Public Service Commission of Wisconsin
Office of Energy Innovation
Energy Innovation Grant Program

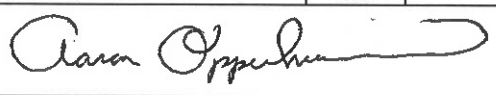
Wisconsin Office of Energy Innovation

ATTACHMENT A - COVER SHEET

SECTION I - Provide information summarizing the project proposal.		
Project Title:	City Hall Campus Energy Optimization & Electrification	
PSC Grant Request ($):	**Applicant Cost Share ($):**	**Project Total ($):**
$131,488	$165,300	$296,788
Choose one Eligible Activity		
☐ Renewable Energy & Energy Storage	☒ Energy Efficiency & Demand Response	☐ Comprehensive Energy Planning
Acknowledgement of ARRA Applicability. Check all that apply. (See Section 1.3 of Application Instructions)		
☒ Buy American: Alteration, maintenance or repair of a public building or public work.		
☒ Davis Bacon and Related Acts: Use of laborers or mechanics employed by contractors and subcontractors.		
☐ Historic Preservation: Project involves historical (over 50 years old), archeological or cultural resources.		
National Environmental Policy Act (NEPA): Review the list of covered activities in Attachment C (also discussed in Section 1.3.4) of the Application Instructions. ☐ Environmental Questionnaire **is attached.** Project activity **is not** covered. ☒ No Environmental Questionnaire needed. Project activity **is** covered.		

SECTION II - Provide information for your organization, signatory, and primary contact for the project.				
Applicant Type:	☒ City	☐ Village	☐ Town	☐ County
☐ Tribal Nation	☐ Manufacturer		☐ K-12 School District	
☐ University of Wisconsin System	☐ Wisconsin Technical College System		☐ 501(c)(3) nonprofit	
☐ Municipal Utility (water, wastewater, electric, natural gas)		☐ Hospital (public or nonprofit)		

Name (on W-9):	City of Sun Prairie
Address (on W-9):	300 E Main St., Sun Prairie, WI 53590
County or Counties Served by Project:	Dane
DUNS Number or CAGE Code:	DUNS: 094367547 CAGE: 6WTT3
NAICS Code:	921120 – Legislative Body
FEIN	

Authorized Representative/Signatory (Person authorized to submit applications and sign contracts)		**Primary Contact** (if different from Authorized Representative)	
Name:	Aaron Oppenheimer	**Name:**	Scott Semroc
Title:	City Administrator	**Title:**	Sustainability Coordinator
Phone:	608-825-1193	**Phone:**	608-381-5553
E-mail:	aoppenheimer@cityofsunprairie.com	**E-mail:**	ssemroc@cityofsunprairie.com
Signature of the Authorized Representative			

City of Sun Prairie

City Hall Campus Energy Optimization & Electrification

Summary of Project Budget				
Line	**Description**	**PSC Grant Request**	**Applicant Cost Share**	**Total Project Cost**
1	Personnel			$0
2	Fringe			$0
3	Equipment	$131,488	$165,300	$296,788
4	Supplies			$0
5	Travel			$0
6	Contractual			$0
7	Other			$0
8	Indirect			$0
	Totals	$131,488	$165,300	$296,788
	% of Total	**44%**	**56%**	

Applicant Comments: Equipment budget for both PSC Grant Request and Applicant Cost Share were calculated based on the four project components. Quotes were obtained for all associated equipment costs, and cost share was included to reflect budgeted amounts along with additional incentives. Both Focus on Energy and WPPI Energy incentives were provided by those parties as estimates based on the best available information. 1. Facility-wide LED Lighting Upgrade: Grant Amount ($15,000 for costlier LED fixtures/controls), Cost Share ($91,000 city budgeted based on quote + $4,500 Focus on Energy + $1,800 WPPI @ $.04/kWh), 2. HVAC System Controls Upgrade: Grant Amount (funds gap between quote $105,500 and city budgeted amount $35,000 = $70,500) Cost Share ($35,000 city budgeted amount for HVAC controls), 3. Building Inspection Cargo Van Electric Vehicle: Grant Amount ($18,000 for increment between budgeted vehicle and EV model) Cost Share ($30,000 for budgeted vehicle) 4. EV Charging Station Installation at City Hall Parking Lot: Grant Amount ($12,494 *2 for equipment, $3,000 * 2 for installation; installation offset by WPPI incentive = $27,988) Cost Share (WPPI incentive of $1,500 * 2 per charger = $3,000).

3.3. **Application Executive Summary**

- **Project Description.**

The proposed *City Hall Campus Energy Optimization & Electrification* project would be a comprehensive upgrade of this important municipal facility. The City of Sun Prairie is taking significant actions to reduce energy consumption and associated negative externalities across its municipal operations. Based on the city's Municipal Energy Plan (included as a reference material and in Section 3.4.7) using 2018 data the facility consumed 609,824 kWh of electricity, 16,862 Therms of natural gas, emitted 554 metric tons of CO_2e, had a total annual energy cost of $77,200, and accounted for 8% of total CO_2e of municipal buildings/operations energy consumption. Additionally, many city vehicles are parked and operate out of this facility; the fleet as a whole accounted for 906 CO_2e metric tons emitted and is 13% of total municipal energy consumption. City Hall is the primary hub of municipal operations, and houses a variety of key governmental functions (City of Sun Prairie Comprehensive Plan Chapter 4);

Sun Prairie's City Hall, located at 300 E. Main Street, was constructed in 1993 in downtown Sun Prairie. The building, which houses many of the City's administrative offices and the Sun Prairie Police Department, has approximately 42,000 square feet of space. The administrative offices occupy the second floor and a portion of the first floor of the building. The Police Department occupies a portion of the first floor and the basement. The first floor includes the Treasurer's Office, Building Inspection, a break room (undergoing renovations to include a lactation room), and a community meeting room. The second floor includes the Common Council Chambers, conference rooms, and staff offices.

This project aligns with the city's effort to meet its Energy Independent Communities "25x25" goal, set in 2009 to generate 25% of electricity and transportation fuels from renewable resources by 2025. City staff are working with the Sun Prairie Sustainability Committee to strengthen this goal in 2022, and while not yet finalized is likely targeting a 100% clean electricity target for municipal operations by 2030. Based on WPPI Energy's 2020 Annual Report, (provided as reference material) the 2020 Fuel Mix included 9.9% renewables (RECs retired), 11.1% renewables (RECs were sold and clean energy attributes cannot be attributed to the reported fuel mix), and 19.9% nuclear energy. WPPI Energy power supply is representative of each individual member, including Sun Prairie Utilities. By implementing energy efficiency and renewable energy projects, the city can cost-effectively reduce the "denominator" of this equation, and purchase RECs to achieve both the original and strengthened target. This project also aligns with the State of Wisconsin's goal of 100% carbon-free electricity by 2050, which will support meeting that goal and aligns with the State's Clean Energy Plan.

Installed and operational in December 2018, the facility has a rooftop mounted 80kW Solar PV system that has a public dashboard and to date has generated 230 MWh of on-site renewable energy. Following that the city installed a larger 140kW Solar PV system at the Westside Community Building in December 2019 (dashboard). These projects are highlighted as demonstration of the cities commitment to investing in sustainability-related projects, and the focus of this grant application is to optimize total site energy consumption through four discreet project activities detailed below. The facility campus considers the building, vehicles, and occupants as one complex system; by updating multiple components of this system, a significant reduction in both Scope 1 (direct) and Scope 2 (indirect) emissions/negative externalities can be made.

Sun Prairie intends for the City Hall facility to be a model of energy efficiency, renewable energy, transportation electrification, and a leader in high-performance building sustainability principles. The proposed project will support four key project components that will move this facility closer to its ultimate intended outcome; becoming a net-zero, all-electric facility that can serve as a case study for other municipal facility across Wisconsin to replicate. The project would consist of four components:

1. **Facility-wide LED Lighting Upgrade**, which totals over 700 lamps and fixtures throughout the facility. Based on an energy assessment report completed in 2021, this activity would result in annual electricity savings of 45,993 kWh, annual demand savings of 24.78 kW, and a total annual cost savings of $6,827.81. This analysis was quite conservative as it used a deemed 40-hour work week runtime; many areas of the building are operational far longer than this (for example, the Police Department). Additionally, the building is open for city and community meetings in the evening hours. This component would entirely upgrade the facility to LED lighting, which has been proven to offer significant energy savings, occupant performance, and maintenance advantages compared to CFL or incandescent lighting. The city has made progress in planning and budgeting for this project since 2019, but due to budget and staffing availability challenges it has not yet moved forward. The grant amount would advance this effort through direct purchase of LED lighting for installation in the facility. The funds would provide the opportunity to include optional portions of the project scope (Access Challenged Lighting and Advanced Lighting Controls, which add cost and complexity, to be included as alternate bids in the procurement process), in addition to exterior lighting.

2. **HVAC System Controls Upgrade**, which are critical to efficient operations and would provide the potential to upgrade to air-source or ground-source (geothermal) systems in the future. HVAC controls do have energy savings, but traditionally these are challenging to characterize. However, with city staff capabilities, access to AMI 15-minute interval data for electricity use, and in partnership with WPPI Energy and Sun Prairie Utilities, these savings can be tracked and realized over the course of implementation and monitoring of controls upgrades. The main upgrades would include new network architecture (scheduling, alarming, trending, and better connection of HVAC building data), install new DDC controllers for the hot water system/cooling tower/air-handling units (AHUs), install new variable air volume (VAV) controllers, install new heat pump unit controllers, along with CRAC and exhaust fan controls. This significant upgrade would allow for better control of the facility, which has become increasingly important as building use has changed, hours of operation have become more flexible, and occupant comfort/performance is being optimized.

3. **Building Maintenance Cargo Van Electric Vehicle**, which would fall under Beneficial Electrification and provide a reduction in gasoline use. This would also provide city staff and the general public more educational and training opportunities regarding electric vehicles, and reduce net energy consumption along with associated emissions. Currently the target vehicle would be an addition to the city's fleet; a new EV cargo van the Building Maintenance Division would use frequently for regular operations. One of the key barriers to fleet electrification has been charging station location and availability. As many fleet vehicles are currently parked at City Hall, electrifying the highest-use vehicles would provide a valuable learning opportunity for overall operations, city staff, and the general public visiting City Hall or the downtown area.

4. **EV Charging Station Installation at City Hall Parking Lot,** which would fill a critical infrastructure need for city operations to electrify fleet vehicles. The city/municipal utility would install two (2-port) charging stations, with a total capacity of four vehicles. Of particular note for educational and public benefit would be the availability of the stations for both public vehicles and fleet vehicles. The working plan would be to configure the stations so that the general public could charge in the day, and after a set time (~5:00pm) the stations would only be accessible by city vehicles, which could then charge overnight. This dual-use approach would provide for flexibility while allowing the public an additional location to charge. The city would also align with the charging station practices at the Sun Prairie Utilities office, which provides charging for free to the public. This additional service would provide equitable charging to residents, reduce range anxiety, and balance the needs of fleet operations with general public access.

- **Key Partners and Stakeholders.**
  As this project focuses primarily on city operations, the primary roles and responsibilities will consist of various departments (Administration, Public Works, Fleet, SPU) and associated staff. Various staff have convened to plan and project manage these efforts in the event the city is awarded funding, and are prepared to implement cross-departmentally. WPPI Energy and Focus on Energy would be additional project partners, for both technical support and additional incentives for various project components. Their energy advisors and energy service representatives have also been involved in the planning of this project.
- **Project Objectives and Metrics.**

  While there are various project components and complex metrics associated with this project, the primary objective is straightforward – a net primary energy (MMBtu) reduction for city operations housed at the City Hall campus. This will be measured by project component, and previous data collection and organization efforts have created an existing measurement platform via utility bill data being uploaded into ENERGY STAR Portfolio Manager, which the city uses to track building characteristics and resource consumption. The city also has a fleet management system that can be queried to provide fleet vehicle information and gasoline fuel reduction. Metrics include an improved ENERGY STAR score (75 or higher), reduced electricity (lighting and HVAC loads), natural gas (space heating), and gasoline consumption from operations at City Hall. These will be tracked and reported on using actual consumption data, not estimates or deemed savings values.

- **Reference Materials List.**
  1. Municipal Energy Plan Report, pages 82-87
  2. 2009 Resolution Supporting OEI “25x25” Goals, Declaring Sun Prairie as an WI EIC
  3. WPPI Energy Annual Report 2020, pages 7-9; WPPI Letter of Support
  4. City Hall Floor Plans, ENERGY STAR & MyAccount examples
  5. WICC Fleet Assessment, pages 2, 6, 7, 8, 10
  6. Quote for Component #1 Facility-wide LED Lighting Upgrade
  7. Quote for Component #2 HVAC System Controls Upgrade
  8. Quote for Component #3 Building Maintenance Cargo Van Electric Vehicle
  9. Quote for Component #4 EV Charging Station Installation at City Hall Parking Lot
  10. EV Charging Data at SPU Facility

3.4. **Application Narrative and Merit Review Criteria**

3.4.1. **Eligibility and ability to achieve the objectives.**

The City of Sun Prairie is a municipal government duly incorporated from a village to a city in 1958 in the State of Wisconsin. The City of Sun Prairie (City) is directly eligible for this program as an established municipality located in Wisconsin. The City's Federal DUNS number is 094367547.The City has past experience administering federal and state grants and has the staff expertise required to plan, implement, and evaluate technical projects such as the energy upgrades described in this proposal. The City is capable of complying with the requirements of the requested OEI funding. The project components align with the application instructions as provided, and projects will be completed through the city's applicable competitive procurement process to identify and contract with experienced and credentialed equipment installers. No sub-contractors have been identified at this time for project planning or management activities other than quotes or informational purposes. Applicable ARRA provisions as detailed in the EIGP 2021 Application Instructions include 1.3.1. Buy American Provisions and 1.3.2. Davis-Bacon and Related Acts (DBRA); such provisions shall be met in the procurement process by requiring vendors to demonstrate meeting these provisions in the bid responses and ensuring these parameters are met.

The following staff have been involved in the planning process and are committed to a cross-departmental implementation team should the project move forward, which represents a diversity of skillsets and technical expertise needed for successful project implementation.

