Bid Waiver Form

Revised 04/2021

Short Description of Goods/Services	Research and associated documentation of energy savings associated with window and lighting upgrades at CCB	Total Cost	$162,674

Vendor Name	Slipstream Group Inc.	MUNIS #	TBD	Req #	TBD

Purchasing Officer	Pete Patten	Date	August 2, 2021
Department	Office of Energy & Climate Change / County Executive	Email	kuntz.kathryn@countyofdane.com
Name	Kathy Kuntz	Phone	608.283.1477

A VENDOR QUOTE MUST BE ATTACHED TO THE WAIVER FOR APPROVAL

Provide a detailed description of the goods/services intended to be purchased:

Dane County and the City of Madison are in the process of accepting a grant from DOE (Department of Energy) for "See the Savings: An Advanced Window-Lighting Controls Field Validation." This is a three-year research grant that funds 1) an upgrade to windows and lighting systems on one facade of the City-County Building and 2) research associated with the project. Part of the grant process includes monitoring energy saving levels before, during and after the project from Slipstream Group Inc.

Year 1 will encompass setup and energy monitoring prior to windows and lighting controls being installed.
Year 2 will encompass the installation of the windows and lighting controls (via the Public Works bid process) and resuming the energy monitoring after the installations are complete.
Year 3 will encompass finishing the energy monitoring and then analysis of the energy data and report writing.

The services that will be provided by Slipstream over the course of the three years include:
• Provide technical support to Dane County and City of Madison relative to the proposed window and lighting control upgrades at the CCB
• Install monitoring equipment and measure baseline energy use in all affected suites for three to six months prior to the installation of the upgrades
• Update monitoring equipment as necessary and measure energy use in all affected suites for three to six months after the installation of the upgrades
• Survey suite occupants regarding comfort and other related issues before and after the upgrades
• Work with CCB staff to test the potential for the upgrades to reduce demand charges at CCB
• Analyze energy savings and model projected energy savings in other building types based the CCB data and other available technical data
• Write a research report based on the findings that meets Department of Energy guidelines for rigor
• Develop a deck of slides summarizing the research findings
• Develop a case study regarding the research findings
• Assist Dane County and City of Madison staff to disseminate the findings
• Assist Dane County with all reporting to the Department of Energy

Attached to this request are two budget documents. One shows the whole DOE project budget while the other details Slipstream's portion of the project including the $18,000 of match they are providing for their work. (The Slipstreamwork totals $180,674 with $18,000 of match, for a net contract total cost of $162,674.)

Send to a Purchasing Officer Once Completed

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Procurement Exception List
☐ Emergency Procurement
☒ Unique and specific technical qualifications are required
☐ A special adaptation for a special purpose is required
☐ A unique or opportune buying condition exists
☒ Only one vendor possesses the unique and singularly available ability to meet the Department's requirements

Provide a detailed explanation as to why the competitive bidding (RFB/RFP) process cannot be used. Also provide a detailed justification in relation to the Procurement Exception(s) chosen:

Slipstream identified the U.S. Department of Energy (DOE) funding opportunity and convened Dane County and City of Madison staff to develop this project proposal. Slipstream staff led the development of the concept paper and full project submission, providing more than 75% of the proposal content. (Our DOE Proposal is attached here as background.) More, Slipstream identified the opportunity to couple lighting controls with triple-pane windows as way to meet DOE requirements as well as local priorities. It is highly unlikely that we would have pursued this project without Slipstream's leadership.

Additionally, Slipstream's national reputation for expertise in this kind of a research project helped us win the DOE grant. In the comments we saw from the reviewers regarding our team, the reviewers said:

"Slipstream is the perfect partner for this. This project builds on their previous research and I have no concerns."

and

"The team has adequate resources and excellent project management and technical expertise and experience to implement the project."

Slipstream is also leveraging a variety of other research, including some proprietary research, to meet DOE grant requirements. Initially, DOE wanted Dane County to reduce the efforts at the CCB and add other buildings; we secured DOE agreement to focus on the CCB in part by promising that Slipstream would use the CCB energy data to model energy savings in a variety of other building types and climate zones, leveraging data that Slipstream has from other efforts. It is infeasible that another vendor could fulfill this DOE requirement.

