GUIDELINES for ENERGY SAVING PERFORMANCE CONTRACTS

STATE OF WISCONSIN
Department of Administration
Division of Facilities Development

Guidelines and Procedures
For State Agencies and Energy Service Companies

(Revised February 27, 2013)

Introduction

THIS DOCUMENT PROVIDES POLICY AND PROCEDURES FOR GUARANTEED ENERGY SAVINGS PERFORMANCE CONTRACTING AS A MEANS TO REDUCE ENERGY CONSUMPTION and UTILITY COSTS

Every state agency incurs a cost of utilities, including electric, gas, solid fuels and water utilities for delivering its public services. The State of Wisconsin recognizes the need to use such resources wisely and supports agency efforts to increase efficiency. In addition, state agencies are charged by Governor Walker in Executive Order 63 (issued March 9, 2012) to reduce energy use.

The Wisconsin Legislature recognized that energy conservation projects could be financed out of the savings generated by energy efficiency investments, and that the private sector can provide the service needed to complete such projects in a timely fashion. Wisconsin law, statute s. 16.858 Energy conservation audits and construction projects, allows all state agencies to utilize energy savings to make needed energy conservation improvements, paid for out of their existing utility budgets, through Energy Saving Performance Contracts (ESPC).

The 2007-2009 biennial budget established the initial funding authorization of $30 million dollars of Program Revenue Supported Borrowing (PRSB) as All Agency funding under statute s. 20.866 (2) (ws). This authorization was increased by $50 million in the 2009-2011 biennium and by another $100 million in the 2011-2013 biennium to the current level of $180 million dollars.

The Department of Administration, Division of Facilities Development (DFD) is issuing this guidance document and establishing a process to hire an Energy Service Company (ESCO) from a list of approved Performance Contractors to assist agencies in utilizing the Performance Contracts for energy projects.

Replacing existing energy consuming equipment or infrastructure with more efficient equipment, changes to operations or control strategies can reduce energy costs. The projected savings can be used to finance the improvements that will create the savings, without having to request an increase in an agency's appropriations to pay for that specific project. Backlogs in routine maintenance will not be supported.

Performance Contractors identify eligible projects, identify project cost and then design and install needed improvements. The Agency pays for the financed project out of utility savings realized by the improvements. Under the law, the contractor must provide a written guarantee that the savings will always be at least equal to the payments for the cost of the improvements.

DFD CAN ASSIST STATE AGENCIES IN ENTERING INTO A PERFORMANCE CONTRACT
If an agency believes it will benefit by undertaking energy efficiency measures through Performance Contracting, contact the Department of Administration, Division of Facilities Development staff (David Osborn) for assistance with the process. If the projects are going to be greater than $40,000, DFD will partner with the agency to implement the contracts for the project.

DFD is charged with assisting state agencies with achieving greater energy efficiency, and specifically with reviewing, contracting and approving guaranteed ESPC for state agencies. It is the intent of these guidelines to provide a simplified approach to performance contracting procurement.

HOW TO USE THIS GUIDE

This guide for using guaranteed energy saving performance contracts in Wisconsin provides administrative and technical guidance to state agencies, energy service companies, and others involved in preparing technical reports and drafting energy performance-based contracts for review and approval.

Section One provides an explanation of what an agency must do to put guaranteed energy saving performance contracts in place.

Sections Two, Three and Four are directed to the Energy Service Company and address technical requirements for preparing performance contracting including Energy Assessment Reports for review by the state agency, and DFD. These reports are prepared by the ESCO to identify and analyze the technical and economic viability of projects proposed for financing through guaranteed energy saving performance contracts.

GLOSSARY OF ENERGY EFFICIENCY AND PERFORMANCE CONTRACTING TERMINOLOGY

The following terms are commonly used in energy performance-based contracts, Energy Assessment Reports (EAR) documenting projects to be financed, and measurement and verification plans referenced by the contracts. These definitions supplement those in the State of Wisconsin, Department of Administration. GENERAL CONDITIONS OF THE ENERGY SAVING PERFORMANCE CONTRACT.

a) Agency - "Agency" means an office, department, agency, institution of higher education, association, society or other body in state government as defined under statute s. 16.70 (1e).

b) Baseline Usage - The calculated or measured energy usage by a piece of equipment or a site prior to the implementation of the project. Baseline physical conditions such as equipment counts, nameplate data, and control strategies will typically be determined through surveys, inspections, and/or metering at the site.

c) Conditioned Area - The total square footage of all the space enclosed within the exterior walls of the facility, including areas occupied by auxiliary enterprises, which are provided with heated or cooled air, or both, to maintain conditions for an acceptable indoor environment, including temperature, humidity and airflow.

d) Commissioning - Commissioning is a systematic process of ensuring that all building systems perform interactively according to the design intent and the owner's system operational needs. (For more information refer to the Department of Administration, Division of Facilities Development website).

e) Dependent Measure - A retrofit measure is considered dependent if energy consumption or costs are affected by any other retrofit measure. In considering the effect of dependencies, technical analysts must use the following sequence: (1) building loads; (2) distribution systems; (3) primary equipment, and (4) energy management systems.

