

Q&A - EFFICIENCY CERTIFICATES ANNOUNCEMENT

Overview

Q1: What are energy efficiency certificates?

A: Utility regulators are increasingly seeing energy efficiency as a preferred solution to meeting the increasing demand for electricity. State and federal governments are exploring establishing mandatory energy efficiency programs that help motivate large users to reduce their energy needs.

An Energy Efficiency Certificate (EEC), which generally represents the amount of MWh of energy saved as a result of a specific project, is a new method of validating energy savings. EECs have monetary value when the holder of the certificate trades them to an utility to meet mandated energy efficiency savings or to another company in need of an energy offset.

Already, Connecticut, Pennsylvania and Nevada have Energy Efficiency Credit trading as part of their established mandatory energy efficiency requirements. They are being asked by their regulatory agencies to meet certain percentages of their projected energy needs through energy efficiency programs, like energy efficiency certificates. More states are expected to follow and national legislation is being proposed.

The purchasing of energy efficiency credits is one way of documenting a company's commitments to reduce energy usage and ultimately their carbon dioxide (CO2) emissions footprints

Q2: What is an Energy Efficiency Certificate?

A: Energy Efficiency Certificates are documentation of reduced energy need/usage. Customers can earn one certificate for the total MWh of energy demand reduced for a given energy efficiency project. These certificates can be "retired" or can be traded, on the renewable energy marketplace in Connecticut, Pennsylvania and Nevada [for projects within the state (CT and NV) or within the electrical grid region] or through the brokered, voluntary market. The monetary value of an EEC will depend on the supply and demand in a given market.

Q3: Approximately how much are Energy Efficiency Certificates worth?

A: The value of each certificate will be value based by the market itself (very much like any stock, certificate or bond traded on the open market – the value of each certificate is determined by the supply or certificates available and the demand for those certificates). In Connecticut, the state has set a floor value of \$10/MWh and a ceiling value of \$31/MWh.

Q4: How will the program work?

A: The Neuwing Energy assessments are a two-part evaluation to:

- 1) Determine the initial data center energy draw from the data center or the IT equipment identified for consolidation based on industry accepted cost and energy estimates for the servers in use and the energy use and cooling profiles of the data center, and
- 2) A second review of data center energy draw after steps are taken to reduce energy consumption.

Customers are then awarded Energy Efficiency Certificates annually for the operational life of the identified equipment for the total of megawatt-hours of energy that are no longer needed to power and cool their data center or operate IT equipment. Neuwing Energy will keep a portion of each customer's earned certificates or charge a per MWh saved fee in exchange for the assessment. Customers can trade earned Efficiency Certificates through Neuwing Energy on the energy efficiency certificate market or they can retain their certificates, using them to document progress toward their environmental commitment and demonstrate reductions in energy use and associated CO2 emissions.

Q: Why focus on reducing energy demand?

A: It is about cost. Each kWh of electricity saved through energy efficiency costs \$.029/kWh, as compared to the cost of baseload generation (coal fired or nuclear plants) at \$.058/kWh generated and shoulder load generation (natural gas or oil fired turbine generators) at \$.118/kWh.¹

Energy efficiency has been identified by many NGOs (non-government organizations), legislators and electrical industry regulators as the most inexpensive, environmentally friendly way to increase electrical energy supply. Because of this impact, state legislatures and Public Service Boards are mandating that utilities satisfy a portion of their demand, demand growth, or renewable energy mandates [Renewable Portfolio Standards (RPS)]² through energy efficiency projects. Three states; Pennsylvania, Connecticut and Nevada require or allow the use of EECs to satisfy demand management or RPS program requirements. There are currently twenty additional states evaluating enacting EEC requirements over the next two to three years.

Q: Are there CO2 Emissions associated with an EEC?

A: CO2 emissions associated with electrical generation and use are broken into two categories . . .

Direct emissions: These emissions result from the burning of fuels to generate the electricity and are generally viewed as the responsibility of the utility company.

