Finance Department

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Purchasing Services

REQUEST FOR INFORMATION

RFI #:	12002-0-2023-BG
For:	Integration and Automation Platform for Grid-Interactive Efficient Buildings (GEB)
Released Date:	Thursday, December 22nd, 2022
Due Date:	Thursday, February 2nd, 2023 @ 2:00 PM CST
City Agency:	Engineering Division

Method of Delivery Options

Email response to: bids@cityofmadison.com

1 GENERAL CONDITIONS AND INSTRUCTIONS TO BIDDERS

1.1 Applicable Terms and Conditions

- Products or Equipment. All quotations for supplies and/or equipment must be submitted in accordance with the specifications contained in this solicitation and City of Madison Standard Terms and Conditions.
- Services. All quotations for services must be submitted in accordance with; the specifications contained in this solicitation, City of Madison Standard Terms and Conditions, and Purchase of Services Contract.
- Copies. Copies of above-referenced forms are available from the Purchasing Office or from the following links:
  www.cityofmadison.com/finance/documents/STC.pdf
  www.cityofmadison.com/finance/documents/ConditionsofPurchasePO.pdf
  www.cityofmadison.com/attorney/documents/posContract.doc

1.2 Award

This is a request for information only. It is not anticipated that an award will come directly from this solicitation.

1.3 Schedule

RFI Issue Date:	Thursday, December 22nd, 2022
Questions Due Date	Thursday, January 12th, 2022
Answers Posted Date:	Thursday, January 26th, 2022
RFI Responses Due Date:	Thursday, February 2nd, 2022

2 CONTACTS

Technical:	For questions regarding technical specifications.	Jon Evans City of Madison Engingeering (608) 243-5893 jevans@cityofmadison.com
Buyer:	For questions regarding instructions, terms & conditions.	Brittany Garcia City of Madison Purchasing Services (608) 243-0529 bgarcia@cityofmadison.com

3 BID DISTRIBUTION NETWORK

Please note that the City no longer maintains an in-house bidders' list. **Notification of bid opportunities, addenda, tabulations and awards will only be made to subscribers via these networks.**

State of Wisconsin VendorNet System:	State of Wisconsin and local agencies bid network. Registration is free. http://vendornet.state.wi.us/vendornet
DemandStar by Onvia:	National bid network – Free subscription is available to access bids from the City of Madison and other Wisconsin agencies, participating in the Wisconsin Association of Public Purchasers (WAPP). A fee is required if subscribing to multiple agencies that are not included in WAPP.
Bid Opportunities:	www.cityofmadison.com/finance/purchasing/bidDemandStar.cfm
Home Page:	www.demandstar.com
To Register:	www.onvia.com/WAPP

DISCLAIMER

THIS IS A SOURCES SOUGHT NOTICE FOR THE PURPOSE OF MARKET RESEARCH ONLY - NO AWARD WILL BE MADE AS A RESULT OF THIS NOTICE.

This Request for Information (RFI) is issued for information and planning purposes only and does not constitute a solicitation nor does it restrict the City of Madison as to the ultimate acquisition approach.

The purpose of this RFI is to identify qualified contractors who can meet the City of Madison (City) requirements for an integrated software solution to support data acquisition, control sequencing and automation for a Grid-Interactive Efficient Building (GEB) platform. Any contract/order that might be awarded based on information received or derived from this market research will be subject to the competitive process. Contractors are required to respond with a capability package that is clear, concise, and complete. The City of Madison is not responsible for any cost incurred by industry in furnishing this information. All costs associated with responding to this RFI will be solely at the interested vendor's expense. Not responding to this RFI does not preclude participation in any future Request for Quote (RFQ) if one is issued. Any information submitted by respondents to this RFI is strictly voluntary. All submissions become property of the City of Madison and will not be returned.

INTRODUCTION

The City of Madison (City) is soliciting information and recommendations from qualified companies with building operating systems that incorporate functionalities of either (or all) Energy Management Information Systems (EMIS), Demand/Peak Load Management, or Grid-interactive Efficient Building (GEB) platforms. These solutions are to be considered for deployment across several City-owned buildings. This solicitation is part of a US Department of Energy (DOE) funded Connected Community pilot in which GEB platforms will be deployed first in City buildings and then, if successful, to local businesses through a utility program. Implementing partners on the DOE project include the City, the local utility Madison Gas and Electric (MGE), Slipstream, RMI, ACEEE, and bluEvolution.

