Energy Smart Services

solutions & incentives for business

SECTION 2D

CUSTOM INCENTIVES

- Sometimes technologies just don't lend themselves to standardization. At other times the technologies are straightforward, but they need to interact in complex or site-specific ways. For situations like these, Energy Smart Services offers **Custom Incentives**. Custom Incentives provide the flexibility to respond to specific operating conditions and design challenges. City Light staff will work with design teams to identify innovative ways to achieve efficiency goals tailored to the customer's specific needs.
- Energy Smart Services funds the implementation of emerging new technologies, as well as upgrades to equipment unique to specific industrial and commercial settings. Projects lending themselves to this kind of treatment include compressed air systems, HVAC controls, daylighting, large new construction projects, high efficiency transformers, elevators, and industrial controls and process equipment.
- Through Custom Incentives, Energy Smart Services gains the flexibility to offer funding for any Energy Conservation Measure that saves on-site electricity without fuel switching. Thorough initial project development by the design team can maximize energy savings, and can yield very attractive payback periods. Since the project goes beyond standard design, documentation is required to prove energy savings, including performance data on existing equipment and rigorous analysis of expected energy savings. The reward is a project tailored to the individual customer's needs that provides excellent efficiency, system operation improvements, and very large energy savings.

from Seattle City Light

Section 2D.
Custom Incentives

- Purpose and Scope
- Application and Process
- Selecting Energy Conservation Measures for Analysis
- Identifying the Baseline
- Overview of Funding Formulas
- Calculating the Value of Savings to Seattle City Light
- Calculating the Cost Cap
- Writing a Custom Incentive Report

Custom Incentives

PURPOSE AND SCOPE

The purpose of Custom Incentives is to offer the customer full flexibility in the range of projects eligible for Energy Smart Services funding. Any Energy Conservation Measure that reduces kWh without fuel switching may be considered for funding using a customized funding calculation if the measure isn't already covered by a Simple Rebate or Standard Incentive. Technologies covered by Custom Incentives include but are not limited to:

- The latest high efficiency industrial process equipment
- Controls for HVAC and industrial processes
- Daylighting
- Elevators
- Motors (see note below)

Most, but not all, motors are handled as Standard Incentives. See the *Instructions for Filling out the Funding Calculation Worksheets for HVAC and Motors* in Section 2C for an explanation of which motors may be handled as Custom Incentives and which are covered as a Standard Incentive.

APPLICATION AND PROCESS

In order to receive technical assistance for developing a Custom Incentive proposal, the customer fills out an Energy Smart Services *Application for Service* and sends it to Seattle City Light.

The customized energy savings calculation that becomes the basis for Energy Smart Services Custom Incentives may be performed by a consultant, contractor, or City Light Energy Management Analyst. For more information about these options, read about Facility Assessments and Energy Analysis Assistance in Section 3 of this manual.

If an Energy Conservation Measure is to be funded through a Custom Incentive, three types of information are required to determine the level of funding available: what the Energy Conservation Measure consists of (a design or proposal), how much energy it is likely to save, and how much it will cost. This information is formalized in a Custom Incentive Report, a Facility Assessment Report, or an Energy Analysis Report, each of which provides the estimated energy savings, a technical description of the Energy Conservation Measure (specifications that become part of the contract), and the estimated funding amount.

The rest of this section explains how a Custom Incentive measure is documented for funding.

SELECTING ENERGY CONSERVATION MEASURES FOR ANALYSIS

Recommendations and analysis are broken down into specific Energy Conservation Measures to allow the customer to select a scope compatible with available budgets and company goals. Each measure should include only one technology type so that the savings, cost, and funding

information generated for each can be compared usefully to other similar projects. For example, multiple cooling tower fans, and their respective controls, might be included in a single Energy Conservation Measure, but a solar window film wouldn't be included in that same measure, even though the solar film might affect the savings calculation for the cooling tower fans.