Slipstream is a nonprofit headquartered in Dane County with unique expertise relative to energy efficiency research. There is not another nonprofit in Wisconsin with similar expertise or experience doing this kind of deep and rigorous technical energy efficiency and building performance research in a way that meets DOE standards.

Bid Waiver Approval (For Purchasing Use Only)	
☐ Under $37,000 (Controller)	
☐ $37,000+ (Personnel & Finance Committee)	**Date Approved:**

Send to a Purchasing Officer Once Completed

DE-FOA-0002324 Control Number: 2324-1511

Building Technologies Proving Ground – Public Sector Field Validation

Technical Volume

Project Title: See the Savings:
An Advanced Window-Lighting Controls Demonstration

Lead Organization: Dane County
City-County Building, Room 421
210 Martin Luther King Jr. Blvd
Madison, WI 53703

Technical point of contact: Scott Schuetter, Principal Engineer
Slipstream
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608.210.7149

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Dane County Office of Energy & Climate Change
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608.772.5452

Team Members: Dane County

City of Madison

Slipstream

Confidentiality: None

Project Overview

The **Project Team** is led by Dane County, Wisconsin (a county government) and includes the City of Madison and Slipstream, a Wisconsin nonprofit with deep energy efficiency technology expertise. Supporting our efforts are the local electric and gas utility, Madison Gas & Electric and Wisconsin Focus on Energy, the statewide energy efficiency program (see LOCs). This team has broad and deep experience with building retrofits as well as technology demonstration projects. There is also a shared history of collaboration; City and County staff collaborate on sustainability issues and both the City and County have a history of working with Slipstream staff on energy efficiency and technology projects.

As **background**, both Dane County and the City of Madison manage public building portfolios. Both entities have aggressively pursued energy efficiency and renewable energy in recent years. Initial efforts focused on the most cost-effective elements such as LED retrofits, HVAC projects, and some solar PV. Increasingly, both entities want to pursue deeper retrofits, including envelope and grid-interactive efficiency solutions. Both the County and City are also interested in working with our local electric utility, Madison Gas & Electric, to expand load flexibility and demand response in our buildings. Our challenge has been finding cost-effective technologies. In the City-County Building (CCB) an additional challenge is the shared space arrangement, which makes it infeasible for one entity to pursue window upgrades in isolation from the other. We are proposing a joint initiative here—demonstrating an innovative triple-pane window retrofit packaged with cost-effective lighting and advanced controls to maximize carbon savings and grid flexibility—to identify a path forward for both our joint and separate efforts.

Our **validation objectives** are to demonstrate how a window retrofit, using cutting-edge technologies such as thin triple-panes, can be cost-effective at scale, especially when packaged with more cost effective lighting and advanced controls. Specifically we aim to demonstrate 10% HVAC savings, 60% lighting savings, 20% peak and demand lighting demand savings. Scaled to relevant buildings nationally, that represents more than 480 TBtu in annual savings.

The potential **DOE impact** for this project is substantial. Given tight financial conditions for local governments, Dane County and Madison are unlikely to pursue any upgrades without DOE support. More, the DOE funding is enabling city-county coordination on the upgrade, which is necessary for aesthetic reasons since both entities have space on all four building facades. By helping us collaborate on one façade, the DOE support makes efforts on the other facades more likely. To illustrate the DOE impact, consider that windows have been the primary comfort complaint in the CCB for years but neither entity has had the wherewithal (even before the pandemic and current economic recession) to address the issue. This project will not move forward without DOE support.