Staff Name	Title	Experience	Responsibilities
Adam Schleicher	Director of Public Works	Public Works, Building Maintenance Departmental oversight	Project management and support activities related to project components 1-4
Andy Hirvela	Supervisory Engineer (SPU)	Municipal Electric Utility Engineering, Technical Services	Technical support related to project components 2, 4
Ben John	Public Works Operations Manager	Public Works Operations oversight, project management	Project management and support activities related to project components 1-4
Caitlin Stene	Director of Administrative Services	Administration Department oversight	Administrative support activities related to project components 1-4
Clint Cry	Energy Services Manager (WPPI Energy)	Energy Services, Technical support	Project logistics, funding, and support activities related to project components 1, 2, 4
J.R. Brimmer	Fleet & Contracts Supervisor	Vehicle fleet management, performance analysis	Project management and support activities related to project components 3-4
Kristin Vander Kooi	Director of Finance	Budget support, Finance Department oversight	Budgetary, financial support related to project components 1-4

Lauren Freeman	Engineering Management Analyst	Financial analysis, project management support	Project management and support activities related to project components 1-4
New Lor	Building Maintenance Supervisor	Building equipment and project management support	Project management and support activities related to project components 1, 2, 4
Sandy Xiong	Strategic Planning & Engagement Manager	Overall administrative and project management support	Project management and support activities related to project components 1-4
Scott Semroc	Sustainability Coordinator	Grant application coordination and project management lead	Lead project manager for grant, all project components & reporting

3.4.2. **Budget Justification and Cost Share ("Match")**

Summarized in Attachment B – Budget Sheet, cost share activities will be described in further detail below, organized by each project component. Cost share includes local municipal budgeted funds, Focus on Energy funding, and WPPI Energy funding. Additionally, a significant amount of staff time will be used to complete these projects, but wasn't included as there were significant funds dedicated to equipment upgrades and much of the analysis occurred prior to the performance period.

1. Facility-wide LED Lighting Upgrade

In 2019 the city had budgeted for the LED conversion project, however due to disruptions related to the COVID-19 pandemic, shifting funding priorities, staff bandwidth, and technical expertise the project has not moved forward. In 2021 progress was made towards detailing technical specifications and completing procurement activities to complete this project. The city is listing cost share of $91,000 to reflect the original quote received for the conversion of ~700 LED lamps and fixtures throughout the facility. There were additional considerations (Access Challenged Lighting and Advanced Lighting Controls) that were of interest but not feasible due to the added project cost and complexity. The city intends to include these as alternate optional bids in the procurement process. The original quote also wasn't facility-wide and excluded exterior lighting, exit signs, and other miscellaneous lights, which would be included in this updated scope. The $15,000 in EIGP grant funding would allow the city to fund the updated scope and possibly include the alternate bids depending on the bid prices received. Lighting in the City Council chambers and stairwells would require scaffolding or a lift which would drastically increase cost for those upgrades. There's also potential to integrate lighting controls on high use fixtures or with the HVAC control system. The additional cost share reflects incentive amounts from Focus on Energy ($4,500) and WPPI Energy ($1,800) both of which are conservative estimates based on the best available project data. WPPI incentives are provided at a rate of $.04/kWh reduced.

Grant Amount	Cost Share (City Budget)	Cost Share (Incentives)	Description
$15,000	$91,000	$4,500 Focus on Energy $1,800 WPPI Energy	Grant funding for updated scope and alternate bids, cost share for budgeted original project quote, energy efficiency program incentives.

2. HVAC System Controls Upgrade

Originally constructed in 1993, City Hall has the original HVAC controls system in place, which is a critical opportunity to upgrade building operations systems. The system currently consists of a centralized space cooling (chiller and cooling tower), heating (boiler), and cold water/hot water looped distribution system that serves the building. The air-handling unit and variable air volume units provides fresh air, and there are 30 heat pumps that control zones throughout the building. The control system currently runs on JAVA which will be retiring in 2022, necessitating an upgrade. While there can be a smaller stop-gap upgrade, the city intends to use this opportunity to implement a more holistic upgrade that can provide far better control, energy savings, and occupant comfort. The city has budgeted $35,000 for basic upgrades in 2023, but would move this funding amount to 2022 in order to capitalize on an expanded project scope if awarded. The city received a comprehensive quote from a reputable controls systems provider that is also reviewing building upgrades at the Westside Building, providing the opportunity to consolidate system controls and network architecture to one provider, offering economies of scale and better system oversight, in addition to reduced licensing cost and redundancies of multiple systems. The grant amount of $70,500 would reflect the balance between the provided quote of $105,500 and the city budgeted amount of $35,000. This project would result in a significant controls upgrade of the network architecture, supervisory controller, DDC controllers, VAV controllers, Heat Pump DDC controller and new zone temperature sensors, among a variety of other upgrades. Of additional note is that this project would be eligible for both Focus on Energy and WPPI Energy custom incentives, the amount of which is still being calculated through the completion of technical workbooks and was not available at the time of submission of this grant application. WPPI incentives are provided at a rate of $.04/kWh reduced, resulting in an estimated incentive of $805 (but not confirmed).

Grant Amount	Cost Share (City Budget)	Cost Share (Incentives)	Description
$70,500	$35,000	*TBD	Grant funding and city budget for building wide HVAC controls upgrade.

3. Building Maintenance Cargo Van Electric Vehicle

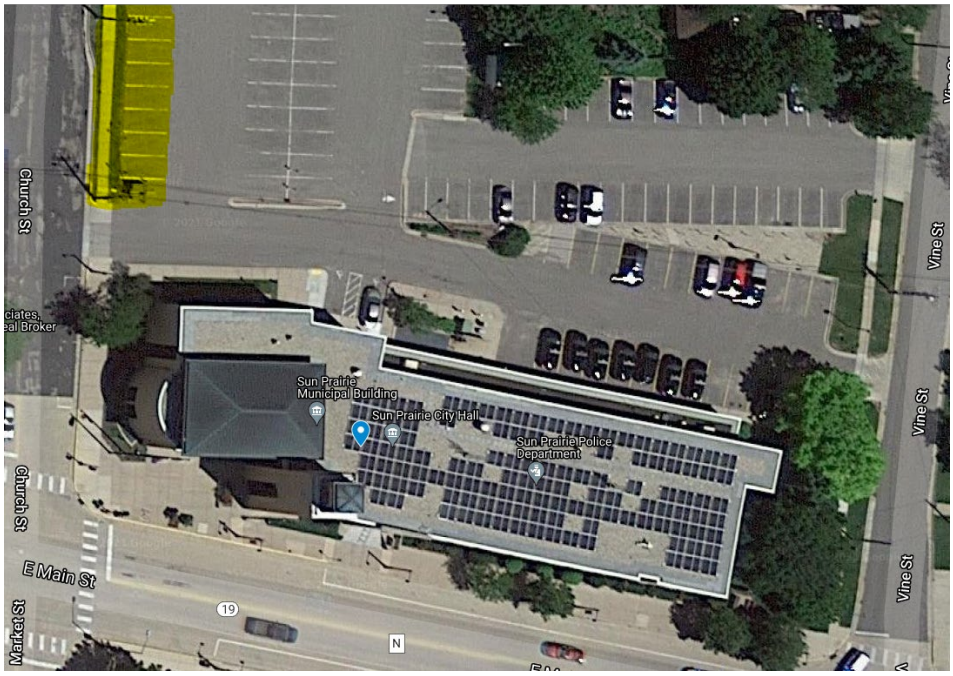
City staff have been working across departments to identify fleet electrification opportunities. To date, the fleet has converted 11 Police Cruisers to hybrid, and one Public Works vehicle to all-electric. In 2021 the city worked with Wisconsin Clean Cities (WICC) to conduct a fleet assessment to identify cost-effective opportunities. Lower fleet vehicle usage due to the COVID-19 pandemic and low base cost state pricing for gasoline vehicles have made cost-effective fleet electrification challenging to date. After reviewing 2022 purchases, the fleet manager suggested the upcoming purchase of an EV Cargo Van would be a strong candidate for electrification, as the vehicle would be used by a Building Maintenance Technician in the Building Maintenance Division which regularly visits facilities throughout the city. The vehicle was originally budgeted for purchase at $30,000 in 2022 as a traditional internal combustion vehicle. This project component would include a grant amount of $18,000 to fund the increment between the $45,000-$48,000 total purchase price of the EV Cargo Van and the $30,000 originally budgeted for the vehicle.

Grant Amount	Cost Share (City Budget)	Cost Share (Incentives)	Description
$18,000	$30,000	$0	Grant funding and city budget for upgraded purchase to EV Cargo Van for Building Maintenance staff.

4. EV Charging Station Installation at City Hall Parking Lot

In addition to economics, the other major barrier to fleet electrification is the availability of charging infrastructure on city facilities where fleet vehicles are stored. This component would take a major step forward towards reducing this barrier, by installing two two-port charging stations at the City Hall parking lot. This would allow for future fleet purchases to be Plug-in Hybrid (PHEV) at minimum, and/or EVs to be selected for fleet operations as the city continues to grow its fleet and associated operations. Additionally the city plans to provide flexibility at these stations and make them available to the public, which would provide a fourth EV charging station within city limits (currently there are three stations located throughout the city, one of which is located at the SPU facility and comparable use data is included as reference material). However SPU is planning to construct and relocate to a new facility in 2023, which would make these proposed stations critical to easily-accessible downtown charging for both the public and city fleet vehicles. The current plan (see below figure, highlighted location) is to locate the charging stations in the parking lot of City Hall, possibly abutting Church St. which would make them easily visible from E. Main St. and centrally located in downtown Sun Prairie.

Figure 1. Potential EV Charging Location at City Hall parking lot



The grant amount would reflect quotes received and best available information on installation costs ($12,494 equipment + software * two stations, $3,000 installation * two stations = $30,988), less the incentive amount that would be provided by WPPI Energy ($1,500/charger * two stations = $3,000); a total grant amount of $27,988. The city would also create a budget and plan to include cost coverage for

the free public charging component, an estimated $1,008 annual cost based on existing SPU facility public charging usage. This would provide the opportunity for both the city fleet and the public to reduce gasoline consumption and have confidence in public charging availability, which is one way to equitably provide services for residents that might be visiting downtown or the City Hall facility for a variety of reasons. The city is also developing a transportation electrification roadmap in 2022 which would provide resources for city operations, residents, and businesses; this project component would directly assist in meeting those goals to provide a variety of sustainable transportation solutions throughout the community.

Grant Amount	Cost Share (City Budget)	Cost Share (Incentives)	Description
$27,988	$0	$3,000	Grant funding and incentives for installation, software, and equipment for EV charging stations.

Consolidated Project Component Budget Table

Component	Grant Amount	Cost Share (City Budget)	Cost Share (Incentives)	Description
(1) LED Upgrade	$15,000	$91,000	$6,300	~700+ LED lamps, fixtures building-wide
(2) HVAC Upgrade	$70,500	$35,000	*TBD	Updated HVAC controls, building-wide
(3) EV Cargo Van	$18,000	$30,000	$0	Electric Building Maintenance fleet vehicle
(4) EV Charging Stations	$27,988	$0	$3,000	(2) 2-port charging stations
Totals:	$131,488	$156,000	$9,300	Progress to all-electric, net-zero campus

3.4.3. **Savings and Payback.**

Expected savings from this project come in many forms, and will broadly be characterized as resource optimization. Some investments have a directly calculable ROI or payback, and can be quantified and measured fairly accurately. Others are harder to quantify and will have additional “non-energy benefits” such as occupant health and productivity, Scope 1 & 2 emissions, equitable public and city fleet access to sustainable transportation infrastructure, and more. There will overall be a measurable net reduction in equivalent primary energy (MMBtu; measured in electricity kWh, energy demand kW, natural gas Therms, and gasoline gallons). There is complexity in this analysis as typically these activities or measures are done in a silo, however this project aspires to also be a model for impact calculation methodology and the results will be dynamic. Perhaps most importantly the city is willing and able to provide performance data at very granular intervals for building and transportation energy performance; something that could potentially benefit analysis and energy savings claims for similar business or municipal government operations of both facilities and fleets. This data could also benefit energy efficiency programs such as Focus on Energy, which historically has relied on deemed

measurements of energy savings as data access and scale prove costly and challenging to obtain. By implementing a project that benchmarks historical energy use, having a well-documented action outline with discrete outcomes and completion dates, and the ability to "tag" or timestamp energy reduction interventions, a compelling opportunity to provide more accurate energy performance results at a granular level would be a valuable project outcome.

1. Facility-wide LED Lighting Upgrade

Component one has perhaps the most straightforward savings calculations, as LED projects have been completed and verified across a wide swath of building types and operations. Broadly speaking, LED technology offers significant benefits related to electricity (kWh) and power (kW) consumption, operations and maintenance related to fixture/lamp burnout, and has been proven to provide a higher quality light output in many ways (correlated color temperature CCT and color rendering index CRI being two primary examples) compared to other lighting technologies. By replacing over 700 light fixtures and lamps throughout the facility, a substantial reduction in lighting load (63%+) can be realized. Lighting loads account for a significant portion of commercial electricity use (~17%, see Figure 2. In the HVAC section below). Supporting documentation reflects analysis done in 2020-2021; however this should be considered an extremely conservative "upper-bound" simple payback (listed at 13.27 years) for several reasons. The project cost was given as an estimate and not through a formalized competitive procurement, the stated hours of operation (40 hours/week, or 2,080 hours annually) was generalized for the entire facility while in reality many locations such as the second floor offices, Council Chambers, and Police Station run longer than this, and the fact that no centralized lighting control system is in place, making it likely that many existing lights run far longer than is desirable. Additionally, this scope would be updated to include all lights throughout the facility boundary, including exterior lighting, exit signs, and miscellaneous lights. As a result, this project component would be monitored with interval electric meter data to determine the lighting load energy savings from an LED upgrade. A summary of this analysis can be found in Reference Material #6 "Quote for Component #1 Facility-wide LED Lighting Upgrade"; however for the reasons stated savings should be considered a minimum and don't include the expanded scope. Additional benefits include: improved occupant safety/health/productivity (better light quality can prevent slip and falls, reduce eye strain, mirror natural circadian rhythms), reduced O&M/callbacks from failed or malfunctioning fixtures, reduce environmental impacts associated with lower energy consumption but also light pollution which affects wildlife window collisions and migration disruption.

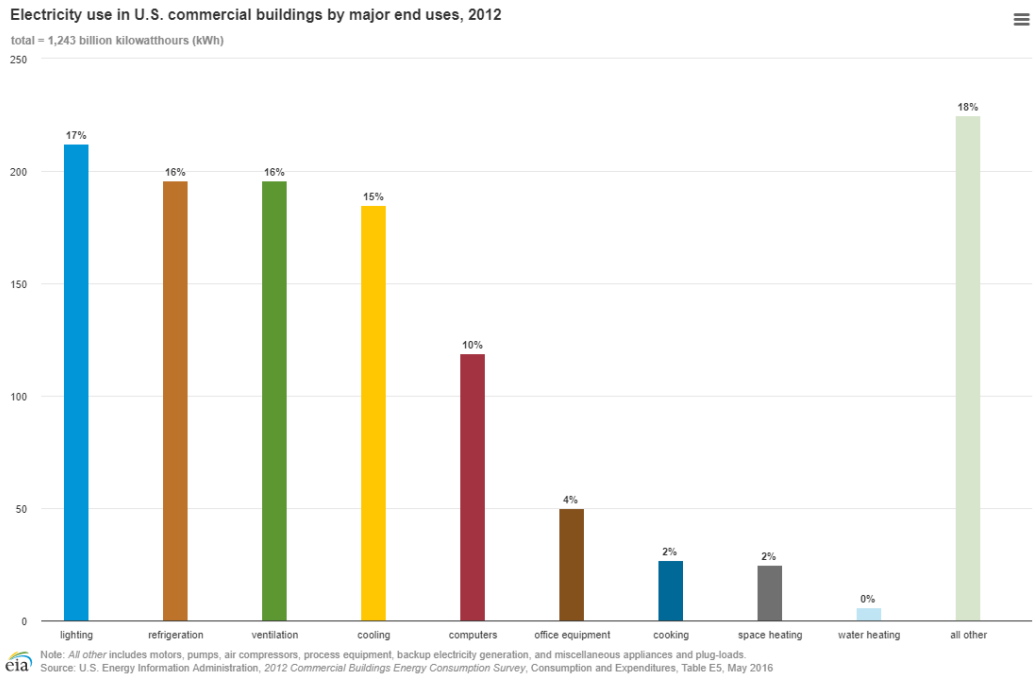
Annual kWh Savings	Annual kW Savings	O&M Savings	Project Cost	Estimated Payback	Total Cost Savings; Non-Energy Benefits
45,993	24.78	$2,688	$95,416	13.27 Years	$6,827.81; Improved occupant health/safety/productivity, reduced environmental impacts.

