

CHAMPAIGN COUNTY BOARD COMMITTEE AGENDA

COUNTY FACILITIES

Brookens Administrative Center, Lyle Shields Meeting Room
1776 E. Washington, Urbana
Tuesday, October 6, 2009 – 7:00 p.m.

CHAIR: Steve Beckett

MEMBERS: Ron Bensyl, Lorraine Cowart, Stan James, John Jay, Michael Richards,
Larry Sapp, Samuel Smucker, C. Pius Weibel

<u>AGENDA ITEM</u>	<u>PAGE NO.</u>
I. <u>Call to Order</u>	
II. <u>Roll Call</u>	
III. <u>Approval of Agenda/Addendum</u>	
IV. <u>Approval of Minutes</u>	
A. September 8, 2009	1-5
V. <u>Public Participation</u>	
VI. <u>Courthouse Masonry/Bell Tower Project</u>	
A. Project Spreadsheet	6
VII. <u>Physical Plant</u>	
A. Monthly Reports (<i>to be distributed</i>)	
B. Update on Implementation of Energy Policy for Champaign County Facilities	7-8
C. Current Projects Update	
1. Courthouse Building Automation Systems	
2. County Clerk Election Equipment Move	
3. Coroner Office Move	
VIII. <u>Chair's Report</u>	
A. Schedule for Co. Board Members Tour of Outlying County Buildings (<i>deferred from September meeting</i>)	9
B. Resolution Honoring Denny Inman (<i>to be distributed</i>)	
IX. <u>County Administrator Report</u>	
A. Update on Nursing Home Life Safety/Smoke Barriers Project	
X. <u>Semi-Annual Review of Closed Session Minutes</u> (<i>deferred from September meeting</i>)	

XI. Other Business

A. Smart Energy Design Report

XII. Designation of Items to be Placed on County Board Consent Agenda

XIII. Adjournment

*Champaign County Administrative Services
1776 E. Washington St.
Urbana, IL 61802
217-384-3776*

*C. Pius Weibel
County Board Chair
Debra Busey
County Administrator*

**CHAMPAIGN COUNTY BOARD
COMMITTEE MINUTES**

COUNTY FACILITIES COMMITTEE

Tuesday, September 8, 2009

Lyle Shields Meeting Room, Brookens Administrative Center

1776 E. Washington St., Urbana, Illinois

MEMBERS PRESENT: Beckett, Bensyl, Cowart, James, Jay, Richards, Sapp, Smucker, Weibel

MEMBERS ABSENT: None

OTHERS PRESENT: Deb Busey, Alan Reinhart, Mark Shelden, Andrew Buffenbarger

Chair Beckett called the meeting to order at 7:00 p.m. A roll call confirmed a quorum was present.

APPROVAL OF AGENDA

MOTION by Smucker to approve the agenda; seconded by James. Motion carried. There was no addendum for this meeting.

APPROVAL OF MINUTES

MOTION by Bensyl to approve the minutes of August 11, 2009 as presented; seconded by Weibel. Motion carried.

PUBLIC PARTICIPATION

No public comments made.

BROOKENS SPACE UTILIZATION SUB-COMMITTEE REPORT

Recommendation for Relocation of County Clerk Election Equipment and Coroner's Office

MOTION by Richards to move the County Clerk election equipment to the Brookens Pod 400 space formerly occupied by State's Attorney Support Enforcement Program and that the Putman Meeting Room be designated for exclusive use of the County Clerk's office in the 6-8 week period prior to any election; and immediately upon the relocation of the County Clerk's election equipment, the Coroner's Office move from Brookens to the Gill Building, with both moves to be completed by November 30, 2009; seconded by Smucker. Richards stated that the Sub-Committee and the involved departments were both happy with the recommendation. Sapp asked for clarification about the move for the County Clerk and were they no longer moving to the old Highway garage. Busey stated the interior of the old Highway garage is not yet adequate to address the Clerk's needs with regard to interior upgrades and there is no budget at this time to address those needs. Sapp asked about the remodeling costs to move the Coroner into the Gill building. Busey and Reinhart determined the interior upgrades at the Gill building will be minimal and includes painting and some wall work to enclose an area for inquest needs. Sapp stated his

difficulty in supporting this recommendation, mainly because the previous recommendation was to move the Clerk's office into the former Highway facility. Richards stated the Mental Health Board program "Parenting with Love and Limits" will be able to move into the vacated Coroner's space. James asked the maker of the motion if he would accept an amendment to the motion to include that the cost of the moves shall not exceed \$10,000. Richards accepted the amendment.

Shelden stated he is not happy with the current situation proposed for his election supplies, but that he was already operating in a situation that was not good either, but will work with what has been given him. He said he knows that Busey has shown a commitment to working towards a better long term solution. Busey stated the costs for this project can be absorbed by the Physical Plant and Administrative Services budgets. She feels that utilities this year may be under spent. Jay said he was troubled by a couple of things. He thought the committee was already working towards a long range plan and that the County Clerk's office would take priority with the vacated highway space. He was not opposed to the Sheriff using the space, but that was not what was originally accepted. He is adamantly opposed to extending the life of the Gill building lease and wondered if there is other space in the area of the County buildings other than the Gill building. Busey stated she hadn't received a directive from the committee, but would work on that if directed. She informed the committee that information regarding metal buildings had been given to committee in the past.

James said the sub-committee had much discussion about different alternatives and that the sub-committee wants to develop a plan but ideas jump around because of all the different ideas. He also said the committee discussed the need to maintain whatever buildings the County may build or obtain. The board needs a plan with regard to building facilities and they need to keep looking for a solution. James said it would be nice to develop a capital plan for facilities. Smucker said the next item on the agenda was about the scope of the sub-committee and they thought that looking at a long range plan was outside their scope. The sub-committee felt the County needs to get somewhere and move forward with how to deal with a County-wide plan.

Bensyl asked about the possibility of the county owned property where the Army Reserve Unit is. Busey said she has sent numerous requests to meet officials about that property as their lease is up March, 2010, but has been unsuccessful in her attempts. Her feeling is that since they hadn't contacted the County yet that they would probably still be staying there. She also said that she has been keeping Peter Tracy, Mental Health Board Director, up to date with regard to the progress of the moves and they are aware the plan for Parenting with Love and Limits has been delayed. A roll call vote carried with two no votes by Jay and Sapp.

Request for Clarification of Scope of Responsibility Assigned to Brookens Space Utilization Sub-Committee

Beckett stated he had viewed the role of the subcommittee as an expanded role because of the components of the County's facilities. He feels the subcommittee did good work and would like for it to continue with long range planning needs. As a larger committee, County Facilities talks about all kinds of things and the subcommittee brings the good ideas for recommendation. Weibel stated the subcommittee could have an expanded role. James said he has nothing against the subcommittee, but felt there was a wealth of knowledge of the larger Facilities committee. He thought the subcommittee could do the legwork, but that the Facilities committee should be included in the discussion of what is to be determined. He prefers discussion by the entire committee. Richards stated his idea was that the subcommittee was to talk with the department heads, but the Facilities Committee thought the plan was a bit vague. Smucker wanted to look at

things like long term facility maintenance. Beckett and Busey are looking into forming a plan for that and plan to put it on a future agenda. Sapp said he has a hard time wrapping his brain around all the different plans. He felt the committee should focus on one plan and find out what each department needs. He said it was difficult to determine what was originally proposed for the County Clerk's office and that many changes occurred since the original plan was determined. Sheldon said he had a problem with asking each department because they may feel different needs. He described the areas in the basement at Brookens and that is where his microfiche is stored, but another department might be able to store their microfiche in a different area closer to where they are. He said one department might see what another has and feel they also need that. Discussion continued. Sapp stated that wanted to hear from department what their needs are, not what they want based on what other departments may have. James voiced his complaint that studies always happen, but nothing seems to move forward. He really wants to move forward rather than putting all the ideas on the table.