f) Division of Facilities Development (DFD) – The Division within the Department of Administration with the authority under statute s. 16.85 to take charge of and supervise all engineering or architectural services or construction work performed by or for the state for all state agencies.

g) Energy Cost Index (ECI) - A reference expressing the total energy cost (electricity, natural gas, or other fuel costs) of operating a building over a given period (usually a year) in terms of cost/gross square foot of space.

h) Energy Assessment Report (EAR) - The technical report developed as an outcome of the investment grade audit that identifies and documents a recommended group of energy conservation measures (ECM'S), a measurement and verification plan and includes a final energy saving performance contract proposal. The EAR is prepared, signed and submitted by a Technical Analyst for review and approval using the format provided in these guidelines.

i) Energy Conservation Measure (ECM) – Retrofit or measure that reduces energy consumption or energy operating costs of facilities in accordance with DFD standards. These do not include routine maintenance activities.

j) Energy Retrofit Group - A composite group of recommended ECM'S for a single facility. The identification, design, acquisition, and installation of one or more energy efficient measures designed to reduce energy consumption or peak demand, or to facilitate the use of alternative energy resources.

k) Energy Service Company (ESCO) – Any entity or its successor that provides energy related services in accordance with statute s. 16.858.

l) Energy Utilization Index (EUI) - A reference expressing the total energy (electricity, natural gas, steam, hot water, chilled water or other fuel source) used by a building over a given period (usually a year) in terms of Thousand BTU (kBTU)/ gross square foot of space.

m) Estimated Energy Cost Savings - The estimated reduction of energy costs resulting from an ECM. If

different from Guaranteed Savings both numbers must be listed together.

n) Facility - Any major energy-using building or buildings which is owned or operated by the State.

o) Guaranteed Savings - Energy cost savings which are measured in accordance with these guidelines and secured by a financial document sensitive to that measurement. These savings must be guaranteed through a contract. The stated amount may not exceed the minimum savings determined under the audit to be realized by the state within the period specified in the audit.

p) Gross Area or Gross Square Feet - The total square footage of all the space enclosed within the exterior walls of the facility, including areas occupied by auxiliary enterprises, basements and penthouses. Includes all space such as hallways, lobbies, stairways, mechanical rooms and elevator shafts.

q) Implementation Costs - All the costs associated with each ECM, including direct labor to install the retrofit, supervisory labor, engineering, administration, warranty work, material and equipment costs and any metering or monitoring costs.

r) Independent Measures - An ECM is considered independent if its energy consumption and cost associated with it is not affected by any other ECM.

s) Investment Grade Audit (IGA) – Detailed audit and analysis performed by ESCO to demonstrate energy savings as a basis for developing an energy assessment report and final energy saving performance contract cost proposal.

t) Measurement and Verification (M&V) methods - The performance measurement and verification guidelines adopted by the Federal Energy Management Program (FEMP) or the International Performance Measurement & Verification Protocol (IPMVP) will be the basis for measurement and verifications of paybacks.

u) Payback - The amount of time required for savings from an ECM or Energy Retrofit Group to offset all costs. Payback analysis is calculated with the debt service on 5.25% State energy bond financing and an energy inflation rate of 3.0% included. The overall payback period for a project or Energy Retrofit Group may not exceed 20 years with debt service and inflation included (or a simple payback of 16.07 years without debt service and inflation). The payback period for individual ECM's within a project or Energy Retrofit Group may not exceed the life of the improvement. The energy bond and interest rate may be adjusted at any time by the DOA Capital Finance Office to match current economic conditions. The bond and interest rate shall be approved by the DOA Capital Finance Office at least every two years in conjunction with the DOA biennial capital budget schedule.

v) Performance Contract - A contract which ensures energy cost performance in accordance with statute s. 16.858.

w) Preliminary Scoping Audit – Initial energy audit performed by ESCO to demonstrate potential for energy savings performance contract.

x) Technical Analyst - The Professional Engineer, Architect or qualified energy analyst responsible for the energy assessment of a facility.

Section 1 - INTRODUCTION TO PERFORMANCE CONTRACTING FOR STATE AGENCIES

The Wisconsin Legislature, through statute s. 16.858, and s. 16.847 allows state agencies to enter into guaranteed Energy Saving Performance Contracts (ESPC's). Agencies should consider overall costs, energy conservation targets, and staff workload in deciding whether or not to use performance contracting. Agencies will also have the ability to implement energy conservation projects using PRSB through the traditional design, bid, and build method. It is Agency responsibility to determine which method best fits their needs.

AGENCY OBLIGATIONS

1. Step 1 - Contact the Department of Administration, Division of Facilities Development indicating your interest in performance contracting, and obtain the list of approved performance contractors. Each ESCO on the list will have their proposals with qualifications posted on Vendor Net.

2. Step 2 -The Agency will review the proposals and qualifications from the approved ESCO list, and select three (3) or more ESCOs to conduct preliminary scoping audits of the project site and prepare a report and a cost proposal. Short-listing and oral interviews may be used. Contact Focus on Energy for current incentive program requirements.