Technical Description, Innovation, and Impact

Relevance and Outcomes

- The **technology solution we propose to validate** is an advanced technology triple-pane window retrofit coupled with cost-effective LED lighting and networked lighting controls connected with the Building Automation System (BAS) that is substantially more efficient than state of shelf options. The technology package will save energy, reduce electricity demand, provide grid flexibility, improve occupant comfort and increase our ability to manage indoor air quality. The thin triple-pane windows will achieve the NFRC assembly properties of U-0.18 to 0.19, SHGC-0.20 to 0.30, and VT-0.47 to 0.52. The LED lighting will achieve an LPD of 0.50 W/ft2 through proper fixture selection and spacing. It will additionally incorporate advanced lighting controls such as occupancy control, photosensing, task tuning, and demand response. Finally, the occupancy signal from the lighting controls will be connected to the HVAC's BAS to enable additional savings such as thermostat setbacks during periods of no occupancy.
- The **energy savings calculations and methodology used to determine that the technology package can achieve 250 TBtu national energy savings** if widely adopted is based on CBECS and RECS data for the applicable markets at 100% penetration with 11% HVAC[1] and 69%[2] lighting savings. The most relevant building types are education, healthcare, lodging, office, public assembly and multifamily. See table for details.

National energy savings (TBtu/yr.)					
Percent savings by end use	**11%**	**11%**	**11%**	**69%**	**N/A**
Building Type	**Heating**	**Cooling**	**Ventilation**	**Lighting**	**Total**
Education	32.9	10.0	7.5	53.8	104.2
Health care	23.1	8.7	9.0	42.1	82.9
Lodging	7.4	4.3	5.4	N/A	17.1
Office	33.6	13.0	23.5	102.1	172.2
Public assembly	20.8	9.5	2.6	24.2	57.0
Multifamily	41.8	8.4	No data	N/A	50.2
Total	159.5	53.8	48.1	222.2	483.5

- Our **pre-determined host site** is the City County Building (CCB), an office building located in downtown Madison in Climate Zone 6A [ASHRAE Standard 169-2013]. An office building originally built in 1955 and expanded in 1985, the CCB has ~325,000 SF of office space, owned and managed by Dane County. About half that space is leased to the City of Madison. While the current design is preliminary, we envision this retrofit affecting about 25% of the building. Both the City and County are actively pursuing interior retrofits

[1] Selkowitz, S., "Thin Triple Pane Windows: A Market Transformation Strategy for Affordable R5 Windows", Prepared for the Northwest Energy Efficiency Alliance, April 2020.

[2] Myer, M., "Evaluation of Advanced Lighting Control Systems in a Working Office Environment", Prepared for the U.S. General Services Administration, November 2018.

at the building but there are no current plans to update the windows, even though most occupant comfort complaints are related to window performance.

- **EERE funding is critical for this project.** This project enables the City and County to collaborate on research and implementation of a technology solution, creating standards for future efforts. Without EERE funding no window upgrades will occur.

Costs/Savings

The advanced window technology we are considering is thin, triple-pane windows. Simple paybacks of this window technology has been estimated at between 5 and 9 years. We will pair the window technology with an LED fixture retrofit using networked advanced controls. Simple payback of similar lighting systems have been demonstrated at 6.6 years,[3] assuming a $0.10/kWh utility cost. These payback thresholds are within public sector and energy efficiency program limits given that government buildings are typically owned for decades.

Feasibility

We are confident that the technology package proposed here will:

- **Perform as intended when installed at the City County Building** (CCB). The CCB currently has operable windows, prompting energy waste, maintenance issues and indoor air quality concerns. Transitioning to triple-pane high efficiency windows and lighting controls that are synced with the BAS will enable better management of the spaces. More, the City of Madison recently addressed windows in another historic downtown government building, the Madison Municipal building, where achieved energy savings were consistent with their project modeling. We are building upon our team's deep and broad experience with implementing energy savings projects.
- **Be acceptable to facilities staff and building occupants**. The CCB has two sets of tenants--Dane County and City of Madison staff. By collaborating on this project we ensure that all voices and perspectives are taken into account throughout the process. Our plan includes opportunities for facility staff and occupant input.
- **Validate this technology package** (thereby providing an example for others). In addition to the project report we will create a video webinar featuring the project outcomes. We will market the live webinar and final report using Slipstream's extensive contact database of energy industry stakeholders which includes energy efficiency and building design professionals, and large building owners, including governments, educational institutions, and developers. We will share results with Focus on Energy. Additionally, the City and County will use project outcomes to develop a standard for future window retrofit projects.
- **Mitigate risks associated with the project**. Both Dane County and Madison have decades of experience implementing retrofit projects in public facilities; staff is adept at identifying and managing risks associated with projects. Similarly, the Slipstream team is adept at addressing M&V issues associated with occupied buildings. We are confident we will accomplish project objectives.