Energy analysis is only part of the work required to develop a successful Energy Conservation Measure. Equally important is a clear description of what is being proposed, and careful consideration of whether the proposed measure would satisfy the full range of the customer's needs for comfort, safety, productivity, equipment operability and maintainability. The faster the description of an Energy Conservation Measure can be pinned down, the more rapidly the energy conservation analysis will proceed.

In developing a full description or design of the measure, the customer may receive input from contractors, manufacturer's representatives and/or design consultants. Design consultants hired to produce Energy Conservation Measure designs are typically electrical or mechanical engineers licensed in the state of Washington who have experience with the types of measures under consideration.

The Energy Management Analyst will also offer to help the customer develop a list of Energy Conservation Measures (see the *Facility Assessment* and *Energy Analysis Assistance* parts of Section 3 of this manual). For projects that change ventilation levels, the Energy Smart Services program requires that the installation meet ASHRAE ventilation standard 62-89 or another applicable code or standard. Normally, the specification of ventilation rates and assurance that they comply with a given standard would be performed by a design consultant.

The development of a project description or design should be well coordinated with the Custom Incentive analysis so that the analysis and the description of the project ultimately cover the same ground.

IDENTIFYING THE BASELINE

1. Background and Definitions

The purpose of Energy Smart Services is to offer the customer financial incentives to purchase equipment that is more efficient than what he or she would have purchased in the absence of funding. In short, it is the goal of the program to influence design and equipment selection to save electricity. The starting point for any calculation of energy savings or cost is therefore the identification of "what the customer would have done" in the absence of Energy Smart Services funding.

"What the customer would have done" is referred to as the "baseline". Energy savings are therefore defined as the difference in energy consumption between the baseline and the "proposed" Energy Conservation Measure. The cost, likewise, is calculated as the difference in cost between the baseline and the proposed Energy Conservation Measure, and is referred to as the "incremental cost." If, for example, a customer were considering high efficiency lighting for a new building, the incremental cost of the higher efficiency lighting would be the difference in cost between two lighting systems, not the total cost of the higher efficiency lighting system.

2. What Would the Customer Have Done Without Funding?

Determination of the baseline is the first step in calculations of energy savings because the selection of the baseline has a strong influence on the amount of funding available.

Often it is not possible to know what the customer would have done in the absence of Seattle City Light funding, so the program has requirements concerning baseline selection. These requirements are intended to prevent financial incentives from going toward levels of efficiency that are no different than what the customer would have purchased without funding.

The efficiency of the existing equipment is often considered the baseline. For example, if the equipment appears to be in good working condition, it is often determined that the owner would not upgrade his equipment in the absence of Energy Smart Services funding. Therefore the funding calculations are based on the total cost of the installation. However, if any of the following conditions apply, the baseline becomes either the Energy Code, or (for equipment not covered by the Energy Code) standard practice:

- The project is new construction
- The project is a major remodel
- Equipment is being up-sized
- Equipment installed is not replacing other equipment
- Broken equipment is being replaced that must be replaced soon anyway in order to maintain a safe, comfortable, fully functional facility
- Old equipment being replaced that has become too expensive or difficult to maintain

The *Resource Directory* at the end of this manual explains where to find copies of the current Energy Codes. Inside the City of Seattle, the Seattle Energy Code applies; outside the City of Seattle, the Washington State Energy Code applies.

For replacement of broken Energy Smart Services-funded equipment before the expiration of its assumed service life, the baseline is the existing equipment as though it were functioning properly.

The same baseline should be used to calculate the energy savings as is used to calculate the incremental cost of a measure.

3. Adjusting the Baseline to Reflect Recommended O&Ms

If the baseline is the existing equipment (not Energy Code or standard practice), an adjusted baseline must be created that reflects completion of any O&Ms that will be required as part of the Energy Smart Services Financial Incentives for ECM Installation contract. The Custom Incentive Report will specify the Operations and Maintenance Measures needed to put the systems affected by Energy Conservation Measures into proper operation.