3. Step 3 - The Agency will supply a preliminary scoping audit request (Audit Request Form provided) which describes the project scope, contact information, background information concerning the project site and energy use to the ESCOs conducting the audits including:

a) Building name.
b) Year constructed.
c) Occupancy and usage.
d) Gross square footage and number of floors.
e) Metered energy use data and utility company invoices to the extent possible.
f) Data on energy consuming or energy saving equipment and past energy conservation, as available.
g) Energy management procedures.
h) Anticipated future change in use or modifications to the building or equipment.
i) Prior energy audits or studies, as available.

The quality, quantity and availability of site information will vary from site to site.

4. Step 4 – The three (3) or more selected ESCOs conduct a preliminary scoping audit at the project site, analyze options, develop a report and a preliminary energy saving performance contract cost proposal and submit to the Agency. If the preliminary scoping audit indicates that there is a viable project, the agency may opt to go forward, or at their discretion may not. The overall simple payback period for a project or Energy Retrofit Group may not exceed (16.07) years (see Item u in the Glossary and Section 2.2.g). The life cycle cost analysis shall include utility, Focus on Energy, and other incentives. The payback period for individual ECM's within a project or Energy Retrofit Group may not exceed the life of the improvement.

5. Step 5 - Agency reviews the preliminary scoping audit reports and preliminary energy saving performance contract proposals to select one ESCO to develop the project. The agency will select the one final ESCO which the agency determines best meets the evaluation criteria (Evaluation Form provided). The agency initiates a project in Wisbuild to establish a project number, forwards a Contract for Investment Grade Audit & Energy Assessment Report (form provided) to the selected ESCO for signature and then to DFD for final signature and execution.

6. Step 6 – The one final selected ESCO completes the investment grade audit, energy assessment report, measurement and verification plan and the final energy saving performance contract cost proposal and submits to the Agency and DFD for review. DFD will provide technical review assistance to the Agency. During the review period, the ESCO provides responses to Agency and DFD comments and provides additional information as requested for clarification.

If the investment grade audit results in a project cost increase or savings decrease that combined are greater than ten percent (10%) of those in the preliminary scoping audit and preliminary energy saving performance contract cost proposal, or the proposal does not have a satisfactory payback, the agency is under no obligation to pay for the investment grade audit and may initiate negotiations with the second ranked ESCO.

7. Step 7 - If the Agency decides to proceed, the Agency shall negotiate the scope, cost, savings and other terms of the energy saving performance contract with the selected ESCO that performed the investment grade audit.

The ESCO must submit a revised proposal for an investment grade audit, energy assessment report,

measurement and verification plan and the final energy saving performance contract cost based on the scope, cost savings and other terms negotiated by the Agency.

If the Agency decides not to enter into an energy saving performance contract with the selected contractor after the investment grade technical energy audit has been completed for reasons other than those described in Step 6, the agency agrees to pay the contractor out-of-pocket expenses for the investment grade audit and energy assessment report service not-to-exceed $0.05 (5 cents) per gross square foot of audited space.

8. Step 8 – Agencies submit performance contracting projects to DFD similar to other projects. For projects less than $185,000, the Agency will submit a small project request to DFD. Of those, projects less than $50,000 will be fully delegated and the Agency will execute the final performance contract (form provided) with the ESCO. For projects between $50,000 and $185,000, DFD will execute the final performance contract with the ESCO. For projects over $185,000, the agency submits the project for Building Commission approval and DFD will execute the final performance contract with the ESCO. During all phases of proposal development, the Agency and ESCO staff shall work with a Focus on Energy advisor to procure the best available approved incentive grant agreements in support of the agency request.

All projects will be entered in Wisbuild for contract processing, contract payment, management and reporting purposes. DFD fees will be $500 for projects less than $50,000 and 2% of the performance contract value for all other projects. For each project DFD will assign a DFD project manager and the Agency will assign an Agency representative who will be designated as the construction representative. The Agency representative will provide the first level of ESCO pay request review and approval and the DFD project manager the second level.

9. Step 9 – After projects are approved and contracts executed, the Agency and ESCO hold a preconstruction meeting to review and coordinate all project activities (Reference Section 2, Article 7 below). The Agency is to review and comment on submittals and provide construction phase oversight of ESCO activities. Upon completion of the construction phase, the Agency and ESCO hold a substantial completion meeting to review operation and maintenance manuals, review record drawings, coordinate required grant payment documentation, take part in training, and establish and document a substantial completion date.

10. Step 10 – After substantial completion, the Agency becomes responsible for maintenance and normal replacement of filters, belts, lamps, etc. of installed systems and equipment. Annually for the duration of the project investment recovery, the Agency and DFD review the savings reports submitted by the ESCO to determine if reported savings meets the contract obligations. (Reference Section 2, Article 10 below) If they do not, the ESCO remits the difference to DFD in accordance with s. 16.858(2)(a).

Section 2 – PERFORMANCE CONTRACTING IN STATE OF WISCONSIN FACILITIES

Guidelines and requirements for preparing energy and financial calculations. technical, cost and savings criteria.

ENERGY SERVICE COMPANY OBLIGATIONS

1. The final selected ESCO shall provide comprehensive energy services, including but not limited to:

a) The preparation of an investment grade audit, energy assessment report, measurement and verification plan and energy saving performance contract proposal.
b) The design, specification, procurement and installation of equipment and systems to be used in providing energy efficiency and water conservation services.
c) Startup and commissioning of the systems and equipment installed.
d) Warranty response to equipment and system failures not considered part of routine service and maintenance.
e) Operation and maintenance manuals for the systems and equipment installed.
f) Staff training.
g). Working cooperatively with Agency and DFD staff in all activities.

h) Investigating and securing Focus on Energy and utility financial incentives and utility rate reductions available through government and/or utility sponsored programs.
i) Written energy savings performance guarantees.
j) Annual report and reconciliation of energy savings.

2. Technical audit and analysis work must be prepared and analyzed by technical analysts meeting the following criteria:

a) Have extensive knowledge of energy-using systems found in institutional and commercial buildings;
b) Have a working knowledge of energy efficient retrofits utilizing state-of-the art technologies, and a specific understanding of building operation and maintenance procedures;
c) Be experienced in conducting energy analyses identifying energy efficient retrofit projects in institutional or commercial buildings and in preparing comprehensive reports on the findings;
d) Be involved in on-site work to gather project data;
e) Have a working knowledge of the building(s) and its energy-using systems;
f) Direct or perform all aspects of the data collection, project selection, analysis, cost estimation; and provide final recommendations for the project;
g) Be knowledgeable in measurement and verification techniques and protocols. It is the responsibility of the technical analyst to respond in a timely manner to any comments, questions or necessary revisions resulting from the technical review.

Energy analysis may be performed by manual calculations, spreadsheets and/or computer programs. Submit detailed calculations and computer program inputs and outputs with the energy assessment report. Calculation methodologies are to be consistent with industry standards. Account for variations in occupancy and operating schedules, weather, part load efficiencies and the effect of dependent measures. Include a description of the assumptions made in estimating baseline and proposed energy consumption. Use current utility rates applicable to the ECM and include demand and power factor charges where applicable.

Detail the ECM descriptions and include equipment and product information so that the Agency, Focus on Energy, and DFD may assess the energy savings, installation, operational and maintenance implications. All energy using equipment and devices must meet or exceed applicable ASHRAE 90.1, Focus on Energy, Energy Star and Federal Energy Management Program (FEMP) minimum efficiencies.

Provide a detailed breakdown of costs as indicated in the energy assessment report. Implementation costs and calculated savings must reflect actual costs and savings. Costs and/or savings may not be artificially shifted between ECMs to misrepresent actual paybacks.

Use the following payback equation for each ECM to incorporate the cost of money (debt service on 5.25% State bonds) into the payback analysis calculations:

$$n = \ln(CRF/(CRF-i))/\ln(1+i)$$

Where:

n = payback years
CRF = capitol recovery factor (savings/cost)
i = annual compound interest rate (use 5.25% State bond rate)
ln = natural logarithm

An “effective” interest rate shall be determined as follows from the state energy bond rate, 5.25%, and energy inflation rate, 3.0%, as approved by the DOA Capital Finance Office:

i’ = effective interest rate
j = inflation rate

$$i' = (i - j) / (1 + j)$$

Example:

ECM cost	=	$25,000
savings	=	$2,000/year
CRF	=	$2,000/$25,000 = 0.08
i'	=	(.0525 - .0300)/(1+.0300) = 0.0218
n	=	ln(.08/(0.08-0.0218)/ln(1+0.0218) = 14.75 years

Calculation is included in Annual Energy Savings Summary Table, reference Energy Assessment Report Tables spreadsheet. For further information, refer to 2007 ASHRAE Handbook – HVAC Applications, 36.10, Equations (8 and 9).

3. Changes in operations, maintenance or staffing needs, or the capital cost contribution from equipment replacement may not be considered in the energy payback calculation. However the State of Wisconsin is interested in quantifying any maintenance and operational savings. Include projections of these savings as supporting documentation in the energy assessment report but not as part of the payback calculation.

4. Environmental Benefits - Calculate the reduction of SOx, NOx, CO2 and Hg due to ECM's and include in the energy assessment report.

5. The investment grade audit, energy assessment report, measurement and verification plan, and final energy saving performance contract proposal will be reviewed by the Agency and DFD. The ESCO shall provide written responses to Agency and DFD comments and supplemental information and clarifications as requested during the review period. The ESCO must submit a revised proposal for an investment grade audit, energy assessment report, measurement and verification plan and the final energy saving performance contract cost based on the scope, Focus on Energy and utility incentives, cost savings and other terms negotiated with the Agency.

   a) When there are ECMs with savings that payback within the life of the improvement, even though the savings may not achieve the 16 year payback criteria, they may be combined and bundled with other shorter payback ECMs which together have a combined payback of 16 years or less.
   b) For example, an energy efficient replacement chiller may have a 20 year payback and a 25 year life. Even though this exceeds the 16 year payback criteria individually, it could be combined with lighting improvements which may have a 5 year payback yielding a combined bundled payback of 16 years or less.
   c) In situations where a measure provides no energy conservation, there is no return on investment and the work may not be combined or included in the project unless a separate source of funding other than energy bond funds is used. An exception is made for metering, sub metering, and dashboard systems specifically included to support a sustained M&V system. In that case, it is acceptable to make improvements within a combined project bundle of 16 years or less.
   d) Similarly, if the payback for an ECM exceeds the life of the improvement, there isn't a full return on investment and the work can't be combined or included unless a separate funding source is used to buy down the cost to within the life of the improvement.
   e) These guidelines concur with Statute s. 16.858 requirements related to determination and realization of energy savings for PRSB which is the basis of the program.

6. Compliance with DFD requirements, State and Federal codes and regulations - All construction must meet the requirements of the DFD master specifications including general requirements in addition to the technical sections, DFD design guidelines and standards, state and federal codes and regulations in effect at the time of contract execution. ESCO is responsible for obtaining all regulatory reviews and permits including the Department of Commerce and local Fire Department reviews and approvals.

   Building automation systems, additions and modifications shall be of the same manufacturer as the existing system and by the firm currently providing system service.

7. ECM Implementation - After execution of the final performance contract, schedule a preconstruction meeting with the Agency to coordinate ECM scheduling and implementation with the Agency. No work is to take place without prior approval of the Agency. State buildings are typically occupied and implementation must accommodate building occupants. Follow all institution security requirements, non-harassment requirements, safety requirements, access, and work protocols. Coordinate site access, parking, hours of work, on site storage, waste management, deliveries and construction activities with the Agency. Identify prime and subcontractors, key

contacts and emergency contacts. Provide 48 hours notice of utility interruptions and coordinate dates with the Agency. The ESCO is responsible for recording meeting minutes and distributing to the Agency, DFD, contractors and subcontractors.

Submit system schematics, equipment and product submittals, engineered control drawings including sequences and lists of materials, design drawings and construction schedules not previously included in the energy assessment report to the Agency for review and comment.

Install, checkout, test, startup and commission all work in compliance with manufacturer's instructions and ensure equipment and systems operate as intended. Provide testing and balancing of new work in HVAC systems by NEBB or AABC certified contractor and include final report in O&M manuals. Provide system modifications, adjustments, trim impellers, etc. to obtain design performance.

At the completion of installation, schedule a substantial completion meeting with the Agency to review project closeout documentation and establish the substantial completion date. The ESCO is responsible for recording meeting minutes and distributing to the Agency and DFD. Provide the following documentation and training:

a) As-built record drawings of construction beyond in-kind replacement of fixtures and items of equipment, and all control work. Submit to Agency and DFD.
b) Three copies of operation and maintenance manuals for all installed fixtures, equipment and systems bound in three ring binders. Include submittals, product data, manufacturers and contractors operation and maintenance instructions. Provide a contact list of equipment and fixture suppliers, contractors and subcontractors. Include a copy of the HVAC test and balance report. Provide a warranty statement. Submit to Agency.
c) Training sessions for Agency personnel using operation and maintenance manuals. Demonstrate equipment and system operation, adjustment and maintenance procedures.

d) Copies of required equipment specification documentation, operating reports, and invoice information to comply with Focus on Energy grant payment requirements.

The ESCO is responsible for one year of warranty repair or replacement from the substantial completion date. In addition, other than normal maintenance and repair, the ESCO must warranty that under normal use the overall life of the ECM improvement is no less than the payback period for the ECM.

8. Energy Savings Performance Guarantee - Provide an energy savings performance guarantee with the IGA energy assessment report. The savings guarantee shall establish a minimum level of annual savings for the duration of the project investment recovery period. Reconciliation of savings shall be on an annual basis.

9. Measurement and Verification - ESCOs are to follow the performance measurement and verification guidelines adopted by the Federal Energy Management Program (FEMP) of the International Performance Measurement & Verification Protocol (IPMVP) as the basis for validating energy savings and paybacks. Actual parameter measurement and utility data analysis are to be used and are preferred over calculated or stipulated savings. Installation of metering or sub metering that verifies project performance is strongly encouraged within the project. The ESCO's measurement and verification plan, selected options and approach are subject to approval by the Agency and DFD.

FEMP Measurement and Verification for Federal Energy Projects can be down loaded from:
http://www1.eere.energy.gov/femp/pdfs/mv_guidelines.pdf

Standard Measurement and Verification Plan for Lighting Retrofit Projects in Buildings and Building Sites:
http://apps1.eere.energy.gov/buildings/publications/pdfs/alliances/lighting_measurement_evaluation_protocol.pdf

IPMVP concepts and Options for Determining Energy and Water Savings can be down loaded from:
http://www.nrel.gov/docs/fy02osti/31505.pdf

The measurement and verification plan, its implementation, and the periodic energy savings reports are the responsibility of the ESCO. Additionally, DFD may require third-party measurement and verification oversight or review of the periodic energy savings reports. The measurement and verification plan will become part of the contract and along with the periodic energy savings reports will be used to assess whether the savings guaranteed

by the ESCO have been met.

10. Periodic Energy Project Savings Report - The periodic energy project savings report must be submitted annually for the duration of the project investment recovery to the Agency and DFD within forty-five days of the end of the year to which it applies. Include parameter measurements, utility data analysis and calculations substantiating savings. The periodic energy project savings report will be reviewed based on the following criteria:

    a) Are the savings greater than or equal to those estimated or guaranteed in the energy assessment report and the contract? (If the estimated and guaranteed savings are not the same, both numbers must be shown throughout the documents.)
    b) Does the report present the data elements, calculations and results as set forth in the M&V Plan?
    c) Are the parameter measurements, utility data analysis and calculations which support the savings an accurate and acceptable representation of actual conditions and savings?
    d) Do the parties (i.e. Agency, DFD, ESCO) have any disputes or concerns regarding the report?

    If the annual savings do not meet the guaranteed savings, the ESCO remits the difference to DFD in accordance with s. 16.858(2)(a).

Section 3 – ENERGY ASSESSMENT REPORTS

Energy assessment reports must be prepared in the format provided in this section.

The prescribed format is intended to expedite the review process as well as the report writing process. All numbers, titles, etc. should be in the location indicated in the format. Final report copies must be bound on the left-hand side in three-ring binders with the title and date of the report on the spine. The entire report must also be submitted in electronic as well as hard copy, including all tables, figures, and pictures. Four copies of the Energy Assessment Report (EAR) must be submitted along with the contract, maintenance and verification plan and sample energy project savings report to the Department of Administration for review.

Title Page:

ENERGY ASSESSMENT REPORT FOR:	(Institution/Agency) (Street Address) (City, WI, Zip) (Agency Contact)
CONDUCTED BY:	(Name of ESCO) (Address, Phone Number)
PREPARED BY:	(Technical Analyst) (Signature) (Date of Submittal)

Body of Report:

1. Table of Contents
2. Executive Summary
    a) Facility Description
    b) Summary of Recommended Energy Conservation Measures
    c) Annual Energy Savings Summary Table (Reference Energy Assessment Report Tables spreadsheet for detailed requirements)
    d) Annual Building Energy Use Table, Existing and Proposed (Reference Energy Assessment Report Tables spreadsheet for detailed requirements)
    e) Annual Emissions Reduction for CO2, SOx, NOx and Hg.
3. Existing Conditions and Audit Analysis of Buildings
4. Individual ECM Descriptions
5. Energy Analysis, Measurement and Verification
    a) Measurement and Verification Plan
        Table listing each ECM, analysis approach/methodology, analysis tools and FEMP or IPMVP measurement and verification plan option
        Time interval(s) to be used for measurements

Sample calculation of savings analysis
b) Supplemental Energy Analysis Descriptions
6. Utility Rate Schedule and Analysis
7. Focus on Energy Incentives and Utility Rebates
8. Implementation Plan and Schedule
9. Detailed Project Financial Information with Cost Break Downs (Reference Energy Assessment Report Tables spreadsheet for requirements)
10. Performance Contract Proposal with Energy Savings Performance Guarantee
11. Appendices
a) Detailed calculations
b) Operating schedules changes
c) System schematics as appropriate
d) Equipment and Product Information
Manufacturer's literature
Equipment specifications
Sizing, selection and efficiency data
e) Operations and Maintenance Improvements
f) Other supporting documentation

Section 4 – PLUMBING, HVAC AND ELECTRICAL REPORT REQUIREMENTS

PLUMBING

Information Requirements

1. ECM Descriptions and Calculations:

a) Description of existing and proposed fixtures, faucets, flush valves, showers, etc.
b) Quantities of fixtures by fixture type and building
c) Number of building occupants and number of days per year building is occupied
d) Daily average number of uses of fixtures by fixture type
e) Average cycle time per use for faucets, showers and similar continual flow fixtures
f) Existing baseline fixture flow and flush rates and measurement verification method
g) Proposed fixture flow and flush rates and proposed measurement and verification method
h) Analysis of existing water closet bowl clearing ability with lowered flush rate
i) Water and sewer rates
j) Water heater description, age, efficiency and fuel rates
k) Water heater, faucet, shower, food service spray head and dishwasher inlet and outlet water temperatures

HVAC

Information Requirements

1 ECM Descriptions:

a) Quantities of terminals, zones, etc.
b) Equipment type and capacity
c) System capacities
d) Meter types/quantities
e) Scope descriptions of all mechanical equipment level control work including:
1) Quantity of output points added
2) Quantity of input points added
3) Quantity of existing output points verified
4) Quantity of existing input points verified

5) Existing control sequences to be functionally tested (entire AHU sequence, economizer sequence, heating coil sequence, etc.)
6) Repaired and/or replaced devices (sensors, actuators, valves, dampers, etc.)
7) Controller replacement and/or addition

f) Detailed control sequence modification descriptions as well as associated explanations for how each of the modifications save energy
g) DDC enterprise level upgrade scope and explanation how energy is saved

2. Cost, Savings and Payback Breakdowns by System and Type of Work. Where several items are grouped into a single ECM, provide breakdowns by what could be called "sub-ECMs" with individual cost, savings and payback for each. The summed individual cost and savings should match the overall ECM. Examples Include:

a) AHU controls modifications
b) AHU or other system controls upgrades
c) AHU system terminal control replacement and/or modification (separate from AHU controls)
d) AHU system modifications such VFDs and constant volume to variable volume operation
e) HW system pump control modifications
f) HW system boiler control modifications
g) Exhaust fan control modifications
h) Chiller control modifications
i) Chilled water pump control modifications
j) Fume Hood control modifications
k) Radiation control modifications
l) Terminal heating (unit heaters, etc) control modifications
m) System modifications such as adding VFDs
n) DDC enterprise level upgrades (supervisory level controllers and DDC server software)
o) Metering

3. Air Handling System Tables:

a) Building
b) AHU tag
c) AHU age
d) Area served
e) System type (VAV, CV, etc.)
f) Heating coil type (steam/HW)
g) Cooling coil type (chilled water/DX)
h) Nominal airflow
i) Min outside air
j) Fan motor HP
k) Fan motor BHP if known
l) Controls Manufacturer and relative age of components
m) Number of terminal zones
n) Terminal zone controls (DDC/pneumatic)
o) Current operating schedule
p) Proposed operating schedule
q) Other notable information

4. Major Equipment Descriptions or Tables:

a) Building

b) Equipment tag
c) Equipment age
d) Area and system(s) served
e) Type of equipment (centrifugal chiller, screw chiller, condensing boiler, steam boiler, etc.)
f) Capacity
g) Other notable information

5. Energy savings calculations for each ECM (or "sub ECM" where applicable):

a) "Before ECM" calculations and "after ECM" calculations where applicable
b) Calculation inputs
c) Calculations including spreadsheets, equations, energy model input and energy model output
d) The order or sequence of the proposed ECMs applications to demonstrate that taking the same savings for multiple ECMs is being avoided
e) ECM energy savings broken down by heating, cooling, fan, pump and heat rejection energy
f) Air system energy savings broken down by terminal unit modifications, air handling unit modifications and return or exhaust fan modifications. If several different modifications are being implemented for the terminals or air handling units then provide the separate savings calculations for each modification
g) Where different components of calculations are done on different sheets in the proposal, provide references with page numbers so that the various pages and calculations can be followed throughout the proposal.

General Instructions

1. Where operation of equipment can currently be scheduled by DDC systems or time clocks, scheduling savings will not be considered. Where equipment can't currently be scheduled, scheduling savings may only be used to pay for the work required to schedule the equipment. The savings may not be used to pay for other work that is not required to schedule the equipment.

2. DDC enterprise level upgrades (supervisory level controllers and DDC server software) may be included if they are needed to support other ECMs in the building and if the cost is supported by the overall savings in the building. Metering may also be included provided the cost is supported by the overall savings in the building.

3. ECMs must pay back within the life of the equipment and the life of the ECM improvement to insure that the State realizes a positive return on the investment. Equipment and ECM life to use in calculations are as follows:

a)	Indoor air handling unit	40 years
b)	Roof mounted air handling unit	30 years
c)	Roof top unit	25 years
d)	Roof Mounted exhaust fan	30 years
e)	Indoor mounted exhaust fan	40 years
f)	VAV terminal	30 years
g)	VAV DDC terminal controller	20 years
h)	Chiller Centrifugal	25 years
i)	Chiller Reciprocating	20 years
j)	Chiller Rotary Screw	20 years
k)	Boiler	20-40 years depending on type and condition
l)	Variable Frequency Drive	15 years
m)	DDC field level controllers	20 years

(Where new DDC controls are being installed on existing air handling units, 25% of the value of the controls will be retained when the air handler is replaced in the future provided the controls will be less than 15 years old at the time the air handling unit is expected to be replaced. This may be figured into the payback calculations)

n) Control sequence modifications and control repairs — 10 years

ELECTRICAL

Information Requirements

1. Energy Conservation Measures (ECM) Descriptions:

    a) Interior Lighting Upgrades- New fixtures and new layout.
    b) Interior Lighting Upgrades- New Ballast and Lamp combinations.
    c) Complete Building Lighting Control Upgrades.
    d) Individual Room Lighting Control Upgrades.
    e) Exterior Lighting Upgrades.
    f) Exterior Lighting Control Upgrades.

2. Lighting Upgrade tabulation shall include the following:

    a) Individual Rooms- specific room number and description of use.
    b) Existing lighting Wattage.
    c) Proposed Lighting Wattage.
    d) Net Wattage saving.
    e) Present Occupancy hours.
    f) Lighting kW Hours.
    g) Existing measured illumination level.
    h) Proposed calculated illumination level.
    i) Existing Controls.
    j) Proposed Controls.
    k) Proposed lighting kW hour savings with modified controls.
    l) Electric Utility Costs.
    m) Annual Savings- Dollars. Provide basis of cost calculation.
    n) Existing Fixtures. Description and lamp/ ballast type.
    o) Proposed changes to fixtures, lamp/ ballast combinations.
    p) Installation cost.
    q) Cost per fixture.
    r) Payback.

3. Major Equipment Descriptions or Tables:

    a) Building Name
    b) Area of building
    c) Room Number
    d) Room Usage
    e) Lighting System
    f) Control types specific to area/room
    g) Hours of use
    h) Equipment age
    i) Other notable information

General Instructions

1. Refer to Wisconsin Department of Administration, Division of Facilities Development, Electrical System Standards & Design Guidelines, section II, part 15, Lighting, for additional information on lighting requirements in state facilities.

2. Proposed adjustments to individual room illumination levels shall be based on Illuminating Engineering Society (IES), 10th edition recommendations.

3. Electrical savings shall be calculated using actual utility rates. If on-peak, off-peak, and time-of-day demand charges are different, the detailed savings calculations shall use the rate charged at the expected time of use.

4. Lighting fixture replacements for entire rooms shall not be assumed to be 1-for-1 replacements. The ESCO shall consider the IES recommended foot-candle levels, and provide fixture layouts based on these calculations. The new fixture layouts may possibly reduce the number of lamps per fixture, or the number of light fixtures in the space.

5. Low ballast factor (bf) ballasts have reduced lamp lumen output compared to normal ballast factor ballasts. The actual lumen output of tested lamp/ballast combinations shall be used in the calculations.

6. Savings from proposed Lamp and Ballast upgrades shall be calculated and submitted utilizing wattages from manufacturer's test results of actual lamp/ballast combinations. Typical wattages shall not be used. Specific lamp and ballast manufacturer catalog numbers shall be submitted.

7. Proposed Lighting Control upgrades shall comply with Wisconsin Administrative Code SPS 363 - Energy Conservation.

8. Lighting controls and switching shall be kept simple, inexpensive, and easy-to-maintain.

9. Architectural lighting control systems (scene lighting controls), low-voltage switching systems, digital control systems, or whole-building programmable control systems utilizing multiple control panels, shall be used only when necessary. These systems may be considered only for lighting control in lecture halls, auditoriums and theaters, for switching of large areas, or for specific energy-saving requirements. Coordinate use with DFD staff.

10. Proposed new lighting control systems shall include integration to existing control systems and facility monitoring systems when existing controls include the same.

11. Proposed lighting upgrades involving new fixtures and layout shall include calculated photometric data including defined area, level of activity, minimum and maximum foot-candles on the calculation plane, uniformity ratio (Ave/Min) and maximum watts/sqft lighting load. Lighting levels shall be based on IES, 10th edition recommendations.

12. Proposed lighting upgrades involving required Egress Illumination fixtures shall include calculated photometrics including defined area, level of activity, minimum and maximum foot-candles, uniformity ratio (Ave/Min) and maximum watts/sqft lighting load. Egress lighting levels shall comply with Wisconsin Administrative Code SPS 362 (IBC 1006).

13. Exterior lighting upgrade proposals shall include calculated photometrics including defined area, level of activity, minimum and maximum foot-candles on surface, uniformity ratio (Ave/Min) and maximum watts/sqft lighting load. Lighting levels shall be based on IES, 10th edition recommendations and local municipal exterior illumination codes. There will be no light trespass to nearby properties. There should be minimal to no exterior up light. All lighting should illuminate surfaces below the light sources to increase efficiency and minimize sky glow.

14. Lamp and ballast upgrades to Master/Slave fixtures shall take whip length limitations between fixtures into consideration for actual lamp/ballast combinations being proposed.

15. Lamp and ballast upgrades shall include cleaning of the reflectors and lenses, and replacement of damaged lamp sockets (tombstones).

16. In general, interior installations shall use high-performance T8, F32T8, 5000ºK lamps:
    a) Minimum 3000 initial lamp lumens,
    b) Minimum 24,000 hour rated life at three-hour starts,
    c) CRI of 81 or higher,
    d) Shall meet TLCP requirements for low mercury,

    Special circumstances may dictate other lamp types or color temperature.

17. ECMs must pay back within the life of the equipment and the life of the ECM improvement to insure that the State realizes a positive return on the investment. Consideration must be given to the equipment's present condition and age, and how long it is expected to meet service demands. Equipment and ECM life to use in calculations are as follows:

a)	Interior lighting fixture	30 years.
b)	Exterior lighting fixture	30 years.
c)	Lighting control device	20 years.
d)	Lighting control system - digital	20 years.
e)	Interior lighting lamp	Based on use hours and manufacturer's rated equipment life.
f)	Interior lighting ballast	Based on use hours and manufacturer's rated equipment life.
g)	Exterior LED source	Based on use hours and manufacturer's rated equipment life, but not more than 75,000 hours.

End