[3] NextEnergy, "Lighting Technology Energy Solutions Final Technical Report", Prepared for the U.S.Department of Energy, February 2020.

Innovation and Impact:

- Double-paned low-e window retrofits (U-0.3, SHGC-0.27, VT-0.64) and LED lighting with limited controls (LPD of about 0.65 W/ft2) are the **current state-of-the-shelf** for the applicable technology solutions. Our package is significantly better with windows U-0.18 to 0.19, SHGC-0.20 to 0.30, and VT-0.47 to 0.52 and advanced, networked controls.
- We believe the **project can achieve** energy savings of 10% for HVAC and 60% for lighting plus 20% peak and DR lighting load savings. We project a simple payback of less than 10 years and increased occupant comfort as measured through pre- and post-surveys.
- **The advantages of proposed technology solution** are improved occupant comfort and productivity, reduced maintenance, and better control of indoor air quality. The retrofit package also includes grid flexibility components, including lighting demand response and window load reduction during peak demand periods.
- **This project will demonstrate how coupling advanced windows with lighting controls is cost effective**. The project will also demonstrate how multiple building stakeholders can collaborate to increase the efficiency of spaces. Both Dane County and the City of Madison have aggressive plans to increase the energy efficiency of their facilities; collaborating on deep savings at the CCB will prompt additional collaboration.

Workplan and Technology Transition Plan

Project Objectives

This project will deliver a cost-effective package of cutting-edge window technology, coupled with lighting fixture and advanced controls retrofit. The package will provide energy savings, occupant comfort improvements and grid flexibility. We will demonstrate and disseminate results to inspire the public sector and commercial retrofit markets nationwide. Our project will:

- Demonstrate integrated retrofits of windows and lighting at 1 public building.
- Optimize load shape for the local grid.
- Create a retrofit standard.
- Disseminate the concept nationwide to drive deployment.

Technical Scope Summary

The retrofit package will be deployed as a pilot in the City County Building in Madison, WI with support from Madison Gas & Electric, the electric and natural gas utility for the facility. The retrofit design, installation, and commissioning will occur within the first half of the three-year project. We will concurrently develop a field test plan. All metrics will be measured using pre/post measurement and analysis. Measurement and verification activities will include:

- HVAC electricity and natural gas consumption and demand spanning portions of the cooling and heating seasons
- HVAC building automation system points such as space temperature
- Lighting electricity consumption and demand
- Window and adjacent wall temperatures, as well as solar radiation
- Light level in retrofit spaces
- Occupant satisfaction surveys (thermal and visual comfort, controllability)

At the end we will incorporate the package into Dane County and the City of Madison's retrofit standards. We will analyze the retrofit package's energy savings and grid flexibility potential for different building types at various climate zones using DOE's prototype building models. The final deliverables will be a comprehensive technical project report and webinar.

WBS and Task Description Summary
The following outlines how project milestones and goals will be accomplished.

Budget Period 1
Task 1. Retrofit Design, Installation and Commissioning
Subtask 1.1. Design. We will research cutting-edge window retrofits. We have already developed quotes for thin triple pane windows from Alpen. We will also research lighting retrofits with advanced lighting controls. We already have experience with Cree, Acuity, and Lutron (Vive System) and many LED light fixture manufacturers and product lines. We will work with designers to finalize the retrofit design. We will develop control and window specifications to be included in the bid documents.

Milestone 1.1: Complete design. Submit key design drawings to DOE.

Subtask 1.2. Installation and Commissioning. County and City will oversee installation in their spaces, managing contractors for installation and coordinating with occupants. County and City will oversee commissioning to ensure systems are maximizing energy savings, to ensure satisfied occupants and to enhance performance persistence.

Milestone 1.2.1: Installation complete. Submit installation documentation to DOE.

Milestone 1.2.2: Commissioning complete. Submit commissioning report to DOE. DOE invited to tour site.

