REQUEST FOR BOARD ACTION

HENDERSON COUNTY BOARD OF COMMISSIONERS

MEETING DATE:	August 2, 2010
SUBJECT:	Energy Efficiency in Government Buildings Grant
ATTACHMENTS:	Yes Grant Proposal

SUMMARY OF REQUEST:

A grant application will be submitted prior to the August 10, 2010 deadline for the Energy Efficiency in Government Buildings Grant overseen by the North Carolina Energy Office. The Henderson County, North Carolina HVAC and Control System Upgrade Project is for \$360, 270 for controls for Henderson County buildings (Main Library, King Street Building, Human Services, and 1995 Courthouse), \$9,168 for optimization at the Historic Courthouse, and \$51,965 for a new HVAC system for the Whitmire Building for the City of Hendersonville. The total proposal will cost \$421,403. An estimated \$82,000 will be received from Duke Energy, the local utility service provider, in energy efficiency incentives. Subtracting out the incentives received from Duke Energy, the total grant proposal will be for \$339,403. Henderson County will not leverage matching funds. The costs savings are estimated at \$60,515 and approximately 2,712,063 kBTU of energy will be saved in the first year. This also equates to an estimated 509.2 metric tons of greenhouse gases cut.

The current draft of the proposal is attached.

BOARD ACTION REQUESTED:

To authorize the County Engineer to submit the Energy Efficiency in Government Buildings Grant application for the HVAC and Control System Upgrade Project.

Suggested Motion(s):

I move that the Board authorize the County Engineer to submit the Energy Efficiency in Government Buildings Grant application for the HVAC and Control System Upgrade Project.

<u>Title: Henderson County, North Carolina HVAC and Control System</u> <u>Upgrade Project</u>

Energy Efficiency and Municipal Buildings (Recovery Fund)

Grant Proposal Submitted to: Department of Commerce,

State Energy Office

Henderson County, North Carolina

Department of Engineering

100 N. King St.

Hendersonville, NC 28792

Voice: (828) 694-6560

Fax: (828)697-4535

Marcus Jones, P.E. Director of Engineering

Greg Wiggins Central Services Manager

Alexis Baker Environmental Programs Coordinator

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Attachment 4: Henderson County Strategic Energy Plan

Project Overview:

The Henderson County HVAC and Control System Project is an aggregate program incorporating HVAC and Control System upgrades for Henderson County and the City of Hendersonville government buildings. Henderson County's 1995 Courthouse, Human Services, Main Library, and King Street Building will be equipped with web-based automation systems to efficiently control HVAC systems. Henderson County's Historic Courthouse will undergo a HVAC system diagnostic. The City of Hendersonville's Whitmire Building will install a new HVAC system (See Attachment 1).

The automated control systems utilized in the Henderson County buildings will create sustainable and cost-effective savings. By having these automated systems, Henderson County will take advantage of the lowest possible rates from the local utility provider. Additionally, these controls will monitor outdoor temperatures to optimize the best possible settings for energy savings, comfort, and green house gas reduction. The project will also be sustainable. The installation contractor will provide onsite training for central services employees. The parts will be warranteed for a year. Afterwards, the system will be continually maintained by Henderson County staff and an agreement will be made with the contractor for annual maintenance and upgrades to the systems. The City of Hendersonville has trained staff to maintain the newly installed HVAC system. All savings will be reincorporated into the general fund towards other government functions and programs for citizens of Henderson County and Hendersonville.

The estimated proposal is for \$360, 270 for controls for Henderson County buildings, \$9,168 for optimization at the Historic Courthouse and \$51,965 for a new HVAC system for the Whitmire Building for the City of Hendersonville. The total proposal will cost \$421,403. An estimated \$82,000 will be received from Duke Energy, the local utility service provider, in energy efficiency incentives. Subtracting out the incentives received from Duke Energy, the total grant proposal will be for \$339,403.

The entire project will be overseen by Henderson County. Mr. Greg Wiggins, Central Services manager, and Mr. Tom Wooten, City of Hendersonville Public Works Director, will ensure that the all equipment is properly installed and maintained. Mr. Wiggins will oversee monitoring and verification of the project. Mr. Marcus Jones, Director of Engineering, will be point of contact. Ms. Alexis Baker, environmental programs coordinator, will be responsible for providing electric data verifying a noticeable energy savings. All installation and equipment will be contracted and will follow the Davis Bacon Act.

Project Summary

The Henderson County HVAC and Control System Project is an aggregate project integrating new automated web-based control systems for the 1995 Courthouse, Human Services, Main Library, and the King Street Building as well as a new HVAC system for the City of Hendersonville's Whitmire Building. Henderson County's Historic Courthouse will undergo a diagnostic and repair of its current HVAC system. The proposal is for \$421,403 with \$82,000 in leverage from the Duke Energy Super Saver Incentive Program. The costs savings are estimated at \$60,515 and approximately 2,712,063 kBTU of energy will be saved in the first year. This also equates to an estimated 509.2 metric tons of greenhouse gases cut.

Project Description

Description of Current Situation

1995 Courthouse

- 15 year old chilled water/ice storage system.
- Johnson Controls BAS is outdated and is not functioning properly.
- BAS is running on a severely outdated Windows95 platform.
- Existing controls are not properly sequencing the chiller/ice storage system to maximize energy savings.
- Seasonal process of switching to the lower Utility Provider OPT rates is currently a manual process that has resulted in unnecessary peak demand charges.

Human Services

- BAS is an older version of Tracer Summit and has multiple communication errors and other operational anomalies.
- VAV boxes are not being automatically calibrated and there are scheduling problems in the Variable Air System (VAS).
- Current night setback and occupied schedules are not programmed for energy efficiency and occupant comfort.
- County personnel must physically drive to the building to access the Tracer Summit workstation data.

Main Library

- Seven gas/electric rooftop units and 2 split systems.
- All of the HVAC systems are constant volume controlled by standard thermostats.

King Street Building (100 N. King Street)

- 10 rooftop units and 5 split systems.
- Half the building is using standard thermostats to control the constant volume HVAC systems. Half is using an outdated Enerstat Zone Control System that doesn't function properly.

Whitmire Building

- Six gas furnaces,
- One air handler
- Four outdoor units.

Historic Courthouse

- Air cooled chiller
- CCN Carrier Controls
- Courthouse is simultaneously heating and cooling

Description of New Equipment

1995 Courthouse

- Web-based Tracer ES Building Automation System with the server to reside in this building. Custom programming and scheduling for the enterprise server.
- Custom graphics of floor plans and each piece of controlled/supervised equipment to be loaded onto a new SQL express server.
- Variable Frequency Drive (VFD) for efficient operation of the cooling tower fan.

Human Services

- Web-based Tracer ES Building Automation System with the server residing in the 95 Courthouse.
- Custom programming and scheduling will be provided for the rooftop VAV systems
- Custom graphics of floor plans and each piece of controlled/supervised equipment to be loaded onto the new SQL express server.

Main Library

• Web-based Tracer ES Building Automation System with the server to reside in the 95 Courthouse.

- Custom programming and scheduling for the rooftop and split systems.
- Custom graphics of floor plans and each piece of controlled/supervised equipment to be loaded onto the new SQL express server.
- Custom scheduling for night setback and occupied modes.
- Outside air monitoring station

King Street Building (100 N. King Street)

- Web-based Tracer ES Building Automation System with the server to reside in the 95 Courthouse.
- Custom programming and scheduling for the rooftop and split systems.
- Custom graphics of floor plans and each piece of controlled/supervised equipment to be loaded onto the new SQL express server.
- Custom scheduling for night setback and occupied modes.
- Outside air monitoring station.

Whitmire Building

- Six (6) 92% AFUE gas furnace
- Three (3) Twinning kits
- Three (3) $7\frac{1}{2}$ ton evaporator coils
- Four (4) outdoor units air conditioning
- One (1) Air Handler
- Four (4) 7 day programmable thermostats
- Four (4) room sensors

Historic Courthouse

- Diagnostic
- Major repairs to control system
- Repair incorrect installations

Please see attachment 1 for more information.

Project Timeline

The project will be completed within six months of receipt of purchase order and before December 2011.

September 2010: Purchase Order received

October 2010: 1995 Courthouse

November 2010: King Street Building (100 N. King Street)

December 2010: Main Library

January 2011: Historic Courthouse and Whitmire Building

February 2011: Project Completion

Estimated Savings

The total project is estimated to save \$60,515 in the first year, cut 509.2 tons of greenhouse gases, and save more than 2,712,063 kBTU in energy.

Jobs Created/Retained

Jobs Retained (Contractor installations)

Human Services 110	
Main Library 170	
100 North King 198	
Historic Courthouse 40	
Whitmire Building 40	
Total 947 ho	ours

Jobs Retained (Administration)

Monitoring and Data Validation	40
Update and Upgrading of Systems	40
Total	80 hours

All work will be accomplished within six months of receipt of grant application. A total of 1047 hours will occur within six months. This is equivalent to one (1) full time equivalent or .5 for a year.

Project Location

Henderson County is a tier 2 location. In 2008, the estimated population of Henderson County was 103,836. In that same year, the median household income was estimated at \$49,090. This is less than the state median income which is $$50,233^{1}$. Current data indicates the unemployment

¹ Henderson County Planning Department. 2009. http://www.hcplanning.org/hcstats/stats.html

rate for Henderson County is 9.3%. The unemployment rate in Henderson County is lower than the North Carolina unemployment rate which is 10.7%.²

Monitoring and Verification

Energy data is compiled into an access database and reported on a quarterly basis to the Board of Commissioners. The baseline data is included below as verification prior to beginning the project. The project will be continuously monitored and data will be provided to verify energy savings

FY 2009 Baseline Data						
					Cost	
Building	KW used	BTU	Electric Cost	Therms	Therms	Total Cost
95 Courthouse	1,947,840	6,646,614,432	\$101,110.12	29,413	\$35,751.22	\$136,861.34
Main Library	548,400	1,871,305,320	\$37,315.07	8,478	\$10,624.56	\$47,939.63
Historic						
Courthouse	585,688	1,998,543,162	\$42,101.77	12,865	\$15,634.00	\$57,735.77
Human Services	1,378,404	4,703,527,969	\$95,857.76	26,193	\$32,541.62	\$128,399.38
King Street						
Building	494,400	1,687,041,120	\$34,576.61	1,131	\$1,605.20	\$36,181.81
Whitmire Building	83,000	283,220,900	\$7,773.90	3,387	\$3,235.27	\$11,009.17
Total	5,037,732	17,190,252,904	\$318,735.23	81,467	\$99,391.87	\$418,127.10

Organization Background and Experience

Marcus Jones, P.E., Director of Engineering for Henderson County: Mr. Jones is the head of Engineering. He will serve as direct point of contact. He has overseen a recent grant for a compressed natural gas station in Hendersonville, NC to completion.

Tom Wooten, Public Works Director for the City of Hendersonville: Mr. Wooten will direct the installation and project manage all work conducted for the City of Hendersonville. Mr. Wooten has overseen several state funded grants including the Main Street grant funding.

Greg Wiggins, Maintenance Supervisor for Henderson County: Mr. Wiggins will serve as project manager for Henderson County. He is lead on a state lighting retrofit grant.

² U.S. Department of Labor. Bureau of Labor Statistics. 2009. http://www.bls.gov/bls/unemployment.htm

Alexis Baker, Environmental Programs Coordinator for Henderson County: Ms. Baker will serve as project coordinator and will be responsible for all public information and educational outreach including press releases and data reporting. She has worked with Mr. Wiggins and Mr. Jones on grant writing and energy monitoring.

Contractor: All services must go through a formal bidding process. The request for proposals will include a similar scope of work and experience as presented in this report and the attached scope and analysis from Trane. All HVAC control systems will be installed by the chosen contractor.

Budget

		Cost per	Number of	
Line Item	Line Item Summary	Item	Items	Total
Direct Costs	95 Courthouse System	\$232,000	1	\$232,000
	Human Services System	\$28,780	1	\$28,780
	Main Library	\$43,335	1	\$43,335
	King Street Building (100 N. King St)	\$56,155	1	\$56,155
	Historic Courthouse optimization	\$9,168	1	\$9,168
	Whitmire Building HVAC			
	replacement	\$51,965	1	\$51,965
Administrative Costs	Included in line item			
Leverage Costs	Duke Super Saver Incentives			\$82,000
Total Grant (less				
leverage)				\$339,403

Leverage

Approximately \$82,000 will be leveraged from the Duke Super Saver Incentive program. These rebates are received after the equipment is installed.

Required Forms



Application Information Form Energy Efficiency in Governmental Buildings

Name of OrganizationHenderson County, NC
Contact Person <u>Marcus Jones</u> Title <u>Director of Engineering</u>
Physical Address 100 N. King St.
City/County/ZipHendersonville, NC 28792
Phone (828)694-6560Fax (828)697-4535E-mail majones@hendersoncountync.org
DUNS number: 017347365 E-Procurement Registration? Yes x No
Federal Employer Identification Number or alternative identification: 566000307
Project Location (street address, city, county, zip code) Henderson County, NC 28792
Jobs - total # of people 1 (6 mo) Total # of hours 1047
Energy saved or product displaced in BTUs or therms 2,712,063,000 (1 therm = 100,000 BTUs)
Project start date September 2010 End date February 2011
Funds Requested for Solicitation No. 2010LocalGovtEduc2: \$339,403
Leveraged Funds: \$82,000 Total Project Cost: \$421,403

Grant Agreement Form

The Grant Agreement between the Department of Commerce, Energy Division (the "Agency") and the Grantee named below consists of all rights and obligations contained in the following:

Funding Opportunity and Invitation to Submit Applications Energy Efficiency in Governmental Buildings, including all Appendices and amendments thereto;

- a. Grantee's Application/Proposal as approved by the SEO;
- DOE Award Agreement DE-EE0000157, as the same may be amended from time to time;
- Applicable Directives of the OERI at http://qa.ncrecoverycms.nc.gov/Compliance/OERIDirectives.aspx#;
- d. SEP regulations, 10 CFR Part 420 at http://ecfr.gpoaccess.gov; and
- e. DOE Assistance Regulations, 10 CFR Part 600 at http://ecfr.gpoaccess.gov

The undersigned represent and warrant that they are authorized to bind their principals to the terms of this Grant Agreement. In witness whereof, the Grantee and the Agency have executed this Grant Agreement which shall become effective on the date executed by the Agency.

ORGANIZATION: He	enderson County, N	C		
CONTACT PERSON:	Marcus Jones			
CONTACT INFORMA	TION:(828)694-6560 Phone	(828)697-4535 ⁿ Fax	najones@hende: E-mai	rsoncountync.org I
BY:(Signature)	TITLE:		DATE:	_
(Printed name		****	****	*
	(Dept. of Com	merce use only)		
BY:(Signature)	TITLE:		DATE:	-
(Printed name Grant Code (non-Stat) e Entities):			

THIS PAGE MUST BE SIGNED AND INCLUDED IN YOUR APPLICATION.

U.S. DEPARTMENT OF ENERGY NATIONAL ENERGY TECHNOLOGY LABORATORY

Environmental Questionnaire for Making Individual NEPA Determinations For Activities Funded From State Energy Program Grants (ES-1)

I. BACKGROUND

The Department of Energy's (DOE's) procedures for implementing the National Environmental Policy Act (NEPA) codified at 10 CFR Part 1021 require careful consideration of the potential environmental consequences of all proposed actions early in their planning. DOE must determine at the earliest possible time whether such actions require preparation of an Environmental Assessment, an Environmental Impact Statement, or are categorically excluded from further NEPA review. You must complete this Environmental Questionnaire regarding your proposed action to provide DOE with the information it needs to determine the appropriate level of NEPA review.

II. INSTRUCTIONS

In completing this questionnaire, you must provide specific information regarding the nature of your proposed action, including information on its size, operations, and the types and quantities of air emissions, wastewater discharges, solid wastes, land disturbance, etc. You should identify the location(s) of the proposed action and specifically describe the activities that would occur at that location. In addition, you should submit a copy of your statement of work (SOW) or other description of the proposed activity as it appears in your proposal or application. You should provide all of the information about a single project (including any "connected actions" as that term is defined under NEPA) in one questionnaire. If you are proposing two or more unrelated and distinct actions (e.g., a state or tribe applying for financial assistance for a number of separate energy conservation projects), you should complete a separate questionnaire for each project.

III. <u>QUESTIONNAIRE</u>

- A. SUMMARY OF PROPOSED ACTION (Original grant recipient should fill out items 1-4 if it is providing this form to others who are seeking loans or grants from the original recipient for example, the original recipient is using SEP funds for a revolving loan or grant program.)
 - 1. Original Funding Source: 🛛 State Energy Program Grant
 - 2. Original Recipient (Name of State, Tribe, Territory, or Other Entity): State Energy Office, NC
 - 3. Grant Number: DE-EE0000157
 - 4. Name of Market Title in the Original Recipient's Grant that Would Fund this Proposal: Building Efficiency
 - 5. Proposed Action: HVAC and Control System Upgrade Project
 - 6. Proposer (if not the Original Recipient):

 7. Description (Provide a detailed summary of the nature and extent of the proposed action. The electronic form will insert additional space as needed, or use an attachment if more space is needed.): <u>HVAC attacted Control systems and new HVAC for Hendersonvill</u> 8. Summarize the addivides necessary to implement the proposed action and its all locations where each activity will exour. All activities within Hendersonville, NC. Intall control, systems in Henderson County buildings and new HVAC in Hendersonville, NC. Intall control, systems in Henderson County buildings and new HVAC in Hendersonville, NC. Intall control, systems in Henderson County buildings and new HVAC in Hendersonville, NC. 9. Does the proposed action involve disturbance of undeveloped land (e.g., forest lands, agriculture fields, grasslands, and lands, wetlands, coastal areas, etc.). 10. Describe the nature, size, and operation of any structure that will be constructed or installed as part of the proposed action. No construction will occur. 4 – 7 1/2 ton all handlers and 6 carrier gas furnaces. 11. Identify major materials and products (if any) that would be produced by the proposed action. Materials Used (input) (Estimate Quantity) <u>Waterwater ()</u> Hazardous Waster () Coal () Wasterwater () Hazardous Matorials () Other Produced to assess the environmental impacts of the proposed action. NEPA requires evaluations of the proposed action is potential impacts on the environment (including land use; energy use; natural, historic, and cultural resources; and pollutants). 1. Land Use a. Characterize present land use where the proposed action. Bustran <u>Bustran</u> <u>Bustran</u> Gutners <u>Bustran</u> <u>Bustran</u> Gutners <u>Bustran</u> <u>Bustran</u> Gutners <u>Bustran</u> <u>Bustran</u> Gutners <u>Bustran</u> Gutners <u>Bustran</u> Bustran <u>Bustran</u> Bustran <u>Bustran</u> Bustran <u>Bustran</u> Bustran <u>Bustran</u> Bustra							
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		a	. Identify any state- or federal-listed endangered or threatened plant or animal species or habitat affected by the proposed action.				

X None
 b. Would any threatened or endangered species habitat be affected by the proposed action? X No Yes (describe)
c. Describe any impacts that construction activities would have on any other types of sensitive or
Imple flabilities. I
3. Socioeconomic and Infrastructure Conditions
 a. Would the proposed action generate increased traffic use of roads through local neighborhoods, urban, or rural areas. X No Yes (describe)
 b. Would the proposed action require new transportation access (roads, rail, etc.)? Describe location, impacts, costs. X No Yes (describe)
c. Would any new transmission lines, pipelines or power line or other right-of-ways be required? I No Yes (Describe location, voltage, and length of right-of-way)
4. Historical/Cultural Resources
 a. Describe any historical, archeological, or cultural places in the vicinity of the proposed action; note any sites included on the National Register of Historic Places. X None (describe)
b. Would construction or operational activities of the proposed action disturb any historical,
In the structures, or sites ? In the structures of sites ? In the structures of sites ? In the structures of sites I and the
c. Would the proposed action interfere with visual resources (e.g., eliminate scenic views) or alter the present landscape? X No Yes (describe)
5. Atmospheric Conditions/Air Quality?
a. Would proposed action require issuance of new or modified air permits to perform project related work and activities?
No (explain) Yes not applicable to control system and HVAC
 b. Would the proposed action emit any pollutants regulated by the National Emissions Standards for Hazardous Air Pollutants (NESHAPS)? No (explain) Yes <u>n/a</u>
 c. Would the proposed action be classified as either a New Source or a major modification to an existing source under the federal Clean Air Act? X No Yes (describe)
d. Would the proposed action need to comply with the New Source Performance Standards? Image: Standard Standards Image: Standard Standards Image: Standard St

e. X	Would the proposed project(s) be subject to Prevention of Significant Deterioration review? Not applicable INO (explain) IVES (describe)
-	Hydrologic Conditions/Water Quality
a.	What is the closest body of water to the proposed action's location(s) and what is its distance from these locations. Site? <u>Closest water body is 1,108 ft from Courthouse</u>
b.	What sources would supply potable and process water for the proposed action? $\underline{n/a}$
c. ⊠□□□	Quantify the annual amount of wastewater that would be generated by the proposed action. None Non-contact cooling water (gallons) Process water (gallons) Sanitary and/or grey water (gallons) Other describe (gallons)
d.	What would be the major components of each type of wastewater (e.g., coal fines)?
X	No wastewater produced
e.	Identify the local treatment facility that would receive wastewater from the proposed action.
X	No discharges to local treatment facility
f.	Describe how wastewater would be collected and treated.
g. X	Would any run-off or leachates be produced from storage piles or waste disposal sites? No Security Yes (describe sources, nature of flow, and collection techniques)
h.	Would the proposed action require issuance of new or modified water permits for operation or construction?
i. X	Where would wastewater effluents from the proposed action be discharged?
j. X	Would the proposed action require a permit to discharge effluents into a body of water? No Yes (describe water use and effluent impact)
k.	Would a new or modified National Pollutant Discharge Elimination System (NPDES) permit be required?
l. X	Would the proposed action adversely affect the quality or movement of groundwater? No Yes (describe)
m.	Would the proposed action use groundwater? If so, how much?

7. Solid and Hazardous Wastes

; 	A. Describe and estimate major non-hazardous solid wastes that would be generated by the proposed action. Nonhazardous solid wastes are defined as any solid, liquid, semi-solid, or contained gaseous material that is discarded or has served its intended purpose, or is a manufacturing or mining by-product (40 CFR 260, Appendix I).
(c. How and where would solid waste disposal be accomplished? On-site (identify and describe location) I Off-site (identify location and describe facility and treatment) n/a
(d. How would wastes for disposal be transported? $\underline{. n/a}$
•	e. Describe and estimate the <u>quantity</u> of hazardous wastes (40 CFR 261.3) that would be generated, used, or stored by the proposed action. n/a
f	f. How would hazardous or toxic waste be collected and stored? <u>n/a</u>
([g. If hazardous wastes would require off-site disposal, have arrangements been made with a certified TSD (Treatment, Storage, and Disposal) facility? Identify the TSD facility. ☑ Not required
I	Name and location of TSD facility: <u>n/a</u>
8.	Health/Safety Factors
(a. Identify hazardous or toxic substances that would be used in the proposed action. Hazardous or toxic substances that would be used (identify): n/a
ł	b. What would be the likely impacts of these substances on human health and the environment? <u>No</u>
(c. Would there be any potential for workers to be exposed to toxic/hazardous chemicals or wastes?
c [d. Are there any special physical hazards associated with the proposed action? \overline{x} No \Box Yes (describe)
e	e. Would safety training be necessary for any laboratory, equipment, activities or processes involved with the proposed action? Contractors must be licensed installers.

f. Describe any increases in ambient noise levels from construction and operational activities. Increase in ambient noise level (describe)? <u>Minimal.Installation of HVAC</u> g. Would construction result in the removal of natural barriers that act as noise screens? ▲ No construction planned 🗌 No Yes (describe) 9. Environmental Restoration and/or Waste Management a. Would the proposed action include CERCLA removals or similar actions under RCRA or other authorities, meeting CERCLA cost/time limits? X No Yes (describe) b. Would the proposed action include siting, construction, and operation of temporary pilot-scale waste collection and treatment facilities or pilot-scale waste stabilization and containment facilities? x No Yes (describe) **REGULATORY COMPLIANCE** 1. For the following laws, describe any existing permits, new or modified permits, manifests, responsible authorities or agencies, contacts, etc., that would be required for the proposed action: a. Resource Conservation and Recovery Act (RCRA): X None Required (describe) b. Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA): X None Required (describe) c. Toxic Substance Control Act (TSCA): 🗴 None 🗌 Required (describe) d. Water Pollution Control Act (WPCA)/Clean Water Act (CAA)/Underground Injection Control Program (UIC): Required (describe) X None e. Underground Storage Tank Control Act (UST) 🗴 None 🗌 Required (describe) f. Clean Air Act (CAA): X None Required (describe) g. Endangered Species Act (ESA): X None Required (describe) h. Floodplains and Wetlands Regulations: None Required (describe) i. Fish and Wildlife Coordination Act (FWCA): X None Required (describe) i. National Historic Preservation Act (NHPA): 🗵 None 🔲 Required (describe) _____

k.	Coastal Zone Management Act (CZMA):	
2.	Identify any other environmental laws and regulations (federal, state <u>and</u> local) for which compliance would be necessary for this proposed action, and describe the permits, manifests, and contacts that would be required.	
F.	DESCRIBE ANY ISSUES THAT WOULD GENERATE PUBLIC CONTROVERSY REGARDING THE PROPOSED ACTION. Describe:	
G.	WOULD THE PROPOSED ACTION PRODUCE ADDITIONAL DEVELOPMENT, OR ARE OTHER MAJOR DEVELOPMENTS PLANNED OR UNDERWAY, IN THE AREA? Image: No ima	
Н.	SUMMARIZE THE SIGNIFICANT IMPACTS THAT WOULD RESULT FROM THE PROPOSED ACTION. Image: Significant impacts (describe)	
IV.	CERTIFICATION BY PROPOSER	
I hereby certify that the information provided herein is current, accurate, and complete as of the date shown immediately below.		
DATE:	(MM/DD/YYYY)	
SIGNATURE:		
TYPED NAME: Marcus Jones		
TITLE: Director of Engineering		
ORGANIZATION: Henderson County, NC		
V.	REVIEW AND APPROVAL BY DOE	

I hereby certify that I have reviewed the information provided in this questionnaire, have determined that all questions have been appropriately answered, and judge the responses to be consistent with the efforts proposed. Based on the information in the questionnaire, I conclude the following (check the appropriate box):

The proposed action falls under one or more of the categorical exclusions (CXes) listed in Appendix A or B of Subpart D of the DOE NEPA Implementing Procedures and would not (1) violate applicable ES&H requirements, (2) require siting of waste TSD or recovery facilities, (3) disturb hazardous substances (excluding naturally occurring petroleum and natural gas), thus producing uncontrolled or unpermitted releases, and (4) adversely affect environmentally sensitive resources.

Additionally, the proposed action (1) would not present any extraordinary circumstances such that the action might have a significant impact upon the human environment, (2) is not connected to

other actions with potentially significant impacts, and (3) is not related to other actions with cumulatively significant impacts.

Based on the Environmental Questionnaire and these conclusions, Categorical Exclusion of the proposed action would be appropriate.

The proposed action does not qualify as a CX as identified in Subpart D of DOE's NEPA Implementing Procedures; therefore, the proposed action may require further documentation in the form of an Environmental Assessment or Environmental Impact Statement.

DOE NEPA Compliance Officer:_____ Date: _____

MM/DD/YYYY)

Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion – Lower Tier Covered Transactions

- 1. By signing and submitting this document, **the prospective lower tier participant** is providing the certification set out below.
- 2. The certification in this clause is a material representation of the fact upon which reliance was placed when this transaction was entered into. If it is later determined that the prospective lower tier participant knowingly rendered an erroneous certification, in addition to other remedies available to the State and/or federal government, the department or agency with which this transaction originates may pursue available remedies, including suspension and/or debarment.
- 3. The prospective lower tier participant shall provide immediate written notice to the person to which this proposal is submitted if at any time the prospective lower tier participant learns that its certification was erroneous when submitted or has become erroneous by reason of changed circumstances.

The terms "covered transaction," "debarred," "suspended," "ineligible," "lower tier covered transaction," "participant," "person," "primary covered transaction," "principal," "proposal," and "voluntarily excluded," as used in this clause, have the meanings set out in the Definitions and Coverage sections of rules implementing Executive Order 12549, 45 CFR Part 76.

- 4. The prospective lower tier participant agrees by submitting this proposal that, should the proposed covered transaction be entered into, it shall not knowingly enter any lower tier covered transaction with a person who is debarred, suspended, determined ineligible or voluntarily excluded from participation in this covered transaction unless authorized by the department or agency with which this transaction originated.
- 5. The prospective lower tier participant further agrees by submitting this document that it shall include the clause titled "Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion Lower Tier Covered Transaction," without modification, in all lower tier covered transactions and in all solicitations for lower tier covered transactions.
- 6. A participant in a covered transaction shall rely upon a certification of a prospective participant in a lower tier covered transaction that is not debarred, suspended, ineligible, or voluntarily excluded from covered transaction, unless it knows that the certification is erroneous. A participant may decide the method and frequency of which it determines the eligibility of its principals. Each participant may, but is not required to, check the Non-procurement List.
- 7. Nothing contained in the foregoing shall be construed to require establishment of a system of records in order to render in good faith the certification required by this clause. The knowledge and information of a participant is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.

Except for transactions authorized in paragraph 5 of these instructions, if a participant in a covered transaction knowingly enters into a lower tier covered transaction with a person who is suspended, debarred, ineligible, or voluntarily excluded from participation in this transaction, in

addition to other remedies available to the State and/or federal government, the department or Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion – Lower Tier Covered Transactions - Continued

8. agency with which this transaction originated may pursue available remedies, including suspension, and/or debarment.

The government, the department or agency with which this transaction originated may pursue available remedies, including suspension, and/or debarment.

(see http://www.pandc.nc.gov/actions.asp for the N.C. list and <u>https://www.epls.gov/</u> for the federal list)

- 1. The prospective lower tier participant certifies, by submission of this document, that neither it nor its principals is presently debarred, suspended, proposed for debarment, declared ineligible, nor voluntarily excluded from participation in this transaction by any State and/or federal department or agency.
- 2. Where the prospective lower tier participant is unable to certify to any of the statements in this certification, such prospective participant shall attach an explanation to this proposal.

Signature

Agency/Organization

Title

Date

(Certification signature should be same as the Grant Agreement Form signature.)

Certification Regarding Lobbying

The undersigned certifies, to the best of his or her knowledge and belief, that:

- No Federal appropriated funds have been paid or will be paid by or on behalf of the undersigned, to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any Federal contract, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.
- 2. If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this Federally funded contract, grant, loan, or cooperative agreement, the undersigned shall complete and submit Standard Form SF-LLL, "Disclosure of Lobbying Activities," in accordance with its instructions.
- 3. The undersigned shall require that the language of this certification be included in the award document for subawards at all tiers (including subcontracts, subgrants, and contracts under grants, loans, and cooperative agreements) who receive federal funds of \$100,000.00 or more and that all subrecipients shall certify and disclose accordingly.

This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by Section 1352, Title 31, U.S. Code. Any person who fails to file the required certification shall be subject to a civil penalty of not less than \$10,000.00 and not more than \$100,000.00 for each such failure.

Signature

Title

Agency/Organization

Date

(Certification signature should be same as the Grant Agreement Form signature.)