4. Adjusting the Baseline to Reflect Other Measures

If there are interactions between the savings of multiple Energy Conservation Measures, the energy savings calculations should be calculated using a rolling baseline, specifying the sequence in which the measures are analyzed, and ensuring that the baseline for each measure reflects the installation of measures earlier in the sequence.

OVERVIEW OF FUNDING FORMULAS

The Seattle City Light funding for a Custom Incentive is equal to the lesser of the following two amounts:

The Value of Savings to SCL = estimated annual kWh savings x the funding factor

The Cost Cap = incremental cost up to 70% of the total cost

CALCULATING THE VALUE OF SAVINGS TO SCL

The Value of Savings to SCL approximates the value of the expected energy savings of the measure over its service life. It equals the estimated annual energy savings (kWh) times a funding factor that is based on the expected measure life and the assumed value of energy.

1. The Funding Factor

To find the funding factor for a given measure, first look up the expected service life in Table 2D–1, then look up the funding factor given for that service life in Table 2D–2.

2. Annual Energy Savings

In order to assure a reasonable level of accuracy, the following requirements identify the minimum level of complexity for annual energy savings calculations used as the basis for a Custom Incentive.

If the equipment being proposed will experience a variable load, the customized energy savings calculation must involve at least the complexity of a bin calculation. The variables affecting the load and/or equipment efficiency are identified, and the hours of operation per year are broken down into bins of operation representing various load levels. The number of hours of operation per year is identified for each bin, and the baseline and proposed efficiencies at each bin level are introduced, with the savings per bin equal to the (hours per year in that bin) x (kW baseline - kW proposed). Unless the measure under analysis is a control that varies hours of operation, the hours per year in each bin are not to vary between the baseline and the proposed, nor are they to be adjusted after the project goes to contract.

Any on-site measurements used to calibrate the energy savings calculation must include a record of the operating conditions at which the measurements were made so that if baseline and post-installation kW readings are compared, they are compared for specific bin conditions.

Table 2D–1: Service Lives (in Years)

yrs	*Equipment Description*	*yrs*	*Equipment Description*
	BUILDING ENVELOPE		**HVAC**
20	Double Glazing	12	Air Conditioners*
18	Heat Mirror	15	Air Terminals
14	Low Emmissivity Coating	20	Boilers
7	Solar Shade Film	20	Chillers, water cooled not exposed*
10	Tinted Or Reflective Coating	15	Chiller, air cooled or exposed on roof*
20	Insulation	20	Cooling Towers
10	Air Curtain		Controls: see Miscellaneous
		15	Coils
	DOMESTIC WATER HEATERS	15	Compressors
10	Heat Pump	15	Economizers
12	Point-Of-Use	10	Low leakage dampers
15	Solar	20	Fans
		18	Furnaces
	LIGHTING	15	Heat Exchangers
	Fixtures fixtures, lamps, ballasts*		Heat recovery: See Misc.
		12	Heat pumps, air to air*
	MISCELLANEOUS	15	Heat pumps, hydronic*
12	Controls	15	Pumps, Base Mounted
15	Heat Recovery	10	Pumps, Pipe or wall Mounted
15	Motors And Drives*	10	Make-Up Air For Exhaust Hoods
20	Reciprocating Engines	15	Radiant heaters
15	Thermal Energy Storage	15	VAV air distribution systems
15	Transformer	10	Unit heaters, electric
30	Steam Turbines	20	Unit heaters, hot water or steam
	REFRIGERATION		
14	Unequal Parallel Refrigeration		
11	Refrigeration Case Cover		
3	Strip Curtain		

* = Equipment funded through Standard Incentives, not Custom Incentives. See explanation and Energy Smart Services *Funding Calculation Worksheets* in Section 2.

