



PUBLIC SCHOOL
CARBON-FREE
ASSESSMENT PROGRAM

Public School Carbon-Free Assessment Program Report

Vienna High School District 133

July 2024

CARBON
FREE

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**PUBLIC SCHOOL
CARBON-FREE**
ASSESSMENT PROGRAM

EXECUTIVE SUMMARY

The Public Schools Carbon-Free Assessment (PSCFA) Program was signed into law as part of the State of Illinois Climate and Equitable Jobs Act. The Legislation states that each electric utility with greater than 500,000 customers, including Ameren Illinois, shall implement a PSCFA Program to assist its public schools:

- Increase the efficiency of their energy usage.
- Reduce carbon emissions across the School District.
- Become carbon free with their energy usage.

The Ameren Illinois PSCFA report for Vienna HSD 133 includes a comprehensive analysis of (6) areas, defined in the legislation which are referred to as “Tasks” within this report. All tasks are defined, and findings are summarized within their respective sections of the report. Each section also has a corresponding appendix which contains the details, calculations, methodologies, charts, graphs, etc. of the analysis performed for each Task.

The Ameren Illinois PSCFA Program and its associated partners are pleased present this report and the accompanying appendices to Vienna HSD 133. We appreciate the District’s participation and efforts in collaborating to ensure an accurate report could be produced. The Ameren Illinois Energy Efficiency Program will be in contact with you soon after receiving this report to discuss how to leverage available incentives to take advantage of energy saving opportunities.

Ameren Illinois is committed to helping schools achieve their Carbon-Free goals. You can find a list of financial support options available to Public Schools as well as Ameren Illinois support programs and resources at AmerenIllinoisSavings.com/PSCFA-resources.

A handwritten signature in black ink, appearing to read "Mike Pittman".

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AMEREN ILLINOIS PSCFA TASKS AND PARTNERS

Ameren Illinois is partnering with Leidos Engineering, LLC (Leidos) to conduct and oversee the analyses for all eligible public schools. In this report, Leidos performed the assessments for (3) of the Tasks and oversaw the work of trusted, subject matter expert partners completing the assessments for the remaining (3) Tasks. This report includes key highlights, summaries of opportunities and recommendations for achieving the Carbon Free goal in each of the (6) Tasks.

Task #	Task Description	Ameren Illinois Partner
1	Energy efficiency savings opportunities	Energy Sciences, CMC Energy Services
2	Evaluation / inspection of mechanical insulation and building envelope	Diverse Power Solutions, I-STAR™ Energy Solutions
3	Total achievable solar energy potential	Leidos
4	Infrastructure required to support electrification of space/water heating equipment	Leidos
5	Infrastructure required to support electrification of schools' transportation needs	Leidos
6	Investments required to achieve WELL or similar certification	Jones Lang LaSalle (JLL)



Disclaimer:

The electricity savings, natural gas savings, and greenhouse gas (GHG) emissions (i.e., carbon) reductions stated in this report are based on individual measures only. Quantifying the total savings per school would require a higher level of analysis that is beyond the scope of the current proposal. This is because the implementation of one measure may reduce the effects of another measure if both are implemented at the same time. For example, if high efficiency lighting were to be installed as one measure, less energy/heat will be generated from the lighting; therefore, the heating, ventilation, and air conditioning (HVAC) system for that same facility would not have to operate as much. The carbon reduction that had been calculated for the HVAC system independently would need to be recalculated for the lower lighting load. This is called a “synergistic” effect. Additionally, it is unlikely that all measures identified in this assessment will be implemented, due to either their cost effectiveness or difficulty in implementing, making the “synergistic” calculation irrelevant.