Office for Historically Underutilized Businesses (HUB)

Please check the following:

- 1) Is your organization registered with HUB office? Yes_____ No____
- Are your organization minority contractors, small contractors, physically handicapped contractors, women contractors, disabled business enterprises and nonprofit work centers for the blind and severely disabled? Yes_____ No____x____

Attachments





The Trane Solution

Tracer ES accommodates the facility management needs of government organizations that operate multiple facilities. Tracer ES software resides on a central server that can be accessed from any secure Internet connection. Its open, non-proprietary design enables integration and communication with both Trane and non-Trane systems.

Facility management staff can use Tracer ES to remotely monitor and control HVAC systems, lighting, and energy management throughout your facilities to positively impact operational efficiency, occupant comfort and productivity, building health and performance, and operating costs.

To learn more about Tracer ES, visit www.Trane.com or contact a Tracer ES Product Specialist at 1-800-TRACER1.

Take Control of Your Government Facilities with **Tracer ES**[™]

Government organizations at the federal, state and municipal level must try to accomplish the seemingly impossible task of reducing facility-related expenses in the face of rising energy costs, increasing building usage, stricter indoor air quality requirements and ongoing maintenance expenditures for aging systems.

Tracer ES[™], the Trane web-based building automation solution, can help government organizations overcome the budgetary, environmental, management and purchasing challenges of operating multiple-facility operations.

Operating Cost Challenges:

- Years of deferred maintenance have left many government facilities with inadequate or failing systems and outdated technology. At the same time, strict purchasing regulations and tight budgets restrict the ability to invest in large scale repairs or replacements.
- Energy costs represent a significant operating expense; and rising costs make forecasting difficult and unpredictable. It is imperative that governmental institutions control energy consumption and develop energy reduction strategies.
- The use of proprietary technology increases costs by locking buyers into a single vendor for system additions, effectively eliminating options for competitive bidding.
- Expenditures for purchasing, licensing and maintaining computer hardware, software and upgrades are a continuous drain on IT budgets and personnel.

Operating Cost Solution:

Tracer ES lets you immediately access operating data so you can monitor and compare energy consumption and costs. As a result, you'll be able to make better decisions on how to optimize facility operations for energy savings.

Tracer ES is built on an open platform that allows integration and communication between multiple platforms – whether old or new, Trane or not. As a result, old systems can be gradually replaced over time to help minimize budget pressures and make sure your institution won't be locked into a single, proprietary vendor.

A modular design also helps conform to purchasing regulations and eases the strain on budgets by reducing expenditures on unwanted or unnecessary features. Because Tracer ES resides on a central server, your organization will see a reduction in the cost of purchasing and maintaining multiple software and hardware platforms.

W. Street St.

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Operational Efficiency Challenges:

- Maintenance, operations and engineering departments are asked to do more with fewer employees as governmental operating budgets are tightened.
 Personnel are strained even further because facilities are increasingly being used for evening, weekend and lastminute events.
- Building systems within government facilities often run the gamut from modern to obsolete. Furthermore, these facilities are equipped with disparate building automation systems that are not compatible with each other. As a result, operators waste time and effort because they have to log into each system separately – and they lack a "common view" that would allow them to maximize system and operational efficiencies across their organization.
- Government organizations lack effective tools to simplify the management of multiple facilities. As a result, building managers and operators are forced to allocate an inordinate amount of their time to make individual schedule, temperature and lighting adjustments along with other repetitive and timeconsuming tasks.
- Building automation systems purchased with the goal of improving operational efficiency are often



Trane A business of American Standard Companies www.trane.com

For more information, contact your local Trane office or e-mail us at comfort@trane.com

Multiple-facility organizations feel budgetary, operational, air quality and productivity pressures

misused or underused, especially if building personnel find them intimidating or difficult to operate.

Operational Efficiency Solution:

By providing remote, online access to building systems throughout an area of responsibility, Tracer ES eliminates many of the inefficient tasks that consume so much facility management time. Whether it's a community-wide meeting or a weekend training seminar, Tracer ES operators are able to make online adjustments to space conditions, temperature set points and system schedules from virtually any PC on the network.

A user interface based on extensive usability research with actual building operators makes Tracer ES easy to use, regardless of the operator's level of comfort and experience with computerbased technology. Using a single system as a "window" into the entire organization makes it easier for facilities staff to learn and become proficient.

IAQ and Worker Productivity Challenges:

 The link between poor indoor air quality and worker health has created a strong push from government to augment building conditions. Improving air quality is a major challenge for organizations that lack systems to effectively monitor and control their indoor environments.

- Reducing instances of "Sick Building Syndrome" is an emerging objective for facility owners and operators.
 Organizations are faced with finding effective ways to maintain optimal indoor space conditions, such as humidity, temperature and ventilation, to ensure that their buildings are healthy.
- Studies have shown clear associations between office worker productivity and indoor environmental conditions, especially as they relate to temperature and humidity.¹ The improvement of space conditions can be a challenge for organizations that don't have a means to monitor and control multiple facilities from a single system.

IAQ and Worker Productivity Solution:

Tracer ES can help government organizations maintain comfortable, healthy environments, and avoid sick buildings. You can use Tracer ES to help monitor and control temperature, humidity and carbon dioxide levels within a single building, or multiple facilities, to detect variances before they affect comfort and indoor air quality. These improved conditions will greatly contribute to occupant comfort, worker productivity and health throughout all your facilities.

¹Professor Alan Hedge, PhD, CPE, Cornell University Department Design and Environmental Analysis: Linking Environmental Conditions to Productivity, Presentation at Eastern Ergonomics Conference and Exposition, New York, June, 2004.

Literature Order Number	BAS-SLB019-EN
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Trane has a policy of continuous product and product data improvement and reserves the right to change design and specifications without notice.



Trane Comfort Solutions 1400 Sweeten Creek Road Asheville, NC 28803 Phone: (828) 210-2606 Fax: (828) 210-2627

July 20, 2010

Greg Wiggins Central Services Manager Henderson County Government 1220 Spartanburg Highway Hendersonville, NC 28792

Dear Mr. Wiggins:

On behalf of Trane, I would like to thank you for your recent inquiry regarding energy and environmental improvements to the heating and cooling systems at your facility. The purpose of this correspondence is to review the options available now and in the near future.

We have analyzed four buildings in the county and have determined that you would realize significant energy and operational savings by installing a Tracer ES Building Automation System (BAS). Tracer ES is Web-based building automation software that dramatically simplifies the complex requirements of managing and operating multiple facilities. It lets owners and operators of multiple facilities access information about any of their buildings from any secure PC connected to the Internet. Tracer ES excels as a Web-based application because of its user-centered design, robust search tools, intuitive navigation, open architecture, and auto discovery and self configuration capabilities. The result is an online building control system that is especially easy to use.

For this project, we have analyzed the 95 Courthouse, the Human Services building, the Main Library and the 100 North King building. For each of these buildings, we have provided a Trane Energy Analyzer (TEA) report and a Trane Energy Optimizer (TEO) report. Each of these reports provides a detailed energy benchmarking study and recommended Energy Conservation Measures (ECM's). Please refer to these reports for more detailed information. Listed below are each of the buildings and the associated scope to install Tracer ES and additional ECM's.



Typical System Architecture

95 Courthouse

Current Situation

This building is cooled by a 15 year old chilled water/ice storage system. The existing Johnson Controls BAS is outdated and is not functioning properly. The BAS is running on a severely outdated Windows95 platform. The existing controls are not properly sequencing the chiller/ice storage system to maximize energy savings. The seasonal process of switching to the lower Duke Energy OPT rates is currently a manual process that has resulted in unnecessary peak demand charges.

Recommendations

Install the Web-based Tracer ES Building Automation System with the server to reside in this building. Provide custom programming and scheduling for the enterprise server and associated equipment. This includes scheduling and algorithms to properly manage the chiller/ice storage system to take advantage of the lowest possible Duke Energy rates. In addition, we will provide custom graphics of floor plans and each piece of controlled/supervised equipment to be loaded onto a new SQL express server. All inputs, outputs and setpoints will be displayed on graphics for ease of operation. To further reduce your energy usage, we will provide and install a Variable Frequency Drive (VFD) for efficient operation of the cooling tower fan.

Scope

Tracer Summit System

- Provide one BCU interface panels as required for communication between all Trane DDC controllers.
- Provide Ethernet communication for the BCU for building LAN connection with the system.

Enterprise Sever License and Setup (Qty. 1)

- Provide access for multiple users over the existing campus LAN network for HVAC monitoring and control.
- Provide custom programming for the enterprise server and associated equipment.
- Provide a software license for 1 BCU interface panel supplied by Trane.
- Provide and install a SQL express server for transmission of data and graphics on the Henderson County LAN.
- Provide custom graphics of floor plans and each piece of controlled/supervised equipment to be loaded onto the SQL express sever. All inputs, outputs, and setpoints will be displayed on graphics for ease of operation.

Chiller (Qty. 1)

• Communication link wiring to the chiller for transmission of all chiller data points to the Tracer Summit system. LON communication card provided with the chiller.

Primary Chilled & Condenser Water Pumps (Qty. 2)

- Provide, install, and wire a DDC panel for control and monitoring of the pumps.
- Provide, install, and wire transformers and power supplies for powering the controller and associated control devices.
- Communication wiring between the control panels and the BCU interface panel.
- Provide, install, and wire E/P transducers to control V-1, -2, and -3 the cooling tower bypass, the ice tank bypass, and the plate and frame heat exchanger bypass.
- Start /stop and positive status of the primary chilled and condenser water pumps serving each of the chillers.
- Provide and wire immersion temperature sensors and thermal wells for common primary chilled and condenser water supply and return

Scope (continued)

Secondary Chilled Water Pumps (Qty. 1)

- Provide, install, and wire a DDC panel for control and monitoring of the pumps.
- Provide, install, and wire transformers and power supplies for powering the controller and associated control devices.
- Communication wiring between the control panel and the BCU interface panel.
- Start /stop and positive status of the secondary and tertiary chilled water pumps.
- Provide and wire immersion temperature sensors and thermal wells for secondary chilled water supply and return.

Cooling Tower System

- Provide, install, and wire a DDC panel for control and monitoring of the cooling tower.
- Provide, install, and wire transformers and power supplies for powering the controller and associated control devices.
- Communication wiring between the control panels and the BCU interface panel.
- Provide, install, and wire a VFD for the cooling tower fans. Line and load side power wiring provided by others.
- Start/stop, speed control, and positive status of the cooling tower fan.
- Provide and wire immersion temperature sensors and thermal wells for common condenser water supply and return.

Boiler Plant

- Provide, install, and wire a DDC control panel for control and monitoring of the hot water system.
- Transformers and power supplies for powering controller and associated control devices.
- Communication wiring between the control panels and the BCU interface panel.
- Enable/disable, status, and alarm supervision of the existing boiler.
- Start/stop and positive status of the hot water pumps.
- Provide, install, and wire E/P transducer to control V-4 hot water temperature reset valve.
- Provide and wire temperature sensors and thermal wells for hot water supply temperature for the boiler.
- Provide and wire temperature sensors and thermal wells for hot water secondary supply and return temperature.

VAV AHU Controls Upgrade (Qty. 8)

- Provide, install, and wire DDC panel with LCD display for control and monitoring of the unit.
- Transformers and power supplies for powering controller and associated control devices.
- Communication wiring between the control panel and the BCU interface panel.
- Custom programming for VAV operation.
- Provide, install, and wire E/P transducers to control the existing pneumatic chilled water valve, pneumatic hot water valve, and face and bypass dampers.
- Re-use the existing freezestat.
- Provide, install, and wire a mixed air and discharge air temperature sensors.
- Start/stop, speed control, and positive status of the supply air fans.
- Provide, install, and wire outside air and return air damper actuators existing dampers.
- Provide, install, and wire a VFD to replace the existing single speed starters.
- Verify existing fire alarm shut down wiring.

VAV Retrofit (Qty. 60)

- Provide, wire, and install a DDC control retrofit kit to the existing VAV boxes.
- Provide, wire, and install damper motor actuator.
- Communication wiring between each VAV box controller and the BCU interface panel.
- Provide, install, and wire wireless space temperature sensor.
- Control of the existing staged electric heat in the VAV boxes.
- Provide, install, and wire discharge air temperature sensors.

Scope (continued

Constant Volume AHU Controls Upgrade (Qty. 3)

- Provide, install, and wire DDC panel with LCD display for control and monitoring of the unit.
- Transformers and power supplies for powering controller and associated control devices.
- Communication wiring between the control panel and the BCU interface panel.
- Custom programming for single zone VAV operation.
- Provide, install, and wire E/P transducers to control the existing pneumatic chilled water valve, pneumatic hot water valve, and face and bypass dampers.
- Re-use the existing freezestat.
- Provide, install, and wire a mixed air and discharge air temperature sensors.
- Start/stop, speed control, and positive status of the supply air fans.
- Provide, install, and wire a VFD to replace the existing single speed starters.
- Provide, install, and wire wireless space temperature sensor.
- Provide, install, and wire a mixed air and discharge air temperature sensors.
- Provide, install, and wire outside air and return air damper actuators existing dampers.
- Verify existing fire alarm shut down wiring.

Outside Air Monitoring

- Provide, install, and wire outside air temperature and humidity sensors in an aspirated cabinet to insure accurate readings.
- Integration of outside air station point data into the Tracer Summit system for use in control programs.

95 Courthouse Energy Project \$232,000

Human Services

Current Situation

This building is a five year old building with several rooftop VAV systems. The existing BAS is an older version of Tracer Summit. The system has multiple communication errors and other operational anomalies. The VAV boxes are not being automatically calibrated and there are scheduling problems in the Variable Air System (VAS). The current night setback and occupied schedules are not programmed for energy efficiency and occupant comfort. County personnel must physically drive to the building to access the Tracer Summit workstation data.

Recommendations

Install the Web-based Tracer ES Building Automation System with the server to reside in the 95 Courthouse. Provide custom programming and scheduling for the rooftop VAV systems. In addition, we will provide custom graphics of floor plans and each piece of controlled/supervised equipment to be loaded onto the new SQL express server. All inputs, outputs and setpoints will be displayed on graphics for ease of operation. To further reduce your energy usage, we will provide re-commissioning evaluation of the existing control components and economizers.

Scope

Enterprise Sever License and Setup (Qty. 1)

- Provide access for multiple users over the existing campus LAN network for HVAC monitoring and control.
- Provide custom programming for the enterprise server and associated equipment.
- Provide a software license for 2 existing BCU interface panels supplied by Trane.
- Provide and install a SQL express server for transmission of data and graphics on the Henderson County LAN.
- Provide custom graphics of floor plans and each piece of controlled/supervised equipment to be loaded onto the SQL express sever. All inputs, outputs, and setpoints will be displayed on graphics for ease of operation.

Human Services Energy Project \$28,780

Main Library

Current Situation

This building is approximately 30 years old and has seven gas/electric rooftop units and 2 split systems. Many of these HVAC units have been replaced in recent years. All of the HVAC systems are constant volume controlled by standard thermostats. This building does not currently have a building automation system.

Recommendations

Install the Web-based Tracer ES Building Automation System with the server to reside in the 95 Courthouse. Provide custom programming and scheduling for the rooftop and split systems. In addition, we will provide custom graphics of floor plans and each piece of controlled/supervised equipment to be loaded onto the new SQL express server. All inputs, outputs and setpoints will be displayed on graphics for ease of operation. To further reduce your energy usage, we will provide custom scheduling for night setback and occupied modes. We will provide an outside air monitoring station to take advantage of outside air economizing whenever possible. This will be done to maximize energy savings while also providing proper temperature and humidity control for the extensive collection of books.

Scope

Tracer Summit System

- Provide one BCU interface panels as required for communication between all Trane DDC controllers.
- Provide Ethernet communication for the BCU for building LAN connection with the system.

Enterprise Sever License and Setup (Qty. 1)

- Provide access for multiple users over the existing campus LAN network for HVAC monitoring and control.
- Provide custom programming for the enterprise server and associated equipment.
- Provide a software license for 1 BCU interface panel supplied by Trane.
- Provide and install a SQL express server for transmission of data and graphics on the Henderson County LAN.
- Provide custom graphics of floor plans and each piece of controlled/supervised equipment to be loaded onto the SQL express sever. All inputs, outputs, and setpoints will be displayed on graphics for ease of operation.

Package Systems (Qty. 7)

- Provide, install, and wire a DDC control panel for control and monitoring of the unit.
- Provide, install, and wire transformers and power supplies for powering controller and associated control devices.
- Communication wiring between the unit DDC control panels and the BCU interface panel.
- Start/stop and status of each unit supply fan.
- Provide, wire, and install a discharge air temperature sensor.
- Provide, wire, and install a wireless space temperature sensor.

Split Systems (Qty. 1)

- Provide, install, and wire a DDC control panel for control and monitoring of the unit.
- Provide, install, and wire transformers and power supplies for powering controller and associated control devices.
- Communication wiring between the unit DDC control panels and the BCU interface panel.
- Start/stop and status of each unit supply fan.
- Install low voltage control wiring to the condensing unit.
- Provide, wire, and install a discharge air temperature sensor.
- Provide, wire, and install a space temperature sensor.

Scope (continued

Outside Air Monitoring

- Provide, install, and wire outside air temperature and humidity sensors in an aspirated cabinet to insure accurate readings.
- Integration of outside air station point data into the Tracer Summit system for use in control programs.

Main Library Energy Project \$43,335

100 North King

Current Situation

This is a 1960's era building with 10 rooftop units and 5 split systems. Half the building is using standard thermostats to control the constant volume HVAC systems. The other half is using an outdated Enerstat Zone Control System that doesn't function properly. This building does not currently have a building automation system.

Recommendations

Install the Web-based Tracer ES Building Automation System with the server to reside in the 95 Courthouse. Provide custom programming and scheduling for the rooftop and split systems. In addition, we will provide custom graphics of floor plans and each piece of controlled/supervised equipment to be loaded onto the new SQL express server. All inputs, outputs and setpoints will be displayed on graphics for ease of operation. To further reduce your energy usage, we will provide custom scheduling for night setback and occupied modes. We will provide an outside air monitoring station to take advantage of outside air economizing whenever possible. This will be done to maximize energy savings while also providing proper temperature and humidity control for the building occupants. Please note that our scope for this building does not include demo or removal of the old zone control dampers or panels.

Scope

Tracer Summit System

- Provide one BCU interface panels as required for communication between all Trane DDC controllers.
- Provide Ethernet communication for the BCU for building LAN connection with the system.

Enterprise Sever License and Setup (Qty. 1)

- Provide access for multiple users over the existing campus LAN network for HVAC monitoring and control.
- Provide custom programming for the enterprise server and associated equipment.
- Provide a software license for 1 BCU interface panel supplied by Trane.
- Provide and install a SQL express server for transmission of data and graphics on the Henderson County LAN.
- Provide custom graphics of floor plans and each piece of controlled/supervised equipment to be loaded onto the SQL express sever. All inputs, outputs, and setpoints will be displayed on graphics for ease of operation.

Package Systems (Qty. 10)

- Provide, install, and wire a DDC control panel for control and monitoring of the unit.
- Provide, install, and wire transformers and power supplies for powering controller and associated control devices.
- Communication wiring between the unit DDC control panels and the BCU interface panel.
- Start/stop and status of each unit supply fan.
- Provide, wire, and install a discharge air temperature sensor.
- Provide, wire, and install a wireless space temperature sensor.

Split Systems (Qty. 5)

- Provide, install, and wire a DDC control panel for control and monitoring of the unit.
- Provide, install, and wire transformers and power supplies for powering controller and associated control devices.
- Communication wiring between the unit DDC control panels and the BCU interface panel.
- Start/stop and status of each unit supply fan.
- Install low voltage control wiring to the condensing unit.
- Provide, wire, and install a discharge air temperature sensor.
- Provide, wire, and install a space temperature sensor.
Scope (continued

Outside Air Monitoring

- Provide, install, and wire outside air temperature and humidity sensors in an aspirated cabinet to insure accurate readings.
- Integration of outside air station point data into the Tracer Summit system for use in control programs.

100 North King Energy Project \$56,155



General notes

- All necessary custom programming for proper control and supervision of equipment under our control.
- All work to be performed between 7:00am and 5:00pm Monday through Friday.
- 6 complete sets of submittals.
- Asbuilt documentation and complete system manuals.
- On site training of owner's representatives.
- One year parts and labor warranty.

Not included in this proposal

- Repair or replacement of any mechanical equipment.
- Performance bonds.
- Starters, their installation or wiring.
- Power wiring of mechanical equipment.
- Thermostat guards or covers.
- Thermometers or pressure gauges.
- Test and balance or operation/manipulation of system for the test and balance contractor.
- Installation or wiring of controls not supplied by Trane unless stated above.
- Installation of supplied thermal wells, control valves, dampers, or wet pressure sensors.
- Duct smoke detectors or their installation.
- Fire and smoke dampers or their installation.
- Smoke control panel, Fireman control panel or fire alarm system.
- Startup of any mechanical equipment.
- Phone line or LAN wiring for the BCU interface panel.
- Tracer Summit software, PC computer, or operating software.

Total for Four Energy Projects \$360,270

Thank you for giving us this opportunity to work with you to upgrade your buildings. Obviously this information is from a high level perspective. In the near term time we would like to meet with you to provide additional details and develop specific strategies that match your county objectives.

In addition to obtaining ARRA Grants, Performance Contracting and Duke Energy Rebates may be additional sources of funding these projects. Please call or write me if you have any questions or comments.

Regards,

UM Sugth

Bill Frazzetto Account Manager Trane Comfort Solutions



Trane Energy Analyzer Report

Henderson County 100 North King Tuesday, July 20, 2010

We Make Buildings Work Better for LifeTM

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Energy Assessment for Henderson County 100 North King

1. Introduction

The purpose of this energy assessment is to provide information about how energy is used, a point of reference for comparisons to other similar facilities, and direction about potential energy savings opportunities for Henderson County 100 North King. The assessment and recommendations are based upon the information provided to the Trane Energy Analyzer¹. Refer to the Trane Energy Analyzer to obtain more detailed information about the information and data that was used to conduct this energy assessment.

The accuracy of this assessment and the resulting recommendations are directly influenced by the degree of accuracy of the data that was input to the Trane Energy Analyzer. In addition to the data inputs, a number of other factors such as weather variations, building occupancy and operation schedules can affect energy usage and consequently energy cost savings. Typical characteristics² for these other factors were used in the simulation model to calculate energy consumption and conduct this assessment. The assessment is not intended to predict the future effect on any changes made to Henderson County 100 North King but rather to provide guidance and focus on the greatest potential energy savings opportunities and recommend next steps.

2. Why Energy Efficiency is Good Business

Energy use and thus, improvements in energy efficiency can contribute to the achievement of long-term organizational objectives. Links between energy efficiency and business objectives can be direct, as in the case of improved operational efficiency and reduced costs, or indirect, such as with improved employee productivity. Listed below are a few examples how energy efficiency can contribute to business success.

Examples of Business Objectives with Links to Energy Efficiency

- Improved operational efficiency
- Reduced operating costs
- Improved product quality
- Improved air quality
- Improved tenant/occupant satisfaction
- Improved employee productivity
- Improved contribution to environmental protection & sustainability
- Improved corporate image

3. How You Use Energy Today

It is useful to compare energy consumption and use patterns with other similar facilities in assessing your current state and to develop improvement targets for the future. The sections below provide benchmarks against an "industry average" and an energy efficient³ low-rise office (3 stories or less) similar in size to your facility and located in the same geographic region.

¹ The Trane Energy Analyzer can be accessed through <u>http://energy.trane.com</u>

² Typical case - for these factors, the model assumes the most common practice or value to calculate energy use. ³ The energy efficient facility used in these comparisons use energy savings technologies, which are typically cost

effective in new and significantly renovated buildings.

3.1 Total Consumption

Annual energy costs for your facility are: \$1.00 per ft², based on 51 kBtu/ft² in energy consumption. This is 42.6% lower than the industry average for a low-rise office (3 stories or less) in your region.

In contrast, energy costs for a new, energy efficient low-rise office (3 stories or less) would amount to approximately \$0.82 per ft², based on 43 kBtu/ft² annual energy consumption. For most facilities, it is possible to achieve this level of efficiency by implementing readily available energy efficiency strategies and management practices.

Figure 1a: Comparison of Energy Use for Henderson County 100 North King to the Industry Average and an Energy Efficient low-rise office (3 stories or less) (\$/ft²)



Table 1a: Comparison of Energy Use for Henderson County 100 NorthKing to the Industry Average and an Energy Efficient low-rise office (3stories or less)

	Electricity	Natural Gas	Steam	Total
Your Facility	\$0.96	\$4.06	\$0.00	\$1.00
Industry Average	\$1.50	\$0.24	\$0.00	\$1.74
Efficient Facility	\$0.74	\$7.94	\$0.00	\$0.82

Figure 1b: Comparison of Energy Use for Henderson County 100 North King to the Industry Average and an Energy Efficient low-rise office (3 stories or less) (kBtu/ft²)



Table 1b: Comparison of Energy Use for Henderson County 100 NorthKing to the Industry Average and an Energy Efficient low-rise office (3stories or less)

	Electricity kBtu / ft ²	Natural Gas kBtu / ft ²	Steam kBtu / ft ²	Total kBtu / ft ²
Your Facility	46.7	3.8	0.0	50.5
Industry Average	73.3	22.1	0.0	95.3
Efficient Facility	36.1	7.4	0.0	43.5

NOTE: The main source used to develop the energy benchmark data was the DOE Energy Information Administration's Commercial Building Energy Consumption Survey (CBECS).

3.2 End Use Breakdown

Figures 2 and 3, followed by Table 2, illustrate the energy end use breakdown for Henderson County 100 North King. End uses with the largest costs typically represent the areas for the greatest savings opportunities. Based on the data you provided, these are space cooling and interior lighting.

Figure 2: Energy Cost End Use Breakdown of Henderson County 100 North King



Figure 3: Energy End Use Breakdown of Henderson County 100 North King



Table 2: Energy End Use Breakdown of Henderson County 100 North King

	Cost		Ene	ergy		
End Uses	Value	Percent	mmBtu	Percent		
Space Cooling (Cool)	\$15,691	43.7%	766.3	42.1%		
Space Heating (Heat)	\$1,385	3.9%	129.0	7.1%		
Interior Lighting (Lights)	\$7,866	21.9%	384.1	21.1%		
Misc. Equipment (Misc.)	\$4,077	11.4%	199.1	10.9%		
Fans & Pumps (Fans)	\$5,146	14.3%	251.3	13.8%		
Exterior Loads (Ext.Ld.)	\$1,064	3.0%	52.0	2.9%		
Elevators (Elev.)	\$610	1.7%	29.8	1.6%		
Domestic Hot Water (DHW)	\$78	0.2%	7.3	0.4%		
Totals	\$35,917	100%	1,818.9	100%		
NOTE: The energy breakdown information estimate is beend on the teal inputs and building model						

NOTE: The energy breakdown information estimate is based on the tool inputs and building model profiles derived from DOE-2 building modeling.

3.3 Greenhouse Gas Emissions

Greenhouse gases, particularly carbon dioxide, are known to cause global warming and are linked to the production of energy. Figure 4 below illustrates greenhouse gas emissions generated by your energy consumption as compared to the industry average and an energy efficient facility.



Figure 4: Greenhouse Gas Emissions (metric tons of CO₂)

Table 3: Your Facility's CO2 Output Comparison

	Annual Metric Tons of CO ₂
Your Facility	324.7
Industry Average	539.5
Energy Efficient Facility	259.1
Typical Automobile	3.8

Sources: U.S. Energy Information Administration ("Updated State-Level Greenhouse Gas Emission Factors for Electricity Generation," 2001 and http://www.eia.doe.gov/oiaf/1605/coefficients.html) and Natural Resources Canada ("Canadian GHG Challenge Registry Guide to Entity and Facility-Based Reporting Emission Factors," 2000 - 2002 average).

By reducing your consumption level to that of an efficient facility, you would save 65.7 metric tonnes of CO2 per year. That's equivalent to taking 17.3 automobiles off the road each year.

4. Retrofit Opportunities

Significant energy savings can accrue from implementing a combination of best energy management practices and upgrading or installing new, more energy efficient technology. The greatest potential savings opportunities for Henderson County 100 North King are summarized below.

4.1 Low and No-Cost Opportunities

Energy savings of from 3 to 15 percent can be realized by adopting best energy management practices. These opportunities typically require little or no cost to implement. Suggested best energy management practices for Henderson County 100 North King include the following:

Your Energy Saving Opportunities

- Office Equipment: Turn off office equipment and appliances and invoke energy saving features. Computers, monitors, copiers, fax machines, and printers often have energy saving modes which are not activated and most office equipment is left on unnecessarily.
- Outdoor Air: Check that minimum outdoor air levels are at recommended requirements which maintain proper indoor air quality; many buildings actually bring in much more outdoor air than necessary.
- Operation & Maintenance:
 Have mechanical systems checked and maintained on a regularly scheduled basis. At least 10% in energy savings may be expected for systems that are properly maintained versus those which are serviced only when problems occur. Moreover, equipment life is prolonged, leading to further cost savings.
- HVAC Controls: Have controls for heating, ventilation and air conditioning (HVAC) equipment checked to ensure that they are operating at optimum levels.
- Lighting: Optimize circuits and/or energy management systems to only control areas where lighting is needed at desired times; many buildings require that the lights are on for an entire floor when only an office is occupied, for instance.

4.2 Energy Conservation Measure Opportunities

Based on the energy profile for Henderson County 100 North King, the following energy efficiency measures represent the greatest potential for savings. Note that most measures are not additive and cannot be summed to obtain a cumulative total savings estimate.

Table 4: 0	Opportunities
------------	----------------------

Opportunity	Action Item
Lighting (Option 1)	Retrofit interior lighting with more efficient system to reduce overall lighting demand (0.9 W/ft ² , 10.6 W/m ²).
Cooling (Option 1)	Optimize "free cooling" by providing for the ability to provide more outside air outside when the air temperature is below the cooling setpoint.
Cooling (Option 2)	Improve cooling system effectiveness by reducing cooling system losses, routine maintenance, and/or replacing old cooling equipment (20% increase in overall cooling efficiency).
Lighting (Option 2)	Reduce interior lighting usage by adding controls (automatic and/or manual) that turn off lights when not fully needed, as may be the case when a room is unoccupied or has adequate natural daylight. Savings shown are based on reducing the lighting use by 20%, but the savings potential may be higher or lower depending your specific circumstances and usage patterns.
Demand Ventilation	Use carbon dioxide and/or occupancy sensors to control outside air while maintaining indoor air quality.

5. Next Steps

The Trane Energy Analyzer assessment has evaluated a number of energy saving measures that can be taken immediately and others that will require additional information and planning. The following steps are suggested:

Planning

- Develop an energy efficiency improvement target for your business
- Identify a person who will become the "energy champion" for your business
- Develop a detailed plan for how to achieve your target
- Identify how energy efficiency improvements link to achievement of your business objectives both directly and indirectly to create motivation for action

Immediate No Cost/Low Cost Energy Savings Opportunities

- Develop a plan to implement the suggestions from section 4.1
- Review the Products and Services section on our web site for more ideas
- Develop an employee awareness and communications program to gain broad support and participation for your energy savings initiatives

Retrofit Improvements

- Enhance your energy management expertise by visiting the Products and Services section of our web site.
- Conduct a cost/benefit analysis to determine if the project meets your organization's investment criteria. Remember to take into account the influence of "cross effects"⁴ when evaluating the long-term benefits of your project. Contact us or your own contractor for assistance.

