

ST. LOUIS COUNTY PROPERTY MANAGEMENT SUSTAINABILITY PLAN

Issued by: St. Louis County Property Management, Duluth MN

Introduction

In the U.S. buildings are energy hogs, consuming 42% of America's energy, 72% of its electricity, and 34% of its natural gas, which constitutes more than \$400 billion a year in building related energy expenses nationwide. This is more than any other sector, and consumption is expected to grow 33% by the year 2050. Residential houses are becoming wider and commercial buildings are becoming taller. Energy is needed to heat, light, and maintain these spaces. In 2007, the U.S. used more primary energy than the total energy use of both Japan and Russia. What's more, a significant amount of that energy and money is wasted.

Energy waste depends on the building's shell, what's inside the shell, and how the stuff inside the shell is being used. Simply stated, energy efficient buildings directly correlate with an increase in cost savings associated with operating said buildings. Also, if what's inside the shell is maintained and operated properly, additional savings will be garnered. Entrepreneurs and forward thinking entities are now focusing their research on energy efficient technologies and conservation strategies for these markets.

Energy efficiency has become a national concern, Executive Orders 13423 and 13514 require all federal agencies to lead by example in advancing the nation's energy security and environmental performance by achieving set goals. The Executive Orders necessitate a reduction in energy intensity, water use, and petroleum use all combined with an increase in renewable power, and alternative fuel use. These orders apply at the federal level and will soon trickle down to the state level. St. Louis County is being proactive in meeting, and exceeding these requirements, at the local level.

This sustainability plan highlights efforts, goals, accomplishments, and strategies aimed at raising awareness about sustainability in local government, establishing a baseline for various efforts and activities undertaken by the county, developing and implementing a vision for the St. Louis County Property Management Department, encouraging other county departments to develop their own sustainability plans, and laying out the action steps and priorities necessary that assure sustainable practices are implemented presently and into the future.

In the Property Management Department, as in the building sector, the core of sustainability revolves around a control of energy consumption. Elements of energy consumption include energy efficiency, low maintenance (man power and parts) building systems, sustainable design (using a holistic process called Integrative Design), efficient space utilization, and a healthy work environment. Buildings should be able to operate at current production levels without hindering resource availability for future generations. The Property Management Department will seek to achieve sustainability in county buildings by improving the building shells, what's inside the buildings, and providing guidance on how the equipment and systems inside the building should be used most effectively and efficiently.

Background & Recognition of Participants

St. Louis County

Located in Northeastern Minnesota, St. Louis County, with total area of 6,860 square miles, is the largest county east of the Mississippi. St. Louis County is known for its spectacular natural beauty; including Voyageurs National Park, Superior National Forest, the Boundary Waters Canoe Area Wilderness, four state parks (including Minnesota's newest park on Lake Vermilion), 1,000 lakes, hundreds of miles of rivers (including many trout streams), and it is the gateway to Lake Superior's North Shore.

St. Louis County is the home of 200,226 people living in small mining towns, farm communities, and busy cities. Its population is concentrated along the Mesabi and Vermilion Iron Ranges and in the Duluth area on the western tip of Lake Superior. The major industries in St. Louis County are mining, wood and paper products, aviation, higher education, shipping and transportation, health care, and tourism.

Duluth, the largest city, is an international seaport and also the county seat. St. Louis County maintains courthouses in Duluth, Hibbing and Virginia and two Government Services Centers in Duluth and Ely to serve its citizens.

Property Management Department

The Property Management Department of St. Louis County is responsible for the operation, maintenance, repair, security and capital improvements of the county's physical assets. These include several buildings on the National Register of Historic Sites. The department manages the county's leased space agreements in the county's role as lessee and lessor. The department is responsible for the inventory, classification, evaluation, database maintenance, and investigating retention and use alternatives as they relate to county fee lands. Besides providing maintenance, construction and ongoing renovation services, the department also develops plans to ensure the county's compliance with applicable legislation concerning building and program access; conducts space utilization studies and makes recommendations to maximize the efficient use of property; and develops and evaluates ongoing energy conservation efforts. The Property Management Department works to develop partnerships with other county departments and the local building trades industry. The department has 70 employees, and an adopted operating budget of \$7,466,961 for 2012, per Board Resolution 636 dated December 13, 2011. Capital improvement projects managed by Property Management average 8 million annually including all building bonding projects.

Department Mission Statement: to manage and operate the county's capital assets by developing quality facilities and environments.

History of Participants

St. Louis County and has emerged as a true energy leader in sustainability, with its innovative county-wide planning process and ability to audit and assess facilities while implementing cost-effective yet energy efficient building systems wherever and whenever possible. Awarded federal funds through the U.S. Department of Energy under the Energy Efficiency and Conservation Block Grant Program, St. Louis County (SLC) partnered with SEH, Compass Rose and Conservation Technologies (the Assessment

Team) to begin the process of developing a county-wide sustainability plan by establishing goals for the reduction of energy consumption, greenhouse gas emissions, environmental impacts and associated costs. In addition the county plays a significant role in evaluating new technologies, methods, applying renewable resources, sharing of equipment, staff, and facilities, and leveraging other resources to benefit local government, communities, and citizens.

Purpose & Rationale

The purpose of developing a sustainability plan for the St. Louis County Property Management Department is to document the vision, goals, and actions that the department is striving to implement in an effort to promote sustainable practices in long-range planning, policies, construction projects, maintenance activities and daily operations. This document will record current efforts toward a more sustainable building portfolio, identify new projects and programs, and help to prioritize where the county should focus its efforts. This plan is a demonstration of the Property Management Department's commitment to implement energy efficient practices and systems in county facilities.

This sustainability plan was developed to function in line with previous County Board of Commissioners' resolutions and initiatives. Energy costs constitute a large portion of the county's facility operational budget, and with utility costs increasing at least 5% annually (and in some cases as much as 25% annually), energy conservation is most certainly a cost effective area of focus. Energy efficiency and reduced consumption will have a significant impact on the county's budget, which has a direct impact on taxpayers, in the near and long-term.

The Plan

This is a dynamic document intended to provide a roadmap for outlining and documenting major steps toward achieving sustainability over the next 20 years. This plan details the Property Management Department's vision, challenges, and strategies to meet each sustainability goal.

This sustainability plan will seek to achieve the following:

- Identify the benefits to the county for developing a sustainability plan
- Discover and tap into new program ideas that are working for other counties, public agencies, and private industries
- Target the most cost-effective opportunities to reduce energy use and improve energy efficiency (especially those that help achieve economic, social, and environmental benefits)
- Support efforts to leverage funding from other federal, state, and private sources
- Produce a roadmap for achieving these benefits and benchmarks that will help the county and its stakeholders stay on course
- Document strategies to track energy saved, renewable energy systems installed, greenhouse gas emissions reduced, funds leveraged and jobs created

For the Property Management Department, this sustainability plan serves as a commitment to comply with all relevant federal and state environmental laws and regulations and to go beyond compliance by integrating the values of sustainability, stewardship, and resource conservation into its day to day activities and services. The Property Management Department will make decisions to improve the long-

term quality and regenerative capacity of the environmental, social, and economic systems that support the county's activities and facility needs. The department will engage in pollution prevention activities, develop and promote practices that maximize beneficial environmental effects, and minimize harmful impacts of county facility operations and associated activities on the environment. Also, the department will assess impacts associated with departmental activities and services, and will develop and track measures of progress.

Additional benefits:

- Energy efficiency reduces operating costs
- Water conservation reduces operating costs
- Energy efficient buildings are more durable, last longer, and are less costly to maintain
- Construction/operational waste reduction and recycling efforts lower disposal costs
- Indoor air quality and day lighting measures create healthy and productive work environments and reduce absenteeism
- Communicates positive community relations
- Natural resources are conserved for future generations

Goals

St. Louis County Vision for Sustainability and Board Directives

The County Board has been supportive of sustainability models, philosophy and action by enacting Board Resolutions #551 (October 2007) and Board Resolution #103 (February 2008). These have committed the county to the following goals (see Appendix A):

- Maintain and improve recycling programs
- Improve waste reduction in the county to minimize need for land disposal
- Manage and operate the county's capital assets by developing and maintaining cost conscience, sustainable, quality facilities and environments
- Serve the interests of taxpayers by reducing the costs of fuel and energy consumption
- Promote the health and well being of county citizens and maintaining a healthy viable ecosystem
- Wisely entrust its resources and people to environmental stewardship
- Direct development and implementation of comprehensive pollution prevention, waste reduction and environmentally preferable purchasing programs, directing county departments and agencies to address the energy issue by the following priorities 1) Energy Conservation 2)Energy Efficiency 3)Renewable/Alternative Energy

In April 2011, the assessment team of Compass Rose, Inc., SEH, and Conservation Technologies completed the St. Louis County, MN Energy Efficiency and Conservation Plan (EECP), funded by the US Department of Energy's Energy Efficiency and Conservation Block Grant Program. Additionally, energy inefficiencies were identified through the analysis of historic utility/building-use data and site assessment visits of the county's major facilities. Infrastructure, policies and operational processes were adjusted to facilitate potential reduction of energy consumption and Energy Use Intensity (EUI) by as

much as 41% per building. Energy Use Intensity is the unit of measurement that describes a building's annual energy use, relative to its size. The county has committed to three high-level sustainability goals:

- 1) Reduction of energy, emissions and costs in all areas of county operations where the opportunities are measureable, transparent, synergistic, cost-effective and sustainable.
- 2) Maximize long-term benefits by incorporating energy efficiency, conservation and carbon reduction strategies in capital improvement planning, budgeting and culture.
- 3) Target programs and projects that provide substantial, sustainable and measurable energy savings, job creation and economic stimulus.

In addition, the county's Energy Efficiency and Conservation Plan (EECP) set the following goals:

- Saving money through lower life cycle cost and maintenance reductions
- Pursuing and capturing funding, rebates, and grants
- Supporting sustainable/renewable energy development through policies and incentives
- Leveraging bonding capacity and increasing tax base by attracting green businesses
- Protecting and creating jobs
- Enhancing the business climate through credits and incentives
- Partnering with communities and businesses
- Protecting the local economy through energy diversity
- Supporting jobs and tourism through efforts that promote clean streams, forests, and natural resources
- Reducing negative environmental impacts
- Public education and outreach

Property Management's Goals for Sustainability

The Property Management Department shall improve energy efficiency and reduce operating/maintenance costs in county facilities by identifying and implementing best practices, energy efficient technologies, and sustainable energy management in all of its operational, maintenance and facility construction activities. In addition, the department will seek to comply with and/or exceed guidelines set forth in environmental and energy statutes, regulations, and executive orders.