Courthouse Masonry/Bell Tower Project

MOTION by Cowart to receive and place on file the Courthouse Masonry/Bell Tower Project report update; seconded by Bensyl. Motion carried.

PHYSICAL PLANT

Monthly Reports

MOTION by James to receive and place on file the monthly reports of the Physical Plant; seconded by Sapp. Motion carried.

Update Regarding Downtown Correctional Center Chiller

Reinhart states another major failure on the downtown chiller was repaired last month. Beckett asked about the cost for a possible replacement. Reinhart states the chiller that was replaced last year at the ILEAS building was nearly \$130,000, but that is somewhat different. The jail is a different operation and is open 24/7. Reinhart said a plan needs to be determined by next summer because the chiller and backup chiller cannot handle the load. Smucker asked if this was something that was included in requests under the stimulus package. James states he does not like using the older chiller and back up chiller because of their age. Bensyl asked about cost estimates. Busey stated there were no estimates received yet, but the Finance Committee has on their agenda consideration of a budget amendment requesting \$21,000 in repairs just this summer to the downtown jail's chiller. Busey also stated she would like the Board to determine if the County expects to use this building another 20 years and analyze options with long range plans for the building.

CHAIR'S REPORT

Downtown Urbana NewsRack Project – Decision re: Color and Location

Chair Beckett reiterated to the committee the project will not cost the County any money and that the City has abandoned its "artistic" approach to the newsstand. He directed the committee's attention to the photos included with the agenda and stated the current agreement with the City will reflect the new ideas for the newsstand. He then allowed the committee to discuss color.

MOTION by Sapp to approve the change of the approach to the newsstand; seconded by James. Bensyl wanted assurance there was no cost to the County. Motion carried.

MOTION by Sapp to approve the color “buttercup” as the color for the proposed newsstand; seconded by Richards. Smucker said he didn’t care for that color, saying the lightness of the color would show smudges and detracted from the color of the courthouse. He suggested “post office blue” as the proposed color. Sapp accepted his request as an amendment to the motion. Weibel suggested the color “vermillion”. Becket said he thought that color, which is close to red, and the “buttercup” would stand out too much against the courthouse. He requested the color “evergreen” or “black” as options. He said those two colors might be best because black is the color of the pay station, which is very near the spot proposed for setting the newsstand and the “evergreen” would blend in with the grass and neither color would compete against the courthouse. Sapp and Richards accepted the amendment to include “evergreen”. Motion carried unanimously.

Schedule for County Board Members Tour of Outlying County Buildings

Beckett asked the committee if they wished to visit all the County facilities as a group. He said the idea cam from the subcommittee because of the work requested of them. Beckett said each party caucus should be asked and the item will be placed on next month’s agenda.

COUNTY ADMINISTRATOR REPORT

Update on Energy Efficiency Grant Applications

Ms. Busey said she had received an update from Denny Inman on the applications. All the work has been completed and the County is simply waiting on a response from his contact at the state to see how the grant documents are to be presented. Busey informed the committee the funds would be distributed by the State. Sapp asked how long it would take and could the chiller issue be added to that. Busey and Reinhart said they would check into that.

Request Approval for Renewal Application & Participation in COI Electricity and Natural Gas Co-op

Ms. Busey had attended a meeting with the co-op and stated the co-op had grown and is a good indicator to the buying power and also includes other counties. She is asking approval to proceed and said the final application would have to be approved by the Board in September, as the applications are due the following day.

MOTION by Sapp to recommend to the County Board approval of the renewal application fees for the County’s participation in the Chamber Energy Co-op at \$150 per location, up to a maximum of \$1,800 or twelve location for the electrical co-op; and \$200 per location, up to a maximum of \$2,400 or twelve locations for the gas co-op; seconded by Jay. Motion carried.

Report on Nursing Home Life Safety/Smoke Barrier Issue

Andrew Buffenbarger and Chair Beckett spoke with Riley Glerum about this issue. It is not something the previous architects had done, but now the federal government has changed the interpretation of the standards. Additional smoke barriers need to be put in the attic spaced of the Nursing Home to prevent the passage of smoke. Mr. Glerum developed a way to get materials into the attic space which is very difficult to do and should take a couple of months. The issue now is cost. A solution must be started by the next time the federal inspectors come in. One smoke

barrier would be constructed by the kitchen and another by the Alzheimer's Unit. Brief discussion continued about fire rated materials used. Busey stated no action needs to be taken at this meeting, but bids will be let and should be ready to be presented at the October meeting.

SEMI-ANNUAL REVIEW OF CLOSED SESSION MINUTES

Deferred to October.

OTHER BUSINESS

Chair Beckett stated that Krannert Center for the Performing Arts is having a guitar festival and they had requested a reflected image of a guitar on the east wall of the courthouse. He gave approval as it would not affect anything on the courthouse and showed a copy of the notice of the festival.

Smucker requested an update on the smart energy design and also requested a follow-up or update on the implementation of the County's energy policy. This item will be placed on the October agenda.

DESIGNATION OF CONSENT AGENDA ITEMS

Consensus of the committee there are no items for the consent agenda and that the recommendation with regard to the Energy Co-op application should go on the regular County Board agenda.

ADJOURNMENT

Chair Beckett declared the meeting adjourned at 8:04 p.m.

Respectfully submitted,

Ranae Wolken
Recording Secretary

Secretary's note - Please note the minutes reflect the order of the agenda/addendum as approved, and may not necessarily reflect the order of business conducted at the meeting.

COURTHOUSE MASONRY STABILIZATION & RESTORATION PROJECT

Prepared By: E Boatz 10/06/09

	ORIGINAL CONTRACT	CHANGE ORDERS	CONTRACT TOTAL	PAYMENTS THIS MONTH	PAYMENTS YEAR TO DATE	BALANCE TO FINISH
Original Project Budget						
	\$6,747,552.14					
Current Budget w/Change Orders						
	\$6,992,128.97					
<u>Architect Fees-White & Borgognoni</u>						
Basic Service	\$425,641.74					\$9,608.51
Amend #1-Option 4 Tower		\$43,425.00		\$2,375.99	\$416,033.23	\$2,644.15
Amend #2-Temp Cool/Jury Assembly		\$853.40		\$155.75	\$40,780.85	\$0.00
Amend #3-Tower Exit		\$6,221.74		\$0.00	\$853.40	\$0.00
Amend #4-Security Camera		\$4,130.73		\$0.00	\$6,221.74	\$0.00
Amend #5-Clk Face Stone/Lighting Prot		\$10,129.12		\$0.00	\$4,130.73	\$0.00
Amend #6-Bollard Security/Crthse Plaza		\$2,845.00		\$0.00	\$10,129.12	\$0.00
Amend #7-South Security; Energy Mod		\$23,388.00		\$0.00	\$2,845.00	\$0.00
Amend #8-Pathways & landscaping		\$11,738.20		\$0.00	\$23,388.00	\$0.00
Amend #9 - Emergency Masonry Repair		\$3,077.50		\$0.00	\$11,738.20	\$0.00
Total Architect Fees	\$425,641.74	\$105,808.69	\$531,450.43	\$2,531.74	\$516,120.27	\$3,077.50
<u>Reimbursables-White & Borgognoni</u>						
Analysis/Testing; On-site Observation	\$98,092.72			\$3,695.00	\$82,517.53	\$15,575.19
Amendment #1 - Option 4 Tower		\$7,494.18	\$105,586.90			\$7,494.18
Miscellaneous Reimbursable Expenses	\$39,839.50			\$562.32	\$34,489.82	\$5,349.68
Amendment #1- Option 4 Tower		\$20,593.82	\$60,433.32	\$53.25	\$1,587.51	\$19,006.31
Total Reimbursable Expenses	\$137,932.22	\$28,088.00	\$166,020.22	\$4,310.57	\$118,594.86	\$47,425.36
<u>Building Const - Roessler Const</u>						
Existing Building	\$2,787,950.00	\$252,379.89	\$3,040,329.89	\$79,768.32	\$2,745,710.38	\$294,619.51
Tower	\$2,804,150.00	\$247,623.23	\$3,051,773.23	\$80,231.68	\$2,761,289.62	\$290,483.61
Owner Items		\$158,555.20	\$158,555.20	\$4,125.25	\$158,555.20	\$0.00
Contingency	\$591,878.18	\$66,680.14	\$0.00			\$0.00
Total Building Construction	\$6,183,978.18	\$658,558.32	\$6,250,658.32	\$164,125.25	\$5,665,555.20	\$585,103.12
<u>Additional Contracts</u>						
Todd Frahm - Gargoyles		\$44,000.00	\$44,000.00	\$0.00	\$44,000.00	\$0.00
Total Additional Contracts	\$0.00	\$44,000.00	\$44,000.00	\$0.00	\$44,000.00	\$0.00
PROJECT TOTAL	\$6,747,552.14	\$244,576.83	\$6,992,128.97	\$170,967.56	\$6,344,270.24	\$647,858.64

