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2/8/17

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MTSU Clean Energy Initiative Project Funding Request

There are five (5) sections of the request to complete before submitting. See <http://www.mtsu.edu/~sga/cleanenergy.shtml> for funding guidelines. Save completed form and email to cee@mtsu.edu or mail to MTSU Box 57.

1. General Information

Name of Person Submitting Request
Alan Parker

Department/Office
Facilities Services Department

Phone # (Office)
615-898-2392

MTSU Box #
32

Phone # (Cell)
615-948-3082

E-mail alan.parker@mtsu.edu

Submittal Date
2-7-17

2. Project Categories (Select One)

Select the category that best describes the project.

<input checked="" type="checkbox"/>	Energy Conservation/Efficiency	<input type="checkbox"/>	Sustainable Design
<input type="checkbox"/>	Alternative Fuels	<input type="checkbox"/>	Other
<input type="checkbox"/>	Renewable Energy		

3. Project Information

- Please provide a brief descriptive title for the project.
- The project cost estimate is the expected cost of the project to be considered by the committee for approval, which may differ from the total project cost in the case of matching funding opportunities. **Any funding request is a 'not-to-exceed' amount. Any proposed expenditure above the requested amount will require a resubmission.**
- List the source of project cost estimates.
- Provide a brief explanation in response to question regarding previous funding.

3a. Project Title
Satellite Chilled Water Plant Energy Study

3b. Project Cost Estimate
\$17,066

3c. Source of Estimate
Quote from vendor - see attached + 5% contingency

3d. If previous funding from this source was awarded, explain how this request differs?

4. Project Description

(Completed in as much detail as possible.)

- a. The scope of the work to be accomplished is a detailed description of project activities.
- b. The benefit statement describes the advantages of the project as relates to the selected project category.
- c. The location of the project includes the name of the building, department, and/or specific location of where the project will be conducted on campus.
- d. List any departments you anticipate to be involved. Were any departments consulted in preparation of this request? Who? A listing may be attached to this form when submitted.
- e. Provide specific information on anticipated student involvement or benefit.
- f. Provide information for anticipated future operating and/or maintenance requirements occurring as a result of the proposed project.
- g. Provide any additional comments or information that may be pertinent to approval of the project funding request.

4a. Scope: Work to be accomplished

The scope of work involves a study of the Satellite Chilled water plant to determine potential energy conservation measures that could be implemented in the chiller, cooling tower, and pumping arrangements currently operating in the plant.

4b. Scope: Benefit Statement

Several potential opportunities exist within the satellite plant to improve energy conservation. This study will provide detailed calculations to determine the best options for future implementation.

4. Project Description (continued)
4c. Location of Project (Building, etc.) Satellite chilled water plant
4d. Participants and Roles Alan Parker - Director of Engineering Linda Hardyman - Center for Energy Efficiency Jeff McConnell - Engineer
4e. Student participation and/or student benefit
4f. Future Operating and/or Maintenance Requirements None required for this initial study.
4g. Additional Comments or Information Pertinent to the Proposed Project

5. Project Performance Information Provide information if applicable. <ul style="list-style-type: none"> a. Provide information on estimated annual energy savings stated in units such as kW, kWh, Btu, gallons, etc. b. Provide information on estimated annual energy cost savings in monetary terms. c. Provide information on any annual operating or other cost savings in monetary terms. Be specific. d. Provide information about any matching or supplementary funding opportunities that are available. Identify all sources and explain.
5a. Estimated Annual Energy Savings (Estimated in kW, kWh, Btu, etc.) Our current chilled water plants operate around 1.1-1.2 KW/ton. The full implementation of a chiller-tower-pump optimization scheme has the potential for driving the overall plant efficiency down to as low as 0.55 KW/ton. This study will identify the additional infrastructure needed to approach that goal.
5b. Annual Energy COST Savings (\$) TBD
5c. Annual Operating or Other Cost Savings. Specify. (\$) N/A
5d. Matching or Supplementary Funding (Identify and Explain) The Facilities Services Department may provide matching funds.



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DATE: 9/29/2016	QUOTE: MM16-054	PAGES: 3
TO: Alan Parker MTSU		PROJECT: MTSU Chilled Water Plant Study LOCATION: Murfreesboro, TN

I offer the following for your consideration:

ARMSTRONG OPTIMIZATION SURVEY & STUDY SATELLITE CHILLED WATER PLANT

It is Armstrong's opinion that the Satellite Plant will represent a good candidate for Armstrong's Design Envelope OPTI-VISOR module. This is based on the equipment currently indicated in the information provided.

Armstrong Optimization Survey and Study would include the following items and events for the **Satellite Plant:**

Project Gathering Details:

- Site inspection of chiller plant equipment (Chillers, pumps, cooling towers, VFD's)
- Condition assessment of chiller plant equipment
- Review of existing control strategy
- Gather name plate data
- Gather trend logs
- Gather load data
- Interview plant operators

Inspection and Documentation of Issues such as:

- Low delta T condition frequency
- Excessive end of run pressures
- Cooling Tower fill condition
- Hours of operation/low load periods
- CHWS temperature needs for special areas (e.g. dehumidification)
- Chiller communication protocol (Modbus/BACNet)
- Bypass Valves and on/off valves location and operation
- VFD's at 100% always
- How the central plant and satellite plant interact (i.e. CHWSR temperatures in the loop)
- Number of chillers running at part load

A formal report will be issued outlining the details above.

Armstrong is prepared to be on-site within 4-6 weeks of receipt of order.

Approximate time to complete this survey and study; Two (2) weeks upon return from site.

TOTAL NET PRICE, FOB FACTORY, FREIGHT ALLOWED

\$ 14,840.00 Plus Tax

Rethink Chiller Plant Investments

File No: 90.07
Date: JANUARY 16, 2015
Supersedes: NEW
Date: NEW

Investment-Grade Risk/Return Profile

Chiller plants are the most energy intensive part of your HVAC system, which makes them the most expensive to operate. So a chiller plant optimization brings the promise of significant savings. As with any high return opportunity one naturally assumes there must be high risk associated, but in this case we've removed the risk.

Savings. Guaranteed.

Armstrong has proven, industry-leading expertise in chiller plant automation and system optimization. After performing a detailed analysis of your system, Armstrong will make a

commitment to you for future annual energy savings in the form of a savings guarantee. If, in the first year of operation with our optimization strategy, we fall short of our annual

We've taken the risk out of chiller plant optimization.

savings guarantee, Armstrong will pay you three times the shortfall for that first year of operations, up to \$100,000.

Our chiller plant optimization uses a comprehensive approach that involves you at every step. The offer includes the additional control equipment and a collection of services. Services include but are not limited to commissioning, project management, automated diagnostics, maintenance recommendations and operational recommendations.

You Save or We Pay.


No other HVAC company offers the same combination of high-efficiency solutions and comprehensive services. And no other HVAC company has the confidence to offer a guarantee like this.

**SAVINGS****GUARANTEE**

Armstrong will commit an annual energy savings after a detailed analysis.

If there is a shortfall in the guaranteed savings in the first year of operation,

Armstrong will pay you three times the shortfall for that year up to a maximum

**\$100,000**

For more information, contact
your Armstrong Representative
or visit us at:
www.armstrongfluidtechnology.com