The ideal platform would interface with, monitor, and control some or all of the following behind-the-meter, distributed energy resources (DER): HVAC equipment, networked lighting systems, electric vehicle supply equipment (EVSE), photovoltaic (PV) inverters, and battery energy electric storage systems (BESS.) It would also be able to receives signals from a utility or grid operator, as well as data from third-party data streams including weather or emissions factors. It is possible that the project will need to combine more than one solution to achieve all of these goals.

Technology and service providers are invited to submit their solutions and ideas in accordance with this RFI. Questions related to this RFI can be directed at any time to Jon Evans at jevans@cityofmadison.com.

REQUIREMENT SCOPE & OBJECTIVE

The objective of this RFI is to identify potential solutions that meet the City's need to execute the deployment of a GEB platform. Broadly, the required solution will be software-based and enable data acquisition from a range of existing and yet to be installed components as described above. It will have the ability to interface with a variety of data formats common to the types of systems and devices described above, normalize and tag data, perform sophisticated analysis of the data and enable predictive energy and demand management via automated adjustments to building control systems.

The solution must be able to easily integrate with the City's existing architecture. For HVAC, all buildings have a modern Niagara 4 system of JACE appliances installed in each building and a Niagara 4 server to host graphics and alarms for building operators. All buildings have a Honeywell automation system using this Niagara framework. Table 1 provides order-of-magnitude estimates and descriptions of the DERs and GEB strategies to be demonstrated in the City facilities. With a successful demonstration there is significant potential for scaling further within an MGE pilot program of up to 10 additional commercial buildings.

Table 1: DER and GEB strategy description.

Application	Quantity	Example strategies to demonstrate
Building Load Shaping	5-6 municipal buildings; 300,000 ft^2	Enhanced energy efficiency of HVAC and lighting
		Load shed via Automated Demand Response (ADR) of HVAC and lighting
EV Managed Charging	20 Level 2 chargers serving 40 electric vehicles	Load shift via managed charge and supplemental batteries
Smart Inverters + Batteries	Smart inverters on 10 PV systems; Add batteries to 2 sites	Smart inverter functionality. Generally following California Rule 21 requirements, inverters should be able to provide dynamic reactive and real power support, voltage and frequency ride-through with adjustable trip settings, and ramp rate controls. Batteries should be able to provide the same functions, in addition to load shift.

GEB Solution Information

For the following sections and in the spaces provided, please provide details on your solution and, where applicable, examples (i.e., software platform architecture diagram, user interface screenshots, code snippets, links to documentation, a list of compatible communication protocols) of existing or planned solutions that demonstrate the ability to fulfill the requirements. *For the **Capability** column, simply state whether the capability is "Existing", "None", or list a date when it is planned to be included in the solution.

Feature	Capability*	Example, explanation, links
Technical Requirements • **Integration** |The EMIS vendor must have the ability to setup an IoT gateway device (or utilize a Niagara framework driver to integrate the existing Honeywell JACE 8000 appliances) in each building within scope. An IoT gateway device must integrate with a variety of operations technology (OT) networks such as HVAC controls, networked lighting, electrical metering, EVSE, PV inverters, or BESS via the buildings local area network (LAN). The IoT gateway must be capable of reading on 1-minute intervals all required OT equipment I/O sensor or output data points via third party protocols such as Open API and/or industry standard software protocols (e.g. BACnet, Modbus, DNP3, and/or OCPP). • **Accessibility** | Available for access through a non-proprietary thin client, over a wide area network, or available on a cloud instance of the software by end-users 24x7x365 during non-maintenance windows. Ability to be supported locally and remotely. • **SOO Storage** | Store Sequence of Operations (SOO) in text format for reference and should also provide capability to download SOOs in text or PDF format. • **SSO & User Authentication** | Capable of Single Sign On (SSO) and multi-factor authentication. • **Scalability** | Scalable to include all assets with the		

