



Summary of the Activities and Accomplishments of the Energy Independence Subcommittee

April 2008

Issues related to energy use and emissions have moved to the forefront of policy debates on the local, state, and national levels. In response to increasing energy costs and environmental concerns, the Energy Independence Subcommittee (EIS) was established in the spring of 2007 as a joint subcommittee of three County Board standing committees: the Personnel & Finance Committee; the Environment, Agriculture and Natural Resources Committee; and the Public Works and Transportation Committee.

Membership

The Energy Independence Subcommittee was comprised of six members, two appointed by the chair of each parent committee. The members of the Subcommittee were:

- Supervisor Matt Veldran, Chair of the Subcommittee (Public Works and Transportation Committee)
- Supervisor Dave Ripp, Vice-Chair of the Subcommittee (Public Works and Transportation Committee)
- Supervisor Kyle Richmond (Environment, Agriculture, and Natural Resources Committee)
- Supervisor Chuck Erickson (Environment, Agriculture, and Natural Resources Committee)
- Supervisor Tom Stoebig (Personnel and Finance Committee)
- Supervisor Brett Hulsey (Personnel and Finance Committee)

Staff from throughout county government assisted in the Subcommittee's work. Specifically, the Subcommittee heard presentations by staff from the Dane County Regional Airport, the Department of Administration, the Department of Human Services, and the Department of Public Works and Transportation. The Office of the County Board provided staff support.

Scope

The charge to the subcommittee was to address the following issues:

- Short term and long range energy planning to increase Dane County's energy independence through conservation and increased reliance on alternative sources of energy.
- Development of a comprehensive approach to reduce emissions to address global warming; which may include efforts such as hybrid cars for the county fleet, wind generation, light bulbs for county residents, and LEED certification for county buildings.

Activities

Over the course of eight meetings between June 2007 and April 2008, the Subcommittee learned about current Dane County energy efficiency efforts as well as initiatives in counties across the



country. Travis Myren, Assistant Director of Administration, shared information regarding Dane County's energy conservation measures and projects, including the green courthouse project and performance contracts for energy efficiency projects. He also compiled data on county fuel use and energy consumption by department. These documents can be found in Appendix A.

One of Dane County's energy initiatives is the conversion of methane to electricity at the landfills. Jerry Mandli, Director of the Department of Public Works, Highway, and

Transportation, and Mike DiMaggio, Dane County Solid Waste Manager, made a presentation to the Subcommittee regarding the county's gas wells, including information about the revenue generated for the General Fund, and the technological improvements needed to use less concentrated gas.



The Subcommittee discussed vehicle use and purchasing policies. Alternative fuel vehicles remain more expensive than conventional fuel vehicles. Many of the vehicles that the county purchases are for specialized uses, such as patrol cars or trucks for the Department of Public Works, Highway and Transportation use. The Subcommittee learned that there are currently no required criteria for fuel economy.



The City of Madison has created an Office of Facilities and Sustainability, and Jeanne Hoffman, the Office Manager, provided the Subcommittee with a presentation regarding the City's efforts and approach to sustainability. Madison has used the Natural Step approach to train staff to identify sustainable practices. They are also joining ICLEI and will use that organization's software to measure greenhouse gases and other emissions. Some of the efforts the City of Madison has implemented include solar hot water heat at the fire stations, use of green cleaning supplies, and a reduction in the fleet of recycling and refuse trucks.

Much of the Energy Independence Subcommittee's efforts were focused on the energy efficiency and alternative energy opportunities for the new Badger Prairie Health Care Center. Scott Carlson, project manager for the effort with the Department of Public Works, Highway, and Transportation, worked with the architect so the building would be LEED certifiable, and worked with Focus on Energy to identify incentive payments for efficiency improvements. The Subcommittee urged greater consideration of alternative fuels to heat the building, as well as the

use of solar energy for hot water heat. As a result of the Subcommittee's work, the architect is studying the feasibility of using biomass or geothermal to heat the new facility.