1. Long Term Goals

- Be a state-wide leader in sustainable facility management
- To continuously implement sustainable best practices in building design, construction, maintenance, and operation.
- Provide a safe and healthy work environment for all county employees and workers constructing or renovating facilities
- Strive for "net zero" energy efficient buildings where possible
- Use materials, whenever possible, that are biodegradable or recyclable
- Use recycled-content, sustainability harvested, or reused materials that are nontoxic whenever possible.

- Promote facility operational design and business uses within county facilities that are synergistic with sustainability "best practices"
- Utilize data driven conservation and maintenance- start metering process for current and future projects, which include providing facility supervisors with monthly utility use and building feedback data to improve building performance and promote more effective maintenance practices
- Develop a "Building Standards Manual"
- Stabilization of costs and improved return on investments

2. Short Term Goals

- Implement integrative design and energy modeling principals into all project planning efforts and A/E contracts
- Develop A/E and construction RFP/Bid packages that establish sustainable design and construction practices as the norm and that include qualitative assessment metrics to more effectively evaluate bids and proposals
- Continue to identify and implement projects and programs that have immediate energy reduction and conservation impacts
- Replacement of equipment to improve building infrastructure or improve Energy Star ratings
- Building equipment and control standardization to more efficiently and cost-effectively manage building systems
- Using cost effective "green solutions" whenever and wherever possible
- Implement a system to assess, benchmark, track, and verify the planned improvements in order to measure success
- Increase overall building efficiencies and reduce energy demand

Strategy

Nationally, there has been some progress in improving overall building energy efficiency. Between 1980 and 2003, delivered annual energy use per square foot fell nearly one-fifth in commercial buildings and one-third in residential buildings. There have also been building standards, appliance standards, and utility-funded programs for further improvement. Yet all of these efforts combined have not been enough to accommodate the nation's growth in floor space and energy use. The Property Management Department's strategies provide a way to implement energy efficiency technologies and knowledge into every part of the building in an effort to meet the challenge of becoming a leader in building energy efficiency.

The Property Management Department will take the following actions to achieve set goals. All actions are contingent upon these categories:

- Energy and Resource Consumption
- Recycling
- Facility Infrastructure
- Maintenance
- Building Environment
- Efficient space utilization, productivity, healthy environment for occupancy

Overarching Strategies for the Department

Strategy 1: Integrative Design

The Property Management Department has begun to implement a whole design approach known as "Integrative Design". This approach is a collaboration of ideas and expertise shared intensively among all parties in the design process, from stakeholders to the design professionals. An integrative design process begins with the RFP and continues through to project completion.

According to the Rocky Mountain Institute, Integrative Design is...

“A holistic process that considers the many disparate parts of a building project, and examines the many disparate parts of a building project, and examines the interaction between design, construction, and operations, to optimize the energy and environmental performance of the project. The strength of this process is that all relevant issues are considered simultaneously in order to “solve for patter” or solve many problems with one solution. The goal of integrated design is buildings and developments that have potential to heal damaged environments and become net producers of clean energy, healthy food, clean water and air, and healthy human and biological communities.”

Integrative design brings together project participants, from the very beginning, that do not typically work in tandem throughout the project life-cycle in an effort to cross-reference and enhance the project design and efficacy. Methods of integrative design include energy modeling, stakeholder analysis, return on investment consideration, facility benchmarking, building system analysis, building positioning, environmental landscaping, low profile design, collaboration between all parties, and efficient space utilization to name a few.

Strategy 2: Partnerships

The Property Management Department has partnered with Compass Rose, Inc., Short Elliott Hendrickson Inc., and Conservation Technologies to address sustainability to the greatest extent possible. The process of capital planning and asset management is paramount to the success of sustainability efforts in the short and long-term. Additionally, the creation of the new Capital Planning Manager position has allowed the department to begin taking its sustainability efforts to the next level with an expanded ability to proactively plan, research, forecast, budget and seek financial support for facility investments and strategies. Partnerships with other government agencies, local utility companies, and the construction/design industry will help ensure the long-term viability of a sustainability plan.

Strategy 3: Request for Proposals (RFPs) Standards

When hiring architects and engineers, it is required that they demonstrate their understanding and commitment to energy efficiency, energy conservation, renewable energy opportunities, environmental concern, long life cycles, low maintenance issues, and an integrative design approach before they are selected to work on county projects. In addition, architects and engineers who demonstrate previous experience in completed projects and knowledge in energy conservation principles will receive higher

evaluation ratings. By working with design firms that are committed to sustainability, the county will be better able to ensure that the most cost-effective and energy efficient means are being employed to improve facilities. Additionally, by working with the county Purchasing Division to strengthen construction bid specifications and the contractor evaluation metrics, Property Management is better able to secure the most highly quality and cost-effective project delivery possible for the county and tax payers.

Strategy 4: Implementing Energy Efficient Systems

Below is a sampling of some of the energy efficient systems Property Management is employing in county facilities:

White Roofs

White roofs reflect much of the sun's energy back into space, whereas a black roof absorbs the sunlight and turns it into heat during the summer. A black roof may get up to 60 degrees hotter than a white roof, heating both the building and the air. Additionally, UV light accelerates roof material degradation. Due to the heat absorption on a black roof, the roofing material continually expands and contracts with the fluctuation in temperature. This creates problems at the glued seams of the roof and results in a significantly shorter roof life cycle. White roofs last longer, save money over time, and result in less building energy consumption.

Green Roofs

Similar to a white roof, a green roof reflects much of the sun's energy back into space. Green roofs help maintain storm water runoff, moderate urban heat effects, provide insulation for the building, and improve air quality. Additionally, a green roof can last for well over 50 years.

Premium Efficiency Equipment

By using energy efficient electrical motors, building efficiency can be improved by 20% to 30% on average. Most improvements have a payback time of 1 to 3 years. This means a potential big impact on the reduction of global greenhouse gas emissions couple with tangible operating cost reductions.

Based on U.S. Department of Energy data, it is estimated that the National Electrical Manufacturers Association (NEMA) premium-efficiency motor program would save 5.8 terawatts of electricity and prevent the release of nearly 80 million metric tons of carbon into the atmosphere over the next ten years. This is equivalent to keeping 16 million cars off the road.

Electric motor systems consume large amounts of electrical energy and can provide an opportunity for significant energy savings. Energy represents more than 97 percent of total motor operating costs over the motor's lifetime. However, the purchase of a new motor often tends to be driven by the price, not the electricity it will consume. Even a small improvement in efficiency could result in significant energy and cost savings. Investing a little more money (2%) upfront for a more efficient motor is often paid back in energy savings, and improving energy efficiency reduces greenhouse gas emissions that contribute to climate change.

Building Automation Controls (BAC) and Energy Management Controls

Buildings have thousands of components that control the operations of heating, cooling, ventilation, exhaust, fluid transfer, humidification, dehumidification, etc., and without robust and reliable master controls and coordination, the building will not operate at maximum efficiency and will experience more breakdowns and occupancy discomfort. These systems allow a few well-trained staff to operate buildings remotely or on site. Additionally, it is vitally important that once new building systems are installed they be commissioned to insure that they are performing as specified. Building commissioning is the process of verifying, in new construction, that all the subsystems for HVAC, plumbing, electrical, fire/life safety, building envelopes, interior systems (example laboratory units), cogeneration, utility plants, sustainable systems, lighting, wastewater, controls, and building security achieve the owner's project requirements as intended by the building owner and as designed by the building architects and engineers. Retro-commissioning is essentially the same process that is applied to existing building systems and functions much like a “tune-up” for the building. It is not enough to put energy efficient systems into a building, they must be properly fine tuned and managed to achieve optimal efficiency.

Renewable Energy/Alternative Energy Resources

Solar energy provides clean renewable energy that reduces electrical load and offsets consumption and demand. Photo voltaic panels (PV Panels) are easy to maintain, have no moving parts (PV electric), and have a 25-year warranty. Solar panels preheat domestic hot water in buildings and solar walls preheat fresh air intake. These systems and equipment are eligible for rebates and grants. The department seeks to improve energy conservation first and then explore alternative energy sources for viability and affordability in any given project.

The county is also experimenting with wind power electricity generation on the GSC building in Duluth.

Energy star appliances

The department will use ENERGY STAR certified appliances to meet energy efficiency goals. Appliances earn the ENERGY STAR label by meeting the following requirements set forth by EPA specifications:

- Products must contribute significant energy savings nationwide.
- Qualified products must deliver the features and performance demanded by consumers, in addition to increased energy efficiency.
- The qualified product must recover the purchaser's product investment in increased energy efficiency through utility bill savings, within a reasonable period of time.
- Product energy consumption and performance can be measured and verified with testing.

Asset management strategy

Property Management has implemented an asset management program to track, analyze, and control energy consumption and building component life-cycles in facilities. Through the use of energy

consumption/cost tracking and comprehensive building component inventories, the program enables Property Management to identify opportunities for improvement and forecast facility expenditures for the short and long-term. With this knowledge, the department can achieve energy savings, develop a capital plan, develop cost-effective funding strategies and organize overall facility portfolio maintenance activities (see appendix E).

Integrated Design/Front-end loaded project planning

Integrated Design: requires team members to work across traditional design principle boundaries. Starting with the conceptual phases of the project, engineers are suggesting design solutions to architects and architects are suggesting engineering solution to the engineers; no discipline has the luxury of waiting until another has completed their concept efforts to begin their work- everyone contributes at the conceptual level and the design matures incrementally across all disciplines. The impacts of the solutions are analyzed both individually and holistically.

Front-end loaded project planning: informed, multi-variable decisions are synthesized and confirmed earlier in the process – typically prior to determining a final funding amount for the project. Ideally, a project will be in the complete design document phase prior to establishing an approved funding amount for the project.

Energy Modeling

Energy Modeling is a performance analysis using a building energy estimation computer model of energy flow, process, and cost. The model analyzes building envelope considerations, equipment, and system types, energy code compliance, utility incentives, benchmarking, and predictions.

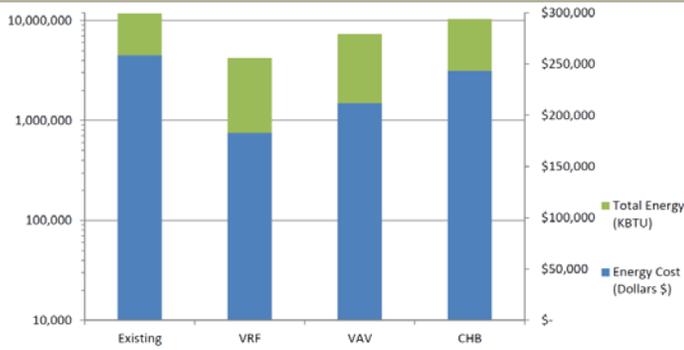
Loads- determine cooling and heating loads by mathematically simulating the thermal performance of the building.

Energy- determines the energy use throughout the course of a year by mathematically simulating the performance of the HVAC and lighting equipment in response to established building energy use loads.