% of Project Paid to Date

90.73%

ENERGY POLICY FOR CHAMPAIGN COUNTY FACILITIES

Objective:

The objective of this policy is -

1. To operate energy efficient County facilities
2. Incorporate energy management into County decision making.
3. Balance life/safety with responsible energy policy/usage.
4. Implement practices that ensure efficient use of energy.
5. To encourage elected officials to utilize energy efficient practices within their offices.
6. Promote energy efficiency by example and education.

Policy:

1. It is the policy of the County Board to implement strategies which reduce overall energy consumption in County facilities and operations. The County Board recognizes that each County facility has a unique energy usage baseline and each County department has a distinctive mission which will impact energy usage.
2. This policy is designed to act as a guideline for the purchase of utilities, purchase of energy efficient equipment, remodel of existing facilities, and the operation and maintenance of existing facilities. The policy is designed to encourage personnel to continually evaluate and critique the impact of related decisions on County energy usage, energy efficiency, and budget.
3. It is the policy of the County Board to encourage the submission, review, and evaluation of County employee energy reduction ideas as to technical feasibility and cost effectiveness. The County Board will recognize County employees who contribute to the success of this policy.
4. It is the policy of the County Board to publicize energy reduction initiatives and energy usage/cost data reports for access by County employees and public.
5. **Purchase of Utilities:** The County Board and Administration will build inter-governmental and institutional partnerships which take advantage of economies of scale. The County Board and Administration will seek out innovative energy initiatives to replace or supplement existing energy sources to achieve stable utility cost for County operations.
6. **Purchase/Lease of Energy Efficient Equipment:** When purchasing new, replacing, or leasing office equipment, technological equipment, or other equipment consideration will be given to the energy efficiency of the available equipment. Unless extenuating circumstances exist the new equipment will be more energy efficient than the equipment to be replaced. When proposed equipment is more energy efficient than existing equipment but higher in cost, a cost analysis will be performed to determine if the higher cost equipment would cost less over the estimated "life" of the item due to lower energy or maintenance cost.
 - a. **Energy Star:** When available all purchases of new or replacement equipment shall have the Energy Star designation.
7. **Remodel of Existing Facilities:** All remodeling of space within County owned facilities will incorporate latest energy efficiency design information. All equipment specified within the remodeled space will be the latest energy efficient devices. When energy efficient options cost 10% more than traditional items,

a cost analysis will be performed to determine if higher cost alternatives will have a lower “life” cost due to less energy usage or maintenance cost. The cost analysis will be provided to the County Board to assist in determining final project cost

8. **Operations and Maintenance of Existing Facilities.** County facilities and supporting equipment will be maintained at a optimal level of performance and energy efficiency. Physical Plant personnel will remain current on energy conservation measures and will implement when practical.
 - a. County buildings will be maintained:
 - i. Heating Months: October-March - 68° F
 - ii. Cooling Months: April - September - 76° F
 - b. Energy usage baselines will be determined for each facility and usage reports will be provided to the County Board monthly.
 - c. Lighting fixtures which have failed or are deemed energy inefficient will be replaced when funding is available.
 - d. Lighting sensors will be installed in restrooms and conference rooms.
 - e. De-lamping plans will be designed for each County facility. Each plan will be crafted with input from the respective appointed and/or elected officials.
 - f. Boilers will be set and maintained at 120° F or the manufacturer prescribed setting.
 - g. Employees will follow prescribed energy practices and thus individual appliances (personal heaters, candles, etc.) are discouraged. If utilized the device shall be connected to motion activated sensor.
 - h. Copy machines will use “Energy Saver” mode.
 - i. Computer monitors will be shut off when not in use for more than one hour.
 - j. Vending equipment will be energy efficient.
9. **Use of Renewable Energy:** There is a preference for the use of renewable energy sources for County facilities. The County will transition to renewable power sources whenever cost-efficient. The calculation of cost-efficiency will consider cost savings over the lifetime of the renewable energy source and outside sources of funding. Renewable energy source may include solar power, wind power, or geothermal power.

Goal: Introduce and implement energy saving measures which will reduce overall energy consumption by .50/s.f. by November 2010.

LISTING OF COUNTY BUILDINGS

BUILDING	ADDRESS
Courthouse	101 E. Main
Juvenile Detention Center	400 Art Bartell
Correction Center	204 E. Main
Satellite Jail	502 S. Lierman
Brookens Admin Center	1776 E. Washington
Garage - ESDA	1701 E. Main
Sheriff/County Clerk Storage	1701 E. Main
Highway Storage	1701 E. Main
Old Salt Storage	1301 Art Bartell
Salt Dome Storage	1301 Art Bartell
Emergency Management Agency	1905 E. Main
ILEAS Building	1701 E. Main
Mechanical Building	1701 E. Main
Garage - ESDA	1701 E. Main
Animal Control	210 S. Art Bartell
Highway Building	1605 E. Main
Nursing Home	500 Art Bartell

**Closed Meeting Minutes Review - County Facilities Committee –
September 8, 2009**

**Is it necessary to protect the public interest or privacy of an
individual?**

Date of Minutes	Yes, Keep Confidential	No, Place in Open Files
April 26, 1990 <i>Performance Appraisal Subcommittee</i>		
November 12, 1992 <i>Performance Appraisal Subcommittee</i>		
July 7, 1993 <i>Search Subcommittee for Physical Plant Dir,</i>		
November 6, 2001-#1		
November 6, 2001 - #2		
December 10, 2002		
January 6, 2004		
May 4, 2004		
June 8, 2004		
August 25, 2004 <i>Performance Appraisal Subcommittee</i>		
September 15, 2004 <i>Performance Appraisal Subcommittee</i>		
October 5, 2004		
May 10, 2005		
August 23, 2005 <i>Performance Appraisal Subcommittee</i>		
August 31, 2005 <i>Performance Appraisal Subcommittee</i>		
October 12, 2005		
February 7, 2006		

May 2, 2006		
August 22, 2006		
August 24, 2006 – Performance appraisal subcommittee		
September 14, 2006 #1 – Performance appraisal subcommittee		
September 14, 2006 #2 - Performance appraisal subcommittee		
October 3, 2006		
November 21, 2006		
May 6, 2008		
November 12, 2008		

***Minutes not previously approved in semi-annual review.**

**SEDAC Report
Renewable Energy Options Study**



**Champaign County Government Energy
Initiative**

1776 E. Washington Street
Urbana, IL 61802

4/28/2009

This report was prepared as the result of work by a member of the staff of the Smart Energy Design Assistance Center (SEDAC). It does not necessarily represent the views of the University of Illinois, its employees, or the State of Illinois. SEDAC, the State of Illinois, its employees, contractors and subcontractors make no warrant, express or implied, and assume no legal liability for the information in this report; nor does any party represent that the uses of this information will not infringe upon privately owned rights. This report has not been approved or disapproved by the Illinois Department of Commerce and Economic Opportunity nor has the Department passed upon the accuracy or adequacy of the information in this report. Reference to brand names is for identification purposes only and does not constitute an endorsement.