Feature	Capability*	Example, explanation, links

portfolio. This could potentially scale to multiple different portfolios of buildings in MG&E territory.
• **User Roles** | Provide the ability to assign dashboard views by the defined user groups based on organization role. Provide the ability to customize user groups in terms of access levels and which buildings can be accessed. Provide the ability to set expiration dates on access. The minimum number of user groups would be:
  ○ Superuser (administrative access)
  ○ Management user
  ○ Read-only user
• **Operating system** | On premises solutions compatible with MS Windows OS systems or supportable Linux OS.
• **Hosting** | Capable of deployment through a cloud hosted (SaaS) solution or on-premises, depending on requirements. In the case of a hosted solution, the system has a production environment and a test environment.
• **Upgrades** | Deployed technology must be upgradable to stay current with software and hardware compatibility.
• **Custom Reports** |Ability to provide users to create and save custom reports (pdf, word, excel, etc.) based on user defined time ranges for selected data as defined in a dashboard		

Data Normalization and Integration • **Integration Layer** | Act as a system integration and data normalization layer for all integrated systems. Also known as an independent data layer (IDL). • **Database Connectivity** | Allow for cloud-based database connectivity, including support for SQL-compatible databases and time series databases. • **API Connectivity** | Provide open APIs for integration enablement with third party software applications. Allow for integration with SOAP/REST APIs.		

Feature	Capability*	Example, explanation, links
• **Data Tagging and Ontology** | Utilize a standard naming and tagging convention (e.g. Haystack or Brick Schema ideally) and utilize standardized ontologies for data modeling (e.g., Digital Twin Definition Language). • **Integrated Data** | Does the system provide an integrated programming interface (ideally utilize block programming) or a rules engine and allow an event in one subsystem to trigger an action sequence in a secondary subsystem? • **Integrated System** | Integrate with following systems using open protocols or REST APIs for data normalization, command and control (with exceptions), monitoring, alarming and reporting ○ *Building Automation Systems* ○ *Lighting Controls* ○ *Utility Meters and Sub-meters* ○ *Energy Management Systems* ○ *Electrical power distribution system (read-only)* ○ *People counting or occupancy sensing platform* ○ *EVSE* ○ *PV inverters* ○ *BESS* • **Integrated Data** | Accept and utilize open protocols with underlying systems via open protocol communication, including BACnet, Modbus, oBIX, XML, JSON, SOAP, MQTT, API, SNMP, OPC, LonTalk • **Cloud backend API** | Platform provides a backend rest API service to export data telemetry data via authorized web requests. System to provide flexibility to allow data to exported in batches per building per equipment type.		
<u>User Interface</u> • **Graphics |** Utilize graphics with Responsive Web Design (RWD), with HTML 5 preferred. System application is accessible through HTML 5 browser (Chrome or Edge). System is optimized for Mobile or Tablet applications.		

Feature	Capability*	Example, explanation, links
• **Graphic User Interface** | Ability to configure dashboard views and information displayed in each view. Ability to build and configure unique dashboards without requiring custom programming or vendor dependence. • **Key Performance Indicators (KPIs)** | Ability to generate performance indicators and provide visualization of performance in dashboard or simplified indicators. Ability for users with elevated rights to independently create unique KPIs without requiring custom programming or additional support from vendor. See Table 2 for a list of likely KPIs. • **Views** | Include the following pages at a minimum: ○ ***City-Wide or Portfolio-level view*** Confirm if it would include building list, portfolio energy consumption and real time electric demand, alerts for new peaks, total PV output, critical alarms. Confirm if these views roll-up and are visible at the City-Wide Portfolio level ○ ***Building-level view*** Confirm if it would include real time energy usage, alarms, real time weather, predicted demand, KPIs, actual demand, view of PV, battery storage and car charging metrics where applicable. ○ ***System-level view*** Confirm if it would include the ability to see waterfall of relevant data for PV, battery storage and car charging stations for those sites that have them as defined by Table 3 • ***Alarm Summary view*** Confirm if it would provide the ability to review alarms, sort by category (e.g. priority, equipment type, date, etc.) and track number of occurrences using a parent/child hierarchy. • **Visualization |** Key visualizations would ideally be: ○ Heat maps of energy usage by hour and day. ○ Predicted or baseline kW load profile, actual real-time kW load profile in a time series with		