Cost- Calculates operating costs using the energy data.

An example of Energy Modeling for the Government Service Center (GSC) appears below:

St. Louis County Government Services Building



Savings Packages

Savings Package Line Items		Existing Building Performance	Savings Package 1 (VRF)	Savings Package 2 (VAV)	Savings Package 4 (CHB)
Total Energy Usage	kBtu	11,793,456	4,227,495	7,371,762	10,359,278
	Savings %	N/A	64%	37%	12%
Electric Usage	kWh	1,789,347	843,301	654,749	1,473,590
	Savings %	N/A	53%	63%	18%
Steam Usage	Lbs	3,428,000	2,319,571	377,080	173,353
	Savings %	N/A	68%	11%	5%
District Chilled Water Usage	Tons	132,931	130,707	8,351	12,486
	Savings %	N/A	712%	6%	9%
Total Energy Consumption Cost	\$	\$ 116,121	\$ 75,602	\$ 46,780	\$ 15,277
	Savings %		65%	40%	13%
Potential Energy Star Rating	0 - 100	71	99	98	81
Simple Payback	Years		Immediate	162.2	-61.7

Optional Energy Strategies	Actual Usage	Energy Use Savings	Historical Demand Charges	Total Est. energy costs	Incremental First Cost	Payback Years	Energy Star Rating	Existing Building	Savings Package 1	Savings Package 2	Savings Package 4	
	Total kBtu	\$										
Lighting Strategies												
Reduce light intensity to 1.2 W/Sq. Ft.		\$ 1,607			\$ 235,000		71				X	
Reduce light intensity to 0.9 W/Sq. Ft.		\$ 3,845			\$ 245,000	4.5	81					
Reduce light intensity to 0.6 W/Sq. Ft.		\$ 7,977			\$ 350,000	18.1	99		X	X		
Ventilation Strategies												
Existing Building (Baseline)	11,793,456	\$ 116,121	\$ 142,036	\$ 258,157			71	X				
(CHB)New DOAS with Chilled Beams+1.2W/SQFT	10,359,278	\$ 15,277	\$ 142,036	\$ 242,880	\$ 1,794,000	-61.7	81				X	
(VAV)New AHU W/ VAV System+0.6W/SQFT	7,371,762	\$ 46,780	\$ 142,036	\$ 211,377	\$ 394,500	162.2	98			X		
(VRF)DOAS with VRF System+0.6W/SQFT	4,227,495	\$ 75,602	\$ 142,036	\$ 182,555	\$ 3,870,950	Immediate	99		X			

Note: Demand charges are based on a 15 minute peak usage window and will be reduced based on the reduction of energy usage. The reduction cannot be calculated directly, thus demand charges for this purpose are assumed to be constant.

Key Summary Information

Existing Building Mechanical + Lighting	VAV	At End of Life	Energy Cost:	\$116,121
Proposed Mechanical + Lighting System	VRF	Baseline Cost	Energy Savings:	\$75,602 65%
Updated Version of Existing System	VAV	ADD: \$394,950	Energy Savings:	\$46,780
40%				
Chilled Beam Mechanical System	CBM	ADD: \$1,794,000	Energy Savings:	\$15,277 13%

As is seen, Loads, Energy, Costs, several different HVAC and lighting systems can be "test driven", cost compared, payback and return on investments calculated without risk or cost.

HVAC

Many traditional HVAC systems have been and will continue to be replaced with premium efficiency pumps, fans and motors. All components are specified at high efficiency, including exhaust air heat recovery, point of use domestic water, heating, occupancy sensing temperature and lighting controls, automated energy management system, variable speed motor load drives. CO2 sensors are used to measure quantities of fresh air intake needed and take in only what outside air is necessary to maintain air quality- thus saving energy.

Strategy 5: Building Audits

All major buildings will have energy audits via energy consumption/cost software for marking utility use, life cycle, and total facility cost data. It is important to implement a system to assess, benchmark, track,

and verify the planned improvements in order to measure success. This is a process that Property Management is currently utilizing and will continue to improve upon in the future.

Building Specific Strategies

Application of these sustainability practices and plans will be implemented where most appropriate in each building that Property Management operates. Each building is in a different location, has a different age, use, and function. Strategies are customized to each building's unique characteristics.

DULUTH

<p><u>Courthouse</u> Year Constructed: 1909 Use: Courthouse & Business Occupancy Sq/Ft: 202,109</p>	
<i>Long Term Goals</i>	<p>Improve building's energy efficiency and longevity by improving building's shell</p> <p>Continue diligent operational and maintenance practices</p>
<i>Short Term Goals</i>	<p>Continue diligent operational and maintenance practices</p>
<i>Envelope</i>	<p>High performance historically correct window units installed</p> <p>Sloped roof replacement with Cornice repair</p>
<i>HVAC</i>	<p>All components specified at high efficiency with an automated energy management system and variable speed motor load drives</p>
<i>Lighting</i>	<p>Lighting retrofitted with CF bulbs, T-8 Fixtures, and LED fixtures and bulbs</p> <p>Lighting reduction to standard requirement levels as prescribed by different types of spaces</p> <p>Occupancy sensor lighting</p>
<i>Water</i>	<p>Low flow restroom fixtures to control water use</p>
<i>Energy Efficient Actions</i>	<p>Continue to investigate means and methods for improved energy efficiency</p> <p>Monitor consumption for trending</p>
<i>Building Specific Challenges</i>	<p>Built in 1909, this historic building has energy retrofit limitations</p> <p>Building is very high traffic</p>

Duluth Courthouse Parking Lot/ 3rd St. Parking Ramp

Year Constructed: 1985

Use: Public and Staff Parking

Sq/Ft: 95,480 -247 parking spaces

Long Term Goals	Make the facility zero energy reducing operating costs to taxpayers while reducing the county's carbon footprint Continue diligent inspections Preventive maintenance and timely repairs to maximize the life of the structure
Short Term Goals	Continue diligent operational and maintenance practices
Envelope	Ceilings and walls washed and repainted a gloss white (industrial latex paint) to improve lighting levels Windows installed in stair towers to allow for better day-lighting of stairwells Pre-cast concrete spans and poured concrete columns C.M.U. stair towers
HVAC	N/A
Lighting	Lower overhead "buried" lights and replace with LED Installation of 20 LED Exit signs to replace fluorescent fixtures Replaced 2 double fixture poles with 2 single fixture wall mounts (on stair towers) HPS stairwell light Occupancy sensors to turn off lights during non-use times, leaving security lights available Daylight sensors to turn off lights in areas that receive ample amounts of daylight
Water	N/A
Energy Efficient Actions	6 arrays of photo voltaic panels installed on ramp's rooftop generating approximately 8.5 KW of electrical energy
Building Specific Challenges	Poor light quality of high pressure sodium lights was unacceptable for this application plus they were on 24 hours a day, seven days per week- which was unnecessary Parking ramp requires constant repairs and maintenance due to heavy use, winter salt, sand penetration and exposure

Government Service Center (GSC)

Year Constructed: 2007

Use: Single Facility

Sq/Ft: 25,000

<i>Long Term Goals</i>	Commence building renovation similar to 1st floor in 2013 Reduce total energy consumption by at least 60% "Design from the ground up," method where all components and equipment both computing and cooling are integrated as a whole system. Commence new mechanical infrastructure and building shell life cycle
<i>Short Term Goals</i>	Continue diligent operational and maintenance practices
<i>Envelope</i>	Reseal windows and frames Rooftop replaced in 2010 with white finish EPDM
<i>HVAC</i>	Inefficient electric chiller A/C unit replaced by city district cooling
<i>Lighting</i>	High efficiency lighting upgrades Lighting reduction to standard requirements Stairwells repainted white to lower lighting load requirements Exit lights replaced with long-life low power fixtures
<i>Water</i>	Low flow fixtures
<i>Energy Efficient Actions</i>	PV panel mount installation. PV arrays added annually as budget allows. Architectural wind turbine project with 6 to 1,000 watt grid tied wind turbines to be installed with Photo Voltaic (PV) panel mounts
<i>Building Specific Challenges</i>	Over 137,000 people per year passing through the facility and is the largest building in the county's building portfolio. Thus it is necessary to relocate higher traffic departments to lower levels of the building.

County Jail

Year Constructed: 1995

Use: Office, Institutional Occupancy

Sq/Ft: 93,539

<i>Long Term Goals</i>	Improve Security Replace building automation system/energy managements controls Dramatically increased energy efficiency in 365 day, 24/7 facility Replace kitchen HVAC
<i>Short Term Goals</i>	Continue diligent maintenance and operational practices
<i>Envelope</i>	White rubber rooftop replacement

<i>HVAC</i>	Installed high efficiency domestic hot water heaters, condensing boiler for summer/shoulder season
<i>Lighting</i>	LED lighting in gym, day rooms, and building exterior
<i>Water</i>	Time controlled automatic fixtures
<i>Energy Efficient Actions</i>	Future solar panel installation and use Solar hot water heating in 2012
<i>Building Specific Challenges</i>	Heavy water utilization with laundry, kitchen and inmate showers 24 hour, 7 days per week, 365 days per year operation High traffic

<u>Public Safety/911 Center</u> Year Constructed: 2007 Use: Single Facility Sq/Ft: 30,000	
<i>Long Term Goals</i>	Minimize environmental/wetland impacts Design should allow for future growth Building shells exceeds building code insulation by 30%
<i>Short Term Goals</i>	Continue diligent operational and maintenance practices
<i>Envelope</i>	High performance fiberglass framed windows White UV and heat reflective roof Super insulated
<i>HVAC</i>	1.98% efficient- low operating temperature condensing boilers Heat/cooling recovery system for HVAC fresh air supply High efficiency condensing boilers Premium efficiency fan and pump motors Low maintenance and efficient Free cooling A/C units for winter and shoulder season cooling Variable frequency drive units for pump and fan motors (runs units only at speed necessary to meet occupancy needs) CO2 sensors to control amount of fresh air supply
<i>Lighting</i>	High efficiency lighting Occupancy sensors to turn off the lights if office or room is unoccupied
<i>Water</i>	Low flow fixtures to control amount of water use

<i>Energy Efficient Actions</i>	<p>Low profile building design to minimize impact of prevailing winter winds</p> <p>Minimal lawn area, low maintenance/no watering plantings</p> <p>Environmental landscaping to block winter winds (north & west) - deciduous trees to provide shading in the summer (south side)</p> <p>Long life cycle - low maintenance building construction and design</p> <p>Building is positioned on long east/west axis to maximize southern winter exposure (heat gain), and to minimize west window summer heat gain.</p>
<i>Building Specific Challenges</i>	Elimination of personal appliances for a consolidated "kitchen" area with "energy star" rated appliances