Task 2. Pre-Retrofit Measurement and Verification
Subtask 2.1. Plan M&V and install M&V equipment. Based on the retrofit design, Slipstream will prepare an M&V plan for the test site. Once finalized, we will procure necessary additional M&V instruments or recalibrate our existing instruments, before M&V equipment setup and installation at the field test site. We will additionally confirm or set up trending of relevant BAS points. Our measurements will cover the lighting power and HVAC equipment energy as well as comfort-related variables such as space temperature and light levels in the spaces.

Milestone 2.1: Create comprehensive M&V plan that is consistent with our demonstration plans. Submit to DOE for review.

Subtask 2.2. Pre-Retrofit Monitoring. The retrofit will be monitored for an appropriate period of time to determine energy performance, impact on the indoor environment and any other non-energy factors. This is likely to span portions of the cooling and heating seasons before the retrofit. We will administer pre-retrofit occupant and owner satisfaction surveys, for both continuous improvement and dissemination testimonials.

Milestone 2.2.1: Ensure that adequate cooling season pre-retrofit data is being collected. DOE verifies data stream.

Milestone 2.2.2: Ensure that adequate heating season pre-retrofit data is being collected. DOE verifies data stream.

Milestone 2.2.3: Administer pre-retrofit surveys. DOE to review results.

Budget Period 1 Go/No-Go Decision Point: Met all budget period 1 milestones. DOE verifies all milestones have been met.

Budget Period 2
Task 3. Post-Retrofit Measurement and Verification
Subtask 3.1. Post-Retrofit Monitoring. We will adjust any monitoring to capture the updated system's post-retrofit configuration. We will continue monitoring for portions of the cooling and heating seasons after the retrofit. We will re-administer occupant and owner satisfaction surveys.

Milestone 3.1.1: Ensure that adequate heating season post-retrofit data is being collected. DOE verifies data stream.

Milestone 3.1.2: Administer post-retrofit surveys. DOE to review results.

Milestone 3.1.3: Ensure that adequate cooling season post-retrofit data is being collected. DOE verifies data stream.

Subtask 3.2. Demand Response Testing. We will prepare field test plans. The test plan will focus on instigating different levels and durations of DR events to the lighting system and measuring power impacts during and after the events (to see if any "rebounding effect" will occur.) The demand profile during the DR events will be compared to demand profiles during periods without DR events. We will also conduct occupant surveys for visual comfort and tolerance levels during DR events.

Milestone 3.2:Demand response data collection complete. DOE to review results.

Subtask 3.3. Data Analysis. We will condition the gathered data, filtering for outliers and data gaps. We will use weather normalization to map both the pre- and post-retrofit data onto a Typical Meteorological Year. We will compare pre- and post-retrofit estimates to calculate energy and demand impacts. We will quantify DR demand impacts and also analyze annual energy savings on a time dependent basis, including marginal costs and emissions to understand the retrofit's GEB impact. We will calculate the project's cost effectiveness using the actual project costs. At the end of the testing, the M&V equipment will be uninstalled from the field test sites.

Milestone 3.3: Quality control data from M&V equipment, BAS trends, and occupant comfort surveys. DOE reviews data set.

Subtask 3.4. Building Energy Modeling. We will expand our analysis beyond the demonstration site using the U.S DOE's prototype building models. This analysis will include the most applicable facility types for this technology package. It additionally will include all major U.S. climate zones. Through this expanded analysis, we will quantify the technology package's impact on energy and demand impact in a wide range of applications.

Milestone 3.4: Develop building energy models. DOE reviews energy model files.

Task 4. Reporting and Dissemination

Subtask 4.1. Final technical report. We will prepare a comprehensive final technical report describing the project, field test site, field test results, and technical analysis results.

Milestone 4.1: Finalize project technical report. DOE reviews technical report.

Subtask 4.2. Dissemination. In order to reach as wide an audience as possible, we will prepare a webinar and case study. We will disseminate these resources through an extensive existing network of building owners, commercial efficiency program managers and other stakeholders. We will have focused follow-up conversations with 3 likely public building owners that are interested in the package, meeting with them to describe and promote the technology package. In addition, our projects are often used as case studies, public tours or other educational opportunities and in these cases key sustainability features can also be highlighted.

Milestone 4.2.1: Develop webinar slide deck. DOE approves.

Milestone 4.2.2: Complete a case study document, including quantified cost and performance effects. DOE reviews case study.