Indirect Emissions: When an entity uses electricity, that user takes responsibility for the direct emissions associated with the generation of the electricity. The associated, indirect CO2 emission is calculated using the CO2 emission factor for the utility's electricity portfolio or the CO2 emission factor assigned to the regional grid (the egrid factor published by DOE).

All of the CO2 emissions associated with an EEC are indirect emissions and can only be used as an offset for other indirect emissions.

Q: What 'standards' are in place to govern/regulate the EEC market?

A: EECs can be marketed in the regulatory market and in the voluntary market.

Regulatory Market: The specific requirements for the EEC are dictated by the Public Service Board (PSB) which governs the state market. Currently, three states, Connecticut, Pennsylvania and Nevada, have provisions for EECs as a means to satisfy PSB requirements to meet a percentage of electricity demand growth through energy efficiency projects. It is expected that other states will establish demand-side management requirements for satisfying a portion of demand growth over the next several years.

Voluntary Market: Companies that are interested in being environmentally responsible and are growing their business can procure EECs to compensate for the increased electricity use resulting from their actual or anticipated business growth. This market will be governed by a standard being developed by Environmental Resource Trust (ERT) and another independent organization with release of both standards planned during the fourth quarter of 2007.

¹ "Funding and Savings for Energy Efficiency, Programs for Program Years 2000-2004" Cynthia Rogers, Mike Messenger, Sylvia Bender, Energy Efficiency, Demand Analysis and Renewable Energy Division, California Energy Commission.

² A Renewable Portfolio Standard requires a state or country to satisfy a defined percentage of their electrical demand through renewable or non-CO2 emitting generating sources. Many states include energy efficiency projects as an acceptable method to satisfy the RPS. Currently 28 states have RPSs.

The specific requirements which apply will depend on the market in which the EEC is generated, but as noted it is expected that EECs generated in accordance with the two planned standards are expected to meet the requirements of both the voluntary and regulatory market.

Q: What are typical prices for EECs?

A: Currently, EEC prices can vary from \$1 to about \$30/MWh depending on demand. For example, under the Connecticut program, the price has a floor of \$10/MWh and is capped at \$31 per MWh. In the regulatory market, EEC pricing will be set by supply and demand considerations and the cost of the energy efficiency project (what EEC price is necessary to help the project meet company specific ROI hurdles). Currently their value in the regulatory market is between \$10 and \$15/MWh. In the voluntary market, EEC prices are likely to reflect the price of CO2 emissions either based on markets such as the Chicago Climate Exchange or the cost of CO2 emissions as reflected by the cost of renewable energy credits. Current pricing for CO2 emissions on the CCX market is \$3/ton of CO2 and for RECs is around \$3-7/ton of CO2.

Q: Is EEC today a real practice in the market?

A: Currently, there are mandated EEC markets in Pennsylvania, Nevada and Connecticut. In PA, CT, and NV, an EEC is one option in an energy efficiency hierarchy that includes options such as Combined Heat and Power generating facilities. There are also EEC programs being developed in the UK, France, Belgium and Italy.

Q: What is the life of an EEC (i.e., do EECs expire)?

A: The life of an EEC will depend on the market into which it is being sold. The regulatory market may limit the duration of the EEC project to a specified number of years. For example, in CT the certificates have a life of one year. Under the ERT standard, the EEC can be re-verified each year, for as long as the equipment remains installed and the energy savings can be documented and verified in accordance with the Monitoring and Verification plan. The duration of the certificates generated under this program can be set with Neuwing Energy.

Q: Where exactly can one trade the EECs?

A: Currently, there is not an open market similar to the Chicago Climate Exchange or the EU Emission Trading Scheme (ETS) for trading EECs. The market prices of EECs will be set by "market makers" such as Neuwing and Sterling Planet. There is currently trading directly between brokers or companies and utilities in places where regulatory requirements exist requiring utilities to procure EECs to cover demand growth. In these situations, utilities involved are likely to publish the price that they are paying for certificates. It is likely that an open exchange will be established within the next one or two years as EECs are incorporated into more state and country level demand side management programs.