HIBBING

<p><u>Courthouse</u> Year Constructed: 1954 Use: Courthouse, Business Occupancy Sq/Ft: 64,338</p>	
<i>Long Term Goals</i>	Major renovation and addition
<i>Short Term Goals</i>	Continue diligent operational and maintenance practices
<i>Envelope</i>	Windows replaced with triple pane, thermally broken, high performance units
<i>HVAC</i>	<p>Consists of several AHUs. The building is served by variable air volume handling units and several variable air volume (VAV) boxes</p> <p>Replaced HVAC compression with high efficiency</p> <p>HVAC controllers to be replaced in 2013</p>
<i>Lighting</i>	Replace with high efficiency ballasts, bulbs and fixtures
<i>Water</i>	N/A
<i>Energy Efficient Actions</i>	<p>Side walk replacement</p> <p>Second floor remodel</p>
<i>Building Specific Challenges</i>	Provide security measure for staff and public

Hibbing Annex

Year Constructed: 1956

Use: Office, Business Occupancy

Sq/Ft: 27,000

<i>Long Term Goals</i>	To create an office building with low operational costs while maintaining maximum operational energy efficiency.
<i>Short Term Goals</i>	Continue diligent operational and maintenance practices
<i>Envelope</i>	A "tight" building envelope Roof insulated to R40 White membrane roof designed to reflect sun's heat Above ground walls insulated with addition R23 and subgrade walls R22 Special fiberglass framed high performance windows with special glazing and inert gas filled
<i>HVAC</i>	Displacement ventilation High efficiency hand dryers All pumps, fans, and motors required to operate the annex are of premium efficiency HVAC system consists of several AHUs. The lower level is served by a variable air volume air handling unit and several variable air volume (VAV) boxes. The main level is served by displacement air handling units. These units are located in the lower level and serve the main level through grilles located in the raised floor throughout the main level. Exhaust ventilation for the restrooms is handled by several fans serving multiple areas. Heating is provided by hot water generated from steam to water converters and then circulated to radiation and VAV reheat coils. The air handling unit coils utilize steam for the heating and chilled water for cooling. The chiller and storage tank are located on the exterior of the building at grade.
<i>Lighting</i>	Energy efficient lighting upgrades including T-8 fluorescent fixtures, compact fluorescent bulbs Natural day lighting to reduce artificial lighting requirements with clerestory windows and internal light transfer panels Motion detecting lights
<i>Water</i>	Water conserving fixtures

<i>Energy Efficient Actions</i>	<p>Solar domestic hot water for public restrooms producing 50 to 80 gallons of 140 degree water daily</p> <p>Solar wall pre-heated make up air system with no moving parts and requires almost no maintenance. This system can pre-heat the incoming air up to 60 degrees by using absorbed solar heat.</p> <p>6.1 KW photovoltaic electrical generation system installed</p> <p>Energy conserving landscaping</p> <p>Break area has super energy efficient Sun Frost refrigerator</p> <p>Recycled building</p>
<i>Building Specific Challenges</i>	Storm water runoff

VIRGINIA

<p><u><i>Virginia Courthouse</i></u> Year Constructed: 1914 Use: Single Facility Sq/Ft: 47,416</p>	
<i>Long Term Goals</i>	Renovation and addition to the courthouse to expand and upgrade the facility
<i>Short Term Goals</i>	Continue diligent operational and maintenance practices
<i>Envelope</i>	<p>Window replacement with high performance window units</p> <p>R-40 walls</p> <p>Other infrastructure upgrades to reduce energy consumption</p> <p>White roof/ R-60</p>
<i>HVAC</i>	New high efficiency HVAC system
<i>Lighting</i>	<p>Replaced with high efficiency ballasts, bulbs, and fixtures</p> <p>Motion sensors</p>
<i>Water</i>	Low flow automatic fixtures to control use
<i>Energy Efficient Actions</i>	<p>High efficiency condensing boilers</p> <p>"Solar Wall" for heating intake air supply</p>
<i>Building Specific Challenges</i>	Security for public and employees

Northland Office Building (NOB)

Year Constructed: 1923

Use: Office, Business Occupancy

Sq/Ft: 74,278

<i>Long Term Goals</i>	Reduce energy intensity load and decrease utility costs Complete building and mechanical renovation and remodeling
<i>Short Term Goals</i>	Continue diligent operational and maintenance practices
<i>Envelope</i>	Installed high performance windows Insulation for exterior walls Roofing insulated with single ply membrane system and slopes. Fully adhered Jen-Flex roofing system was installed in 1992. Potential upgrades include white top roof top.
<i>HVAC</i>	Mechanical system and HVAC control system and a mixed bag of obsolete equipment long past its life cycle Domestic hot water heated by electric water heaters HVAC system consists of several AHU's, at constant volume and are obsolete Heating is provided by steam coils in the air handling units with some perimeter hot water radiation and an extensive amount of electric baseboard heating
<i>Lighting</i>	Emergency lighting needs to be installed and upgraded Reduction in the number of light fixture in the building
<i>Water</i>	N/A
<i>Energy Efficient Actions</i>	Some lighting has been upgraded Occupancy sensors installed in common areas
<i>Building Specific Challenges</i>	Old building Efficient space utilization Energy efficiency Non-county tenants

Monitoring and Reporting

One of the key components to the Property Management Department's Sustainability Plan is to manage and report on the status of its infrastructure and programs along with the effectiveness of various initiatives in meeting efficiency and conservation goals. Reporting on the effectiveness of initiatives and expenditures has become a significant requirement for receipt of federal funding. In addition, it may be difficult to secure or maintain critical funding from the federal and state government without accurately providing progress reports. The analysis required not only includes an up-front determination of the expected return-on-investment, but on-going reporting regarding energy costs avoided, greenhouse gas emissions reduction, and other efficiencies gained. These results are captured by various formats and

systems such as VFA, federal Energy Star website, LEED guideline compliance, building commissioning, key performance indicators, and MN Power Rebates. Reports may also address major building components such as windows, HVAC systems, lighting, and insulation. Finally, lessons learned and data gathered can be applied to facilities managed by other departments just as it is used by Property Management.

VFA

VFA is an off-the-shelf web-based asset and energy management program that is highly customizable depending on user needs and complexity. It is used by small municipalities and world-wide institutions for asset reporting, capital planning, and decision-making. This software is quite powerful in managing facility-based infrastructure but also adaptable for a wide range of assets as suggested for St. Louis County. It allows the county to benchmark, assess and evaluate decisions impacting its respective assets.

Energy Star

To qualify for the ENERGY STAR rating, a building or manufacturing plant must earn a 75 points or higher on EPA's 1-100 energy performance scale, indicating that the facility performs better than at least 75% of similar buildings nationwide. The ENERGY STAR energy performance scale accounts for differences in operating conditions, regional weather data, and other important considerations. The energy baseline period is the baseline period to be used for tracking all energy, emissions, and performance rating changes.

The Property Management Department uses ENERGY STAR's Portfolio Manager as a means of tracking each building's energy use. It is attuned to building specific information, benchmarking and rating building performance data. The Property Management Department can then easily recognize where energy efficient technologies should be implemented to improve overall building efficiency.

Six out of the buildings the department is responsible for are ENERGY STAR rated, receiving a score of 75 points or higher.

LEED

LEED, or Leadership in Energy and Environmental Designs, provides a practical framework for measuring building design, construction, operation, and maintenance solutions. The Property Management Department has achieved LEED standards and specifications in most of its facility renovation projects without pursuing LEED designation or due to the expense of formal endorsement. All LEED design criteria are evaluated for all county construction projects.

Building Commissioning

Building commissioning is the process of verifying that all subsystems in new construction are meeting the owner's project requirements as intended by the building owner and as designed by the building architects and engineers. Subsystems include HVAC, plumbing, electrical, fire/life safety, building envelopes, interior systems, sustainable systems, lighting, wastewater, controls, and building security.

Design commissioning starts with the design engineers and architects constructing is based on the department's building specifications and the owner's project requirements.

Recommissioning is the process of analyzing existing buildings to make sure they are operating per design criteria.

These processes ensure that buildings will operate to the maximum efficiency per design.

Key Performance Indicators

Energy Consumption Tracking- set goals and baselines to reduce and measure energy use.

Monthly Energy Data to Facility Supervisors- Utility use data and consumption tracking information will be given to all Facility Supervisors for the purpose of improving maintenance and operations.

MN Power Rebates

The St. Louis County Property Management Department has been able to make some efficiency upgrades at little or no additional cost to taxpayers through partnership efforts locally and on a state level. For example, the county has received over \$120,000 in Minnesota Power “Power Grant” rebates since 2002. Minnesota Power has been, and continues to be, a key partner for piloting new technologies, including the turbines that are now located on the Government Services Center building in downtown Duluth. In addition, \$18,496 was awarded from the Minnesota Department of Commerce for energy/cost-saving measures by implementing renewable energy strategies; an additional \$12,200 was awarded for the Hibbing Annex photovoltaic installation specifically. The green roof project on the Duluth Motor Pool building, which was installed spring of 2008, is made possible with a \$50,000 grant from Minnesota’s Lake Superior Coastal Program - DNR Waters. In total, rebates of over \$200,000, and growing, have been received to assist in the inclusion of green technologies and products in county building efforts.

Cost Benefit Analysis/Return on Investment

Energy efficiency is good business; this is especially true in a down economy. The only way to control escalating energy costs is by including sustainability considerations, energy conservation actions, renewable energy projects, and life cycle cost considerations in all facility project decisions. Aggregate energy (all forms) prices have risen an average of 5% annually over the past decade, but the U.S. Department of Energy (U.S. DOE) reports an average aggregate increase of 22% in just the last fiscal year. Energy conservation minimizes the impact of future energy cost increases and has the effect of increased cash flow (lower operating budgets) with an ancillary benefit of better facilities.

The concept of energy conservation and sustainability as an investment is readily realized, as it derives greater benefits than, just initial costs.

The prime opportunity to implement energy conservation, sustainability, increased life cycle benefits is during the execution of a capital improvement project. The U.S. DOE reports that “stand alone” energy conservation projects yield a 15% average Return on Investment (ROI), so sustainability considerations coupled with a planned capital project will create even greater ROI opportunities.

Simple payback calculations are an effective tool, but only in projects with a very short useful life, as this is a static snapshot in time. Most projects have useful life cycles measured in decades where the dynamic cost of equipment purchases, labor, utility rates, future values, etc. cannot be accurately estimated.

Lifecycle cost analysis is the most comprehensive measure to estimate an ROI, as it captures and compares all associated costs of maintenance, repairs, future replacement, disposal, wasted energy, etc.

over the project's entire life. This method requires more analysis than a simple payback model, but it will tell a more inclusive and holistic story.

Bottom line - there are no perfect calculations, but energy conservation and sustainability are, without question, sound investments and business decisions.