Table of Contents

Acknowledgements _____ 5

Executive Summary _____ 6

Introduction _____ 8

Renewable Energy _____ 8

Solar PV _____ 8

Wind Power _____ 11

Utility Consumption and Cost Overview _____ 15

Analysis Approach _____ 18

ECRM1: Wind 10 kW _____ 19

ECRM2: Wind 30 kW _____ 19

ECRM3: Wind 600 kW _____ 19

ECRM4: Wind 1 MW _____ 20

ECRM5: Solar 10 kW _____ 20

ECRM6: Solar 30 kW _____ 20

ECRM7: Hybrid 20 kW Wind and 20 kW Solar _____ 20

Conclusions and Recommendations _____ 21

Appendix A – Funding Opportunities _____ 22

Appendix B – Average Wind Speeds for Champaign County, Illinois _____ 23

Appendix C – Abbreviations _____ 24

Index of Tables

Table 1: Summary of Energy Cost Reduction Measures _____	7
Table 2: Economic Analysis of Energy Cost Reduction Measures _____	7
Table 3: Energy Consumption and Cost Summary _____	15
Table 4: Target Finder Results _____	17
Table 5: ECRM Summary _____	18
Table 6: Economic Analysis of ECRMs _____	19

Index of Figures

Figure 1: Solar PV system at the Pennsylvania Department of Environmental Protection (DEP), Cambria Office Building _____	8
Figure 2: PV Cell, Module and Array _____	9
Figure 3: Curtain Wall at Tiger Woods Learning Center _____	10
Figure 4: GE Wind Energy's 3.6 MegaWatt Wind Turbine _____	11
Figure 5: Vertical Axis Turbine _____	12
Figure 6: Sizes of Wind Turbines _____	12
Figure 7: Monthly Electricity Consumption and Cooling Degree Days (CDD) _____	16
Figure 8: Monthly Natural Gas Consumption and Heating Degree Days (HDD) _____	16

Acknowledgements

The Smart Energy Design Assistance Center (SEDAC) would like to thank Denny Inman County Administrator of Champaign County, Illinois, for participating in the Smart Energy Program. Luis Martinez of SEDAC was the engineer responsible for the analysis and the author of this report. Assistance in report preparation by Ben Sliwinski and the rest of the SEDAC staff is gratefully acknowledged.

Executive Summary

SEDAC has performed a renewable energy study of Brookens Center in Urbana, Illinois. This report presents the results of the analysis along with the methods and assumptions used. Our goal is to identify promising Energy Cost Reduction Measures (ECRMs) based on renewable energy technology. Our work does not replace engineering design which may be necessary for project implementation. Our suggestions do not override local building code requirements which should be consulted prior to investments.

SEDAC has identified up to \$139,737 in annual cost savings from an investment of about \$1,000,000 representing a net present value of \$741,432 and resulting in a 13% annual return on your energy efficiency investment. All together, the savings amount to a 100% reduction in the facility's electric energy costs. Implementing the recommended measures will enhance the facility's bottom line and reduce vulnerability to fuel price fluctuations. This report details our findings and can be used as a tool for obtaining financing from a lender to finance these measures.

This study evaluated seven different ECRMs for application to the facility.

Two of the studied ECRMs have favorable economics by themselves but require the highest capital investment. It is more cost effective to study the building energy efficiency first and determine a list of applicable ECRMs such as lighting upgrades, thermostat settings and setbacks, occupancy sensors, HVAC upgrades, etc (see footnote ¹). Then, create a package of promising ECRMs including renewable ECRMs such as the ones included in this report, such that the overall package has favorable economics.

The resurgent emphasis on energy efficiency has been brought about by rising energy costs. In today's volatile energy markets it is impossible to predict energy cost increases. Nationally, since 2000, commercial natural gas prices have increased over 85 percent, while commercial electric prices have increased 38%. (Energy Information Administration Monthly Energy Review, November 2008, <http://www.eia.doe.gov/emeu/mer/contents.html>, Tables 9.9 and 9.11). It should also be noted that electricity costs had been fairly stable in Illinois due to an electrical rate freeze which expired on January 1, 2007.

¹ http://smartenergy.arch.uiuc.edu/html/what_ECRMtop12.html

ECRMs	Estimated Installation Cost	Annual kWh Savings	% Total kWh Usage	Annual Cost Savings	Maintenance	Annual Net Savings
Wind 10 kW	\$50,000	13,174	0.8%	\$1,317	\$500	\$817
Wind 30 kW	\$150,000	39,600	2.5%	\$3,960	\$1,500	\$2,460
Wind 600 kW	\$600,000	907,003	57.0%	\$84,351	\$6,000	\$78,351
Wind 1 MW	\$1,000,000	1,610,592	101.3%	\$149,737	\$10,000	\$139,737
Solar 10 kW	\$100,000	12,599	0.8%	\$1,260	\$0	\$1,260
Solar 30 kW	\$300,000	37,796	2.4%	\$3,780	\$0	\$3,780
Hybrid 20 kW Solar /20 kW Wind	\$230,000	58,801	3.7%	\$5,880	\$400	\$5,480

Table 1: Summary of Energy Cost Reduction Measures

ECRMs	IRR	NPV	Cost with DCEO Incentives	IRR with DCEO Incentives	NPV with DCEO Incentives
Wind 10 kW	n/a	(\$39,818)	\$50,000	n/a	(\$39,818)
Wind 30 kW	n/a	(\$119,343)	\$150,000	n/a	(\$119,343)
Wind 600 kW	12%	\$376,427	\$600,000	12%	\$376,427
Wind 1 MW	13%	\$741,432	\$1,000,000	13%	\$741,432
Solar 10 kW	n/a	(\$84,298)	\$70,000	n/a	(\$54,298)
Solar 30 kW	n/a	(\$252,893)	\$210,000	n/a	(\$162,893)
Hybrid 20 kW Solar/20 kW Wind	n/a	(\$161,707)	\$170,000	n/a	(\$101,707)

Notes to Table 2:

- (1) Discount Rate assumed to be 5% when calculating the NPV, ECRMs with IRR less than 5% will show a negative NPV.
- (2) ECRMs were given a lifetime of 20 years.
- (3) Results are in today's dollars on a pre-tax basis.
- (4) IRR of n/a means less than or equal to zero.

Table 2: Economic Analysis of Energy Cost Reduction Measures

Introduction

Brookens Administrative Center is located at 1776 W. Washington Street in Urbana, Illinois. The client contacted SEDAC with interest in performing a study of the feasibility of installing renewable energy systems for this facility. One year's worth of utility bills was provided. Based on satellite images, the floor area of the building is estimated to be about 101,586 square feet.

Renewable Energy

Renewable energy sources provide multiple benefits to society. The use of renewable energy sources increases independence from fuel price fluctuations. In addition, unwanted consequences such as air and water pollution and the release of greenhouse gases from fossil fueled power plants are avoided or minimized. The present report will consider two renewable energy technologies: solar photovoltaic (PV) power and wind power.

Solar PV

Solar photovoltaic power is an important energy technology with numerous environmental benefits, contributing to energy independence and the possibility of creating jobs and strengthening the economy. Few power generating technologies have as little impact on the environment as Solar PV since it quietly generates energy from light, creating no air pollution or hazardous waste (except for end of life disposal) and without requiring liquid or gaseous fluids to be transported or combusted. Instead, the source of this energy, sunshine, is free and abundant.



Figure 1: Solar PV system at the Pennsylvania Department of Environmental Protection (DEP), Cambria Office Building²

² http://www1.eere.energy.gov/solar/to_environment.html

The word photovoltaics has two parts, photo, derived from the Greek word for light and Volt, relating to electricity pioneer Alessandro Volta. Therefore, photovoltaics can be translated as light-electricity. PV materials convert light energy into electricity by using the photoelectric effect, discovered by Edmond Becquerel as early as 1839.

