

Energy Efficiency Audit of the 2009 Update of the Community Facilities and Utilities Chapter

The ARRA Energy Efficiency Conservation Block Grant through the New Hampshire Office of Energy & Planning provided funding for this project.

In regard to energy efficiency, the audit looked at the goals and objectives, community facilities, private facilities tables and graphs, and appendices contained in the 2009 Update of the Community Facilities and Utilities Chapter. The purpose is to provide energy efficiency recommendations to the City of Dover for use in their Sustainability Plan.

Section 1: Goals and Objectives

Public Facility Goal: Plan for, develop and maintain an efficient *and integrated* system of public facilities and services to accommodate anticipated growth and development.

Continue to use the 2009 Master Plan Goals and Objectives

Objective 1: Promote a pattern of growth and development that is sustainable and allows for cost effective delivery of services consistent with the needs of the City.

Revision to Objective 3: Program public facility improvements through a Capital Improvement Program (CIP) that is based upon the policies and actions from this Master Plan and an appropriate system of priorities *that encourage energy efficient projects.*

Objective 6: Establish a task force to identify, evaluate and implement a formal Citywide Building Maintenance Plan that identifies and addresses maintenance issues in a cost effective and efficient manner.

Objective 7: Consider requiring that new municipal building construction meet *LEED* certification standards and take steps to improve the energy efficiency of existing municipal buildings and operations.

Revision to Objective 8: Encourage the Energy Advisory Committee to develop *and update an* Energy Action Plan to reduce dependence on traditional fossil fuels within municipal operations and decrease electricity and natural gas consumption.



Section 2: Purpose

This Master Plan Chapter includes all of the Cities community facilities and utilities. The goal is to implement energy efficiency in the community facilities and utilities for energy savings and economic benefit. The Local Energy Committee could develop an Action Plan for reducing energy use and greenhouse gases.

Section 3: Background

Dover has already signed up to participate in the Peregrine web-based tool that provides a benchmarking tool for municipalities. Dover established a Local Energy Committee in February 2007. In **2006** the City of Dover committed to the Sierra Club's "Cool Cities" for Climate Protection Campaign and the U.S. Mayors' Climate Change Agreement. As a result the Dover Energy Advisory Committee (DEAC) was created to assist in: creating recommendations for energy conservation policy and procedures; to develop energy efficiency and renewable energy projects; to reduce greenhouse gas emissions; and to work to insulate the City from fluctuations in future energy costs. In March 2008 DEAC published Dover's first "Energy Action Plan" which included a detailed report of the City's energy use, energy costs and greenhouse gas emissions and recommendations.

DEAC has conducted several energy-related educational outreach efforts in the City, advocated for green development of the Cocheco Waterfront Development, worked with City planning staff to incorporate energy efficiency and sustainability into the land use chapter of the Master Plan, and guided the current performance contract with energy services company Johnson Controls (JCI) now under implementation.

Facility Improvement Measures were identified as a result of the **2009** detailed energy audit conducted by JCI of municipal buildings. The goals of the JCI contract are to cut energy costs, provide capital upgrades, increase the energy efficiency and the reliability of the City's mechanical and electrical systems, and maintain or increase occupant comfort and well-being. The Dover Energy Advisory Committee provided input to the City in the selection of measures to implement, and seven of fifteen improvements have been completed since September 2009. Examples of these efforts include improved weatherization and insulation, increasing lighting efficiency, and water conservation at municipal facilities, including City Hall.

The Department of Planning & Community Development is currently in the process of coordinating a cohesive approach to sustainability for the City through the development of a municipal Sustainability Plan & Sustainable Dover initiatives

To use quotes from this section:

The citizens of Dover have come to expect a high level of municipal services from the City and its employees. The City delivers a wide and diverse range of services to the



residents and businesses of the City. The Committee realizes that implementation of this plan would require staff resources and funding for replacement parts and maintenance supplies, but in the long run, well maintained facilities will operate more efficiently and have a longer useful life.

Section 4: Introduction

Fire and Rescue Service



Central Fire Station at 911 Broadway

Fire and rescue services have buildings in three locations: Central Fire Station, South End Fire Station, and Liberty Way Fire Station.

Recommendations:

- Benchmark the energy usage and carbon footprint of each of the three buildings using Peregrine web-based tool.
- Identify ways to save energy in each of the buildings such as weatherization or energy lighting upgrade.