Conclusions

Accomplishments and Examples of Activities by the Property Management Department

- Reduction of CO₂, nitrogen oxide, sulphur dioxide particulates, and mercury, into the environment. Many conservation projects are taking or have already taken place so that the county will have less demand for energy.
- Reduction of water usage in the Government Services Center, Duluth Depot Heritage Arts Center (by 50%), and Hibbing Courthouse Annex.
- \$200,000 invested in energy conservation projects and renewable energy sources
- All building projects request for proposals (RFP) for architectural and engineering services include energy saving and sustainability requirements. Architects and Engineers must demonstrate their understanding and commitment to energy efficiency, energy conservation, renewable energy opportunities, environmental concerns, long life cycle, and low maintenance issues before they are selected to work on county projects.
- Most major buildings have had energy audits - Range facilities are in process.
- The purchase of asset management and facility energy consumption/cost software to begin benchmarking utility use, life cycle, and total facility cost data.
- The purchase of network PC controlling software to shut off or put to sleep the approx 2,000 PC units that used to run 24/7/365 - this payback is approx 1 year.

Duluth Courthouse Lighting Upgrades - All existing historic light fixtures have been retrofitted with CF bulbs. All other lighting has been upgraded and the lighting load has been reduced by approximately 50%. In many locations, lighting has been reduced to standard lighting requirement levels as prescribed for different types of spaces.

Duluth Courthouse - HVAC, electrical, fire safety and plumbing upgrades, all phases completed. All components were specified @ high efficiency, including exhaust air heat recovery, point of use domestic water heating, occupancy sensing temperature and lighting controls, automated energy management system, variable speed motor load drives. This portion of work has reduced the County's electrical use from \$13,000 per month to \$6700 per month (as of 12-09). A savings of \$75,600.00 per year!

Duluth Courthouse Window Replacement - slated for spring of (2011) - the 30 + year old windows are beyond their life cycle and have been replaced with high performance historically correct units. A blower

door test revealed that the 5th floor (fewest windows per floor) leaked an equivalent amount of air as a 4 foot by 4 foot hole in the wall.

Government Services Center (GSC) - High efficiency lighting upgrade started, including the retro-fit of lighting and in some cases, a reduction in lighting levels, stairwells repainted for improved lighting levels, inefficient electric chiller A/C unit replaced by city district cooling, relocating high traffic department to lower levels of the building has started, all exit lights to be replaced with long-life low power fixtures.

A 6 kW Architectural Wind turbine project which includes 6 - 1,000 watt grid tied wind turbines has been installed. Photo voltaic (PV) panel mounts have been installed in the 2011 roof replacement project and will be added annually as the budgets allow. The real payback is for peak power demand. The department pays \$7.50 per KW of peak demand while the PV panels deliver maximum output right at our peak usage - mid day fully operational/occupied mode. This will be a “peak shaving” effort.

Duluth Motor Pool Building - High efficiency lighting upgrades and repainting for light level improvement. Battery operated floor sweeper replaced natural gas unit for cleaning inside the facility.

Green Roof (which includes a modular type roof on the East half and a garden roof for crops on the west half), window replacement (ongoing), building insulation, mechanical & ventilation replacement and building infrastructure upgrades has been completed. This project addressed several deferred maintenance items and will greatly improve the building envelope’s thermal performance. Previously the building has no insulation and had an excess sq/ft area of windows - most glass block - mostly facing north, with no opportunity for solar gain. The green roof part of the project will be a pilot program with the DNR, MPCA and WLSSD for storm water runoff control. We pursued the Minnesota Coastal Council for a matching grant and was approved and received for \$50,000. We also obtained a \$10,000 grant for the garden roof portions from Northeast Minnesota Sustainable Development Partnership. An additional \$5,000 was awarded to the Duluth Community Garden Program who will be tending the gardens along with the Duluth Thunderbird-Wren House. The garden roof portion will be used to raise fruits and vegetables. The motor pool has the longest running government owned PV array in northeastern MN - it was installed in April of 2002.

Third Street and GSC Parking Ramp - Lighting upgrades and lighting controllers and painted all interior surfaces white for improved lighting levels. Windows installed in the tops of both stair towers to allow for better day-lighting of stairwells. Changes lowered electrical energy use by over \$12,000.00 per year in the ramp alone. We now have approx 8.5 KW of PV generation in the ramp, which results in zero energy use in the summer and reduced the total winter electrical cost to approximately \$500.

Chris Jensen Health and Rehabilitation Facility - Replacement of roofing and saturated insulation on the Chris Jensen Health and Rehabilitation Facility’s Willows Unit with an energy saving white membrane and new insulation. White roofs help save energy by reducing cooling loads in the summer months by reflecting the sun’s heat energy and can reduce heating during the winter by allowing snow not to melt and all its inherent insulation value.

High efficiency boilers and hot water heaters have been installed and will provide an estimated energy cost savings of \$79,000.00 annually and coupled with the Chris Jensen window replacement project, will significantly lower energy costs even further and improve comfort.

Emergency Operations Center, Pike Lake Site - Building exhaust replaced with heat recovery system and radio equipment room A/C replaced with “free cooling” standalone unit.

Duluth Heritage and Arts Center (Depot) - Water conservation efforts have begun at the Depot by installing a surplus cooling tower to replace the city water cooling for air conditioning the facility. Steam energy reduction in the Depot accomplished by using point humidification for one of the galleries. This saves the County \$17,000.00 annually.

Duluth Depot Heritage and Arts Center - Lighting retro-fit at the Depot reflects an annual savings of \$12,000.00. Depot was formerly cooled using cold water. This cost the center \$28,000.00 annually. They now are using the cooling tower formerly located at the Duluth courthouse site. By doing so, the annual bill has been reduced to approximately \$7,000.00 while at the same time, was an effective way to recycle the tower!

Hibbing Courthouse Lighting - All lighting replaced with high efficiency ballasts, bulbs and fixtures.

Hibbing Courthouse Windows - Windows which comprise 70% of the wall space were replaced with triple pane, thermally broken, high performance units.

Virginia Courthouse Lighting - All lighting replaced with high efficiency ballasts, bulbs and fixtures.

Hibbing Annex Building - This 27,000 sq/ft office building has been completed and now houses County Health Department, Social Services Department, and Veterans staff and the State of Minnesota's Department of Employment and Economic Development. This project was designed with sustainability, energy conservation, renewable energy, occupant comfort and health, and minimal maintenance as the standard. This building is now the "greenest" County owned facility, and is a test bed and model for future projects.

Some features of the Hibbing Annex building include solar hot water heater for public restrooms, a 6.1 KW photovoltaic electrical generation system, and a solar pre-heated make up air system which has no moving parts and requires almost no maintenance. This System can pre-heat the incoming air up to 60 degrees by using absorbed solar heat. The building includes many other "green" features and systems as well.

Incorporated into the New Public Safety Building - Green Building Design

- Ninety-eight percent (98%) efficient - low operating temperature hot water boilers.
- High performance fiberglass framed windows.
- White UV and heat reflective roof.
- Building shell exceeds building code insulation requirements by 30%.
- High efficiency lighting.
- Heat/cooling recovery system for HVAC fresh air supply.
- Premium efficiency fan & pump motors.
- Variable frequency drive units for pump and fan motors (this runs the units only at the speed necessary to meet the occupancy needs).
- Co2 sensors to control the amount of fresh air supply.
- Occupancy sensors in offices to minimize the conditioned air supply to the office or room - if unoccupied.
- Occupancy sensors to turn off the lights if office or room is unoccupied.
- Automatic restroom fixtures to control water use.

- Building is positioned on long east/west axis to maximize southern winter exposure (heat gain), and to minimize west window summer heat gain.
- Low profile building design to minimize impact of prevailing winter winds.
- Minimal lawn area, low maintenance/no watering plantings.
- Environmental landscaping to block winter winds (north & west) - deciduous trees to provide shading in the summer (south side).
- Long life cycle - low maintenance building construction and design.

Projects in Planning or Underway - Elimination of personal appliances in County facilities, consolidated “kitchen” areas being installed as areas are remodeled and fitted with “energy star” rated appliances. All non UL listed appliances will be removed from all County buildings. Replacement program for appliances in courthouses and other County owned facilities for safety enhancement and energy savings - UL listed commercial grade units and energy star labeled units. As an example, the County replaced 39 Mr. Coffee type coffee makers (reduced quantity to just a couple), 19 refrigerators (also reduced to just couple of units), and 17 small space heaters (totally eliminated) on just one floor of the Government Services Center building in Duluth. This change alone represents an annual savings of \$2500.00. Many more on other floors and in other building have also been replaced.

Government Services Center (GSC) Data Center relocation and upgrade project - This project will model the “high performance data center” as prescribed by new design standards of the Rocky Mountain Institute studies and publications. This high performance data center will consume approximately 70% less electrical energy than the existing data center. This is achieved through “design from the ground up” method, where all components and equipment (both computing and cooling) are integrated as a whole system. The conversion to a high performance data center will save the county approx \$4,000 per month in electrical and HVAC costs - plus free up valuable office space.

Virginia Courthouse - This building presently has large square foot glass block window units which possess a very low R-rating. The heating and cooling requirements of the building would be greatly improved by replacing the glass block with high performance window units. A new high efficiency HVAC system will replace the existing systems (some portions are 70 years old).

Summary

The St. Louis County Property Management Department has made significant progress towards meeting the goals and strategies outlined in this plan. Results have shown an overall improvement in energy efficiency throughout the building portfolio.

These sustainability goals and strategies set the stage for continued development and implementation of opportunities across departments. Specifically, in transportation/fleet, purchasing, and employee/community outreach.

In addition the Property Management Department will outwardly publicize its successful efforts for other counties to follow as a recommendation. This will enhance St. Louis County's image as a responsible steward of county funds, but also demonstrate to county residents and businesses that it intends to continue to pursue efficiencies, attract funding, and enhance the quality of life in Northern Minnesota.

Appendix A- Board Resolutions

Appendix B- Executive Orders 13426 and 13514

Appendix C- Executive Orders 11-12

Appendix D- Asset Management Strategy Example

Appendix E- Energy Efficiency and Conservation Plan

Appendix F-Best Practices

Appendix A- Executive Summaries

STRENGTHENING FEDERAL ENVIRONMENTAL, ENERGY, AND TRANSPORTATION MANAGEMENT

Executive Order 13423 requires federal agencies to lead by example in advancing the nation's energy security and environmental performance by achieving the following goals:

- **Energy Efficiency:** Reduce energy intensity 30 % by 2015
- **Greenhouse Gases:** Reduce greenhouse gas emissions through reduction of energy intensity 30% by 2015
- **Renewable Power:** At least 50 % of current renewable energy purchases must come from new renewable sources (in service after January 1, 1999).
- **Building Performance:** Construct or renovate buildings in accordance with sustainability strategies, including resource conservation, reduction, use, and indoor environmental quality.
- **Water Conservation:** Reduce water consumption intensity 16 % by 2015
- **Vehicles:** Increase purchase of alternative fuel, hybrid, and plug-in hybrid vehicles when commercially available.
- **Petroleum Conservation:** Reduce petroleum consumption in fleet vehicles by 2 % annually through 2015.
- **Alternative Fuel:** Increase use of alternative fuel consumption by at least 10 % annually.
- **Electronics Management:** Annually, 95% Assessment Tool standards where applicable; enable Energy Star® features on 100 percent of computers and monitors; and reuse, donate, sell, or recycle 100 percent of electronic products using environmentally sound management practices.