FACILITIES EVALUATED IN VIENNA HSD 133

The following facilities were designated by the School District to be included in their Public Schools Carbon Free Assessment analysis and report:

Category / Building Type	School Facility Name
High School (9-12)	MAIN SCHOOL BLDG
Auxiliary	FOOTBALL FIELD
Maintenance	POLE BARN

KEY HIGHLIGHTS OF THE CARBON FREE ASSESSMENT



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VIENNA HSD 133

KEY HIGHLIGHTS OF THE CARBON FREE ASSESSMENT



319

METRIC TONS

in carbon reduction from all proposed project measures.

Potential to achieve

NET ZERO

energy usage if all solar installations are completed.



9 MEASURES

identified to improve the health and safety of students and staff across the District.



7

top low-/no-cost energy efficiency measures/opportunities.

4 VEHICLES

can be electrified by installing (2) charging stations throughout the District.



ABOUT THE CARBON FREE ASSESSMENT

This Carbon Free Assessment aims to 1) increase the energy efficiency of facilities, 2) reduce carbon emissions, and 3) assist the School District in becoming carbon free in their energy usage. The assessment focused on six core areas: top energy efficiency opportunities; evaluation and inspection of the mechanical insulation and building envelope; total achievable solar energy potential; infrastructure required to support electrification of space and water heating equipment; infrastructure required to support electrification of transportation needs; and investments required to achieve WELL or similar certification. "Key Highlights" showcases figures and benchmarks that can be achieved across school facilities that were part of this assessment.



ASSESSMENT RESULTS

The following pages provide specific analysis and recommendations for each of the (6) unique Tasks from the Ameren Illinois PSCFA Program and all its affiliated partners (The Program). **Complete findings, details, calculations, methodologies, charts, graphs, etc. of the evaluations completed for each Task can be found in the Appendices as noted in each Task section.**

TASK #1:

TASK #1: ENERGY EFFICIENCY SAVINGS OPPORTUNITIES

Partner(s): CMC Energy Services

Description of Work: The Program conducted on-site analysis of each school facility, identifying energy saving opportunities through a room-by-room walkthrough. Facility staff were also interviewed to determine building operating practices and controls management.

Each site assessment included:

- A facility walk-through survey.
- Identification of the top energy efficiency savings opportunities.
- Capital upgrades recommended.
- Energy savings estimates.

Potential carbon reduction of 31 metric tons through the top low-and no-cost energy efficiency measures and other identified improvements.

The site assessment findings for each school and a summary table showing energy savings and carbon reductions per school are provided in **Appendix A**.

SUMMARY OF FINDINGS FOR TASK #1

The energy efficiency site assessments that were completed have common, recurring findings and recommendations that fall into low-/no-cost measure categories and/or are maintenance items that should be addressed as soon as feasible.

Table 1 shows a summary of the top low-/no-cost measures found within the District. A complete description of all energy efficiency measures identified as well as the ENERGY STAR®'s Low/No Cost Guidelines are included in **Appendix A** along with the individual reports for each school facility. The Ameren Illinois Energy Efficiency Program staff can assist with the coordination of available incentives for implementation of all noted energy efficiency measures.

The following table lists the top identified energy efficiency opportunities noted as Low/No Cost:

Table 1. Summary of Top Low-Cost/No-Cost Maintenance Items

School Facility	Measure Category	Description	Electric (kWh)	Cumulative Monthly Demand (kW)	Natural Gas (Therms)	GHG Emissions / Carbon Reduction (Metric Tons)
Vienna High School	HVAC Heating & Cooling	Perform Tune-Up of 20 Gas Packaged RTUs, 5 Gas Unit Heaters, 4 Ducted ACs, 2 Ductless Mini-Split ASHPs, 1 Ducted Split-System ASHP, and 1 VRF ASHP totalling 2,518.1 kBtu Cooling, 151.4 kBtu Electric Heating, and 3,835 kBtu Gas Heating	15,411	13.3	1,507	12.46
Vienna High School	Lighting Controls	Install Occupancy Sensors on (256) 34W 4' 2L LED Linear Fixtures	10,164	1.9	0	2.95
Vienna High School	Domestic Hot Water	Install Timer on (1) 98-Gal and (1) 100-Gal Gas Storage Water Heaters	0	0.0	198	1.05
Vienna High School	Domestic Hot Water	Adjust Temperature Setpoint of (1) 98-Gal Gas Storage Water Heater from 145°F to 120°F	0	0.0	149	0.79
Vienna High School	Laboratory	Install Occupancy Sensor on (1) 0.75 HP Laboratory Fume Hood Fan	747	0.0	79	0.64
Vienna High School	Miscellaneous	Install Occupancy Sensors on (9) 1/6 HP Restroom Exhaust Fans	1,129	0.7	0	0.33
Vienna High School	Lighting Controls	Repair Timer on 1 Exterior 40W LED Wallpack	93	0.0	0	0.03
Totals			27,545	15.9	1,933	18.24
Note: The estimated energy savings does not take into account interactive effects between the recommended measures. However, studies have shown that savings of 20-30% of the baseline energy usage are achievable for K-12 school buildings.						

GHG Conversion Factors

Natural Gas (therms) to lbs. of carbon dioxide (CO ₂)	11.7 lb./therm
Electric (kWh) to lbs. of CO ₂	0.639 lb./kWh
Constant	2204.6 lb./metric ton

TASK #2:

TASK #2: EVALUATION/INSPECTION OF MECHANICAL INSULATION AND BUILDING ENVELOPE

Partners: **Diverse Power Solutions** (DPS) and **I-STAR™ Energy Solution, LLC** (I-STAR™, a subsidiary of Irex Contracting).

Description of Work: The Program conducted evaluations/inspections of the building envelope and mechanical insulation components for each School District facility, including:

- Exterior building envelope.
- Mechanical piping and equipment (hot and cold applications).
- HVAC system applications.
- Refrigeration and other low-temperature equipment applications.

Opportunity for CO₂ reduction of 23 metric tons if all building envelope and mechanical insulation upgrades are completed as proposed.

Note that while energy efficiency carbon reduction opportunities cannot be totaled within a school facility or District due to the synergistic effects involved, these effects for mechanical insulation and building envelope systems are miniscule, and, therefore, are able to be totaled as shown in the highlighted tables below.

SUMMARY OF FINDINGS FOR TASK #2 (MECHANICAL INSULATION EVALUATION AND INSPECTION)

The Program evaluated the performance of the piping, duct, and associated equipment at all District buildings housing this equipment. Upon review of all existing equipment, no opportunities for mechanical insulation were found.

SUMMARY OF FINDINGS FOR TASK #2 (INSPECTION OF BUILDING ENVELOPES)

The Program assessed the performance of the building envelope in each of the District's facilities to identify areas of energy loss, such as:

- **Air Leaks** - Gaps at transitions between wall, floor, and roof levels; structural penetrations through the wall system, that can cause direct energy loss.
- **Thermal Bridging** - The movement of heat across an object that is more conductive than the materials around it can be a major source of energy loss. The conductive material creates a path of least resistance for heat.
- **Wet Insulation** - Moisture in the envelope will migrate to the interior of the system, reducing insulation values and damaging building components.

An accurate assessment is critical to the success of a facility energy management program, even if no envelope-related improvements are warranted. The District's facilities were found to have a mixed set of conditions regarding infiltration losses, mostly due to age and maintenance issues.

The recommended building envelope improvements provide an opportunity for reducing air infiltrations, greatly improving occupant comfort as well as providing valuable energy savings. The estimated annual savings for implementing envelope improvements within the entire District are as follows:

Building Envelope Savings	
Thermal Savings (therms):	1,680
Electric Savings (kWh/yr):	2,492
CO2 Reduction (metric tons):	23

The complete Mechanical Insulation (MI) and Building Envelope (BE) Assessment reports for the District's buildings are provided in **Appendix B**.

TASK #3:

TASK #3: SOLAR ENERGY POTENTIAL

Partner: Leidos

Description of Work: The Program performed its analyses of solar energy potential within the Vienna High School District 133 utilizing the HOMER Grid platform.