PV cells are devices made of semiconductor materials with the ability of utilizing sunlight to stimulate the semiconductor material into full conduction and convert this full conduction into useable electricity. PV cells come in many sizes and shapes and are often connected together to form PV modules that may be up to several feet long and a few feet wide. Modules, in turn, can be combined and connected to form PV arrays of different sizes and power input. Figure 2 shows PV cells, modules and arrays. Each cell typically produces only a small amount of power. To produce more power, cells can be interconnected to form modules, which can in turn be connected into arrays to produce yet more power. Because of this modularity, PV systems can be designed to meet any electrical requirement, no matter how large or how small.

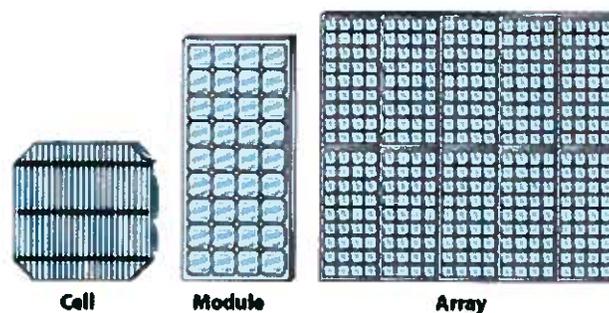


Figure 2: PV Cell, Module and Array³

Some advantages of PV power are listed as follows.

- ✓ PV systems are reliable and require little maintenance. Contrary to the commonly held “PV myth”, PV systems can generate power in all types of weather. On partly cloudy days, they turn out as much as 80% of their rated power. Even on extremely overcast days, they can still produce about 25% of their maximum output. They are easy to maintain since they have no moving parts.
- ✓ PV systems have virtually no environmental impact. They are clean and silent, producing no atmosphere emissions or greenhouse gases. Compared with electricity generated from fossil fuels, each kilowatt-hour of

³ http://www1.eere.energy.gov/solar/pv_systems.html

PV-produced electricity offsets up to 217,000 pounds of carbon dioxide every year, according to a report from the National Renewable Energy Laboratory (Herig 2000).

- ✓ Some PV systems are produced domestically, strengthening the economy and reducing trade deficit.
- ✓ PV systems are modular and flexible. A PV system can be constructed to any size in response to the energy needs at hand. And a PV system can be enlarged or moved as these energy needs change.
- ✓ PV systems can serve both form and function in a building. State of the art PV modules are now available in a variety of colors and styles, allowing designers to use them as aesthetic elements built right into roofs, skylights, awnings, entryways and facades. Today's modules can even be specified to transmit a percentage – usually 80% to 90% – of natural light. Mixed with non-transmissive modules, these systems create a pleasant environment inside the building, helping to ventilate and heat the building at the same time.



Figure 3: Curtain Wall at Tiger Woods Learning Center⁴

The curtainwall shown here includes three types of glass: the top panels are the thickest and generate the most energy, the middle panels are more transparent and generate less energy, and the bottom panels are regular glass.⁵

Among the disadvantages of solar power are the following:

⁴ http://www.us.schott.com/architecture/english/references_us.html

⁵ <http://www.usglass-digital.com/usglass/200807/?u1=texterity>

- ✓ The main disadvantages of Solar PV are related to the economics because, although a lot of progress has been achieved in the last 20 years, PV is not yet cost-competitive with electricity from an established grid.
- ✓ In addition, the present conversion efficiencies require large space for powering energy intensive applications such as vehicles or factories.

Despite the disadvantages, PV solar is a proven and reliable technology available today for significantly reducing energy bills for your facility.

Wind Power

Wind is a form of solar energy. Winds are caused by the uneven heating of the atmosphere by the sun, the irregularities of the earth's surface and rotation of the earth. Wind flow patterns are modified by the earth's terrain, bodies of water and vegetation. The term wind electricity or wind power describe the process by which the wind is used to generate mechanical power or electricity. Wind turbines convert the kinetic energy in the wind into mechanical power. This mechanical power can be converted into electricity by a generator. Figure 4 shows GE Wind Energy's 3.6 MegaWatt wind turbine, one of the largest prototypes ever erected.



Figure 4: GE Wind Energy's 3.6 MegaWatt Wind Turbine

Modern wind turbines fall into two basic groups: the horizontal axis variety, as shown in Figure 4 and vertical axis design, as shown in Figure 5. Horizontal axis wind turbines typically either have two or three blades. These three-bladed wind turbines are operated "upwind", with the blades facing into the wind.



Figure 5: Vertical Axis Turbine ⁶

There are a variety of sizes of wind turbines, ranging from residential to utility scale, as Figure 6 shows. Larger wind turbines are more efficient and cost effective.

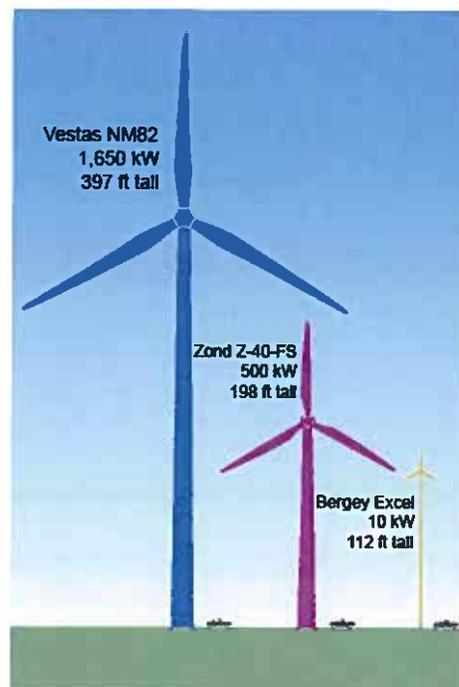


Figure 6: Sizes of Wind Turbines

The main advantages of wind power are described as follows.

- ✓ Wind energy is a clean energy source which does not pollute the air like power plants that rely on combustion of fossil fuels, such as coal or natural gas. Wind turbines do not produce atmospheric emissions that cause acid rain or greenhouse gases.
- ✓ Wind energy is a domestic source of energy, produced in the United States. The nation's wind supply is abundant.

⁶ http://re.emsd.gov.hk/english/wind/small/small_ep.html

- ✓ Wind energy relies on a renewable source, wind, which is a form of solar energy.
- ✓ Wind energy is one of the lowest-priced renewable energy technologies available today, costing between 4 and 6 cents per kilowatt-hour, depending upon the wind resource and project financing of the particular project.

Among the disadvantages of wind power can be listed the following:

- ✓ Wind Power must compete with conventional generation sources on a cost basis. Depending on how energetic a wind site is, the wind farm may or may not be cost competitive. Even though the cost of wind power has decreased dramatically in the past 10 years, the technology requires a higher initial investment than fossil-fueled generators.
- ✓ Although wind power systems have relatively little impact on the environment compared to other conventional power plants, there is some concern over the noise produced by the rotor blades and aesthetic (visual) impacts. These problems have been resolved or greatly reduced through technological development or by properly placing wind power systems.
- ✓ There is a concern regarding wildlife due to the belief that spinning turbine blades will injure or kill airborne wildlife. This issue has been extensively researched and dismissed by experts. Modern turbines do not move fast enough to pose any real threat to wildlife and are probably less dangerous to airborne species than buildings with glass windows.

Wind power systems generally have lower initial costs than solar photovoltaic systems, especially for large power generation and are included in this study.

Renewable Energy and Net Metering

Net metering is a policy that allows clients to receive the full value of the electricity that their renewable energy system produces. The term *net metering* refers to the method of accounting for a renewable energy system's electricity production. Clients with PV or wind power systems can thus offset their electric bill with any excess electricity they produce. As the renewable energy system produces electricity, the kilowatts are used first to meet any electric requirements (e.g., appliances, lights) in the building. If more electricity is produced from the system than the building needs, the extra kilowatts are fed into the utility grid.

