Energy and Water Conservation Report Format
Projects Between $2M and $10M Construction Cost

Cover Page

Executive Summary

Energy conservation measures (ECMs) were evaluated per the requirements of U-M Design Guideline 3.2. The total estimated cost savings and first cost of the recommended ECMs for this project are summarized below:

Estimated Annual Energy Cost Avoidance w/ECMs:	$152,300
Total Estimated First Cost of ECMs:	$1,210,000
Over-all Simple Payback (years):	7.9
KWH/Year Savings:	XXXXX
Therms/Year Savings:	XXXXX

A requirement of U-M Design Guideline 3.2 is for designs to use 20% less water compared to designs that exactly meet the building code. The estimated water savings for this project are summarized below:

Estimated Total Annual Water Savings:	41,000 gallons
Annual Water use w/o Water Conservation Measures:	200,000 gallons
Percent Savings Versus Code Requirement:	21%

Table 1: Summary of ECM Evaluations

Table 1 summarizes every energy conservation measure evaluated by the design team for this particular project, along with various ECM financial metrics.

Table 1: Summary of ECMs Evaluated

ECM No.	Description	First Cost Estimate	Annual Costs Savings	Simple Payback	ROI	Persistence[1] H/M/L	Accepte dYes/No	Comments
1a	Additional 0.75" Wall Insulation	$180,000	$14,000	12.9	7.8%	H	**N**	
1b	Additional 1" Wall Insulation	$300,000	$16,500	18.2	5.5%	H	**N**	
1c	Additional 1.5" Wall Insulation	$350,000	$18,400	19.0	5.3%	H	**Y**	
2a	Glass SHGC =0.38	$186,000	$7,500	24.8	4.0%	M	**N**	
2b	Glass SHGC =0.33	$190,000	$8,000	23.8	4.2%	M	**Y**	
2c	Argon Filled Triple Glazed Glass SHGC = 0.26	$265,000	$13,400	19.8	5.1%	L	**N**	Seal life guaranteed only 10 years. Slight gray tint.
3	Day Lighting Sensors, Atrium	$42,000	$12,000	3.5	28.6 %	M	**Y**	
4	Desiccant Wheel	$200,000	$40,000	5.0	20.0 %	M	**Y**	
5	Exterior Shades, South Façade	$78,000	$15,000	5.2	19.2 %	H	**Y**	
6	Increase Thermostat Deadband	$0	$7,000	N/A	N/A	L	**Y**	
7	Free Cooling Process Load	$350,000	$55,000	6.4	15.7 %	H	**Y**	
8	Shower Heat Recovery Device	$24,000	$3,000	8.0	12.5 %	L	**N**	Maintenance issues

Note 1: Persistence represents an opinion of the probability that the estimated energy savings will be fully realized.

Table 2: Water Conservation Measures and Predicted Results

Table 2 indicates the water saving measures and resulting percent water savings predicted for this project versus a project constructed to meet building code requirements (building code requirements are based on Energy Policy Act of 1992 fixture performance dictates). The requirement of U-M Design Guideline 3.2 is for designs to provide projects that use 20% less water than projects designed to exactly meet the building code.

Table 2: Water Conservation

Water Conservation Measure	Estimated Annual Savings (Gallons)
Dual Flush Water Closets	7,000
Waterless or 1/8 Gallon Per Flush Urinals	5,000
HVAC Condensate Used For Cooling Tower Make-Up	8,000
2 GPM Shower Heads	12,000
Gray Water Recovery	9,000

Estimated Total Annual Water Savings:	**41,000**
Annual Water use w/o Water Conservation Measures:	**200,000**
Estimated Percentage Savings:	**21%**

Tables 3 and 4:

U-M Design Guideline 3.2 requires that all projects implement certain "mandatory" energy conservation measures, and it requires that other energy conservation measures be "evaluated" for every project. Tables 3 and 4 indicate which of the mandatory and evaluated measures were found applicable to the project.

Table 3: Review of Mandatory Energy Conservation Measures

Mandatory ECM No.	Description	Implemented Yes/No	Comments	ECM Cross Ref.
a	Window Blinds/Shades	Y		ECM 9
b	Occupancy Schedules	Y		
c	Part Load Efficiency	Y		
d	HVAC System Zoning	Y		ECM 8
e	DDC VAV Control	Y		
f	Standalone HVAC Systems	N	No process areas.	
g	Laboratory ECMs	N	Not a lab building.	
h	Building Envelope Thermal Scanning	Y		ECM 4
i	Limit Incandescent Lighting	Y		
j	Lighting and Power Justification	N		

Table 4: Review of Mandatory Energy Evaluations

Mandatory Evaluation No.	Description	Implemented Yes/No	Comments	ECM Cross Ref.
a	Additional Below-Grade Insulation			
b	Additional Wall Insulation			
c	Additional Roof Insulation			
d	Improved Glazing (1)			
e	Eliminate Server Rooms			
f	High Efficiency Chiller (1)			
g	Free Cooling			
h	Heat Recovery			
i	Increased Envelope Inspections			
j	Occupancy/Daylight Sensing			
k	High Efficiency Boiler (1)			
l	High Efficiency HVAC Equipment (1)			
m	Variable Volume Kitchen Hoods			

Note 1: Performance/efficiency better than required by code.

Table 5: Energy Cost Assumptions:

Table 5 reports the energy cost assumptions utilized for energy cost calculations.

Table 5: Energy Costs Assumptions

Energy Type	Cost	Comments
Electricity	$0.079 /kwh	DTE Direct Purchase Rate
Natural Gas	$0.842/therm	MichiCon Direct Purchase Rate
District Steam	$1.90/therm	U-M Utility Rate
District Chilled Water	$1.07/therm	U-M Utility Rate