One of the charges to the Subcommittee was to develop an approach to reduce emissions. The Subcommittee discussed approaches to measure energy use, develop a benchmark, and monitor emissions over time. There are various organizations that support software to help communities create an emissions inventory, develop baseline data and an emissions reduction plan. The Subcommittee heard a report by an intern for the County, Michelle Vigen, who reviewed the advantages and disadvantages of a number of options. Based on this information, the Subcommittee requested the Dane County Department of Administration to submit data for the years 2000 and 2006 to the Chicago Climate Exchange and, pursuant to their initial assessment, request the Public Works and Transportation Committee to explore membership in either ICLEI (the International Conference of Local Environmental Initiatives) or the Chicago Climate Exchange. Ms. Vigen's report is attached as Appendix B.

Accomplishments

The accomplishments of the Subcommittee fall in to three areas: efforts related to the 2008 Dane County budget, impact on the construction of the new Badger Prairie Health Care Center, and review of options for a framework to measure emissions.

Subcommittee members supported budget initiatives that were, in part, an outgrowth of the Subcommittee's work.. One amendment to the 2008 budget requires the Dane County Regional Airport to purchase 20 percent of its electricity from renewable sources. In 2006, the Airport consumed 8.2 million KWH of electricity. The premium charged by MG&E to purchase



electricity generated by alternative energy sources is one cent per KWH. At this price, the Airport will spend approximately \$16,600 for 20 percent of its electricity to be generated by alternative sources.

The County Board also amended the 2008 budget to include funding for a sustainability project. The amendment provides \$5,000 for a consultant to assist staff in developing sustainable practices for Dane County government.

The Energy Independence Subcommittee worked to have the new \$21 million Badger Prairie Health Care Center facility include not only energy conservation measures, but possibly alternative energy sources for heat and hot water heat. At the Subcommittee's initiative, the County Board adopted a resolution to fund the feasibility of using biomass to heat the new building and using solar energy for hot water heat. The use of geothermal energy to heat the new facility is also under consideration.



Over the course of their meetings, the Subcommittee discussed the need to create an inventory of emissions, develop a baseline year, and plan to reduce greenhouse gases and other pollutants. Their interest in this issue led to Michelle Vigen's summary of the advantages and disadvantages of various frameworks to measure emissions. The Subcommittee has laid the groundwork for the County to move forward in this important initiative.

Next Steps

Two recent County Board actions should insure that the Subcommittee's work will continue both through standing committee and staff efforts.

The proposed County Board Rules for the 2008-2010 County Board term (Chapter 7 of the Dane County Code of Ordinances) provide that the Public Works and Transportation Committee has responsibility for energy and sustainability efforts. Draft language for the County Board Rules specifies that the committee: “Oversee the development and implementation of sustainable practices for county facilities, including the possible use of alternative energy sources and energy efficient measures in the construction, improvement, repair or maintenance of county buildings and grounds; and the development of greenhouse gas benchmarks and monitoring of emissions from county facilities and fleet.”

At the same time, the County Board approved Resolution 210, 07-08, Dane County Researches Sustainable Practices in its Operations, Management and Policymaking which calls for the creation of a county staff team to begin the preliminary planning necessary to develop recommendations and identify budget implications to implement sustainable principles for Dane County operations. This effort will be funded by the \$5,000 in the 2008 budget to introduce key managers to the Natural Step and identify approaches for staff training and for sustainability improvements to consider in the next budget cycle.

The Energy Independence Subcommittee laid the groundwork for making energy-related issues central to the County’s operating practices. By incorporating the issues of energy, sustainability, and emissions measurement in the County Board’s standing committee structure, and by weaving sustainability into daily staff practices, the County will be able to more effectively address energy use and monitor and control emissions in the years to come.

*Karin Peterson Thurlow
Office of the Dane County Board of Supervisors
April, 2008*

Energy Conservation Measures and Projects

- **Green Courthouse Project**

The courthouse project has been based on sustainable design principles guided by LEED (Leadership in Energy and Environmental Design) standards. The courthouse budget contained \$400,000 specifically for green building elements, although green building standards were incorporated throughout the design and construction phases.