⁴ Making an upgrade to one system may influence another system. For example, improving the efficiency of your lighting may impact your air conditioning.

6. Trane Energy Analyzer Disclaimer

This report is a Preliminary Energy Assessment, which serves to investigate possible energy conservation opportunities and is based on the information provided by and interviews with customer personnel. The recommendations are based on an analysis of conditions observed and information gathered at the time of the survey and is based on historical information. Statements concerning energy savings are projections only and actual savings to be realized by the customer are dependent upon many factors, including conservation measures implemented, seasonal weather variations, fuel price, and specific energy use practices of the facility occupants and workers. Nothing contained in this report constitutes a guarantee by Trane that the projected savings will be realized by the customer.

This report, by itself, is not intended, as a basis for the engineering required to adopt any of these recommendations. Its intent is to interest the customer in the potential cost savings of the recommendations. Development of design documents and specifications typically will be required to successfully implement the recommendations.



Trane Energy Optimizer Report

Henderson County 100 North King Friday, July 20, 2010

We Make Buildings Work Better for LifeTM

Energy Retrofit Analysis for 100 North King Introduction

The purpose of this analysis is to identify potential energy conservation measures (ECMs) and other operations cost saving opportunities for an existing facility and to quantify a potential return on investment associated with implementing the selected recommendations. The recommendations and financial analysis are based upon the information provided to the Trane Energy Optimizer to assist in determining the current operation, configuration, and total cost of ownership of the systems being analyzed. The analysis also leverages Trane's extensive experience in the building services market, using proven energy-efficient technologies and HVAC maintenance knowledge to estimate the associated energy and operations cost savings. Refer to the Trane Energy Optimizer to obtain more detailed information about the information and data that was used to conduct this assessment.

The accuracy of the Trane Energy Optimizer analysis and the resulting recommendations are directly influenced by the degree of accuracy of the input data. In addition to the data inputs, a number of other factors such as changing utility rates, changes in how the building is being used and maintained, weather variations, etc. can affect the total cost of ownership of the building systems and the associated cost savings. These other factors are not inherently built into the tool calculations and should be considered when selecting tool inputs and analyzing tool outputs. The analysis is not intended to predict actual project costs or actual financial benefits but rather to provide guidance and focus on the overall potential energy savings opportunity for the facility.

Qualified Energy Conservation Measures (ECMs)

Significant energy savings can result from implementing a combination of ECMs that include the best energy management practices and upgrading or installing energy efficient technology. You have qualified the following ECMs as those that will potentially improve the energy performance of your facility based on the current operation and condition of your building systems:

Airside Survey	Target Savings (%)
Mixed Air Damper - Enthalpy Control	4.0
Night Setback	7.0
Optimal S/S and Ventilation Delay	4.0
Outdoor Air Reduction	4.0
Sequencing of Heating/Cooling/Mixed Air	4.0
Demand Limiting	4.0
Total Airside Survey (maximum of 30%)	27.0 %
Lighting Survey	
Conversion of Fluorescent Fixtures	7.0
Lighting Control	7.0
Occupancy Sensor Control	4.0
Total Lighting Survey (maximum of 40%)	18.0 %

* Depending on the ECMs selected, the targeted savings percentages may not be additive. Ceilings have been placed on the total survey savings percentage to prevent overstating these values when multiple ECMs are selected. Further analysis should be performed to refine the accuracy of these numbers before implementation.

** Remember to take into account the influence of "cross effects" when evaluating the long-term benefits of your project. Making an upgrade to one system may influence another system, for example, improving the efficiency of your lighting may impact your heating and cooling loads.

Annual Utility Costs

Understanding how much is spent on utility costs allows Trane to establish benchmarks used to derive the benefits from the selected ECM savings percentages. Here is the annual utility cost information that you provided to Trane:

Annual Electric Bill	\$34,454
Annual Gas Bill	\$1,463
Annual Water Bill	\$0
Annual Energy Cost Inflation (%)	3%

Energy Savings

Using the ECM savings percentages and the annual utility costs, the projected annual energy savings can be calculated. Other benefits (such as rebates) obtained from the project, if applicable, were manually entered in the Trane Energy Optimizer tool for inclusion into the analysis.

The estimated energy savings (benefits) calculated for this project are as follows:

Year	1	2	3	4	5
Airside Survey	\$1,116	\$1,150	\$1,184	\$1,220	\$1,256
Lighting Survey	\$1,798	\$1,852	\$1,908	\$1,965	\$2,024
Tracer ES Building Automation System	\$3,600	\$3,700	\$3,800	\$3,900	\$4,000
Total Annual Energy Savings (\$)	\$6,515	\$6,702	\$6,892	\$7,085	\$7,281
Total Annual Energy Savings (%)	18%	18%	18%	18%	18%

"* To complete the savings estimate calculations, the following assumptions that are based on data from the Energy Information Administration (EIA) were made concerning the facility's utility consumption: Electricity breakdown: Chiller plant consumes 26%, Airside consumes 12%, Lighting consumes 29%, and Heating consumes 0% of the electricity bill. Natural gas breakdown: Heating consumes 66% of the natural gas bill. Water breakdown: Plumbing consumes 100% of the water bill.

Initial Investment

Early in the project analysis phase, estimated project costs are used to demonstrate what the potential customer investment might look like. For this analysis, these cost values can be generated in several different ways:

- Breakeven Analysis This allows the user to analyze what ECM implementation cost would produce a "revenue neutral" project (NPV > 0, IRR = Required Rate of Return), based on the estimated ECM savings, the financial selection criteria, and the annual utility costs. This analysis will provide guidance as to where the maximum cost of the project would need to be to meet the financial selection criteria.
- ECM Project Cost Calculator As a part of the Trane Energy Optimizer tool, this calculator provides the cost to implement many of the ECMs found in the tool and requires minimal input. Costs are based on data from RS Means among other reliable sources.
- Manual cost entry A project cost estimate developed outside of the Trane Energy Optimizer tool can manually entered into the tool. All other costs (apart from the ECM implementation costs), such as consulting, project management, service agreement, etc., must be entered in the Trane Energy Optimizer using this manual method.

The costs estimated to implement this project are as follows:

Initial Investment

ECM Project(s)					
Total Initial Investments (Year 0):					
Other Annual Cost	S				
Year	1	2	3	4	5
Total Costs	\$0	\$0	\$0	\$0	\$0

* If a tax rate is provided, potential costs for depreciation for the initial capital investment are automatically calculated in the Trane Energy Optimizer tool. For this analysis, the initial project investment is depreciated over the default five year project duration. Consult with your tax advisor to determine your depreciation costs and the tax impact to your organization.

Cash Flow Analysis

The cash flow analysis combines all of the cost and savings estimates, as well as potential tax implications, for the proposed project. The estimated cash flow for the proposed project over a 5 year period is as follows:

Total Initial Investments \$56,155 (Year 0):

Year	1	2	3	4	5
Total Benefits	\$6,515	\$6,702	\$6,892	\$7,085	\$7,281
Total Costs	\$0	\$0	\$0	\$0	\$0
Benefits (Net)	\$6,514	\$6,702	\$6,892	\$7,085	\$7,280
Cash flow	\$6,514	\$6,702	\$6,892	\$7,085	\$7,280
Cumulative cash flow	(\$49,641)	(\$42,939)	(\$36,047)	(\$28,962)	(\$21,682)

* The project duration default is 5 years, as requiring a payback in two to five years is a common project selection measurement. If expenditures or benefits for the proposed project extend beyond a 5 year project duration and there is a desire to calculate the NPV and IRR over a longer period, this must be done outside of the Trane Energy Optimizer tool.

The Potential Energy Savings Opportunity

From the cash flow analysis and the financial selection criteria, we are able to evaluate the proposed project for overall profitability. A positive NPV and an IRR that meets or exceeds the Required Rate of Return indicate a project that should be pursued further. For the proposed project, the financial measurements were calculated as follows:

Net present value (NPV)	\$18,131 at 10 years
Internal rate of return (IRR)	7 %
Payback period (in years)	8.24 years

Next Steps

The Trane Energy Optimizer analysis has evaluated the savings potential of implementing an energy retrofit project and initiating an HVAC service program for your facility. Additional information and planning may now be required to validate these findings. The following steps are suggested:

- Work with your Trane Account Manager to determine if a mutually beneficial project is possible based on the analysis completed so far
- Commit to working with Trane to provide further information as needed to validate the analysis results
- Identify the key decision makers required to establish any additional project success criteria and to evaluate the project based on these criteria
- Work with Trane to establish energy and operations saving objectives and develop a detailed plan for how to achieve these objectives

Trane has the knowledge and expertise to bring a comprehensive energy retrofit approach to your project and assist you in maintaining the resulting savings with an HVAC service program. While energy and operations savings are key factors in driving the project, other factors such as increasing occupant comfort and improving indoor air quality are also considered. Increasing the performance of your mechanical systems not only reduces bottom line costs to increase profits and competitiveness, it also improves the building's asset value, increases occupant productivity, and reduces greenhouse gas emissions, the combination of which few other investments can offer.

Trane Energy Optimizer Disclaimer

This report is a Preliminary Energy Analysis, which serves to investigate possible energy and operations saving opportunities and is based on the information provided by interviews with customer personnel. The recommendations are based on an analysis of conditions observed and information gathered at the time of the survey and is based on historical information and stated assumptions. Statements concerning estimated savings are projections only and actual savings to be realized by the customer are dependent upon many factors, including conservation measures implemented, seasonal weather variations, utility rates, applicable codes and regulations, building usage, and specific energy use practices of the facility occupants and workers. Nothing contained in this report constitutes a guarantee by Trane that the projected savings will be realized by the customer.

This report, by itself, is not intended, as a basis for the engineering required to adopt any of these recommendations. Its intent is to interest the customer in the potential cost savings of the recommendations. A more detailed analysis of the current operation and condition of the facility, project costs, and expected project benefits typically will be required to successfully implement the recommendations.



Carrier Commercial Service 9401-N Southern Pine Blvd Charlotte, NC 28273 704.507.6155 (ph) 860.622.6962 (fax)

23 July 2010

Attention: Greg Wiggins Henderson County Courthouse 200 North Grove Street Hendersonville, North Carolina 28792

Subject: Controls System Corrections Quotation # 45699

Mr. Wiggins and Henderson County Associates,

Diagnosis:

The controls system at the courthouse needs a major systemic corrections. Currently the system is simultaneously heating and cooling year round regardless of outside temperatures. Proper graphics for the building were never created and the staff never trained in the use of the system. Because of the poor state of the current system, Carrier believes fixing the issues could pay for itself within a year.

Solution:

This is a not to exceed labor quote for one week, 5 days, of controls technician time. The intent of this quote is to diagnose, identify, and fix as many problems as time permits. No parts are included in this quote. In the event that a problem is found that require parts or additional labor, a separate quote will be tendered for approval. As an added benefit the process of correcting the system issues at the courthouse will also serve to educate the staff on the controls system.

Price

The fixed price for the labor and material for the scope of work will be, less taxes......\$9,168.00

Prices will remain firm for a period of 30 days. This quotation is subject to the terms and conditions on the following pages. Quoted price does not include any sales, excise or similar taxes, it being understood that any of which may apply are to be added at cost. Quoted price does not include any labor or material to repair any problems that could be discovered during the performance of the proposed work. Additional work, if necessary, will be performed only upon your written authorization and will be invoiced at our standard rate. All time is quoted at straight hours unless stated otherwise.

Please call our office if you have any questions regarding this proposal or if we can be of any additional assistance with your service needs. Please sign your acceptance of this quote and return to our office at your earliest convenience. We appreciate your business!

Sincerely,	Sign:	
MATHEW RUTLEDGE	Print Name:	
	Date:	
Mathew D. Rutledge	Title:	
Carrier Commercial Services	P.O.#:	

CARRIER CORPORATION

TERMS AND CONDITIONS OF SALE - SERVICE

- 1. PAYMENT AND TAXES-- Payment shall be made 1.25% 10/net 30 days from date of invoice. Carrier reserves the right to require cash payment or other alternative method of payment prior to completion of work if Carrier determines, in its sole discretion, that Customer or Customer's assignee's financial condition at any time does not justify continuance of the net 30 days payment term. In addition to the Agreement price, the Customer shall pay Carrier any applicable taxes or government charges that may be required in connection with the service or material furnished under this Agreement.
- 2. WORKING HOURS- All services performed under this Agreement including major repairs, are to be provided during Carrier's normal working hours unless otherwise agreed.
- ADDITIONAL SERVICE- Services or parts requested by Customer in addition to those specified in this Agreement will be provided upon receipt of Customer's written authorization and invoiced at Carrier's prevailing labor rates and parts charges. Additional services or parts shall be supplied under the terms of this Agreement.
- 4. EXCLUSIONS- Carrier is not responsible for items not normally subject to mechanical maintenance including but not limited to: duct work, casings, cabinets, fixtures, structural supports, grillage, water piping, steam piping, drain piping, cooling tower fill, boiler tubes, boiler refractory, disconnect switches and circuit breakers. Carrier is not responsible for repairs, replacements, alterations, additions, adjustments, repairs by others, unscheduled calls or emergency calls, any of which may be necessitated by negligent operation, abuse, misuse, prior improper maintenance, vandalism, obsolescence, building system design, damage due to freezing weather, chemical/electrochemical attack, corrosion, deterioration due to unusual wear and tear, any damage related to the presence of mold, fungi, mildew, or bacteria, damage caused by power reductions or failures or any other cause beyond Carrier's control.

Carrier is not responsible for the identification, detection, abatement, encapsulating or removal of asbestos, products or materials containing asbestos, similar hazardous substances, or mold, fungi, mildew, or bacteria. In the event that Carrier encounters any asbestos product or any hazardous material in the course of performing its work, Carrier may suspend its work and remove its employees from the project, until such product or material, and any hazards connected with it are abated. Carrier shall receive an extension of time to complete its work and compensation for delays encountered as a result of such situation and its correction.

Carrier shall not be required to perform tests, install any items of equipment or make modifications that may be recommended or directed by insurance companies, government, state, municipal or other authority. However, in the event any such recommendations occur, Carrier, at its option, may submit a proposal for Customer's consideration in addition to this Agreement. Carrier shall not be required to repair or replace equipment that has not been properly maintained.

- 5. WARRANTY- Carrier warrants that all service provided under this Agreement shall be performed in a workmanlike manner. Carrier also warrants all Carrier parts or components supplied hereunder to be free from defects in material and workmanship. For parts or components determined to be defective within one year from date of installation or before the termination date of this Agreement, whichever is earlier, and in the case of service, determined to be defective within ninety (90) days of completion of that service, Carrier shall at its option repair, replace, or issue a credit, for any such parts, components or service, provided they were not damaged, abused, or affected by chemical properties. Carrier shall not be liable for repairs required as a consequence of faulty installation by persons other than Carrier, misapplication, abuse, improper servicing, unauthorized alteration or improper operation by persons other than Carrier. Any claim for defective workmanship must be provided to Carrier in writing. <u>THIS WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESS, IMPLIED OR STATUTORY INCLUDING THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.</u> Carrier's obligations to repair, replace, or issue credit for any defective parts, components or service shall be Customer's exclusive remedy.
- 6. PROPRIETARY RIGHTS- During the term of this Agreement and in combination with certain services, Carrier may elect to install, attach to Customer equipment, or provide portable devices (hardware and/or software) that shall remain the personal proprietary property of Carrier. No devices installed, attached to real property or portable device(s) shall become a fixture of the Customer locations. Customer shall not acquire any interest, title or equity in any hardware, software, processes, and other intellectual or proprietary rights to devices that are used in connection with providing service on Customer equipment.
- 7. DELAYS- Delays caused by conditions beyond the reasonable control of either party shall not be the liability of either party to this Agreement.
 - CUSTOMER RESPONSIBILITIES- Customer shall:
 - Provide safe and reasonable equipment access and a safe work environment.
 - Permit access to Customer's site, and use of building services including but not limited to: water, elevators, receiving dock facilities, electrical service and local telephone service.
 - Keep areas adjacent to equipment free of extraneous material, move any stock, fixtures, walls or partitions that may be necessary to perform the specified service.
 - Promptly notify Carrier of any unusual operating conditions.
 - Upon agreement of a timely mutual schedule, allow Carrier to stop and start equipment necessary to perform service.
 - Provide adequate water treatment.
 - Provide the daily routine equipment operation (if not part of this Agreement) including availability of routine equipment log readings.
 - Where Carrier's remote monitoring service is provided, provide and maintain a telephone line with long distance direct dial and answer capability.
 - Operate the equipment properly and in accordance with instructions.
 - Promptly address any issues that arise related to mold, fungi, mildew or bacteria.
- EQUIPMENT CONDITION & RECOMMENDED SERVICE– Upon the initial scheduled operating and/or initial annual stop inspection, should Carrier determine the need for repairs or replacement, Carrier will provide Customer in writing an 'equipment condition' report including recommendations for corrections and the price for repairs in addition to this Agreement.

In the event Carrier recommends certain services (that are not included herein or upon initial inspection) and if Customer does not elect to have such services properly performed in a timely fashion, Carrier shall not be responsible for any equipment or control failures, operability or any long-term damage that may result. Carrier at its option will either continue to maintain equipment and/or controls to the best of its ability, without any responsibility, or remove such equipment from this Agreement, adjusting the price accordingly.

- 10. CUSTOMER TERMINATION- Customer shall have the right to terminate this Agreement for Carrier's non-performance provided Carrier fails to cure such non-performance within 30 days after having been given prior written notice of the non-performance. Upon early termination or expiration of this Agreement, Carrier shall have free access to enter Customer locations to disconnect and remove any Carrier personal proprietary property or devices as well as remove any and all Carrier-owned parts, tools and personal property. Additionally, Customer agrees to pay Carrier for all incurred but unamortized service costs performed by Carrier including overheads and a reasonable profit.
- 11. CARRIER TERMINATION- Carrier reserves the right to discontinue its service any time payments have not been made as agreed or if alterations, additions or repairs are made to equipment during the term of this Agreement by others without prior agreement between Customer and Carrier.
- 12. LIMITATION OF LIABILITY- Under no circumstances shall Carrier be held liable for any incidental, special or consequential damages, including loss of revenue, loss of use of equipment or facilities, or economic damages based on strict liability or negligence. Carrier shall be liable for damage to property, other than the equipment provided under this Agreement, and to persons, to the extent that Carrier's negligent acts or omissions directly contributed to such injury or property damage. Carrier's maximum liability for any reason (except for personal injuries) shall consist of the refunding of all moneys paid by Customer to Carrier under this Agreement.
- 13 WASTE DISPOSAL- Customer is wholly responsible for the removal and proper disposal of waste oil, refrigerant and any other material generated during the term of this Agreement.
- 14. CLAIMS- Any suits arising from the performance or non-performance of this Agreement, whether based upon contract, negligence, strict liability or otherwise, shall be brought within one (1) year from the date the claim arose.
- 15. GOVERNMENT PROCUREMENTS- Carrier offers standard Commercial Items that may not comply with Government specifications. Carrier does not comply with the Cost Accounting Standards (CAS) or with the Federal Acquisition Regulations (FAR), except for FAR Part 12. In no event shall Carrier provide any Cost or Pricing Data in connection with this Agreement or subsequent modifications.
- 16. SUPERSEDURE, ASSIGNMENT and MODIFICATION- This Agreement contains the complete and exclusive statement of the agreement between the parties and supersedes all previous or contemporaneous, oral or written, statements. Customer may assign this Agreement only with Carrier's prior written consent. No modification to this Agreement shall be binding unless in writing and signed by both parties.



Trane Energy Analyzer Report

Henderson County Courthouse Friday, July 16, 2010

We Make Buildings Work Better for LifeTM

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Energy Assessment for Henderson County Courthouse

1. Introduction

The purpose of this energy assessment is to provide information about how energy is used, a point of reference for comparisons to other similar facilities, and direction about potential energy savings opportunities for Henderson County Courthouse. The assessment and recommendations are based upon the information provided to the Trane Energy Analyzer¹. Refer to the Trane Energy Analyzer to obtain more detailed information about the information and data that was used to conduct this energy assessment.

The accuracy of this assessment and the resulting recommendations are directly influenced by the degree of accuracy of the data that was input to the Trane Energy Analyzer. In addition to the data inputs, a number of other factors such as weather variations, building occupancy and operation schedules can affect energy usage and consequently energy cost savings. Typical characteristics² for these other factors were used in the simulation model to calculate energy consumption and conduct this assessment. The assessment is not intended to predict the future effect on any changes made to Henderson County Courthouse but rather to provide guidance and focus on the greatest potential energy savings opportunities and recommend next steps.

2. Why Energy Efficiency is Good Business

Energy use and thus, improvements in energy efficiency can contribute to the achievement of long-term organizational objectives. Links between energy efficiency and business objectives can be direct, as in the case of improved operational efficiency and reduced costs, or indirect, such as with improved employee productivity. Listed below are a few examples how energy efficiency can contribute to business success.

Examples of Business Objectives with Links to Energy Efficiency

- Improved operational efficiency
- Reduced operating costs
- Improved product quality
- Improved air quality
- Improved tenant/occupant satisfaction
- Improved employee productivity
- Improved contribution to environmental protection & sustainability
- Improved corporate image

3. How You Use Energy Today

It is useful to compare energy consumption and use patterns with other similar facilities in assessing your current state and to develop improvement targets for the future. The sections below provide benchmarks against an "industry average" and an energy efficient³ low-rise office (3 stories or less) similar in size to your facility and located in the same geographic region.

¹ The Trane Energy Analyzer can be accessed through <u>http://energy.trane.com</u>

² Typical case - for these factors, the model assumes the most common practice or value to calculate energy use. ³ The energy efficient facility used in these comparisons use energy savings technologies, which are typically cost

³ The energy efficient facility used in these comparisons use energy savings technologies, which are typically cost effective in new and significantly renovated buildings.

3.1 Total Consumption

Annual energy costs for your facility are: \$1.39 per ft², based on 98 kBtu/ft² in energy consumption. This is 1.8% lower than the industry average for a low-rise office (3 stories or less) in your region.

In contrast, energy costs for a new, energy efficient low-rise office (3 stories or less) would amount to approximately \$0.69 per ft², based on 45 kBtu/ft² annual energy consumption. For most facilities, it is possible to achieve this level of efficiency by implementing readily available energy efficiency strategies and management practices.

Figure 1a: Comparison of Energy Use for Henderson County Courthouse to the Industry Average and an Energy Efficient low-rise office (3 stories or less) (\$/ft²)



Table 1a: Comparison of Energy Use for Henderson County Courthouse to the Industry Average and an Energy Efficient low-rise office (3 stories or less)

	Electricity	Natural Gas	Steam	Total
Your Facility	\$1.11	\$0.28	\$0.00	\$1.39
Industry Average	\$1.22	\$0.20	\$0.00	\$1.42
Efficient Facility	\$0.62	\$0.07	\$0.00	\$0.69

Figure 1b: Comparison of Energy Use for Henderson County Courthouse to the Industry Average and an Energy Efficient low-rise office (3 stories or less) (kBtu/ft²)



Table 1b: Comparison of Energy Use for Henderson County Courthouse to the Industry Average and an Energy Efficient low-rise office (3 stories or less)

	Electricity kBtu / ft ²	Natural Gas kBtu / ft ²	Steam kBtu / ft ²	Total kBtu / ft ²
Your Facility	66.5	31.8	0.0	98.3
Industry Average	73.3	22.1	0.0	95.3
Efficient Facility	37.0	7.9	0.0	44.9

NOTE: The main source used to develop the energy benchmark data was the DOE Energy Information Administration's Commercial Building Energy Consumption Survey (CBECS).

3.2 End Use Breakdown

Figures 2 and 3, followed by Table 2, illustrate the energy end use breakdown for Henderson County Courthouse. End uses with the largest costs typically represent the areas for the greatest savings opportunities. Based on the data your provided, the end uses with the highest costs for are interior lighting and space heating.Because energy prices differ among fuel sources, the end uses with the highest energy consumption differ from those with the highest cost.Based on the data your provided, they are reversed with interior lighting higher than space heating.

Figure 2: Energy Cost End Use Breakdown of Henderson County Courthouse





Figure 3: Energy End Use Breakdown of Henderson County Courthouse

Table 2: Energy End Use Breakdown of Henderson County Courthouse

	Cost		Energy	
End Uses	Value	Percent	mmBtu	Percent
Space Cooling (Cool)	\$17,985	12.9%	1,080.5	11.0%
Space Heating (Heat)	\$25,678	18.5%	2,876.1	29.3%
Interior Lighting (Lights)	\$40,488	29.1%	2,432.4	24.7%
Misc. Equipment (Misc.)	\$20,983	15.1%	1,260.6	12.8%
Fans & Pumps (Fans)	\$23,656	17.0%	1,421.2	14.5%
Exterior Loads (Ext.Ld.)	\$5,436	3.9%	326.6	3.3%
Elevators (Elev.)	\$2,222	1.6%	133.5	1.4%
Domestic Hot Water (DHW)	\$2,671	1.9%	299.1	3.0%
Totals	\$139,118	100%	9,829.9	100%
NOTE: The energy breakdown information estimate is beend on the teal inputs and building model				

NOTE: The energy breakdown information estimate is based on the tool inputs and building model profiles derived from DOE-2 building modeling.

3.3 Greenhouse Gas Emissions

Greenhouse gases, particularly carbon dioxide, are known to cause global warming and are linked to the production of energy. Figure 4 below illustrates greenhouse gas emissions generated by your energy consumption as compared to the industry average and an energy efficient facility.



Figure 4: Greenhouse Gas Emissions (metric tons of CO₂)

Table 3: Your Facility's CO2 Output Comparison

	Annual Metric Tons of CO ₂
Your Facility	1,128.4
Industry Average	1,174.5
Energy Efficient Facility	575.7
Typical Automobile	3.8

Sources: U.S. Energy Information Administration ("Updated State-Level Greenhouse Gas Emission Factors for Electricity Generation," 2001 and http://www.eia.doe.gov/oiaf/1605/coefficients.html) and Natural Resources Canada ("Canadian GHG Challenge Registry Guide to Entity and Facility-Based Reporting Emission Factors," 2000 - 2002 average).

By reducing your consumption level to that of an efficient facility, you would save 552.7 metric tonnes of CO2 per year. That's equivalent to taking 145.4 automobiles off the road each year.

4. Retrofit Opportunities

Significant energy savings can accrue from implementing a combination of best energy management practices and upgrading or installing new, more energy efficient technology. The greatest potential savings opportunities for Henderson County Courthouse are summarized below.

4.1 Low and No-Cost Opportunities

Energy savings of from 3 to 15 percent can be realized by adopting best energy management practices. These opportunities typically require little or no cost to implement. Suggested best energy management practices for Henderson County Courthouse include the following:

Your Energy Saving Opportunities

- Office Equipment: Turn off office equipment and appliances and invoke energy saving features. Computers, monitors, copiers, fax machines, and printers often have energy saving modes which are not activated and most office equipment is left on unnecessarily.
- Outdoor Air: Check that minimum outdoor air levels are at recommended requirements which maintain proper indoor air quality; many buildings actually bring in much more outdoor air than necessary.
- Operation & Maintenance:
 Have mechanical systems checked and maintained on a regularly scheduled basis. At least 10% in energy savings may be expected for systems that are properly maintained versus those which are serviced only when problems occur. Moreover, equipment life is prolonged, leading to further cost savings.
- HVAC Controls: Have controls for heating, ventilation and air conditioning (HVAC) equipment checked to ensure that they are operating at optimum levels.
- Lighting: Optimize circuits and/or energy management systems to only control areas where lighting is needed at desired times; many buildings require that the lights are on for an entire floor when only an office is occupied, for instance.

4.2 Energy Conservation Measure Opportunities

Based on the energy profile for Henderson County Courthouse, the following energy efficiency measures represent the greatest potential for savings. Note that most measures are not additive and cannot be summed to obtain a cumulative total savings estimate.

Opportunity	Action Item
Fans	Install variable speed fans and controls on applicable air handling units.
Lighting (Option 1)	Retrofit interior lighting with more efficient system to reduce overall lighting demand (0.9 W/ft ² , 10.6 W/m ²).
Lighting (Option 2)	Reduce interior lighting usage by adding controls (automatic and/or manual) that turn off lights when not fully needed, as may be the case when a room is unoccupied or has adequate natural daylight. Savings shown are based on reducing the lighting use by 20%, but the savings potential may be higher or lower depending your specific circumstances and usage patterns.
Heating	Improve heating system effectiveness by reducing heating system losses, routine maintenance, and/or replacing old heating equipment (20% increase in overall heating efficiency).
Demand Ventilation	Use carbon dioxide and/or occupancy sensors to control outside air while maintaining indoor air quality.
Cooling	Optimize "free cooling" by providing for the ability to provide more outside air outside when the air temperature is below the cooling setpoint.

Table 4: Opportunities

5. Next Steps

The Trane Energy Analyzer assessment has evaluated a number of energy saving measures that can be taken immediately and others that will require additional information and planning. The following steps are suggested:

Planning

- Develop an energy efficiency improvement target for your business
- Identify a person who will become the "energy champion" for your business
- Develop a detailed plan for how to achieve your target
- Identify how energy efficiency improvements link to achievement of your business objectives both directly and indirectly to create motivation for action

Immediate No Cost/Low Cost Energy Savings Opportunities

- Develop a plan to implement the suggestions from section 4.1
- Review the Products and Services section on our web site for more ideas
- Develop an employee awareness and communications program to gain broad support and participation for your energy savings initiatives

Retrofit Improvements

- Enhance your energy management expertise by visiting the Products and Services section of our web site.
- Conduct a cost/benefit analysis to determine if the project meets your organization's investment criteria. Remember to take into account the influence of "cross effects"⁴ when evaluating the long-term benefits of your project. Contact us or your own contractor for assistance.

⁴ Making an upgrade to one system may influence another system. For example, improving the efficiency of your lighting may impact your air conditioning.

6. Trane Energy Analyzer Disclaimer

This report is a Preliminary Energy Assessment, which serves to investigate possible energy conservation opportunities and is based on the information provided by and interviews with customer personnel. The recommendations are based on an analysis of conditions observed and information gathered at the time of the survey and is based on historical information. Statements concerning energy savings are projections only and actual savings to be realized by the customer are dependent upon many factors, including conservation measures implemented, seasonal weather variations, fuel price, and specific energy use practices of the facility occupants and workers. Nothing contained in this report constitutes a guarantee by Trane that the projected savings will be realized by the customer.

This report, by itself, is not intended, as a basis for the engineering required to adopt any of these recommendations. Its intent is to interest the customer in the potential cost savings of the recommendations. Development of design documents and specifications typically will be required to successfully implement the recommendations.



Trane Energy Optimizer Report

Henderson County Courthouse Friday, July 16, 2010

We Make Buildings Work Better for LifeTM
Energy Retrofit Analysis for Courthouse Introduction

The purpose of this analysis is to identify potential energy conservation measures (ECMs) and other operations cost saving opportunities for an existing facility and to quantify a potential return on investment associated with implementing the selected recommendations. The recommendations and financial analysis are based upon the information provided to the Trane Energy Optimizer to assist in determining the current operation, configuration, and total cost of ownership of the systems being analyzed. The analysis also leverages Trane's extensive experience in the building services market, using proven energy-efficient technologies and HVAC maintenance knowledge to estimate the associated energy and operations cost savings. Refer to the Trane Energy Optimizer to obtain more detailed information about the information and data that was used to conduct this assessment.