Milestone 4.2.3: Direct outreach to 3 public building owners, broad communication to utility audience. DOE invited to meetings.

Subtask 4.3. Standard Development. We will update our design standard to include these advanced strategies for future projects. Design standards are provided to project teams at the

start of new projects - they include contractual requirements and deliverables in one document and a separate document broken down by division of work that outlines our basis of design/starting point. This document includes window and lighting requirements. Successful strategies from this research project will be incorporated into these documents.

Milestone 4.3: Update design standard. DOE reviews.

Task 5. Project Management

Subtask 5.1. Project management. See "Project Management" section below.

Milestone 5.1: Quarterly project reports, financial reports, and participation and reporting at the annual BTO peer-review conference. DOE reviews.

Milestone Summary and Go/No-Go Decision Points

Our first milestone is to complete the retrofit design. In parallel, we will be developing an M&V plan. Following our plan, we will gather pre-retrofit data, ensuring that we are gathering quality data spanning the full range of weather conditions. We will manage the technology package's installation and commissioning. The project's No-Go decision point is successful completion of all Budget Period 1 milestones. We will then ensure post-retrofit data quality. We will gather data during DR events. We will analyze data to quantify the retrofit's impact at CCB. We will develop energy models to extrapolate this impact to other building types and regions. We will disseminate the results through a final report, webinar, case study, and focused conversations. We will publish a template design standard for other public entities to use on their similar projects.

End of Project Goal

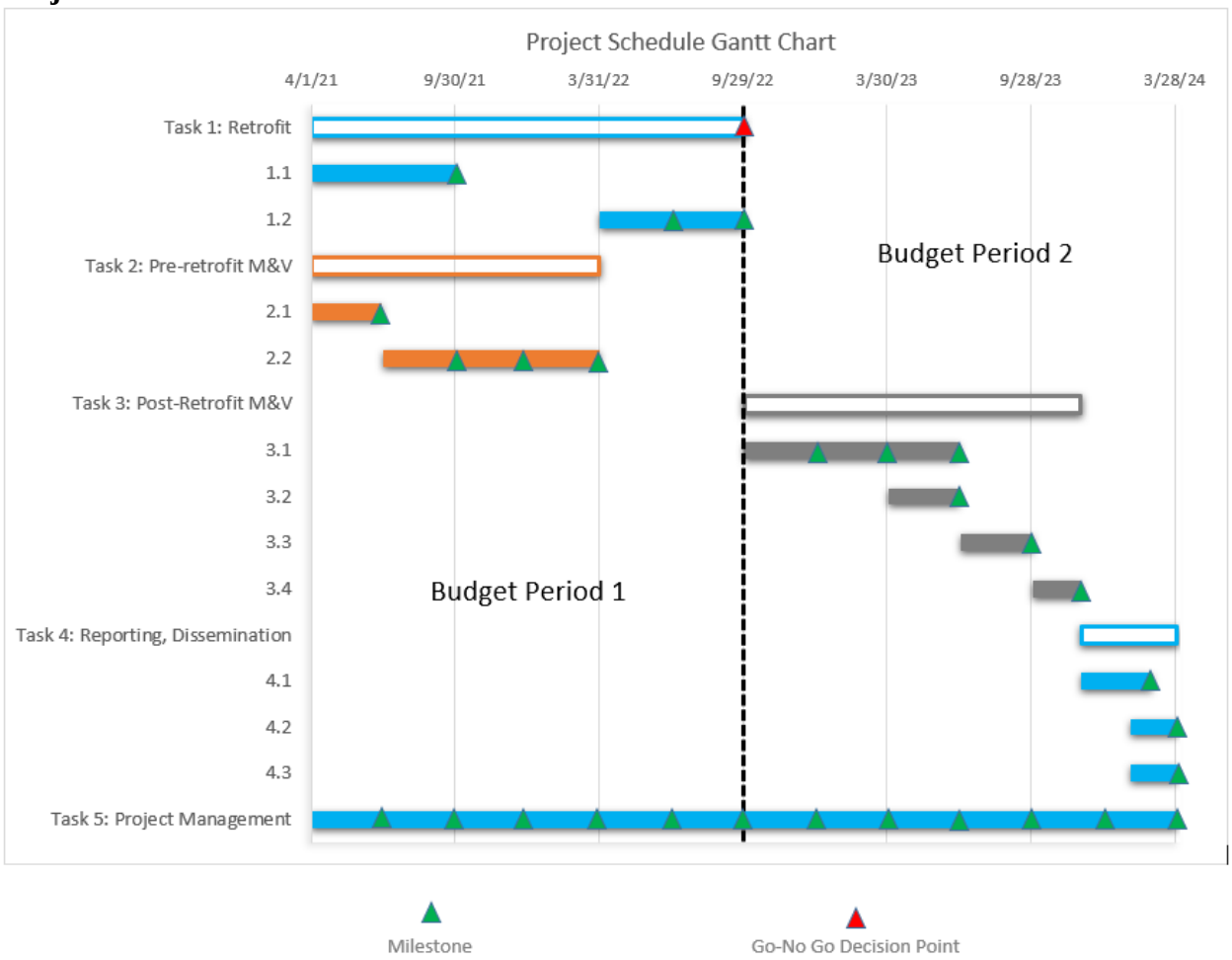
The end of project SMART goal is that field validation of the technology package is complete. The retrofit will reduce HVAC energy consumption by 10% and lighting energy consumption by 60%. It will show a peak load reduction of 20% and demand response reduction of 20% of lighting power. Occupant satisfaction, as measured on a Likert scale, will increase. The simple payback for the project will be less than 10 years.