2. HVAC System Controls Upgrade

Generally speaking HVAC controls upgrades have been notoriously hard to quantify at a high-level, as there are so many different facility types and system configurations to consider. The below narrative and analysis describes expected savings based on available information. The likely drivers of energy savings include the following; (1) reduced fan motor use, (2) optimized system scheduling, setbacks, and setup, (3) elimination of simultaneous heating/cooling from non-communicating systems, (4) economization and optimization fresh air intake, and (5) improved diagnostics/preventative maintenance of aging system which can avoid "drift" or reduced performance of components such as fans, motors, pumps, etc., (6) blocked or underperforming outdoor air dampers, (7) radiant valves overheating spaces. These items are applicable to both the heating and cooling system. Energy savings is most likely to come when the existing system has limited functionality and energy saving control strategies are very limited, which is the case at this facility. Controls are also only accessible at the terminal (located in the basement), making adjustments and monitoring challenging.

The current natural gas boiler (for space and water heating) is likely around 80% efficient. This equipment is also aging and will likely be upgraded soon, but is not part of this project scope as the intent is to stretch its useful life in order to consider heat pump systems with a larger BTU outdoor condensing system that would allow for a much smaller boiler to be installed for backup or second stage heating. By upgrading to a new condensing boiler with modulation capabilities, this would increase efficiency to around 92-93% and decrease natural gas consumption even further. With new HVAC controls being installed first, when boiler replacement (which is imminent based on evidenced scaling and corrosion) occurs the system can be right-sized to the building, preventing additional over-use (the current boiler is 2-million BTU, which was sized in the 90s and single-staged). With improved controls and a more efficient boiler set up, sharper reset schedules allowing the boiler to run the majority of the time in condensing mode would be very beneficial. A rough estimate of 25-35% energy savings with room for upside (for the boilers space heating capabilities, the upgraded controls would enable this).

Figure 2. Commercial Building Electricity Use Breakout



Installed HVAC controls would allow for performance monitoring and the ability to make adjustments to all equipment, which results in operational and utility cost avoidance. Real-time analysis with 15-minute interval electric data paired with monthly gas utility consumption would inform verified energy savings. As an approximate estimate, the following information was assessed relative to facility specific information at City Hall. The above data from EIA demonstrates an approximate breakout that could be used to derive energy savings, especially when paired with data from the same source showing natural gas is about 32% of energy used in commercial building. Using utility bill data for City Hall, the following estimate for savings and payback was calculated:

2018 Data: City Hall Consumed 609,824 kWh of electricity, 16,862 Therms of natural gas.

Electricity End Use (HVAC), %	Electricity Consumption (end use % of 2018 total) kWh		Natural Gas Use (Space Heating/HVAC), %	Natural Gas Consumption (end use % of 2018 total) kWh
Ventilation, 16%	97,752		Space Heating, 90%	15,176
Space Cooling, 15%	91,474		Water Heating, 10%	N/A
Space Heating, 2%	12,196		---	---
Total, 33%	**201,242 kWh**		Total, 90%	**15,176 Therms**

A case study from the DOE highlighting a City Hall in Gillette Wyoming (85,500 SF, Project Cost $900,000) HVAC control upgrades resulted in energy savings of 24%; scaling this SF/building size to Sun Prairie City Hall would provide a deemed energy savings value of 13%, revised down to **10%**. As a result, a calculated estimate for this project component would result in a total annual electricity reduction of (201,242 * 10%) = 20,124 kWh (3.3% of annual total) and natural gas reduction of (15,176 * 10%) = 1,517 Therms (9% of annual total). Based on a blended kWh rate paid of $.09/kWh and blended Therms rate of $.80/Therm, the total estimated annual cost savings would be ($1,811+$1,213) = $3,024. However, as mentioned earlier this activity enables and optimizes future energy savings of equipment replacement, such as the boiler, chiller, and the installation of more efficient heat pumps. There are also significant cost savings associated with maintenance staff time, equipment replacement, and preventing catastrophic equipment failure through fault detection, diagnostics, and real-time alerts through an updated controls system. These benefits are substantial and have a higher cost savings in comparison to energy savings, which will likely be higher than estimated when using actual billing data to assess energy consumption performance in real-time.

	Electricity (kWh)	Natural Gas (Therms)
Annual Energy Savings	20,124	1,517
Annual Energy Savings (%)	3.3%	9%
Annual Energy Cost Savings	$1,811	$1,213
Total Annual Cost Savings	$3,024 + staff time + prevention of equipment failure	

3. Building Maintenance Cargo Van Electric Vehicle

Currently, the city has budgeted $30,000 in 2022 for a new cargo van vehicle purchase in the Building Maintenance Division. The current baseline comparison vehicle is gasoline only (Ford Fusion used previously by this position), and would be used for regular city operations starting at a minimum lower bound 5,000 miles annually. While this would be a new vehicle, the fuel efficiency baseline for this vehicle would be 22 MPG (20-25 MPG range for city usage), resulting in a minimum consumption of about 227.27 gallons (5,000 miles / 22 MPG) of gasoline annually. At an estimated rate of $3.00/gallon of gasoline the total annual fuel cost would be $681.81. With an expected service life of 10 years, the total lifecycle (LC) fuel consumption of this vehicle would be 2,272.7 gallons, at a total lifecycle fuel cost of $6,818.10. Importantly, this calculation is incomplete and doesn't include all Total Cost of Ownership (TCOO) metrics, which include: Vehicle Price, Depreciation, Fuel, Diesel Exhaust Fluid, Maintenance & Repair, Insurance, License & Registration (WICC Reference Table 5).

Sun Prairie worked with Wisconsin Clean Cities to assess its current fleet for future replacement opportunities. The quote received from a vendor for a Ford E-Transit Cargo Van had models with estimated miles per charge range between 116-126 mpc, and an estimated charge time of eight hours (assuming 48-amp, 240v which would be similar to Level 2 charging). As this model is still being evaluated by the EPA and DOE for MPGe fuel economy, an approximate estimate of 61 MPGe based on a similar cargo van was used for analysis. This comparable "fuel" cost would be significantly lower on a per mile basis compared to gasoline, if an energy conversion of 33.7 kWh = 1 gallon of gasoline (WICC reference Table 2) is used. For EV "fuel" consumption, the mileage was taken and divided by 61 MPGe and multiplied by 33.7 kWh to get a true equivalency comparison. For the 5,000 mile scenario this results in 5,000 miles / 61 MPGe *33.7 kWh = 2,762.3 kWh in annual electricity use. Using the current SPU charging station kWh rate of $.06/kWh, the equivalent cost per gallon of electricity is $2.022. Instead of a simple payback, a range of options are given as the economics are heavily dependent on how often the vehicle is driven; use data occurred during the pandemic which has significantly reduced both the amount of miles driven across fleet vehicles and also the amount of service work done to city facilities, which creates uncertainly and as a result multiple scenarios are provided to create a range of reasonable assumptions.

	Gasoline Cargo Van	Electric Cargo Van
Annual/LC Fuel Consumption (5,000 miles)	227/2,270 Gallons	2,762.3 kWh/27,623 kWh
Annual/LC Fuel Consumption (10,000 miles)	454/4,540 Gallons	5,524.6 kWh/55,245 kWh
Annual/LC Fuel Consumption (15,000 miles)	681/6,810 Gallons	8,286.9 kWh/82,868.9 kWh
Estimated cost per gallon	$3.00	$2.022
Annual/LC Fuel Cost (10,000 mile mid-point)	**$1,362/$13,620**	**$331.50/$3,314.8**
Annual/LC O&M Cost (WICC Table 5)	$2,070/$20,700	$1,305/$13,048
Estimated Annual/LC Savings (Gas Fuel+O&M – EV Fuel+O&M)	N/A	**$1,795.50**

4. EV Charging Station Installation at City Hall Parking Lot

In some ways similar to HVAC economic analysis, it is inherently challenging to assess straightforward savings and payback for EV Charging Stations, as various costs and benefits aren't normalized and accrue to different parties. The below assessment takes available data and makes reasonable assumptions to determine a value proposition for this project component. For comparative analysis, the baseline condition would be a gasoline fueling station and internal combustion powered vehicles.

One way to consider this component is as a public good investment; one that provides a resource to the community, leverages local resources in that the electricity is provided by a local municipal utility (and more specifically electrons coming from the roof via the Solar PV system) as opposed to gasoline exported from out of state/country, and mile-for-mile provides a cheaper vehicle fuel. Electricity for vehicle propulsion varies by electric and gasoline prices but overall is generally cheaper than gasoline propulsion; A 2018 University of Michigan study found that the current average annual cost of driving a new gasoline vehicle in the United States is $1,117 compared to a new BEV is $485, a difference of $632 annually. To complicate the analysis further, there is both the fleet charging aspect of this component, along with the public charging (which is planned to be free of charge, making a payback implausible to calculate). Looking specifically at the example in component 3, those savings are enabled by the EV charging station. Additionally, benefits are flowing to Sun Prairie residents in the form of reduced EV charging costs. There are also significant environmental benefits of EV operations when compared to gasoline, which is currently an unpriced externality (GHG emissions, outdoor air quality in the city). These impacts affect the entire community and their reduction is considered an additional value-add of this project. A Union of Concerned Scientists calculator finds a 71% reduction in grams of CO2e/mile comparing BEV to gasoline.

To qualify savings/value of this project component, a few factors are proposed for consideration: (1) total vehicle miles driven (VMT) converted from gasoline to electric propulsion (which can be measured directly from the charging stations dashboard) for both city fleet and public vehicles, (2) reduction of negative environmental externalities (detailed in 3.4.4.), and (3) utilization of local energy resources via the municipal electric utility as opposed to gasoline imported from out of state, or even the country. There are also indicators showing employees view EV charging as a perk, and view the amenity favorably as they consider purchasing their own EVs, as an employee retention tool.

(1) VMT converted from gasoline to electric: This metric would be measured at the charging station, and include both fleet vehicles and public utilization of the station. By considering EV charging stations as public good infrastructure or an enabler of savings at the vehicle level, a reasonable estimate of cost savings can be realized. Reference Material "WICC Fleet Assessment" Table 2 on page 6 shows fuel type and unit price comparisons (SPU blended electric rate is actually lower than in Table 2 at $.09/kWh).

The assessment also looked at existing fleet vehicles average annual VMT and fuel consumption (Table 3 on page 7). Using the average annual VMT of 4,318 miles and annual fuel consumption of 245 gallons of gasoline, a comparison for fleet vehicle electrification can be made.

As a result, using the rate of $3.00/gallon, and average consumption of 245 gallons/year, annual gasoline fuel savings per vehicle (which would grow at a rate of 2-3 vehicles per year as the fleet electrifies) would be **$735/vehicle/year. Importantly this doesn't include O&M savings, which can be**

seen in the below example. A final factor to consider is the reduction in Total Cost of Ownership (TCOO) for EVs when compared to gasoline, which if taken at face value for city fleet vehicles would save between $11,553-$21,983; this would be true for the general public in impact to their cost savings as well at a mid-point of $16,768* (WICC Fleet Assessment, Table 5 page 10).

In conclusion, there is not a straightforward cost savings analysis for an EV Charger that serves both a fleet and provides free charging to the public (see reference materials for current EV Charger use at the SPU facility; providing about 1.42 MWh or EV charging or $84/month to ~15 unique drivers). However both the quantitative and qualitative benefits as an enabling technology are important and provide the necessary first step to fleet electrification. Interestingly enough electricity use would actually increase at City Hall, but with the reduction in gasoline consumption a net energy reduction would be realized, and can also be tracked by combining the AMI data of the electric meter and the usage data from the EV charger. The consolidated summary assumes three fleet vehicles (separate from the EV cargo van) and an annualized TCOO reduction/cost savings ($16,768 * 10 year service life / 3 vehicles = $16,678).

	Fleet Vehicle Value	Public Benefit Estimate
Total Cost of Ownership savings/Vehicle	$16,768*	$16,768*
Gasoline Gallons Reduced; Avg./Vehicle	245 Gallons	14,263 miles / 25 MPG = 570.5 Gallons

Consolidated Summary:

Project Component	**Annual Energy Savings**	**Annual Cost Savings**	**Non-Energy Benefits (Positive Externalities)**
Facility-wide LED Lighting Upgrade	45,993 kWh	$6,827.81	Improved occupant health/safety/productivity, reduced environmental impacts, reduced slip and fall risk.
HVAC System Controls Upgrade	20,124 kWh, 1,517 Therms	$3,024	Improved occupant health/safety/productivity, reduced maintenance staff time, reduced risk of equipment failure.
Building Maintenance Cargo Van Electric Vehicle	454 Gallons Gasoline	$1,795.50	Improved outdoor air quality, fleet electrification progress, reduced reliance on imported fuel, local electricity consumption.
EV Charging Station Installation at City Hall Parking Lot	735 Gallons Gasoline	$5,030.40	Provision of public EV charging infrastructure, enabling technology to facilitate transportation electrification,

Totals:	**521 MMBtu**	**$16,678**	**Improved building performance, enables city fleet electrification.**

Even with a complex, multi-variate analysis, the bundled impact of this project results in a payback on the total grant amount of $131,488/$16,678 = 7.9 Years.

3.4.4. **Energy Savings and Environmental Impact.**

Much of the analysis provided in 3.4.3 outlines the conservation of various forms of energy. This section takes the consolidated table results at the end of that section and provides a summary of net energy savings and associated emissions reductions. There are directly measurable and also indirectly associated savings with this project; for example the avoided electric line losses of distributing power to the facility is reduced as a result of the energy efficiency components, and what can be the international logistical impacts of gasoline fuel transportation are also reduced.

