

1. **Operational Costs for Electricity:** To get a better understanding of the magnitude of savings potential, a big picture view of the cost of electricity is essential. Data from FY 2020 shows a proposed budget line item of more than $3M for electricity for CCSD. These costs (this does not include salaries or benefits) are by far the highest line item for the operation budget. The analysis would track actual data which would be required.
2. **Energy Demand for Each School:** The first step in sizing a solar panel system is determining each school's energy demand and energy expenditures. This requires analyzing historical electricity bills and estimating future demand. This information will help determine the size of the system needed to meet the school's energy requirements.
3. **Energy Provider for Each School:** Each school may be under different agreements depending on the provider. Currently, Georgia Power would be the primary provider; however, other providers such as Jackson EMC or Walton EMC may fall under other school location jurisdictions.
4. **Energy Pricing Agreements with Providers:** Analyzing the pricing structure for energy with the schools is essential.
5. **Location and Land Availability:** The location of the school is an important factor in determining the size of the solar panel system. The amount of sunlight the panels will receive is dependent on the latitude and climate of the region. Areas with more sunshine require smaller systems to meet energy needs, while those with less sunlight require larger systems.

Once this preliminary data is gathered, opportunities for modeling are available to provide more detailed feasibility studies for further consideration.

Sizing a solar panel system for a school requires careful consideration of several important factors, including energy demand, location and climate, panel efficiency,

battery storage, and financing options. By carefully evaluating these factors, schools can optimize their solar panel system's effectiveness and minimize costs, while contributing to a more sustainable future.

Additional benefits of solarizing CCSD schools

Solarizing school systems can bring a range of benefits beyond financial savings, including promoting equity and justice. Here are some additional benefits:

1. **Environmental Justice:** Solar energy reduces greenhouse gas emissions and air pollution which disproportionately affects low-income and minority communities. By solarizing schools, the environmental impact is reduced on these communities and helps promote environmental justice.
2. **Educational Benefits:** Solar panels can be used as an educational tool to teach students about renewable energy, climate change, and environmental sustainability. For example, energy tracking can provide real life data for mathematical and statistical analysis, providing an experiential opportunity for student immersion in STEM subjects. This can create a more scientifically literate and engaged citizenry.
3. **Improved Health:** By reducing air pollution, solar energy improves public health outcomes. Studies have shown that air pollution increases the risk of respiratory diseases, heart attacks, and other health issues.
4. **Resilience:** Solar energy provides a reliable source of power during power outages, such as those caused by severe weather events. This helps schools remain open during emergencies, providing a safe and reliable space for students and the community.
5. **Job Creation:** The solar industry is a growing sector that provides employment opportunities. Solarizing school systems creates local jobs and stimulates economic development in the surrounding community.
6. **Energy Democracy:** Solarizing schools promotes energy democracy by allowing communities to generate their own clean energy and take control of their energy systems. This reduces dependence on fossil fuels and promotes a more equitable and sustainable energy system.

Solarizing school systems brings a range of benefits beyond financial savings, including promoting health, equity and justice.

Summary

The case studies of successful solar installations in schools such as Belair K-8 School and recently Frank Long Elementary School in Georgia showcase the potential for educational institutions to benefit from renewable energy sources.

With financing options like E-SPLOST, Green Bank loans, and opportunities under the Inflation Reduction Act (IRA) and direct pay programs, solarizing schools is more accessible than ever. But it's not just about financial benefits. Solar energy also offers incredible environmental and educational benefits that can transform the way our students learn and grow.

By conducting a preliminary system analysis to determine energy demand, pricing agreements, and location availability, we can demonstrate the feasibility and cost savings of solar installation. This means that solarizing schools isn't just a smart financial move - it's a way to promote sustainability, reduce our carbon footprint, improve the health and well-being of the community and inspire the next generation of students and leaders.

Together, we can build a brighter, more sustainable future for all.

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