- Preparing the courthouse site required the demolition of an existing office building and the movement of a smaller office. In the deconstruction phase, 6,900 tons of the material was diverted from landfills through reuse and recycling efforts.
- The 4th floor features a roof garden terrace at a cost of approximately \$30,000.
- Several other building features are consistent with LEED standards. The Weidt Group estimated the payback time(s) noted below.
 - Low E glazing on windows (*very long term payback*)
 - Stepped light controls in offices and light shelves to even the distribution of daylight (*3.2 year payback*)
 - Occupancy sensors for interior lights (*2-9 year payback depending on office type and size of area*)
 - High efficiency centrifugal chiller (*48.7 year payback*)
 - Individual air handling units on each floor to reduce duct length and fan energy
 - High efficiency motors with variable frequency drives (*4.4 year payback*)
 - Demand control ventilation for all floors including the garage

- **Green Features – Airport Terminal Expansion**

The Dane County Regional Airport completed a terminal expansion project in 2006 that incorporates many sustainable design and construction measures. The \$65 million project was constructed in three phases over five years, beginning in 2001. Many of the green building and efficiency features are listed below:

- Recycled materials were used throughout the building, and construction debris was separated and sorted, with 98 percent collected for recycling (40,000 tons).
- A building automation system dims lights and modifies heating and cooling to unused areas of the terminal.
- A chiller plant makes ice at night which is then used to cool the building during the day to lessen utility spike demand.
- Natural daylighting was used with sun control/shading devices with low-E /fritted/tinted non-reflective glazing.
- The structural steel was domestically fabricated and had re-cycled content.
- Energy Star top rated Class A white membrane roofing was installed.

- The lighting system uses resource efficient metal halide/fluorescent lighting
 - Accoustic ceiling tiles were manufactured from recycled soda bottles for public areas.
 - Low water consumption plumbing fixtures with automatic shut-offs were installed.
- **Performance Contract for Energy Efficiency Projects**
The County used a performance contract with Johnson Controls under to identify, install, and finance energy efficiency projects. Under the performance contract, the contractor guarantees a level of energy savings which can be used to fund the debt service on project costs. If the savings estimated by the contractor is not realized, the contractor will pay the difference between the estimated energy savings and the real energy savings. This project qualified for a \$60,000 grant from Wisconsin Focus on Energy. Under the plan, the County completed the following projects:

- T-8 Lighting Upgrade – 1st Floor CCB
- Installed ¾ inch Parabolic Louvers – Madison Police Department Offices
- T-8 Lighting Upgrade in all CCB stairwells
- New Chiller and Pumps - CCB
- Insulated exposed steam and water pipes – BPHCC
- Automated Curtain Fan Control – CCB
- Upgraded all HVAC controls – CCB and PSB
- Automated Snow Melt System on Garage Entrance – PSB

After deducting the grant award, the total project cost was \$575,845 with an estimated simple payback of 9.3 years and the following energy saving projections:

- 602 kW/mo. peak demand reduction
- 911,600 kWh per year
- 10,900 therms per yr
- \$57,250 per year energy savings
- \$6,100 per year operational savings

These projections are being verified by Dane County Public Works for the first year of operation.

- **Performance Contract for Alliant Energy Center Building Improvements**
The Alliant Energy Center of Dane County has also used a performance contract to complete the following improvements. The total project cost was \$467,700 after applying a \$31,100 energy savings grant. The total annual savings is expected to be approximately \$72,000 making the term of the simple payback 6.5 years.

- **Exhibition Hall Improvements**

- Replaced 1000W metal halide lighting and T12 florescent lighting with 750W pulse start metal halide and T5 florescent lighting
 - Saves 217,364 KW/year
- Installed a high speed door on loading dock
 - Saves 20,261 KW/year and 23,366 Therms/year

- **Coliseum Improvements**

- Replaced T12 florescent lighting with T8 florescent lighting on concourses
 - Saves 309,369 KW/year
- Installed Metasys temperature control system
 - No guaranteed savings
- Installed 12 new steamtraps
 - Saves 3,833 Therms/year

- **Alliant Energy Shared Savings Program**

The County financed lighting upgrades at the Badger Prairie Health Care Center through a shared savings program where payments are made with energy savings resulting from installation of the new equipment. The upgrades are estimated to save 474,618 kWh and \$26,768 annually. No new funds were required to participate in this program.