Project Component	Annual Energy Savings	Annual CO2e Reduction
Facility-wide LED Lighting Upgrade	45,993 kWh	32.6 Metric Tons
HVAC System Controls Upgrade	20,124 kWh, 1,517 Therms	14.3 Metric Tons 8 Metric Tons
Building Maintenance Cargo Van Electric Vehicle	454 Gallons Gasoline	4 Metric Tons
EV Charging Station Installation at City Hall Parking Lot	735 Gallons Gasoline	6.5 Metric Tons
Totals:	521 MMBtu	65.4 Metric Tons

3.4.5. **Equity and Energy Justice.**

As large energy users and policy makers, local governmental units are uniquely positioned to lead the charge of energy justice and ensuring equitable outcomes in their communities. Sun Prairie is committed to balancing the demands and impacts of economic stability, environmental protection, and social equity across our community now and in the future. Sustainable investments such as the ones proposed allow for several benefits to support an equitable, just, and clean-energy community. Energy savings as a result of this project reduce operational costs and reduce GHG emissions. This passes on to reduced tax bills for residents and improved air quality as a result of the projects. Any net reduction in municipal operational costs occur equitably across the community, and the value of additional services this project provides described elsewhere in the application result in multiple public resources.

Providing free EV charging to the public is a practice already in place at the Sun Prairie Utilities office. Duplicating this model supports Sun Prairie's commitment to center transportation and energy equity and ensure equitable EV infrastructure access for all residents. Additionally the EV Cargo Van would result in zero tail-pipe emissions, which would improve the air quality incrementally in the community. As the city fleet and community continues to electrify transportation, ambient outdoor air quality will only continue to improve in neighborhoods and throughout the community. Avoided emissions, education, and decreased operational costs would all equitably benefit the Sun Prairie community.

In addition to meeting the ARRA provisions as detailed in the application instructions, Sun Prairie is committed to supporting and utilizing minority business enterprises, women business enterprises, disabled business enterprises, veteran/disabled veteran business enterprises, and small business enterprises throughout its procurement process. This would remain the case for the procurement process of these projects. This inclusive procurement strategy promotes economic growth, localizes wealth in the community and retains jobs in the community.

3.4.6. **Financial Leverage and Economic Impact.**

As with most municipalities, budgets are constrained, staff have limited bandwidth, and funding sources are perpetually challenged. Even in the case of a planned, budgeted LED projected that started in 2019, various challenges have led to delays. Simply put, the EIGP funding would be critical to moving this project forward, and there are not available budgeted funds to pursue this project as described without the grant funding. Instead of relying only on traditional ROI or SPB analyses, the complexities of municipal operations, changing technologies, and the incorporation of a systems-thinking approach necessitate new ways of defining success. Completing all the named components in one project and a bounded performance period would significantly accelerate Sun Prairie towards meeting its sustainability goals. While some (insufficient) budget is available for some project components, it's far lower than what's needed to meet the target outcomes of each component, and in other cases there is no funding at all. More specifically, the likelihood of components 2 (HVAC Controls), 3 (EV Cargo Van), and 4 (EV Charging Stations) moving forward without grant funding in 2022 is 0%. For component 1 (LED building-wide), the project would likely move forward but with a lower budget that would upgrade only a limited number of fixtures. To showcase this need, in 2021 city staff proposed an addition to the 2022 budget that would have included funds for facility energy efficiency analysis and retro-commissioning, but this proposal was declined and instead valuable taxpayer dollars went to funding critical staff positions such as Police Officers and IT Systems Administrator. These are challenging decisions for the City Council to make, and underscore the need for external funding for the city to complete this important work. Significant analysis was put into energy planning that identified the most impactful projects over the long-term of city operations.

3.4.7. **Existing Energy Planning Efforts.**

In 2019 the City was awarded a collaborative grant by the OEI to create a Municipal Energy Plan. That plan was foundational to creating a strategy to identify, prioritize, and implement energy reduction projects. City staff have been working across departments to build off this strategy and implement successful projects. Based on the report findings, City Hall is a logical candidate for energy efficiency upgrades. The pages included as reference material directly influenced this project plan, and were an important step in establishing project priorities.

In 2021 the City hired its first Sustainability Coordinator, who has experience with energy efficiency, renewable energy, and facility energy management projects. In the second half of 2021 the city uploaded all facilities into ENERGY STAR Portfolio Manager, an energy management tool that consolidates building information (details, energy, water, waste & materials) and allows for benchmarking, performance tracking, reporting, and goal-setting features. The city has established an automated upload of its monthly electricity consumption for all city-owned facilities, and created a data connection to bulk upload its natural gas consumption to this platform. These efforts are foundational and critical to better tracking and understanding the various energy flows of municipal operations. These comprehensive energy planning efforts have built a strong foundation from which to plan, quantify, and implement a variety of building performance projects that will improve operations, reduce energy consumption, and improve the indoor environmental quality for occupants.

3.4.8. **Energy Resiliency.**

This project and its components directly improve the energy resiliency of municipal operations. Sun Prairie City Hall is an Emergency Operations Center (EOC), which serves as the headquarters for various department heads to convene in the basement of the facility in the event of an emergency, natural disaster, or other catastrophic event. Additionally, city hall is designated as a community storm shelter in the event of severe weather. There is a diesel generator onsite that can power the facility in the event of a power outage or emergency. However, a key limiting factor is the total overall load being served by the generator in the event of a power outage. Importantly, both HVAC and Lighting loads are critical to building operations and by reducing their power draw, there are benefits to both routine and emergency operations of the facility. This project would also reduce the runtime and/or total amount of diesel fuel consumed by the generator by reducing these power loads, which would reduce cost and emissions of emergency operations and hence improve energy resiliency.

3.4.9. **Education and Awareness.**

This project would incorporate several educational components for both city staff and the general public if awarded. As a public facing facility, City Hall serves frequent visitors coming to the facility for events, municipal court, information, bill payment, permit processing, and usage of the community room or to attend city meetings such as City Council. Every building user could benefit from signage, energy usage dashboards displayed on lobby monitors, in addition to the website which already displays Sustainability-related information including access to the Solar PV system production details. City Hall would also provide an excellent location for public ride-and-drives and demonstrations. Required project documentation would also be provided in case study format, along with important energy use data that could inform a variety of other projects or programming. Having access to real-time consumption data and educating a variety of stakeholders on the project performance over time would serve as a perpetual learning tool that could be modeled by municipalities and other stakeholders.

Constructing the two EV chargers at City Hall allow for educational and engagement opportunities for all residents. With proximity to City Hall, Cannery Square and several downtown businesses and events including the Sun Prairie Farmer's Market, Corn Fest Parade, Fire & Lights Parade, National Night Out, and Streets of Sun Prairie, the chargers serve an educational purpose in addressing range anxiety and building community confidence in transportation electrification.

3.4.10. **Innovation.**

By integrating several sustainability-related components into one project, innovative features would provide compelling opportunities: a case study, building tours, EV ride-and-drives, energy use dashboards, signage, dual-use (public/city fleet) EV charging, and most importantly a systems-oriented approach to meeting the city's sustainability goals. Even some of the features such as LED lighting, while an established energy efficiency technology, could still be considered innovative when looking at broader market adoption curves. A 2020 US DOE report (Page 2 Table) found that in 2018 across the US, LED installed penetration as a % of total lamps and luminaires was 29.8% for Total Indoor, and only .2% for Connected Controls. Even more nascent than LED technology is heat pump technology for HVAC applications. While penetration data by commercial building sector can be challenging to obtain, based on the 2021 Focus on Energy EERD VRF Study Final Report, Variable Refrigerant Flow (VRF) systems, a type of building-wide heat pump system, is only being installed at a rate of 30-50 projects/year in WI. This is highlighted because the proposed HVAC controls upgrade component is a critical first step to being able to retrofit the facility with any type of building-wide heat pump system. The City would need to upgrade controls mindfully and has already requested that systems be designed to incorporate air-source or ground-source heat pump systems in the future, in other words a "heat pump ready" facility that could incorporate this new technology into future budget cycles. Finally, EVs and EV charging stations are becoming more available but are still an incredibly small percentage of total vehicles on the road today, and based on EVadoption data as of 12/31/2020 there are only 30,541 EV charging locations in the US, or 96,536 total ports. According to the DOE Alternative Fuels Data Center, currently there are only 6,310 registered EVs in Wisconsin, out of a total 2,159,924 (.0029%, Statista). The city would use emerging technology, dynamic communication methods and other opportunities that arise to highlight the success and impact of this project.

Each project component on its own could be considered innovative for a local municipal government, and brought together the project as a whole represents a significant operational innovation. The technology (LED, HVAC, EV, EV charging), partner engagement (cross-departmental city staff, municipal utility, WPPI Energy, public vehicles and city fleet), impact to stakeholders (a net reduction in MMBtu consumption across building electric loads, space heating, and gasoline for vehicle transportation of both public and city equipment), would all be tracked in detail and available to other municipalities or other organizations seeking to implement similar projects in their communities. By already creating an energy monitoring platform for city operations, these efforts can also be replicated in existing Sun Prairie facilities, such as those being renovated (Sun Prairie Public Library and Family Aquatic Center) or newly constructed (new SPU facility in 2023, new Public Works facility in the 2022-2031 Capital Improvement Plan). The city would be a willing resource and partner to help others achieve similar energy reduction goals in their municipal operations.

3.5. **Reference Materials**

1.

SUN PRAIRIE BACKGROUND

Sun Prairie is a growing city of over 30,000 residents east of Madison. The city's electricity is supplied by the Sun Prairie Municipal utility which is part of the WPPI Energy, the regional power company that serves many municipal utilities. The WPPI representative for Sun Prairie utilities played an active role in this collaboration. The city's gas is supplied by both Alliant Energy and WE Energies. The City has taken a proactive role in investing in sustainable energy systems, including a recently installed 80 kW solar system on its City Hall as well as a new PV installation on the newly constructed Westside building. Sun Prairie is part of the Energy Independent Communities, which is a voluntary agreement between the State of Wisconsin and communities that adopt the goal of generating 25 percent of their energy from renewable energy sources locally by 2025. Recently, the City partnered with the Madison Metro Bus system to create an express bus route from Sun Prairie to the Capitol.

This chapter provides a detailed summary of the Sun Prairie energy plan. We begin by summarizing Sun Prairie's energy profile to provide a baseline understanding of current energy consumption, costs and carbon emissions for 2018. We then delve into our recommendations for near terms investments or action, split out into four categories: building energy efficiency, street lighting opportunities, fleet opportunities, and solar energy opportunities.

COMMUNITY ENERGY PROFILE

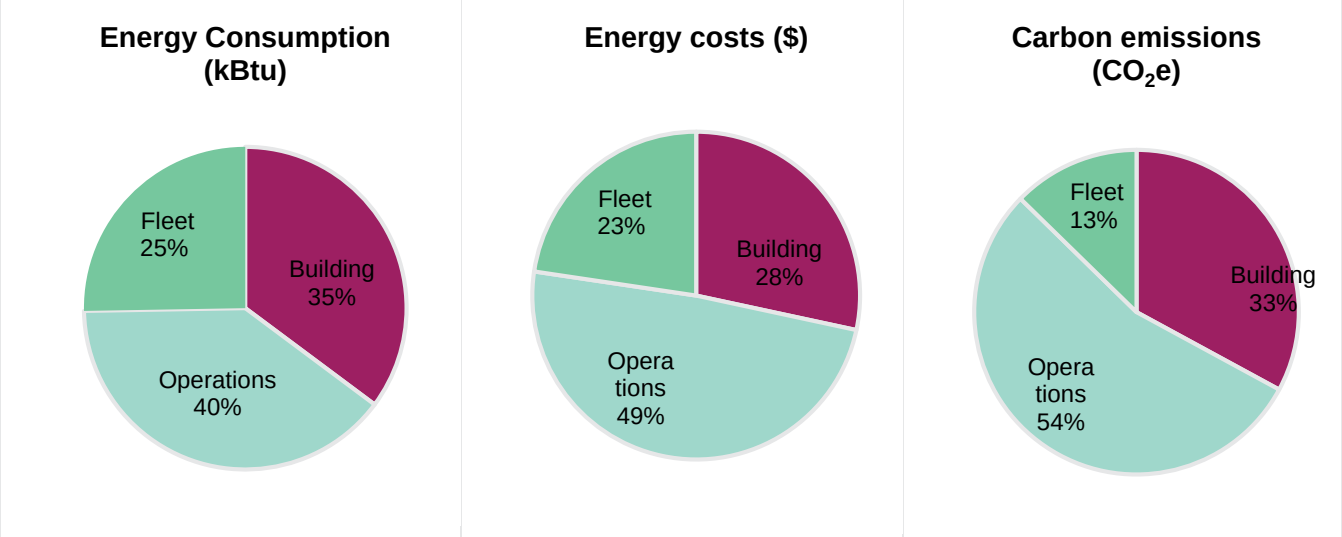
The three main energy inventory elements for Sun Prairie's energy profile include buildings, operations, and municipal fleet. Table 70 provides details by category on what was included in development of the Sun Prairie energy profile, based on the data provided by Sun Prairie staff.

Table 70: Sun Prairie inventory elements (2018 baseline)

Buildings	Operations	Fleet
Aquatic Center	Lift Stations	28 Police vehicles
City Garage	Parks and Recreation	18 Light-duty vehicles
City Hall	Streetlights	16 Emergency vehicles
EMS East	Wastewater Treatment Plant	23 Heavy-duty vehicles
Fire Department		45 Pickups
Library		64 Other
Museum		
Public Works		
Sun Prairie Utilities		
Westside Community Building		

Figure 18 shows the percent contribution of each source to total energy use, cost, and carbon emissions. The cost and carbon intensity of the different fuels (electricity, natural gas, gasoline, and diesel) can significantly impact the contribution of each source to the total.

Figure 18: Sun Prairie energy consumption, cost and carbon emissions (2018)



Breaking these elements down further, Table 71 details the annual energy use, carbon emissions, and energy cost associated with each building and operation use type. The buildings are listed individually; if there were multiple meters per building, we aggregated the values up to the building level. If there were multiple meters for operation data, it was aggregated by use type such as streetlights and lifts. Sun Prairie's City Hall hosts a net-metered PV system. The amount of electricity used by City Hall, as shown in the table, reflects the net amount of electricity that Sun Prairie purchased from the utility, with any reductions from solar panel production included as part of that amount.

