

# ENERGY AND WATER CONSERVATION REPORT FORMAT

## PROJECTS BETWEEN \$2M AND \$10M CONSTRUCTION COST

*2013-07-15: Revised to require yearly savings of KWH and Therms be reported, for DTE energy incentive programs.*

*Utilize the following report format to indicate compliance to U-M Design Guideline 3.2. Supplemental narratives and tables may be provided in addition to the information required below, but for the required tables indicated below, do not change the table explanations, format, headings, footnotes, or the order in which the tables are presented. The data in the tables in this sample report is for illustrative purposes only, update to project specific values.*

### **Cover Page**

*Provide a cover page with the project name, project number, date and report version: SD, DD, CD, or FINAL. Provide similar information in the report footer.*

### **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         |

*The estimated savings in energy units, reported below, is useful for utility incentive programs. When reporting this information, do not convert electrical energy savings to equivalent therms, or gas savings to equivalent KWH.*

|                      |       |
|----------------------|-------|
| 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 <sup>1</sup> H/M/L | Accepted Yes/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**

| <b>Water Conservation Measure</b>              | <b>Estimated Annual Savings (Gallons)</b> |
|------------------------------------------------|-------------------------------------------|
| 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**

| <b>Mandatory ECM No.</b> | <b>Description</b>                 | <b>Implemented Yes/No</b> | <b>Comments</b>     | <b>ECM Cross Ref.</b> |
|--------------------------|------------------------------------|---------------------------|---------------------|-----------------------|
| 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              |

**Attach the following to this report in the order indicated:**

- *Completed COMcheck compliance report demonstrating compliance to ASHRAE Standard 90.1.*
- *If the ECB method is used, complete data files from the energy simulation program. Include the name of the simulation program(s) used. The output reports shall also show the amount of time any loads are not met by the HVAC system for the baseline building design and the proposed building design. The proposed building design shall not have more "unmet hours" than the baseline building.*
- *An explanation of any error messages noted in the simulation program output.*

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Project: <insert project name>

Report Version: <insert SD, DD, CD, or FINAL>