The accuracy of the Trane Energy Optimizer analysis and the resulting recommendations are directly influenced by the degree of accuracy of the input data. In addition to the data inputs, a number of other factors such as changing utility rates, changes in how the building is being used and maintained, weather variations, etc. can affect the total cost of ownership of the building systems and the associated cost savings. These other factors are not inherently built into the tool calculations and should be considered when selecting tool inputs and analyzing tool outputs. The analysis is not intended to predict actual project costs or actual financial benefits but rather to provide guidance and focus on the overall potential energy savings opportunity for the facility.

Qualified Energy Conservation Measures (ECMs)

Significant energy savings can result from implementing a combination of ECMs that include the best energy management practices and upgrading or installing energy efficient technology. You have qualified the following ECMs as those that will potentially improve the energy performance of your facility based on the current operation and condition of your building systems:

Airside Survey	Target Savings (%)
CO2 Demand Control Ventilation	7.0
Duct Static Pressure Optimization	4.0
Mixed Air Damper - Enthalpy Control	4.0
Night Setback	7.0
Optimal S/S and Ventilation Delay	4.0
Outdoor Air Reduction	4.0
Sequencing of Heating/Cooling/Mixed Air	4.0
Supply Air Reset	4.0
Variable Speed Drive Control	7.0
Ventilation Optimization	7.0
Total Airside Survey (maximum of 30%)	30
Chiller Plant Survey	
Chiller/Tower Optimization	7.0
Chilled Water Reset	4.0
Chiller Plant Control	7.0
Direct Digital Controls	7.0
VFD's on Tower fans	7.0
Total Chiller Plant Survey (maximum of 30%)	30

Heating Survey

11.0 %
4.0
7.0

* Depending on the ECMs selected, the targeted savings percentages may not be additive. Ceilings have been placed on the total survey savings percentage to prevent overstating these values when multiple ECMs are selected. Further analysis should be performed to refine the accuracy of these numbers before implementation.

** Remember to take into account the influence of "cross effects" when evaluating the long-term benefits of your project. Making an upgrade to one system may influence another system, for example, improving the efficiency of your lighting may impact your heating and cooling loads.

Annual Utility Costs

Understanding how much is spent on utility costs allows Trane to establish benchmarks used to derive the benefits from the selected ECM savings percentages. Here is the annual utility cost information that you provided to Trane:

Annual Electric Bill	\$110,767
Annual Gas Bill	\$28,348
Annual Water Bill	\$0
Annual Energy Cost Inflation (%)	3%

Energy Savings

Using the ECM savings percentages and the annual utility costs, the projected annual energy savings can be calculated. Other benefits (such as rebates) obtained from the project, if applicable, were manually entered in the Trane Energy Optimizer tool for inclusion into the analysis.

The estimated energy savings (benefits) calculated for this project are as follows:

Year	1	2	3	4	5
Airside Survey	\$3,988	\$4,107	\$4,230	\$4,357	\$4,488
Chiller Plant Survey	\$8,640	\$8,899	\$9,166	\$9,441	\$9,724
Heating Survey	\$2,058	\$2,120	\$2,183	\$2,249	\$2,316
Chiller/Ice Storage Sequencing	\$11,076	\$11,408	\$11,751	\$12,103	\$12,466
Total Annual Energy Savings (\$)	\$25,762	\$26,534	\$27,331	\$28,150	\$28,995
Total Annual Energy Savings (%)	19%	19%	19%	19%	19%

"* To complete the savings estimate calculations, the following assumptions that are based on data from the Energy Information Administration (EIA) were made concerning the facility's utility consumption: Electricity breakdown: Chiller plant consumes 26%, Airside consumes 12%, Lighting consumes 29%, and Heating consumes 0% of the electricity bill. Natural gas breakdown: Heating consumes 66% of the natural gas bill. Water breakdown: Plumbing consumes 100% of the water bill.

Initial Investment

Early in the project analysis phase, estimated project costs are used to demonstrate what the potential customer investment might look like. For this analysis, these cost values can be generated in several different ways:

- Breakeven Analysis This allows the user to analyze what ECM implementation cost would produce a "revenue neutral" project (NPV > 0, IRR = Required Rate of Return), based on the estimated ECM savings, the financial selection criteria, and the annual utility costs. This analysis will provide guidance as to where the maximum cost of the project would need to be to meet the financial selection criteria.
- ECM Project Cost Calculator As a part of the Trane Energy Optimizer tool, this calculator provides the cost to implement many of the ECMs found in the tool and requires minimal input. Costs are based on data from RS Means among other reliable sources.
- Manual cost entry A project cost estimate developed outside of the Trane Energy Optimizer tool can manually entered into the tool. All other costs (apart from the ECM implementation costs), such as consulting, project management, service agreement, etc., must be entered in the Trane Energy Optimizer using this manual method.

The costs estimated to implement this project are as follows:

Initial Investment

ECM Project(s)				\$232,000	
Total Initial Investments (Year 0):			\$232,000		
Other Annual Cost	S				
Year	1	2	3	4	5
Total Costs	\$0	\$0	\$0	\$0	\$0

* If a tax rate is provided, potential costs for depreciation for the initial capital investment are automatically calculated in the Trane Energy Optimizer tool. For this analysis, the initial project investment is depreciated over the default five year project duration. Consult with your tax advisor to determine your depreciation costs and the tax impact to your organization.

Cash Flow Analysis

The cash flow analysis combines all of the cost and savings estimates, as well as potential tax implications, for the proposed project. The estimated cash flow for the proposed project over a 5 year period is as follows:

Total Initial Investments \$232,000 (Year 0):

Year	1	2	3	4	5
Total Benefits	\$25,762	\$26,534	\$27,331	\$28,150	\$28,995
Total Costs	\$0	\$0	\$0	\$0	\$0
Benefits (Net)	\$25,762	\$26,534	\$27,330	\$28,150	\$28,994
Cash flow	\$25,762	\$26,534	\$27,330	\$28,150	\$28,994
Cumulative cash flow	(\$206,238)	(\$179,704)	(\$152,374)	(\$124,224)	(\$95,230)

* The project duration default is 5 years, as requiring a payback in two to five years is a common project selection measurement. If expenditures or benefits for the proposed project extend beyond a 5 year project duration and there is a desire to calculate the NPV and IRR over a longer period, this must be done outside of the Trane Energy Optimizer tool.

The Potential Energy Savings Opportunity

From the cash flow analysis and the financial selection criteria, we are able to evaluate the proposed project for overall profitability. A positive NPV and an IRR that meets or exceeds the Required Rate of Return indicate a project that should be pursued further. For the proposed project, the financial measurements were calculated as follows:

Net present value (NPV)	\$63,301 at 10 years
Internal rate of return (IRR)	16%
Payback period (in years)	8.6 years

Next Steps

The Trane Energy Optimizer analysis has evaluated the savings potential of implementing an energy retrofit project and initiating an HVAC service program for your facility. Additional information and planning may now be required to validate these findings. The following steps are suggested:

- Work with your Trane Account Manager to determine if a mutually beneficial project is possible based on the analysis completed so far
- Commit to working with Trane to provide further information as needed to validate the analysis results
- Identify the key decision makers required to establish any additional project success criteria and to evaluate the project based on these criteria
- Work with Trane to establish energy and operations saving objectives and develop a detailed plan for how to achieve these objectives

Trane has the knowledge and expertise to bring a comprehensive energy retrofit approach to your project and assist you in maintaining the resulting savings with an HVAC service program. While energy and operations savings are key factors in driving the project, other factors such as increasing occupant comfort and improving indoor air quality are also considered. Increasing the performance of your mechanical systems not only reduces bottom line costs to increase profits and competitiveness, it also improves the building's asset value, increases occupant productivity, and reduces greenhouse gas emissions, the combination of which few other investments can offer.

Trane Energy Optimizer Disclaimer

This report is a Preliminary Energy Analysis, which serves to investigate possible energy and operations saving opportunities and is based on the information provided by interviews with customer personnel. The recommendations are based on an analysis of conditions observed and information gathered at the time of the survey and is based on historical information and stated assumptions. Statements concerning estimated savings are projections only and actual savings to be realized by the customer are dependent upon many factors, including conservation measures implemented, seasonal weather variations, utility rates, applicable codes and regulations, building usage, and specific energy use practices of the facility occupants and workers. Nothing contained in this report constitutes a guarantee by Trane that the projected savings will be realized by the customer.

This report, by itself, is not intended, as a basis for the engineering required to adopt any of these recommendations. Its intent is to interest the customer in the potential cost savings of the recommendations. A more detailed analysis of the current operation and condition of the facility, project costs, and expected project benefits typically will be required to successfully implement the recommendations.



Trane Energy Analyzer Report

Henderson County Human Services Friday, July 16, 2010

We Make Buildings Work Better for $Life^{TM}$

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Energy Assessment for Henderson County Human Services

1. Introduction

The purpose of this energy assessment is to provide information about how energy is used, a point of reference for comparisons to other similar facilities, and direction about potential energy savings opportunities for Henderson County Human Services. The assessment and recommendations are based upon the information provided to the Trane Energy Analyzer¹. Refer to the Trane Energy Analyzer to obtain more detailed information about the information and data that was used to conduct this energy assessment.

The accuracy of this assessment and the resulting recommendations are directly influenced by the degree of accuracy of the data that was input to the Trane Energy Analyzer. In addition to the data inputs, a number of other factors such as weather variations, building occupancy and operation schedules can affect energy usage and consequently energy cost savings. Typical characteristics² for these other factors were used in the simulation model to calculate energy consumption and conduct this assessment. The assessment is not intended to predict the future effect on any changes made to Henderson County Human Services but rather to provide guidance and focus on the greatest potential energy savings opportunities and recommend next steps.

2. Why Energy Efficiency is Good Business

Energy use and thus, improvements in energy efficiency can contribute to the achievement of long-term organizational objectives. Links between energy efficiency and business objectives can be direct, as in the case of improved operational efficiency and reduced costs, or indirect, such as with improved employee productivity. Listed below are a few examples how energy efficiency can contribute to business success.

Examples of Business Objectives with Links to Energy Efficiency

- Improved operational efficiency
- Reduced operating costs
- Improved product quality
- Improved air quality
- Improved tenant/occupant satisfaction
- Improved employee productivity
- Improved contribution to environmental protection & sustainability
- Improved corporate image

3. How You Use Energy Today

It is useful to compare energy consumption and use patterns with other similar facilities in assessing your current state and to develop improvement targets for the future. The sections below provide benchmarks against an "industry average" and an energy efficient³ low-rise office (3 stories or less) similar in size to your facility and located in the same geographic region.

¹ The Trane Energy Analyzer can be accessed through <u>http://energy.trane.com</u>

² Typical case - for these factors, the model assumes the most common practice or value to calculate energy use. ³ The energy efficient facility used in these comparisons use energy savings technologies, which are typically cost

³ The energy efficient facility used in these comparisons use energy savings technologies, which are typically cost effective in new and significantly renovated buildings.

3.1 Total Consumption

Annual energy costs for your facility are: \$1.26 per ft², based on 76 kBtu/ft² in energy consumption. This is 26.3% lower than the industry average for a low-rise office (3 stories or less) in your region.

In contrast, energy costs for a new, energy efficient low-rise office (3 stories or less) would amount to approximately \$0.83 per ft², based on 45 kBtu/ft² annual energy consumption. For most facilities, it is possible to achieve this level of efficiency by implementing readily available energy efficiency strategies and management practices.

Figure 1a: Comparison of Energy Use for Henderson County Human Services to the Industry Average and an Energy Efficient low-rise office (3 stories or less) (\$/ft²)



Table 1a: Comparison of Energy Use for Henderson County HumanServices to the Industry Average and an Energy Efficient Iow-riseoffice (3 stories or less)

	Electricity	Natural Gas	Steam	Total
Your Facility	\$1.03	\$0.24	\$0.00	\$1.26
Industry Average	\$1.51	\$0.20	\$0.00	\$1.71
Efficient Facility	\$0.76	\$0.07	\$0.00	\$0.83

Figure 1b: Comparison of Energy Use for Henderson County Human Services to the Industry Average and an Energy Efficient Iow-rise office (3 stories or less) (kBtu/ft²)



Table 1b: Comparison of Energy Use for Henderson County HumanServices to the Industry Average and an Energy Efficient Iow-riseoffice (3 stories or less)

	Electricity kBtu / ft ²	Natural Gas kBtu / ft ²	Steam kBtu / ft ²	Total kBtu / ft ²
Your Facility	49.7	26.2	0.0	75.9
Industry Average	73.3	22.1	0.0	95.3
Efficient Facility	37.0	7.9	0.0	44.9

NOTE: The main source used to develop the energy benchmark data was the DOE Energy Information Administration's Commercial Building Energy Consumption Survey (CBECS).

3.2 End Use Breakdown

Figures 2 and 3, followed by Table 2, illustrate the energy end use breakdown for Henderson County Human Services. End uses with the largest costs typically represent the areas for the greatest savings opportunities. Based on the data your provided, the end uses with the highest costs for are interior lighting and space cooling.Because energy prices differ among fuel sources, the end uses with the highest energy consumption differ from those with the highest cost. The end uses with the highest and second highest energy consumption are interior lighting and space heating, respectively.

Figure 2: Energy Cost End Use Breakdown of Henderson County Human Services



Figure 3: Energy End Use Breakdown of Henderson County Human Services



Table 2: Energy End Use Breakdown of Henderson County Human Services

	Cost		Ene	ergy						
End Uses	Value	Percent	mmBtu	Percent						
Space Cooling (Cool)	\$24,732	20.3%	1,197.6	16.3%						
Space Heating (Heat)	\$20,656	16.9%	2,295.8	31.3%						
Interior Lighting (Lights)	\$32,874	26.9%	1,591.8	21.7%						
Misc. Equipment (Misc.)	\$17,045	14.0%	825.3	11.2%						
Fans & Pumps (Fans)	\$19,102	15.7%	925.0	12.6%						
Exterior Loads (Ext.Ld.)	\$4,488	3.7%	217.3	3.0%						
Elevators (Elev.)	\$942	0.8%	45.6	0.6%						
Domestic Hot Water (DHW)	\$2,167	1.8%	240.8	3.3%						
Totals	\$122,007	100%	7,339.3	100%						
NOTE: The energy breekdown inform	ation actimate in h	and on the teal	innute and huildin	NOTE: The energy breakdown information estimate is based on the teal inputs and building model						

NOTE: The energy breakdown information estimate is based on the tool inputs and building model profiles derived from DOE-2 building modeling.

3.3 Greenhouse Gas Emissions

Greenhouse gases, particularly carbon dioxide, are known to cause global warming and are linked to the production of energy. Figure 4 below illustrates greenhouse gas emissions generated by your energy consumption as compared to the industry average and an energy efficient facility.



Figure 4: Greenhouse Gas Emissions (metric tons of CO₂)

Table 3: Your Facility's CO2 Output Comparison

	Annual Metric Tons of CO ₂
Your Facility	827.2
Industry Average	1,135.5
Energy Efficient Facility	556.6
Typical Automobile	3.8

Sources: U.S. Energy Information Administration ("Updated State-Level Greenhouse Gas Emission Factors for Electricity Generation," 2001 and http://www.eia.doe.gov/oiaf/1605/coefficients.html) and Natural Resources Canada ("Canadian GHG Challenge Registry Guide to Entity and Facility-Based Reporting Emission Factors," 2000 - 2002 average).

By reducing your consumption level to that of an efficient facility, you would save 270.6 metric tonnes of CO2 per year. That's equivalent to taking 71.2 automobiles off the road each year.

4. Retrofit Opportunities

Significant energy savings can accrue from implementing a combination of best energy management practices and upgrading or installing new, more energy efficient technology. The greatest potential savings opportunities for Henderson County Human Services are summarized below.

4.1 Low and No-Cost Opportunities

Energy savings of from 3 to 15 percent can be realized by adopting best energy management practices. These opportunities typically require little or no cost to implement. Suggested best energy management practices for Henderson County Human Services include the following:

Your Energy Saving Opportunities

- Office Equipment: Turn off office equipment and appliances and invoke energy saving features. Computers, monitors, copiers, fax machines, and printers often have energy saving modes which are not activated and most office equipment is left on unnecessarily.
- Outdoor Air: Check that minimum outdoor air levels are at recommended requirements which maintain proper indoor air quality; many buildings actually bring in much more outdoor air than necessary.
- Operation & Maintenance:
 Have mechanical systems checked and maintained on a regularly scheduled basis. At least 10% in energy savings may be expected for systems that are properly maintained versus those which are serviced only when problems occur. Moreover, equipment life is prolonged, leading to further cost savings.
- HVAC Controls: Have controls for heating, ventilation and air conditioning (HVAC) equipment checked to ensure that they are operating at optimum levels.
- Lighting: Optimize circuits and/or energy management systems to only control areas where lighting is needed at desired times; many buildings require that the lights are on for an entire floor when only an office is occupied, for instance.

4.2 Energy Conservation Measure Opportunities

Based on the energy profile for Henderson County Human Services, the following energy efficiency measures represent the greatest potential for savings. Note that most measures are not additive and cannot be summed to obtain a cumulative total savings estimate.

Opportunity	Action Item
Fans	Install variable speed fans and controls on applicable air handling units.
Lighting (Option 1)	Retrofit interior lighting with more efficient system to reduce overall lighting demand (0.9 W/ft ² , 10.6 W/m ²).
Cooling	Improve cooling system effectiveness by reducing cooling system losses, routine maintenance, and/or replacing old cooling equipment (20% increase in overall cooling efficiency).
Heating	Improve heating system effectiveness by reducing heating system losses, routine maintenance, and/or replacing old heating equipment (20% increase in overall heating efficiency).
Lighting (Option 2)	Reduce interior lighting usage by adding controls (automatic and/or manual) that turn off lights when not fully needed, as may be the case when a room is unoccupied or has adequate natural daylight. Savings shown are based on reducing the lighting use by 20%, but the savings potential may be higher or lower depending your specific circumstances and usage patterns.
Demand Ventilation	Use carbon dioxide and/or occupancy sensors to control outside air while maintaining indoor air quality.
Domestic Hot Water	Reduce the temperature of the domestic hot water system to provide 122°F (50°C) water.

Table 4: Opportunities

5. Next Steps

The Trane Energy Analyzer assessment has evaluated a number of energy saving measures that can be taken immediately and others that will require additional information and planning. The following steps are suggested:

Planning

- Develop an energy efficiency improvement target for your business
- Identify a person who will become the "energy champion" for your business
- Develop a detailed plan for how to achieve your target
- Identify how energy efficiency improvements link to achievement of your business objectives both directly and indirectly to create motivation for action

Immediate No Cost/Low Cost Energy Savings Opportunities

- Develop a plan to implement the suggestions from section 4.1
- Review the Products and Services section on our web site for more ideas
- Develop an employee awareness and communications program to gain broad support and participation for your energy savings initiatives

Retrofit Improvements

- Enhance your energy management expertise by visiting the Products and Services section of our web site.
- Conduct a cost/benefit analysis to determine if the project meets your organization's investment criteria. Remember to take into account the influence of "cross effects"⁴ when evaluating the long-term benefits of your project. Contact us or your own contractor for assistance.

⁴ Making an upgrade to one system may influence another system. For example, improving the efficiency of your lighting may impact your air conditioning.

6. Trane Energy Analyzer Disclaimer

This report is a Preliminary Energy Assessment, which serves to investigate possible energy conservation opportunities and is based on the information provided by and interviews with customer personnel. The recommendations are based on an analysis of conditions observed and information gathered at the time of the survey and is based on historical information. Statements concerning energy savings are projections only and actual savings to be realized by the customer are dependent upon many factors, including conservation measures implemented, seasonal weather variations, fuel price, and specific energy use practices of the facility occupants and workers. Nothing contained in this report constitutes a guarantee by Trane that the projected savings will be realized by the customer.

This report, by itself, is not intended, as a basis for the engineering required to adopt any of these recommendations. Its intent is to interest the customer in the potential cost savings of the recommendations. Development of design documents and specifications typically will be required to successfully implement the recommendations.



Trane Energy Optimizer Report

Henderson County Human Services Friday, July 16, 2010

We Make Buildings Work Better for LifeTM

Energy Retrofit Analysis for Human Services Introduction

The purpose of this analysis is to identify potential energy conservation measures (ECMs) and other operations cost saving opportunities for an existing facility and to quantify a potential return on investment associated with implementing the selected recommendations. The recommendations and financial analysis are based upon the information provided to the Trane Energy Optimizer to assist in determining the current operation, configuration, and total cost of ownership of the systems being analyzed. The analysis also leverages Trane's extensive experience in the building services market, using proven energy-efficient technologies and HVAC maintenance knowledge to estimate the associated energy and operations cost savings. Refer to the Trane Energy Optimizer to obtain more detailed information about the information and data that was used to conduct this assessment.

The accuracy of the Trane Energy Optimizer analysis and the resulting recommendations are directly influenced by the degree of accuracy of the input data. In addition to the data inputs, a number of other factors such as changing utility rates, changes in how the building is being used and maintained, weather variations, etc. can affect the total cost of ownership of the building systems and the associated cost savings. These other factors are not inherently built into the tool calculations and should be considered when selecting tool inputs and analyzing tool outputs. The analysis is not intended to predict actual project costs or actual financial benefits but rather to provide guidance and focus on the overall potential energy savings opportunity for the facility.

Qualified Energy Conservation Measures (ECMs)

Significant energy savings can result from implementing a combination of ECMs that include the best energy management practices and upgrading or installing energy efficient technology. You have qualified the following ECMs as those that will potentially improve the energy performance of your facility based on the current operation and condition of your building systems:

Airside Survey	Target Savings (%)
Mixed Air Damper - Dry Bulb Control	4.0
Mixed Air Damper - Enthalpy Control	4.0
Night Setback	7.0
Optimal S/S and Ventilation Delay	4.0
Outdoor Air Reduction	4.0
Demand Limiting	4.0
Total Airside Survey (maximum of 30%)	27.0 %
Heating Survey	
Boiler Tuning	7.0
Optimize Boiler Sequencing	7.0
Supply Water Setpoint Optimization	4.0
Total Heating Survey (maximum of 25%)	18.0 %

Lighting Survey

Lighting Control

Total Lighting Survey (maximum of 40%) 7.0 %

7.0

* Depending on the ECMs selected, the targeted savings percentages may not be additive. Ceilings have been placed on the total survey savings percentage to prevent overstating these values when multiple ECMs are selected. Further analysis should be performed to refine the accuracy of these numbers before implementation.

** Remember to take into account the influence of "cross effects" when evaluating the long-term benefits of your project. Making an upgrade to one system may influence another system, for example, improving the efficiency of your lighting may impact your heating and cooling loads.

Annual Utility Costs

Understanding how much is spent on utility costs allows Trane to establish benchmarks used to derive the benefits from the selected ECM savings percentages. Here is the annual utility cost information that you provided to Trane:

Annual Electric Bill	\$99,184
Annual Gas Bill	\$22,823
Annual Water Bill	\$0
Annual Energy Cost Inflation (%)	0%

Energy Savings

Using the ECM savings percentages and the annual utility costs, the projected annual energy savings can be calculated. Other benefits (such as rebates) obtained from the project, if applicable, were manually entered in the Trane Energy Optimizer tool for inclusion into the analysis.

The estimated energy savings (benefits) calculated for this project are as follows:

Year	1	2	3	4	5
Airside Survey	\$3,214	\$3,214	\$3,214	\$3,214	\$3,214
Heating Survey	\$2,711	\$2,711	\$2,711	\$2,711	\$2,711
Lighting Survey	\$2,013	\$2,013	\$2,013	\$2,013	\$2,013
Tracer ES/Building Recommissioning	\$4,500	\$4,000	\$3,500	\$3,000	\$2,500
Total Annual Energy Savings (\$)	\$12,438	\$11,938	\$11,438	\$10,938	\$10,438
Total Annual Energy Savings (%)	10%	10%	9%	9%	9%

"* To complete the savings estimate calculations, the following assumptions that are based on data from the Energy Information Administration (EIA) were made concerning the facility's utility consumption: Electricity breakdown: Chiller plant consumes 26%, Airside consumes 12%, Lighting consumes 29%, and Heating consumes 0% of the electricity bill. Natural gas breakdown: Heating consumes 66% of the natural gas bill. Water breakdown: Plumbing consumes 100% of the water bill.

Savings From Trane Service

An effective HVAC service program includes the performance of preventative, predictive, scheduled, and unscheduled actions to minimize equipment decline and failure. The objective of the program is to minimize the overall total cost of ownership of the building systems by maximizing efficiency, reliability, and safety. To estimate the potential savings associated with implementing a successful HVAC service program, one must first understand the total cost of ownership of the existing systems.

Initial Investment

Early in the project analysis phase, estimated project costs are used to demonstrate what the potential customer investment might look like. For this analysis, these cost values can be generated in several different ways:

- Breakeven Analysis This allows the user to analyze what ECM implementation cost would produce a "revenue neutral" project (NPV > 0, IRR = Required Rate of Return), based on the estimated ECM savings, the financial selection criteria, and the annual utility costs. This analysis will provide guidance as to where the maximum cost of the project would need to be to meet the financial selection criteria.
- ECM Project Cost Calculator As a part of the Trane Energy Optimizer tool, this calculator provides the cost to implement many of the ECMs found in the tool and requires minimal input. Costs are based on data from RS Means among other reliable sources.
- Manual cost entry A project cost estimate developed outside of the Trane Energy Optimizer tool can manually entered into the tool. All other costs (apart from the ECM implementation costs), such as consulting, project management, service agreement, etc., must be entered in the Trane Energy Optimizer using this manual method.

The costs estimated to implement this project are as follows:

Initial Investment

Total Costs	\$4,300	\$4,500	\$4,700	\$4,900	\$5,100
Equipment Service Agreement	\$2,200	\$2,300	\$2,400	\$2,500	\$2,600
Controls Service Agreement	\$2,100	\$2,200	\$2,300	\$2,400	\$2,500
Year	1	2	3	4	5
Other Annual Costs					
Total Initial Investments (Year 0):					\$28,780
ECM Project(s)					\$28,780

* If a tax rate is provided, potential costs for depreciation for the initial capital investment are automatically calculated in the Trane Energy Optimizer tool. For this analysis, the initial project investment is depreciated over the default five year project duration. Consult with your tax advisor to determine your depreciation costs and the tax impact to your organization.

Cash Flow Analysis

The cash flow analysis combines all of the cost and savings estimates, as well as potential tax implications, for the proposed project. The estimated cash flow for the proposed project over a 5 year period is as follows:

Total Init	tial
Investme	ents
(Year 0):	\$28,780

Year	1	2	3	4	5
Total Benefits	\$12,438	\$11,938	\$11,438	\$10,938	\$10,438
Total Costs	\$4,300	\$4,500	\$4,700	\$4,900	\$5,100
Benefits (Net)	\$8,138	\$7,438	\$6,738	\$6,038	\$5,338
Cash flow	\$8,138	\$7,438	\$6,738	\$6,038	\$5,338
Cumulative cash flow	(\$20,642)	(\$13,204)	(\$6,466)	(\$428)	\$4,910

* The project duration default is 5 years, as requiring a payback in two to five years is a common project selection measurement. If expenditures or benefits for the proposed project extend beyond a 5 year project duration and there is a desire to calculate the NPV and IRR over a longer period, this must be done outside of the Trane Energy Optimizer tool.

Financial Selection Criteria

For the Trane to perform the payback analysis for the proposed project, it is necessary to understand the criteria by which the project will be measured. The analysis that was performed is based on the following information that you have provided to Trane:

Required Rate 0.0% of Return

Tax Rate* 0.0%

* If the tax rate is 0%, the project was analyzed on a pre-tax basis.

The Potential Energy Savings Opportunity

From the cash flow analysis and the financial selection criteria, we are able to evaluate the proposed project for overall profitability. A positive NPV and an IRR that meets or exceeds the Required Rate of Return indicate a project that should be pursued further. For the proposed project, the financial measurements were calculated as follows:

Net present value (NPV) @ 0.0 %	\$4,910
Internal rate of return (IRR)	6 %
Payback period (in years)	4.08

Next Steps

The Trane Energy Optimizer analysis has evaluated the savings potential of implementing an energy retrofit project and initiating an HVAC service program for your facility. Additional information and planning may now be required to validate these findings. The following steps are suggested:

- Work with your Trane Account Manager to determine if a mutually beneficial project is possible based on the analysis completed so far
- Commit to working with Trane to provide further information as needed to validate the analysis results
- Identify the key decision makers required to establish any additional project success criteria and to evaluate the project based on these criteria
- Work with Trane to establish energy and operations saving objectives and develop a detailed plan for how to achieve these objectives

Trane has the knowledge and expertise to bring a comprehensive energy retrofit approach to your project and assist you in maintaining the resulting savings with an HVAC service program. While energy and operations savings are key factors in driving the project, other factors such as increasing occupant comfort and improving indoor air quality are also considered. Increasing the performance of your mechanical systems not only reduces bottom line costs to increase profits and competitiveness, it also improves the building's asset value, increases occupant productivity, and reduces greenhouse gas emissions, the combination of which few other investments can offer.

Trane Energy Optimizer Disclaimer

This report is a Preliminary Energy Analysis, which serves to investigate possible energy and operations saving opportunities and is based on the information provided by interviews with customer personnel. The recommendations are based on an analysis of conditions observed and information gathered at the time of the survey and is based on historical information and stated assumptions. Statements concerning estimated savings are projections only and actual savings to be realized by the customer are dependent upon many factors, including conservation measures implemented, seasonal weather variations, utility rates, applicable codes and regulations, building usage, and specific energy use practices of the facility occupants and workers. Nothing contained in this report constitutes a guarantee by Trane that the projected savings will be realized by the customer.

This report, by itself, is not intended, as a basis for the engineering required to adopt any of these recommendations. Its intent is to interest the customer in the potential cost savings of the recommendations. A more detailed analysis of the current operation and condition of the facility, project costs, and expected project benefits typically will be required to successfully implement the recommendations.



Trane Energy Analyzer Report

Henderson County Main Library Tuesday, July 20, 2010

We Make Buildings Work Better for $Life^{TM}$

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Energy Assessment for Henderson County Main Library

1. Introduction

The purpose of this energy assessment is to provide information about how energy is used, a point of reference for comparisons to other similar facilities, and direction about potential energy savings opportunities for Henderson County Main Library. The assessment and recommendations are based upon the information provided to the Trane Energy Analyzer¹. Refer to the Trane Energy Analyzer to obtain more detailed information about the information and data that was used to conduct this energy assessment.

The accuracy of this assessment and the resulting recommendations are directly influenced by the degree of accuracy of the data that was input to the Trane Energy Analyzer. In addition to the data inputs, a number of other factors such as weather variations, building occupancy and operation schedules can affect energy usage and consequently energy cost savings. Typical characteristics² for these other factors were used in the simulation model to calculate energy consumption and conduct this assessment. The assessment is not intended to predict the future effect on any changes made to Henderson County Main Library but rather to provide guidance and focus on the greatest potential energy savings opportunities and recommend next steps.

2. Why Energy Efficiency is Good Business

Energy use and thus, improvements in energy efficiency can contribute to the achievement of long-term organizational objectives. Links between energy efficiency and business objectives can be direct, as in the case of improved operational efficiency and reduced costs, or indirect, such as with improved employee productivity. Listed below are a few examples how energy efficiency can contribute to business success.