Feature	Capability*	Example, explanation, links
adjustable time scale for past, more granular present, and future forecasted views. ○ Five-day forecast of peak demand each day ○ Portfolio summaries that roll up multiple buildings demand and/or other points • **User Group Data Points** | Confirm if it would provide the ability to viewpoint data by User Group. Data elements for each alarm include but are not limited to: ○ Building ○ Building System (heating, cooling, central plant) ○ Equipment Type ○ Point Type ○ Point Name ○ System Tag ○ Point Tag		
Data Storage • **Data Policies** | Meet or exceed data policies, including data privacy, storage, retention, destruction, and usage • **Aggregation** | Allow the ability to collect data from disparate intelligent building systems and place in a single data repository that can be accessed and used by other integrated systems and software • **Data Storage** | Provide ability to scale and increase the amount of data points stored to support integration with selected buildings • **Data Trending** | Provide the ability for users to select data stored and trended including but not limited to points, values, point name, timeframe, and sampling rate. Ability to store up to 5 years of data for primary equipment to monitor asset KPIs (e.g., kW per ton for chillers, load profile, or damper position for min OA to monitor potential fouling on air flow stations, etc.) Ability to chart in different sets of trend data together to identify corollaries.		

Feature	Capability*	Example, explanation, links
Reporting • The solution can provide [year-over-year, month-over-month, week-over-week, or day-by-day] [energy, cost, and/or equipment health and performance reports] in a format specified by or acceptable to the owner • **User Rights** | System can assign rights to the reports tool, access to reports, and provide an audit log of changes made by each user. • **Active Sites** | System provides a list of active sites that are live and connected and a list of sites that are having data update issues. • **Formats** | System provides reports in multiple file formats (xls, word, csv, sql, and other accepted database formats, etc.) • **Graphics** | System allows ability to create graphics within reports. • **Exporting** | System provides the ability to export raw data. • **Public dashboard** | public dashboard for reporting aggregated energy-savings and emissions reductions metrics to building occupants • **Scheduling** | System can schedule report distributions. • **Automatic Generation** | System can automatically generate reports. • **Overrides** | System can provide current list of equipment or setpoints in override status. (I.E., building operator overriding BACnet HVAC equipment on BACnet priority 8 via the BAS) • **Notifications |** The solution can provide customizable notification schemes including: [work order generation, e-mail, phone, text message, to individual and/or group recipients] for data quality alerting, anomaly detection, and fault detection		

Feature	Capability*	Example, explanation, links

Energy Management
• **Data Availability |** Provide time stamp, demand (kW), usage (kWh) and temperature (F) and comparisons to historical values. Ability to identify the highest monthly peak demand window (5 to 15 minute window depending upon utility rate structure).
• **Energy Usage Intensity (EUI) |** Provide EUI values based on existing meter data and provide comparison to past EUI performance.
• **ENERGY STAR rating |** Confirm if the system can use EUI data and based on ASHRAE climate zone provide comparison to equivalent ENERGY STAR rating (e.g. 25th percentile of energy usage for similar building stock)
• **Greenhouse Gas Emissions (GHG) |** Provide GHG emissions based on meter data, and be able to bring in real-time, day-ahead grid carbon intensity data from sites like:
  ○ https://www.watttime.org/
  ○ https://www.wattcarbon.com/
• **Utility Rate Tracking |** System can use utility rate information to identify the cost impacts of demand and usage including on-peak and off-peak or other similar rate structures.
• **Fault detection and diagnostics |** Ability to analyze system function, primarily HVAC but possibly other systems, and automatically identify faults for improved energy and maintenance performance as defined by Table 3.		