Table 71: Sun Prairie baseline energy, carbon and cost data by building and operation use type (2018)

	Use/building	Net Electricity (kWh)	Natural gas (therms)	Carbon emissions (CO_2e metric tons)	Percent of total CO_2e	Energy cost
Buildings	Aquatic Center	152,000	14,736	194	3%	$25,560
	City Garage	10,126	1,859	18	0.3%	$2,230
	City Hall	609,824	16,862	554	8%	$77,200
	EMS East	43,832	3,908	54	0.8%	7,165
	Fire Department	111,575	7,236	123	2%	$16,615
	Library	479,680	21,159	478	7%	$65,460
	Museum	16,193	1,655	21	0.3%	$9
	Public Works	45,520	10,096	88	1%	$11,065
	Westside Community	558,680	36,645	620	9%	$83,440
	Sun Prairie Utilities	263,022	17	200	3%	$28,940
Operations	Parks and Recreation	30,851	4,096	45	1%	$5,850
	Streetlights	2,053,880	-	1,564	22%	$225,925
	Treatment Plants	2,648,344	43,755	2,249	31%	$317,570
	Lifts	34,832	-	27	0.4%	$3,830
	Fleet			906	13%	$255,775
Total		**7,058,359**	**162,024**	**7,141**		**$1,129,400**

Figure 19 illustrates how the baseline energy use intensity (EUI) of each Sun Prairie building compares to the ASHRAE 100-2018 target and benchmark value for similar use buildings. A few buildings were excluded as good benchmark comparisons did not exist. Additionally, it's important to note that the ASHRAE values represent a typical building type and do not account for buildings that may house multiple city departments or functions, such as the Westside Community Building which includes community spaces, EMS, fire and police department and parks department offices.

Figure 19: Sun Prairie EUI benchmarking and comparison to ASHRAE benchmark and target

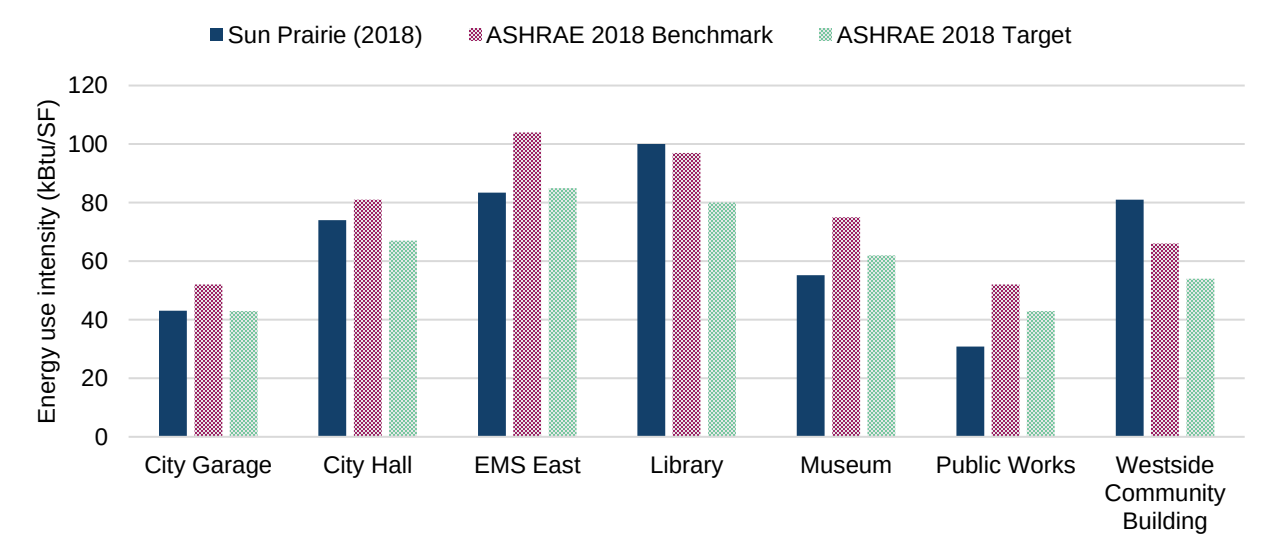


Table 72 illustrates the current renewable energy consumption in the city. On-site solar currently makes up around 4 percent of total electricity use in Sun Prairie – leaving potential for future developments. The city has two planned or installed on-site solar arrays: an 80 kW installation on City Hall and a forthcoming 130 kW installation on the Westside Community Building.

Table 72: Sun Prairie renewable energy summary - current production (as of 2019)

RENEWABLE ENERGY QUICK FACTS	
On-Site net metered solar (kWh)	261,780
Percent of gross municipal electricity	4%

Table 73 illustrates the current vehicle fuel usage, carbon emissions, and fuel cost by vehicle type. This includes both Sun Prairie utility and city vehicles. The police department has the most significant energy footprint, driven largely by the need to idle to maintain car functions while not in motion and the high relative mileage. This significant use presents an excellent opportunity for conversion to hybrid vehicles as will be outlined below.

Table 73: Sun Prairie vehicle fuel usage by vehicle type (2018)

Department	Number of vehicles	Gallons	CO_2e (metric tons)	Fuel cost
Police	28	37,515	319	$89,280
Light-duty	18	3,045 (+ 590 kWh)	26	$7,245
Emergency Vehicles	16	13,610	125	$35,915
Pickups	45	20,495	174	$48,775
Heavy-duty	23	9,175	94	$26,980
Other	64	28,020	167	$47,625
Total	195	111,860	905	$255,820

SUN PRAIRIE RECOMMENDATIONS FOR NEAR-TERM IMPLEMENTATION

Our analysis found energy investments that have a strong return on investment and significant energy savings potential. Implementing simple energy efficiency improvements to Sun Prairie's municipal buildings can reduce building energy consumption by almost 7 percent. By converting all streetlights to LEDs, Sun Prairie could cut annual streetlight electricity use in half – reducing utility costs and saving around 145 tons of carbon annually. In the fleet department, the City should prioritize converting police vehicles to hybrids as they offer a payback around one year and lead to a 40 percent decline in lifetime carbon emissions. Lastly, by adding solar arrays to 2 sites, the City can reduce fossil fuel electricity consumption by an additional 24 percent.

Table 74 summarizes the carbon and energy cost savings that the City would see if they implemented the recommended near-term actions in each major opportunity area. The following sections provide additional detail on each opportunity.

Table 74: Sun Prairie impact summary – estimated annual CO_2e and energy cost savings

Near-term Opportunity	CO_2e Reduction (metric tons)	Percent Carbon Reduction	Energy Cost Savings	Percent Energy Cost Reduction
Building efficiency	226	10%	$32,570	11%
Streetlights	738	47%	$106,605	47%
Fleet	141	16%	$41,365	16%
Solar	1,424	-	$205,620	-
Total opportunity	2,529	**35%**	$386,160	**34%**

Energy efficiency opportunities

Our analysis focused on near-term measures that not only have an energy or cost savings, but also may have possible benefits of reducing maintenance costs, improving occupant comfort, or increasing staff productivity. We also considered the ease and cost of implementation when prioritizing our recommendations.

To identify these opportunities, Slipstream conducted high-level walk-through for three buildings: the Sun Prairie City Hall, Sun Prairie Library, and Sun Prairie Westside Building. We took note of major end-uses and process, and spoke with building staff to understand building operations. The following provides a walk-through summary for each building with additional detail on energy savings potential below.

Sun Prairie City Hall

The Sun Prairie City Hall was built in 1994. It includes the city municipal functions as well as the eastside police department.

Observations

- HVAC system is water source heat pump system, which is ahead of its time given the age of the building.
- Planned upgrade to LED lighting. Currently testing different fixtures to choose best replacements.
- Offices had lighting occupancy sensors, but some have been removed or don't function.
- The first and second floors have potential for daylighting controls.

Recommendations

LED retrofit and lighting controls: Complete upgrade to LED. Consider vacancy sensors on light switches for small rooms and offices, similar to previous installation. Modern vacancy sensors may have improved over outdated design. Consider integrated light fixtures complete with occupancy sensors, photosensors, and wireless controls for meeting rooms and open offices on the 1st and 2nd floor. It will be easiest to add integrated light fixtures when upgrading to LED.

Task tuning: When upgrading lighting systems to LED and they include lighting controls, consider having a lighting contractor or representative task tune the system to match lighting levels to space lighting levels recommended by the Illuminating Engineering Society (IES). LED lamps tend to have higher lighting quality and appear "too bright". Lowering light levels slightly will save energy and increase occupant comfort.

Heat pump end of life replacement: Consider buying CEE Tier 2 or better heat pumps when replacing individual units at end of life. Refer to the 2109 CEE Commercial Unitary Air-Conditioning and Heat Pumps Specification for cooling and heating efficiency ratings.

2.

City of Sun Prairie, Wisconsin

A RESOLUTION SUPPORTING THE WISCONSIN OFFICE OF ENERGY INDEPENDENCE "25 X 25" GOALS AND DECLARING SUN PRAIRIE A WISCONSIN ENERGY INDEPENDENT COMMUNITY

"25 x 25 RESOLUTION"

Presented: November 10, 2009

Adopted: November 10, 2009

File Number: 11,071

Resolution No.: 09/162

RESOLUTION

WHEREAS, Governor Doyle has created an Office of Energy Independence with the goals of generating 25% of electricity and transportation fuels from renewable resources by 2025, and capturing 10% of the emerging bio-industry and renewable energy market by 2030; and,

WHEREAS, the Office of Energy Independence is seeking partnerships with local units of government to further the State of Wisconsin's efforts to achieve the "25 x 25" goals; and,

WHEREAS, the City will benefit from such a partnership with the State of Wisconsin; and,

WHEREAS, the City recognizes that the public sector must lead in implementing energy efficiency and renewable energy in public facilities.

NOW THEREFOR BE IT RESOLVED, that the City of Sun Prairie Common Council declares Sun Prairie to be a Energy Independent Community partner in pursuit of the "25 x 25" goals toward energy independence.

BE IT FURTHER RESOLVED, that the City of Sun Prairie Common Council hereby commits to the efforts required to participate as a "one-star" Energy Independent Community

APPROVED: _____
Joe Chase, Mayor

Date Approved: November 10, 2009

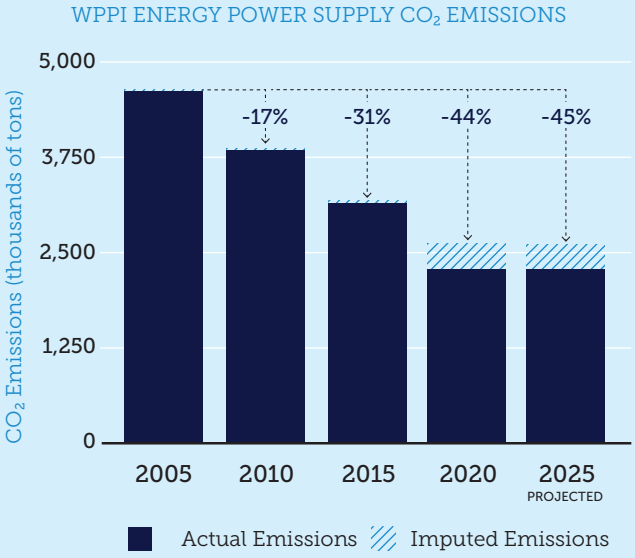
This is to certify that the foregoing resolution was approved by the Common Council of the City of Sun Prairie at a meeting held on the 10th day of November 2009.

_____
Diane J. Hermann-Brown, City Clerk

3.

Reducing CO_2 Emissions

WPPI members' longstanding and active support of renewable energy has delivered significant results for the environment. With the addition of the cost-effective Point Beach Solar Energy Center, we are on track for a 45% reduction in CO_2 emissions by 2025 when compared to 2005.



The solid bars in the chart represent WPPI's actual emissions from WPPI-owned generating units and purchased power from specific generating units, utility systems and the Midcontinent Independent System Operator (MISO) market. The dashed bars represent imputed emissions for renewable resources for which WPPI did not purchase the associated renewable energy certificates or credits (RECs) in the first instance, or for which the associated RECs have been sold. It is possible that RECs currently held by WPPI may be sold to third parties in the future, which would result in an increase in imputed emissions. Actual emissions from MISO market purchases and imputed emissions were determined using a calculated residual emission rate factor equal to the average emission rate of non-renewable resources in the MISO market.

See p. 8 for more information regarding RECs.

The Grid North Partners Hampton-Rochester-La Crosse transmission project crosses the Mississippi River.

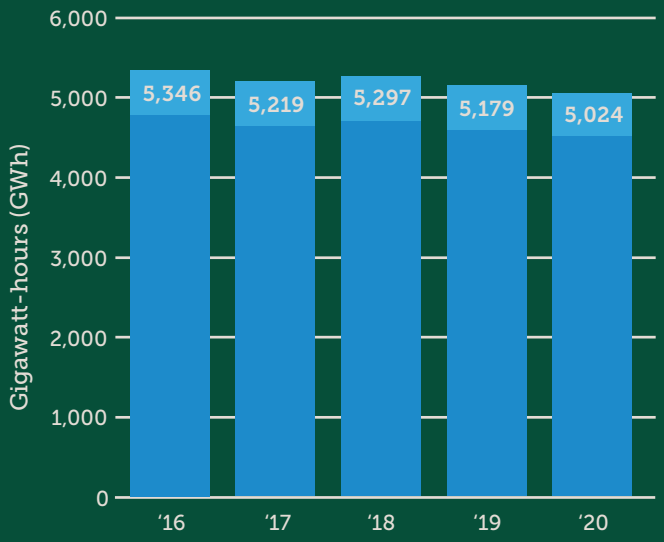
Transmission Investments Help WPPI Keep Costs Down

Owning transmission assets delivers a valuable return that helps offset increasing costs of transmission service, which comprise more than 15% of WPPI's wholesale electric rate to members.

- **American Transmission Co.** WPPI has a 6.7%, $145-million equity investment in this regional transmission organization.
- **Badger Coulee 345 kV Transmission Line.** WPPI owns 1.5% of the project's jointly-owned physical transmission assets from the Briggs Rd. to North Madison substations.
- **Hampton–Rochester–La Crosse 345 kV Transmission Line.** WPPI owns approximately 9.5% of the Grid North Partners (formerly CapX2020) project's jointly-owned physical transmission assets located in Wisconsin.

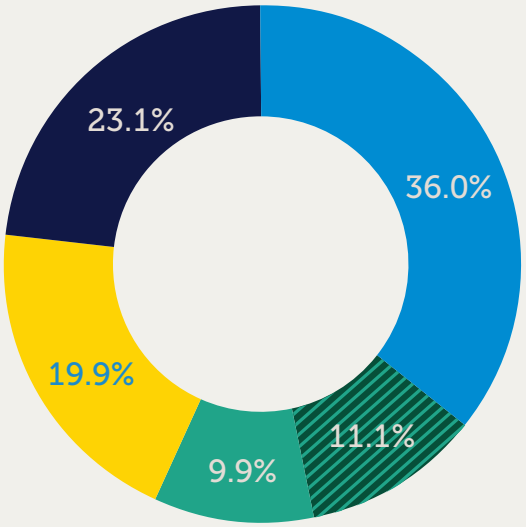
WPPI recovers a majority of the costs associated with our direct transmission ownership as a transmission owner within the Midcontinent Independent System Operator. Our transmission investments also help ensure a strong regional grid, with increased access to cost-effective generation and more renewable energy options.