- The square footage of each potential area that could possibly accommodate solar was estimated using geospatial tools (for example, Google Earth Pro's Polygon Function).
- Once the potential capacity of the solar photovoltaic system (also known as "PV") for each site was identified, HOMER Grid was used to calculate the solar energy potential to meet each facility's usage.

Solar energy potential identified can help Vienna High School District 133 to achieve net zero energy use, an equivalent CO₂ reduction of 172 metric tons if all installations are implemented.

The evaluation is an order of magnitude, therefore an estimated value of 10 watts per square foot of usable rooftop or parking lot was used for the purposes of this study.¹ In addition, a utilization factor of 75% was applied to account for roof setbacks and any rooftop equipment and parking lot limitations associated with installing solar at the site.

Disclosure

*The solar assessments in **Appendix C** show the total solar energy potential / opportunity for each school within the Vienna High School District 133. Note that some proposed buildings and parcels may not be suitable for solar panels or ground-mounted arrays, nor may they be able to be sized to the full capacity proposed or maximum area available. Additionally, the scope of this assessment did not include analyses via the interconnection process to accommodate the solar panels / arrays that are proposed for each school.*

¹ The U.S. Department of Housing and Urban Development Renewable Energy Toolkit notes, "It takes roughly 100 square feet of usable rooftop space to install 1 kW of system capacity (or 10 watts per square foot)."

If such analyses were to be performed, system modifications may be identified that would be at the Distributed Energy Resource (DER) owner's expense to incorporate. All proposed solar opportunities can be sized so that the net usage is zero and that the installation will not have to identify as a Qualifying Facility (QF).

Ameren Illinois is providing the results of this solar assessment in compliance with 220 ILCS 5/8-402.2. By accepting the results of this solar assessment, the District hereby acknowledges that the assessment results provided herein are provided without any liability on the part of Ameren Illinois and its affiliates, employees, agents and directors for any error or omission. Ameren Illinois does not make any representation, warranty, guarantee, condition, or assurance whatsoever, whether express, implied, or statutory, regarding the design of any existing or future solar installation or utilization.

SUMMARY OF FINDINGS FOR TASK #3

The following two tables note the various findings from the Solar Potential Study.

Table 2: Estimated Solar Capacity

- Estimated annual energy output from the solar energy potential at the site.
- Indication of whether solar capacity can meet peak demand of building.

Table 2. Estimated Solar Capacity by School District Building

School District Building	Estimated Solar Capacity				Estimated Solar Capacity Meets Peak Demand (kW) of Building
	Roof Area One PV (KW)	Roof Area Two PV (KW)	Parking Lot One PV (kW)	Parking Lot Two PV (kW)	
Main School Bldg. & Pole Barn	607	-	151	701	Y
Football Field	2	5	465	-	Y
a) *Main School Bldg. and Pole Barn are considered in a single report.					

Table 3: Solar Energy Potential by School District Building

- The estimated annual solar production (PV Output) in kWh.
- Facility's estimated annual energy cost savings, given proposed solar capacity for facility.
- Whether facility can have at least 75% of its entire energy usage provided by proposed solar.
- The estimated capital cost of the PV system.

Table 3. Solar Energy Potential by School District Building

School District Building	Solar Energy Potential Summary			
	Estimated Annual Solar Production (kWh)	Estimated Annual Savings \$	Solar Output Meets ≥ 75% of Facility Annual Usage (Y/N)	Capital Cost for Installing Proposed Solar Infrastructure (\$M)
Main School Bldg. & Pole Barn	589,366	\$ 68,389	Y	\$ 878,485
Football Field	2,874	\$ 429	Y	\$ 7,760

Additional notes regarding the Solar Potential Study:

- Per the State of Illinois net metering laws, the maximum size of installed solar should match (and not exceed) the facility's annual usage.
- However, at any given time a solar installation may generate more energy than a facility needs.
- Therefore, the total amount of solar capacity potentially available for the School District facilities may be capable of getting the School District to net zero energy use.
- The total CO₂ reduction for the School District is based on the combined kWh usage of the 3 school facilities that are capable of hosting solar panels and/or a ground mounted array.
- Refer to the following link for additional information on net metering in Illinois:
<https://www.citizensutilityboard.org/illinois-net-metering/>

Appendix C provides the individual solar energy potential study reports that outline options for rooftop and ground-mounted solar arrays and the expected generation for the 3 District sites.

