

Sun Prairie City Hall Facility-wide LED Lighting & Acoustical Ceiling Tile Upgrade



June 2023



SUN PRAIRIE



WPPI energy



UPPER90



O E I

Wisconsin Office of Energy Innovation

BACKGROUND

[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 Finance Front Counter, Building Inspection, and a community meeting room. The second floor includes the Common Council Chambers, meeting rooms, and staff offices. The city installed a 66.6 kWp Solar PV system in 2018, which has a publicly available production dashboard: [SolarEdge | Sun Prairie City Hall](#).

SUSTAINABLE SUN PRAIRIE

In 2020, the city completed a [Municipal Energy Plan](#), which provided an overview of energy use within facilities, operations, and the city fleet. This plan outlined the basis for implementing projects and strategies that would support the city in reducing energy consumption across operations. In that report City Hall was a key facility highlighted, with a (2018) net electricity consumption of 609,824 kWh (~9% of the city's total electricity consumption for facilities and operations), ~\$77,200 in total annual energy cost, and ~8% of total CO2 emissions.

Following the report, the city created a Sustainability Task Force, which worked from May 2020 to May 2021 to develop a [Final Task Force report](#) which created a roadmap for the city and community to establish sustainability objectives through over 100+ recommendations across eight impact areas that include Municipal Decision Making, Net Zero Energy, and Development Pattern. The final report included many recommendations that aligned with the energy plan, and highlighted energy efficiency and materials management as key strategies towards achieving these objectives.

Sun Prairie started to operationalize these efforts, including prioritizing investments in clean energy technologies. The city in 2022 passed a [resolution](#) establishing a 100% clean, renewable electricity goal for city operations by 2025, which includes targets for energy efficiency in facility operations. The City Hall LED project was originally planned for in 2019, but due to the COVID-19 pandemic was delayed until 2022, when city staff were able to coordinate cross-departmentally to move the project forward. The [Sustainable Sun Prairie](#) webpage serves as a hub of information to disseminate resources and showcase project activities.

PROJECT SUMMARY

Throughout 2022, the city revisited project scope and economics, working with potential vendors and holding a facility walkthrough to identify the best solutions for the project. Ultimately, Upper90 Energy LLC was selected for the project, and worked with city staff to explore LED lighting solutions, ceiling tile material selection, and responsible materials management for the existing equipment that was being replaced or upgraded. The project partners (which included the city, Sun Prairie Utilities, WPPI Energy, and Upper90) took a facilitated, collaborative approach to project management that allowed for several sustainability objectives to be met, most notably energy use reduction and landfill diversion.