(<http://www.epa.gov/oaintrnt/practices/eo13423.htm>)

Executive Order 13514 introduces new greenhouse gas (GHG) emissions management requirements, expands water reduction requirements for federal agencies, and addresses waste diversion, local planning, sustainable buildings, environmental management, and electronics stewardship. EO 13514 requires federal agencies to achieve the following goals:

- **GHG Emissions:** Establish reduction targets for agency wide GHG emissions to be achieved by 2020. Develop and report annual comprehensive inventories
- **Building Performance:** Ensure that all new construction and major renovations meet the Guiding Principles for High-Performance Sustainable Buildings, and that 15% of existing buildings meet them by 2015. Starting in 2020, design federal buildings to achieve "zero net energy" by 2030.
 - Integrated Design
 - Optimize Energy Performance
 - Enhance Indoor Environmental Quality
 - Reduce Environmental Impact of Materials

- **Water Conservation:** Reduce potable water consumption intensity 26 percent by FY 2020, compared to an FY 2007 baseline. (This extends the water consumption intensity reduction requirement of EO 13423 by five years.) Reduce industrial, landscaping, and agricultural water use 20 percent by FY 2020, compared to an FY 2010 baseline.
- **Strategic Planning:** Develop a "Strategic Sustainability Performance Plan" that commits the Agency to identify specific goals for achieving this executive order and to evaluate Agency climate change risks and vulnerabilities in order to manage the effects of climate change on the Agency's operations and mission.
- **Storm water Management:** Section 438 of the Energy Independence and Security Act of 2007 (EISA).
- **Local Planning:** Participate in regional transportation planning, increase selection of local energy use, and plan new facility locations near existing town centers.
- **Fleet Management:** Reduce fleet consumption of petroleum fuels by 2 % annually through 2020.
- **Waste Diversion and Pollution Prevention:** Achieve a 50% solid waste diversion rate by 2015. Reduce paper use, increase composting, and decrease chemical use.
- **Procurement:** Ensure 95% of new contract actions (task and delivery orders) are energy- and water-efficient, bio-based, environmentally preferable, generally non-toxic, and contain recycled content.
- **Electronics Stewardship:** Procure products that are Electronic Product Environmental Assessment Tool (EPEAT)-registered, ENERGY STAR[®] labeled, or Federal Energy Management Program (FEMP)-designated equipment.
- **Environmental Management:** Continue to employ environmental management systems at all organizational levels.

<http://www.epa.gov/oaintrnt/practices/eo13514.htm>

STATE OF MINNESOTA
EXECUTIVE DEPARTMENT



MARK DAYTON
GOVERNOR

Executive Order 11-12

**Providing for Job Creation through Energy Efficiency and Renewable
Energy Programs for Minnesota's Public Buildings**

I, Mark Dayton, Governor of the State of Minnesota, by virtue of the authority vested in me by the Constitution and applicable statutes, do hereby issue this Executive Order:

Whereas, state government is a major consumer of energy and the state should be a leader in adopting cost-effective energy conservation and renewable energy practices; and

Whereas, industry experts estimate energy consumption can be reduced by up to 25 percent through operational changes and best management practices; and

Whereas, an effective public-private partnership to improve public building energy efficiency and use of renewable energy can save taxpayers millions of dollars annually while creating needed construction jobs; and

Whereas, these energy efficiency and renewable energy improvements will be in the public interest and should be constructed by the best means and highest quality of labor reasonably available, and these improvements will be funded by direct public payments made possible by the energy savings to the State and other public entities; and

Whereas, this Executive Order will put Minnesota in a position to attract new investments and jobs to the state as a center for national energy efficiency and renewable energy job creation; and

consumption in state-owned facilities and payment of utility bills by state agencies.

- e. State agencies shall identify and implement best management practices and cost-effective energy efficiency and renewable energy improvements utilizing Guaranteed Energy Savings Contracts, the State Energy Improvement Financing Program, or other implementation and financing mechanisms that may be appropriate.
 - f. All state contracts entered into to perform energy efficiency and renewable energy improvements and associated work shall adhere to the prevailing wage law, Minnesota Statutes, sections 177.41 to 177.44, and any other applicable prevailing wage statutes and ordinances, in contract solicitations and contract enforcement.
 - g. For purposes of this Executive Order, "state agency" means an agency as defined in Minnesota Statutes, section 16B.01, subdivision 2, that occupies state-owned buildings.
2. By **May 15, 2011**, the Commissioner of Commerce, in partnership with state and local government and energy service companies, shall convene an Energy Service Coalition, Minnesota Chapter to establish voluntary standards, best practices, educational resources and outreach strategies to advance state and local government utilization of energy saving performance contracting.
 3. By **June 15, 2011**, the Commissioner of Commerce shall create and staff an Office of Guaranteed Energy Savings Programs to offer a technical assistance program for state agencies, local units of government, and school districts that elect to implement energy-saving and renewable energy improvements through Guaranteed Energy Savings Contracts. The intent of this program is to maximize job creation, energy and operational cost savings, and investment in state facility infrastructure.
 4. By **September 1, 2011**, the Commissioner of Commerce shall develop a proposal to provide on-going funding for the Office of Guaranteed Energy Savings Programs services to state agencies, local governments, and school districts.
 5. By October 11, 2011, the Commissioner of Commerce shall analyze barriers to the development of renewable energy projects by state agencies, local governments and other public sector entities, and shall recommend modifications to current law and/or administrative procedures to address those barriers.
 6. A state agency that prepares a predesign for a major renovation of a building must perform an assessment of the cost-effectiveness of installing renewable energy generation equipment in conjunction with the building renovation. The assessment must comply with the requirements of Minnesota Statutes, section 16B.32, subdivision 1a.

7. The University of Minnesota, the Minnesota State Colleges and Universities, the Metropolitan Council and the Metropolitan Airports Commission are strongly encouraged to evaluate energy performance contracting or other alternative financing methods as a means of implementing their energy efficiency and facilities upgrade projects before requesting other state money, such as Higher Education Asset Preservation and Replacement (HEAPR) funding.
8. The Commissioner of Commerce, in partnership with other state agencies, shall track and participate in relevant aspects of the federal “Better Buildings Initiative” to ensure Minnesota secures money available through aspects of the building retrofit initiative, including “Race to the Green.”
9. By **December 31, 2011**, State agencies shall assess building automation systems and monitoring points in state-owned buildings and identify opportunities to improve their effectiveness in monitoring operations of facility assets, energy use, equipment conditions, systems performance, and environmental conditions to more quickly and easily identify when buildings are consuming more energy than necessary and to enhance tracking and reporting capabilities.
10. The Commissioner of Employment and Economic Development shall develop a list of Minnesota suppliers of applicable energy efficiency and renewable energy equipment and work with Minnesota energy efficiency and renewable energy companies to increase job creation and advance energy related manufacturing technologies in the state to make Minnesota a national center of energy technology and manufacturing.

Under Minnesota Statutes, section 4.035, subdivision 2, this Executive Order is effective 15 days after publication in the State Register and filing with the Secretary of State.

In Testimony Whereof, I have set my hand on April 8, 2011.

Mark Dayton
Governor

Filed According to Law:

Mark Ritchie
Secretary of State

Appendix C- Board Resolutions

BOARD LETTER NO. 07 - 409

ENVIRONMENT & NATURAL RESOURCES COMMITTEE NO. 1

BOARD AGENDA NO.

DATE: October 2, 2007 **RE:** Waste Reduction, Pollution
Prevention and
Environmentally Preferable
Purchasing

FROM: Dana Frey
County Administrator

Ted Troolin
Solid Waste Director

Tony Mancuso
Property Management Director

Dick Florey
Director of Purchasing

RELATED COUNTY/DEPARTMENT GOAL(S):

- Maintain and improve recycling programs.
- Improve waste reduction in the County to minimize need for land disposal.

ACTION REQUESTED:

Adoption of resolution supporting County departmental waste reduction, pollution prevention, and environmentally preferable purchasing activities.

HOW THIS ACTION ENABLES THE DEPARTMENTS TO REACH GOALS:

Passage of the resolution will reaffirm and emphasize to departments that the Board endorses and supports waste reduction, pollution prevention, and environmentally preferable purchasing activities. This leadership will promote progress in these activities.

BACKGROUND:

As defined by the Minnesota Pollution Control Agency, "Pollution Prevention (P2) is a 'front-end' method to decrease costs, risks, and environmental concerns. In contrast to managing pollution after it is created, P2 reduces or eliminates waste at its source." "Waste reduction" refers to taking steps to keep from generating waste. These steps include buying in bulk to reduce packaging, reusing and repairing materials, purchasing products with demonstrated durability, and other related options. Environmentally Preferable Purchasing (EPP) is the practice of purchasing products, materials, equipment, services, and supplies that have a lesser or reduced effect on human health and the environment when compared with competing products or services that serve the same purpose.



Resolution
of the
Board of County Commissioners
St. Louis County, Minnesota

Adopted on: October 9, 2007 Resolution No. 551
Offered by Commissioner: Raukar

WHEREAS, the St. Louis County Board of Commissioners is committed to supporting waste reduction, pollution prevention, and environmentally preferable purchasing activities; and

WHEREAS, the St. Louis County Board believes that source reduction is a valuable strategy in reducing or eliminating waste at its source, as well as decreasing costs, risks, and environmental concerns;

NOW, THEREFORE, BE IT RESOLVED, that it shall be the vision of St. Louis County to look toward the future of the environment within its boundaries and to wisely entrust its resources and people to environmental stewardship; and

RESOLVED FURTHER, that the St. Louis County Board of Commissioners directs the development and implementation of comprehensive pollution prevention, waste reduction, and environmentally preferable purchasing programs, directing all county departments and agencies to, from this date forward, set these activities as priorities and take additional steps to prevent pollution, conserve resources; and

RESOLVED FURTHER, that County departments shall work cooperatively to identify and implement sound waste reduction, pollution prevention, and environmentally preferable purchasing practices and jointly develop county policies and programs in these areas.