- **Dane County In-House Conservation Program**

The Division of Facilities Management has developed an in-house conservation program (attached) that outlines energy conservation measures employees should follow to reduce energy consumption. Measures in the plan include:

Light Metering

The Facilities Management Division offers light metering to check the lighting levels at employees' workstations and adjust them to proper standards. In many cases, lights can be removed resulting in energy savings.

Hand Sanitizers

Hand Sanitizers are now being installed in the Public Safety Building and the City County Building. By using the Hand Sanitizers, employees can clean their hands safely while conserving water.

Online Reports of Wasted Energy

The Facilities Management Division has an online form through which employees are encouraged to report wasted energy.

- **Photovoltaic Panels**

Dane County Arena

- 16-panel array
- 4.8-kilowatt (kW) DC, 5,612 kilowatt-hours (kWh) per year
- Manufactured by ASE America
- Installed by Great Northern Solar and H&H Electric

Dane County Henry Vilas Zoo

- Dual-axis tracking array
- 1.2-kilowatt (kW) DC, 1,950 kilowatt-hours (kWh) per year
- Manufactured by ASE America
- Installed by H&H Electric

Lussier Family Heritage Center

- 2-panel array with dual-axis tracking
- 1.32-kW DC, 2,150 kilowatt-hours (kWh) per year
- Manufactured by Sharp USA
- Installed by H&H Electric

- **1st County in the State with a Green Building Policy**

Virtually all recent construction projects have had Green Building elements. Examples include:

Coliseum Chiller Replacement

This Alliant Energy Center replaced the chiller for ice-making equipment and augmented the building HVAC using ammonia chillers and highly efficient mini-screw compressors. The use of ammonia refrigerant is energy efficient, cost efficient, and environmentally sound. The specification of mini-screw compressors is an energy and a life-cost efficiency measure.

Badger Salt Facility

The Badger Salt Facility is a Highway and Transportation Department Building that stores road salt used to melt snow and ice on state and county highways. The facility features berms, a detention pond, and other landscaping elements that contain the salt in a limited area, control site erosion, and prevent salt absorption into the soil. Low energy radiant heat along with individually controlled fans for heating, cooling and fresh air intake were also installed as energy efficient elements.

Heritage Center

This Parks facility was designed with low E glass windows to provide adequate daytime lighting while minimizing unwanted heat gain and loss. The artificial interior lighting is high efficiency T-8. The facility also provides roof water collection for a water garden to minimize run-off, and the basement was planned

for practical uses other than storage to maximize the overall utility of available space.

Lake Farm Campground Facility

This Parks facility uses energy efficient separated bank lighting with T-8 fixtures. The windows are glazed with low E glass, and roofing and toilet partitions are manufactured from recycled plastic. Both the exterior and interior surfaces are finished with maintenance-free materials, and the showers have individual light sensors and heat timers. Other energy efficient equipment includes high efficiency water heaters, automatic shut-off faucets, and water saving toilet flush valves.

Parks Pit Toilets

These Parks structures are constructed with maintenance-free interior and exterior finishes including recycled plastic window frames and trim. The vaults are leak-proof to prevent the contamination of soil or groundwater, and the pits are sealed with odor-free vents. Daylighting also allows the elimination of electricity at these facilities.