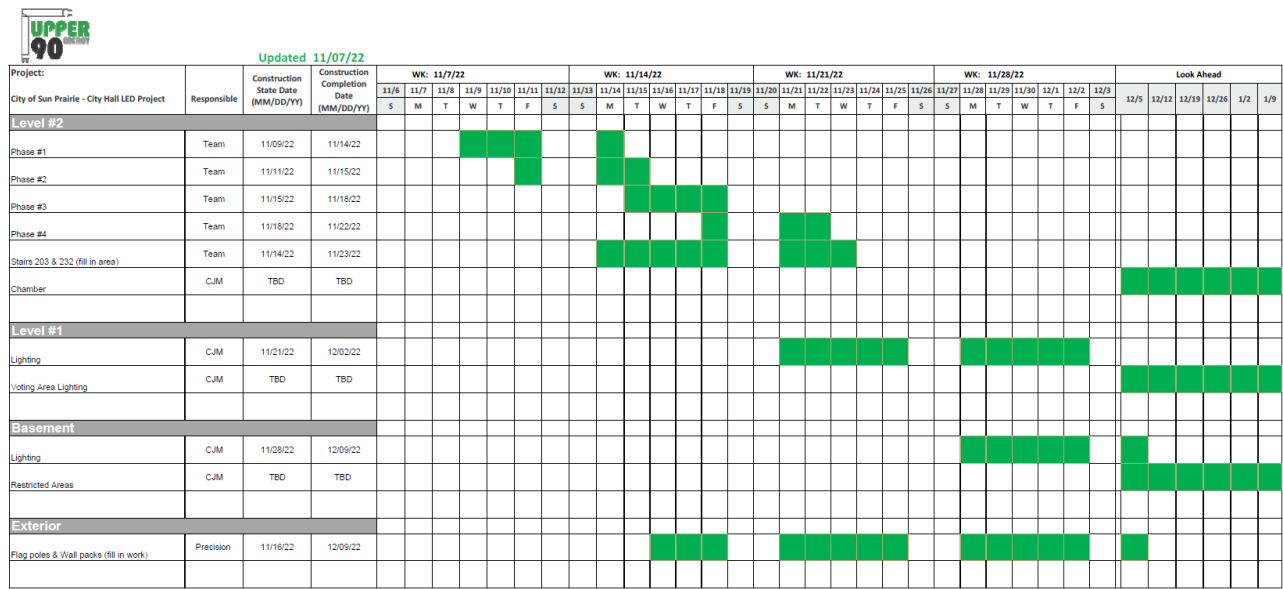


Figure 1: Project timeline

- LED statistics, summary, final lighting count, estimated energy savings:
 - Sun Prairie uses ENERGY STAR Portfolio Manager, and SPU MyAccount to track energy consumption and project savings across the municipal facility portfolio, along with regular utility bill analysis. Recent utility investments in advanced metering infrastructure (AMI) allows for a granular, 15-minute increment view of electricity usage in all city facilities.
 - The LED upgrade consisted of replacing 728 lights in total, reducing annual electricity consumption by an estimated ~71,000 kWh/year or about 15% of the total building electricity usage, which results in an estimated utility cost savings of ~\$11,000 total annually. The new lights



will have an improved light output, color temperature, and are expected to last over 15 years at minimum.

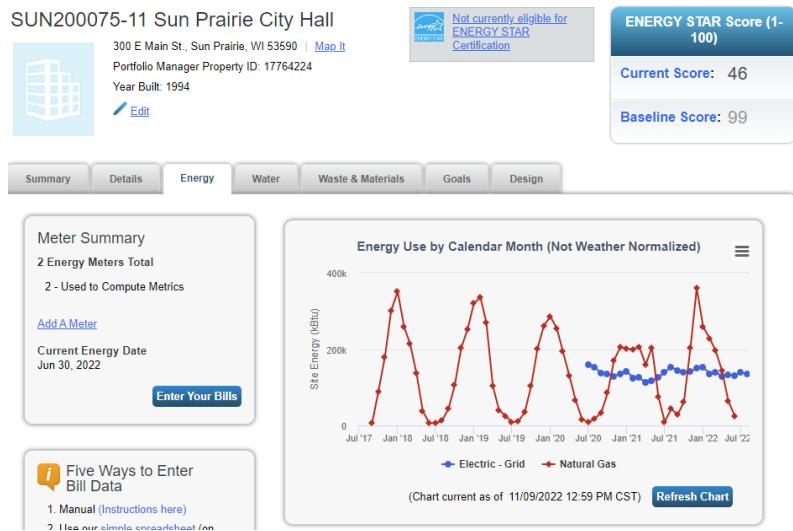


Figure 2: MyAccount Summary

- Staff worked with facility occupants to maximize light output and color temperature (CCT) within individual office spaces for an improved user experience.