TASK #4:

TASK #4: INFRASTRUCTURE REQUIRED TO SUPPORT ELECTRIFICATION OF SPACE AND WATER HEATING

Partner: Leidos

Description of Work: The Program used the data provided in Task #1 in the energy efficiency assessments (found in **Appendix A**) to identify energy efficiency recommendations that convert existing HVAC and domestic hot water from natural gas to electricity.

- The recommendations for electrifying space and water heating are typically electric heat pumps that can replace natural gas boilers and/or domestic hot water heaters. By substituting electricity for higher-emissions fossil fuels, significant reductions in CO₂ and therefore GHG emissions can be achieved, as CO₂ is the primary greenhouse gas emitted.

A path has been introduced for Vienna High School District 133 to evaluate equipment electrification when current equipment reaches end of life... increasing equipment efficiency and maximizing carbon reduction.

SUMMARY OF FINDINGS FOR TASK #4

For this measure, the Program reviewed the potential for electrification of various HVAC and Water Heating Equipment. Generally speaking, on a pure dollar savings basis, electrification of HVAC and Water Heating Equipment has challenging economics given the high cost of electrification.

However, if any existing HVAC and/or water heating equipment in District facilities is at the end of its useful life, fails, or is scheduled for a planned replacement, the difference between the capital costs of

replacing that equipment in kind versus the costs and carbon free benefits of electrifying the space should be evaluated.

When electrifying any equipment, a detailed evaluation should be completed in order to determine the infrastructure upgrades needed. These additional infrastructure cost upgrades could negatively impact the economics of moving forward with this measure.

One way to improve the payback is to assign a cost of carbon to fossil fuel emissions. This may allow for a more attractive project.

The electrification measures identified for each School District facility (i.e., heat pumps) as well as the carbon reductions associated with these measures are shown in **Appendix D**.

TASK #5:

TASK #5: INFRASTRUCTURE REQUIRED TO SUPPORT ELECTRIFICATION OF TRANSPORTATION

Partner: Leidos

Description of Work: Leidos performed a preliminary design of the potential electric vehicle (EV) infrastructure necessary to support the conversion of the school's fleet vehicles at each site.

- Averages were used for EV miles driven per year per vehicle, EV efficiencies, driving range per charge, and energy usage of vehicles per charging session, etc., to calculate the size of each site's charging infrastructure and service rating needed.
- This assessment also provides an estimate of the carbon reduction that would occur if the District's existing gasoline powered fleet were removed from the road.

The electrification of a portion of the School District's fleet will be enabled by the installation of 2 charging stations at the High School. The electrification will result in approximately 85 metric tons of annual CO₂ reduction assuming all 4 fleet vehicles are converted to electric vehicles simultaneously.

SUMMARY OF FINDINGS FOR TASK #5

Electric vehicle charging infrastructure was proposed at Vienna High School to support the electrification of (4) District school buses. Two dual-port 19 kW (80A) Level II charging stations are proposed for use by the school buses as well as other School District vehicles. A typical Type C Electric School Bus has a 150 kWh battery and can fully charge in 6-8 hours using a 19 kW Level II charging port. Redundancy and resiliency were considered in the design. It is expected that managed charging would allow the School District to electrify 4-6 school buses using the proposed (4) 80A charging ports.

Table 4 shows a high-level summary of the electric vehicle charging stations proposed for installation per school facility and annual carbon reduction amounts.

