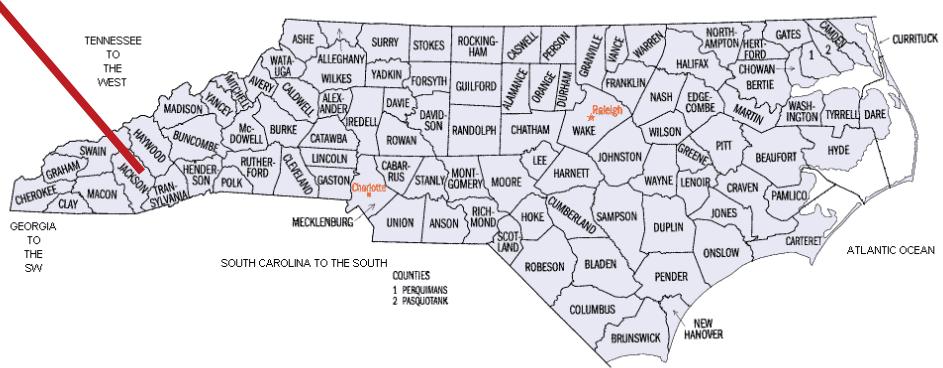
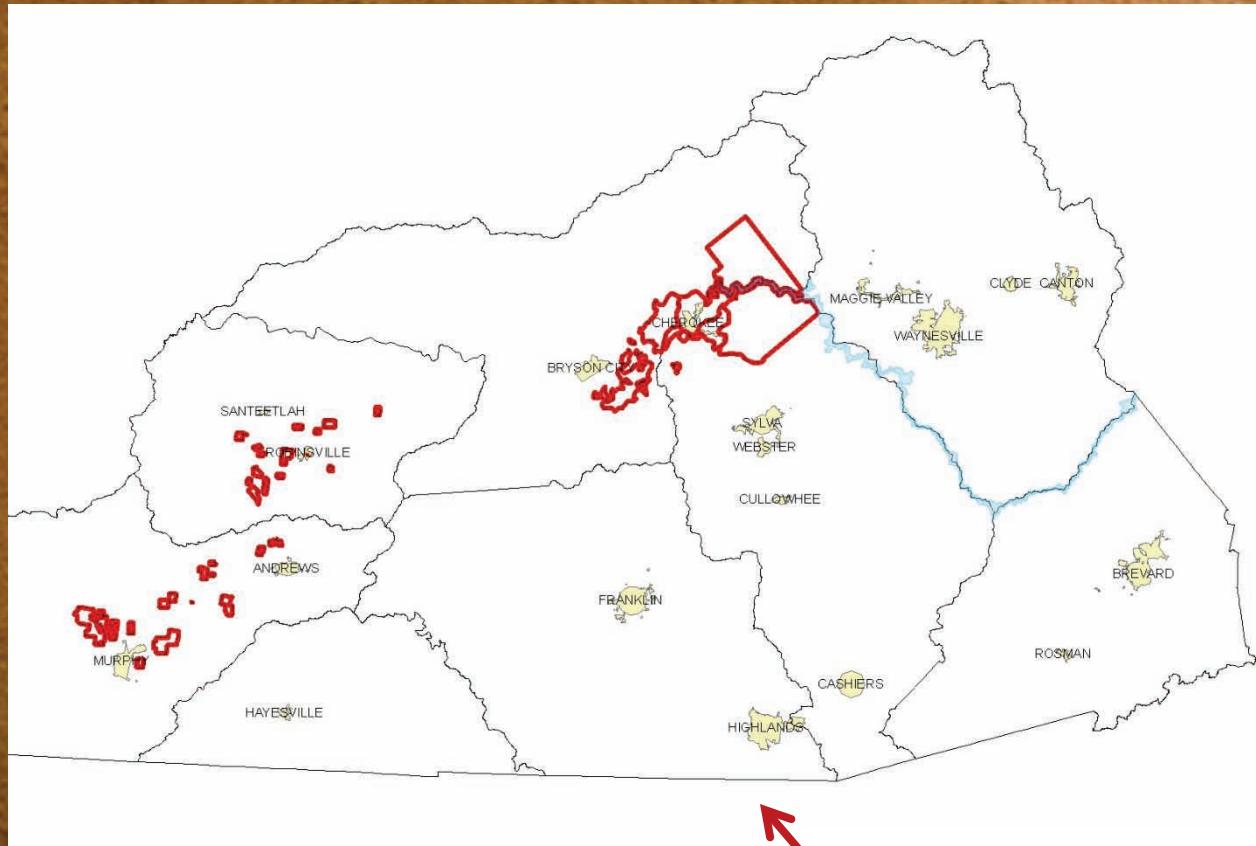