Police Department

The Dover Police Department is currently housed in a 13,159 square foot space in the basement of Dover City Hall where it has been since 1935. In this space are offices,



meeting rooms, storage areas, a booking room and cell block. Additionally, several offsite locations are being used. At present the Police Department is operating in a facility that is undersized and insufficient to meet the needs of the agency or the community. There is a lack of both work and storage space. As the City continues to grow, this situation will become more problematic. Future growth will also require a level of personnel to accommodate this growth. That study declared that the Dover Police Department needed 28,107 SF to provide adequate space for all employees and programs with an additional 8,000 SF required for proper police vehicle and large item evidence storage.

Recommendations:

- Benchmark the energy usage in current facility.
- Establish a police facility as recommended in the 2007 Space Needs Assessment, with consideration being given to re-location into existing available buildings in the downtown area or the construction of a new facility in conjunction with a potential municipal parking garage. Priority should be given to energy efficient projects or LEED certification standards.

Schools

The City of Dover currently operates three elementary schools (Woodman Park, Garrison, and Horne Street), a middle school, and a senior high school with a regional career and technical center. All of these facilities are within a three-mile radius of City Hall.

Recommendations:

- The School Board should work cooperatively with the City Council to fund the Capital Improvement Program to provide for these renovation projects with priority given to energy efficiency.
- Identify energy efficiency projects and get children involved with pilot projects.
- Consider joining the Collaborative for High Performance Schools

Current Master Plan goals:

- *Renovate Horne Street School no later than 2010*
- *Renovate Garrison Elementary School no later than 2012*
- *Renovate Dover High School and Career Technical Center no later than 2015*

Library

The Dover Public Library, built in 1905, is constructed of brick and granite with a slate roof. Its size is 20,000 square feet spread over three floors. In 1988, a 6,000 square foot, 2-story addition was completed on the library's parking lot side which included an enlarged Children's Room on the ground level, and an expanded periodical and seating



area on the main floor.

Recommendations:

- A century-old slate roof is in need of significant repair. Pilot project for green technology.
- Crowded Parking Lot: as McConnell Center agencies' programs have grown, and library usage has increased, from 9-2 on weekdays, it is often difficult to find a parking spot in the Library Parking Lot. This has led to numerous and often daily patron complaints. Encourage bikes by having multiple bike racks.

City Hall

The present City Hall was dedicated in 1935 and was designed to be completely fireproof. The only wood used in construction was for interior finishing. It contains one million bricks, 190 tons of steel and 16 fireproof vaults. It has three functional floors. The basement houses the Police Department. On the main or second floor there are a number of City administrative offices including: City Manager, City Clerk/Tax Collection, Information Technology, Assessing, Economic Development, and Planning and Community Development. The third floor holds the Legal Office, Finance, Accounting, Purchasing, and Water and Sewer billing, a large auditorium and the City Council Chambers/conference room. The auditorium can hold up to 900 people. Human Services, the administrative offices of Community Services, and Building and Inspection Services which were located in City Hall, have been relocated.

Recommendations:

- The City should develop a detailed maintenance plan for City Hall that covers the electrical, plumbing, heating, and telephone systems. Funding dedicated to the maintenance of the building and its systems should be included in each operating budget and implement energy efficient projects.
- Renovations to City Hall should be done in a manner that respects the historic nature of the structure so that the building will retain its historic integrity but using high energy standards.

McConnell Center

The McConnell Center Renovation project is a multi-million dollar rehabilitation of a 103,000 square foot former school facility into a multi-generational human service based community center. The renovations to the building were energy efficient, such as the replacement of over 240 windows.

Recommendations

- The City should develop a detailed maintenance plan for the McConnell Center that covers the electrical, plumbing, heating, and telephone systems. Funding



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dedicated to the maintenance of the building and its systems should be included in each operating budget.

- The roof sections on the building should be replaced as soon as deemed necessary according to the selected bid received from the roofing contractor perhaps with a pilot project for alternative energy.
- A review of Johnson Controls INC performance contact.
- Stay on top of maintenance plan for highest energy efficiency.

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City of Dover Facilities Listing