Under federal law, utilities must allow independent power producers to be interconnected with the utility grid, and utilities must purchase any excess electricity they generate. Many states have gone beyond the minimum requirements of the federal law by allowing net metering for customers with renewable systems. With net metering, the customer's electric meter will run

backward when the renewable energy system produces more power than is needed to operate the building at that time. An approved, utility-grade inverter converts the dc power from the PV modules into ac power that exactly matches the voltage and frequency of the electricity flowing in the utility line; the system must also meet the utility's safety and power-quality requirements. The excess electricity is then fed into the utility grid and sold to the utility at the retail rate.

In the event of a power outage, safety switches in the inverter automatically disconnect the renewable energy system from the line. This safety disconnect protects utility repair personnel from being shocked by electricity flowing from the PV array into what they would expect to be a "dead" utility line.

At the end of the month, if the customer has generated more electricity than used, the utility credits the net kilowatt-hours produced at the wholesale power rate. But if the customer uses more electricity than the system generates, the customer pays the difference. The billing period for net metering may be either monthly or annually. In some states, the excess generation credits at the end of each billing period are carried over to the next billing period for up to a year. Net metering allows facilities to receive the full value of that electricity without having to install a battery storage system. Essentially, the power grid acts as the customer's battery backup, which saves the customer the added expense of purchasing and maintaining a battery system.

Generally, the preferred method of accounting for the electricity under net metering is with a single, reversible meter. An alternative is dual metering, in which customers or their utility purchase and install two non-reversing meters that measure electrical flow in each direction. The present trend around the country is toward a single, reversible meter.

Some utilities are opposed to net metering because they believe it may have a negative financial impact on them. However, a number of studies have shown that net metering can benefit utilities. These benefits include reductions in meter hardware and interconnection costs, as well as in meter reading and billing costs. Grid-connected PV systems can also help utilities avoid the cost of additional power generation, increase the reliability and quality of electricity in the grid, and produce power at times of peak usage, when utility generation costs are higher and they often need the extra power.

In Illinois⁷, net metering is available under Rule 83 IL Admin Code, Part 465, effective April 1, 2008, for residential and non-residential customers of Illinois who own or operate a renewable fuel-powered generator of 2,000 kW (2 MW) capacity or less, located on the customer's premises and is used to offset some or all of their electric usage. For non-residential customers, net metering is typically accomplished through the use of a dual meter. Dual metering is required for non-residential customers with systems greater than 40 kW but not greater

⁷ www.kentlaw.iit.edu/faculty/fbosselman/classes/Spring2008/PowerPoints/CatieHeindel.ppt

than 2 MW. The utility must provide the necessary metering equipment for systems up to 40 kW in capacity. Net metering and dual metering are not available to systems greater than 2 MW.

Eligible generators of 40 kW or less will receive a one-to-one retail rate credit for their excess generation. Eligible generators between 40 kW and 2 MW will receive credits equal to the utility's avoided cost for their excess generation. Credits will be carried over month to month, with the annual period running from May to April or November to October, at the customer's discretion.

Utility Consumption and Cost Overview

Annual utility costs for the period from January 2008 to December 2008, from the provided utility bills, were \$166,409 for electricity and \$45,488 for natural gas at an average cost of \$0.10/kWh for electricity and \$1.27/therm for natural gas.

	Annual Energy Consumption		Annual Energy Costs		Average Unit Cost	
Electricity	1,590,648	kWh	\$166,409	79%	\$0.10	/kWh
Nat Gas	35,780	Therms	\$45,488	21%	\$1.27	/therm
		Total	\$211,897			
Floor Area	101,586	sf				
Energy Use Intensity	89	kBtu/sf/yr	Energy Cost Intensity	\$2.09		\$/sf/yr

Table 3: Energy Consumption and Cost Summary

Monthly electrical energy consumption is shown in Figure 6, also shown are the Cooling Degree Days (CDD) for Champaign, Illinois. Monthly natural gas consumption is shown in Figure 7, along with the Heating Degree Days (HDD) for Champaign, Illinois. Cooling and Heating Degree days are indicative of the outdoor temperature difference during each season.

From the electrical energy plot, it is noticed that electric consumption increases during the cooling months with respect to the rest of the year. However, the energy consumption is substantial even during the heating season. That consumption is probably due to lighting and other internal loads. On the other hand, the natural gas consumption correlates very well with the heating degree

days, with a gas load during the cooling season of around 1,000 therms, which is higher than the expected water heating load.

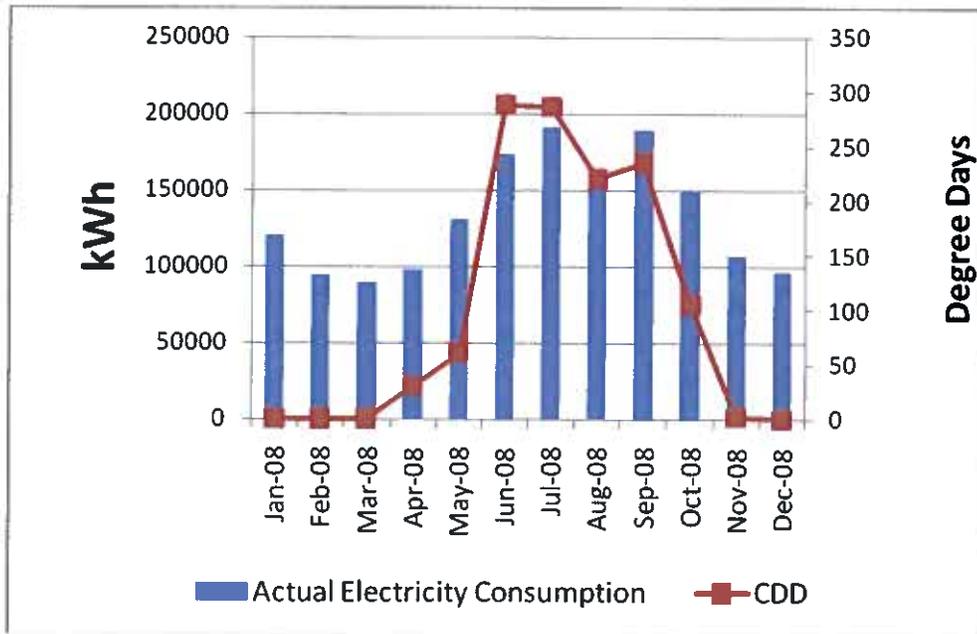


Figure 7: Monthly Electricity Consumption and Cooling Degree Days (CDD)

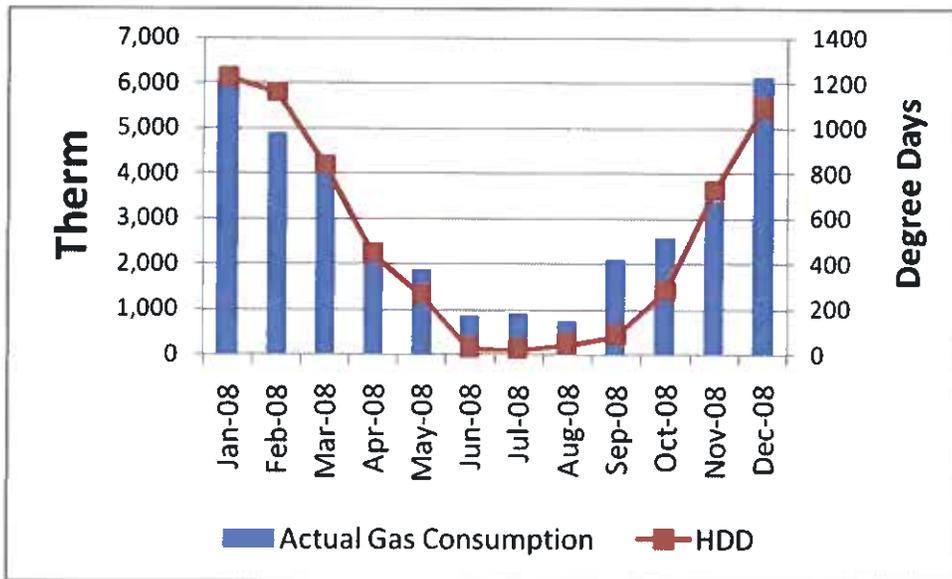


Figure 8: Monthly Natural Gas Consumption and Heating Degree Days (HDD)

ENERGY STAR Target Finder⁸ is typically used to evaluate the projected energy usage of the base building as compared to similar buildings in the area. It does this by calculating an Energy Use Intensity (EUI) for the building. This value specifies the units of energy consumed (typically kBtu) per square foot per year.