Demand Management • **Advanced Analytics for Building Automation Performance** | Ability to make consistently accurate (+/- 5%) predictions on the time and magnitude of a building's daily peak demand. • **Automated Adjustments of Control Systems** | Ability to		

Feature	Capability*	Example, explanation, links
affect adjustments to the building control systems (e.g. BAS and lighting) to conserve energy. • **Automated Demand Management** | Ability to leverage predictions on peak demand or planned load shed such that real time, automated adjustments to building control systems, EVSEs, and BESS will be implemented to achieve target reductions. • **Automated Demand Response** | Ability to receive DNP3, IEEE 2030.5, or OpenADR (including integration to OpenADR top node) and implement pre-defined load shed of building control systems, EVSEs and BESS. • **Utility program integration** | Experience integrating the product into utility demand response or utility energy efficiency programs.		
Integration with other distributed energy resources • **PV Integration |** Ability to interface with local inverters using SunSpec Modbus, API, and/or IEEE 2030.5. Must support at minimum SolarEdge, Fronius, and SMA inverters. • **BESS Integration |** Ability to interface with local BESS using one or more of SunSpec Modbus, API, IEEE 2030.5, DNP3 and/or MQTT • **EVSE Integration** | Ability to interface with local EVSE using OCPP, OpenADR, API, or IEEE 2030.5. Must support at minimum EnelX chargers with JuiceNet.		
Integration with utility, grid operator, or aggregator signals • **Receive GEB signals |** Ability to receive and respond to OpenADR and/or IEEE 2030.5 signals • **Access real-time market data |** Ability to read, via API, weather, wholesale market prices, real-time emissions		

Feature	Capability*	Example, explanation, links
rates, etc. • **Record and report data during mandatory demand response events |** Ability to record data as specified by utilities, grid operators, and/or aggregators for the purposes of verifying participation in mandatory demand response tests and events.		

Other *optional* functions
• **Maintenance management |** Ability of the solution to integrate with a work order management system. Ability to automatically push faults and pull data.
• **Integration with lighting control systems |** Experience (not just ability) integrating with common lighting control platforms to integrate lighting control data and analysis into EMIS. The default or standard system in City buildings is Lutron Vive.
• **Ability to Integrate 3rd Party Data Sets |** Ability to be deployed using an integrated data layer provided by a separate entity?
  ○ Would integrating with this data layer impact your solution's ability to push automated changes to building control systems?
  ○ Would you need to receive this data layer in any particular format?		

Service

For the City's part, they will have dedicated building operation and management staff trained to use the GEB Platform. It is anticipated to be a multi discipline team comprised of engineers, consultants, contractors, mechanics, electricians, custodians, and other admin staff that will view dashboards, determine performance needs, prioritize and communicate changes, follow-up and work together to implement changes, and implement mechanical and control sequence changes based on how the buildings are currently performing. The multi discipline team will also determine if changes are negatively impacting other staff working in the buildings. IT staff will support as needed with troubleshooting network connections or hardware/software approvals or installs.

Describe your service model. What role does a third-party integrator typically have to play for installation and setup? What about for ongoing maintenance?

Also describe if there are any other staffing considerations to operate the solution other than that described above. Describe any system warranties that are offered beyond or as an alternative to the service offering.

Respond below:

Cybersecurity

Do you see any major issues with meeting the City of Madison's cybersecurity policies, standards, and guidelines? Policies & Standards | EmployeeNet, City of Madison, Wisconsin

Respond below:

Cost

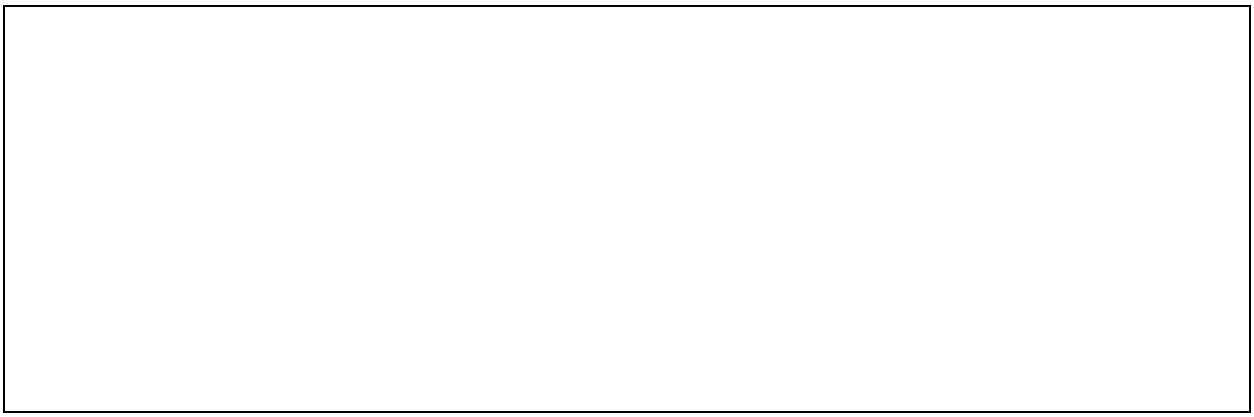
Please provide any generally available information on the cost to both procure and operate the solution. Use whichever cost model is most typical or that you think is best fit for a customer like the City of Madison (per point, per ft^2, etc.). *At this time this is not a request for a specific cost proposal tailored to the city's current project*. List all the different costs that tend to be billed by your firm or third-parties necessary for implementation, including: licensing, fixed install cost, ongoing service cost.