DESCRIPTION	ADDRESS	INSURED VALUE	CONSTRUCTI ON MATERIAL	SQ. FT.	YEAR
Armory	99 Oak St	2,048,000	mason	15,047	1961
Empty car garage	Glen Hill Rd	229,760	Metal	5,000	1961
Veteran's Bldg	156 Back River	347,687	Wood	2,522	
Butterfield Gym	6 Washington St.	4,001,522	Brick	26,227	
McConnell Center	30 St. Thomas St.	12,702,000	Brick	82,496	1904
City Hall/non-Police	288 Central Ave	6,120,254	Brick	44,844	1934
City Hall - Police	46 Locust St	2,622,966	Re: City Hall	57,144	
Police Storage	River Street	159,151	Metal	2,128	1982
Horse Stables Int'l/Ext'l Improvements	75 Cocheco St.	15,000	Wood		
Durham Rd. Fire Station	25 Durham Rd	1,015,000	Cinder Block	7,471	
Broadway Fire Station	9-11 Broadway	942,708	Brick	7,458	
Liberty North End Fire Station	262 Sixth Street	3,367,000	brick	17,554	2008
Sand/Salt Shed	River St.	48,000	Alum/Poly.	1,680	
New PW Facility	271 Mast Road	3,919,337	Prefab Steel	44,324	2001
New PW Fac. Sand/Salt Shed	271 Mast Road	220,000	Concrete Tent	9,240	2001
Pole Barn New PW Facility	271 Mast Road	258,582	Wood	6,700	2001
Recycling Center	271 Mast Road	89,453	Concrete	1,392	2002
Morningside Park Shelter	29 Riverdale Drive	1,600			
Garrison Hill Park Shelter	Garrison Hill	1,600			
Admin/Rec. Building	23 Bellamy Rd	233,425	Wood	2,240	
Garrison Hill Observatory	10 Garrison Hill	297,312		2,898	
2 Picnic Shelters	60 Henry Law Ave	9,400			
General Storage	271 Mast Road	12,900	Concrete	192	1989
Cemetery Tomb	131 Central Ave	95,685	Brick	432	1800
Cemetery Barn	35 So Pine St	307,161	Brick/block	4,224	1900
Cemetery Chapel/office	131 Central Ave	700,334	Brick/block	3,908	1911
Indoor Pool	6 Washington St.	3,426,000	Brick		1968
Guppy Park Softball Bldg	150 Portland Ave	6,400	Concrete block		1989
Guppy Pool Storage/Pump Bldg	150 Portland Ave	96,608	Concrete Block	576	
Guppy Pool Pavilion	150 Portland Ave	44,000	Wood	1,254	1990
Guppy Park Bath House	150 Portland Ave	108,784	Concrete Block	630	
Jenny Thompson Pool	150 Portland Ave	1,245,000	Concrete		
Shaw's Lane field house	14 Shaws Lane	127,000	wood	1,200	2008
Train Station & Platform	32 Chestnut St	205,026	Wood	1,000	2001
Dover Public Library	73 Locust St.	3,099,005	Brick	24,081	1905
Cell Phone Tower	271 Mast Road	110,000	Metal		2003
Pedestrian Foot Bridge	30 River St	285,000	Wood	1,480	
Dover Ice Arena	110 Portland Ave	6,517,807	Metal/Concrete	61,854	2000
Total City		\$55,036,467			

Waste Management

The City has a curb-side Bag & Tag and recycling program whereby residents purchase trash disposal bags for waste that is collected and disposed of in Turnkey Landfill in Rochester. In addition, the City provides recycling bins for a variety of recyclable materials including glass, cans, newsprint, plastic and paperboard.

Recommendations:

- Improve on the city-wide recycling rate of 52% by finding more ways of making recycling easier
- Find a suitable location in the city to compost residential yard waste and chip Brush.

Fleet Services

The Fleet Services division within the Community Services Department services and maintains city vehicles for the following Departments: Community Services, Inspection, Police, School, Recreation, Assessing, and Administration. The division also performs these services for outside municipalities and departments such as: Dover House Authority, Strafford County Sheriff, Riverside Rest Home, Strafford County Attorney's office, Town of Madbury, and Town of Lee. Outside services are performed at an hourly rate plus parts. The division provides quality vehicle repair services and implements vehicle management practices to all City of Dover vehicles at an economical cost.

Recommendations:

- Maintain a consistent and appropriate level of vehicle replacement funds.
- Initiate fuel savings measures with economical, fuel efficient vehicles.
- Explore the use of alternative fuel vehicles that utilize fuels such as compressed natural gas (CNG), ethanol, and biodiesel. This could be a regional effort with a shared distribution facility, *such as the CNG facility at UNH*.
- Enforce Citywide idling policy.

Facilities, Grounds, and Cemeteries

Extensive pruning and some tree removal is necessary in the grounds. The City should replace the dead or dying trees. There are around 15 acres still open and available for use.

Recommendations:

- The City should develop a detailed maintenance plan for all City buildings and facilities that covers the electrical, plumbing, heating, and telephone systems.



Funding dedicated to the maintenance of each building and its systems should be included in the City's operating budget.

- The City should conduct a study to determine how many years the remaining space in Pine Hill Cemetery will meet the needs of the citizens, so that it can start looking for additional cemetery space or developing a plan to more efficiently utilize the existing cemetery space.
- The City should develop a tree replacement program in the cemeteries to insure that new trees are planted to replace those trees that are lost due to disease or weather.