The facility has an Energy Use Intensity (EUI) of 89 kBtu/sf/yr. Target Finder was used for comparing the energy performance of Brookens Center with that of other buildings. In this case, the building type used for comparison on Target Finder was Office Building. Results yield a rating of 53 out of 100. That implies that 47% of similar buildings use less energy on average. Achieving a building energy performance equivalent to an ENERGY STAR rating (by being in the top 75% of energy performers) would require decreasing energy usage to below 51 kBtu/sf/yr. This is an appropriate and attainable target with a broad spectrum of benefits.

Utility rates used throughout this analysis were based on utility bills provided by the client. The utility rates of \$0.08 per kWh and \$1.27 per therm used in Table 3 and throughout this analysis were based on 2007-2008 bills for Brookens Center. These values were calculated by dividing the total utility cost in that period, including transmission, distribution, demand, customer charges and credits by the total number of kWh or therms used during the one year period.

Target Energy Performance Results (estimated)			
Energy	Design	Target	Top 10%
Energy Performance Rating (1-100)	53	75	90
Energy Reduction (%)	3	26	45
Source Energy Use Intensity (kBtu/Sq. Ft./yr)	215.3	164.8	123.5
Site Energy Use Intensity (kBtu/Sq. Ft./yr)	88.6	67.8	50.8
Total Annual Source Energy (kBtu)	21,873,317.9	16,738,467.7	12,541,149.9
Total Annual Site Energy (kBtu)	9,005,291.0	6,891,262.4	5,163,217.8
Total Annual Energy Cost (\$)	\$ 204,505	\$ 156,497	\$ 117,254
Pollution Emissions			
CO ₂ -eq Emissions (metric tons/year)	1,518.3	1,161.9	870.6
CO ₂ -eq Emissions Reduction (%)	3%	26%	45%

Table 4: Target Finder Results

⁸ http://www.energystar.gov/index.cfm?c=new_bldg_design.bus_target_finder

Analysis Approach

A computerized model was created in order to predict the energy production of various renewable energy systems. The software used for building the model was HOMER, developed by the National Renewable Energy Laboratory (NREL).⁹

The model uses the monthly electric load consumption provided through the utility bills. HOMER has the ability to model various renewable energy systems, including wind and solar PV systems connected to the grid along with net metering.

Wind resource information was obtained for Champaign County from Illinoiswind.org¹⁰. Average wind speeds for Champaign County are shown in Appendix B. Solar resource information for Champaign County was obtained through HOMER from an online meteorological database.

Various Energy Cost Reduction Measures (ECRMs) that utilize renewable energy (wind power or solar power) were modeled and are presented in this report.

Energy Cost Reduction Measures

Using the HOMER model, a number of renewable ECRMs were modeled and their economic feasibility was studied. The following tables show a summary of results.

ECRMs	Estimated Installation Cost	Annual kWh Savings	% Total kWh Usage	Annual Cost Savings	Maintenance	Annual Net Savings
Wind 10 kW	\$50,000	13,174	0.8%	\$1,317	\$500	\$817
Wind 30 kW	\$150,000	39,600	2.5%	\$3,960	\$1,500	\$2,460
Wind 600 kW	\$600,000	907,003	57.0%	\$84,351	\$6,000	\$78,351
Wind 1 MW	\$1,000,000	1,610,592	101.3%	\$149,737	\$10,000	\$139,737
Solar 10 kW	\$100,000	12,599	0.8%	\$1,260	\$0	\$1,260
Solar 30 kW	\$300,000	37,796	2.4%	\$3,780	\$0	\$3,780
Hybrid 20 kW Solar/20 kW Wind	\$230,000	58,801	3.7%	\$5,880	\$400	\$5,480

Table 5: ECRM Summary

⁹ <https://analysis.nrel.gov/homer/>

¹⁰ <http://www.illinoiswind.org/>

ECRMs	IRR	NPV	Cost with DCEO Incentives	IRR with DCEO Incentives	NPV with DCEO Incentives
Wind 10 kW	n/a	(\$39,818)	\$50,000	n/a	(\$39,818)
Wind 30 kW	n/a	(\$119,343)	\$150,000	n/a	(\$119,343)
Wind 600 kW	12%	\$376,427	\$600,000	12%	\$376,427
Wind 1 MW	13%	\$741,432	\$1,000,000	13%	\$741,432
Solar 10 kW	n/a	(\$84,298)	\$70,000	n/a	(\$54,298)
Solar 30 kW	n/a	(\$252,893)	\$210,000	n/a	(\$162,893)
Hybrid 20 kW Solar/20 kW Wind	n/a	(\$161,707)	\$170,000	n/a	(\$101,707)

Notes to Table 6:

- (1) Discount Rate assumed to be 5% when calculating the NPV, ECRMs with IRR less than 5% will show a negative NPV.
- (2) ECRMs were given a lifetime of 20 years.
- (3) Results are in today's dollars on a pre-tax basis.
- (4) IRR of n/a means less than or equal to zero.

Table 6: Economic Analysis of ECRMs

ECRM1: Wind 10 kW

The first proposed measure is installing a 10 kW Wind Turbine. The installation cost is assumed as \$5 per Watt Installed, for an initial cost of \$50,000. According to the HOMER model, this turbine would be capable of producing 13,174 kWh annually and resulting in Annual Net Savings of \$817. The 20 year internal rate of return of this measure is less than zero as is the Net Present Value (NPV), equal to -\$39,818.

ECRM2: Wind 30 kW

A larger, 30 kW wind turbine was also studied. The installation cost is assumed as \$5 per Watt installed for a total initial cost of \$150,000. The predicted energy savings, according to HOMER, is 39,600 kWh annually, yielding \$2,460 in annual energy cost savings. The economics is not favorable since the IRR is less than zero and the net present value is -\$119,343. A 30 kW Wind Turbine would offset 2.5% of current energy costs.

ECRM3: Wind 600 kW

As a third option, a much larger turbine with a capacity of 600 kW was also modeled in HOMER. For larger wind turbines, the initial cost per Watt decreases significantly. It is assumed that wind turbines above 600 kW may cost \$1 per Watt. Results yield annual energy savings of 907,003 kWh, reducing annual energy costs by \$78,351. The economic analysis indicates that the IRR is equal

to 12%, with a NPV of \$376,427. This Wind Turbine would offset 57% of current energy costs.

ECRM4: Wind 1 MW

Much larger wind turbine installations are also available, at a much higher capital cost but also lower cost per Watt. Assuming the initial cost is \$1 per installed Watt (a total investment of \$1,000,000), HOMER predicts that the annual energy savings is 1,610,592 kWh, saving \$84,351 in energy costs every year. The IRR is 13% and the NPV is equal to \$741,432. This wind turbine would offset 101% of current electricity costs.