Commissioner Raukar moved the adoption of the Resolution and it was declared adopted upon the following vote:
Yeas – Commissioners Fink, O’Neil, Forsman, Sweeney, Nelson, Raukar, and Chair Kron - 7
Nays – None

STATE OF MINNESOTA
Office of County Auditor, ss.
County of St. Louis

I, DONALD DICKLICH, Auditor of the County of St. Louis, do hereby certify that I have compared the foregoing with the original resolution filed in my office on the 9th day of October, A.D. 2007, and that this is a true and correct copy.

WITNESS MY HAND AND SEAL OF OFFICE at Duluth, Minnesota, this 9th day of October, A.D., 2007

DONALD DICKLICH, COUNTY AUDITOR

By 

Deputy Auditor/Clerk of County Board



*Resolution
of the*

Board of County Commissioners

St. Louis County, Minnesota

Adopted on: February 12, 2008 Resolution No. 103

Offered by Commissioner: Kron

WHEREAS, it is in the best interest of taxpayers to reduce the costs of fuel and energy consumption; and

WHEREAS, promoting the Health and Well-Being of County Citizens and Maintaining a Healthy Viable Ecosystem are two established priorities of the St. Louis County Board of Commissioners; and

WHEREAS, our partners of the State (Association of Minnesota Counties) and Federal (National Association of Counties) levels support immediate and long range efforts by the Federal government to involve all levels of stakeholders to mitigate possible sources of climate change through a series of practical incentives and more Federal funding; and

WHEREAS, many state and local governments throughout the nation, both large and small, are reducing pollutants through a series of activities that simultaneously provide economic and quality of life benefits; and

WHEREAS, St. Louis County has proven through the efforts of its Property Management Department, that it is a national and regional leader in energy conservation innovation and "green building" initiatives; and

WHEREAS, emissions reduction programs can benefit communities through reduced energy bills, green space preservation, air quality improvements, reduced traffic congestion, improved transportation choices, and economic development and job creation through energy conservation and new technologies;

Appendix D- Energy Efficiency and Conservation Plan

Energy Efficiency and Conservation Strategy

Phase 1 Final Report

February 22, 2010

Page 1

This document summarizes the process, results, and recommendations of the first phase of development of an Energy Efficiency and Conservation Strategy (EECS) for St. Louis County, Minnesota. Directed by the U.S. Department of Energy (DOE) as a requirement to access Energy Efficiency and Conservation Block Grants, this first phase focused on establishing a framework for planning, management, and reporting of energy efficiency and conservation activities. This framework, along with the EECS goals and proposed implementation actions were submitted to DOE in December 2009 in an abbreviated format (Attachment D), which is included in Appendix A of this report.

The successful completion of Phase 1 of EECS development and the submission to DOE allows St. Louis County to proceed with the first implementation action of authorizing a contract for replacement of windows in the Duluth County Courthouse building to improve energy efficiency. Other implementation and reporting actions, defined as Phase 2 EECS implementation are set to begin in the near future as funding and staff commitments allow.

Background

In 2009, St. Louis County was awarded federal funds through the U.S. Department of Energy under the Energy Efficiency and Conservation Block Grant Program. Initial priorities identified by St. Louis County for expenditure of these funds included:

1. Strategic Energy Plan Development
2. Implement a tool/system to analyze, benchmark, measure, record and verify the proposed opportunities to reduce and conserve energy
3. Energy Efficient Courthouse Window Retrofit and Upgrade

While these basic goals and implementation actions were identified as a minimum requirement by the DOE to access the EECSBG funds, the county desired to go further to set the stage for long-term efficiencies and reductions in the use of energy and emission of greenhouse gases. Energy efficiency and conservation initiatives are not new for the county and through this process, staff documented and provided several examples of programs, Board resolutions, and awards for leadership and actions focused on energy efficiency and conservation, as well as waste reduction, renewable energy pilot projects, forestry management, and public education and outreach. With this foundation, the county initiated Phase 1 of the EECS development process to engage all internal departments in maximizing the benefits to the county and its residents.

Plan Development Process

Phase 1 of the EECS development process occurred over a period of three months in fall 2009 and primarily involved a Steering Committee made up of leaders from Administration, Public Works, and Property Management and a day-long workshop that included most county departments to provide input for this strategy planning effort. A consultant was engaged to facilitate the process.

At the start of the process, the Steering Committee reviewed EECS and sustainability documents and reports from major cities including Minneapolis, MN and Chicago, IL, as well as other plans from cities and counties across the U.S. (See Reference Resources at end of report). This information provided a working template for the development of a plan that is tailored to the unique size, geography, population, and economy of St. Louis County. The Steering Committee also assembled and reviewed available county information and Board resolutions and a process was outlined to assess both internal and external opportunities.

Of significant importance to the Steering Committee was the development of a realistic plan that can be effectively implemented. With this intent in mind, the process maintained a focus on services the county delivers in the course of its day-to-day business and initiatives/actions that it can directly lead and influence with residents, businesses, and the communities located within its jurisdiction. The following high-level goals for energy efficiency and conservation were developed for further discussion and evaluation during the department workshop.

1. Financial
 - a. Saving money through lower life cycle cost and maintenance reductions
 - b. Pursuing and capturing funding, rebates, and grants
 - c. Supporting sustainable/renewable energy development through policies and incentives
 - d. Leveraging bonding capacity and increasing tax base by attracting green businesses
 - e. Leveraging sustainable forest products through forest management policies
2. Local Economy
 - a. Protecting and creating jobs
 - b. Enhancing the business climate through credits and incentives
 - c. Partnering with communities and businesses such as Laurentian Energy Authority for provision of biomass
3. Energy Diversity
 - a. Increasing efficiencies and reducing energy demand
 - b. Protecting the local economy through energy diversity
4. Social and Environmental
 - a. Support for jobs and tourism through clean streams, forests, and natural resources
 - b. Reducing negative environmental impacts
 - c. Public education and outreach

The Steering Committee then applied these high-level goals to identify several potential internal and external opportunities that could be pursued by county departments in carrying out their business. The following table provides a “snapshot” of some of these potential opportunities.

Department	Internal Opportunities	External Opportunities
Administration	Policy, Consumption, Purchasing, Technology, Space	Promote and communicate, educate, provide leadership, manage relationships
County Board	Policy Development	Policies, provide leadership for communities and constituents
Property Management	Facilities management and maintenance	Educate, promote, provide leadership
Public Works	Fleet management, energy usage, salt usage, work methods, transportation	Transportation system management, support alternative modes and travel reduction
Sheriff	Facilities and fleet management	Jail management
Environmental Services	Waste management and reduction	Education, enforcement, waste management, sewer inspections
Land Department		Natural resource management (forest, mining, gravel)

Department Workshop

Current county initiatives, high-level goals, and potential internal and external opportunities provided the background data for a day-long workshop involving most county departments. In a round-robin format, staff discussed potential opportunities for energy efficiency and conservation for not only their own department, but other departments as well. This allowed participants to offer new perspectives on county operations and provided support for connecting and applying successful departmental activities into other areas. The workshop concluded with a review of overall efficiency and conservation “themes” and staff provided an evaluation of the ease of implementation and the potential benefits that could be derived through their implementation.

A significant amount of useful information was gathered during the workshop and the raw data collected is included in Appendix D. This information ranges from suggestions for broad county initiatives to specific recommendations that may have high potential for efficiency and costs savings. All require additional evaluation and consideration as this process moves forward.

The table on the following page provides a summary of “themes” and potential opportunities that were identified and evaluated during the workshop. These opportunities require additional definition, evaluation, and screening by County leadership to determine their viability, costs, and benefits of implementation. This evaluation will occur in Phase 2 of the EECS implementation.

Energy Efficiency and Conservation Strategy Plan

At the conclusion of the workshop, three primary goals and supporting objectives were identified by the Steering Committee and submitted to the Department of Energy as the framework for St. Louis County's EECS plan. These goals are summarized as follows (taken directly from DOE "Attachment D"):

1. To conserve and reduce energy and greenhouse gas emissions in all areas of county operations where the opportunities are measurable, transparent, synergistic, and sustainable. This goal is supported by the County Board through approved resolutions and executed by County Administration who will be responsible for implementation of this strategy. Specific objectives include: (i) Identify opportunities in each county department where the department has a significant opportunity within their respective "circle of influence" to reduce and conserve energy (will use the planning matrix developed during the research as part of developing our EECS; development of concrete objectives based on current benchmark data and timetable due by 12-31-10); (ii) Implement a system to assess, benchmark, track, and verify the planned improvements in order to measure success (Project Activity 2 will begin more of this work and the pilot implementation of an Asset and Energy Management software will be implemented by May 1, 2010, beginning with county buildings); (iii) Establish long term energy and conservation reduction targets (next steps will include establishing specific targets for energy efficiency, conservation and CO₂ reduction for years 2010 to 2050); (iv) Continue to identify and implement projects and programs that have immediate energy reduction and conservation impacts (such as the Energy Efficient Courthouse Window Retrofit and Upgrade in Project Activity 3); and (v) Capitalize on the synergistic opportunities the county has with cities located within its jurisdiction.
2. To develop policies to link all decisions regarding county operations with a requirement that they meet the targets and follow the tracking processes identified above, in order to maximize long-term benefits. This includes incorporating energy efficiency, conservation and CO₂ reduction in Capital Improvement Program (CIP) planning, budgeting and strategic planning efforts. This will also ensure that the county is developing programs and strategies that will continue beyond the funding period. The new CIP now requires departments to detail their energy efficiency and conservation considerations for each proposed project (implemented December 2009). The budget and strategic planning effort improvements will be implemented during calendar year 2010.
3. To target programs and projects that provides substantial, sustainable and measurable energy savings, job creation, and economic stimulus. As a major regional economic engine, St. Louis County will identify and prioritize opportunities to create or retain jobs and grow the local economy through their investment and decisions in energy efficiency and conservation and will emphasize the sustainable management of natural resources. The planning efforts undertaken as part of the development of the EECS have already begun to incorporate this goal, which will be further developed with specific deliverable objectives in county strategic planning efforts, department business plans and other county planning documents.

These goals and objectives set the stage for continued development and implementation of opportunities across departments.

Management and Reporting

One of the key drivers for success in the implementation of the EECS plan is the ability of St. Louis County to manage and report on the status of its infrastructure and programs and the effectiveness of various initiatives in meeting efficiency and conservation goals. Simply put, the county cannot achieve what it cannot measure. Transparent reporting on the effectiveness of initiatives and expenditures is not only an expectation of citizens and county officials; it has become a significant requirement for receipt of federal funding. The analysis required not only includes an up-front determination of the expected return-on-investment, but on-going reporting regarding energy costs avoided, greenhouse gas emission reductions, and other efficiencies gained. These results are captured in various formats and systems by the Minnesota B-3 guidelines, Federal Energy Star website, LEED certifications, and anticipated legislation regarding greenhouse gas emission reporting. Reporting to these various entities cannot be completed without an efficient method for accumulating, tracking, and summarizing this information.