ENERGY REQUIREMENTS



PEAK DEMAND

2020 FUEL MIX



- **36.0%** Coal
- **23.1%** Natural Gas
- **19.9%** Nuclear Energy
- **11.1%** Renewables (no RECs)*
- **9.9%** Renewables

* For every megawatt hour of electricity produced by renewable sources, a renewable energy certificate or credit (REC) is created. The person or entity holding that REC is entitled to claim all of the environmental benefits of the associated renewable electricity generation. WPPI holds some, but not all, of the RECs associated with the electricity it receives from renewable sources. WPPI uses RECs (by retiring them within a REC tracking system) in connection with certain WPPI and member programs and to comply with state renewable energy standards. WPPI Energy also sells some RECs, the revenues from which help lower the wholesale costs for WPPI members.

The area of the chart labeled "Renewables" represents the portion of electricity received from renewable sources for which WPPI received and has not sold the associated RECs. These RECs may in the future be used by WPPI to comply with regulatory requirements, retired for other purposes or sold to third parties as described above. The portion of the chart labeled "Renewables, No RECs" represents the portion of electricity received from renewable sources for which WPPI did not purchase the associated RECs in the first instance, or for which the associated RECs have been sold.

2020 POWER SUPPLY RESOURCES

Owned Generation	Fuel	Capacity (MW)
South Fond du Lac Units 1 & 4	Gas	154
Boswell Unit 4	Coal	117
Elm Road Generating Station	Coal	106
Island Street Peaking Plant	Gas	52
Worthington Wind Turbines	Wind	2

Power Purchase Agreements	Fuel	Capacity (MW)
WPS	System Energy	150
Bishop Hill III Wind Energy Center	Wind	132
Point Beach Nuclear Plant	Nuclear	117
Nelson Energy Center	Gas	91
Butler Ridge	Wind	54
WEPCO	System Energy	50
Top of Iowa II	Wind	50
Member-Owned Generation	Gas, Oil	40
Barton I	Wind	30
Forward Wind Energy Center	Wind	27.5
Kimberly Hydro	Hydroelectric	2.1
Richland Center Renewable Energy	Biogas	1.8
Jefferson Solar	Solar	1
Community Solar Gardens	Solar	0.6
John Street Hydro	Hydroelectric	0.5

reliable, affordable, responsible electricity

1425 Corporate Center Drive Sun Prairie, WI 53590-9109 608.834.4500 wppienergy.org

January 11, 2022

Public Service Commission of Wisconsin
Office of Energy Innovation
4822 Madison Yards Way
Madison, WI 53705

Dear Administrator Nieto:

WPPI Energy and Sun Prairie Utilities is pleased to provide this letter of support for the City of Sun Prairie grant application for the Wisconsin Public Service Commission's Energy Innovation Grant Program.

The proposed Sun Prairie City Hall Energy Optimization and Electrification project application will illustrate the City of Sun Prairie's commitment to energy efficiency and demonstrate new electric vehicle (EV) technology to customers who are considering the transition to electric vehicles.

The LED and HVAC Systems Control projects will reduce the City's energy usage and reduce greenhouse gas emissions. This aligns with WPPI Energy and Sun Prairie Utilities goal of reducing energy usage community wide to lower the cost of wholesale energy for all customers in Sun Prairie and reducing our carbon emissions as a power provider.

The EV charging stations will help promote EV technology and elevate economic development in the downtown area. WPPI Energy is submitting their own grant application to study the effects of EVs on the distribution system and these charging stations would be part of that overall study.

WPPI Energy and Sun Prairie Utilities understands the value of this project and looks forward to contributing as a strategic and technical partner of the applicant.

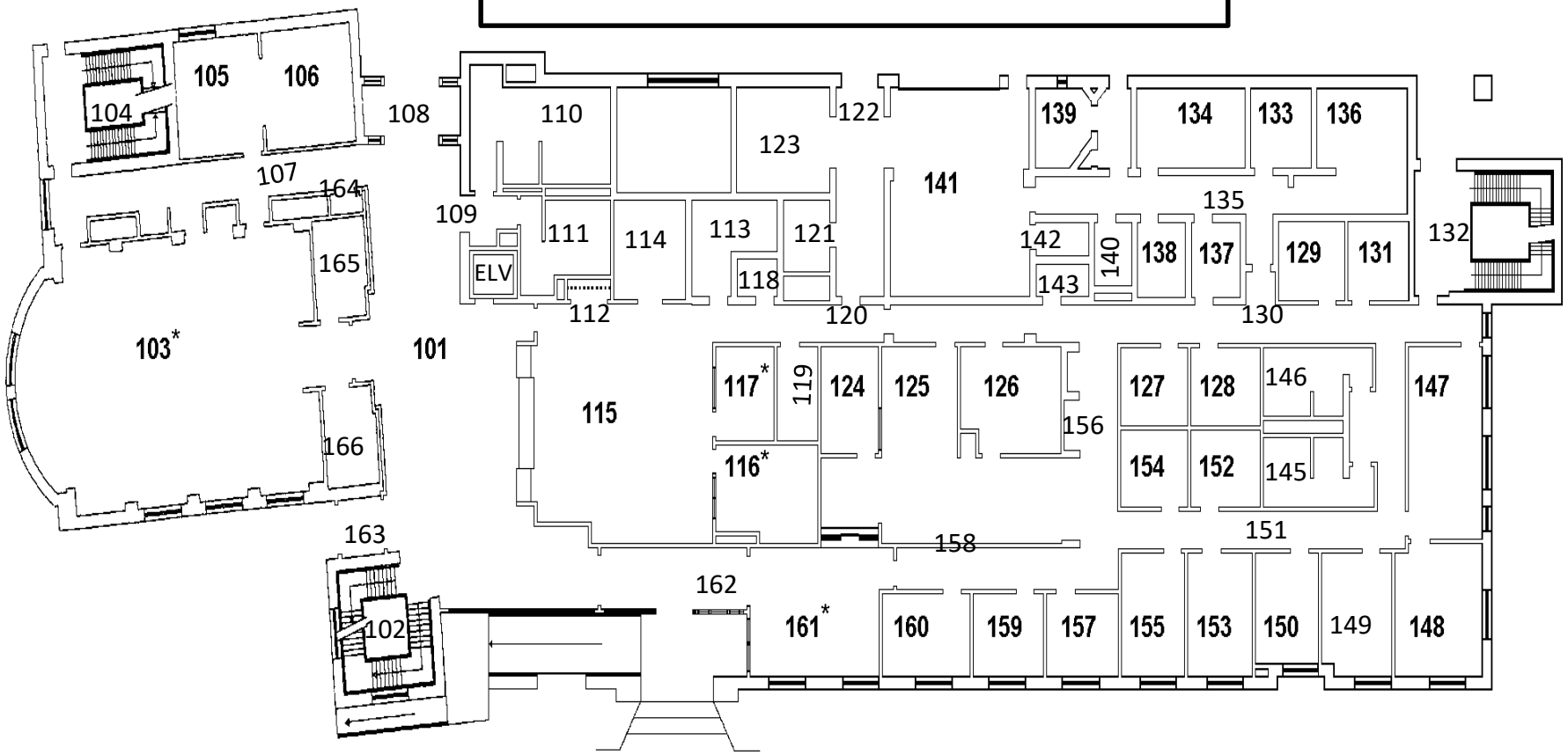
Regards,

Clint Cry

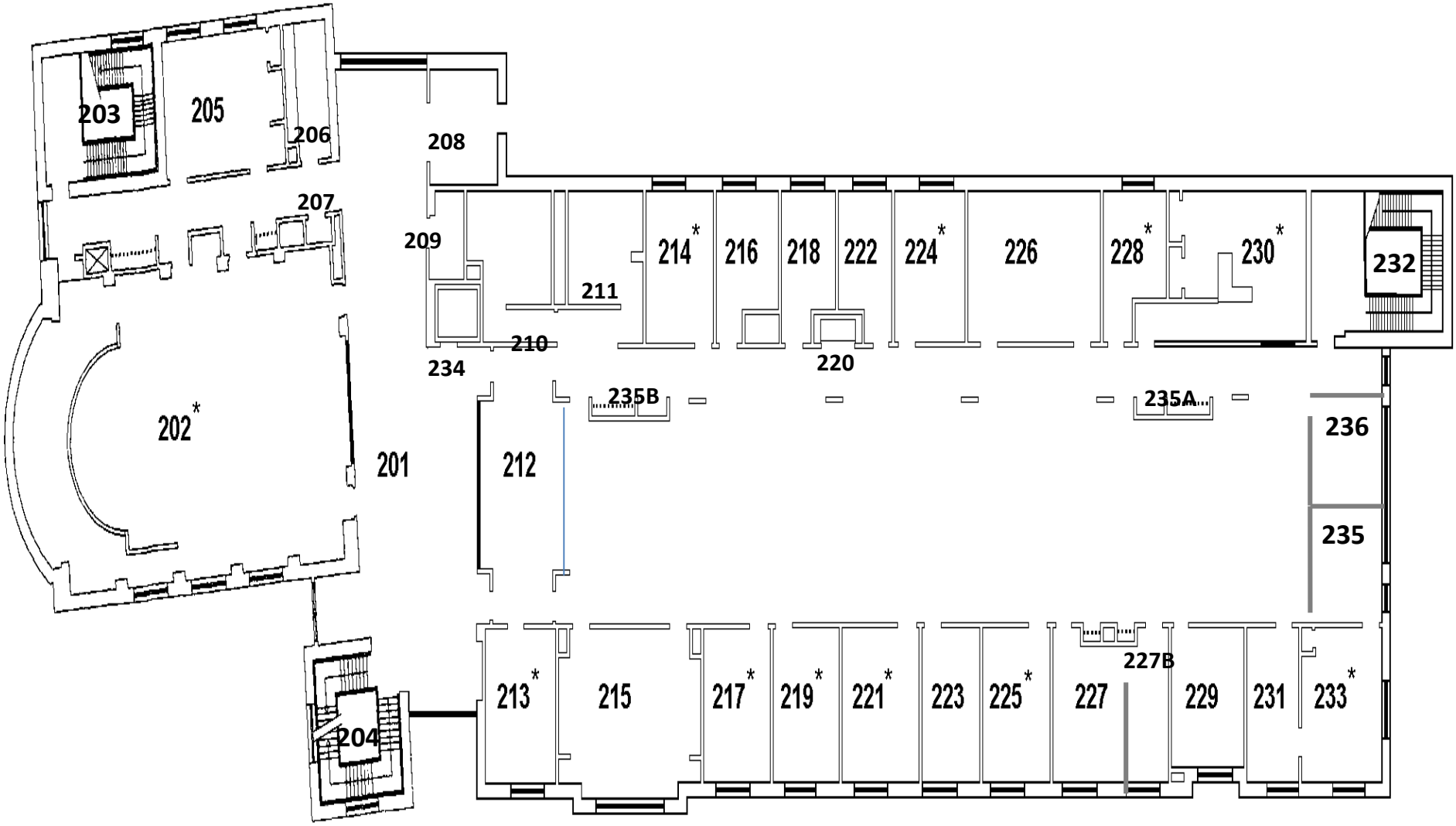
Clint Cry
WPPI Energy Services Manager
Serving Sun Prairie Utilities

4.

Floor Plan
1st Floor City Hall



Floor Plan
2nd Floor, City Hall



Change Metric

SUN200075-11 Sun Prairie City Hall

300 E Main St., Sun Prairie, WI 53590 | Map It

Portfolio Manager Property ID: 17764224

Year Built: 1994

Edit

Not currently eligible for ENERGY STAR Certification

ENERGY STAR Score (1-100)

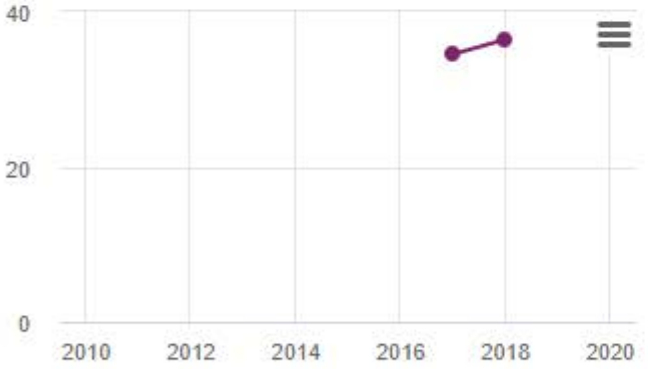
Current Score: 51

Baseline Score: 99

Summary | Details | Energy | Water | Waste & Materials | Goals | Design

Source EUI Trend (kBtu/ft²)

Change Metric



(Chart current as of 10/04/2021 03:30 PM CDT)

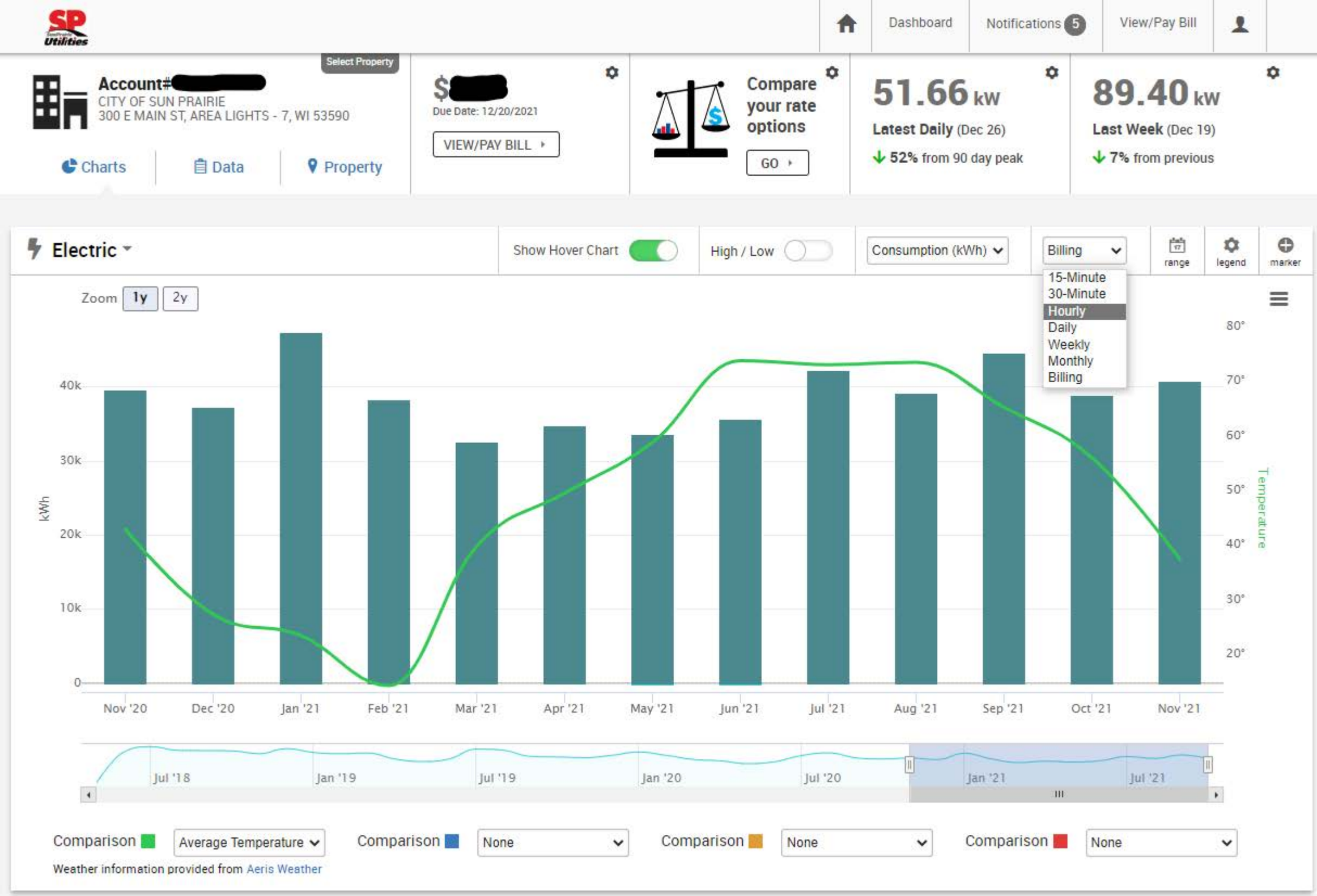
Refresh Chart

Change Metrics

Change Time Periods

Metrics Summary

Metric	Sep 2017 (Energy Baseline)	Jul 2021 (Energy Current)	Change
ENERGY STAR Score (1-100)	99	51	-48.00 (-48.50%)
Source EUI (kBtu/ft²)	31.8	129.2	97.40 (306.30%)
Site EUI (kBtu/ft²)	30.2	67.1	36.90 (122.20%)
Energy Cost ($)	9,268.63	52,364.80	43096.17 (465.00%)
Total GHG Emissions Intensity (kgCO2e/ft²)	1.6	8.5	6.90 (431.20%)
Water Use (All Water Sources) (kgal)	Not Available	Not Available	N/A
Total Waste (Disposed and Diverted) (Tons)	Not Available	Not Available	N/A