ECRM5: Solar 10 kW

A series of Solar PV energy systems are also under consideration. To begin with, a PV array with a capacity of 10 kW is studied. SEDAC recommends allocating a 100 square foot area per each kW of PV panel installed. Therefore, 1,000 square feet of un-shaded area are required for this measure. The cost is assumed as \$10 per Watt installed, yielding an initial investment of \$100,000. HOMER predicts annual energy savings of 12,599 kWh for a total net savings of \$1,260 on an annual basis. The IRR is negative and the NPV is -\$84,298. This renewable energy system would offset 1% of current electric consumption. In addition, DCEO Incentives are available for PV Solar energy installations, at a rate of \$3 per Watt DC, yielding \$30,000 worth of incentives. Therefore, including this incentive, the initial cost would be reduced to \$70,000 for a negative IRR and NPV of -\$54,298.

ECRM6: Solar 30 kW

Another option is installing a 30 kW PV panel array. The required area, assuming 100 square feet per kW installed, is 3,000 square feet to allocate for this installation. The cost is assumed as \$10 per Watt installed for a total initial cost of \$300,000. The HOMER model yields 37,796 kWh in annual energy savings and \$3,780 in annual energy cost savings. The IRR of this measure is negative with a NPV of -\$252,893. This system would be capable of reducing energy consumption by 2.4%. DCEO State incentives are available worth of \$90,000, yielding an initial cost of \$210,000 for a negative IRR and NPV of -\$162,893, including incentives.

ECRM7: Hybrid 20 kW Wind and 20 kW Solar

Finally, a combination of wind and solar power was also considered. Wind and solar energy produce power intermittently, namely, wind power systems produce electricity depending on the wind speed and solar power systems produce power

during the day-time only. A combination of wind and solar power systems would increase flexibility and provide renewable clean energy for more hours on a given day. A hybrid system, consisting of a 20 kW wind turbine and 20 kW PV panel system was modeled using HOMER. For the wind turbine, \$5 per Watt installed was assumed, for the PV panels, 2,000 square feet of floor area and \$10 per Watt installed were assumed. The total initial cost of this measure is \$230,000, yielding annual energy savings of 58,801 kWh, equivalent to \$5,480 energy cost savings per year. The IRR of this measure is negative and the NPV is equal to -\$161,707. This renewable energy system is capable of offsetting 3.7% of current energy consumption.

For this measure, DCEO incentives worth \$60,000 are available, reducing the initial investment to \$170,000 for a negative IRR and NPV of -\$101,707.

Conclusions and Recommendations

The results of this report indicate that two of the studied ECRMs have favorable economics. Namely, the 600 kW and 1 MW wind turbines. Overall, there are several options for renewable energy generation available for Brookens Center, capable of reducing current energy consumption from 1% to 100%. The economic results, assuming current costs and state incentives (see Appendix A for more information on incentives), yield IRRs from negative to 13%. SEDAC typically recommends, based on a thorough energy study including utility bills analysis, site visit and energy modeling, a list of applicable ECRMs such as lighting upgrades, thermostat settings and setbacks, occupancy sensors, HVAC upgrades, etc (see footnote ¹¹). Then, create a package of promising ECRMs including renewable ECRMs such as the ones included in this report, such that the overall package has favorable economics. The goal is to invest in energy cost reduction measures that reduce, in combination, present energy consumption by 30% on average in a cost effective manner

SEDAC would like to thank David Inman, County Administrator of Champaign County, Illinois for participating in the Smart Energy Program and offer our continued assistance in answering any questions that may arise or potential implementation issues.

¹¹ http://smartenergy.arch.uiuc.edu/html/what_ECRMtop12.html

Appendices

Appendix A – Funding Opportunities

DCEO Solar Energy Incentive Program:

The Illinois Department of Commerce and Economic Opportunity (DCEO) offers incentives for Solar Photovoltaics technologies, applicable for various sectors including local governments and state governments. The incentive varies up to \$3.25 per DC Watt with a maximum amount of \$250,000.

http://www.commerce.state.il.us/dceo/Bureaus/Energy_Recycling/Energy/Clean+Energy

For information on state and federal rebates and tax credits, see Database of State Incentives for Renewables and Efficiency:

<http://www.dsireusa.org/index.cfm?EE=0&RE=1>

The Illinois Solar Energy Association (ISEA) established the Renewable Energy Credit Aggregation Program (RECAP) to purchase renewable energy credits (RECs) at \$0.06 per watt. For more information see:

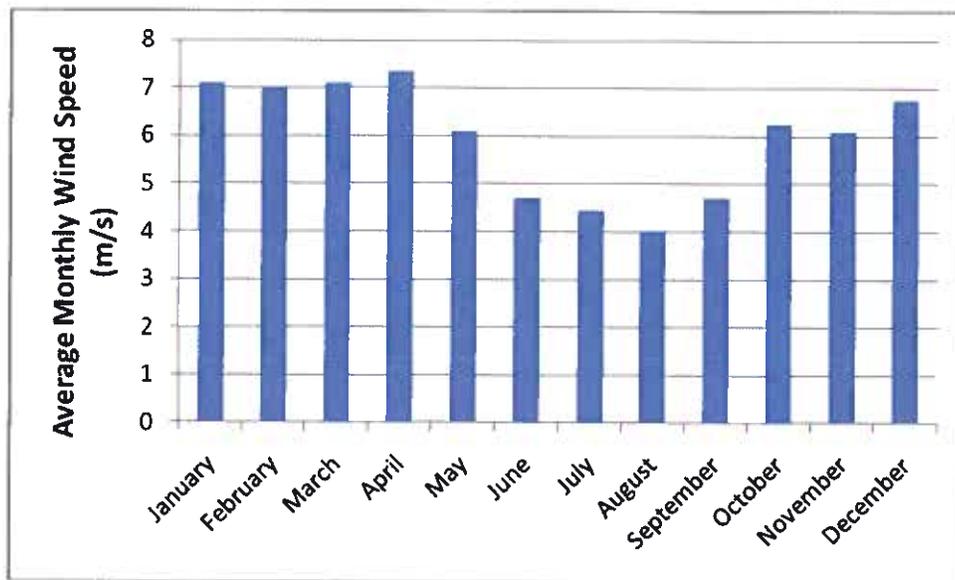
<http://www.illinoissolar.org/>

The Illinois Clean Energy Community Foundation provides grants for energy efficiency improvements and renewable energy projects:

<http://www.illinoiscleanenergy.org/>

SEDAC has developed a website for posting links to various funding opportunities: http://smartenergy.arch.uiuc.edu/html/info_loan.html

Appendix B – Average Wind Speeds for Champaign County, Illinois¹²



¹² <http://www.illinoiswind.org/>

Appendix C – Abbreviations

BTU – British thermal unit

°C – Celsius

CDD – Cooling Degree Days

ECRMs – Energy Cost Reduction
Measures

EUI – Energy Use Intensity

°F – Fahrenheit

ft – Foot, or Feet

hr – Hour

HDD – Heating Degree Days

IRR – Internal Rate of Return

kBtu – kiloBtu, one thousand British
Thermal Units

kW – kilowatt, one thousand watts

kWh – kilowatt-hours, one thousand
watt-hours

MBtu – Mega-Btu, million British
Thermal Units

MW – Megawatt, one million watts

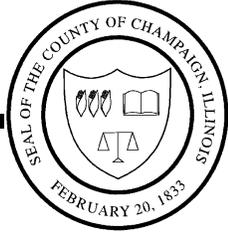
NPV – Net Present Value

PV -- Photovoltaics

SF or sf – Square Feet

therm – A unit of measure for natural
gas. Equal to 100,000 BTUs or 100
Cubic Feet.

yr - Year(s)



**CHAMPAIGN COUNTY BOARD
COMMITTEE ADDENDUM**

COUNTY FACILITIES COMMITTEE

**Lyle Shields Meeting Room
1776 E. Washington St., Urbana
Tuesday, October 6, 2009 – 7:00 p.m.**

CHAIR: Beckett

MEMBERS: Bensyl, Cowart, James, Jay, Richards, Sapp, Smucker, Weibel

ITEM

PAGE NO.

IX. County Administrator Report

B. Approval of Lease Extension for ILEAS for 2012