General Information				Existing										Proposed										Savings and Price				
Building Name	Run Hours	kwh rate	Room / Space	Fixture Quantity	Fixture Type	Fixture Size	Lamps per Fixture	Lamp Type	Lamp (Watts)	Lamps (Total)	Fixture (Watts)	Total kW	Fixture Quantity	Fixture Type	Fixture Size	Lamps per Fixture	Part Number	Lamp (Watts)	Lamps (Total)	Fixture (Watts)	Total kW	kW Saved	kWh (Existing)	kWh (Proposed)	kWh Savings	Electrical Savings (\$)		
Sun Prairie City Hall	2210	\$ 0.09	Dispatch	4	Troffer	2x4	3	T8	32	12	89.28	0.36	n	LED Panel	2x4	1	KT8PLED050P24KCAVDIM/G2	30.00	4.00	30.00	0.12	0.24	789	265.20	524.04	\$ 47.38		
Sun Prairie City Hall	2210	\$ 0.09	000 cubicles	12	Troffer	2x4	3	T8	32	36	89.28	1.07	n	LED Panel	2x4	1	KT8PLED050P24KCAVDIM/G2	30.00	12.00	30.00	0.36	0.71	3849	1172.11	1241.49	\$ 141.49		
Sun Prairie City Hall	2210	\$ 0.09	000 cubicles	8	Recess Can	8"	2	PL-2 Pin	26	16	48.36	0.39	n	Recess Can	8"	1	KT8LED039P8ACSGVDIM	23.00	8.00	23.00	0.18	0.20	855	406.64	448.56	\$ 40.55		
Sun Prairie City Hall	2210	\$ 0.09	020 mens bath	7	Troffer	1x4	2	T8	32	14	59.52	0.42	r	Troffer	1x4	2	KTLED13T848GCAVDIM/G2	15.50	14.00	21.00	0.15	0.27	921	324.87	595.90	\$ 53.63		
Sun Prairie City Hall	2210	\$ 0.09	020 mens bath	4	Recess Can	8"	2	PL-2 Pin	26	8	48.36	0.19	n	Recess Can	8"	1	KT8LED039P8ACSGVDIM	23.00	4.00	23.00	0.09	0.10	428	205.52	324.29	\$ 29.18		
Sun Prairie City Hall	2210	\$ 0.09	020 mens bath	10	Industrial	4"	2	T8	32	20	59.52	0.60	r	Industrial	4"	2	KTLED13T848GCAVDIM/G2	15.50	20.00	21.00	0.21	0.39	1315	464.10	851.29	\$ 76.62		
Sun Prairie City Hall	2210	\$ 0.09	020 mens bath	7	Troffer	1x4	2	T8	32	14	59.52	0.42	r	Troffer	1x4	2	KTLED13T848GCAVDIM/G2	15.50	14.00	21.00	0.15	0.27	921	324.87	595.90	\$ 53.63		
Sun Prairie City Hall	2210	\$ 0.09	020 mens bath	4	Recess Can	8"	2	PL-2 Pin	26	8	48.36	0.19	n	Recess Can	8"	1	KT8LED039P8ACSGVDIM	23.00	4.00	23.00	0.09	0.10	428	205.52	324.29	\$ 29.18		
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Sun Prairie City Hall	2210	\$ 0.09	25	1	Troffer	2x4	3	T8	32	3	89.28	0.09	n	LED Panel	2x4	1	KT8PLED050P24KCAVDIM/G2	30.00	1.00	30.00	0.03	0.06	297	66.30	131.01	\$ 11.79		
Sun Prairie City Hall	2210	\$ 0.09	25	2	Troffer	2x4	2	T8	32	4	59.52	0.12	n	LED Panel	2x4	1	KT8PLED050P24KCAVDIM/G2	30.00	2.00	30.00	0.06	0.06	263	132.60	130.48	\$ 11.74		
Sun Prairie City Hall	2210	\$ 0.09	26 lab	4	Troffer	2x4	3	T8	32	12	89.28	0.36	n	LED Panel	2x4	1	KT8PLED050P24KCAVDIM/G2	30.00	4.00	30.00	0.12	0.24	789	265.20	524.04	\$ 47.38		
Sun Prairie City Hall	2210	\$ 0.09	EOC	8	Troffer	2x4	3	T8	32	24	89.28	0.71	n	LED Panel	2x4	1	KT8PLED050P24KCAVDIM/G2	30.00	8.00	30.00	0.24	0.47	1578	530.40	1048.07	\$ 94.33		
Sun Prairie City Hall	2210	\$ 0.09	EOC	2	Troffer	2x4	3	T8	32	6	89.28	0.18	n	LED Panel	2x4	1	KT8PLED050P24KCAVDIM/G2	30.00	1.00	30.00	0.06	0.12	399	132.60	261.03	\$ 23.58		
Sun Prairie City Hall	2210	\$ 0.09	020 conference	8	Troffer	2x4	2	T8	32	16	59.52	0.48	n	LED Panel	2x4	1	KT8PLED050P24KCAVDIM/G2	30.00	6.00	30.00	0.24	0.24	1052	530.40	521.91	\$ 46.97		

Figure 3: Screenshot of inventory

• Ceiling tile statistics, summary, final count, insulation/recycled content

- The second-floor ceiling tiles are original to the building (1993), and many had noticeable wear, dirt, or deterioration. The new tiles will closely resemble recently installed tiles on the first floor, are thicker (improved insulation and noise reduction) and consist of a very high recycled content at 81%.