Table 4. Summary of EV Charging Infrastructure Proposal

Facility Name	Quantity / Location	Annual CO2 Reduction in Metric Tons
Vienna High School	(4) 80A charging ports in rear bus parking area off N 4 th Street	85.0

The full EV charging infrastructure assessment report for each location can be found in **Appendix E**. Each report includes the following:

- The inputs used for analysis.
- Pricing details.
- EV charging port layout and site sketches.
- Assumptions and calculations used for CO2 reduction values.

TASK #6:

TASK #6: INVESTMENTS REQUIRED TO ACHIEVE WELL OR SIMILAR CERTIFICATION

Partner: Jones Lang LaSalle (JLL)

Description of Work: The Program used WELL Accredited Professionals (WELL AP) to advise the Vienna High School District 133 on investments and facility requirements to pursue WELL Health-Safety Rating (HSR, certification).

- The WELL Building Standard® (WELL) is a performance-based rating system for measuring, validating, and monitoring features of the built environment that impact human health, productivity, well-being and comfort.
- Pursuing WELL Health-Safety Rating (a lighter-touch version of the WELL Building Standard) allows building owners and occupants to know their space is promoting health and safety through factors such as sanitization, emergency preparedness, air and water quality, and health services.
- According to a study conducted by the Harvard School of Public Health, WELL matters to school facilities since improved indoor environmental conditions have been linked to a doubling of cognitive performance scores.²
- A Feasibility Study was conducted to determine the applicability of WELL features and the potential of pursuing WELL at scale across the 1 School District facility.

The report provides a roadmap for the School District to implement 9 health and safety features that will improve student and staff well-being across all facilities. Better indoor environmental conditions are linked to greater cognitive performance.

² Source: <https://green.harvard.edu/toolsresources/research-highlight/impact-greenbuildings-cognitive-function>

- The WELL Feasibility Study outlines required improvements, processes, and investments that would be needed to pursue the WELL Health Safety Rating. Full details of the Study can be found in **Appendix F**.

SUMMARY OF FINDINGS FOR TASK #6

Based on JLL's findings, the Program recommends implementing various WELL HSR aligned strategies across the District and pursuing WELL Health-Safety Rating at eligible locations. Vienna HSD 133 is uniquely positioned to capitalize on this approach given the health and wellness organizational initiatives already in place. Tracking the health and well-being efforts of the School District through WELL Health-Safety Rating provides clear reporting on what has been achieved to date, as well as guidance for the best next steps.

Table 5 provides the cost estimates for certification across the District.

Table 5. Costs for Pursuing WELL HSR Certification (Costs per Entire District)

WELL Health-Safety Rating Pursuit	Administrative Costs	Estimated Feature Implementation Costs	Estimated Total
Year 1	\$3,188	\$8,142	\$11,330
Year 2 (and recurring annually)	\$3,000	\$4,392	\$7,392
Estimated Total, year 1 = \$11,330 per building on average			
Estimated Total, year 2 = \$7,392 per building on average			

Complete details on the above findings can be found in **Appendix F**.

CORE RECOMMENDATIONS FOR VIENNA HIGH SCHOOL DISTRICT 133 IMPLEMENTATION

This section is a summary of recommendations and potential “next steps” for the School District based on the findings from the completed assessments for each Task. These recommendations will assist the District in achieving the public schools’ carbon free sustainability goals set forth by the State.