Examples of Business Objectives with Links to Energy Efficiency

- Improved operational efficiency
- Reduced operating costs
- Improved product quality
- Improved air quality
- Improved tenant/occupant satisfaction
- Improved employee productivity
- Improved contribution to environmental protection & sustainability
- Improved corporate image

3. How You Use Energy Today

It is useful to compare energy consumption and use patterns with other similar facilities in assessing your current state and to develop improvement targets for the future. The sections below provide benchmarks against an "industry average" and an energy efficient³ low-rise office (3 stories or less) similar in size to your facility and located in the same geographic region.

¹ The Trane Energy Analyzer can be accessed through <u>http://energy.trane.com</u>

² Typical case - for these factors, the model assumes the most common practice or value to calculate energy use. ³ The energy efficient facility used in these comparisons use energy savings technologies, which are typically cost

³ The energy efficient facility used in these comparisons use energy savings technologies, which are typically cost effective in new and significantly renovated buildings.

3.1 Total Consumption

Annual energy costs for your facility are: \$3.74 per ft², based on 118 kBtu/ft² in energy consumption. This is 14.2% higher than the industry average for a low-rise office (3 stories or less) in your region.

In contrast, energy costs for a new, energy efficient low-rise office (3 stories or less) would amount to approximately \$1.62 per ft², based on 45 kBtu/ft² annual energy consumption. For most facilities, it is possible to achieve this level of efficiency by implementing readily available energy efficiency strategies and management practices.

Figure 1a: Comparison of Energy Use for Henderson County Main Library to the Industry Average and an Energy Efficient low-rise office (3 stories or less) (\$/ft²)



Table 1a: Comparison of Energy Use for Henderson County MainLibrary to the Industry Average and an Energy Efficient low-rise office(3 stories or less)

	Electricity	Natural Gas	Steam	Total
Your Facility	\$3.41	\$0.33	\$0.00	\$3.74
Industry Average	\$3.07	\$0.20	\$0.00	\$3.27
Efficient Facility	\$1.55	\$7.06	\$0.00	\$1.62

Figure 1b: Comparison of Energy Use for Henderson County Main Library to the Industry Average and an Energy Efficient low-rise office (3 stories or less) (kBtu/ft²)



Table 1b: Comparison of Energy Use for Henderson County MainLibrary to the Industry Average and an Energy Efficient low-rise office(3 stories or less)

	Electricity kBtu / ft ²	Natural Gas kBtu / ft ²	Steam kBtu / ft ²	Total kBtu / ft ²
Your Facility	81.3	36.3	0.0	117.6
Industry Average	73.3	22.1	0.0	95.3
Efficient Facility	37.0	7.9	0.0	44.9

NOTE: The main source used to develop the energy benchmark data was the DOE Energy Information Administration's Commercial Building Energy Consumption Survey (CBECS).

3.2 End Use Breakdown

Figures 2 and 3, followed by Table 2, illustrate the energy end use breakdown for Henderson County Main Library. End uses with the largest costs typically represent the areas for the greatest savings opportunities. Based on the data your provided, the end uses with the highest costs for are space cooling and interior lighting.Because energy prices differ among fuel sources, the end uses with the highest energy consumption differ from those with the highest cost. The end uses with the highest and second highest energy consumption are space cooling and space heating, respectively.

Figure 2: Energy Cost End Use Breakdown of Henderson County Main Library



Figure 3: Energy End Use Breakdown of Henderson County Main Library



Table 2: Energy End Use Breakdown of Henderson County Main Library

	Cost		Ene	ergy		
End Uses	Value	Percent	mmBtu	Percent		
Space Cooling (Cool)	\$27,052	36.2%	644.5	27.4%		
Space Heating (Heat)	\$6,163	8.2%	688.0	29.3%		
Interior Lighting (Lights)	\$17,340	23.2%	413.1	17.6%		
Misc. Equipment (Misc.)	\$8,985	12.0%	214.1	9.1%		
Fans & Pumps (Fans)	\$11,327	15.2%	269.9	11.5%		
Exterior Loads (Ext.Ld.)	\$2,310	3.1%	55.0	2.3%		
Elevators (Elev.)	\$1,211	1.6%	28.8	1.2%		
Domestic Hot Water (DHW)	\$339	0.5%	37.8	1.6%		
Totals	\$74,727	100%	2,351.3	100%		
NOTE: The energy breakdown information estimate is based on the tool inputs and building model						

NOTE: The energy breakdown information estimate is based on the tool inputs and building model profiles derived from DOE-2 building modeling.

3.3 Greenhouse Gas Emissions

Greenhouse gases, particularly carbon dioxide, are known to cause global warming and are linked to the production of energy. Figure 4 below illustrates greenhouse gas emissions generated by your energy consumption as compared to the industry average and an energy efficient facility.



Figure 4: Greenhouse Gas Emissions (metric tons of CO₂)

Table 3: Your Facility's CO2 Output Comparison

	Annual Metric Tons of CO ₂
Your Facility	273.0
Industry Average	234.9
Energy Efficient Facility	115.1
Typical Automobile	3.8

Sources: U.S. Energy Information Administration ("Updated State-Level Greenhouse Gas Emission Factors for Electricity Generation," 2001 and http://www.eia.doe.gov/oiaf/1605/coefficients.html) and Natural Resources Canada ("Canadian GHG Challenge Registry Guide to Entity and Facility-Based Reporting Emission Factors," 2000 - 2002 average).

By reducing your consumption level to that of the industry average, you would save 38.1 metric tonnes of CO2 per year. That's equivalent to taking 10.0 automobiles off the road each year. The savings are even more significant when reducing your consumption to that of an energy efficient facility - you would save 157.9 metric tonnes of CO2, that's equivalent to taking 41.5 automobiles off the road each year.
4. Retrofit Opportunities

Significant energy savings can accrue from implementing a combination of best energy management practices and upgrading or installing new, more energy efficient technology. The greatest potential savings opportunities for Henderson County Main Library are summarized below.

4.1 Low and No-Cost Opportunities

Energy savings of from 3 to 15 percent can be realized by adopting best energy management practices. These opportunities typically require little or no cost to implement. Suggested best energy management practices for Henderson County Main Library include the following:

Your Energy Saving Opportunities

- Office Equipment: Turn off office equipment and appliances and invoke energy saving features. Computers, monitors, copiers, fax machines, and printers often have energy saving modes which are not activated and most office equipment is left on unnecessarily.
- Outdoor Air: Check that minimum outdoor air levels are at recommended requirements which maintain proper indoor air quality; many buildings actually bring in much more outdoor air than necessary.
- Operation & Maintenance:
 Have mechanical systems checked and maintained on a regularly scheduled basis. At least 10% in energy savings may be expected for systems that are properly maintained versus those which are serviced only when problems occur. Moreover, equipment life is prolonged, leading to further cost savings.
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- Lighting: Optimize circuits and/or energy management systems to only control areas where lighting is needed at desired times; many buildings require that the lights are on for an entire floor when only an office is occupied, for instance.

4.2 Energy Conservation Measure Opportunities

Based on the energy profile for Henderson County Main Library, the following energy efficiency measures represent the greatest potential for savings. Note that most measures are not additive and cannot be summed to obtain a cumulative total savings estimate.

Table 4: 0	Opportunities
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Opportunity	Action Item
Lighting (Option 1)	Retrofit interior lighting with more efficient system to reduce overall lighting demand (0.9 W/ft ² , 10.6 W/m ²).
Cooling (Option 1)	Optimize "free cooling" by providing for the ability to provide more outside air outside when the air temperature is below the cooling setpoint.
Cooling (Option 2)	Improve cooling system effectiveness by reducing cooling system losses, routine maintenance, and/or replacing old cooling equipment (20% increase in overall cooling efficiency).
Lighting (Option 2)	Reduce interior lighting usage by adding controls (automatic and/or manual) that turn off lights when not fully needed, as may be the case when a room is unoccupied or has adequate natural daylight. Savings shown are based on reducing the lighting use by 20%, but the savings potential may be higher or lower depending your specific circumstances and usage patterns.
Demand Ventilation	Use carbon dioxide and/or occupancy sensors to control outside air while maintaining indoor air quality.
Heating	Improve heating system effectiveness by reducing heating system losses, routine maintenance, and/or replacing old heating equipment (20% increase in overall heating efficiency).

5. Next Steps

The Trane Energy Analyzer assessment has evaluated a number of energy saving measures that can be taken immediately and others that will require additional information and planning. The following steps are suggested:

Planning

- Develop an energy efficiency improvement target for your business
- Identify a person who will become the "energy champion" for your business
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- Develop a plan to implement the suggestions from section 4.1
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Retrofit Improvements

- Enhance your energy management expertise by visiting the Products and Services section of our web site.
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Trane Energy Optimizer Report

Henderson County Main Library Friday, July 20, 2010

We Make Buildings Work Better for $Life^{TM}$

Energy Retrofit Analysis for Main Library Introduction

The purpose of this analysis is to identify potential energy conservation measures (ECMs) and other operations cost saving opportunities for an existing facility and to quantify a potential return on investment associated with implementing the selected recommendations. The recommendations and financial analysis are based upon the information provided to the Trane Energy Optimizer to assist in determining the current operation, configuration, and total cost of ownership of the systems being analyzed. The analysis also leverages Trane's extensive experience in the building services market, using proven energy-efficient technologies and HVAC maintenance knowledge to estimate the associated energy and operations cost savings. Refer to the Trane Energy Optimizer to obtain more detailed information about the information and data that was used to conduct this assessment.

The accuracy of the Trane Energy Optimizer analysis and the resulting recommendations are directly influenced by the degree of accuracy of the input data. In addition to the data inputs, a number of other factors such as changing utility rates, changes in how the building is being used and maintained, weather variations, etc. can affect the total cost of ownership of the building systems and the associated cost savings. These other factors are not inherently built into the tool calculations and should be considered when selecting tool inputs and analyzing tool outputs. The analysis is not intended to predict actual project costs or actual financial benefits but rather to provide guidance and focus on the overall potential energy savings opportunity for the facility.

Qualified Energy Conservation Measures (ECMs)

Significant energy savings can result from implementing a combination of ECMs that include the best energy management practices and upgrading or installing energy efficient technology. You have qualified the following ECMs as those that will potentially improve the energy performance of your facility based on the current operation and condition of your building systems:

Airside Survey	Target Savings (%)
CO2 Demand Control Ventilation	7.0
Night Setback	7.0
Optimal S/S and Ventilation Delay	4.0
Outdoor Air Reduction	4.0
Sequencing of Heating/Cooling/Mixed Air	4.0
Ventilation Optimization	7.0
Demand Limiting	4.0
Total Airside Survey (maximum of 30%)	30
Lighting Survey	
Conversion of Fluorescent Fixtures	7.0
Lighting Control	7.0
Total Lighting Survey (maximum of 40%)	14.0 %

* Depending on the ECMs selected, the targeted savings percentages may not be additive. Ceilings have been placed on the total survey savings percentage to prevent overstating these values when multiple ECMs are selected. Further analysis should be performed to refine the accuracy of these numbers before implementation.

** Remember to take into account the influence of "cross effects" when evaluating the long-term benefits of your project. Making an upgrade to one system may influence another system, for example, improving the efficiency of your lighting may impact your heating and cooling loads.

Annual Utility Costs

Understanding how much is spent on utility costs allows Trane to establish benchmarks used to derive the benefits from the selected ECM savings percentages. Here is the annual utility cost information that you provided to Trane:

Annual Electric Bill	\$68,225
Annual Gas Bill	\$6,502
Annual Water Bill	\$0
Annual Energy Cost Inflation (%)	3%

Energy Savings

Using the ECM savings percentages and the annual utility costs, the projected annual energy savings can be calculated. Other benefits (such as rebates) obtained from the project, if applicable, were manually entered in the Trane Energy Optimizer tool for inclusion into the analysis.

The estimated energy savings (benefits) calculated for this project are as follows:

Year	1	2	3	4	5
Airside Survey	\$2,456	\$2,530	\$2,606	\$2,684	\$2,764
Lighting Survey	\$2,770	\$2,853	\$2,939	\$3,027	\$3,118
Tracer ES Building Automation System	\$1,200	\$1,300	\$1,400	\$1,500	\$1,600
Total Annual Energy Savings (\$)	\$6,426	\$6,683	\$6,944	\$7,211	\$7,482
Total Annual Energy Savings (%)	9%	9%	9%	9%	9%

"* To complete the savings estimate calculations, the following assumptions that are based on data from the Energy Information Administration (EIA) were made concerning the facility's utility consumption: Electricity breakdown: Chiller plant consumes 26%, Airside consumes 12%, Lighting consumes 29%, and Heating consumes 0% of the electricity bill. Natural gas breakdown: Heating consumes 66% of the natural gas bill. Water breakdown: Plumbing consumes 100% of the water bill.

Initial Investment

Early in the project analysis phase, estimated project costs are used to demonstrate what the potential customer investment might look like. For this analysis, these cost values can be generated in several different ways:

- Breakeven Analysis This allows the user to analyze what ECM implementation cost would produce a "revenue neutral" project (NPV > 0, IRR = Required Rate of Return), based on the estimated ECM savings, the financial selection criteria, and the annual utility costs. This analysis will provide guidance as to where the maximum cost of the project would need to be to meet the financial selection criteria.
- ECM Project Cost Calculator As a part of the Trane Energy Optimizer tool, this calculator provides the cost to implement many of the ECMs found in the tool and requires minimal input. Costs are based on data from RS Means among other reliable sources.
- Manual cost entry A project cost estimate developed outside of the Trane Energy Optimizer tool can manually entered into the tool. All other costs (apart from the ECM implementation costs), such as consulting, project management, service agreement, etc., must be entered in the Trane Energy Optimizer using this manual method.

The costs estimated to implement this project are as follows:

Initial Investment

ECM Project(s)					\$43,335
Total Initial Investments (Year 0):					\$43,335
Other Annual Cost	S				
Year	1	2	3	4	5
Total Costs	\$0	\$0	\$0	\$0	\$0

* If a tax rate is provided, potential costs for depreciation for the initial capital investment are automatically calculated in the Trane Energy Optimizer tool. For this analysis, the initial project investment is depreciated over the default five year project duration. Consult with your tax advisor to determine your depreciation costs and the tax impact to your organization.

Cash Flow Analysis

The cash flow analysis combines all of the cost and savings estimates, as well as potential tax implications, for the proposed project. The estimated cash flow for the proposed project over a 5 year period is as follows:

Total Initial Investments \$43,335 (Year 0):

Year	1	2	3	4	5
Total Benefits	\$6,426	\$6,683	\$6,944	\$7,211	\$7,482
Total Costs	\$0	\$0	\$0	\$0	\$0
Benefits (Net)	\$6,426	\$6,683	\$6,945	\$7,211	\$7,482
Cash flow	\$6,426	\$6,683	\$6,945	\$7,211	\$7,482
Cumulative cash flow	(\$36,909)	(\$30,226)	(\$23,281)	(\$16,070)	(\$8,588)

* The project duration default is 5 years, as requiring a payback in two to five years is a common project selection measurement. If expenditures or benefits for the proposed project extend beyond a 5 year project duration and there is a desire to calculate the NPV and IRR over a longer period, this must be done outside of the Trane Energy Optimizer tool.

The Potential Energy Savings Opportunity

From the cash flow analysis and the financial selection criteria, we are able to evaluate the proposed project for overall profitability. A positive NPV and an IRR that meets or exceeds the Required Rate of Return indicate a project that should be pursued further. For the proposed project, the financial measurements were calculated as follows:

Net present value (NPV)	\$33,554 at 10 years
Internal rate of return (IRR)	18 %
Payback period (in years)	6.44 years

Next Steps

The Trane Energy Optimizer analysis has evaluated the savings potential of implementing an energy retrofit project and initiating an HVAC service program for your facility. Additional information and planning may now be required to validate these findings. The following steps are suggested:

- Work with your Trane Account Manager to determine if a mutually beneficial project is possible based on the analysis completed so far
- Commit to working with Trane to provide further information as needed to validate the analysis results
- Identify the key decision makers required to establish any additional project success criteria and to evaluate the project based on these criteria
- Work with Trane to establish energy and operations saving objectives and develop a detailed plan for how to achieve these objectives

Trane has the knowledge and expertise to bring a comprehensive energy retrofit approach to your project and assist you in maintaining the resulting savings with an HVAC service program. While energy and operations savings are key factors in driving the project, other factors such as increasing occupant comfort and improving indoor air quality are also considered. Increasing the performance of your mechanical systems not only reduces bottom line costs to increase profits and competitiveness, it also improves the building's asset value, increases occupant productivity, and reduces greenhouse gas emissions, the combination of which few other investments can offer.

Trane Energy Optimizer Disclaimer

This report is a Preliminary Energy Analysis, which serves to investigate possible energy and operations saving opportunities and is based on the information provided by interviews with customer personnel. The recommendations are based on an analysis of conditions observed and information gathered at the time of the survey and is based on historical information and stated assumptions. Statements concerning estimated savings are projections only and actual savings to be realized by the customer are dependent upon many factors, including conservation measures implemented, seasonal weather variations, utility rates, applicable codes and regulations, building usage, and specific energy use practices of the facility occupants and workers. Nothing contained in this report constitutes a guarantee by Trane that the projected savings will be realized by the customer.

This report, by itself, is not intended, as a basis for the engineering required to adopt any of these recommendations. Its intent is to interest the customer in the potential cost savings of the recommendations. A more detailed analysis of the current operation and condition of the facility, project costs, and expected project benefits typically will be required to successfully implement the recommendations.

NICHOLSON COMPANY

Post Office Box 7 Dana, North Carolina 28724 Phone 828-697-2638 • Fax 828-693-9380 Heating/AC State License No. 03161, PH-1, 2 & 3 - Class I Refrigeration State License No. 1939 Electrical State License No. 3547-U ESTIMATE & AGREEMENT

DATE July 8, 2009

BID: We hereby propose to furnish material and labor to complete the work outline herein for the sum of:

Forty-two thousand four hundred ninety-eight dollars (\$ 42,498.00) Payment to be made as follows: 100% upon completion City of Hendersonville TO ATTN: Chad 243-0110 PO Box 1670 Location: Whitmire Building-Tom's Park 28793 Hendersonville, NC We hereby submit specifications and bid for: To provide labor and materials to: Remove 6-gas furnaces, 1-air handler and 4-outdoor units If concrete pads need to be larger, City responsible for enlarging pads R22 units-Use existing line sets Use existing gas piping and disconnects Install 6-Carrier 92% AFUE gas furnaces with twinning kits, $3-7\frac{1}{2}$ ton evaporator coils, 1-air handler and $4-7\frac{1}{2}$ ton outdoor units Install 4-7 day programmable thermostats with 4-room sensors 2-Model #58MTB100-F-1-16 furnace 4-Model #58MTB120-F-1-20 furnace 3-Model #KGATW0601HS1 twinning kit 3-Model #28LA008-001 coils 4-Model #38ARZ008-5 outdoor units air conditioning 1-Model #40RM-008-B3-HC air handler 4-7 day programmable thermostats 4-Room sensors Option #1: R22 freon heat pumps-\$6,460.00 extra to be added to contract price * Option #2: R410A puron air conditioning units with 4-new line sets-\$9,467.00 extra to be added to contract price Option #3: R410A puron heat pumps with 4-new line sets-\$14,748.00 extra to be added to contract price CONTRACTOR'S GUARANTEE We guarantee all material used in this contract to be as specified The above above and the entire job to be done in a neat, workmanlike manner. and (I) (we) I Any variations from plan or alterations requiring extra labor or material will be performed only upon written order and billed in \$ 51,965. For option #2 DATE: addition to the sum covered by this contract. Agreements made SIGNED: with our workmen are not recognized. SIGNED: DATE:

This Contract is Void 30 Days From Date Unless Yellow Copy is We comply with all Workman's Compensation & Property Dama

7/8/09



North Carolina Heating and Cooling Equipment Incentive Application

Questions? Call 1-866-380-9580 or visit <u>www.duke-energy.com</u>. Mail original, signed application and required documents to: Duke Energy • 431 Charmany Drive • Madison, WI 53719 or fax to 1-866-908-4921

Is this application: I NEW (original) or

REVISED (changes made to original application)

Building Type – Required (check one)		
Data Centers	Full Service Restaurant	Office
	☐ Healthcare	Public Assembly/Church
		Public Order/Safety
		Religious Worship
	Retail (Non-mail)	☐ Service
		☐ Warehouse
		Served .
I Other:		

Customer Information		
Customer/Business	Contact	
Phone	Account Number (where equipment installed)*	
Street Address (Where incentive should be mailed)		
City	State	Zip Code
Installation Street Address		
City	State	Zip Code
E-mail Address		

*Failure to provide the account number associated with the location where the installation took place will result in rejection of the application.

Vendor Information		
Vendor	Contact	
Phone	Fax	
Street Address		
City	State	Zip Code
E-mail Address		

If Duke Energy has questions about this application, who should we contact?

Customer

🔲 Vendor

Payment Information		
Who should receive incentive payment?	Customer	Vendor (Customer must sign below)
I hereby authorize payment of incentive	Customer Signature (written signature)	
directly to the vendor:	Date	
Provide Tax ID Number for Payee	Customer Tax ID #	
	Vendor Tax ID #	

Terms and Conditions		
I have read and hereby agree to the Terms & Co	nditions and Program Requirements as stated in this form.	
Customer Signature (written signature)	Vendor Signature (written signature)	
Date	Date	
Title	Title	

Incentives are subject to change and may be discontinued at the sole discretion of Duke Energy. Equipment must be installed and operable to be eligible for incentives. As Federal Energy Policy Law changes, equipment efficiency requirements are subject to change.



The Equipment below is (check one):	New Equipment	Retrofit Equipment	Replace Failed Equipment
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Central Air I	Unit Incentives									
Description*	Make/Model # (for split system, supply both the indoor and outdoor coil numbers)	# of Units	Tons Per Unit	Incentives per Ton*	Installed ARI Efficiency Rating (mark one)	ARI Reference Number (required)**	Annual Operating Hours (min. of 1500)	Equipment Cost	Date Installed and Operable (mm/vy)	Total Incentive
			í i		SFER/EER**					
					SEER/EER**					
					SEER/EER**					
					SEER/EER**					
* 800 0000 4.6					SEER/EER**					

* See page 4 for descriptions, efficiency levels and incentives.
**Must provide one of the following to verify ARI Efficiency information for all Central AC units - ARI reference #, printout from ARI Manual Manufacturer's spec sheet stating unit tested under ARI conditions.

Description*	Make/Model #	Size Range Btu/hr	Incentive per Unit*	Quantity	Energy Star [®] Rated	Annual Operating Hours (min. of 1500)	Equipment Cost	Date Installed and Operable (mm/yy)	Total Incentive
					Yes No				
					Yes No				
					☐ Yes ☐ No				

escription*	Make/Model #	Quantity	Size Range	Incentive per Tank*	Installed COP Efficiency*	Annual Operating Hours (min. of 1500)	Equipment Cost	Date Installed and Operable (mm/yy)	Total Incentive**
			MBH		-				
			MBH				1	-	
	· · · · · · · · · · · · · · · · · · ·		MBH						

Maximum incentive cannot exceed 50% of the total equipment cost.



Item Number (Model #)	SHGC*	Square Feet Installed	Incentive per Square Foot	Direction Window Faces	Number of Windows	Date Installed (mm/yy)	Equipment Cost	Total Incentive**
			\$1/sq.ft	East West South				
			\$1/sq.ft	East West South				
			\$1/sq.ft	East West South				

1ake/Model #	Quantity	Incentive per Unit*	Equipment Cost	Date Installed and Operable	Total Incentive
				(mm/yy)	



Equipment Requirements and Incentive Amounts

Cooling Incentive Table ar	nd ARI Rated Efficiency Requirements*		
Description	Size Range	Minimum ARI Efficiency	Incentive
Packaged Terminal Air Co	nditioning		
Α	All sizes	See ** below	\$10/unit
Unitary and Rooftop Air Co	onditioning		
В	<65,000 BTUH (1 Phase)	14.0 SEER	\$25/ton
С	<65,000 BTUH (3 Phase)	14.0 SEER	\$20/ton
D	65,000-135,000 BTUH	11.0 EER	\$40/ton
E	136,000-240,000 BTUH	10.8 EER	\$40/ton
	241,000-760,000 BTUH	10 EER	\$25/ton
G	>760,000 BTUH	9.3 EER	\$30/ton
Unitary and Rooftop Heat I	Pump		
Н	<65,000 BTUH (1 Phase)	14.0 SEER	\$25/ton
1	<65,000 BTUH (3 Phase)	14.0 SEER	\$20/ton
J	65,000-135,000 BTUH	10.6 EER	\$40/ton
К	136,000-240,000 BTUH	10.0 EER	\$40/ton
L	>241,000 BTUH	9.1 EER	\$25/ton
* All unite must most APL	ficional requirements to be all the Decouver		

* All units must meet ARI efficiency requirements to be eligible. Documentation is required. This can be a print out from the ARI guide or if the unit is not tested by ARI, manufacturer specification sheets must state the efficiency level has been tested under ARI conditions.

** PTAC Minimum Efficiency (EER) calculation: 12.8 EER – (.213 x (BTUH/1000)

Energy Star® Window and Sle	eve AC Incentive Table	
Description	Size Range	Incentive
Energy Star [®] Window AC		
M	<14,000 BTU/hr	\$25/unit
N	>14,000 BTU/hr	\$50/unit
Energy Star [®] Sleeve AC		
0	<14,000 BTU/hr	\$25/unit
P	>14,000 BTU/hr	\$50/unit

Heat Pump Water Heater I	ncentive Table		
Description	Size Range	Minimum COP Efficiency	Incentive*
Heat Pump Water Heater		,	
Q	10-50 MBH	3.0	\$2.000/unit
R	51-100 MBH	3.0	\$3.500/unit
S	101-300 MBH	3.0	\$5.000/unit
Т	301v-500 MBH	3.0	\$7.000/unit
U	>500 MBH	3.0	\$9,000/unit
* Maximum incentive cann	ot exceed 50% of the total equipment cost.	· · · · · · · · · · · · · · · · · · ·	TOJOUTIAN

Energy Star [®] Setback/Programmable Thermostat Incentives	
Description	Incentive
Setback/Programmable Thermostat	\$50/thermostat

Window Film Incentive						
Description	Minimum Efficiency	Incentive*				
Window Film	SHGC or 0.40 or less	\$1/square ft.				
*Incentive is capped at a maximum of 50% of the project cost.						



Program Requirements

Equipment Eligibility

- Duke Energy will use the ARI manual for verifying equipment efficiencies for all central air systems. If the equipment
 or matched set is not in the ARI manual, the manufacturer's technical fact sheets must be provided showing the efficiency level
 tested under ARI conditions. Equipment capacity (size) and efficiency must be based on ARI design conditions.
- For split systems, the indoor coil and condenser must be a matched set to be eligible for incentives.
- Cooling system(s) must operate >1,500 hours annually to be eligible.
- Window air units must be ENERGY STAR[®] rated to qualify. An equipment data sheet is required stating the unit is ENERGY STAR[®] rated.
- Thermostat(s) must be ENERGY STAR[®] rated. <u>www.energystar.gov</u>.
- Thermostat(s) shall be installed according to manufacturer's specifications and comply with manufacturer's warranty requirements. Thermostat(s) shall have a program memory retention capability or battery back-up (minimum 2 days), with warning indicator for battery replacement. Thermostat(s) shall be capable of automatic variation of the start of daily-warm-up time depending on indoor and outdoor temperature variations.
- Window Film must be installed according to the manufacturer's instructions on south, east or west facing windows; have a solar heat gain coefficient (SHGC) of 0.40 or less; and cover the entire window aperture.
- · All equipment must be new to be eligible for incentives. Used equipment is not eligible for incentives.

Incentive Eligibility

- Incentives are only available to customers on a Duke Energy North Carolina non-residential rate.
- Incentive will not be paid until eligible equipment has been installed, is available to operate, and verification has been completed by Duke Energy staff as noted in the Term & Conditions stated below.
- · Duke Energy reserves the right to revise incentive levels and/or qualifying efficiency levels at anytime.
- Leased equipment is eligible for incentives providing the equipment meets the program requirements and the customer provides the
 required documentation noted on the Incentive Application Process page of this application.
- Customer may assign the incentive to the vendor who installed/supplied the equipment. The customer's signature is required in the
 appropriate places on this form to assign the incentive to the vendor. Customer agrees that such an action constitutes an irrevocable
 assignment of the incentive. This assigned incentive must reproduce the purchase price paid for the equipment by an equivalent
 amount.
- Any equipment which, either separately or as part of a project, has or will receive an incentive from any other Duke Energy program is ineligible.
- · In no case will Duke Energy pay an incentive above the actual cost of the new equipment.
- · Incentive recipient assumes all responsibilities for any tax consequences resulting from Duke Energy incentive payment.
- To qualify for Duke Energy incentives, applicants who provide their social security number as their federal tax identification number for tax purposes must sign and return the "Customer consent to release personal information" form ("Consent Form") along with the application. Incentive applications are processed by a 3rd party vendor. The 3rd party vendor is responsible for mailing the 1099 form at the end of the calendar year for tax filing. Duke Energy and the 3rd party vendor have signed confidentiality agreement to protect your personal information. If your social security number is your federal tax ID number and you elect not to sign the Consent Form, please do not send Duke Energy the application, as you will not be qualified to participate in the incentive program.

Terms and Conditions

I certify that this premise is served by Duke Energy (or an affiliate of Duke Energy), that the information provided herein is accurate and complete, and that I have purchased and installed the high efficiency equipment (indicated herein) for the business facility listed herein and not for resale. Attached is an itemized invoice for the indicated installed equipment. In understand that the proposed incentive payment from Duke Energy is subject to change based on verification and Duke Energy approval. I agree to Duke Energy verification of both the sales transaction and equipment installation which may include a site inspection from a Duke Energy representative or Duke Energy agent. I understand that I am not allowed to receive more than one incentive from Duke Energy on any piece of equipment. I also understand that my participation in the program may be taxable and that my company is solely responsible for paying all such taxes. I hereby agree to indemnify, hold harmless and release Duke Energy and it's affiliates from any actions or claims in regards to the installation, operation and disposal of equipment (and related materials) covered herein including liability from an incidental or consequential damages. Duke Energy does not endorse any particular manufacturer, product or system design within these programs; does not expressly or implicitly warrant the performance of installed equipment (Contact your contractor for details regarding equipment warranties and is not liable for any damage caused by the installation of the equipment nor for any damage caused by the malfunction of the installed equipment.



Incentive Application Instructions

IMPORTANT NOTICE

Delays in processing incentive payments will occur if required documentation is not included with completed application(s).

- 1. Contact Duke Energy toll free at 866-380-9580 to confirm customer eligibility. Applications are available for download at <u>www.duke-energy.com</u>.
- 2. Review program and equipment requirements on the incentive application. (Page 5)
- 3. Purchase and install eligible energy-efficient equipment.
- 4. Complete and submit application within 60 days after equipment has been installed and is operational.
- 5. The following items are required to verify projects. If they are not included, it will delay payment of incentive.
 - A. Itemized invoice for all equipment installed to include:
 - a. ARI reference # or documentation from the ARI Manual
 - b. Equipment cost and project cost where applicable
 - c. Quantity per equipment type installed
 - d. Model # for each equipment type
 - e. Manufacturer's data sheet for each equipment model #.
 - B. Make sure the account number provided on the cover page (customer information section) is associated with the location where the equipment was installed. If the account # does not match the address where the equipment was installed, the application will be rejected as ineligible.
 - C. Provide required tax ID# for payee.
 - D. Customer must sign and date the application after reviewing the Terms and Conditions. If customer wishes to assign payment of the incentive directly to the vendor, the customer should circle the appropriate payee in the Payment Information section of the application and sign their name to authorize payment.
- 6. Duke Energy may require site verification of projects that have been self-installed, prior to payment of incentive.
- 7. Fax the complete, signed application with all required documents to 1-866-908-4921 or mail to the following address:

Duke Energy Smart \$aver Incentive Program 431 Charmany Drive Madison, WI 53719

8. A percentage of equipment installations will be site verified for quality assurance purposes. Once selected, a Duke Energy representative will contact the customer to arrange for the inspection. All incentive payments related to the project will be withheld until site verification is complete. There is no charge to the customer for these inspections.