Dashboard
Notifications 5
View/Pay Bill
Select Property
Account#[redacted]
CITY OF SUN PRAIRIE
300 E MAIN ST, AREA LIGHTS - 7, WI 53590
Charts
Data
Property
$[redacted]
Due Date: 12/20/2021
VIEW/PAY BILL
Compare your rate options
GO
51.66 kW
Latest Daily (Dec 26)
52% from 90 day peak
89.40 kW
Last Week (Dec 19)
7% from previous
Electric
Show Hover Chart
High / Low
Consumption (kWh)
Billing
range
legend
marker
15-Minute
30-Minute
Hourly
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Jul '19
Jan '20
Jul '20
Jan '21
Jul '21
Comparison
Average Temperature
Comparison
None
Comparison
None
Comparison
None
Weather information provided from Aeris Weather

5.

Fleet Assessment Introduction

Wisconsin Clean Cities (WCC) has partnered with the Wisconsin Office of Energy Innovation to assist local governments in advancing energy emergency resiliency, mitigation, and response. This project is part of the Wisconsin Statewide Assistance for Energy Resiliency and Reliability or SAFER2 Program.

This Alternative Fuel Vehicle and Feasibility Study is designed to examine the feasibility and cost-savings potential of deploying a range of commercially available alternative fuel, advanced vehicle, and efficiency solutions within Sun Prairie's fleet of vehicles.

Sun Prairie provided for analysis a listing of 84 gasoline and hybrid vehicles for analysis. These consisted of vehicles from 12 departments. Vehicle types ranged from small sedans provided for administrative checkout to a Chevrolet Silverado 5500 used by the Fire Department. Diesel fleet vehicles are an opportunity for future project discussions. At the request of Sun Prairie fleet analysis was focused on 15 vehicles that were under consideration for near term replacement. Consisting of small cars, midsized cars, sport utility vehicles, a minivan, and pickups, most vehicles traveling only within the city of Sun Prairie. Small cars and the minivan are assigned to Admin Checkout and are occasionally used for longer distance travel.

Providing an excellent opportunity for electric vehicle deployment, a Chevrolet Bolt is already being used by the Public Works department with positive results. Sun Prairie has a strong sustainability mission with reports constructed in 2020 and being a long-term participant in the Energy Independent Communities program. Expanding the use of electric and hybrid vehicles as a method to decrease fleet operation costs, emissions, and create opportunities for renewable energy integration will be the focus of this report. Details related to other fuels will be provided for reference and consideration.

WCC and the Wisconsin Office of Energy Innovation are pleased to present the following Alternative Fuel Vehicle and Feasibility Report to Sun Prairie. This report is designed to provide the following core deliverables:

1) Develop priority criteria and goals for the fleet in evaluating technologies.
2) Provide a baseline analysis for current fleet operations.
3) Outline relevant alternative fuels and efficiency improvements for the fleet's operations.
4) Assess the operating costs and other investments needed to implement the various technology options.
5) Provide total cost of ownership scenarios and recommendations based on the analysis.

In order to provide an accurate comparison among fuel and infrastructure types that would best suit the needs of the fleet, WCC used the following fuel costs:

Table 2. Fuel Cost Comparison		
Fuel Type	**Unit Price**	**Fuel Per One Gallon of Gasoline**
Unleaded Gasoline	$2.998 gallon	1 gallon of gasoline
Diesel	$3.166 gallon	0.88 gallons of diesel
Electricity	$0.1065 kWh	33.7 kilowatt-hours*
Propane (LPG)	$2.94 gallon	1.353 gallons of LPG
Compressed Natural Gas (CNG)	$2.01 GGE	126.67 cubic ft. of CNG
Ethanol (E85)	$2.34 gallon	1.39 gallons of E85

* According to the EPA, burning one gallon of gas produces 115,000 BTUs (British thermal units). To generate the same amount of heat by way of electricity, it takes 33.7 kilowatt-hours (kWh). Kilowatt-hours is the standard energy unit for electricity. If an electric vehicle can travel 100 miles on 33.7 kWh of electricity, the EPA rates it at 100 MPGe. As you can see, this would be a very efficient vehicle, because a gas car would have to travel 100 miles per gallon to be equivalent.

Fuel prices were based on a variety of sources, including:

- The U.S. Department of Energy's Alternative Fuel Price Report for the Midwest
- AAA Gas Prices daily average value for Wisconsin
- Electricity Local
- Fuel pricing estimates from vendors

In review of the National Renewable Energy Laboratory Alternative Fuel Data Center TransAtlas Dane County has public refueling stations for CNG, Ethanol (E85), Electric, and Propane. Biodiesel blends can be purchased for use in county owned fueling facilities. Electricity is priced based on commercial rates and may differ from what is available from public and dedicated county installed infrastructure. The City of Sun Prairie currently has 3 electric vehicle charging stations and 2 stations offering ethanol blends.

In the case of ethanol E85, it was unknown whether any of the fleet's existing vehicles were flex fuel vehicles capable of running on E85 or mid-level ethanol blends. If this was the case, the fleet could investigate the cost of a blender pump and fuel cost for higher ethanol blends, as there may be long- term savings with this option.

Sun Prairie Fleet

WCC performed a total cost of ownership calculation using the current fleet's usage data to provide cost comparisons for replacing certain fleet segments with new alternative fuel and high efficiency vehicles, instead of conventionally fueled vehicles. To do so, WCC grouped vehicles into segments based on vehicle size and vocation to provide a more accurate comparison between current and potential vehicle replacements. The total cost of ownership calculation provides an objective comparison of the operating and fixed costs associated with the ownership of these vehicles over their associated lifespans.

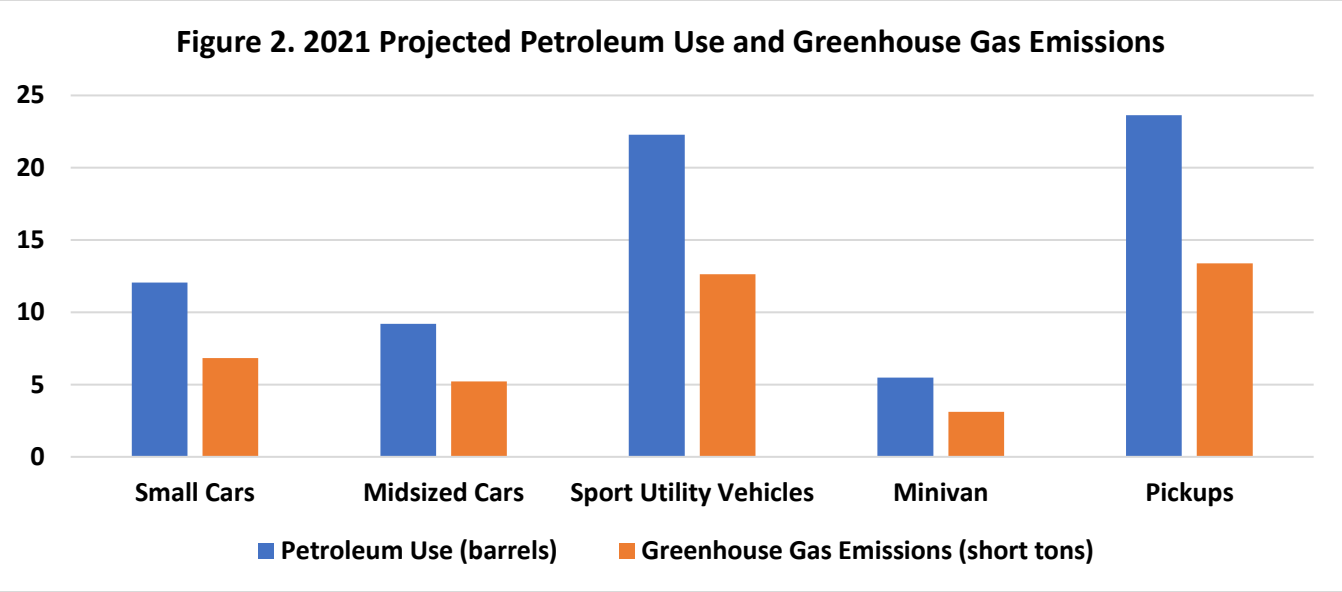
Sun Prairie provided WCC with a vehicle asset list which included unit number, department, make, model year, model, type of fuel, and current odometer readings. Also provided was fleet forecast detailing initial purchase price, expected operational life, year purchased, replacement budget and expected replacement year. Fuel consumption and pricing information was provided on an aggregated by department level. WCC separated vehicles into classes based on size and fuel type, as seen in Table 3 below. Annual vehicle miles traveled in Table 3 is based on estimates for use in 2021. Gallons of fuel consumed was calculated based on estimated vehicle city fuel economy from The U.S. Department of Energy www.fueleconomy.gov.

Table 3. Sun Prairie Analyzed Fleet Breakdown

Type	Number of Vehicles	Fuel	Average Model Year	Average Annual VMT	Average Annual Fuel Consumption
Small Car	3	Gasoline	2010	4,822	193.63
Midsized Car	2	Gasoline	2018	4,652	221.52
Sport Utility Vehicle	3	Gasoline	2017	4,473	357.79
Minivan	1	Gasoline	2010	4,489	264.06
Pickup	6	Gasoline	2015	3,156	189.69
Total	**15**		2014	4,318	245

Since the type, total mileage, and annual mileage of the Engineering department SUV indicated that it was likely a retired Police unit, the replacement was modeled with the same values as those used by Building Inspection. Other vehicles by the Engineering department averaged 3,041 miles annually.

Figure 2 provides a baseline measurement for each fleet segment's well-to-wheels petroleum use (barrels) and greenhouse gas emissions (short tons) for the operating year of 2021 based on predicted vehicle use provided by Sun Prairie. These measurements are designed to establish operational emission baseline measurements for the fleet's current operations. These measurements can be used to gauge reductions in petroleum use and greenhouse gas emissions for the fleet moving forward.



Vehicle emissions throughout this report were calculated on a well-to-wheels basis. WCC used data from Argonne National Laboratories' Greenhouse gases, Regulated Emissions, and Energy use in Transportation (GREET) fuel-cycle model to generate necessary well-to-wheels petroleum use and greenhouse gas (GHG) emission co-efficient for key fuel production pathways and vehicle types. This tool also uses the U.S. Environmental Protection Agency's Motor Vehicle Emission Simulator (MOVES) and certification data to estimate tailpipe air pollutant emissions.

Vehicle Analysis #1: Small Cars

Sun Prairie deploys 3 small cars consisting of 2 model year 2009 and one model year 2013 Ford Focus. The 2009 model year cars are used for Admin Checkout and the 2013 model year car is used for Building Maintenance. The 2009 model year cars are pending replacement this year, while the 2013 is scheduled for 2023. Fuel economy is rated at 24-27 city and 33-36 highway. A budget of between $26,000 and $30,00 has been designated for 2021 and 2023. Individual vehicle details and calculated annual miles and fuel consumption is provided in table 4 below.