ENERGY EFFICIENCY SAVINGS OPPORTUNITIES

- **Develop a Multi-Year Energy Efficiency (EE) Implementation Plan:** Based on the results of CMC Energy Services assessment findings (located in **Appendix A**), develop a multi-year energy efficiency implementation plan to integrate low-cost/no cost measures for the 2 school facilities. Address water/space heating EE measures dependent on Vienna High School District 133’s commitment to implement electrification requirements for the District to be carbon free-ready in future years.
- **Leverage Ameren Illinois EE Programs Incentives:** A wide range of financial incentives are available for the projects identified. To take advantage of these incentives as well as other available project support, it is recommended that Vienna High School District 133 Facilities staff engage the Ameren Illinois Energy Efficiency Program team for incentive information and application support. The program team will already be aware of the project opportunities identified through the Carbon Free Assessment.
- **Utilize Ameren Illinois EE Energy Analyzer Tool:** Register Vienna High School District 133 Facilities staff to enable their use of this tool so they may access interval and usage data for all school facilities.
- **Building Automation Systems:** Perform Retro-Commissioning on Existing Systems. Retro-commissioning means optimizing the performance of existing systems. A wide variety of Building Automation Systems of various ages and capabilities are in use. By optimizing their performance and upgrading systems to current technology, this will not only reduce energy consumption but also will improve environmental conditions and elevate the effectiveness of the Building Maintenance team.

EVALUATION/INSPECTION OF MECHANICAL INSULATION AND BUILDING ENVELOPE

- **Stop Air Infiltration / Ex-infiltration:** Use the District’s maintenance staff to implement improvements to stop air infiltration/ex-infiltration. For example, if windows are left unlatched when closed; simply latching will save energy. Other low-cost improvements with valuable energy savings and rapid payback include:
 - Installing weather stripping and sweeps to entrance doors
 - Replacing degraded door seals
 - Adding sealant around the perimeter of several windows as well as other penetrations such as hose bibbs, electrical outlets, conduit, pipes, etc.

SOLAR ENERGY POTENTIAL

- **Perform Holistic Feasibility Review of Proposed Solar Locations:** Review the proposed locations for installing solar for feasibility, as outlined in the assessment report in **Appendix C**. For roof mounted solar, many factors need to be considered such as the age of the roof, existing locations of mechanical equipment, and the weight-bearing capacity of the roof. Additionally, the practicality of siting solar in parking lots needs to be considered based on the higher cost of installing solar in parking lots. A solar installer, consultant, or energy service company can work with the School District to determine the optimal space available for solar at each site. The solar energy potential opportunities identified are able to provide a pathway for the School District to achieve net zero energy use.

INFRASTRUCTURE REQUIRED TO SUPPORT ELECTRIFICATION OF SPACE AND WATER HEATING

- **Evaluate Carbon Free Benefits When Performing Capital Replacements:** The costs, payback, and construction logistics of electrifying space and water heating are not conducive for full scale implementation at this time. However, aging equipment throughout the School District will require replacement in the future. The incremental cost of high efficiency equipment, e.g., heat pumps that replace traditional HVAC and water heating systems, should be reviewed and analyzed (i.e., take the carbon free benefits into consideration) for all capital replacements going forward. This can be an important component of the long-term strategy to reduce carbon emissions. Please refer to **Appendix D** for additional information.

INFRASTRUCTURE REQUIRED TO SUPPORT ELECTRIFICATION OF SCHOOL'S TRANSPORTATION

- **Install Electric Vehicle Charging Stations:** Review the locations and feasibility of EV charging construction at all sites to support fleet vehicles as well as School District personnel personal vehicles. The recommendation to install EV charging at Vienna High School will result in higher energy consumption; however, the benefits are many, including greenhouse gas (GHG) emissions reductions, lower maintenance costs for EVs, no need to plan for volatility of fuel prices, help in achieving the School District's carbon free goals, etc. Refer to **Appendix E** for additional information.