Project Management

Our team is clear on roles and responsibilities. Slipstream is leading the research; they will provide technical support to the County and City in selecting specific technologies and then perform all M&V tasks. The City and County will each lead installation efforts in their own spaces, on a shared timeline. Once all installation is done Slipstream can conduct M&V to measure energy and demand savings.

- Scott Schuetter is the technical lead for the project and will oversee the M&V as well as reporting results. Kathy Kuntz of Dane County will manage the business aspects of the project, including overseeing the contract with Slipstream.
- City installation and commissioning efforts will be led by Jon Evans while Amanda DePagter will lead the County installation efforts. Both Jon and Amanda have deep retrofit experience.
- The team will meet regularly to discuss progress and address any project change issues. Any identified project risks will be addressed proactively through these discussions.
- Team meetings will be expanded to include representatives from Madison Gas & Electric and the State Office of Energy Innovation as appropriate.

Project Schedule



Technology Transition Plan

Building types that would benefit from this project's outcomes include Education, Health care, Lodging, Office, Public Assembly and Multifamily. The most relevant buildings would have older, inefficient windows (leaky single or double pane) and fluorescent lighting with manual controls or limited automated controls. Technology transition tasks are outlined in detail in the Subtasks 4.2 and 4.3. These activities include a final report, webinar, case study, and focused conversations with other key stakeholders. We will publish a template design standard for other public entities to use on their similar projects.

Technical Qualifications and Resources

- Our project team has deep and broad experience designing, implementing and verifying energy efficiency improvements in buildings.
  - Dane County Facilities staff manage a portfolio of facilities ranging from office spaces to an airport and a zoo. In the last decade Dane County has invested hundreds of thousands of dollars in energy efficiency and renewable energy upgrades to its facilities. Amanda DePagter, Director of Facilities oversees the operations and upgrades in conjunction with staff from Public Works who manage specific upgrade contracts. In 2020 Dane County committed to enroll all buildings—including CCB—in the DOE's Better Buildings Program.

- City of Madison Engineering staff manage energy usage in a portfolio of 100 buildings including office buildings, libraries, park shelters, public works facilities, parking garages, police districts, fire stations and bus maintenance facilities. The City of Madison recently completed a full renovation of a historical 1930 building with original single pane windows. In that instance overall air infiltration was reduced 95%. Overall natural gas and electric use was reduced 50% in line with energy modeling projections.
- Slipstream staff has expertise in architecture, engineering, economics, statistics, psychology, policy analysis, and communications. We have extensive experience conducting field research to measure building and technology performance while also successfully developing and delivering cost-effective utility energy-efficiency programs nationwide. Slipstream's research portfolio includes field testing new and emerging technologies, developing installation and commissioning guidelines, implementing pilot programs for utilities and stakeholder education and training through tech transfer initiatives. Slipstream clients include DOE, DOD, ASHRAE, ComEd, Xcel Energy, National Grid, Focus on Energy, WI PSC Office of Energy Innovation, Minnesota DOC, and many more.