Respond below:

Buy American Requirement

It is likely that all manufactured products installed are subject to federal Buy American requirements. This means the manufactured product was manufactured in the United States, and the cost of the components of the manufactured product that are mined, produced, or manufactured in the United States is greater than 55 percent of the total cost of all components of the manufactured product, unless another standard for determining the minimum amount of domestic content of the manufactured product has been established under applicable law or regulation. Do manufactured products needed for your solution meet Buy American requirements?

Respond below:



APPENDIX A: System Level KPIs

Table 2: System level KPI's detail.

System-level KPIs	EMIS View	Action
Occupant Comfort Index (%)	% of operating hours spent within the zone target temperature	Measure for each zone or collection of zones. Track the average, minimum, and maximum values for each building.
Cooling Plant Efficiency (kW/ton)	Daily profile kW/ton Daily Average (kW/ton)/ton (kW of entire plant preferred)	Varies based on load. Review kW/ton vs. ton plots to identify performance drift.
Heating Plant Efficiency (%)	Btu per hour (out) / Btu per hour (in); Review daily profile	Varies based on load. Review efficiency vs. load plots to identify performance drift
Fan System Efficiency (%)	kW of supply/return/exhaust fans per cubic foot per minute (cfm) of airflow	Varies based on load. Look for variance between air handlers or performance drift.
Chilled water delta T	Daily average difference in chilled water supply and return temperature	If there is an insufficient temperature difference, investigate over-pumping
Measured variable (e.g., supply air temperature, zone airflow rate, zone temperature)	Percentage of time that the measured variable is maintained within the desired deadband (setpoint ± threshold) during the period	Compare multiple components (e.g., VAV terminal units, AHUs) to find the best and worst performers; prioritize maintenance and repair.

Table 3: Fault detection and requirements detail.

System-level KPIs	EMIS View
General faults	• Sensor errors/faults including drift, bias flatline, or complete failure • Stuck/leaky valves and dampers in water- and air-side systems • Scheduling, i.e., HVAC use outside of intended hours of operation • Hunting or cycling, i.e., poorly tuned control loops, cooling tower fan cycling • Manual overrides in place

Chilled water plant	• Chilled water supply temperature reset • Chilled water plant lockout • Hydronic differential pressure reset • Cooling tower leaving water temperature reset • Chiller short cycling • Over-pumping and low delta T (for primary secondary chilled water pumping systems) • Monitoring optimum chiller plant performance
Air-handling unit / Packaged rooftop unit	• Under or over economizing due to sensor, damper, or control sequence issues • Excessive outdoor air intake • Unnecessary simultaneous heating and cooling due to sensor, valve, and control sequence issues • Air-handler unit (AHU) supply air temperature reset • AHU static pressure reset • Fouled or blocked coil and dirty filters • Compressor fault/failure (only for packaged rooftop unit) • AHU optimum start/stop
Terminal units	• Variable air volume (VAV) minimum supply airflow too high (causing reheat) • Zones are outside an acceptable space temperature range • Space heating and cooling setpoints: insufficient deadband or night setback • Rogue zones driving the AHU system to inefficient operation
Hot water plant	• Hot water plant lockout • Hot water supply temperature reset • Hydronic differential pressure reset • Boiler short cycling