INVESTMENTS REQUIRED TO ACHIEVE WELL OR SIMILAR CERTIFICATION

- **Enroll Eligible Properties for WELL Health-Safety Rating:**
 - Engage a consultant to oversee the certification process. Review building eligibility for receiving the certification, features that must be achieved per building to obtain the certification, and requirements for retaining the validity of the certification. See **Appendix F** for more details.
- **Implement Low Cost, No Cost Items:** Continue to implement and/or add low cost, no cost items which have been found to create a positive impact on the School District staff and students. For example:
 - Maintain handwashing and smoke free signage
 - Develop a legionella (i.e., the bacteria that causes legionnaires' disease) management plan
 - Test air and water quality annually

- Assess the ventilation and air treatment systems for Ultraviolet Germicidal Irradiation (UVGI) compatibility
 - Develop a moisture management plan
- **Document Feature Compliance and Submit Project for Review:** Upon completion of any improvements, coordinate with a consultant to document compliance with feature requirements and submit each building for review.

OTHER RECOMMENDATIONS TO SUPPORT CARBON FREE GOALS

- **Develop Minimum Efficiency Standards for Equipment Replacement:** Several pieces of equipment were identified within the School District that are at or near end of life. Minimum standards for equipment replacement should be developed (e.g., “boilers must be at least 92% efficient”) so the opportunity to replace with a high efficiency / low emissions model will not be lost if equipment fails unexpectedly.
- **Standardize Equipment to Be Installed:** Smart thermostats and Domestic Hot Water (DHW) time clocks are a common recommendation for many facilities. If these measures are implemented, the types of thermostats and time clocks purchased should be standardized to allow for ease of use by facilities staff.
- **Maximize Facility Operating Hours:** Better scheduling of building hours (i.e., the time equipment is turned on/off, etc.) can make an immediate impact and contribute towards lowering the carbon footprint. The Ameren Illinois EE Energy Analyzer tool can help the School District verify the savings of any adjustments made to building operating hours.
- **Establish a Sustainability Task Force:** Establish a diverse team of facility stakeholders within Vienna High School District 133 to oversee the implementation of these recommended projects and other sustainability efforts.
- **Offer Sustainability Education and Training to Staff:** Continue to provide opportunities for faculty, administration, and facility managers to enhance their level of knowledge with respect to sustainability within the schools.

FINANCIAL RESOURCES

- Various federal, state and local grants, and tax credits are available to help transition to clean energy. See AmerenIllinoisSavings.com/PSCFA-Resources to learn more about all Public Schools Carbon-Free Assessment Resources.



AMEREN ILLINOIS ENERGY EFFICIENCY PROGRAM

Save on energy costs by incorporating energy efficiency upgrades into your school. Incentives are available to help offset out-of-pocket costs.

> Visit AmerenIllinoisSavings.com/School to learn more.



FINANCIAL SUPPORT

Various federal, state and local grants and tax credits are available to help transition to clean energy.

> Visit AmerenIllinoisSavings.com/PSCFA-Resources to learn more.



BUILDER OPERATOR CERTIFICATION (BOC) TRAINING OPPORTUNITIES

BOC training is available for school maintenance staff to enable better facilitation of energy efficiency and maintenance projects and procedures.

> Visit BOCCentral.org/Training/Illinois to learn more.



SCHOLARSHIP OPPORTUNITIES

Various scholarships are available for students to apply for and jumpstart their future career in energy efficiency.

> Email Alex Deeb at Adeeb@ameren.com to learn more.

APPENDICES

The Program Implementation and Assessment teams are pleased to present this report and the following Appendices which contain the details, calculations, methodologies, charts, graphs, etc. of the evaluations completed for each Task.

Appendix A Energy Efficiency Savings Opportunities Site Assessment Reports by CMC Energy Services

Appendix B Evaluation / Inspection of Mechanical Insulation and Building Envelope Assessments by Diverse Power Solutions and I-STAR™ Energy Solutions

Appendix C Solar Energy Potential Study Report Assessments by Leidos Engineering, LLC

Appendix D Infrastructure Required to Support Electrification of Space and Water Heating Assessments by Leidos Engineering, LLC

Appendix E Infrastructure Required to Support Electrification of School's Transportation Assessments by Leidos Engineering, LLC

Appendix F Investments Required to Achieve WELL or Similar Certification Assessments by Jones Lang Lasalle (JLL)