Table 4. Current Small Car Fleet

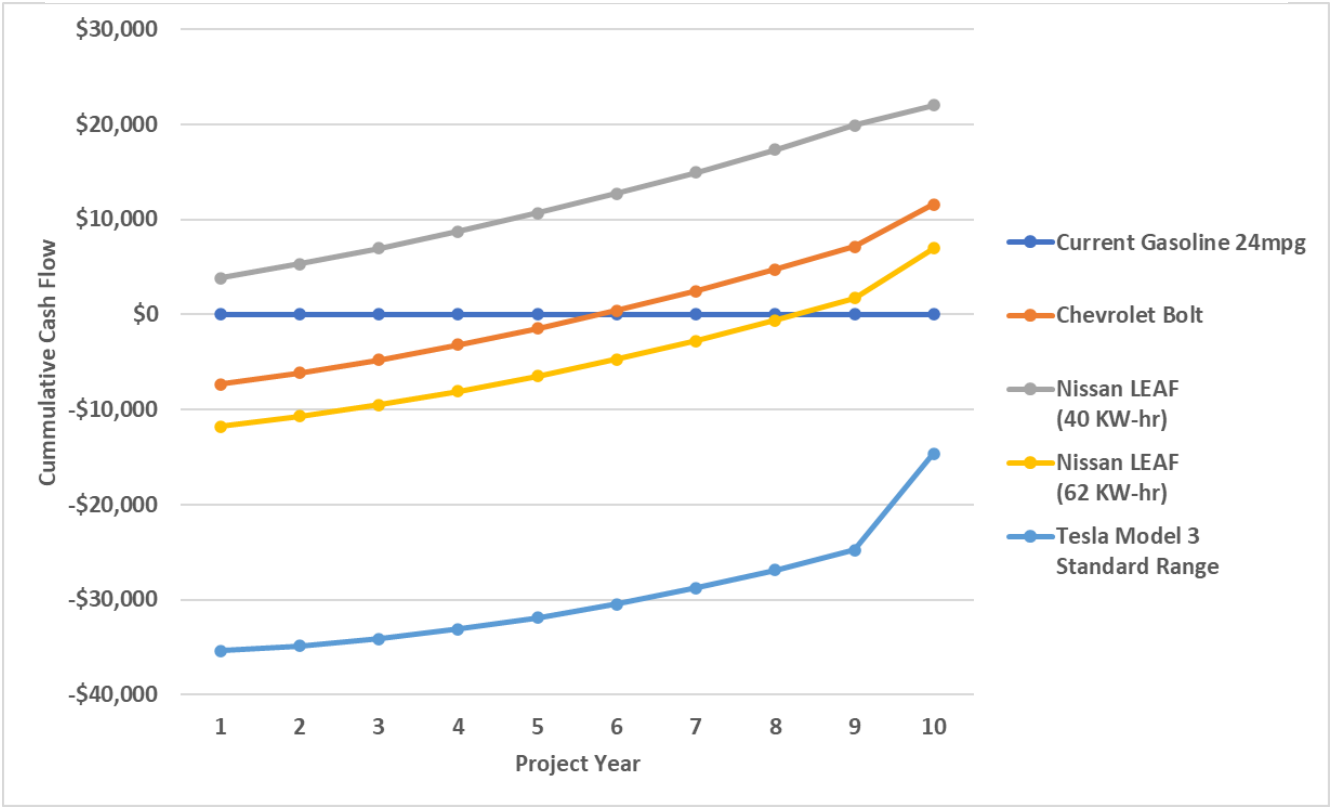
UNIT	Department	Vehicle Model Year	Make	Model	Estimated City MPG	Estimated Hwy MPG	Replacement Year	Budget	Annual miles	Fuel Consumption
317	ADMIN CHECKOUT	2009	FORD	FOCUS	24	33	2021	$ 30,000	4,563.75	190.16
318	ADMIN CHECKOUT	2009	FORD	FOCUS	24	33	2021	$ 26,000	5,175.92	215.66
321	BUILDING MAINTENANCE	2013	FORD	FOCUS	27	36	2023	$ 28,600	4,726.50	175.06

Admin Checkout vehicles may need to travel outside of Sun Prairie, however the use for all vehicles in this category is primarily within the city. The greatest cost savings can be achieved through the replacement of these vehicles with electric, plug-in hybrid, or hybrid vehicles which can be over twice as efficient in city operation as existing vehicles. Many of the alternative fuel vehicle options can be obtained within the desired budget range without need for incentives, however alternatives also become possible if eligible for fleet pricing or tax incentives. Since mileage travelled annually is low a regulated checkout practice would allow for full electric vehicles to be deployed on any city travel and plug-in or standard hybrids for longer travel. As an

Table 5. Total Cost of Ownership Comparison Small Car Options - Electric - City Only Operation					
	Current Gasoline 25mpg	Chevrolet Bolt	Nissan LEAF (40 KW-hr)	Nissan LEAF (62 KW-hr)	Tesla Model 3 Standard Range
Price Per Vehicle	$28,200	$31,000	$27,400	$32,400	$39,990
Depreciation	$65,765	$72,295	$63,899	$75,560	$93,260
Fuel	$19,198	$4,132	$4,400	$4,587	$3,608
Diesel Exhaust Fluid	$0	$0	$0	$0	$0
Maintenance and Repair	$20,695	$13,048	$13,048	$13,048	$13,048
Insurance	$31,445	$33,237	$30,933	$34,133	$38,989
License and Registration	$2,414	$5,254	$5,254	$5,254	$5,254
Total Cost of Ownership	**$139,518**	**$127,965**	**$117,535**	**$132,581**	**$154,159**

As can be seen above replacing the current vehicles in city only operation would save the City of Sun Prairie between $6,937 and $21,983 if the Chevrolet Bolt or Nissan LEAF is selected, only the Tesla results in a higher cost of ownership over the projected 10-year lifespan.

Figure 3: Cumulative Cash Flow – Small Cars City Only Use – EV vs Gasoline



In regards to emissions, selection of any electric vehicle option will provide massive decreases in all pollutant categories and petroleum use. This is displayed in table 6 and figure 4 on the following page.

6.

Savings Summary

Interior Lighting Upgrade Design

	Option 2 (Brand LED Retrofit Door Kits)
Current kWh	73,287
Current Demand (kW)	39.47
Current Energy Costs	$6,595.79
Projected kWh	27,293
Projected Demand	14.69
Projected Energy Costs	$2,456.39
Annual kWh Savings	45,993.38
Annual kW Demand Savings	24.78
Annual Energy Cost Savings	$4,139.40
Maintenance & Product Savings	$2,688.41
Total Annual Cost Savings	$6,827.81
Cost of Project	$95,416.68
Incentive Estimate	-$4,796.41
Net Cost of Project	$90,620.27
Energy Reduction (%)	62.8%
Simple Payback (Years)	13.27

Scope of Work Notes

1 - The table above shows annual energy and cost savings expected with the proposed design based on estimated annual hours of use (Monday - Friday/8:00a - 4:30p) and a utility rate of $.09 per kWh (provided by WPPI). Maintenance savings estimates are based on 50% remaining life of existing lighting.

2 - Project cost includes product, labor, permit, applicable taxes and recycling (turnkey).

3 - Throughout Sun Prairie Municipal Building, offices, cubicles, conference/meeting rooms, breakrooms, reception areas, lobbies and related common rooms/spaces using 2'X4', 2'X2' and 1'X4' recessed fixtures with linear fluorescent lamps, will be upgraded with [redacted] LED BLTR Retrofit Door Kits. The upgraded LED's will be set with lumen output appropriate for task per IES Recommended Practice.

4 - Support spaces throughout the building using linear fluorescent lamps will be upgraded with [redacted] LED lamps and instant start ballasts. Support spaces include storage rooms/areas, mechanical/utility rooms, maintenance rooms, garage/receiving areas, janitor closets, soffit/cove lighting (in restrooms), etc.

5 - Recessed can fixtures (6" & 8") using pin-based compact fluorescent lamps will be upgraded with [redacted] LED downlight retro kits.

6 - Incandescent lamps will be upgraded with comparable [redacted] LED lamps. MR16 halogen lamps will be upgraded with comparable [redacted] MR16 LED lamps.

7 -Existing LED fixtures and lamps will not be upgraded with the exception of the PL LED lamps used in the recessed can fixtures (mentioned above).

8 - The scope of work does not include LED upgrades for the following; (a) Council Chamber Room(s), (b) four uplight fixtures in Stairwell 202, (c) lighting beyond the chained/roped off area(s), (d) exterior lighting and (e) task/under cabinet lighting.

9 - New controls are not included in the scope of work. Rooms/locations using inboard/outboard (bi-level) switching controls will be changed to zone fixture control.

10 - Project cost includes attic stock of 3% for linear LED lamps and 1% ballasts.

11 - [redacted] process all incentive documentation. Incentive estimates are subject to change.

7.

HVAC CONTROLS SCOPE OF WORK: Sun Prairie City Hall Building

General Summary

- This proposal is to update controllers and the interface for the City of Sun Prairie at City Hall.

- **NOTES**:
    - Existing zone temperature sensors do not appear to be a smart sensor. We could attempt to reuse these for a savings of **$5,300** on the HPs and VAVs.
    - **Software** Head-end/supervisory software and computer is included.
    - The owner may want to change out the bacnet wiring at this time. **Vendor** is not including this work but can talk the owner through the installation if they desire to pull the wiring.

ITEM	QTY	TAG	EQUIPMENT DESCRIPTIONS
I	1	MNA	**Software** Network Architecture
II	1	Central Plant	Hot Water System/Cooling Tower
III	1	AHU-1	Air Handling Unit
IV	6	VAV w T	Variable Air Volume Unit with Temp. Sensor
V	30	HP-x	Heat Pump
VI	2	CRU	CRAC Unit
VII	Up to 10	EF-x	Exhaust Fan

ITEM I: Software Network Architecture

- Furnish and install M4-SNE-10501-0 supervisory controller, providing the following functions:
    - Scheduling
    - Alarming
    - Trending
    - Connect to server at West Side for user interface for monitoring and adjustments

ITEM II: For the Following Systems: Hot Water System/Cooling Tower, AHU,

- Furnish and install M4-CGM DDC controller:
    - Reuse existing panel(s)
    - Expansion modules as required
- Reuse all existing points including sensors, actuators, valves etc.
- Reuse existing wiring
- Work with owner to understand existing programming needs and create new program
- Test programming to confirm operation
- For Boilers:
    - Wire new boilers, valves, temp sensors.

ITEM III: VAV (VAV w T)

- Furnish and install M4-CVM03050-0 DDC controller; to include:
- Reuse existing discharge air temperature sensors, valves etc
- Furnish and install Zone temperature sensors
    - Furnish and install **new** wiring going to zone sensor/stat

ITEM IV: Heat Pump Unit (HP-x)

- Furnish and install M4-CGM09090-0 DDC controller; to include:
- Reuse existing discharge air temperature sensors, valves etc
- Furnish and install Zone temperature sensors
    - Furnish and install **new** wiring going to zone sensor/stat

ITEM V: CRAC UNIT (CRU-x)

- Integrate to Leibert Units if on the network

ITEM VI: Exhaust Fan (EF-x)

- Re-land wiring from existing controllers to new controllers (for up to 10 EFs)

TRAINING / WARRANTY:

- Includes (2) hours of on-site owner/operator training.
- Includes warranty for (1) year from date of owner's acceptance of a certificate of substantial completion.

CLARIFICATIONS:

- Stats to have displays that can be programmed to increase or decrease information shown and access to adjustments etc.
- Includes project management, engineering, and programming/commissioning.
- This proposal shall be included within any contract terms and conditions.
- Pricing based on normal working hours (Monday - Friday) No overtime work is included in the above pricing.

EXCLUSIONS:

- Integration to MAU (this was not found on the existing DDC system)
- Additional wiring to the Liebert units if not on the owners network or connected to the existing DDC system via bacnet.
- Integration to the Liebert units if they are not native bacnet
- Furnishing of any control damper unless noted in the scope above.
- Furnishing, installation and wiring of VFDs.
- Payment & Performance Bond
- Furnishing, installation and wiring of smoke detectors, smoke dampers, combination fire/smoke dampers and fire dampers and associated actuators and wiring unless noted in the scope above.
- Any controls for electric wall heaters, Cabinet Heaters, Unit Heaters, ceiling heaters or other systems that are currently stand-alone or not mentioned in the scope above
- Fire sequencing, smoke sequencing, etc.
- New bacnet trunk wiring. (The existing should work however if the existing trunk is not in good shape it could cause communication problems and need to be replaced)
- After-hour, weekend, or holiday work
- Any 120V wiring.
- Third-Party Commissioning.
- Test & Balance or Coordination

Sun Prairie City Hall Building .....US $ 77,700.00*

Furnish and install new control valves for (30) HPs and (6) VAVs.....US $ 27,800.00*

Make	8. Model	Bid Item	Body Style	MANUFACTURER BASE ORDER CODE	Drive		Engine		Equipment Appendices	
					RWD	AWD	ELECTRIC	Est. mpc C/H	Required	Optional
E-TRANSIT CARGO VAN										
Ford	T-350 130" WB, Low Roof, 9500 GVWR	TEV-130LRCARGO	Cargo	W1Y	X		$45,005.00	126	R2	FEVO1
Ford	T-350 130" WB, Med Roof, 9500 GVWR	TEV-130MRCARGO	Cargo	W9C	X		$46,070.00	116	R2	
Ford	T-350 148" WB, Low Roof, 9500 GVWR	TEV-148LRCARGO	Cargo	W1Y	X		$46,182.00	126	R2	
Ford	T-350 148" WB, Med Roof, 9500 GVWR	TEV-148MRCARGO	Cargo	W9C	X		$47,247.00	116	R2	
Ford	T-350 148" WB, High Roof, 9500 GVWR	TEV-148HRCARGO	Cargo	W1X	X		$49,231.00	108	R2	
Ford	T-350 148" WB, High Roof EXTRA LONG, 9500 GVWR	TEV-148HR-ELCARGO	Cargo	W3X	X		$50,359.00	108	R2	
E-TRANSIT CHASSIS										
Ford	T-350 178" WB, SRW, 9500 GVWR	TEV-178CHASSIS	Chassis	W5Z	X		$42,189.00	NA	R2	
E-TRANSIT CUTAWAY										
Ford	T-350 178" WB, SRW, 9500 GVWR	TEV-178CUTAWAY	Cutaway	W5P	X		$41,528.00	NA	R2	

9. QUOTE

September 24, 2021

Mr. Scott Semroc
City of Sun Prairie
300 E. Main Street
Sun Prairie, WI 53590
608-381-5553
SSemroc@CityofSunPrairie.com

CT4021 (Dual Bollard J1772 Level 2 with Credit Card Capability)
With Self-Retracting Cord Management, Video Capability and 5 Year Parts and Labor Warranty
REFERENCE: City of Sun Prairie Wisconsin

Model Number	Description	QTY	Price Per Station	Total Price
ChargePoint CT-4021	Dual Bollard - with Locking Holster and Card Reader	1	List $7,210 $6,489	$6,489
5 Year Commercial Cloud Plan	Reference Page 2 of Quote for Explanation	2	Per Plug $1,319	$2,638
CT4000-PMGMT	CT4000 Power Management Kit	0	$50	$0
Site Validation	Reference Page 2 of Quote for Explanation $599 Site Validation included at No Charge	1	No Charge	$0
5 Year Assure	Reference Page 2 of Quote for Explanation	1	$2,495	$2,495
Kit CT4001-CM	Bollard Concrete Mounting Kit	1	$95	$95
CPSUPPORT-ACTIVE	Initial Station Activation and Configuration Reference Page 2 of Quote for Explanation	1	$349 No Charge	$0
Shipping	Shipping	1	$200	$200
Logistics Fee	Logistics	1	$577	$577
Amount Due	Total cost before installation			$12,494.00

Signature **Date**

Ship to:

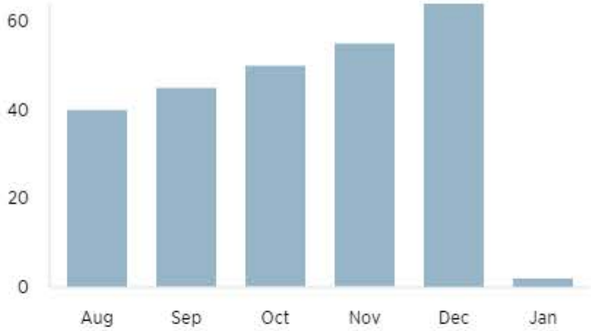
10.

Real Time Power

Unique Drivers

0 Connected Drivers

Sessions



Average Session Length

Last 30 Days

5h 16m

4h 19m Charging

0h 56m Idle

Financials

Session Fees | Utility Cost

$84.00

You've dispensed **1.42 MWh** of electricity over the last 30 days. Recoup your costs by charging a fee. ChargePoint will send you the money.

Estimated monthly cost based on electricity price of **$0.06** per kWh.

Environment

Lifetime

Here's how EV charging has helped:

You've avoided 7,828 kg greenhouse gas emissions

that's like planting 201 trees and letting them grow for 10 years

Energy

in MWh