- Dane County and the City of Madison are committed to using their CCB spaces as a **host site** for this project. Both the city and county have ongoing renovations in the CCB and the aim here is to integrate this energy efficiency work into those renovations, creating a model that both entities could follow going forward.
- The City of Madison did substantial updates to another historic public building, the Madison Municipal building in recent years. That effort included work to increase the efficiency of windows that is informing our efforts here. Additionally, both the City and County have pursued high efficiency/net zero ready new construction projects in recent years that inform this work.
- Both the City and County are committed to making this project a priority if funded. We intend to invest substantial staff resources in the project to ensure its success. These staff commitments are reflected in the budget documents. Key County and City staff are experienced design and construction project managers. Architects and Engineering consulting teams are selected based on qualifications and not just fee to ensure we get experienced staff that provide value to our projects. County and City staff work as part of an integrated design and construction team and are in regular communication with building occupants. The proposed upgrades are a critical component to successful outcomes for this project and staff treat it as such - the remodeling project(s) will have dedicated design and construction project managers, overseen by licensed professional engineers or architects.
- Roles on this project are clearly defined. Slipstream will lead all M&V efforts and provide technical support to the design process. The City and County will each manage technology installations in their respective spaces, using a shared timeline for project completion. Slipstream will coordinate regular meetings of all stakeholders to facilitate open communication and expedited decision-making. City and County sustainability staff (Reece and Kuntz) have a long history of collaboration; they will serve to mediate any issues that arise. Relative to other considerations:
  - The County-City lease and other existing agreements will provide a framework for the City-County interactions
  - The County will issue a contract to Slipstream to cover this project
  - All publications will be collaborative, giving credit to all project participants

- There are no intellectual property issues here; as public entities we will share our insights widely.
- Slipstream will lead communications efforts with support from the city and county.

FOA-Specific Requirements

- What is the technology solution and how does the validation approach de-risk integration of the solution in existing commercial and multi-family buildings?
  Advanced low-e windows (NFRC assembly properties of U-0.18 to 0.19, SHGC-0.20 to 0.30, and VT-0.47 to 0.52) coupled with advanced and networked lighting controls can demonstrate how coupling technology yields a better ROI for existing commercial and multi-family buildings.
- Has the solution been validated previously? What additive value would this project provide? Please cite previous field studies and specific barriers.
  This solution has not been validated previously; the project has the potential to identify window solutions that work for landlords, tenants and occupants of older buildings.
- What is the target application and building sector for this solution?
  We are targeting an older commercial office building; the solution will apply to office, education, public assembly, healthcare, lodging, and multifamily buildings.
- Have all proposed, included technologies achieved applicable and relevant certifications?
  All of the technologies proposed here are commercially available. The lighting products we will use will be listed on Design Lights Consortium's Qualified Products List. The windows we select will be National Fenestration Rating Council (NFRC) rated.
- What is the manufacturing capacity for each technology/product/solution?
  LED lighting and associated controls is widely available with significant manufacturing capacity. Triple-pane windows are also available with manufacturing capacity.
- What is the potential energy and cost savings, taking into account the applicable building sector/market? Please describe how the project will address cost-effectiveness criteria.
  We anticipate HVAC savings of 10% and lighting savings of 60% compared to past fluorescent installations. We also anticipate peak and DR lighting demand savings of 20%. We are targeting a payback of less than 10 years. More details are provided above.
- What are the data collection requirements necessary to de-risk the technology solution and support further voluntary program development?
  In addition to documenting energy (electricity and natural gas) consumption and savings, and electricity demand savings we aim to document occupant comfort. A key variable to great market adoption will be increased occupant comfort and productivity.
- What are additional non-energy benefit streams associated with the technology?
  The most important non-energy benefit is occupant comfort and associated occupant productivity. The upgrades will also reduce maintenance and give us the ability to better manage indoor air quality.