Smart Saver[®] Incentive Program

Technology	Responsible for sales and not installs*	Responsible for sales and Installation*	Technology	Responsible for sales and not installs*	Responsible for sales
Lighting			Thermal Storage		
Heating Ventilation & Cooling			Pumps/Motors/VFD's		
Food Service			Chillers		
Water Heating			Refrigeration		
Process Equipment (air compressors, injection molding, etc.)					

Check all that apply

Vendors who wish to be listed as a Smart \$aver™ Incentive Program participating Vendor shall complete this form. A signed copy of this form must be on file at Duke Energy in order for the Vendor to receive incentive payments. Fax form to 1-866-908-4921 or mail to:

Duke Energy Smart \$aver™ Incentive Program 431 Charmany Drive Madison, WI 53719

I have read and understand the Smart \$aver[™] Incentive Program Requirements for Vendor Participation, and I agree to comply with all requirements set forth therein. By signing this agreement, I agree to provide my customers with information and documentation that is true and accurate to the best of my knowledge. I hereby represent and warrant that the Tax ID and Vendor Tax Status provided below are true and accurate. I agree that any confidential information concerning my customer, including but not limited to Duke Energy service account information, will be used for the sole purpose of facilitating the customer's participation in the Smart \$aver[™] Incentive Program. Further, I understand that I am responsible for making sure everyone working for me understands the requirements prior to soliciting customer participation.

Vendor Federal Tax ID Number

To qualify for Duke Energy incentives, applicants who provide their social security number as their federal tax identification number for tax purposes must sign and return the "Customer consent to release personal information" form ("Consent Form") along with the application. Incentive applications are processed by a third-party vendor. The third-party vendor is responsible for mailing the 1099 form at the end of the calendar year for tax filing. Duke Energy and the third-party vendor have signed confidentiality agreement to protect your personal information. If your social security number is your federal tax ID number and you elect not to sign the Consent Form, please do not send Duke Energy the application, As you will not be qualified to participate in the incentive program.

Vendor Tax Status	Corporation	Individual/Sole Proprietor	Partnership	C Other
Contact me via	Phone	E-Mail	Mail	
Company Name				
Mailing Address				
City, State, Zip				
Phone/Fax	······································		·····	
Primary E-mail Addres	S			
Secondary E-mail Add	ress		······································	
Vendor Signature				
Title				······
Print Name	······································			
Date				

For more information, call 1-866-380-9580 or visit <u>www.duke-energy.com</u>.



Smart \$aver[®] Incentive Program Requirements for Vendor Participation

Program Overview

- Duke Energy offers it's eligible non-residential customers the opportunity to increase profitability through energy cost savings and contribute to a cleaner environment by participating in our Smart \$aver™ Incentive Program.
- Under the Duke Energy Smart \$aver™ Incentive Program, Vendor is defined as any third party who:
 - Promotes the sale and installation of the high efficiency equipment for the customer. The Vendor will ensure that the eligible equipment is installed and operating before submitting the application or assisting the customer in completing the application.
 - Is responsible for the product sale only and is not required to ensure installation of the eligible equipment.
- All license requirements, if any, are solely the Vendor's responsibility. Participating Vendors include equipment contractors, equipment Vendors, equipment manufacturers and distributors, energy service companies, etc. The typical Vendor role is to contact/solicit eligible customers building new or retrofitting existing facilities and encourage the installation of the energy-efficient equipment offered in Duke Energy's program.
- Incentives are paid directly to customers unless the customer assigns the incentive to the Vendor. The assigned incentive must reduce the purchase price paid for the equipment by an equivalent amount. Incentives are taxable to the entity who receives the rebate check. Rebates greater than \$600 will be reported to the IRS unless documentation of tax exempt status is provided.
- Vendors can sign up to be on Duke Energy's Web site as a participating Vendor and be added to Duke Energy's e-mail distribution by faxing the Vendor Participation Agreement (VPA) to 1-866-908-4921 or mail to the following address:

Duke Energy Smart \$aver Incentive Program 431 Charmany Drive Madison, WI 53719

Guidelines for Vendor Activities

 Vendors shall sign and return the attached VPA to Duke Energy prior to soliciting customer participation or when submitting an application. Rebate payments will not be released to a Vendor unless a signed VPA is on file.

Vendors shall not misrepresent the nature of their role in the program. In particular, Vendors shall not state or imply to customers, or any persons, that the Vendor is employed by or working on Duke energy's behalf.

- Vendors may not represent to customers that Duke Energy endorses their specific products or services. Duke Energy does not endorse specific products, services, or companies – only energy-efficient technologies.
- Vendors may advise customers of their option to have Duke Energy make their rebate check(s) payable to the Vendor if the customer's rebate amount is being deducted from the total sale price in advance. The customer must complete and sign the Payment Release Authorization section of the Smart \$aver[™] Incentive Program Application.
- Vendors may use the words "Duke Energy's Smart \$aver™ Incentive Program" in promotional materials or advertisements. Vendors may use the name Duke Energy in a text format to describe the Smart \$aver™ Incentive Program, but are not permitted to use Duke Energy's logos.
- For Vendors who properly install the qualifying equipment, the equipment shall be installed and operating prior to an application being submitted. A percentage of each Vendor's installations will be subject to inspection by Duke Energy for verifying that the equipment is installed and operating. Vendors demonstrating high failure rates (based on a statistically significant sample) will have 100% of subsequent jobs inspected or may have their participation in the Smart \$aver™ Incentive Program revoked by Duke Energy in it's sole discretion.
- Vendors shall provide customers with applicable equipment warranty information for all measures installed. Vendors shall provide the required documentation for customers to apply for the rebate (invoices with model numbers and quantities, specification sheets for installed equipment, etc.) and assist customers in filling out the application.
- Vendors shall comply with all applicable local, state, and federal laws and codes when performing installation and related functions.
- Duke Energy reserves the right to revoke a Vendor's participation in Smart \$aver™ Incentive Program if, in Duke Energy's sole judgment, the Vendor fails to comply with the program's guidelines and requirements.
- Smart \$aver Incentive Program offerings may be modified or terminated without prior notice. Check Duke Energy's Web site for current program status.

For more information, call **1-866.380.9580** or visit <u>www.duke-energy.com</u>.



North Carolina Chillers / Thermal Storage Incentive Application

Questions? Call 1-866-380-9580 or visit www.duke-energy.com. Mail original, signed application and required documents to: Duke Energy • 431 Charmany Drive • Madison, WI 53719 or fax to 1-866-908-4921

Is this application: **NEW** (original) or REVISED (changes made to original application)

Building Type – Requi	red (check one)						
Data Centers		Full Service R	estaurant				
Education/K-12		Healthcare					
Education Other		Industrial					
Elder Care/Nursing H	lome	Lodaina	· ····································				
Food Sales/Grocery	·	Retail (Non-ma	all)				
Fast Food Restaurar	ıt	Retail (Mall)		<u></u>			· · · · · · · · · · · · · · · · · · ·
Other:						nouse	
Gustomer Information							·
Customer/Business	1		Contact				
Phone		<u> </u>	Contact				
FIIOIIE			Account Nu	mber (whe	ere		
Street Address (Where in		mailed	lequipment in	stalled)*			
City	ioonave should be						
			State			Zip Code	
Installation Street Addres	38	····· ································			<u> </u>		
City			State				
E moil Address						Zip Code	
E-mail Address							•
Vendor Information							
Phone							
Street Address		,,,,,,,	Fax				······································
City		······································				<u>. </u>	
-mail Address			State			Zip Code	
			n. n. n.				
f Duke Energy has que	stions about this	application, who shoul	d we contact?	🗌 Cus	stomer	☐ Vendor	
ayment Information							
Vho should receive incen	itive payment?	Customer			tor (Custor		
hereby authorize payme	nt of incentive	Customer Signature (w	ritten signature)			ner must sign below)	······
irectly to the vendor:		Date	interior orginaturo)		······································		
Provide Tax ID Number for Payee C		Customer Tax ID #		-	- <u>n n n n</u>		
		Vendor Tax ID #	Vendor Tax ID #				
erms and Conditions							
have read and berefy on	Tree to the Torme	Conditions 15					
Ustomer Signature		a Conditions and Program	m Requirements as	stated in	this form.		
vritten signature)	1		Vendor Signatu	ure			
ate		······································		11e)		······	
itle							

Incentives are subject to change and may be discontinued at the sole discretion of Duke Energy. Equipment must be installed and operable to be eligible for incentives. As Federal Energy Policy Law changes, equipment efficiency requirements are subject to change.

Title



The Equipment below is (check one): New Equipment Retrofit Equipment Replace Failed Equipment See Page 4 of form for required efficiency levels and equipment eligibility

Tons/Unit	Full-load kW/ton*	Incentive \$/ton	IPLV kW/ton*	Incentive \$/ton	Building Type	Date Installed & Operable (mm/yy)	Total Incentive
<u>_</u>			<u></u>				
<u> </u>							
	<u> </u>						
		kW/ton*	kW/ton* \$/ton	kW/ton* \$/ton kW/ton*	kW/ton* \$/ton kW/ton* \$/ton	kW/ton* \$/ton kW/ton* \$/ton Type	kW/ton* \$/ton kW/ton* \$/ton Type Installed & Operable (mm/yy) Image: State of the state of

The Equipment below is (check one): New Equipment Retrofit Equipment Replace Failed Equipment See Page 4 of form for required efficiency levels and equipment eligibility

Water Cooled Chillers	6									
Description	Make/Model #	# of Units	Tons/Unit	Full-load kW/ton*	Incentive \$/ton	IPLV kW/ton*	Incentive \$/ton	Building Type	Date Installed & Operable (mm/yy)	Total Incentive
Screw Chiller										
Screw Chiller										
Screw Chiller										
* Chiller performance a	and IPLV must be	tested unde	er ARI cond	litions - sub	mit documer	tation of co	mpliance			



Thermal Storage Incentives

The Equipment below is (check one):	ipment 🗌 Replace	Failed Equipment
Thermal Storage System Specifications *		
Manufacturer of Thermal Storage Equipment		
Type of Thermal Storage		
Model Number	Chilled Water	☐ Ice Bank ☐ Ice Harvester
Controls Manufacturer		
Control Strategy		
Number of Thermal Storage Units	Demand Limiting	Maximum Cooling Shift
Partial or Full Storage		
Demand Shifted (kW)	Partial Storage	Full Storage
Storage Capacity (Ton Hours)		
Storage Capacity (Gallons If Applicable)		
Peak Cooling Load (Tons)		
Cooled Area (sq. ft.)		
Hours of Operations M-F		
Hours of Operations Sat		
Hours of Operations Sun		
Date Installed and Operable (mm/yy)		
Thermal Storage chiller Plant Description (Manufacturer, Toppage, Ico Making WM/		
Condenser Type		
Premium cost for Thermal Storage (Dollars)		U Water Cooled
Annual Electrical Operating Cost with Storage (Dollars)		
Annual Savings as a result of Thermal Storage (Dollars)		
Simple Payback including Incentive (Years)	<u> </u>	
Total Incentive (\$190/kW shifted)		
Conventional System Specifications (For Comparison Purposes)		
Chiller Plant Description (Manufacturer, type toppage API Maller)		
Chiller Demand (kW)		
Annual Electrical Operating Cost with Conventional Cooling		
	1	

*Thermal Storage Units with a >1MW load shift are not eligible for incentives under the Prescriptive Program but can be considered for custom incentives. The Custom application and process document are located on the Smart \$aver™ Large Business and Business websites.

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1464 14 Sold 14

Equipment Requirements Chillers Incentive Table & ARI Rated Efficiency Requirements*

AIR COOLED CHILLERS – All Sizes Total Incentive = Base + Additional					
Reciprocal Type Chiller	Base Incentive \$/100	Part Load IPLV kW/ton	Additional Incentive \$/ton		
Full load kW/ton	\$25.00	1.046			
1.142	eas 00	0.935	\$11.10		
1.142	\$25.00	0.821	\$22.50		
1.142	\$25.00	0.753	\$29.30		
1.142	\$25.00	0.961			
1.046	\$30.00	0.858	\$10.30		
1.046	\$30.00	0.630	\$20.80		
1.046	\$30.00	0.753	\$27.00		
1.040	\$30.00	0.691	φ21:00		

AIR COOLED CHILLERS – All Sizes Total Incentive = Base + Additional			
Scroll/Screw Type Chillers	Base Incentive \$/ton	Part Load IPLV kW/ton	Additional Incentive \$/ton
Full load kW/ton	\$25.00	1.046	
1.142	\$25.00	0.925	\$12.00
1.142	\$25.00	0.879	\$16.70
1.142	\$25.00	0.674	\$37.20
1.142		0.961	
1.046	\$30.00	0.847	\$11.40
1.046	<u>\$30.00</u>	0.795	\$16.60
1.046	\$30.00	0.618	\$34.30

WATER COOLED CHILLERS – < 150 tons Total Incentive = Base + Additional

Screw Type Chiller	Read Inconting \$/top	Part Load IPLV kW/ton	Additional Incentive \$/ton
Full load kW/ton	Base incentive short	0.62	
0.79	\$5.00	0.59	\$3.00
0.79		0.55	\$7.00
0.79	\$5.00	0.51	\$11.00
0.79	\$5.00	0.47	\$15.00
0.79		0.63	
0.71	\$15.00	0.56	\$7.00
0.71	\$15.00	0.53	\$10.00
0.71	\$15.00	0.50	\$13.00
0.71		0.46	\$17.00
0.71	\$15.00	0.43	\$20.00
0.71	\$15.00	0.56	
0.63	\$20.00	0.50	\$6.00
0.63	\$20.00	0.47	\$9.00
0.63	\$20.00	0.44	\$12.00
0.63		0.41	\$15.00
0.63	\$20.00	0.38	\$18.00
0.63	<u> </u>		
Centrifugal Type Chiller	÷= 00	0,57	
0.70		0.53	\$4.00
0.70	\$5.00	0.5	\$7.00
0.70	\$5.00	0.42	\$15.00
0.70	\$5.00		
0.63	\$15.00	0.51	\$9.00
0.63	\$15.00	0.48	\$12.00
0.63	\$15.00	0.45	\$15.00
0.63	\$15.00	0.38	\$22.00
0.63	\$15.00	0.53	
0.56	\$20.00	0.46	\$7.00
0.56	\$20.00	0.43	\$10.00
0.56	\$20.00	0.40	\$13.00
0.56	\$20.00	0.34	\$19.00
0.56	\$20.00		



WATER COOLED CHILLERS – 150-300 tons Total Incentive = Base + Additional

Full load kW/ton	Base Incentive Sites		
0.72	State incentive short	Part Load IPLV kW/ton	
0.72	\$5.00	0.57	- Additional incentive \$/ton
0.72	\$5.00	0.54	
0.72	\$5.00	0.50	\$3.00
0.72	\$5.00	0.47	\$7.00
0.65	\$5.00	0.43	\$10.00
0.65	\$15.00	0.57	\$14.00
0.65	\$15.00	0.51	
0.65	\$15.00	0.48	\$6.00
0.65	\$15.00	0.45	\$9.00
0.65	\$15.00	0.42	\$12.00
0.57	\$15.00	0.30	\$15.00
0.57	\$20.00	0.55	\$18.00
0.57	\$20.00	0.01	
0.57	\$20.00	0.40	\$6.00
0.57	\$20.00	0.43	\$8.00
0.57	\$20.00	0.40	\$11.00
entrifugal Ture Ohiller	\$20.00	0.37	\$14.00
sinandgar Type Clillier		U.34	\$17.00
0.63	\$5.00		
0.63	\$5.00		
0.63	\$5.00	0.48	\$3.00
0.63	\$5.00	0.45	
0.57	\$15.00	0.38	
0.57	\$15.00	0.54	
0.57	\$15.00	0.46	00.93
0.57	\$15.00	0.43	
0.57		0.40	
0.51		0.34	\$14.00
0.51	\$20.00	0.48	\$20.00
0.51		0.41	
0.51	\$20.00	0.39	\$7.00
0.51	\$20.00	0.36	\$9.00
	\$20.00	0.00	\$12.00



WATER COOLED CHILLERS ->300 tons

Serou Type Chiller		Part Load IPLV kW/ton	Additional Incentive \$/tor
Eull load kW/ton	Base Incentive \$/ton	0.51	
	\$5.00	0.01	\$3.00
0.04	\$5.00		\$6.00
0.04	\$5.00	0.42	\$9.00
064	\$5.00	0.38	\$13.00
0.04	\$5.00	0.58	
059	\$15.00	0.01	\$6.00
0.50	\$15.00	0,43	\$8.00
0.56	\$15.00	0.45	\$11.00
0.50	\$15.00	0.37	\$14.00
0.58	\$15.00	0.37	\$16.00
0.50	\$15.00	0.55	
0.58	\$20.00	0.40	\$6.00
0.51	\$20.00	0.4	\$800
0.51	\$20.00	0.30	\$10.00
0.51	\$20.00	0.30	\$13.00
0.51	\$20.00	0.33	\$15.00
0.51	\$20.00	0.31	
0.51			
Centrifugal Type Chiller	\$5.00	0.47	\$3.00
0.58	\$5.00	0.44	
0.58		0.41	
0.58	<u>\$5.00</u>	0.35	
0.58	\$15.00	0.49	
0.52		0.42	<u></u>
0.52		0.39	\$12.00
0.52	\$15.00	0.37	
0.52		0.31	
0.52	<u>\$10.00</u>	0.44	\$7.00
0.46	\$20.00	0.37	\$7.00
0.46	\$20.00	0.35	
0.46	\$20.00	0.33	\$11.00
0.46	\$20.00	0.28	\$16.00
0.46	\$20.00		

Thermal Storage Incentives	
	Incentive
	\$190/kW shifted
THERMAL STORAGE ONIT	



Program Requirements

Equipment Eligibility

- Duke Energy will use the ARI manual for verifying equipment efficiencies for all the chillers. If the equipment or matched set is not in the ARI manual, the manufacturer's technical fact sheets must be provided showing the efficiency level tested under ARI conditions. Equipment capacity (size) and efficiency must be based on ARI design conditions. Chillers must meet full load and part load efficiency
- Chillers purchased and installed for backup or redundant systems are not eligible.
- Thermal Storage Units with a >1MW load shift are not eligible for incentives under the Prescriptive Program but can be considered for
- All equipment must be new to be eligible for incentives. Used equipment is not eligible for incentives.

Incentive Eligibility

- Incentives are only available to customers on a Duke Energy North Carolina non-residential rate.
- Incentive will not be paid until eligible equipment has been installed, is available to operate, and verification has been completed by Duke Energy staff as noted in the Term & Conditions stated below.
- Duke Energy reserves the right to revise incentive levels and/or qualifying efficiency levels at anytime.
- Leased equipment is eligible for incentives providing the equipment meets the program requirements and the customer provides the required documentation noted on the Incentive Application Process page of this application.
- Customer may assign the incentive to the vendor who installed/supplied the equipment. The customer's signature is required in the appropriate places on this form to assign the incentive to the vendor. Customer agrees that such an action constitutes an irrevocable assignment of the incentive. This assigned incentive must reproduce the purchase price paid for the equipment by an equivalent amount.
- Any equipment which, either separately or as part of a project, has or will receive an incentive from any other Duke Energy program
- In no case will Duke Energy pay an incentive above the actual cost of the new equipment.
- Incentive recipient assumes all responsibilities for any tax consequences resulting from Duke Energy incentive payment. To qualify for Duke Energy incentives, applicants who provide their social security number as their federal tax identification number for tax purposes must sign and return the "Customer consent to release personal information" form ("Consent Form") along with the application. Incentive applications are processed by a 3rd party vendor. The 3rd party vendor is responsible for mailing the 1099 form at the end of the calendar year for tax filing. Duke Energy and the 3rd party vendor have signed confidentiality agreement to protect your personal information. If your social security number is your federal tax ID number and you elect not to sign the Consent Form, please do not send Duke Energy the application, as you will not be qualified to participate in the incentive program.

Terms and Conditions

I certify that this premise is served by Duke Energy (or an affiliate of Duke Energy), that the information provided herein is accurate and complete, and that I have purchased and installed the high efficiency equipment (indicated herein) for the business facility listed herein and not for resale. Attached is an itemized invoice for the indicated installed equipment. In understand that the proposed incentive payment from Duke Energy is subject to change based on verification and Duke Energy approval. I agree to Duke Energy verification of both the sales transaction and equipment installation which may include a site inspection from a Duke Energy representative or Duke Energy agent. I understand that I am not allowed to receive more than one incentive from Duke Energy on any piece of equipment. I also understand that my participation in the program may be taxable and that my company is solely responsible for paying all such taxes. I hereby agree to indemnify, hold harmless and release Duke Energy and it's affiliates from any actions or claims in regards to the installation, operation and disposal of equipment (and related materials) covered herein including liability from an incidental or consequential damages. Duke Energy does not endorse any particular manufacturer, product or system design within these programs; does not expressly or implicitly warrant the performance of installed equipment (Contact your contractor for details regarding equipment warranties and is not liable for any damage caused by the installation of the equipment nor for any damage caused by the malfunction of the installed equipment.



Incentive Application Instructions

IMPORTANT NOTICE

Delays in processing incentive payments will occur if required documentation is not included with completed application(s).

- Contact Duke Energy toll free at 866-380-9580 to confirm customer eligibility. Applications are available for download at 1. www.duke-energy.com
- Review program and equipment requirements on the incentive application. (Page7) 2.
- Purchase and install eligible energy-efficient equipment. 3.
- Complete and submit application within 60 days after equipment has been installed and is operational. 4
- The following items are required to verify projects. If they are not included, it will delay payment of incentive. 5.
 - A. Itemized invoice for all equipment installed to include:
 - a. Equipment cost
 - Quantity per equipment type installed b.
 - Model # for each equipment type C.
 - Manufacturer's data sheet for each equipment model #. d,
 - B. Make sure the account number provided on the cover page (customer information section) is associated with the location where the equipment was installed. If the account # does not match the address where the equipment was installed, the application will be rejected as ineligible.
 - C. Provide required tax ID# for payee.
 - D. Customer must sign and date the application after reviewing the Terms and Conditions. If customer wishes to assign payment of the incentive directly to the vendor, the customer should circle the appropriate payee in the Payment Information section of the application and sign their name to authorize payment.
- Duke Energy may require site verification of projects that have been self-installed, prior to payment of incentive. 6.
- 7. Fax the complete, signed application with all required documents to 1-866-908-4921 or mail to the following address:

Duke Energy Smart \$aver Incentive Program 431 Charmany Drive Madison, WI 53719

A percentage of equipment installations will be site verified for quality assurance purposes. Once selected, a Duke Energy representative will contact the customer to arrange for the inspection. All incentive payments related to the project will be withheld until site verification is 8. complete. There is no charge to the customer for these inspections.

Smart \$aver[®]Incentive Program Requirements for Vendor Participation

Program Overview

- Duke Energy offers it's eligible non-residential customers the opportunity to increase profitability through energy cost savings and contribute to a cleaner environment by participating in our Smart \$aver™ Incentive Program.
- Under the Duke Energy Smart \$aver™ Incentive Program, Vendor is defined as any third party who:
 - Promotes the sale and installation of the high efficiency equipment for the customer. The Vendor will ensure that the eligible equipment is installed and operating before submitting the application or assisting the customer in completing the application.
 - Is responsible for the product sale only and is not required to ensure installation of the eligible equipment.
- All license requirements, if any, are solely the Vendor's responsibility. Participating Vendors include equipment contractors, equipment Vendors, equipment manufacturers and distributors, energy service companies, etc. The typical Vendor role is to contact/solicit eligible customers building new or retrofitting existing facilities and encourage the installation of the energy-efficient equipment offered in Duke Energy's program.
- Incentives are paid directly to customers unless the customer assigns the incentive to the Vendor. The assigned incentive must reduce the purchase price paid for the equipment by an equivalent amount. Incentives are taxable to the entity who receives the rebate check. Rebates greater than \$600 will be reported to the IRS unless documentation of tax exempt status is provided.
- Vendors can sign up to be on Duke Energy's Web site as a participating Vendor and be added to Duke Energy's e-mail distribution by faxing the Vendor Participation Agreement (VPA) to 1-866-908-4921 or mail to the following address:

Duke Energy Smart \$aver™ Incentive Program 431 Charmany Drive Madison, WI 53719

Guidelines for Vendor Activities

Vendors shall sign and return the attached VPA to Duke Energy prior to soliciting customer participation or when submitting an application. Rebate payments will not be released to a Vendor unless a signed VPA is on file.

Vendors shall not misrepresent the nature of their role in the program. In particular, Vendors shall not state or imply to customers, or any persons, that the Vendor is employed by or working on Duke energy's behalf.

- Vendors may not represent to customers that Duke Energy endorses their specific products or services. Duke Energy does not endorse specific products, services, or companies – only energy-efficient technologies.
- Vendors may advise customers of their option to have Duke Energy make their rebate check(s) payable to the Vendor if the customer's rebate amount is being deducted from the total sale price in advance. The customer must complete and sign the Payment Release Authorization section of the Smart \$aver™ Incentive Program Application.
- Vendors may use the words "Duke Energy's Smart \$aver™ Incentive Program" in promotional materials or advertisements. Vendors may use the name Duke Energy in a text format to describe the Smart \$aver™ Incentive Program, but are not permitted to use Duke Energy's logos.
- For Vendors who properly install the qualifying equipment, the equipment shall be installed and operating prior to an application being submitted. A percentage of each Vendor's installations will be subject to inspection by Duke Energy for verifying that the equipment is installed and operating. Vendors demonstrating high failure rates (based on a statistically significant sample) will have 100% of subsequent jobs inspected or may have their participation in the Smart \$aver™ Incentive Program revoked by Duke Energy in it's sole
- Vendors shall provide customers with applicable equipment warranty information for all measures installed. Vendors shall provide the required documentation for customers to apply for the rebate (invoices with model numbers and quantities, specification sheets for installed equipment, etc.) and assist customers in filling out the application.
- Vendors shall comply with all applicable local, state, and federal laws and codes when performing installation and related functions.
- Duke Energy reserves the right to revoke a Vendor's participation in Smart \$aver[™] Incentive Program if, in Duke Energy's sole judgment, the Vendor fails to comply with the program's guidelines and requirements.
- Smart \$aver™ Incentive Program offerings may be modified or terminated without prior notice. Check Duke Energy's Web site for current program status.

For more information, call 1-866.380.9580 or visit <u>www.duke-energy.com</u>.





Smart Saver[®] Incentive Program

Technology	Responsible for sales and not installs*	Responsible for sales and Installation*	Technology	Responsible for sales and not installs*	Responsible for sales and Installation*
Liahting		□	I nermai Storage	╠──────	<u> </u>
Heating Ventilation			Pumps/Motors/VPD's		
& Cooling	l	↓	Chillers		
Food Service		<u> </u>	Refrigeration	<u> </u>	
Water Heating		<u> </u>	Reingeradott		
Process Equipment					
(air compressors, injection					

* Check all that apply

Vendors who wish to be listed as a Smart \$aver™ Incentive Program participating Vendor shall complete this form. A signed copy of this form must be on file at Duke Energy in order for the Vendor to receive incentive payments. Fax form to 1-866-908-4921 or mail to:

Duke Energy Smart \$aver™ Incentive Program 431 Charmany Drive Madison, WI 53719

I have read and understand the Smart \$aver[™] Incentive Program Requirements for Vendor Participation, and I agree to comply with all requirements set forth therein. By signing this agreement, I agree to provide my customers with information and documentation that is true and accurate to the best of my knowledge. I hereby represent and warrant that the Tax ID and Vendor Tax Status provided below are true and accurate. I agree that any confidential information concerning my customer, including but not limited to Duke Energy service account information, will be used for the sole purpose of facilitating the customer's participation in the Smart \$aver[™] Incentive Program. Further, I understand that I am responsible for making sure everyone working for me understands the requirements prior to soliciting customer participation.

Vendor Federal Tax ID Number

To qualify for Duke Energy incentives, applicants who provide their social security number as their federal tax identification number for tax purposes must sign and return the "Customer consent to release personal information" form ("Consent Form") along with the application. Incentive applications are processed by a third-party vendor. The third-party vendor is responsible for mailing the 1099 form at the end of the calendar year for tax filing. Duke Energy and the third-party vendor have signed confidentiality agreement to protect your personal information. If your social security number is your federal tax ID number and you elect not to sign the Consent Form, please do not send Duke Energy the application, As you will not be qualified to participate in the incentive program.

Corporation	Individual/Sole Proprietor	Partnership	Other
Vendor Tax Status			
Contact me via	E-Mail		
Company Name			
Mailing Address		······································	
City, State, Zip			
Phone/Fax			
Primary E-mail Address			
Secondary E-mail Address			
Vendor Signature			
Title			
Print Name			
Date			

For more information, call 1-866-380-9580 or visit <u>www.duke-energy.com</u>.

Marcus Alexis Jones, P.E. (Principal Investigator)

Experience: 2007-present	DIRECTOR OF ENGINEERING: COUNTY OF HENDERSON Served as the Department Head for Engineering leading the following County functions:
	Building Inspections (Interim): during the one and a half year search process for a Director, lead the Counties and municipalities efforts in regulating North Carolina's Building Code
	Erosion and Sediment Control: regulated erosion control for development within County and participating municipalities under a delegated program from NC Department of Environment and Natural Resources (NCDENR)
	Engineering: technical resources for the County Manager, Board of Commissioners and other Departments and provided project management for large County projects. Facilities and Fleet Management: maintained over one million square feet of County
	buildings and associated grounds and over 350 vehicles. Recreation (Interim): during the six month search for a Director, lead the County Recreation and Park Department with six parks and various recreation programming. Sewer Utility: maintained and ensured compliance with NCDENR for a sewer utility with over 3,000 customers and operated a small wastewater treatment plant
2005-2007	Director of Public Works: County of Moore
	Engineering, technical resource for County Manager, Board of Commissioners and other departments, project management for facility construction. Facilities and Fleet Management, building and grounds maintenance, custodian services and fleet management. Solid Waste Management, C&D Landfill, Scales Operation, Six Convenience Sites with Recycling. Water and Sewer Utility, Managed 10 year Capital Improvement Program, over 10,000 customer connection for water distribution, sewer collection, groundwater supply, water quality, review and approval of developer extensions, customer service and billing. Wastewater Treatment Plant, 6.67 million gallon per day treatment facility, operation of interceptor system serving County, municipality and private systems
2001-2005	Assistant District Engineer: NC Department of Transportation Licensed Professional Engineer. Manage the Subdivision Review, Road Additions and Outdoor Advertising Control, Access Permits Applications and Utility Encroachment Agreements. Assist the District Engineer with the Secondary Road Program to pave soil roads and the Resurfacing Program to resurface paved roads. Supervise technical staff in production of project documents and supervise survey parties and project inspectors.
1998 – 2001 (Full-Time) 2001 – 2003 (Part-Time)	Retail Business Owner: Rainbow Cycles, Inc. Performed all the functions of owning and managing a successful retail business in Moore County: Financial planning and management, inventory management, personnel management, sales and service. Developed and managed marketing efforts that required extensive community involvement. Implemented stringent cost-control measures that resulted in higher net profits.
1993 – 1998	Airport Project Manager: Hobbs, Upchurch & Associates, P. A.