Water Systems

The City of Dover has municipal water service available to almost 68% of the City's land area and provides water to over 85% of the City's households and businesses. Currently the system provides for 8100 customers. The Water Division is funded through user fees charged to customers based on their water consumption. Water supply in the City is provided entirely from groundwater withdrawal. Surface water withdrawals from the Bellamy and Isinglass Rivers during certain times of the year supplement the recharge of two aquifer areas—the Pudding Hill and Hoppers Aquifers. Dover's eight wells have a combined safe yield pumping capacity of 5.2 million gallons per day. The average demand has remained at this level due to the reduction in industrial users, a change out of the commercial and residential meters, and a concerted program to find and repair leaks within the system.

Recommendations:

- Investigate the feasibility of instituting a program of life-cycle costing for all Water Division assets to determine the annual expenditures required to maintain an efficient system of water service to the citizens of Dover.
- Based upon the results of the life-cycle costing program, prioritize and schedule the repair, maintenance, and, when necessary, the construction of those water facilities as part of the City's capital improvement planning process.
- Identify areas that use the highest amounts of water.
- Identify areas where there could be leaks in the system.
- *Educate water users about conservation of water as first priority.*

Sewer Systems

There are approximately 119 miles of sewer lines existing in the City of Dover, of which 15 miles are force mains. The lines vary in size from 8" to 36" in diameter and service approximately 38% of the area of the City and 85% of its residents. The lines generally consist of vitrified clay, reinforced concrete, cement asbestos, and more recently polyvinyl chloride (PVC). In addition, there are 20 pump stations located throughout the City to pump sewage to the waste treatment plant.

Recommendations:



- Identify pump stations that are energy inefficient to prioritize for energy efficiency upgrades.
- Continue the City's program for correcting inflow/infiltration (I/I) problems into the sewer system. The purchase of multiple flow meters will help in isolating the major sources within the system

Section 4: Recommendations

The City has undertaken many efforts to conserve energy and reduce energy cost. These are additional recommendations for the Community Facilities and Utilities Master Plan:

1. Create an inter-departmental task force, such as sustainability team, within the City government to provide key information in energy reducing projects.
2. Continue saving energy with the "low hanging fruit" by identifying cost effective projects for City owned buildings
3. Identify an Energy Champion working within the City and assign task related to energy efficiency.
4. Work with the Local Energy Committee to implement the Action Plan for the City of Dover.
5. Put Energy Efficiency projects on the Capital Improvements Plan – labeled as such.
6. Cooperation or consolidation of urban services among municipalities, special districts and companies should be encouraged, when appropriate, to avoid duplication and overlapping costs and to establish a satisfactory level of quality, quantity and dependability of those services.
7. The sustainable energy aspect is to know by location, type, and population where the City meets adopted standards and where there are unmet needs. By adopting and reviewing these standards, the City would be able to objectively make decisions about development and design of new facilities, marketing of facilities and programs, additional facilities and locations, etc.
8. Electricity, heating, cooling, lighting, water, irrigation, stormwater maintenance and operational costs are not clearly indicated, nor is it clear whether the updates to parks and facilities incorporated energy efficiency, and conservation measures and products.
9. The sustainable energy aspect would be to have a database of each facility and park with detailed information about energy, conservation measures integrated with City policy and standards. For example, in the City Hall identify energy efficiency opportunities and showcase them within the building and on the sustainability website for example the low flush toilets.
10. Creating a budget that documents various City costs for maintenance and operation costs could help build support for annual and capital budgets. For instance, a budget could have the following categories by hour: mowing, trimming and litter removal; general outdoor maintenance; general indoor maintenance; gardens and forestry; etc.



City of Dover
Strafford Regional Planning Commission
Energy Technical Assistance & Planning for New Hampshire Communities

11. By creating the sustainable energy policy, standards and practices, Dover should be able to be proactive and achieve its greatest potential for the benefit of its residents and visitors.
12. Research the PSNH Smart Start Program and the CDFA Municipal Energy reduction fund for funding opportunities.
13. Look into energy performance contacts for other buildings and push for thermal envelope savings.
14. Consider a Power Purchase Agreement which is a contractual agreement to purchase electricity at set price from supplier that uses alternative energy.
15. Consider joining the GHG emissions reduction fund.
16. Use the NH LGC 'Power Down' energy conservation campaign http://www.nhlgc.org/Images/resources/PowerDown_DoorSign.pdf. This would help with behavior changes by City staff.