Eastern Band of Cherokee Indians

EBCI Facility Retrofit Project



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Legislation

- Proclamation, Qualla Environmental Resources Initiative (April 24, 2006)
- Resolution 636 (2007) established energy goals for the Tribe



Project Overview

- Energy efficient implementations
- Seven Tribally owned/leased facilities
- Reduction of energy consumption by at least 30% per facility
- Reduction of air pollutants and GHG emissions



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Area Code	Fund	Division	Program
TUWAT	Water & Sewer	Tribal Utilities	Water Treatment
SENCT	Senior Citizen	Social Services	Public Assistance
TUWAS	Water & Sewer	Tribal Utilities	Sewer
CLRW	Qualla Recreation	Economic Development	Civic Center
ROSID	Roads	Roads	Street Lights
TCPOP	Tsali Care	Health & Medicine	Tsali Care
SPECp	Special Projects	Economic Development	Building Construction
DRC	Wraparound	Social Services	Tribal
HOUSE	Housing	Housing	Housing
TRAVL	Travel & Promotions	Economic Development	Fairgrounds

Table 1 – Top 10 Electricity Consuming Tribal Government Programs

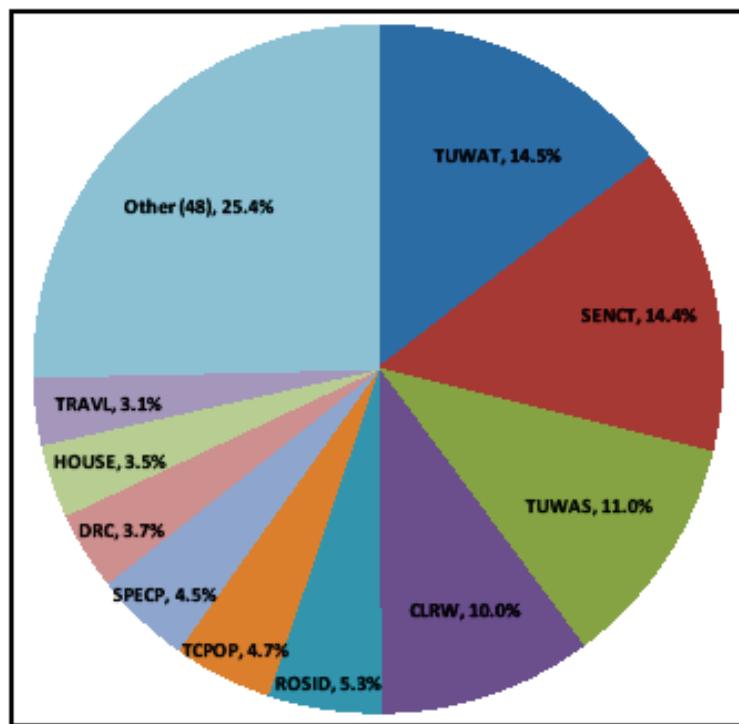


Figure 4 – Electricity Consumption by Tribal Government Program



Eastern Band of
Cherokee Indians

Final Report

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U.S. Department of Energy
Tribal Energy Program
Award No.: DE-FG36-07GO17084

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Strategic Energy Plan

January 2009

Consultant:
South Carolina Institute for Energy Studies
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Cherokee Fairgrounds & Exhibit Building

545 Tsali Boulevard Cherokee, NC



Cherokee Ceremonial and Exhibit Building

This building was built in the mid 1980s and totals approximately 12,600 square feet. Occupancy is according to community activities and scheduled events. During such events, occupancy could be for the duration of 10 hours or more daily.

Energy consumption includes electricity and LP gas, totaling annual energy costs at \$18,691 and 745 million BTU's of energy consumed.

As a result of the energy audit, the following recommendations were made: replacement of HVAC units (5), a routine maintenance HVAC schedule, programmable thermostats, adjustment of insulation that is out of place, replacement of fluorescent lighting, delamping, and insulation of pipes on the hot water heater.



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Implementations

- Replacement of 5 HVAC units
- Routine HVAC maintenance schedule
- Install programmable thermostats
- Adjust insulation
- Replace fluorescent lighting
- Delamping
- Insulate hot water heater pipes



Reductions

- Savings of at least \$7,460 per year
- Energy savings of 236 million BTU's per year
- 3615 lbs reduction in nitrous oxides
(NO_x-precursor to ozone pollution)
- 1,707,000 lbs reduction in carbon dioxide
(CO₂-greenhouse gas)

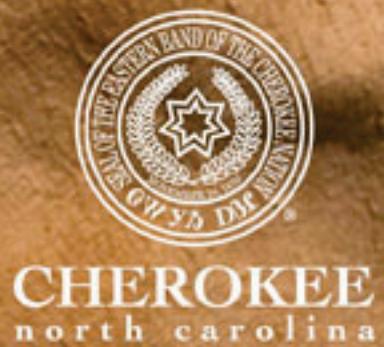


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Cherokee Historical Association

564 Tsali Boulevard Cherokee, NC



Cherokee Historical Association

Cherokee Historical Association is an office building built in the mid 1980s and is 6,720 square feet in three levels. Occupancy consists of 8-10 employees and operational hours of 2080 per year.

Energy consumed is electricity at an annual energy cost of \$14,181 annually and 540 million BTU's per year.

Recommended alterations include the following: replacement of or mechanical overhaul of existing HVAC units, installation of programmable thermostats, replacement of fluorescent lighting, lighting occupancy sensors, installation of flush valve replacements, and replacement of faucet aerators.



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Implementations

- Replace/mechanical overhaul of HVAC units
- Install programmable thermostats
- Replace fluorescent lighting
- Occupancy sensors
- Flush valve replacements
- Replace faucet aerators



Reductions

- Savings of at least \$5,978 per year
- Energy savings of 237 million BTU's per year
- 306 lbs reduction in nitrous oxides
(NO_x-precursor to ozone pollution)
- 144,400 lbs reduction in carbon dioxide
(CO₂-greenhouse gas)

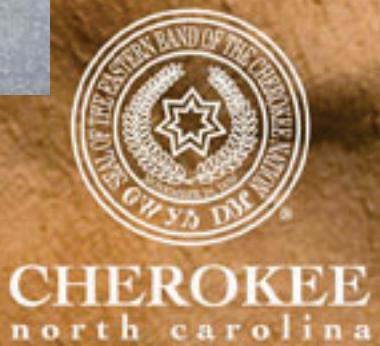


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EBCI Finance Building

45 Council House Loop Cherokee, NC



EBCI Finance Building

The Maggie Wachacha building DBA EBCI Finance Building is approximately 6,390 square feet with a medium brown asphalt shingle roof.

Primary source of energy is electricity with a \$19,390 annual energy cost and 942.9 million of BTU's of energy consumed per year.

Audit results formed the following recommendations: a routine HVAC maintenance schedule, programmable thermostats, replacement of existing HVAC system, replacement of attic insulation, replacement of fluorescent lighting, sealing of building leaks and ceiling penetrations, and addressing the restroom exhaust fans that ran continuously.



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Implementations

- Routine HVAC maintenance schedule
- Programmable thermostats
- Replace HVAC system
- Attic insulation replacement
- Seal building leaks and ceiling penetrations
- Replace fluorescent lighting
- Keep restroom exhaust fans from running nonstop



Reductions

- Savings of at least \$3,902 per year
- Energy savings of 190 million BTU's per year
- 222 lbs reduction in nitrous oxides
(NO_x-precursor to ozone pollution)
- 105,107 lbs reduction in carbon dioxide
(CO₂-greenhouse gas)
- 45 lbs reduction in sulfur dioxide
(SO₂-forms acid rain)



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NC Cooperative Extension

876 Acquoni Rd Cherokee, NC



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NC Cooperative Extension Office (Formerly Women's Wellness Center)

This building was unoccupied at the time the audit was performed and is due to undergo renovations. It is a prefabricated metal building, built in the mid nineteen nineties and totals 7,200 square feet. Occupancy will include 10 employees and an estimated 2080 hours per year.

The sole source of energy supplied is electricity. Total energy consumed is 203 million BTU's annually at a cost of \$5,253.

Recommendations include adjustment of doors allowing air leaks, reinforcement of building envelope, replacement of single pane windows, routine maintenance of HVAC, programmable thermostats, replacement of fluorescent lighting with T-8 system, consolidation of two electric meters, and to provide insulation on existing copper lines to the hot water heater which are currently not insulated.



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Implementations

- Adjust doors allowing air leaks
- Reinforce building envelope
- Replace single pane windows
- Routine maintenance of HVAC system
- Programmable thermostats
- Replace fluorescent lighting with T-8 system
- Consolidate two electric meters
- Provide insulation on copper hot water heater lines



Reductions

- Savings of at least \$2,195 per year
- Energy savings of 87 million BTU's per year
- 112 lbs reduction in nitrous oxides
(NO_x-precursor to ozone pollution)
- 53,040 lbs reduction in carbon dioxide
(CO₂-greenhouse gas)
- 41 lbs reduction in sulfur dioxide
(SO₂-forms acid rain)
- 19,140 gallons of water used for cooling



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Fire Station #2

2305 Old Mission Rd Cherokee, NC



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Fire Substation #2

Substation #2 was built around 2002 and houses the largest ladder fire truck (100 foot reach), which serves high profile buildings, and two additional fire trucks. The building is approximately 5,280 square feet with a standing seam metal roof. The operating schedule is 24 hours a day, seven days a week, 8,760 hours annually.

Energy consumption includes usage of electricity and LP gas totalling energy costs of \$5,260 per year and 235.2 million BTU's of energy consumed per year.

Recommendations include routine HVAC maintenance, installation of programmable thermostats, replacement of lighting fixtures, replacement of hot water piping, and future purchase of Energy Star© rated appliances for the kitchen appliances. It is estimated that implementing these recommendations will provide energy and water expenditure savings of at least \$3,324 annually, and energy consumption savings of 149.2 million BTU's annually.



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Implementations

- Routine HVAC maintenance
- Programmable thermostats
- Replace garage MH's with T5HO's
- Replace T-12's and magnetic ballasts
- Hot water piping



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Reductions

- Savings of at least \$3,324 per year
- Energy savings of 149.2 million BTU's per year
- 192 lbs reduction in nitrous oxides
(NO_x-precursor to ozone pollution)
- 90,890 lbs reduction in carbon dioxide
(CO₂-greenhouse gas)
- 71 lbs reduction in sulfur dioxide
(SO₂-forms acid rain)



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Qualla Arts and Crafts

645 Tsali Boulevard Cherokee, NC



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Qualla Arts and Crafts

This facility was built in 1990 and totals 6,592 square feet. It is a retail facility and operates 2,433 hours per year. There is a total of 390 square feet of single pane glass within the building.

Energy consumption is solely electricity with a total energy cost of \$10,298 per year and 476 million BTU's of energy consumed per year.

Recommendations are to implement a routine maintenance schedule for HVAC systems, replacement of single pane windows with double pane, insulated/sealed attic access cover, programmable thermostats, weather stripping of doors, caulking of window and door frames, replacement of lighting fixtures, and replacing bathroom fixtures with low flush models.



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Implementations

- Routine maintenance schedule for HVAC
- Replace single plane windows
- Insulate/Seal attic access cover
- Programmable thermostats
- Weather strip doors
- Caulk window and door frames
- Replace lighting fixtures
- Replace bathroom fixtures with low flush models



Reductions

- Savings of at least \$3,819 per year
- Energy savings of 142 million BTU's per year
- 108 lbs reduction in nitrous oxides
(NO_x-precursor to ozone pollution)
- 48,354 lbs reduction in carbon dioxide
(CO₂-greenhouse gas)



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Ginger Lynn Welch
810 Acquoni Rd Cherokee, NC



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Ginger Lynn Welch Building (Fitness Side)

The Ginger Lynn Welch Complex houses two buildings each with unique architectural features, lighting, HVAC equipment usage, tenants, and occupancy schedules. For the purposes of this application package, details are portrayed for the Fitness side of the complex which includes a wellness center, weight and aerobic, diabetic programs, wound care, and prevention activity programs.

Energy consumption includes electricity and LP gas, totalling annual energy costs at \$79,633 and 2,934 million BTU's of energy consumed.

Audit results recommended a routine HVAC maintenance program, repair of leaking conditioned air fiber distribution ducts, programmable thermostats, replacement lighting devices, occupancy sensors, and delamping for the gymnasium and general occupancy areas.

Recommendations for the indoor pool area included pool covers, solar heating systems, high efficiency heaters, efficient lighting, efficient pump/motors, water efficiency, and more efficient operations.



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Implementations

- Routine HVAC maintenance
- Repair leaking conditioned air fiber distribution ducts
- Programmable thermostats
- Replace lighting with T-8's and electronic ballasts
- Occupancy sensors
- Delamping
- Pool covers
- Solar heating systems
- High efficiency heaters
- Efficient lighting
- Efficient pump/motors
- Water efficiency



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Reductions

- Savings of at least \$37,330 per year
- 2,138 lbs reduction in nitrous oxides
(NO_x-precursor to ozone pollution)
- 1,010,000 lbs reduction in carbon dioxide
(CO₂-greenhouse gas)
- 787 lbs reduction in sulfur dioxide
(SO₂-forms acid rain)



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Projected Energy Savings Per Facility

Facility	Energy Savings (millions)	Reduction of Nitrous Oxides (NO _x) (in lbs)	Reduction of Carbon Dioxide (CO ₂) (in lbs)	Reduction of Sulfur Dioxide (SO ₂) (in lbs)	Percentage of Reduction (%)
Fire Station #2	149.2	192	90,890	71	63
Ginger Lynn Welch	—	2,138	1,010,000	787	31.03
Womens Wellness	87	112	53,040	41	41.82
Ceremonial Grounds	236	3,615	1,707,000	—	44.69
Qualla Arts & Crafts	142	108	48,354	—	37.08
Cherokee Historical	237	306	144,400	—	42.15
EBCI Finance	190	222	105,107	45	80



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Implementation Costs vs Annual Cost Savings

Facility	Estimated Cost to Implement	Annual Estimated Energy Cost
Fire Station #2	\$5,644	\$3,324
Ginger Lynn Welch	\$66,375	\$37,330
Women's Wellness	\$4,506	\$2,195
Ceremonial Grounds	\$55,405	\$7,460
Qualla Arts & Crafts	\$7,905	\$3,819
Cherokee Historical	\$34,956	\$5,978
EBCI Finance	\$17,015	\$3,902



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Questions