p. 6 of 8

**Public Works, Highway
Dane County Fuel Use in Gallons
2006**

	<u>Diesel</u>	<u>Gas</u>	<u>Total</u>
Highway	202,134	50,080	252,214
Emerg Mgmt	187	214	401
Zoo	36		36
Library	2,126		2,126
Coroner	15	1,519	1,534
Land Conservation		2,712	2,712
Land Reg & Rec Zoning		692	692
Environ Health		236	236
Juvenile Court		441	441
District Attny		711	711
Printing & Serv		7,504	7,504
Badger Prairie		716	716
Consolidated Food Serv		2,002	2,002
Facilities Mgmt	67		67
Human Services		5,523	5,523
Human Services-NIP		7,634	7,634
Park Comm	16,516	13,868	30,384
Public Works-Admin		610	610
Public Works-Lake Mgmt	7,323	5,263	12,586
Public Works-Solid Waste	13,040	71	13,111
Sheriff	5,644	176,797	182,441
	<u>247,088</u>	<u>276,593</u>	<u>523,681</u>
Sales to Municipalities	48,102	60,091	108,193

P 7 of 8

**Public Works, Highway
Dane County Fuel Use in Gallons
2005**

	Diesel	Gas	Total
Highway	246,575	43,689	290,264
Emerg Mgmt	192	391	583
Zoo	95		95
Library	2,119		2,119
Coroner		704	704
Land Conservation		2,784	2,784
Land Reg & Rec Zoning		504	504
Environ Health		207	207
Juvenile Court		418	418
District Attny		659	659
Printing & Serv	29	8,485	8,513
Badger Prairie		805	805
Consolidated Food Serv		2,235	2,235
Facilities Mgmt	76		76
Human Services		5,472	5,472
Human Services-NIP		5,597	5,597
Park Comm	18,288	15,528	33,816
Public Works-Admin		621	621
Public Works-Lake Mgmt	5,729	5,767	11,496
Public Works-Solid Waste	10,186	48	10,234
Sheriff	5,660	185,050	190,710
	<hr/>	<hr/>	<hr/>
	288,949	278,962	567,912
 Sales to Municipalities	50,175	62,655	112,830

Energy Consumption by Major Facility

Facility	2000			2005			2006		
	KWH	E cost	Therms	KWH	E cost	Therms	KWH	E cost	Therms
Courthouse	7,690,928	\$ 420,257	-	7,581,130	\$ 548,833	21,774	2,942,522	\$ 263,055	-
City-County Building	1,029,900	\$ 66,188	235,973	963,219	\$ 84,819	26,864	953,618	\$ 91,537	217,763
Badger/Prairie Health Care Center	7,161,121	\$ 436,440	310,692	6,400,812	\$ 581,458	277,697	6,067,724	\$ 641,467	3,576
Job Center	61,400	\$ 4,956	5,722	60,000	\$ 6,627	4,668	58,320	\$ 7,065	4,556
AEC Campus	112,810	\$ 9,832	14,511	98,838	\$ 10,466	12,125	98,924	\$ 11,554	12,927
Juvenile Shelter	2,650,800	\$ 137,568	2,571	2,615,575	\$ 175,927	2,430	2,596,873	\$ 195,596	4,253
Badger School	457,760	\$ 30,164	4,961	409,600	\$ 37,025	6,208	438,240	\$ 43,436	4,465
Public Safety Building	361,560	\$ 26,779	45,605	319,080	\$ 30,752	55,306	305,760	\$ 33,727	53,489
Lymann Anderson Ag Facility	653,320	\$ 43,824	34,870	688,000	\$ 61,194	31,858	695,480	\$ 68,887	29,626
Highway Main Garage	1,162,175	\$ 58,682	63,269	1,353,155	\$ 121,467	77,714	1,307,540	\$ 132,681	73,935
Northport Campus	411,175	\$ 25,290	27,326	373,760	\$ 30,588	17,270	378,264	\$ 35,085	15,269
Zoo Campus	4,824,267	\$ 263,260	177,049	7,141,599	\$ 538,628	233,150	8,221,164	\$ 668,574	252,788
Ferris Center									
Airport									
Total Major Facilities	26,577,216	\$1,523,240	952,648	28,004,768	\$2,227,784	997,270	30,970,024	\$2,745,299	957,639
Total Countywide	27,814,102	\$1,641,213	1,045,414	30,093,403	\$2,405,358	1,208,956	33,184,658	\$2,966,324	1,040,509
<i>Major Facilities as a % of Total</i>	95.55%	92.81%	91.13%	93.06%	92.62%	82.49%	93.33%	92.55%	92.04%
			90.05%			83.39%			90.53%