At current, data in St. Louis County exists in numerous locations and formats across departments, typically in spreadsheets, but also in data systems such as Maximo that is used by the Public Works Department. As a result, it is extremely difficult to provide a straightforward analysis of needs, priorities, and results for facilities, infrastructure, programs, and numerous other county assets. Lacking the ability to accurately provide progress reports, it may become difficult to secure or maintain critical funding from the federal and state government. To address this, an important recommendation of the EECS plan is the development and implementation of an Asset and Energy Management and Reporting System.

Working parallel to the Steering Committee in developing the EECS plan, a separate committee proceeded with an evaluation of tracking and management tools to allow for reporting and documentation of priorities, progress, costs, and benefits. A proposed structure was developed using off-the-shelf technology for integration of data systems that can be accessed over the internet and viewed by all county departments. A separate memorandum is provided as Appendix B that provides a recommendation and additional justification for the proposed data structure and report formats. Phased implementation of the Asset and Energy Management and Reporting System is a key component for the success of the EECS plan.

Recommendations and Next Steps

In order to focus on early wins and then build on this success to gain long-term momentum, several recommendations have resulted from the Phase 1 EECS process.

1. Implementation of the EECS plan (Phase 2). Using the framework, goals and objectives, and data gathered through Phase 1, the county should continue moving forward by initiating Phase 2 in the near future. This will maintain the departmental support gained during the workshop and prepare for implementation of the Asset Management System and other high priority elements of the EECS plan. By continuing to move forward and involving a broad representation of all departments, the county will stand to quickly benefit from the efficiencies and cost savings identified and envisioned in the EECS plan.
2. Implementation of the energy audits and benchmarking, initially for major facilities managed by the Property Management Department. This will begin the significant task of evaluating the energy usage and potential efficiencies to be gained by addressing major building components such as windows, HVAC systems, lighting, and insulation. This information will also support implementation of the Asset Management System and establishment of reduction targets for

energy consumption and greenhouse gas emissions. In concert with the rollout of the Asset Management System, the lessons learned and data gathered can be applied to facilities managed by other departments.

3. Move forward with planning and implementation of the Asset and Energy Management and Reporting System for buildings managed by the Property Management Department. This will provide a platform for decision-making, capital program development, funding, and reporting that can be expanded to include all major county facilities. Specific areas that should be evaluated and tested in the Asset Management System include:
 - Building infrastructure and major components
 - Energy audit and consumption information
 - Component based life-cycle cost information
 - Office space and leases for facilities utilized by various departments
 - Non-building systems including parking lots, exterior lighting, and utility systemsFollowing pilot testing by the Property Management Department, this system should be expanded to other major building facilities across departments. Planning should also be initiated for other minor facilities, vehicle and maintenance fleets, public infrastructure such as roads and bridges, and other major county assets that are determined to have significant opportunity for increased efficiencies and energy conservation to be further defined in Phase 2 of the EECS process.
4. Review the raw data gathered during the departmental workshop in the near future. This will allow the county to capitalize on the time invested by the group and potentially move forward with easy-to-implement ideas. Participating in successful initiatives will breed support for future EECS implementation.
5. Expand the County's leadership role in energy efficiency and conservation. The City of Duluth also received EECSBG funding and other communities within St. Louis County are pursuing competitive EECSBG funding as well. The County can play a significant role in evaluating new technologies and methods, applying renewable resources, sharing of equipment, staff, and facilities, and leverage other resources to benefit these communities and citizens.
6. Pursue funding for justified improvements and initiatives. Through this EECS planning effort and prior initiatives, St. Louis County is now well positioned to pursue funding to move forward with a variety of programs and projects. With the framework of the EECS plan in place, and the pending implementation of energy reduction targets, benchmarking data collection, and an Asset Management System for reporting and documenting results, the county can quickly demonstrate to these funding sources the effectiveness of its proposed projects and programs. It will also be positioned to leverage county and local funds to the greatest benefit and evaluate anticipated funding sources that may materialize in the near term such as carbon credits and other renewable energy incentives.

In addition to these recommendations, St. Louis County should also outwardly publicize its successful efforts to date and the forward-looking vision developed during Phase 1 of the EECS plan. This will not only enhance its image as a responsible steward of county funds, but also demonstrate to county residents and businesses that it intends to continue to pursue efficiencies, attract funding, and enhance the quality of life in Northern Minnesota.

Appendix E- Asset Management Strategy Example

Executive Portfolio Summary by Region

Report Parameters

Department

Property Management

Division/District

Dukuth Campus, Hibbing, Virginia

Backlog Period: 3

Cost include 4.70 inflation rate.

Backlog is not inflated.

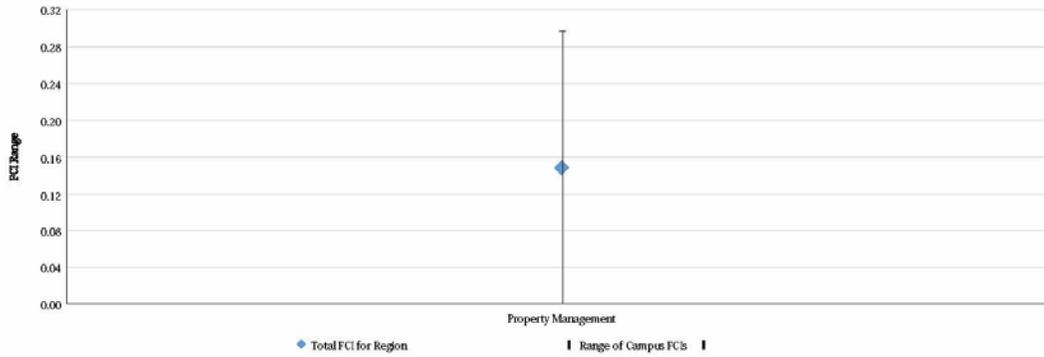
Key Statistics

Total FCI: 0.148

Portfolio Size: 643,213 SF (\$9,756 SM)

Portfolio FCI Range

This section displays minimum, maximum and overall facility conditions based on FCI. The facilities' average age and the backlog (projected costs associated with the group of facilities over the specified timeframe) are also provided.

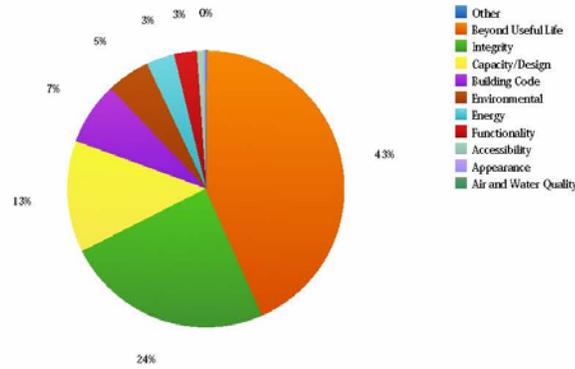


Department	Minimum FCI	Maximum FCI	FCI Range	Total FCI	Average Age	Backlog
Property Management	0.000	0.295	0.295	0.148	41.9	21,027,036

Distribution of Requirement and Renewal Costs by Category

This section displays a segmented roll-up of requirement and renewal costs.

Executive Portfolio Summary *by Region*

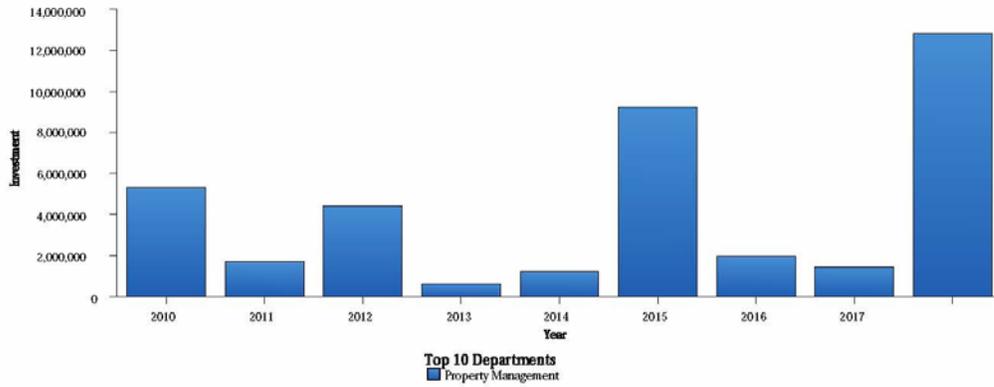


Category	Estimated Cost	Percentage of Total Cost
Beyond Useful Life	16,788,504	43%
Integrity	9,390,468	24%
Capacity/Design	5,063,446	13%
Building Code	2,833,553	7%
Environmental	1,969,058	5%
Energy	1,277,210	3%
Functionality	1,034,170	3%
Accessibility	303,207	1%
Appearance	90,635	0%
Air and Water Quality	25,018	0%
Other:		
Operations	12,510	0%
Life Safety	345	0%
Total:	38,788,124	100%

Investment Summary By Region

This section displays the Estimated Cost of Requirements, including both renewal and non-renewal Requirements, based on the Year of the Recommended Action Date or Override Action Date of the relevant set of Requirements.

Executive Portfolio Summary by Region



Region	2010	2011	2012	2013	2014	2015	2016	2017	Total
Property Management	5,323,089	1,702,127	4,418,991	632,506	1,214,695	9,256,206	1,968,538	1,450,896	38,788,124
Total:	5,323,089	1,702,127	4,418,991	632,506	1,214,695	9,256,206	1,968,538	1,450,896	38,788,124

Notes:

- **FCI** (for an individual Asset) is calculated as its Deferred Maintenance Costs divided by its Current Replacement Value. **Total FCI** (for multiple Assets) is calculated as the sum of the Deferred Maintenance Costs of selected Assets divided by the sum of their Current Replacement Value.
- **Current Replacement Value** is calculated as the sum of the Replacement Cost of all Systems within the selected Assets, unless the Worksheet method of calculating replacement value is selected for an Asset, in which case the specified Asset Replacement Value for those Assets is used.
- **Deferred Maintenance** (also known as **Backlog**) is calculated as the sum of the Estimated Cost of Requirements for the selected Assets that have:
 1. A "Requirement Status" Closed.
 2. A "Requirement Prime Action" with "Estimated Action Date" " OR "Action Override Date" either in the past or:
 - Within the period specified in "Future Years Included" within Configuration FCI Settings (if no value is selected "Backlog Period (Years)" as a report parameter) OR
 - Within the "Backlog Period (Years)", if a value is input for "Backlog Period (Years)" as a report parameter.
 3. A "Requirement Category" that is included in FCI, as determined by Configuration FCI Settings. (Renewal Requirements are included in this total if they meet the criteria above and if the "Exclude System Renewals" checkbox is unchecked in the FCI Settings.)

Appendix F- Best Practices

<http://www.nextstep.state.mn.us/energyconference/090122otto.pdf>