• Re-use of existing tile, working with Blackstar Assets to re-use tile in good condition

- The city and Upper90 also worked with Blackstar Assets to re-purpose the existing tiles that were in reasonable condition for re-use, which will allow for diversion of ~1,500 of the 2,300 total existing tiles from being landfilled. Blackstar Assets signed a Materials Donation Agreement with the city, and ultimately were able to repurpose every tile that was reclaimed.



PUBLIC SERVICE COMMISSION OFFICE OF ENERGY INNOVATION FUNDING SUPPORT

This project received was part of a broader awarded grant opportunity the City of Sun Prairie received from the Wisconsin Office of Energy Innovation (OEI) [PSC Wisconsin Office of Energy Innovation](#) grant to make significant upgrades at City Hall. The application *Sun Prairie City Hall Campus Energy Optimization & Electrification* project was successfully awarded \$131,488 in 2022 to complete LED lighting, HVAC controls, EV charging, and fleet vehicle electrification upgrades in 2022-2023. This LED project included \$15,000 in grant funding to complete the LED upgrade in Council Chambers, a challenging space to upgrade with unique fixtures and 20'+ high ceilings. The full project details can be found at [viewdoc.aspx \(wi.gov\)](#).

UTILITY & ENERGY EFFICIENCY PROGRAM SUPPORT: SUN PRAIRIE UTILITIES, WPPI ENERGY AND FOCUS ON ENERGY



This project received technical support and financial incentives from a variety of resources. The city is proud of its municipal electric utility [Sun Prairie Utilities \(SPU\)](#), which was a key partner in the project. SPU is also a member of the joint action agency [WPPI Energy](#), whose Senior Energy Service Manager was a key stakeholder that provided project guidance and additional financial support. Finally, the state-wide energy efficiency program [Focus on Energy](#) also shared resources through their Energy Advisor and efficiency incentives. This project wouldn't have been as successful or as comprehensive without these partners involved throughout the process.

KEYS TO SUCCESS

- Residents, Businesses, Municipalities, & Organizations should plan, budget, and implement energy conservation & efficiency strategies.
- Work with your utility and Focus on Energy to confirm LED equipment is Design Lights Consortium (DLC) or ENERGY STAR certified.
- Talk to several vendors, weigh options, consider various tradeoffs, lighting types, and design solutions.
- Talk to building occupants, facility maintenance staff, and decision makers to determine priorities, space use, and occupancy needs.

CHALLENGES AND LESSONS LEARNED

- ♦ **Budget for design:** Future municipal lighting projects should consider additional budget for design and potential reconfiguration. The city primarily replaced lights 1-1, which resulted in noticeably brighter spaces. A recommendation for project managers would be to consider an energy audit and lighting design exercise accompanied by light level measurements to capitalize on any reconfiguration opportunities.
- ♦ **Procurement Requirements:** Buy American Act requirements are important components of the Energy Innovation Grant Program but resulted in challenges with sourcing compliant fixtures. Consider working with lighting distributors early in the project planning stage to ensure equipment can be sourced, or exceptions and material alternatives are identified as soon as possible. In one instance, the city had a unique up light fixture in Council Chambers for which there was no Buy American compliant fixture on the market. Lead times and equipment delays will inevitably affect any project schedule, communicate with building occupants about the production schedule and any anticipated delays to minimize disruption.
- ♦ **Deemed vs. Actual Energy Savings:** While it is too early to establish a comparable baseline, early data indicates that kWh energy consumption has reduced, but less than expected. This is due to several factors: (1) consumption data is inherently challenging to normalize for a variety of factors, with weather and occupancy being major drivers.

