

## 2008 Innovations Awards Program APPLICATION

CSG reserves the right to use or publish in other CSG products and services the information provided in this Innovations Awards Program Application. If your agency objects to this policy, please advise us in a separate attachment to your program's application.

ID # (assigned by CSG): 08-M-05MI

**Please provide the following information, adding space as necessary:**

State: MICHIGAN

Assign Program Category (applicant): ENERGY (Use list at end of application)

1. Program Name Building Operations and Energy Management Network (BOEMN)
2. Administering Agency Department of Management and Budget (DMB) Facilities Administration
3. Contact Person (Name and Title) Keith Paasch, Director, Building Operations Division
4. Address 530 West Allegan Street, Lansing Michigan 48909
5. Telephone Number 517-373-0185
6. FAX Number 517- 241-3143
7. E-mail Address paaschk@michigan.gov
8. Web site Address [www.michigan.gov/dmb](http://www.michigan.gov/dmb)
9. Please provide a two-sentence description of the program. The Building Operations and Energy Management Network will create a model infrastructure for building operations, energy controls and communication by consolidating the monitoring and management of all HVAC, lighting, elevators, and energy metering into one system, regardless of original equipment manufacturer. The BOEMN will empower state government to more accurately manage building operations, monitor and optimize energy usage, provide fiscal savings through competitive bidding, and implement standardized training.
10. How long has this program been operational (month and year)? Note: the program must be between 9 months and 5 years old on March 1, 2008 to be considered. Design of the BOEMN began in February, 2006.
11. Why was the program created? What problem[s] or issue[s] was it designed to address?  
Under the leadership of Governor Jennifer M. Granholm and her directives to spend taxpayer dollars responsibly and to decrease energy use, the DMB Facilities Administration Building Operations Division, has been researching methods to pioneer new initiatives in fiscal, operational and energy efficiencies. Beginning with an extensive operations analysis of Michigan's 39 buildings, the following issues were identified:
  - Building control systems have been proprietary and individually hard-wired to central control stations, requiring exclusive contracts for services, and limiting the opportunity for competitive bidding.

- Traditional building controls systems utilize proprietary communication protocols by design, forcing customers to maintain sole-sourcing relationships.
- Existing systems do not provide the means to monitor energy usage in real time, nor report energy usage data in formats which are user friendly.
- Monitoring systems and procedures vary from building to building which:
  - Limits capability for predictive maintenance.
  - Limits ability to perform normalized cost analysis.
  - Requires training of multiple systems and procedures for building personnel to work in multiple buildings.
  - Limits opportunities for operational optimization.

12. Describe the specific activities and operations of the program in chronological order.

- 02/2006 Identify Tridium's Niagara Framework as the acceptable platform upon which to build the communications network.
- 03/2006 Partner with Department of Information Technology, Telecom, and Enterprise Security to utilize existing network infrastructure.
- 06/2006 Internal staff certified in Niagara AX.
- 08/2006 Initial framework complete, servers online.
- 09/2006 First real-time utility metering data streamed to the server.
- 10/2006 First Trane HVAC system integrated.
- 11/2006 Began collecting real-time weather data to new database for weather normalization purposes.
- 02/2007 First Honeywell HVAC system integrated.
- 03/2007 First live onsite BOEMN demonstration to industry professionals.
- 06/2007 First Siemens HVAC system (building) integrated.
- 08/2007 Invited to make a presentation introducing Michigan's BOEMN at Niagara World Summit in May, 2008.
- 12/2007 First bank of elevators integrated to the framework.
- 02/2008 First lighting integration to the framework.

13. Why is the program a new and creative approach or method? BOEMN is the first full building automation system integration of its kind within state governments. For the first time, Michigan state government will be able to monitor, navigate and optimize facility controls and real-time energy usage for buildings throughout the state from remote locations.

14. What were the program's start-up costs? (Provide details about specific purchases for this program, staffing needs and other financial expenditures, as well as existing materials, technology and staff already in place.)