	Licensed Professional Engineer. Gained experience in airport consulting as an airport engineer for five General Aviation airports and one proposed Regional Reliever Airport. Airport projects include Environmental Assessment, Airport Layout Plans, Improvement Design, Land Acquisition, and Grant Administration. Also, developed commercial projects and designed traffic signals. Generated traffic studies for NC Department of Transportation projects. Supervised technical staff in production of project documents and supervised survey parties and project inspectors.				
1989 – 1996 (Part-Time)	First Lieutenant : North Carolina National Guard, Infantry Branch Executive Officer, Detachment Commander, Support Platoon Leader, and Infantry Platoon Leader, supervising 40 soldiers. Responsible for their training, their well-being, and over \$10 million of unit equipment. Completed Training: Infantry Officers Basic (Distinguished Military Graduate), Infantry Officers Advance Course and Airborne School				
1990 – 1993	Engineer Assistant: NC Department of Transportation Structure Design Unit. Performed the following engineering tasks: Assisted in Metrification, assisted in the revision of the unit's design manuals and structure standards, proofed proposed computer program calculations. (30 hours per week as an engineering student)				
Education: 2006 – 2007	UNC School of Government, Chapel Hill, NC -Completed County Administration Course -Comprehensive study of all aspects of County Government in NC				
1989 – 1993	North Carolina State University, Raleigh, NC -Bachelor of Science degree in Civil Engineering -Studied Transportation and Water Resources -Tau Beta Pi, National Engineering Honors Society (inducted as a Junior) -Graduate Course: Advanced Airport Planning and Design (1995)				
1985 – 1989	University of North Carolina, Chapel Hill, NC -Bachelor of Science degree in Business Administration -Concentrations: Personnel Management and Organizational Behavior -UNC-CH is a nationally-ranked undergraduate business school -Army ROTC through Duke University: Distinguished Military Graduate				
Organizations:	 -Kiwanis of Hendersonville (2008-present, Board Member) -United Way of Henderson County (2008-present, Allocation Panel Member) -American Public Works Association (2008-present) -Carolina Recycling Association (2007-present) -Moore County Subdivision Review Board (2003-present, Vice-chair) -Moore County Airport Authority (1999-2002, Vice-chair) -North Carolina Airports Association (1993-2002) -Southern Pines Business Association (1998-2003) -North Carolina Cyclocross Club (2007-present, President) -Sandhills Cycling Club (1994-2007, President) 				

Alexis Baker

<u>Education and Training:</u> University of North Carolina at Chapel Hill, B.A. Environmental Studies (1998-2001) University of North Carolina at Charlotte, M.A. Geography (2003-2006)

Professional Experience:

May 2009-Current. Environmental Programs Coordinator, Henderson County, NC

- Led seminars and educational outreach on environmental stewardship, energy management, and recycling
- Organized special events related to recycling and energy management
- * Authored press releases and articles for local media outlets
- * Authored energy management plans and environmental policy documents
- * Researched and assisted with grant proposals and writing.
- Acted as staff to the Environmental Advisory Committee and Solid Waste Advisory Committee

April 2007-April 2009, Planner, Henderson County, NC

- Authored policy documents and community plans
- ✤ Approved and ensured subdivision compliance with all local and state regulations
- Led community input meetings for community plans
- Acted as staff to the Etowah and Horse Shoe Communities Advisory Committee and the Historic Committee
- ✤ Created shapefiles and geodatabases for planning department.

Synergistic Activities.

- NCI Certified Charrette Planner (April 2008)
- Green Design and Development (March 12, 2008 and May 8, 2008)
- Grant-writing Courses (AB-Tech, March-April, 2007; Land-of-Sky, November 16, 2009)
- Photovoltaic Courses (Appalachian State University, September 18-20, 2009 and October 2-4, 2009)

Tom Wooten

Education and Training:East Carolina University, BS in Biology (1994)Coastal Carolina Community College (Jacksonville, NC),
Associates Degree in Science.

Professional Experience:

August 2004-Current. **Director of Public Works**, City of Hendersonville, NC November 2002-August 2004. **Public Works Superintendent**, City of Hendersonville, NC June 1998-November 2002. **Director of Public Works**, Town of Topsail Beach, NC

Greg Wiggins

<u>Education and Training:</u>	Asheville –Buncombe Technical Community College, AAS - Associate in Applied Science Air Conditioning, Heating & Refrigeration (2009) Diploma (2008) Asheville-Buncombe Technical Community College, AAS- Construction Management (2009)
Professional Experience:	January 2008 to current: Maintenance Supervisor, Henderson County Central Services
	August 2002 to January 2008 – Maintenance Technician II, Henderson County Central Services
	November 1996 to August 2002 – Traffic Signal Technician with the City of Hendersonville, Public Works Department
	July 1990 to November 1996 – Recreation Maintenance and Building Maintenance Technician with the City of Hendersonville, Public Works Department

Attachment 4

Henderson County Strategic Energy Plan

Draft Document

10/23/2009
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Executive Summary

This Executive Summary includes a brief overview of plans to meet the goal of reducing Henderson County's energy usage 10% by June 20, 2010. Measurements toward the goal will be in BTUs per square foot for County facilities. Another goal of this Plan is to make Henderson County a regional leader in energy management and efficiency. These goals will be accomplished through responsible usage of resources in accordance with state legislation and County and regional outreach efforts.

Henderson County Key Elements and Focus Areas of the Plan

The Energy Plan is not intended as merely a mandate to perform specific energy-related tasks, but instead presents a framework for making unique energy decisions.

Key Elements

- **Data collection** Accurate measurement and analysis of electricity, fossil based fuels, and water usage to benchmark and develop Key Performance Indicators (KPIs), including a quarterly review of trends and costs based on building square footage.
- **Building audits** Conduct energy audits to identify conservation opportunities. Update, repair, or replace electrical or mechanical equipment when energy savings are cost effective.
- **Billing audits** Review billing rates with utility providers annually. Bills should be reviewed monthly.
- **Plan development** An Energy Committee involving County departments is responsible for the participation of efficient energy practices among their departments as well as for the County facilities as a whole. This Committee and an additional committee composed of representatives of participating municipalities will review and update this plan on an annual basis (See Section 1).
- Education and outreach Educate the general public and County and Municipality staff through informative presentations, mobile education centers, informative presentations, handouts, County newsletters, training, press releases, and other forms of communication to explain that effective energy conservation reduces energy costs and promotes better environmental stewardship in the Community.
- **Building and Construction Efficiency** Apply energy saving building practices in all major facility construction/renovation projects and in operating and maintenance of building in accordance with US Green Building Council/LEED standards to the highest level practical
- Energy and Fuel Projects Execute approved, prioritized projects of energy efficiency and fuel conservation and implement process improvements, based on Cost Benefit

Analysis (CBA) from Energy Assessments, Capital Improvement Plan (CIP) and Best Management Practices

• **Emergency and Critical Operation Management**— Create contingency plans to deal with equipment failures and fuel or energy shortages.

Focus Areas

Targeted focus areas and refined strategic goals for Henderson County are presented in Table 1.1. Focus areas and refined strategic goals for participating Henderson County municipalities will be added in subsequent updates of this plan.

Focus Area	Goal
Energy awareness, education & information	Incorporate energy conservation and reduction efforts in the County and Municipalities for employees and residents by communication and outreach means Train inspectors and County employees in Energy Star, LEED, HealthyBuilt Homes, ISO 14001, etc.
Maximize energy savings in facilities	Incorporated energy and waste saving building practices in all major facility construction and renovation projects Complete Government owned building Audit Assessments
	-
	Design and maintain high performance government buildings
	Increase use of alternative funding mechanisms in lieu of direct appropriations
Energy conservation technologies, practices and	Fund an Energy Coordinator position for three years through ARRA Funds and other available grants responsible for building and energy audits.
opportunities	Prioritize a list of energy conservation projects and develop a capital improvements plan.
	Create incentive programs to encourage the use of green technologies such as residential/commercial permit waivers or property tax abatements for residents.
	Reduce petroleum consumption by increasing utilization of alternative fuels.
Efficient and effective work environment	Incorporate behavioral modifications into day to day facility operations.
	Create emergency operation plans to address essential equipment failures and fuel or energy shortages.

Henderson County Strategic Energy Plan

Introduction_

Henderson County and the participating municipalities, in order to improve the efficient use and conservation of energy and water resources, has developed this Strategic Energy Plan with a focus upon creating benchmarks, measurable goals, and implementation strategies to thoroughly and adequately analyze and address existing energy management issues within the County.

The Plan encompasses two parts: Buildings efficiency and Transportation. Elements in the Building section of the plan reflect improvements in Energy Managements and Efficiency as well as Alternative Energy Development. Transportation elements intend to reduce fossil fuel consumption. Present efforts and measures of success in each of these focus areas are documented by the Performance Scorecard in Appendix B.

This Plan is intended to be a reviewed and updated annually. The Energy Committees should review their progress on the Plan during their quarterly meetings.

Section 1 - Responsibilities

A. Building Efficiency and Management

The Henderson County Energy Committee will be appointed to create energy efficiency awareness and communication among the departments, to promote energy efficiency behavior changes among County employees, and to identify and address energy efficiency and renewable energy opportunities throughout the facilities. The Committee includes a representative from the County Manager's Office, the Finance Department the Human Resources Department, the Central Services Division, a representative from each department, the Environmental Programs Coordinator, and the Energy Coordinator. The Committee meets quarterly to evaluate the energy programs and projects and to update our Performance Scorecard.

The specific responsibilities of the <u>Henderson Energy Committee Members</u> are as follows:

- <u>The Finance Department</u> prepares quarterly utilities expenditure reports.
- <u>The Central Services Division Representative</u> reports the status of the energy efficiency opportunities (EEOs) that have been addressed since the last meeting, those related costs and estimated savings, any weather-related trends in utility use, and newly identified EEOs in the facilities and central equipment.
- <u>The Environmental Programs Coordinator</u> reports the status of educating the County staff on the importance of their role in improving the energy efficiency of operations and promotes energy efficiency initiatives to the public.
- <u>The Energy Coordinator</u> (see section 5) gives technical assistance with energy billing, auditing, and data analysis and collection.
- <u>The County Manager's Office Representative</u> chairs the Committee and overseas the implementation of the plan.
- <u>Each Department Representative</u> is responsible for updating an energy plan specific to his/her department. These plans should be incorporated into the County Strategic Energy Plan.

A second energy committee tentatively known as the County and Municipal Energy Committee will be composed of representatives from each participating Henderson County municipal government entity. This committee and the Henderson County Energy Committee will be charged with approving updates to the Henderson County Strategic Energy Plan and identifying energy saving opportunities.

The County and Municipal Energy Committee member responsibilities may include the following:

• <u>Municipal Representatives</u> discuss specific energy needs of their participating municipality. Each representative reports their quarterly utilities expenditures to the committee and discusses

successes and shortfalls. They will also discuss energy efficiency opportunities and estimated savings.

- <u>The Henderson County Environmental Programs Coordinator</u> reports the status of educating the County and Municipal staff on improving energy efficiency of operations. The coordinator also updates the committee on possible grants and energy opportunities available.
- <u>The Henderson County Energy Coordinator</u> (see section 5) gives technical assistance with energy billing, auditing, and data analysis and collection.
- <u>The County Manager's Office Representative</u> officially represents the County and may act as chair unless otherwise decided by the committee.

Both committees should work closely together to ensure that the Strategic Energy Plan is a comprehensive plan that addresses energy management needs and concerns for both municipal and county staff and residents.

B. Transportation

The North Carolina Department of Transportation (NCDOT) maintains the majority of public roads in the State. The state maintained road system in North Carolina includes over 79,000 miles of roadway. Henderson County has approximately 850 miles of state maintained roads. NCDOT conducts design and construction of roadways in Henderson County. The County does not currently maintain any roads for public purpose. NCDOT maintains control and authority over what road construction projects are implemented.

NCDOT coordinates much of its transportation planning efforts for the regions of Henderson, Haywood, and Buncombe counties through the French Broad River Municipal Planning Organization (MPO). Henderson County has most recently participated in the preparation and prioritizing of project lists for the:

- "Comprehensive Transportation Plan for French Broad River MPO and Rural Areas of Buncombe, Haywood and Henderson Counties" which serves as a vision for the future transportation system (adopted January 18, 2008);
- "Transportation 2030: The Long Range Multi-Modal Plan for Buncombe, Haywood, and Henderson Counties" which identifies transportation improvements and programs to be carried out over the next 25 years and;
- "Transportation Improvement Program (TIP)" which lists projects proposed for the next seven (7) years.

Beyond the MPO process, Henderson County also works directly with the division offices of NCDOT to provide input and to stay advised of progress on local projects.

Henderson County has an appointed Transportation Advisory Committee (TAC). The TAC is comprised mostly of local government MPO representatives and several County appointed members at large who meet regularly to: (1) discuss local transportation issues, (2) receive updates from the NCDOT district engineer regarding progress on projects (Transportation Improvements Projects (TIP) and secondary road projects); and (3) take input from the public regarding its concerns and issues related to transportation.

Apple Country Transit, the local bus service, is overseen by the Planning Department and operated by Western Carolina Community Action (WCCA). The County leverages federal and state grants to operate the system and matches grants with a local share contribution which is supplemented by the municipalities of Hendersonville and Fletcher. Department and fleet vehicles serving County staff are maintained by Central Services.

Section 2: Current Assessment

A. Building Efficiency and Management

On May 7, 2008, the County Manager announced a mandate to reduce energy by 10%. Under the same directive by the County Manager of a 10% reduction in energy, each department has written simple energy plans addressing certain behaviors that could positively affect efficiency. Under this mandate, data was compiled from May 2007 to the current month. Each quarter beginning in May 2008, data was compared and reported. Additionally, since May 2008, five energy audits have been conducted on existing County facilities. The remaining audits will be classified according to their energy usage. The top six energy users will be evaluated in the next eighteen months.

In order to properly account for energy usage and efficiency within the County, accurate data analysis and collection should be utilized. A baseline year is established based on the County Manager's mandate of a 10% reduction in energy. This baseline will run from May 2007 to April 2008. Future data collection reporting will utilize fiscal years. To accomplish these goals, Staff has obtained current and historical data from the County's electricity and natural gas provider. These providers have agreed to supply a spreadsheet of data on a quarterly basis. Staff is currently working to improve internal energy and utilities accounting procedures. The resulting energy accounting database should be user friendly and produce an expedient method of data reporting.

Data analysis should also incorporate the concept of degree days and heating and cooling days. Degree days are a measure of the difference between 65 degrees Fahrenheit (65°F) and the average daily temperature. This measure assumes that above an average daily temperature of 65°F no heat would be required. Heating degree days are a measure of how much (in degrees), and for how long (in days), outside air temperature was lower than 65°F. They are used for calculations relating to the energy consumption required to heat buildings. Cooling degree days are a measure of how much (in degrees) and for how long (in days) outside air temperature was higher than 65°F. This is, of course, used for calculations relating to the energy consumption required to cool buildings.

The number of cooling and heating days derived from degree days may serve to explain or predict energy needs. Unpredictable energy usage, not corresponding with heating or cooling days, may indicate a need for better energy management or efficiency. Data should also reflect building and facility energy efficiency on a square footage basis as well as in overall usage. Buildings housing more than one department, if not already using them, may also add sub-meters to better understand energy usage by department.

Currently, the County does not utilize alternative energies in its buildings and facilities. However, a grant was recently submitted on September 21, 2009 to install solar thermal water heating on the new courthouse to service the detention center. In Section 4-Energy Efficiency, a goal has been set to incorporate alternative

energies into at least one County building in the next five years. If the grant is won, it is expected to have the solar thermal water heating system installed by or before fiscal year 2011. Once the Henderson County Energy Committee is formed, it will evaluate costs and necessities of other possible alternative energies among their energy efficiency opportunities (EEO) as they evaluate and improve this Strategic Energy Plan.

B. Transportation

WCCA maintains a fleet of over eighteen vehicles and operates fixed route and senior and disabled services under contract with the county. Maintenance is subcontracted privately and vehicles are fueled at the County's maintenance facility. Fleet fuel usage data is maintained by Central Services. Western Carolina Community Action maintains cost figures for Apple Country Transit buses and the WCCA vans. Currently, the Planning Department, which oversees public transportation for the County, has applied for and has received grant funding to replace up to four of the six fixed route buses in WCCA's fleet and approximately four senior and disabled compressed natural gas (CNG) vans. The County is scheduled to build a CNG fueling station in 2010 and to place the CNG vehicles in operation by early 2011. The remaining vehicles will be replaced as funds become available.

Alternative means of transportation include greenways and bike routes (see Figure 1). The Apple Country Greenway Committee discusses improvements and developments for greenways, and Parks and Recreation oversees the maintenance and upkeep of existing greenways under the County's jurisdiction. Bike Routes are designated by the North Carolina Department of Transportation.

Beginning in 2007, the North Carolina Trails program has worked with multiple-country regions in North Carolina to develop regional systems that interconnect in a comprehensive statewide trail network. Land-of-Sky Regional Council partnered with the State Trails Program to develop a regional trails plan for the French Broad/ Pigeon River watershed. Figure 1 displays the existing and proposed routes for bicycle and pedestrian transportation.



Figure 1: Henderson County Trails Map

Section 3 – Accounting and Procurement

A. Building Efficiency and Management

Energy data and water data uses a baseline from May 2007 to April 2008. This time frame was used due to the mandate of the County Manager in May 2008 to reduce energy usage by 10%. All future data collection and reporting will be based on fiscal years. Below, table 1 shows the baseline data as compared to fiscal year 2009 for electricity usage. Both data sets are based on a 12 month period. Overall percent change indicates that electricity usage was reduced by 4.29% between the base line year and the fiscal year. Further data manipulation, including square footage into data analysis, may help to explain why some departments or

facilities may use more energy than others. Future updates to this plan will also include data analysis of propane per square footage to better explain total energy usage per building or department.

In order to ensure the most cost effective and efficient use of electricity, the energy bills should be reviewed monthly and billing rates should be reviewed annually with the utility provider. Changes in billing rates, behavioral modifications, or the incorporation of energy efficiency opportunities should be noted when analyzing data. Changes in efficiency should also be analyzed for cost savings and the estimated reduction in carbon emissions.

Electricity Usage in Henderson County								
Donartmont/	Base Line				Percent Change			
Building	кwн	1,000 BTU	Cost	кwн	1,000 BTU	Cost	1,000 BTU	Cost
New Courthouse	2,043,840	6,973,582	\$102,915.38	1,947,840	6,646,030	\$101,110.12	-4.7%	-1.8%
Animal Services	223,819	763,670	\$15,562.83	163,100	556,497	\$12,455.12	-27.1%	-20.0%
Board of Elections	43,964	150,005	\$4,282.96	35,598	121,460	\$3,569.57	-19.0%	-16.7%
Central Services	95,124	324,563	\$8,777.18	57,002	194,491	\$7,008.31	-40.1%	-20.2%
Cooperative Extension	132,307	451,431	\$10,330.19	79,882	272,557	\$7,499.88	-39.6%	-27.4%
King Street Building	177,011	603,962	\$14,497.42	126,288	430,895	\$10,564.87	-28.7%	-27.1%
Emergency Services	123,239	420,491	\$12,765.31	113,706	387,965	\$12,097.83	-7.7%	-5.2%
Heath & DSS	1,553,496	5,300,528	\$112,585.92	1,393,794	4,755,625	\$98,269.94	-10.3%	-12.7%
Parks & Recreation	476,018	1,624,173	\$1,969.86	465,851	1,589,484	\$2,291.78	-2.1%	16.3%
Historic Courthouse*	271,751	927,214	\$20,712.47	574,633	1,960,648	\$40,981.71	111.5%	97.9%
Library	71,945	245,476	\$7,511.73	43,377	148,002	\$4,642.82	-39.7%	-38.2%
Sheriff	1,287,510	4,392,984	\$82,194.60	1,294,124	4,415,551	\$78,797.72	0.5%	-4.1%
Solid Waste	186,264	635,533	\$17,118.20	100,017	341,258	\$11,082.56	-46.3%	-35.3%
Travel & Tourism	112,346	383,325	\$8,855.52	106,302	362,702	\$8,655.27	-5.4%	-2.3%
Utilities	19,200	65,510	\$2,262.37	23,312	79,541	\$2,739.82	21.4%	21.1%
Youth	95,560	326,051	\$7,631.22	92,160	314,450	\$7,286.11	-3.6%	-4.5%
Total	6,913,394	23,588,500	\$429,973.16	6,616,986	22,577,156	\$409,053.43	-4.3%	-4.9%

Table 1: Electricity Usage in Henderson County, Baseline Comparison toFiscal Year 2009

*Historic Courthouse was unoccupied until August 2008.



Figure 2: Electric Usage in FY 2009

Water usage is based, in most part, on buildings. Facilities such as the County Administration building houses several departments as does the new courthouse and historic courthouse. Fiscal year 2009 as compared to the baseline shows an overall 18.5% increase in water usage. Several ways to reduce water usage through energy efficiency opportunities include low flow toilets and sink aerators.

Water Usage in Henderson County							
Depentments / Duildings	Ba	aseline	Fisc	al 2009	Percent Change		
Departments/Buildings	K Gal	Cost	K Gal	Cost	K Gal	Cost	
New Courthouse	54,763	\$26,502.80	38,803	\$21,641.70	-29.1%	-18.3%	
Animal Services	2,498	\$2,587.49	1,544	\$1,710.99	-38.2%	-33.9%	
Board of Elections	104	\$101.48	136	\$130.82	30.8%	28.9%	
Central Services	853	\$731.21	428	\$490.31	-49.8%	-32.9%	
Cooperative Extension	3,455	\$1,236.14	4,720	\$1,781.13	36.6%	44.1%	
King Street Building	1,001	\$819.23	947	\$810.79	-5.4%	-1.0%	
Emergency Services	533	\$421.10	554	\$453.90	3.9%	7.8%	
Health & DSS	4,390	\$2,866.35	4,728	\$3,129.85	7.7%	9.2%	
Historic Courthouse*	990	\$714.04	456	\$384.51	-53.9%	-46.2%	
Library	6,751	\$4,223.76	6,447	\$4,034.54	-4.5%	-4.5%	
Recreation	1,791	\$835.81	1,919	\$1,155.23	7.1%	38.2%	
Sheriff	3,935	\$2,671.20	3,114	\$2,303.53	-20.9%	-13.8%	
Solid Waste	3,558	\$1,291.33	4,813	\$1,820.01	35.3%	40.9%	
Travel & Tourism	1,935	\$1,276.11	1,213	\$861.12	-37.3%	-32.5%	
Utilities	1,648	\$1,558.30	1,801	\$1,616.05	9.3%	3.7%	
Youth	2,220	\$856.28	2,026	\$841.26	-8.7%	-1.8%	
Total	90,425	48,693	73,649	\$43,165.74	-18.5%	-11.3%	

Table 2: Water Usage in Henderson County, Baseline Comparison to Fiscal
Year 2009

*Historic Courthouse was unoccupied until August 2008.



Figure 3: Water Usage FY 2009

The Henderson County Energy Coordinator (see Section 5) will work with participating municipalities to create baseline data tables and track and report data on a quarterly basis. These tables will be included in subsequent updates to this plan.

B. Transportation

Among County maintained vehicles, the Sheriff's Department had the highest total gasoline costs in FY 2008 and FY 2007. While it is worthwhile to cut back on fuel costs whenever feasible, the distribution of gallons of gasoline spent on County vehicles appears to directly correspond with the departments most likely to utilize vehicles in day to day departmental operations. In the case of the Sheriff's Department, it is necessary for this department to have the highest total gasoline costs compared to other departments as employees of that department may be involved in patrolling and emergency response.

Future updates to this section should include the number of vehicles used per department. The number of vehicles may better reflect if it is necessary for a department to reevaluate their energy usages. Data should also properly reflect the gas shortages in August and September 2008 where mandatory travel restrictions were imposed on County employees. Furthermore, the tables should indicate both total gallons used and cost per department due to the fluctuating price of gasoline. In subsequent updates of this plan, participating municipalities will work with the Henderson County Energy Coordinator (see Section 5) to create baseline fuel tables and track quarterly changes in fuel usage.

	FY2008	FY2007	% of
	Approximate \$	Approximate	Total
Department	Spent	\$ Spent	(Gallons)
Animal Control	\$13,961	\$10,916	2.77%
Assessor	\$3,997	\$3,153	0.80%
Code Enforcement	\$3,668	\$2,928	0.72%
Cooperative Extension	\$1,126	\$ 900	0.23%
DSS	\$3,204	\$2,480	0.62%
EMS	\$63,956	\$46,856	13.58%
Fire Marshall	\$6,145	\$4,842	1.21%
Garage	\$19,075	\$15,077	3.74%
Health Department	\$35,102	\$27,983	6.94%
Inspections	\$ 35,296	\$27,687	6.96%
Library	\$2,942	\$2,331	0.59%
Motor Pool	\$5,296	\$4,255	1.05%
Planning	\$998	\$801	0.20%
Recreation	\$870	\$704	0.17%
Sheriff	\$291,587	\$231,465	57.67%
Soil & Water	\$1,185	\$930	0.23%
Travel & Tourism	\$322	\$233	0.06%
Utilities	\$6,008	\$4,672	1.16%
Youth Development	\$6,740	\$5,341	1.33%
TOTAL	\$501,478	\$393,553	100.00%

Section 4 – Energy Efficiency

A. Building Efficiency and Management

Procedures to adequately address faulty equipment should be written by the Energy Committee and the capital improvement planning process should be overseen by the Central Services manager. These procedures and phone numbers of equipment rentals, suppliers, and repair people will be added as an attachment. All central equipment should have scheduled maintenance. The equipment in need of replacement should be replaced with Energy Star or the most efficient equipment. Contingency plans should be developed and tested to protect critical facility operations from energy and water shortages and incorporated into a countywide Emergency Management Plan.

Within the next 18 months, a total of four to six county building should be audited. These buildings will be specifically chosen due to their rank in energy usage. Audits in the first year may reveal such EEOs as sealing airleaks and voids in the air ducts, doors, and windows, ensuring that thermostats are working properly, installing aerators on sinks, using low flow toilets, placing timers on drink and snack machines, and replacing incandescent lights with compact fluorescent light bulbs. Other more expensive EEOs found during the quarterly energy audits may be reviewed through a performance contract, which would need approval by the Board of Commissioners. Such EEOs may include replacing HVAC equipment with energy efficient heat pumps, replacing windows and inefficient water heaters, and installing insulation. Whenever necessary to improve operation and efficiency, mechanical and electrical equipment should be updated, repaired, or replaced. Programs and processes that may be accomplished in the first year include: improving utility tracking and data analysis, completing a meter survey, auditing buildings using the energy efficiency opportunities (EEO) Checklist (Appendix-G) to develop a list of energy efficiency (EE) and renewable energy (RE) projects and available funding, addressing additional EEOs in buildings, attending efficiency training workshops, requesting the free steam trap survey from the State Energy Office, and obtaining efficiency tests for heating, ventilation, and air conditioning systems (HVAC). Processes to improve energy efficiency should also be pursued. These processes would include an annual review of utility rates with each supplier and an audit of each utility invoice on a quarterly or monthly basis.

Alternative energies should be pursued along with other energy efficiency opportunities. Projects to be accomplished within the next five years include a pilot project to install photovoltaics, solar thermal water heating, and/or rain barrels on an existing county building (See Section 6-Timeline). Additionally, any new building projects should incorporate energy and water conservation technologies into their design. Sustainable building practices should be pursued at all times in all operations and maintenance of buildings. Whenever possible, County buildings should strive to meet U.S. Green Building Council/LEED standards, Energy Star, and HealthyBuilt Home standards. Henderson County should also strive to improve energy efficiency among county and regional residents. Whenever possible, energy efficiency should be encouraged by County employees. Methods of promoting efficiency among residents are further explained in the Outreach section.

B. Transportation

The County is currently reviewing programs and projects to improve transportation cost efficiency. Compressed Natural Gas will be used in at least three buses in 2011. In general, CNG vehicles are 5-15% more efficient in mileage than regular gasoline engines. Natural gas is also less expensive than gasoline and reduces maintenance costs by causing less wear and tear on engines. Replacing the entire bus fleet with natural gas vehicles could translate into a savings of \$20,000 per year. Another benefit of natural gas is that it is one of the most clean burning fuels.

Additionally, County staff should incorporate fuel and cost efficiency and environmental stewardship in their everyday activities. Staff should be encouraged to walk, bicycle, or share rides whenever possible. County vehicles should not be utilized for journeys of less than a quarter mile unless in cases of inclement weather, where large material hauling or moving is involved, or a Staff member has a physical disability.

Departmental energy plans should include an inventory of their vehicles along with their gas mileage, vehicle identification numbers, odometer reading, models, miles per gallon, and maintenance schedules. The information compiled from the departmental inventories will be compiled into a centralized database. Vehicles should, whenever possible, be replaced with the most efficient vehicles and, where feasible, with alternative or flex fuel vehicles. Measures for more efficient vehicles should also be incorporated into an emergency management plan as a preemptive measure against future fuel shortages.

Section 5- Outreach

A. Building Efficiency and Management

Henderson County is committed to wise energy and resource usage. To become a leader in Western North Carolina, Henderson County will not only be dedicated to efficient energy usage in the county, but will use outreach and education to assist residents, employees, and the surrounding counties and communities in reaching their goals of energy efficiency. The Energy Mandate, found in Appendix D, is the County's formal declaration of its commitment to working together to reach the goal of reducing the total annual energy use per square foot of County facilities by at least 10% by June 20, 2010 and 4% for each year thereafter. With the support of the County Manager and department heads, the Energy Committees should realize their efforts toward this goal. The Environmental Programs Coordinator will be responsible for outreach for the communities and the County, various training courses, and grant research and writing for energy related grants. Inspectors and the Central Services Manager should receive Energy Star, LEED, and ISO 14001 training and make these skills available to the public upon request. Permit waiving or property tax abatements may be offered as incentives for LEED, Energy Star, Healthybuilt Homes, or any other reputable green certification process.

The position of Energy Coordinator will be grant funded for three years. This position will be responsible for county wide energy and building audits and energy management outreach. The Energy Coordinator will be made available to all participating government entities to conduct any energy audits, staff training and energy management outreach.

B. Transportation

The Apple Country Transit advertises bus schedules on their website, at the WCCA offices, the Planning Department, and the libraries. The Environmental Programs Coordinator will assist the Planning department by promoting the use of public transit through press releases, web site, and other methods such as a free bus riding

event, limited free ride coupons, and reduced or free rates for those with low or fixed incomes. Energy Coordinator will assist with fuel tracking data.

