

Rec
9/30/16

30
1

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 9-30-16

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
<p>a. Please provide a brief descriptive title for the project.</p> <p>b. 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.</p> <p>c. List the source of project cost estimates.</p> <p>d. Provide a brief explanation in response to question regarding previous funding.</p>
3a. Project Title Satellite Chilled Water Plant Energy Study
3b. Project Cost Estimate \$17,066
3c. Source of Estimate Quote from vendor - see attached + 10% overhead + 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.

- 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.



Nashville • Knoxville • Kingsport

Rome, Eddleman & Associates, Inc.
2603 Grandview Avenue
Nashville, TN 37211
Phone: 615-832-6912
Fax: 615-834-8125
www.reahvac.com

Table with 2 columns: Metadata (DATE, QUOTE, PAGES) and Project Details (TO, PROJECT, LOCATION).

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

REA, Inc. TERMS AND CONDITIONS

1. TERMS OF SALE. Sales of merchandise covered by this proposal to the purchaser are made solely on the terms and conditions hereof.
2. MANUFACTURERS' TERMS AND CONDITIONS. All of the manufacturers' terms and conditions of sale expressly apply to this quotation, and to purchases made pursuant hereto.
3. PRICES. Prices quoted herein are subject to change without notice and orders calling for future delivery will be billed according to the price in effect at the time of delivery unless the manufacturer protects the quoted price for a longer period. Written quotations automatically expire thirty (30) calendar days from the date issued and are also subject to termination by notice within that period.
4. TERMS OF PAYMENT. Terms of payment shall be as set forth in the manufacturers' terms and conditions, or as otherwise determined by the manufacturers or as set forth on the face of this quotation. **Credit Card Payments will have 3.00% added to the proposal amount to cover fees assessed by the credit card companies.**
5. DELIVERY CHARGES. REA, Inc., shall not be responsible for freight, transportation, insurance, shipping, storage, handling, redelivery charges or similar charges unless a statement to the contrary is set forth on the face of this quotation.
6. TAXES. The amount of all present or future sales, revenue, excise, or other taxes applicable to the products listed herein shall be paid by the purchaser. Unless taxes are itemized on the proposal, they are not included therein and shall be added to the purchase price and paid by the purchaser in the same manner and with the same effects as if originally added thereto.
7. DELAYS. REA, Inc., shall not be responsible for delays in delivery or any failure to deliver due to causes beyond its control including but not limited to acts of God, war, riots, embargoes, domestic or foreign governmental regulations or orders, fires, floods, strikes or other labor difficulty, or inability to obtain shipping space or transportation.
8. CANCELLATION. An order once placed and accepted may not in any event be cancelled by the purchaser unless the purchaser shall obtain the written consent of REA, Inc. and the manufacturer and shall reimburse REA, Inc. and the manufacturer for any and all expenses and losses occasioned by said cancellation.
9. WARRANTY. The only warranty applicable to the products listed in the foregoing proposal are those given by the manufacturer thereof. REA, INC. MAKES NO WARRANTIES AS TO MERCHANTABILITY OR AS TO THE FITNESS OF THE MERCHANDISE FOR ANY PARTICULAR USE AND SHALL NOT BE LIABLE FOR ANY LOSS OF DAMAGE DIRECTLY OR INDIRECTLY ARISING FROM THE USE OF SUCH MERCHANDISE OR FOR ANY INCIDENTAL OR CONSEQUENTIAL DAMAGES INCIDENT THERETO. REA, Inc. assumes no responsibility and gives no warranty with respect to any technical assistance given to the purchaser, or other performance by REA, Inc., in connection with the purchase, installation and operation of merchandise or equipment purchased pursuant to this proposal. No person, agent, distributor, or dealer is authorized to give any warranties on behalf of REA, Inc. nor to assume for REA, Inc. any liability in connection with the foregoing proposal.
10. DAMAGE DURING DELIVERY. All material or merchandise shall be shipped F.O.B. point of shipment. It shall be the purchaser's responsibility to verify the condition and quantities of the material or merchandise upon receipt. All freight claims, for damage or otherwise, shall be between the purchaser and the freight company.
11. PURCHASE AND RESALE. All of the terms and conditions listed herein shall apply in the event that the merchandise listed in the foregoing proposal is purchased by REA, Inc. and sold or resold by it to the purchaser.
12. MODIFICATION. The foregoing proposal and terms and conditions may not be modified or terminated orally. No claimed modification, termination or waiver of any of the provisions hereof shall be valid unless by writing signed by REA, Inc. duly authorized agent.
13. APPLICABLE LAW. The foregoing proposal shall be governed by and construed according to the laws of the State of Tennessee.
14. TERMS OF ACCEPTANCE AND SALE. The foregoing proposal is expressly subject to acceptance by REA, Inc. and the manufacturers. The provisions stipulated in this proposal supersede any communication expressed or implied, written or verbal, between the parties hereto and when accepted shall constitute the sole and entire agreement between the parties. Sales of goods covered hereby to the purchaser are made solely on the terms and conditions hereof notwithstanding any additional or conflicting terms and conditions that may be contained in any purchase order or other form of the purchaser, all of which additional and conflicting terms and conditions are hereby rejected by REA, Inc.

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