Table 2D–2: Energy Smart Services Funding Factors

Measure Life	*Industrial Process Loads**	*Non-Process Loads**	*Measure Life*	*Industrial Process Loads**	*Non-Process Loads**
years	$/kWh	$/kWh	years	$/kWh	$/kWh
1	.01	0.02	16	0.15	0.24
2	.02	0.04	17	0.15	0.26
3	.03	0.06	18	0.15	0.27
4	.04	0.08	19	0.15	0.28
5	.05	0.10	20	0.15	0.29
6	.06	0.11	21	0.15	0.30
7	.07	0.13	22	0.15	0.30
8	.08	0.14	23	0.15	0.31
9	.09	0.15	24	0.15	0.32
10	.10	0.17	25	0.15	0.33
11	.11	0.18	26	0.15	0.34
12	.12	0.20	27	0.15	0.35
13	.13	0.21	28	0.15	0.35
14	.14	0.22	29	0.15	0.36
15	.15	0.23	30	0.15	0.37

* "Non-process Loads" include lighting, HVAC, and refrigeration in both commercial and industrial facilities. "Industrial Process Loads" involve equipment directly related to manufacturing, such as steel furnaces.

The most commonly used variable to identify bins for energy savings calculations is outdoor air temperature. The loading on heating and cooling equipment varies with weather and outside air temperature and affects the efficiency of several kinds of equipment found in commercial and industrial facilities.

If energy savings for variable-load equipment are calculated using a computer simulation, the assumptions and inputs to the simulation must be made available for review by Seattle City Light, and the nature of the analysis made by the simulation must be explained in the Custom Incentive Report.

CALCULATING THE COST CAP

The Cost Cap = the incremental cost up to 70% of the total cost.

The purpose of Energy Smart Services funding is to help the customer pay the additional cost of buying equipment that is more efficient than he or she would have purchased in the absence of funding. The calculation of the "incremental cost" is intended to approximate that additional cost of going to a higher efficiency. Stated more formally, the incremental cost is the cost of going from the baseline to the proposed condition.

1. Calculating the Incremental Cost

If the baseline is the existing equipment, the incremental cost is equal to the total cost of the measure (labor, materials, WSST, and design). This generally comes into play when the customer is not already required to replace the equipment, (e.g. replacing fully functional lighting). If the baseline is the Energy Code or standard practice, the customer must spend some amount of money regardless of City Light incentives (e.g. code is already mandating certain efficiency levels) and so the incremental cost is less than the total cost. Incremental cost may then be calculated by any of the following three methods:

- The difference between the bid amount for the baseline and the bid amount for the proposed (including materials, labor, WSST, and incremental design costs)
- 25% of the total measure cost (materials, labor, WSST, & incremental design costs)
- 50% of the material cost (including WSST)

The first method—obtaining two bids—is preferred, because it provides the most accurate information to the customer and the utility. The other two methods are provided as an alternative in case the amount of time required for the first method seems excessive. The Energy Management Analyst and customer may choose any of these three methods.

Design Costs. The incremental cost may include design costs for going from the baseline to the proposed if the design was performed and stamped by a Professional Engineer (P.E.) and the design includes a reasonably complete set of design documents (specifications, and, where useful, scaled drawings). The design costs included in the total cost are not to exceed 10% of the total measure cost.

A project may include many components which are beneficial to the customer but don't contribute to energy efficiency. In calculating the energy conservation measure cost, leave out any components that are in both the baseline and the proposed, and include only components that are either directly responsible for the estimated energy savings, or essential to proper operation of the equipment needed to achieve the estimated energy savings. As stated above, design costs are limited to 10% of the total measure cost.

2. Combining Energy Conservation Measures to Reduce Effects of Cost Caps

Seattle City Light may sometimes choose to allow two Energy Conservation Measures to be combined for the calculation of an overall Cost Cap if doing so will encourage the customer to expand the scope of measures to be installed. For all cases, however, the Custom Incentive report will provide the energy savings, cost, and funding information broken down by Energy Conservation Measure. If the effect of the Cost Cap is reduced by combining Energy Conservation Measures, the funding is calculated both with and without combining, and the increase in funding is distributed between the Energy Conservation Measures in a manner proportionate to their estimated annual savings.

3. Funding from More than One Utility

Some Energy Conservation Measures reduce water or natural gas consumption as well as electricity. If the measure receives funding from multiple agencies, Seattle City Light funding will be adjusted so that the total of the grants is no more than 70% of the installed measure cost.

WRITING A CUSTOM INCENTIVE REPORT

For Custom Incentives, the savings and funding calculations are documented in a Custom Incentives Report. The report should be as concise as possible while offering the following sections and contents:

Summary. A summary of the recommended Energy Conservation Measures, including a brief description, the annual energy savings, cost, incremental cost, funding, and simple customer payback for each measure. Each Energy Conservation Measure shall be assigned a number ("ECM _") that will be used consistently through the report.

Facility Information. A short description of the facility, including a description of the use and occupancy patterns, the lighting and HVAC systems, heating fuel source, and any other major electrical loads. For existing facilities, refer briefly to any previous Energy Smart Services projects and any major renovation plans. Indicate the total kWh and cost of electricity for a clearly defined 12-month period.

Energy Conservation Measure Information (for each ECM). For existing buildings, describe the existing conditions relevant to the proposed Energy Conservation Measure. For new construction, describe the Energy Code baseline. For all projects, describe the proposed measure. Include in both the proposed measure and existing condition descriptions information about the controls, both manual and automatic, and the setpoints. Explain what variables influence the energy consumption of the equipment, and how the savings are calculated. List any O&Ms that should be performed on the system affected by the Energy Conservation Measure. Assign each O&M an ID number ("O&M _"). Explain the baseline selection, and the adjusted baselines (for O&Ms, and any rolling baseline for inclusion of other Energy Conservation Measures). The calculations themselves are to be included in the appendices.

Appendix 1—Specifications, for each Energy Conservation Measure and O&M. Specifications clearly outlining any characteristics critical to achieving the estimated savings, submittal requirements, and inspection procedures. The specifications shall include for each measure at least the control sequence of operations, with setpoints, and the rated capacities and efficiencies.

Appendix 2—Energy Savings and Funding Calculations. Include all assumptions and equations used, and explain where all data came from. If results are presented in a table, for each column either indicate either where the data came from or provide the equation that links it to other columns. Cite sources.

Appendix 3—Bids. Include contractor's bid(s) to install or implement each of the Energy Conservation Measures. The bid(s) should show material, labor, and Washington State sales tax broken out for each of the proposed measures. The bids should also separate out expenses not directly related to the measures themselves. Bids must be itemized with quantity, manufacturer

and model number. If the incremental cost is to be evaluated as the difference between bids for the baseline and the proposed, include both bids for that measure, and identify which is the baseline and which is the proposed. If incremental cost is calculated as 50% of material costs, the bids must clearly identify material costs.

Appendix 4—For each Energy Conservation Measure, Catalog Cut Sheets. These are copies of manufacturer's literature describing any new equipment to be installed at the facility. Performance characteristics (capacity, efficiency, durability, etc.) and safety certification by an approved testing laboratory (UL, ETL, etc.) should be clearly stated on the catalog cut sheets. Cut sheets must demonstrate compliance with the specifications.

Appendix 5. Floor Plans. Facility floor plans or schematic layout, and a sketch of each Energy Conservation Measure showing basic configuration of components.

Appendix 6. Consumption History. Monthly electric consumption for one year, a copy of the current Seattle City Light rate schedule, and a list of the building's electric meters and general description of what each serves (if there is more than one and the information can be readily obtained).

OBTAINING CITY LIGHT FINANCIAL INCENTIVES CONTRACT

See the *Financial Incentives for ECM Installation–Steps to Participate* in Section 2 of this manual for information about Energy Smart Services contracts, inspections, and payment.