- Initial Niagara AX and Vikon Energy Suite software purchase: \$9,100
- (2) web servers and (2) data servers for statewide network data collection: \$60,000
- Initial network programming: \$57,000
- Hardware and programming costs varied per building, depending on architecture design and the level of integration.

15. What are the program's annual operational costs? The annual site license fee is \$2,500. Aside from the license fee and occasional hardware replacements or upgrades, there

are no additional annual operating costs. Internal and inter-departmental costs are not included.

16. How is the program funded? This project has been primarily funded through building occupancy charges, which are operating dollars for the Building Operations Division. Some portions were funded by the State Building Authority building renovations.
17. Did this program require the passage of legislation, executive order or regulations? If YES, please indicate the citation number. No.
18. What equipment, technology and software are used to operate and administer this program?  
Equipment – JACE Controllers manufactured by Tridium.  
Technology – The Niagara Framework ®, a universal software platform that helps manufacturers to develop Internet-enabled equipment systems and device-to-enterprise applications. Niagara resolves the challenges associated with open systems, integration and interoperability by integrating diverse systems and devices – regardless of manufacturer or communication protocol – into a unified platform that can easily be managed and controlled in real-time over the Internet.  
Software – NiagaraAX is a software framework and development environment that solves the challenges associated with building Internet-enabled products, device-to-enterprise application and distributed Internet-enabled automation systems. The core concept of Niagara is its unique, patented component model that transforms the data from diverse external systems into uniform software components. These components form the foundation for building applications to manage and control the devices.
19. To the best of your knowledge, did this program originate in your state? If YES, please indicate the innovator's name, present address, telephone number and e-mail address. Yes. This project was developed by multiple team members from DMB Facilities Administration, Building Operations Division.  
Keith Paasch, Director, Building Operations Division, DMB Facilities Administration, 530 West Allegan Street, Lansing Michigan 48909; 517-373-0185; paaschk@michigan.gov
20. Are you aware of similar programs in other states? If YES, which ones and how does this program differ? The States of Virginia and California have implemented partial systems. The State of Michigan is different because it surpasses metering to incorporate full building automation systems.
21. Has the program been fully implemented? If NO, what actions remain to be taken? Opportunities to optimize this system will always exist. Initial implementation continues as available and appropriate resources can be applied. Michigan has prioritized energy management and metering functionality in this system, but several buildings have HVAC connected, while others have elevator monitoring and lighting control capabilities in place.
22. Briefly evaluate (pro and con) the program's effectiveness in addressing the defined problem[s] or issue[s]. Provide tangible examples.  
By incorporating all aspects of data gathering, command and control into the Building Operations and Energy Management Network, we will be able to:

- Assume ownership and control over building operations and services.
- Utilize the intuitive design and concise graphic displays to monitor service and energy use and needs on a state-wide, group or individual building basis.
- Achieve cost savings through the competitive bidding for service and maintenance; we will no longer be tied to the equipment manufacturer.
- Access all usage data, providing the ability to perform normalized cost and use analysis to more accurately predict future maintenance and energy needs.
- Report usage data.
- Implement energy saving changes to multiple-building systems.
- Conduct in-house monitoring of systems performance to provide faster detection of needs servicing.
- Perform pre-emptive equipment servicing.
- Train building staff on one system, resulting in reduced training costs and staff prepared to work in multiple locations.
- Modify/change control settings from a remote location.

The initial savings realized when upgrading existing building controls using the BOEMN has been projected to reach \$500,000 per building, based on cost estimates from recent bid results. The State of Michigan will also save an additional \$400,000 through the cancellation of sole source maintenance agreements totaling \$700,000.

23. How has the program grown and/or changed since its inception? The original concepts and intent of the program remains unchanged. It is expected that fire systems monitoring will be added in the future. Access control, security and tenant billing may also become future options.
24. What limitations or obstacles might other states expect to encounter if they attempt to adopt this program? It is important that leadership for both building controls and information technology partner early in the process. Successful implementation will require significant involvement by both groups if utilization of existing equipment and infrastructure is to be optimized.