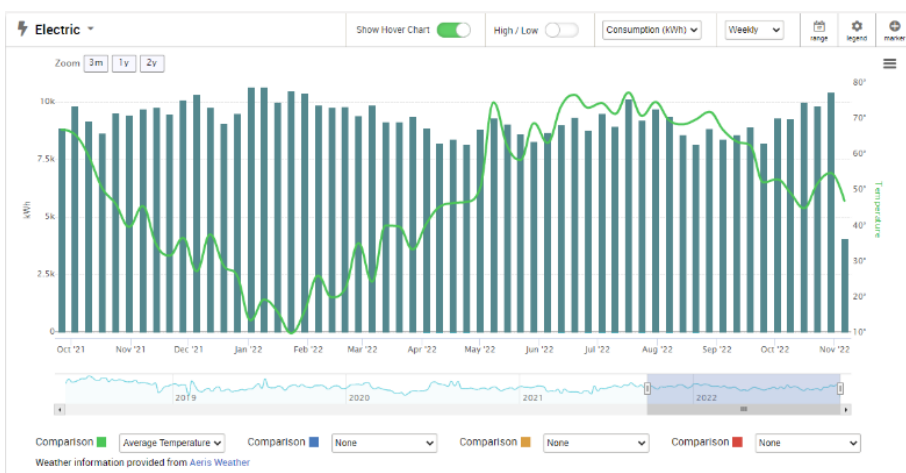


Figure 2: SPU MyAccount Dashboard

Additionally, the past several years has experienced significant occupancy fluctuations due to the COVID pandemic in 2020-2021, office renovations in 2021, and a return to full occupancy in 2022. (2) Failed fixtures throughout the facility are now energized (exterior flagpole lighting, exterior wall packs, miscellaneous fixtures throughout the facility) which added electrical load but brought lighting output to an improved level throughout the facility. (3) Lower Solar PV production in November 2022 compared to 2021, and 2020, which results in a higher electricity use compared to those years. In contrast, the facilities demand (kW) has measurably decreased post-installation.

CONCLUSION

This project is one of four key project components in staff efforts to move the facility closer to its ultimate intended outcome; becoming a net-zero all-electric facility that can serve as a case study for other municipal facilities across Wisconsin to replicate. In addition to a reduction in lighting load, additional benefits realized include better light quality, reduced O&M/callbacks from failed or malfunctioning fixtures, and reduced environmental impacts associated with lower energy consumption.

Staff continue to monitor data to establish a comparable baseline and to determine the lighting load energy savings from the LED upgrade.

RECOGNITIONS

Sun Prairie would like to thank the city council, all partners, and city staff that supported this project. Specifically:

Scott Semroc, Sustainability Coordinator, City of Sun Prairie

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Andy Hirvela, Supervisory Engineer, Sun Prairie Utilities

Clint Cry, Senior Energy Services Manager, City of Sun Prairie

Adam Prochaska, Project Engineer, Upper90

Joe Beck, Co-owner, Blackstar Assets

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PRE & POST INSTALLATION PHOTOS

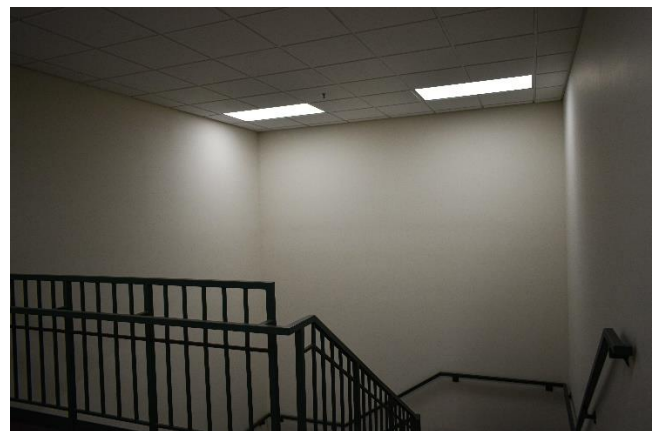
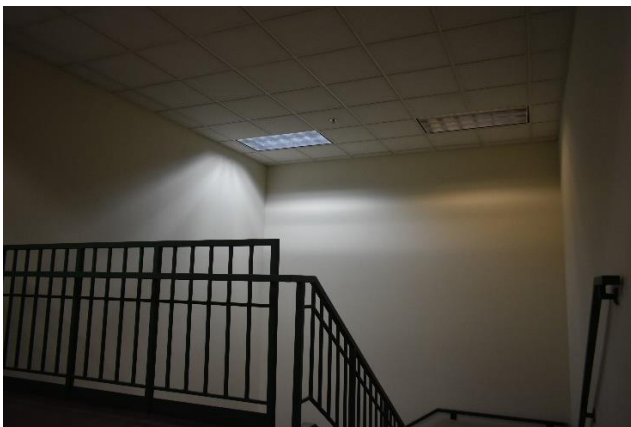
Second Floor Lobby:



Second Floor Workspace:



Second Floor Back Stairwell:



Council Chambers:



Conference Room 215:

