A Comprehensive Environmental Sustainability Plan for the Colorado Chautauqua

Final Report

EXCERPTS

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0.0 Executive Summary

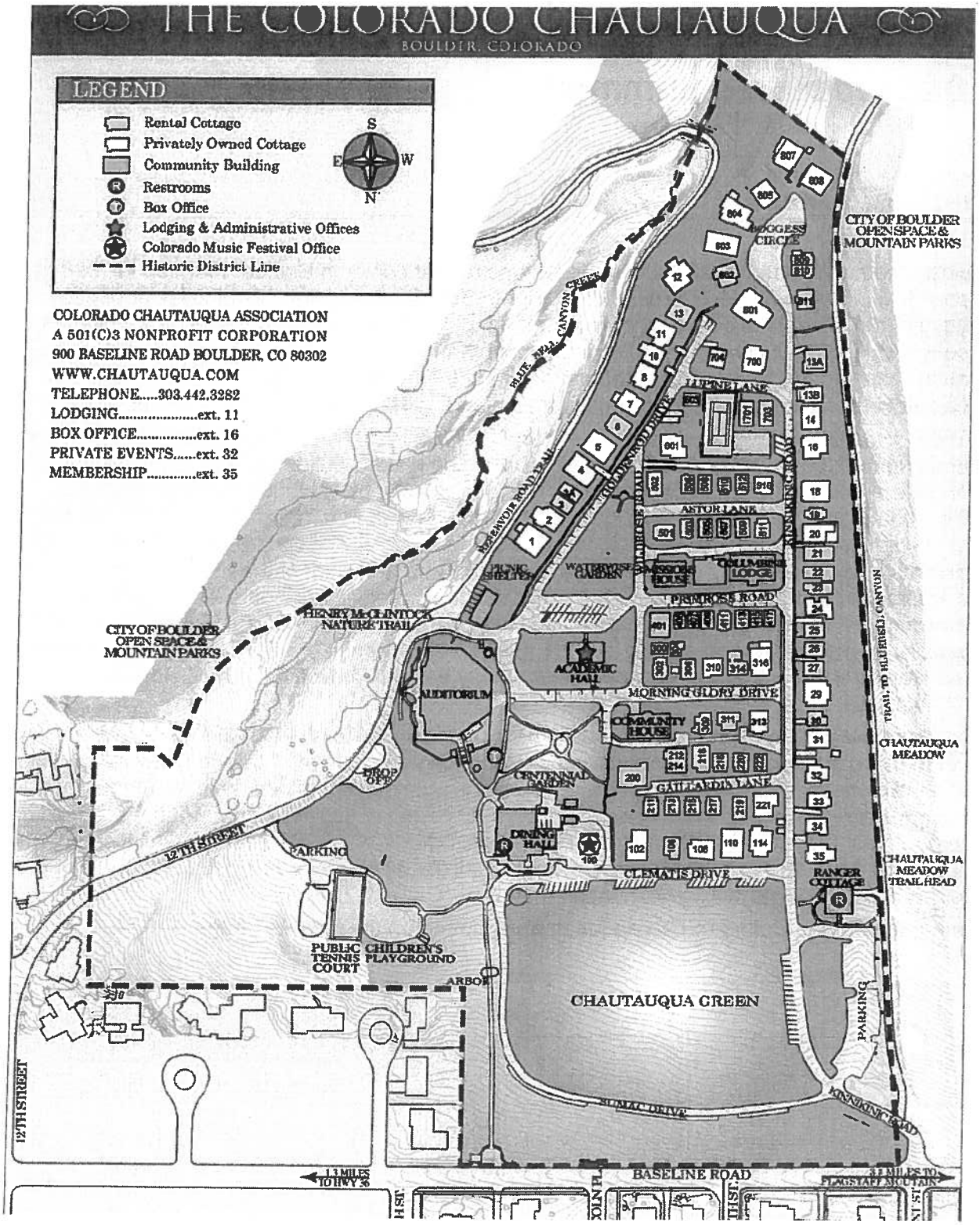
0.1 Background

The Colorado Chautauqua is a 40-acre historic retreat center in Boulder founded in 1898 as a partnership between the Texas Board of Higher Education and the City of Boulder during the heydey of the national chautauqua movement that began in 1874. The original chautauquas sought to engage local communities in the culture of their times, bringing speakers, teachers, musicians and leading figures of the day to their semi-rural assemblies. The Colorado Chautauqua continues this tradition and was named a National Historic Landmark in 2006.

The Colorado Chautauqua Association (herein "CCA"), a 501c3 Colorado non-profit corporation, is steward of 26 of the 40 acres of land and all of the historic buildings, including the Auditorium and Dining Hall (b. 1898), Academic Hall (b. 1901), Community House (b.1918), Missions House Lodge (b.1911), Columbine Lodge (b.1919), Primrose Apartments (b. 1913), 99 cottages and assorted other structures. CCA owns 60 of the cottages and 39 are privately-owned. CCA's mission is to preserve, perpetuate and improve the site and spirit of the historic Chautauqua by enhancing its community and values through cultural, educational, social and recreational experiences. The chautauqua experience is based on lifelong learning, love of nature, voluntary simplicity, and music, oration and the arts. Historic significance, traditions, cultural relevance, respite and enrichment are among the community benefits provided by the Colorado Chautauqua.

After almost a century as a summer-only experience, the Colorado Chautauqua now operates year-round, providing opportunities to "escape, engage and elevate" through stays of one night to several months in its 60 cottages and two lodges, enjoyment of cultural and entertainment programming in the Auditorium and the Community House, business and group meetings and private celebrations in the Community House and other venues, meals and special occasions at the Dining Hall, and just plain enjoyment of the gardens and grounds adjacent to some of the region's most popular hiking trailheads.

A site map of the Colorado Chautauqua can be found on the following page.


THE COLORADO CHAUTAUQUA
BOULDER, COLORADO
LEGEND
Rental Cottage
Privately Owned Cottage
Community Building
Restrooms
Box Office
Lodging & Administrative Offices
Colorado Music Festival Office
Historic District Line
S
E
W
N
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BOX OFFICE.....ext. 16
PRIVATE EVENTS.....ext. 32
MEMBERSHIP.....ext. 35
CITY OF BOULDER OPEN SPACE & MOUNTAIN PARKS
HOGGESS CIRCLE
BLUE BELL CANYON CREEK
LUPINE LANE
ASTOR LANE
KINNIKINICK
WATERHOUSE GARDEN
COLUMBINE LODGE
PRIMROSE ROAD
HENRY McCLINTOCK NATURE TRAIL
ACADEMIC HALL
AUDITORIUM
MORNING GLORY DRIVE
COMMUNITY HOUSE
CHAUTAUQUA MEADOW
TRAIL TO BLUEBIRD CANYON
CENTENNIAL GARDEN
GAILLARDIA LANE
DINING HALL
PARKING
12TH STREET
CLEMATIS DRIVE
RANGER COTTAGE
CHAUTAUQUA MEADOW TRAIL HEAD
PUBLIC TENNIS COURT
CHILDREN'S PLAYGROUND
ARBOR
CHAUTAUQUA GREEN
SUMAC DRIVE
BASELINE ROAD
1.3 MILES TO HWY 36
3.1 MILES TO FLAGSTAFF MOUNTAIN

PLANNING FOR THE FUTURE

In its stewardship role, CCA diligently pursues plans and strategies to ensure a sustainable future for the historic Colorado Chautauqua. CCA has committed to making the Colorado Chautauqua the most environmentally-sustainable National Historic Landmark in the country. To that end, CCA issued a request for proposals for professional services to identify and evaluate opportunities for improvements to CCA's use of resources related to its grounds, facilities and operations. A second goal was to identify how CCA could best use the Colorado Chautauqua campus as a demonstration site to educate visitors about the issues and opportunities for applying innovative environmental concepts and technologies in the context of historic preservation. The primary areas of concentration for integration into an environmental sustainability plan were energy use (electric and gas), indoor and outdoor water use, and waste reduction. The intention was to holistically evaluate all aspects of the operations of the campus from landscaping, building maintenance and retrofit, to waste management, as well as the potential to utilize renewable energy to improve the overall efficiency of operations at Chautauqua. The underlying philosophy was to emphasize simplicity and passive approaches whenever appropriate rather than high-tech, complex solutions for this very unique setting.

CCA engaged the multi-disciplinary project team headed by AEC to develop recommended plans, design guidelines, and cost estimates that will serve as the standards and specifications for renovation of existing buildings, adoption of new technologies, and improved operational policies. Funding for the project was provided by CCA and a generous grant from the Governor's Energy Office.

PROJECT TEAM

The following individuals made major contributions to this document:

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0.2 Environmental Sustainability Elements

0.2.1 ENERGY MANAGEMENT

Energy Demand Reduction

The Chautauqua Cottages, Missions House Lodge and Columbine Lodge

Most of the cottages and lodges at Chautauqua were built between 1900 and the 1950s. The cottages and lodges originally were used summer-only until the late 1940s, when some cottages were minimally renovated to permit use by University of Colorado married students during the school year. Over the years, CCA "winterized" all of the cottages and lodges to permit year-round usage. CCA has continued to slowly upgrade the cottages, a few each year. The cottages and lodges are not energy efficient, in that they lack adequate insulation and have single-pane windows, inefficient heating systems, etc. Their usage as rental units with various types of occupants (from overnight to nine-month lease) contributes to inefficient and inconsistent energy use. The Project Team researched available utility bill data and conducted energy modeling on selected cottages to determine if there were additional means to mitigate energy demand in the Chautauqua cottages and lodges. The Project Team concluded that the Chautauqua cottages, though individually small, have a big energy impact on the total energy demand of the Chautauqua community. The cumulative energy bill for all the Chautauqua cottages is comparable to the combination of all the larger non-residential buildings at Chautauqua. Thus, even small energy improvements made to all the cottages can have a substantial impact in reducing overall energy demand and costs.

Recommendations for energy-efficiency upgrades to the Chautauqua cottages and lodges to reduce energy consumption, provide greater occupant comfort, and save CCA utility expenses include:

- lighting and appliance upgrades (already underway)
- building envelope improvements, including insulation and air sealing techniques, and improvements to existing windows
- space heating and cooling system upgrades, including high-efficiency furnaces or boilers, and whole-house fans for cooling
- replacement of existing domestic hot water systems with tankless natural gas direct-vent water heaters (ongoing)
- landscape shading (although the opportunity for passive heating and cooling strategies may be limited due to architectural design and site orientation constraints)

Funding for these improvements may be available through the existing and emerging financial support mechanisms available through the Center for ReSource Conservation, the City of Boulder's Office of Environmental Affairs, the Colorado Governor's Energy Office and Xcel Energy's 2009-2010 Residential Rebate Program.

Because occupant behavior is usually the biggest variable in residential energy use, the Project Team recommends installation of immediate feedback systems that allow cottage and lodge occupants to see the impact of their behaviors in terms of both consumption and cost in real time.

Non-Residential Buildings at Chautauqua

The Project Team also investigated the potential for energy demand reduction for the non-residential buildings on the campus.

- **Academic Hall** – The Academic Hall (b.1901) currently houses CCA offices, including lodging check-in and resident/guest mail. A building energy analysis was conducted to determine the existing energy efficiency of the structure and to recommend energy conservation measures to improve energy performance.

  The primary energy conservations measures recommended for the Academic Hall include (in order of priority):

  - building envelope improvements, including crawlspace conversion, increased roof, floor and exterior wall insulation levels, and air sealing of all doors and windows
  - replacement of existing lighting with CFLs or LEDs
  - reduction in energy demand from office equipment when the building is unoccupied (this applies for all non-residential buildings)
  - space heating and cooling upgrades, including installation of direct/indirect evaporative cooling and replacement of the existing boiler with a direct-vent high-efficiency boiler

  If all recommended improvements to the Academic Hall are made, the Project Team estimates an annual energy demand reduction of 26%.
- **Other non-residential buildings** - While energy modeling is planned in the future for the remaining non-residential buildings, the information gleaned from the analysis of the Academic Hall is meant to be viewed as a preliminary blueprint for the remaining non-residential structures. As with the cottages, the Project Team recommends that energy-efficiency improvements to the non-residential structures at Chautauqua be assessed for possible support through Xcel Energy's Business Rebate Program.

<u>On-Site and Off-Site Solar Energy Feasibility</u>

Following its analysis of energy-efficiency improvements for the residential and non-residential buildings at Chautauqua, the Project Team focused on the possible integration of renewable energy systems, beginning with a solar feasibility study to determine the potential for both on-site and off-site solar electric (photovoltaic, or PV) power production capabilities. Potential sites for solar PV compatibility were evaluated and logistical hurdles identified.

- **On-site** - For on-site solar energy systems, the Project Team concluded that the Chautauqua Dining Hall and the Auditorium provide the most potential for solar access due to their large roof sections and open southern exposure with minimal shading issues.
  - **Dining Hall** - For the Dining Hall, a Building-Integrated Photovoltaic System (BIPV), or integrated roof tile PV modules, may be possible to integrate seamlessly into the building structure provided installation can coincide with the imminent re-roofing project for the Dining Hall. An 8-10 kW system would provide approximately 27-34% of the Dining Hall's monthly energy demand.
  - **Auditorium** - For the Auditorium, a 10 kW BIPV system may be possible to integrate seamlessly into the building structure provided installation can coincide with longer-term plans for a re-roofing project for the Auditorium. This 10 kW system would produce approximately 90% of the Auditorium's monthly energy demand.

- **Surface areas** - Lastly, the ground area surrounding and near the Auditorium also offers much potential for solar access given its open southern exposure with minimal shading. A solar PV array could either be ground mounted or integrated with a structure (e.g., a carport) to provide solar-generated electricity for the Auditorium.

The Project Team notes that incentives available through Xcel Energy's Solar*Reward Rebate Program may play a large role in the economic viability of any potential on-site renewable energy systems.

- **Off-site** - CCA has expressed interest in exploring with the City of Boulder and Xcel Energy the potental for off-site solar energy generation using the two-acre reservoir site at the southern boundary of the Chautauqua campus. An assessment could include a review of the potential for (1) district-wide distribution of solar-generated electricity using a single point of interconnection with sub-meters for non-residential structures within the campus and (2) the viability of a solar farm concept where a large off-site PV array feeds solar-generated electricity back to the utility. This exploration could include the feasibility of facilitating a third-party power-purchase agreement (PPA).

Geothermal Feasibility

Geothermal heating and cooling is an efficient energy technology that may help to further reduce the energy consumption and carbon footprint at Chautauqua. Current studies indicate that geothermal technology can result in approximately 25% to 50% savings in space conditioning energy use when compared to conventional space conditioning methods. Potential geothermal configurations on- or off-campus include:

- geothermal heat sink at the two-acre reservoir site at the southern boundary of the campus for district-wide heating and cooling
- a district-wide boiler concept adaptable for geothermal technology as it evolves
- identification of a small cluster of buildings with consistent occupancy to be served by a small district geothermal system
- individual non-residential buildings

0.2.2 WATER MANAGEMENT

Stormwater Management Planning

When Chautauqua was founded in 1898 and developed over the next several decades, the concept of urban storm water management in this country was in its infancy. Chautauqua, and the City of Boulder's storm water system in its historic core, were designed with minimal capacity, with the goal being to dispose of storm water as a waste, conveying it to local streams as quickly as possible. Because Chautauqua's stormwater system has never been adequate to convey storms of any significance, chronic erosion and localized flooding problems have required ongoing maintenance, and have contributed to flooding problems downstream, and to degradation of the area's storms.[1]

[1] Preliminary Drainage Assessment Report for Chautauqua Park, September 30, 2002, Prepared by Muller Engineering Company, Inc.

One of the primary approaches to enlightened storm water management is to manage smaller storms where the rain falls and to clean it of pollutants generated by urban activities. A primary goal of storm water management proposed by the Project Team is to infiltrate storm water on-site to meet the requirements of the City of Boulder that have been developed in response to mandates of the Clean Water Act. Strategies to meet basic storm water management regulatory goals and solve localized erosion and flooding problems also could treat the storm water retained on site as a resource to enhance the landscape qualities of Chautauqua. These strategies include:

- Use stormwater to irrigate landscapes at Chautauqua to minimize irrigation with potable water.
- Identify potential solutions for localized flooding problems. Solutions should include stormwater volume reduction for individual building sites, streets, drives and common landscape areas.
- Propose guidelines that are compatible with existing state water laws, and that allow compliance with federal water quality regulations. A goal, at a minimum, would be to infiltrate the prescribed water quality capture volume for the site.
- Preserve and enhance the site's historic landscape qualities.

Water-Wise Practices for Improved Indoor and Outdoor Water Use

Even without the severe drought conditions that often impact Colorado, there are strong environmental and economic advantages in developing water-wise practices for improved indoor and outdoor water use.

- **Outdoor water use** - CCA's goal is to have a simple, colorful, interesting, diverse, sustainable and aesthetically-pleasing landscape that also provides CCA with a manageable water budget. The Center for ReSource Conservation recently conducted a comprehensive water audit for the Chautauqua campus. Based on the results of this audit, CCA already is investigating the following opportunities to minimize the use of potable water for outdoor irrigation:
  - Enhancement and maintenance of current irrigation system features
  - Development of an improved irrigation system design with high-efficiency features that will help to reduce the overall irrigation water demand budget
  - Use of Evapotranspiration (ET) "Smart" Controllers to receive locally-broadcasted ET data via a satellite or onsite weather monitor and/or soil moisture sensors. ET controller technology is designed to encode localized weather data and automatically readjust irrigation system flow times to match actual plant water needs.
- **Indoor water use** - Recommendations include:
  - Installation of low-flow aerators, faucets and high-efficiency toilets in all cottages, lodges and non-residential buildings
  - Greywater reuse (see below)
  - Visitor education program
  - Dining Hall – As the highest single consumer of potable water for indoor use on the Chautauqua campus, using anywhere from 20,000 to 140,000 gallons per month for its restaurant operations, specific recommendations for the Dining Hall include installing foot triggers for faucets, automatic shutoff faucets and nozzles and the possible integration of a large greywater system in the Dining Hall restrooms.

- **Indoor water use – Reuse of greywater:**
  - **Under current Colorado laws.** Greywater is water generated by showers, hand washing, laundry, and similar in-home uses.

    The City of Boulder has shown considerable leadership in exploring the potential for greywater reuse under current Colorado water and health laws. Because water within a structure is regulated by municipal building codes rather than state laws, Boulder has amended its plumbing code to allow for recycling of water within single-family structures, or water use that is typically less than 60 gallons per day, for what is deemed non-consumptive use, such as toilet flushing. This allows for recycling while still complying with Colorado water law.

    At Chautauqua, there are three possibilities for reuse of greywater:

    - Reuse water generated within the larger public buildings, for non-consumptive use (e.g., toilet flushing at the Dining Hall)
    - Reuse water generated from toilet flushing within individual cottages for non-consumptive use (e.g., toilet flushing)
    - Reuse greywater generated from either source, specifically for landscape irrigation.

  The first two possibilities are currently allowed under current laws, while the third would require changes to these laws.

  - **Potential for use if Colorado water laws change.** National and international trends in greywater use generally focus on landscape applications. Currently, nine Western states recognize and regulate greywater as a distinct entity, and even encourage its use for landscape irrigation under specific requirements. Colorado may be reevaluating and revising public health standards, codes, and regulations in the next one to two years. Even though Colorado laws may be changed in the future, the use of greywater for landscape irrigation may still remain in conflict with Colorado water law because it would constitute a "beneficial" use. Because of the multiple legal barriers to exterior use at this time, it is unrealistic to assume that this will be a viable option in the foreseeable future.

    However, if health codes and water law are changed in the future to permit uses such as irrigation, there are a number of proprietary greywater systems available on the market that have great potential for use for individual cottages as well as for larger structures at Chautauqua. These facilities could be incrementally retrofitted over time and maintained by on-site staff, resulting in a significant reduction in potable water use for landscapes.

0.2.3 MOVING CHAUTAUQUA TOWARD ZERO WASTE WITH SOLID WASTE RECYCLING

The current recycling rate for the Chautauqua campus (all CCA operations) is 12% to 15%, and approximately 38% (does not include grease recycling or compostables collection). Significant improvement can come solely through development of more targeted signage and education programs for existing recycling efforts, together with improving recycling efforts at the individual cottage level. Other recommendations include:

- Recycle all organic waste from current landscape trimming services.
- Develop a building material reuse program for all renovation and new construction projects.
- Retrofit existing enclosures and provide for single-stream containers.
- Add compostables collection service to meeting venues.
- Add grease recycling and compostables collection service at the Dining Hall.
- Work with vendors to establish a tracking mechanism for all trash and recycle volumes in order to measure progress toward zero waste.

Other Opportunities to Consider

- "Green" Certifications - Sustainable tourism certification programs that could provide significant marketing benefit and increased visitor activity to Chautauqua based on sustainable tourism referrals.
- Procurement policies - Revisiting and revising current procurement policies based on available resources in green procurement resources and guidelines.
- Education and Inspiration – Create ways to educate visitors re: existing and emerging issues in the area of environmental sustainability in the context of historic preservation through CCA website, speakers' bureau, educational materials and interpretive elements throughout the Chautauqua campus.
- Participation in carbon offset programs.

0.2.4 ESTIMATED COSTS AND RETURN ON INVESTMENT

The Project Team researched estimated costs and return on investment for energy and water-related measures using the best available data. These are more fully described in the 2009-2020 Strategic Implementation Plan found at the end of this report. They are also summarized as follows:

- **Energy-Efficiency Upgrades for CCA Cottages.** Estimated cost of $12,500 per cottage if *all* energy-efficiency measures installed. For all cottages, a HERS Index Score of 85 should result in a 15% reduction in annual energy use when compared to the 2004 IECC Reference House.
    - Real-time pricing feedback tools. Estimated $500 per meter. A recent California study found smart metering cut energy consumption by upwards of 9%. [2] There is no available data to indicate how this savings relates to ENERGY STAR qualified homes.
    - Tankless natural gas direct-vent water heaters. Anticipated 50% annual savings using a tankless water heater over a traditional natural gas tank system.
- **Energy-Efficiency Upgrades for Academic Hall and Non-Residential Buildings.** Estimated cost of $32,900 if all energy-efficiency measures installed in the Academic Hall. Estimated annual energy reduction of 26% with estimated ROI > 11%. Similar scenario is anticipated for other non-residential buildings.

[2] The BEAMA (British Electrotechnical and Allied Manufacturers' Association) website at http://www.beama.org.uk/hottopics/Smart+Metering/implementation.asp contains examples of several smart metering examples around the world, including that of a California statewide pricing pilot.

- **On-Site Solar at Chautauqua Auditorium.** Estimated cost of $45,000 to $50,000 (includes rebate from Xcel Energy's Solar Rewards Rebate Program in Small Category) for 90% estimated annual savings in energy consumption. Estimated 10-YR Internal Rate of Return (IRR) @ 0% for traditional PV module and -3% for BIPV solar tile module.
- **On-Site Solar at Chautauqua Dining Hall.** Estimated cost of $45,000 (includes rebate from Xcel Energy's Solar Rewards Rebate program in Small Category). Estimated 10-YR Internal Rate of Return (IRR) @ -3% for BIPV solar tile module.
- **Geothermal.** Estimated cost of $2,500 to $5,000 per ton of capacity. Final cost estimate dependent upon final geothermal configuration. According to the Geothermal Heat Pump Consortium, a typical geothermal heat pump on a single home can save from 25% to 50% of yearly space conditioning costs when compared to conventional space conditioning systems.
- **Outdoor Water Use.** Outdoor water use data not available. Targeted performance metric is a minimum of 20%-30% reduction or irrigation demand based on detailed water budget for current landscape design.
- **Indoor Water Use at the Chautauqua Cottages.** For installation of high-efficiency toilets (HET), estimated cost of $200-$400 per HET. Low-flow aerators estimated at less than $4/faucet. According to the EPA, HET will contribute to an estimated savings of 4,000 gallons per year per HET, or $90 per year and approximately $2,000 over the lifetime of the HET.
- **Indoor Water Use at the Chautauqua Dining Hall.** The average annual water bill for the Dining Hall is $2,665 (indoor water use). Installation of recommended water conservation measures would produce a *minimum* 20% reduction in water use for an annual estimated savings of $533.

0.2.5 RECOMMENDED PHASING

Activity	2009-2010	2011-2015	2016-2020
Energy-Efficiency Upgrades for all Residential Structures and Assessment of Funding Opportunities	X	X	
Energy-Efficiency Upgrades for all Non-Residential Structures and Assessment of Funding Opportunities	X	X	
Integration into Xcel Energy Smart Grid City Project	X		
Install On-Site Solar at Dining Hall	X		
Install On-Site Solar at Auditorium			X
Install Off-Site Solar Farm at Reservoir Site. PPA must be part of the mix.	X		
Begin geothermal assessment. Determine and install agreed-upon geothermal configuration.	X		
Install stormwater gardens (must follow geothermal installation, if this activity is selected)	X		
Install stormwater park		X	
Install stormwater parking		X	
Install terraced swales along Kinnikinic			X
Implement outdoor water conservation measures	X		
Implement indoor water conservation measures for cottages and Dining Hall	X		
Improve existing recycling efforts through signage and education. Include recycling of all organic waste and building materials. Begin trash enclosure retrofit.	X		
Add grease recycling to Dining Hall.	X		
Add and increase single-stream recycling to trailhead for 7 mos/year.	X		
Add compostables collection services to all parts of the Chautauqua facility, including cottages.		X	

Activity	2009-2010	2011-2015	2016-2020
Purchase recycling stations for all meeting halls/offices.		X	
Identify potential sustainable tourism certification program.	X		
Revise current procurement guidelines.	X		
Research carbon offset programs.	X		
Establish guest speakers bureau.	X		

0.2.6 IMMEDIATE NEXT STEPS

The Project Team recommends the following next steps in order to ensure the successful implementation of the Chautauqua environmental sustainability plan:

ENERGY DEMAND REDUCTION

- Begin implementation of office equipment reduction program when buildings are unoccupied.
- For energy-efficiency upgrades, being cottage upgrade program. Begin with assessment of available financial support mechanisms.
  - Xcel Energy 2009-2010 Residential Rebate Program. Project Team feels that a strong partnership with Xcel Energy must be an integral part of an energy-efficiency upgrade program.
  - Xcel Energy Business Rebate Program (for non-residential energy-efficiency upgrades). Consider customized package for non-residential buildings.
  - Center for ReSource Conservation Residential Energy Assistance Program (REAP).
  - Center for ReSource Conservation Insulate and Seal Rebate Program (for residential structures).
  - Confirm energy model assumptions for three modeled cottages.
  - Distribute RFP for additional energy audits.
  - Install "smart meter" in all cottages.
- For on-site and off-site solar, assess the following:
  - Review potential for on-site solar with BIPV with Historic Landmark Board
  - Assess potential for off-site solar with the City of Boulder and Xcel Energy.
  - Assess funding subsidies through Xcel Energy and other grant funding entities (e.g., Namaste Solar, Colorado Governor's Energy Office).
  - Confirm and/or determine re-roofing schedule for Dining Hall.

- For geothermal:
  - Review current lease agreement to see how subterranean improvements are addressed.
  - Distribute RFP for geothermal assessment.
  - If geothermal configuration is determined, evaluate phasing strategy in light of potential implementation of stormwater management strategies.
- Other:
  - Review potential for participation in Phase II of Xcel Energy Smart Grid City project. Consider "smart-grid" cottage for educational purposes.
  - Consider Xcel Energy Windsource program for selected buildings such that wind power becomes part of the generating capacity at Chautauqua.

WATER MANAGEMENT

- Distribute RFP for overall stormwater management planning efforts. RFP should require that respondent provide for detailed hydrologic analysis and engineering requirements for various stormwater management scenarios as outlined by Wenk Associates, Inc.
- Convert to high-efficiency irrigation system features, including ET "Smart" Controller.
- Repair all existing leaks in all buildings and cottages for immediate water savings.
- Continue installation of HET in all cottages and begin conversion to low-flow aerators and faucets.
- Install water conservation measures in Dining Hall. Create policy manual and train staff.

WASTE MANAGEMENT

- Research grant opportunities for local recycling and zero-waste projects through Boulder County Community Outreach Program.
- Develop signage and education program for existing recycling efforts.
- Develop program to recycle all organic waste and building materials from renovation projects.
- Establish tracking mechanism for current efforts
- Retrofit 4 of 6 existing enclosures. Replace carts with single-stream recycling.

OTHER

- Research and select viable sustainable tourism certification program.
- Revise current procurement policies.
- Evaluate carbon offset programs.
- Begin website enhancement efforts.
- Continue ongoing guest speakers bureau.

CHAUTAUQUA
ESCAPE, ENGAGE, ELEVATE

Colorado Chautauqua Association

Report on First-Year Implementation of Environmental Initiatives

The pace of implementation of CCA's "greenest National Historic Landmark" initiative is, of necessity, defined in significant part by the availability of funding and staff capacity (particularly for large-scale projects).That being said, we are proud of the progress made over the first year of implementation of the Environmental Sustainability Plan finalized in September 2008. These include -

- In-cottage guest bath amenities have been switched to Natura's "Green" product line, which features bottles made primarily form Plastarch Material (PSM), a corn-based biodegradable material. Cartons are made from natural, recycled packaging printed with soy based inks, and the "waste reducing" vegetable soap has an innovative design that eliminates the typically unused center portion of traditional bars. We are currently in process of placing a small informational card in the guest cottages that advise about this product.

- We have switched our day-to-day housekeeping cleaning products to a line called "Green Solutions", which is made by Spartan and distributed by AmSan. These products are more ecologically sound and environmentally friendly, and have achieved the "Green Seal" certification as awarded by an independent, non-profit agency that evaluates cleaning and other products based on causing less toxic pollution and waste, conservation of natural resources and minimizing global warming / ozone depletion. This approach also has the added benefit of being safer for our housekeeping staff to use, and we now purchase and dispense our housekeeping products in bulk, resulting in lower costs and less waste.

- Our for-sale retail inventory in the Lodging office has been expanded, and wherever possible, we are featuring products that incorporate organically grown fibers, non-toxic / BPA-free materials and eco-friendly production processes. Our primary apparel vendors include Anvil Organics and Econscious, the latter an apparel manufacturer that is an industry leader in environmentally-friendly, socially responsible practices.

- The recycling program for Chautauqua continues to evolve and be enhanced. Separate blue containers have now been placed in each cottage, making it more convenient for guests to separate recyclables from other trash and easier for our

housekeeping staff to then dispose of these in the appropriate receptacles for pick-up by our waste disposal vendor. Information is also made available to cottage guests to assist them in knowing which products are recyclable. Additionally, a composting container has now been included in the enclosure that services the Dining Hall to evaluate the effectiveness and practicality of this option for possible wider application. We will soon be introducing new combination trash receptacle units in the Community House that include a composting station, and are moving towards products such as coffee cups, paper plates, napkins, etc. that are compostable, which will facilitate our continuing effort towards promoting "zero waste" events whenever possible at Chautauqua.

- All primary paper products in use throughout Chautauqua operations, such as paper towels, toilet paper, and facial tissue, are a line called EcoSoft, produced by the Bay West division of Wausau Paper. These products are all made from 100% recycled material, and also have been certified by the independent Green Seal program.

- Weather sensors have been installed on the irrigation systems around the Academic Hall, Missions House, Auditorium, both public garden areas and cottage #6. These sensors can evaluate factors such as temperature, relative humidity, wind, and precipitation and can shut down the pre-programmed run cycles of the system to conserve water if irrigation is not necessary.

- Although not appropriate in certain applications, we have continued an ongoing program to replace light bulbs in most fixtures around the campus with CFLs to promote energy efficiency and lower long-term costs. The program includes both cottages and public buildings. We are approximately 80% completed in replacing these bulbs.

- There has been an ongoing program to place low-flow showerheads and toilet fixtures in all cottages, and we have now replaced all showerheads and are phasing in high efficiency toilets (HETs) as required.

- Although Chautauqua's private events are serviced primarily by outside caterers, we often do provide coffee / tea service if this is the only food and beverage requirement for a group. We have worked with our coffee / tea vendor, Allegro, to offer organic / free-trade based coffee and tea products. We are also working on an ongoing basis with our primary catering vendors to encourage them to continue to move in the direction of using locally grown produce, organic-based food products and incorporation of composting as a standard practice.

- As cottage heating and/or hot water systems as well as kitchen appliances require replacement, we have generally been placing high-efficiency and on-demand Rinnai

and other Energy Star-rated products in the units to promote energy efficiency, water conservation and lower emissions.

- The energy efficiency features incorporated into the major restoration work done on cottages #510 and #512 this past year have been well-documented in previous reports and presentations to the Board. While all such possible applications will always be closely evaluated as to cost and ROI, many of these practices will most certainly become standard for future cottage renovations when feasible.

- As we explore options to achieve a higher level of guest and staff summer comfort in cooling of cottages and public buildings, strategies such as solar reflective screening, whole house fans, ceiling fans, high-efficiency "Coolorado" AC systems and other applications are given primary consideration so as to balance the objectives of meeting comfort expectations against energy consumption.

- A comprehensive program to insulate the attics and crawl spaces of all cottages, funded partially by proceeds from the inaugural Grand Convergence, is well-under way. A number of cottages have been completed to date, with an objective of completing about 35 by year-end 2009, and then the remainder in 2010. Additionally, we used available funding from the City of Boulder at the end of 2008 to insulate the attic and crawl space of the Academic Hall.

- A comprehensive landscape design guidelines plan is currently in process of being developed by Mundus Bishop Design. This firm has been instructed to ensure that the guidelines incorporate water conservation as a key component of the criteria in making plant selections and irrigation systems recommendations, and also to include consideration of passive solar shading potential in tree selection and placement.

- We are becoming increasingly proactive in creating awareness and leveraging the market positioning potential of these initiatives on our website and through engagement by Jeff Medanich and others in community, state and national forums.

- A plan to move CCA's administrative functions toward a paperless office is being methodically implemented. Currently the bulk of accounting paperwork is being scanned and stored electronically. By the end of 2009, it is anticipated that the payroll and human resources function will be paperless as well. t's one thing to scan and store paper but the challenge will continue to be how to avoid receiving or generating paperwork in the first place. This change in business practices is part of our environmental initiative but also resolves a risk management issue, as the storage of paperwork within CCA's historic buildings provides fuel in the event of a fire.

CHAUTAUQUA

ESCAPE, ENGAGE, ELEVATE

When we build, let us think that we build forever.
Let it not be for present delight nor for present use alone.
Let it be such a work as our descendants will thank us for;
and let us think, as we lay stone on stone,
that a time is to come
when those stones will be held sacred because our hands
have touched them, and people will say, as they look upon
the labor and wrought substance of them,
See! This our parents did for us!

- John Ruskin