p. 8 of 8

Final Report and Recommendation for Dane County Emissions Inventory

Dane County has set a long-term goal of reducing greenhouse gas (GHG) emissions and improve air quality. In order to do this, the County must build an inventory of emissions from county facilities and operations, determine a baseline, project feasible reductions, and develop an action plan which will help Dane County achieve its reduction goals. This report is based on a month of research on what options are available and which is most optimal for Dane County to adopt in order to compile an inventory of its emissions.

Objectives:

1. Achieve long-term goal of reducing GHG emissions and improving air quality.
2. Achieve short-term goal of quickly compiling an inventory
3. Find an option that is cost-effective, requiring minimal upfront costs and staff support.

Options Researched:

A variety of options were researched: initiatives, software programs, and market systems.

- Chicago Climate Exchange (CCX)* - Carbon credit trading market
- Clean Air Climate Protection (CACP)* - Software program currently used by ICLEI
- The Climate Registry (TCR)* - National registry of emissions
- Harmonized Emissions Analysis Tool (HEAT) - Software program used in the past by ICLEI
- International Council for Local Environmental Initiatives, today known as Local Governments for Sustainability or Cities for Climate Change (ICLEI)* - International program supporting local sustainability efforts
- Natural Step - A framework to develop sustainable systems within businesses and governments
- Torrie Smith Associates Greenhouse Gas Strategy Software for Municipalities - New software produced by makers of eMission, another program used in the past by ICLEI
- Wisconsin Department of Natural Resource Voluntary Emission Reduction Registry (VERR) - State registry for voluntary emission reductions

** Indicates those most thoroughly studied and contrasted. Each option was researched and a representative contacted for more details.*

Factors Considered

1. Objective: Build an Inventory, Motivate Sustainable Initiatives, Action which leads to Results
2. Emissions Measured: GHGs and criteria air pollutants, especially particulate matter.
3. Upfront and Long-term costs: Initial cost/First-year costs, Maintenance and Staffing costs
4. Ease of Use: Format, Reporting, Data Entry
5. Reputation: Past reputation and potential for collaboration with other entities and initiatives

Recommendation

After considering the above factors and comparing each software/initiative/registry to one another, this report concludes and recommends that: **Dane County should enroll as a member of ICLEI and utilize the associated software to compile an inventory of its emissions.**

1. ICLEI is the only program that offers an over-arching multi-disciplinary approach (similar to and easily integrated with the Natural Step) coupled with the practical tools (emissions software) to guide its members to achieving sustainable goals.
2. ICLEI's corresponding software (CACP) is the only program that measures and can provide projections for GHGs and criteria air pollutants, including fine particulate matter.
3. ICLEI will have no unpredictable costs that might be related to software or initiatives related to a carbon market. It will cost no more than \$3,500 to join (based on population measurements), and access to the software is included.
4. ICLEI will be very easy to use. The web-based version of the software will allow for minimal staffing for maintenance since entities of the county can potentially enter their own measurements on a regular basis through the internet.
5. ICLEI has an international membership, with many members in countries leading local sustainable movements (Sweden, Australia, etc.). ICLEI has over 350 local members within the United States...of the 1,000 worldwide.

Presently, Dane County must begin work compiling an inventory of its emissions. For this purpose, it is this study's recommendation that Dane County enroll as a member of ICLEI and utilize the corresponding software to compile an inventory of emissions, with the long-term goal of determining a baseline, projecting reductions, and planning actions to achieve its reduction goals.

[The research, this report, and its findings have been advised by Dave Merritt - Clean Air Coalition Project/County Executive Office; and shared with Karin Peterson Thurlow - Policy Analyst/Board of Supervisors, Travis Myren - Assistant Director of Administration, and Ed Jepsen - DNR and State Registry program.]

Submitted by Michelle Vigen, 30 March 2008