Section 6 - Timelines

One goal of this Plan is to make Henderson County a regional leader in energy management and efficiency. One step toward the realization of this goal is to move toward EPA Energy Star status for each of the County's occupied buildings. The goal will be achieved through the development and implementation of the programs and projects listed in the Performance Scorecard. The Committee develops milestones and assigns accountability for each phase of each program and project. Milestones are updated during the quarterly Committee meetings. The final milestone of each project is to document actual costs and savings. The following milestones have been accomplished in FY 2007-2009:

FY 2007- 2009 Milestones Accomplished
Departmental energy plans written (8 written)
HVAC optimization (thermostat set at 74-78 F in summer and 64-69 F in winter)
Energy awareness PR materials posted and given-out
Staff attended energy training workshops
Grant obtained for CNG buses and station

The following Milestones, with proposed deadlines indicated, will be achieved in FY 2010:

FY 2010 Milestones
Energy Coordinator hired
County Energy Committee established to meet quarterly (4 times)
County and Municipal Committee established to meet quarterly (4 times)
Quarterly Building Assessments (Top 3 buildings)
Utility Rate Review Program initiated (98 electric accounts reviewed)
Five introductory training workshops hosted for staff
Identified the possibility of sub-metering buildings
Utility Data Accounting Database developed (September 1, 2009)
DOE EEC Block Grant application submitted (October 2009)
Redesigned energy data collection procedures (January 1, 2010)
Evaluate Performance Contracting (May 1, 2010)
Remaining County Department Energy Plans written (15 written by June 2010)
Municipality Department Energy Plans written (10-20 written by June 2010)
No-cost EEOs addressed and identified by departments (June 2010)
Remaining EEOs evaluated and prioritized (June 2010)
Meter surveys identified un-needed meters (June 2010)

Trained 2 inspectors in LEED, Energy Star, HealthyBuilt Homes, or ISO 14001 (June 2010)

The following Milestones, with proposed deadlines indicated, are planned for FY 2011-2015:

FY 2011-2015 Planned Milestones
Conducted a Rate Review of every account to ensure the most economical rate
(Annual)
Audited and assessed remaining buildings and central equipment for EEOs
(Annual)
Evaluated and prioritized remaining projects (Annual)
Replaced inefficient lighting fixtures with premium fluorescent fixtures (e.g.
replaced T-12 fixtures with T-8 and replaced incandescent light bulbs with
compact fluorescent light bulbs).
Provided occupancy daylight controls for some lighting systems
Replaced inefficient HVAC systems (1 per year)
Replaced or tuned inefficient boilers and chillers identified through a boiler and
chiller system efficiency survey. (Central Service Manager identifies number of
boilers and chillers and annually services)
Provided additional energy awareness PR materials (Quarterly or 4 times per
year)
Provided insulation in some attics, walls, and floors (1 per year)
Replaced inefficient water heaters with premium-efficiency water heaters
(Annually)
Replaced inefficient motors with premium-efficiency models, cogged V-belts,
and VFDs (Annually)
Hosted additional training workshops for staff
Provided additional educational opportunities to inspectors and County staff on
LEED, Energy Star, HealthyBuilt Homes, or ISO 14001
Implemented one (1) alternative energy project per year
Energy awareness PR materials posted and given-out (July 2010)
CNG fueling station built (July 2010)
Created Emergency Management Plan to identify solutions for water, fuel, and
energy shortages (August 2010)
Vehicle inventory finished for each department (August 2010)
Four (4) of the six fixed route buses and up to four (4) of the seven senior and
disabled social service vans replaced with CNG vehicles (2011)
Piloted a program to install solar thermal water heating and cooling on the
County courthouse (2011)
Had a LEED certified building in Henderson County (2012)

The Central Services Manager will also address the EEOs that were recommended in the boiler and chiller system efficiency surveys. The boilers will be tuned annually, and heat transfer surfaces in the boiler and chiller systems will be cleaned annually. These investments are expected to return a positive cashflow to the operating budget.

During the quarterly meetings, the Henderson County Energy Committee will work as a team to prioritize the investments in programs and projects that are listed in the Performance Scorecard. The Environmental Programs Coordinator's profile of utility costs and the Central Services Manager's list of EEO projects will be discussed. Budget costs and savings estimates for each program and project are regularly updated. At each meeting, goals and milestones will be addressed and updated where necessary.

Financial Parameters

The primary funding source for maintenance programs is the general fund. EEO projects will be funded through grants, and those not so funded will be addressed by a performance contract or through the Capital Improvement Plan. Some of the longer-payback EEO projects and training programs will be funded by grants, while those not funded will be addressed through performance contracting.

Section 7- Funding

In FY 2010, loans, grants, incentives and other funding opportunities will be identified and applied for to improve energy efficiency whenever possible as a supplement to the capital improvements funding. Available funding includes but is not limited to the following:

American Recovery and Reinvestment Act:

Energy Efficiency and Conservation Block Grants: Federal grants may be applied for to assist eligible entities in creating and implementing strategies to reduce energy usage and increase energy efficiency in an environmentally sustainable manner.

<u>North Carolina State Energy Program:</u> The State of North Carolina has submitted a proposed plan to the U.S. Department of Energy. The State breaks down its \$76 million share into the following six categories:

- (1) Supporting small business and industry through energy savings (\$12 million)
- (2) Growing North Carolina's green workforce (\$8.5 million)
- (3) Creating an energy investment revolving loan fund (\$20 million)
- (4) Improving government energy efficiency (\$9 million)
- (5) Promoting residential energy efficiency and renewable energy (\$12 million)
- (6) Fostering renewable energy technology and resource innovation (\$14 million)

Proposed activities to be funded of interest to local governments include continuing education for building inspectors to improve code implementation and enforcement; energy education and training programs for governmental, residential, commercial, industrial, non-profit, and transportation sectors; energy use assessments; and energy plan development.

In addition, the State proposes to establish an energy revolving loan fund to provide no- and low-interest loans to businesses, non-profits, local governments, public schools, community colleges, state agencies, and state universities. The fund will provide loans of up to \$1 million for terms of up to ten years. Eligible projects will include renewable energy initiatives, other energy-saving measures, and performance contract term buy-downs.

The Energy Improvement Loan Program (EILP): Loans of 1-3% are available for local governments through the North Carolina State Department of Energy up to \$500,000 that demonstrate energy efficiency, energy cost-savings or reduced energy demand. The loan can be repaid from the energy savings these improvements generate.

Duke Smart Savers Incentives Program: Duke Energy provides incentives to businesses for installing energy efficient equipment. By submitting invoices and scheduling appointments by Duke representatives, the County can receive cash back for installation of efficient equipment for lighting, heating and cooling, chiller and thermal storage, and motor/pump/VFDs.

<u>Performance Contracting</u>: An agreement is entered into with a private energy service company (ESCO) and Henderson County. The ESCO identifies and finds EEOs and then recommends a package of improvements to be paid for through savings. The ESCO guarantees that savings meet or exceed annual payments to cover all project costs. The contract terms are usually from seven up to fifteen years. If no savings are seen, then the ESCO pays the difference.

Appendix A: Henderson County Departmental Energy Plans

*Municipality Energy Plans inserted by June 2010

Appendix – A

Departmental Energy Plans

Emergency Services (EMS, Fire Marshal, Emergency Management) Energy Conservation Plan

GOAL

To reduce energy consumption by a minimum of 10 percent.

OBJECTIVES

FUEL CONSERVATION

- Maintain proper tire pressure through weekly tire pressure checks. Tires requiring more than 2 pound adjustment on a weekly basis will be checked more frequently.
- Monitor fuel mileage for all vehicles.
- Monitor equipment requirements and remove unnecessary cargo.
- Consolidate trips and errands.
- Avoid excessive idling for non-emergency travel.
- Obey the speed limit.
- Walk (if physically possible) for non-emergency trips less than .3 mile.
- Reduce unnecessary trips to headquarters for training and data transfer through information technology improvements.
- Maintain log of tire pressure and fuel mileage for each vehicle, schedule maintenance at recommended intervals.

(See attachment A)

• Evaluate take-home vehicle assignments.

UTILITY CONSERVATION

- Turn off lights in rooms not in use, or open blinds for natural lighting when appropriate.
- Turn off equipment overnight or when not in use.
- Replace incandescent bulbs with compact florescent bulbs or LED lighting.
- Install low-flow shower heads at crew quarters and implement 4 minute maximum water run time on showers.
- Set thermostats at 64-68 degrees for heating and 74-78 degrees for cooling.
- No space heaters allowed.
- Fans are allowed for use when room is occupied.
- Close blinds in summer and open in winter for solar efficiency

ENERGY CONSERVATION PLAN ATTACHMENT A

VEHICLE NUMBER			_FUEL	_ TYPE	
NEXT SERVICE DUE	<u> </u>				
RECOMMENDED TI	RE P	RESSURE	<u> </u>	<u></u> R	
PRESSURE CHECK	ED	DATE		<u>BY</u>	
PRESSURE CHECK	ED	DATE		<u>BY</u>	
PRESSURE CHECK	ED	DATE		BY	
PRESSURE CHECK	ED	DATE		BY	
MILEAGE	G	ALLONS		MPG	
MILEAGE	G	ALLONS		MPG	
MILEAGE	G	ALLONS		MPG	
MILEAGE	G	ALLONS		MPG	
MILEAGE	G	ALLONS		MPG	
MILEAGE	G	ALLONS		MPG	
MILEAGE	G	ALLONS		MPG	
MILEAGE	G	ALLONS		MPG	
MILEAGE	G	ALLONS		MPG	
MILEAGE	G	ALLONS		MPG	
MILEAGE	G	ALLONS		MPG	
MILEAGE	G	ALLONS		MPG	
MILEAGE	G	ALLONS		MPG	
MILEAGE	G	ALLONS		MPG	

MILEAGE	<u>GALLONS</u>	MPG	
MILEAGE	GALLONS	MPG	

Appendix – A

Departmental Energy Plans

HENDERSON COUNTY FINANCE DEPARTMENT ENERGY CONSERVATION MEASURES

- Keep lights off in areas/rooms not in use
- Reduce the number of fluorescent bulbs in overhead light fixtures
- Keep all thermostats on lowest possible level for the season per county policy
- Have Central Services replace light bulbs with more energy efficient lighting
- Power down all office equipment including computers, copier, printers, etc. daily that do not power down themselves

Departmental Energy Plans

Henderson County Animal Services Center Energy Conservation Plan

Electricity-

- 1) To keep the heat pumps from running all night we are going to start closing all trap doors when the temperatures go below 50° F.
- 2) We will also set the thermostats around 75° F.
- 3) There are two different sets of lights for each wing of dog runs. One set is designed to provide a soft glow at night. We will start turning this set off at night.

<u>Gas</u>-

- 1) We will try and make only one trip a day to the Humane Alliance Spay/Neuter clinic.
- 2) I will also encourage staff to schedule spay/neuter in a manner that will minimize the number of days we have to make the trip.
- 3) Combining supply list so that we minimize the number of trips to vendors. Also using delivery service provided by vendors if it's cost effective.

After department head meeting: Summer 78-74 degrees F Thermostats Winter 65-69 degrees F Theromstats No space heaters Fans are ok if the thermostat is set on the most cost efficient setting. Close Blinds Insulation type inventory Turn off lights and equipment No idle policy for vehicles Buy vehicles smartly Henderson County

Appendix – A

Departmental Energy Plans

ENERGY CONSERVATION HUMAN RESOURCES DEPARTMENT 5/05/08

Energy consumption by Human Resources staff generally includes:

- Lights
- Heating and Air Conditioning
- Water
- Gas
- Electricity
- Paper

HRD efforts to conserve energy include:

- 1. Turn off all lights in bathroom and department upon leaving.
- 2. Choose to teleconference into meetings rather than drive whenever possible.
- 3. Turn off all computers at close of business each Friday or prior to holidays.
- 4. Recycle all paper; increase electronic communication to eliminate paper use; maintain emails and documents electronically and set up electronic task list/reminders rather than printing hard copies whenever possible.
- 5. Do not allow water to run while washing hands, but turn on to lather and to rinse only.
- 6. Use one paper towel instead of two to dry hands after washing.
- 7. Conduct business with remote departments by phone or electronically whenever possible.
- 8. Send regular Admin Alert every Friday to remind all employees what they can do to conserve (turn out lights, turn off computer, recycle, etc.)

Appendix – A

Departmental Energy Plans

Henderson County Soil & Water Conservation District's Energy Conservation Plan

The Henderson County Soil & Water Conservation District is committed to providing the taxpayers of Henderson County with impeccable service in an efficient and effective manner. One of the ways to meet this commitment is to ensure that, from an energy usage standpoint, our office is operating in the most energy-efficient manner possible.

SWCD will strive to reduce its energy usage by utilizing energy-efficient equipment for new purchases, by retrofitting existing facilities to maximize the facilities' efficiency and effectiveness from the standpoint of energy usage, and by educating our employees on day-to-day procedures that reduce energy consumption.

Heating and cooling:

- In winter, set office thermostat as low as comfortable (65 to 68 degrees F is suggested) when the office is occupied.
- Set back the thermostat by as much as 10 degrees F at night or when the office is unoccupied.
- Set back the thermostat to 50 to 55 degrees F when the office is unoccupied for more than 24 hours.
- Install programmable thermostat(s) to automatically provide the settings mentioned above.
- Replace filters once a month during winter.
- Minimize the use of bathroom ventilating fans and/or install a timer switch on them.
- In summer, shade west-facing windows.
- Maintain a temperature of 72 to 74 degrees or higher in summer.
- Regularly change air-conditioning system filters and clean the condenser.

Appliances and Electrical equipment:

- Turn off computer monitors at day's end.
- Turn off printers at day's end.
- Set temperature of water heater to 120 degrees F.
- Wrap water heater with insulating blanket.
- Maintain refrigerator at 37 to 40 degrees F and freezer at 5 degrees F.
- Unplug equipment when not in use, such as coffeemakers, printers, radios, etc.

Other:

- Repair any leaky faucets.
- Turn off lights when not in use.
- Switch to fluorescent bulbs in bathrooms.
- Follow maintenance schedule for departmental vehicle; maintain proper tire inflation.
- Use county car instead of truck when possible to conserve fuel.
- Be sure to follow posted speed limits and/or reduce speed when using county vehicles.
- Combine trips in county vehicles when possible.
- Investigate whether closing blinds over skylights would reduce cooling costs in summer.

Henderson County

• Consider switching employees to a 4-day week to allow for energy conservation via a shorter work week. Consider having employees telecommute/work from home on the fifth day.

Appendix – A

Departmental Energy Plans

05-02-08

IT Department Energy Conservation Plan

- Turn on lights only when needed. Lights in unoccupied areas should not be left on. Emergency lights that stay on all the time should be limited to those that are necessary.
- > Encourage the use of compact fluorescent light bulbs by Central Services.
- > Keep thermostats no higher than 68 degrees for heat or 78 degrees for cooling.
- Personal computers, monitors, and other equipment should be powered off at the end of each workday, and should be configured to sleep or hibernate on inactivity during the work day.
- Equipment such as computers, monitors, projectors, and printers that are used only periodically, in areas such as the IT classroom, should be kept powered off except when in use.
- Purchase only ENERGY STAR certified computers and equipment. The ENERGY STAR computer specification is expected to save consumers and businesses more than \$1.8 billion in energy costs over the next 5 years and prevent greenhouse gas emissions equal to the annual emissions of 2.7 million vehicles. (see www.energystar.gov)
- Replace older photocopier in the IT Department with a new, energy-efficient model, and avoid settings that result in using power all the time, such as "instant on" features. . ENERGY STAR qualified office and imaging products use as much as 60% less electricity than standard equipment (see www.energystar.com).Turn off the copier at close of business.
- Walk rather than drive whenever practical. When driving is required, carpool when possible, and plan trips efficiently to avoid making unnecessary trips. Whenever possible, use conference calls and webenabled technology to hold meetings that would otherwise involve travel.
- > Implement server consolidation through virtualization to maximize energy savings.



Departmental Energy Plans

Henderson County Parks and Recreation Department

801 Glover Street (Jackson Park), Hendersonville, NC 28792 (828) 697-4884 office / (828) 697-4886 fax

ENERGY PLAN

August 8, 2009

Jackson Park and Stoney Mountain Activity Center -

HCPRD office and SMCA office-

-Turn off light when not in use. Avoid using lights during the day if sufficient natural light is available.

-Set thermostat during the summer months between 74° - 78° .

-Set thermostat during the winter months between 65° - 69° .

-Ensure HVAC is on a maintenance program (filters changed etc.)

-Double glazed windows installed in office.

-Conduct Insulation Inventory.

-Change light bulbs to energy efficient bulbs.

-Plan trips to maximize efficient travel.

-Turn off equipment when not in use. (Computer, printers, etc.)

Park grounds-

-Set tennis courts lights to correspond with nightfall. Separate timers on upper and lower courts.

-Turn off ball field lights when games over.

-Inventory safety lights around the park.

-Set basketball court lights to correspond with night fall.

-Evaluate appliances at concessions stands.

Etowah Park, East Flat Rock Park, Edneyville Park, Edneyville Community Center, Westfeldt Park, Dana Park

Park grounds-

-Plan trips to maximize efficient travel. Visit parks using shortest route.

-Set basketball court lights to correspond with nightfall.

-Inventory safety lights around the park.

-Set thermostat during the summer months between 74° - 78°.

-Set thermostat during the winter months between 65° - 69° .

-Ensure HVAC is on a maintenance program (filters changed etc.)

-Conduct Insulation Inventory.

-Change light bulbs to energy efficient bulbs.

Appendix – A

Departmental Energy Plans

Henderson County Planning Department Energy Conservation Plan

Revised 8-3-2009

GOAL

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To reduce energy consumption by a minimum of 10 percent and reduce costs.

OBJECTIVES

Change employee behavior and implement modifications to equipment and operations to reduce energy consumption and costs.

Maintain or increase existing service levels.

EMPLOYEE CONSERVATION ACTIONS

- Turn off lights in rooms not in use.
 - Turn off equipment overnight or when not in use.
 - o This will include all computers, printers, copiers, and other ancillary devices.
 - All equipment should be unplugged at the end of each business day. Plugging equipment into power strips can make this task easier.
 - The large format plotter should remain turned off when not printing.
 - There may be some exceptions where equipment must remain on at all times (IT Server).
- Set thermostats at 64-68 degrees for heating and 74-78 degrees for cooling.
- Space heaters are not allowed.
- Portable fans are permitted.
- Actively use blinds for natural light and solar efficiency (e.g. closed to avoid direct light in summer and open in winter). Avoid direct light that causes unwanted heating in summer but open when light is indirect.
- Turn lights off when sufficient natural light exists.
- Consolidate departmental processes, site visits, and tasks requiring driving when possible.

EQUIPMENT MODIFICATIONS

- Replace incandescent bulbs with compact florescent bulbs.
- Reduce the number of florescent bulbs in use by only using the amount of lighting necessary. Many rooms have double switches for the overhead lights. In that case only use one bank and when adequate natural light is available, do not use them at all.
- Install motion sensor activated lighting in common areas (e.g. rest rooms, file rooms, etc.).
- Remove lighting from vending machines and place timers on snack food machines.
- Install seven day programmable thermostats for HVAC systems.

Henderson County

- Change HVAC filters at specified routine schedules.
- Install LED exit signs.
- Install wall outlet timers for printers, copiers and other equipment to ensure off-time when offices are unoccupied. Alternatively, just turn off power strips each day.
- Unplug unused water fountains and raise temperature settings for actively used water fountains.
- Modify computer settings to enter sleep mode or shut down when idle for specific periods.

Note: Many of the equipment modifications will be implemented by Central Services using Guaranteed Energy Savings Contract.

Henderson County

Appendix – A

Departmental Energy Plans

King Street Office Building Energy Conservation Plan

GOAL

To reduce energy consumption by a minimum of 10 percent.

OBJECTIVES

Change employee behavior and implement modifications to equipment and operations to reduce energy consumption and costs.

Maintain or increase existing service levels.

DEPARTMENTS/UNITS IMPACTED

Human Resources Department HRD/Risk Management Wellness Code Enforcement Department

Emergency Services Department Emergency Management Fire Marshal Planning Department Permitting Planning Property Addressing

Engineering Department Engineering Utilities Erosion Control Inspections

EMPLOYEE CONSERVATION ACTIONS

- Turn off lights in rooms not in use.
- Turn off equipment overnight or when not in use. This will include all computers, printers, copiers, and other ancillary devices.
- Set thermostats at 64-68 degrees for heating and 74-78 degrees for cooling.
- Space heaters are not allowed.
- Actively use blinds for natural light and solar efficiency (e.g. closed to avoid direct light in summer and open in winter). Avoid direct light that causes unwanted heating in summer but open when light is indirect. Turn lights off when sufficient natural light exists.
- Consolidate departmental processes, site visits, and tasks requiring driving.
EQUIPMENT MODIFICATIONS

- Replace incandescent bulbs with compact florescent bulbs.
- Reduce the number of florescent bulbs in use.
- Install motion sensor activated lighting in common areas (e.g. rest rooms, file rooms, etc.).
- Remove lighting from vending machines and place timers on snack food machines.
- Install seven day programmable thermostats for HVAC systems.
- Change HVAC filters at specified routine schedules.
- Install LED exit signs.
- Install wall outlet timers for printers, copiers and other equipment to ensure off-time when offices are unoccupied.
- Unplug unused water fountains and raise temperature settings for actively used water fountains.
- Modify computer settings to enter sleep mode or shut down when idle for specific periods.

Note: Many of the equipment modifications will be implemented by Central Services using Guaranteed Energy Savings Contract.

OPERATIONS

• Adjust work schedules to maximize energy conservation (4 day work week).

Benefits	Obstacles
Customer Convenience	Holidays
Energy Savings	Customer Convenience
Fuel Consumption	Child Care
Employee Commute Cost	

Positive Effects

- 1. The 4-day work week can provide greater convenience and access to customers and citizens by providing extended hours. Current hours of operation are Monday Friday, 8:00a.m. to 4:30p.m.
- Establish 4 work days with new hours of operation as Monday Thursday, 7:00a.m. to 6:00p.m. These extended hours could allow working customers to access government offices before or after their normal workday. From a customer service standpoint, this is a positive step. Department Heads would implement employee schedules to maintain 37.5 hour work week while maintaining weekly office hours totaling 44 hours.
- 3. A 4-day work week can reduce energy usage by eliminating an entire heating/cooling cycle for the HVAC system among other possible energy savings. Temperature settings could be modified each Thursday afternoon to Monday morning to a lower operational setting.

Obstacles

 There are some potential consequences to a 4-day work week. The current Holiday schedule is based upon a 7.5 hour workday. A 4-day work week would require employees to flexschedule hours worked to reach 37.5 hours in a week where the Holiday fell Monday-Thursday. Alternatively, the employee could use vacation leave to make up the difference since the County will continue to allot only 7.5 hours per holiday. The Personnel Handbook would need to address how Holiday pay is handled. The same number of Holidays could be allotted. There are options to address this issue.

- 2. While customer traffic is lower on Fridays, inevitably some customers will not want to wait the extra day to access government offices.
- 3. Child Care for employees may also be an issue to work around and accommodate since some child care centers open at 7:30a.m. and close at 5:30p.m. Department Heads will need to accommodate these employees while not compromising operations. The solution for this issue will vary by department so that an arrangement can be tailored to each situation. However, working on Friday should not be an option as this will negate the energy saving benefits of the new schedule.

Appendix - BPerformance Scorecard

Focus A: Supply Side										
Strategy 1.	Purchase	e utilities at most	economical	rates						
Strategy 2.	Maximize	ximize utilization of incentive programs								
Past Year Activities (2007-2009)		Measure Expected	ment Actual	Sav Expected	ings Actual	Cost	Jobs	Accountability	Funding Source	

2009-2011 Activities	Measure Expected	ement Actual	Sav Expected	ings Actual	Cost	Jobs	Assigned to	Funding Source
Review utility Billing Rates with each supplier, and quarterly invoice audit.							Energy Coordinator	
Review utility incentive programs for alternative funding sources for energy efficiency improvements and renewable energy opportunities.							Energy Coordinator	
Evaluate purchase options with utility providers							Central Services Manager, Energy Committee, Energy Coordinator	
Sub-meter buildings if possible and conduct meter surveys	Reduced energy costs						Energy Coordinator, Central Services Manager, Environmental Programs Coordinator, Utility Provider	

2011-2013 Activities	Measurer Expected	ment Actual	Savi Expected	Savings Expected Actual		Jobs	Assigned to	Funding Source

Focus B: Demand Side									
Strategy 1.	Conduct	Conduct energy audits to identify opportunities for conservation and establish trend line for spending							
Strategy 2.	Prioritize	ioritize energy saving and alternative energy projects according to cost-effectiveness							
Strategy 3.	Develop	Key Performance	e Indicators	(KPIs) that (clearly mea	sure real er	nergy and wate	r conservation progress	i
Strategy 4.	Implemer	nt and address fa	st-payback	energy effic	iency oppo	rtunities.			
Past Year Activities (2007-2009)	es Measurement Savings Expected Actual Expected Actual Cost Jobs Accountability Funding Source								

2009-2011 Activities	Measurer Expected	nent Actual	Sav Expected	Savings Expected Actual		Jobs	Assigned to	Funding Source

2011-2013 Activities	Measurement Expected Actua	Savings Expected Actual	Cost	Jobs	Assigned to	Funding Source

Hender	son County	Strategic Energy Plan				

Focus C: Communication, Outreach, and Training									
Strategy 1.	In-house	workshops trainin	ig employee	es on energy	/ managem	ient.			
Strategy 2.	Train two E	Building Inspectors	in LEED, En	ergy Star, He	ealthyBuilt H	omes, ISO 1	4001, or other e	nergy management certifi	cation
Strategy 3.	Educate e	employees on ber	nefits of ene	rgy manage	ement and o	conservatior	n at work and h	ome via, email, newslet	ter and handouts.
Strategy 4.	Establish	Establish purchasing policies to ensure procurement of efficient equipment and energy star appliances.							
Strategy 5	Implemen	it emergency prod	cedures to d	leal with ene	ergy shorta	ges and equ	uipment failures	\$	
Past Year Activitie (2007-2009)	Measurement Expected ActualSavings Expected ActualCostJobsAccountabilityFunding Source								

2009-2011 Activities	Measure Expected	ment Actual	Sav Expected	ings Actual	Cost	Jobs	Assigned to	Funding Source
Develop County-Wide Energy Management and Emission Reduction Policy					Salary			
Educate BOC, County and Muncipalities, and Facilities on NC Energy legislation, State Energy resources & planning techniques								
Develop an Strategic Energy Plan	Adopted Plan		NA	NA	Salary		Solid Waste/Engineering	
Conduct Energy Management training sessions for Management and employees	Sign off sheet		NA	NA				

Hender	son County			S	trategic Energy Plan	
Develop energy & water conservation educational opportunities: 1) flyers and newsletter, 2) Energy Committee meetings 3) electronic transmissions 4)In-house workshops	Participation by all employees in energy conservation efforts. Certificate				Environmental Programs Coordinator/PIO	
Building Inspectors trained in energy management.	Two inspectors certified				Building Inspections	
		~		1		

2011-2013 Activities	Measurer Expected	ment Actual	Sav Expected	ings Actual	Cost	Jobs	Assigned to	Funding Source
Emergency Procedure Plan	Adopted Plan							

Focus D: Implement Fleet Management Program												
Strategy 1.	Increase r	Increase number of CNG and alternative fuel vehicles within fleet										
Strategy 2	Behaviora	Behavioral changes to reduce amount of fuel used										
Past Year Activities (2007-2009)		Measurer Expected	ment Actual	Savings Expected Actual		Cost	Jobs	Accountability	Funding Source			
CNG grants for bus obtained		CNG station and CNG vehicles obtained										

2009-2011 Activities	Measuren Expected	nent Actual	Savi Expected	ngs Actual	Cost	Jobs	Assigned to	Funding Source
Implement the increased use of alternative fuels	Reduced pollutant, greenhouse gas emissions and							

Henderson County	Strategic Energy Plan							
	consumption							
Standardize fleet preventative maintenance practices and documentation.	Improved vehicle safety, utilization and reporting.							
Implement behavioral strategies into Departmental Energy Plans	Decreased fuel usage							

Henderson County

Strategic Energy Plan

Appendix – C Utility Benchmarks

Utility Providers

Electricity is provided by Duke through [number] meters. Natural Gas is provided by PSNC through [number] meters. Propane is purchased as needed through Energy United Fuel Oil is purchases as needed through Water is purchased from City of Hendersonville though [number] meters.

Annual Energy Use per Facility Total Square Foot = [number]-MBTU/SF

The total gross square footage of our facilities during last FY was [number]-SF.

- **Electricity:** Total KWHs purchased last FY was [number], which equates to [number]-Million BTU when multiplied by 0.0034-MBTU/KWH.
- **Natural Gas:** Total Therms of natural gas purchased last FY was [number], which equates to [number]-Million BTU when multiplied by 0.1-MBTU / Therm.
- **Propane:** Total gallons of propane purchased last FY was [number], which equates to [number]-Million BTU when multiplied by 0.092-MBTU / gallon.
- **Total:** Total MBTU per Square Foot for the last FY was [number]-MBTU/SF.

<u>Utility</u>	2008 \$	2008 MBTU/SF	2009 \$	2009 MBTU/SF
Electricity				
Natural Gas				
Propane				
Total				
Water				

<u>Appendix – D</u> Energy Mandate for Henderson County

The undersigned recognize that utilities usage is a controllable expense in which reductions can be allocated to other needs within our operations budget, and that energy efficiency is the responsibility of all staff.

- The development and implementation of this Strategic Energy Plan is the responsibility of the undersigned Central Services Manager.
- The undersigned managers will support the Central Services Manager in implementing this Plan.
- The Energy Committee will meet quarterly to review progress of the programs and projects included in our Performance Scorecard, and they will update the undersigned directors and managers on a quarterly basis.

Energy Mandate – Goal

To reduce energy costs by 10%

Energy Mandate – Tracking Measures

- Total Utilities use and cost per square foot
- Electric KWH use per square foot
- Gas BTU use per square foot
- Oil BTU use per square foot
- Other fuel use per square foot
- Water use per square foot

Energy Mandate – Commitment

Implemented this _____ day of _____, 2009.

Human Resources Manager

Central Services Manager

Finance Director

County Manager

Appendix – E

Energy Efficiency and Renewable Energy Projects

Project Type	Net Project Area (SF)	Estimated Installed Cost per Sq. Ft. (\$)	Estimated Labor and Design Cost (\$)	Estimated Materials Cost (\$)	Estimated Annual Energy Savings	Estimated Annual CO2 Reduction (tons)	Estimated Annual Savings (\$)	Simple Pay Back (Years)	Schedule
Replace inefficient lighting with premium-efficiency fluorescent fixtures, w/occupancy controls, LED exit signs in five buildings								4	
Provide occupancy and daylight controls for some lighting systems									
Replace inefficient HVAC systems with premium-efficiency heat pump systems in five buildings								10	
Replace inefficient equipment with Energy Star equipment									
Repair holes and seal ductwork									
Insulate attics in two buildings								5	

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Replace inefficient water heaters with premium-efficiency models				5	
Replace 10 inefficient motors with premium-efficiency models, cogged V-belts, and VFDs				5	
Replace 4 inefficient boilers with premium-efficiency boilers				5	
Replace 4 inefficient chillers and cooling towers with premium- efficiency equipment				5	
Solar Electric PV Systems for Public Display				20	
Provide Four Solar Hot Water Systems				4	
Wind Power Pilot Project					
Biodiesel System (grease collection)					
Total					

Appendix – F

Energy Efficiency Opportunity (EEO) Checklist (separate file)