Q: What are the benefits of offering EECs?

A: **Documentation** (IBM and Client): The EEC will document the energy savings of a specific energy efficiency project such as a server consolidation project. This process provides an independent, third party verification of the energy savings.

Financial (Client): EECs will provide a financial incentive for energy efficiency projects such as server consolidation and data center efficiency projects. The current value of smaller consolidation projects, 1–100 MWh, will be the \$2–\$400 range. The IBM System z consolidation project announced as part of Project Big Green (consolidating 3900 distributed servers onto 33 System z servers in IBM data centers), which would conserve 119,000 MWh annually [assuming 4 kW per distributed server (power and cooling) and 60 kW per System z], would generate certificates worth \$328,000 to over \$1,000,000. Larger data center efficiency projects, such as the IBM Lexington Data Center Assessment Project which identified 250 kW of savings (2190 MWh/yr) has the potential to generate EECs worth \$4,400 to over \$20,000 each year the project can be verified. In this particular instance,

this would cover 5–20% of the cost of performing the assessment that identified the inefficiencies.

Public Relations (IBM and Client): The EEC enables companies to demonstrate their commitment to energy efficiency and reduction of the associated environmental impacts from energy use using a third party validation of their efficiency projects. This offering has the potential to have a similar, favorable impact as other energy efficiency incentive programs.

Support to State Energy Efficiency Programs (client): In states with EEC regulations, the EEC program allows companies to support initiatives to reduce energy use and infrastructure stress in the states in which they operate.

Q: How does this service compare to competitive offerings?

A: While various construction and engineering companies offer energy efficient engineering, there is not currently a comparable offering for documenting the energy efficiency of data center energy efficiency projects.

Q: How are the energy efficiency savings measured for a specific energy efficiency project?

A: Data for the existing energy use can be obtained through the methodologies listed below. The methodology chosen for a specific project will depend on the quantity and quality of data that the client has available and the requirements of the regulatory organization or EEC standard under/for which the EEC qualifies.

- a) Direct measurement of energy usage at a facility level using utility bills: The actual number of utility bills required for a particular EEC submittal will depend on the required baseline period for the client's project type. It may range from three months to two years of utility bills and depends on the requirements of the state program or the governing standard.
- b) Direct measurement of energy usage at the equipment level from uninterruptible power systems (UPS) data, software based data collection, metered breaker systems, or use of external measuring devices. The amount of data required to establish baseline may involve one week to several months of data.
- c) Equipment level electrical use and heat output data: This will be calculated using a diversity factor (percentage of electricity specified below nameplate compared to the electricity actually used) based on experience, documented studies, or selected direct measurements as prescribed by the Monitoring and Verification (M&V) plan. The plans are to use a commercial database which provides specification level power usage and heat output nameplate information from commercially available servers.

For server consolidation projects methodology "c" will be used to establish the pre-project electricity use baseline. The baseline requirements and computational methodology will be negotiated with Neuwing Energy and should become fairly standard for each project type.

Data to measure energy usage after the energy efficiency project can include:

- a) At a facility level, direct measurement based on the utility bill.
- b) For equipment, direct measurement from the new equipment (enabled by IBM Director and other server level electricity use measurement capabilities), through electricity use measurements from the UPS, or other method agreed to with the client. The expectation is that the majority of the new equipment will have electricity use measurement capabilities available for the post project

verification. For IBM System z for example, the intent is to use electricity consumption data collected by the System z software.

Q: What are the implications of selling an EEC to the Energy and CO2 inventory of the entity generating the EEC? Put another way, who owns the reduced energy use credit and the associated indirect CO2 emissions avoidance credit if the EEC is sold.

A: EECs may be sold into two markets, with each market having its own, specific rules for ownership assignment of the associated indirect CO2 emissions credit.

Mandatory Market: The effect to the energy and CO2 inventory of the owner of the EEC will depend on the requirements of the enabling regulatory program. Unless stated otherwise in the enabling legislation or regulation for a state or country EEC program, the entity that originates the EEC retains the credit for indirect CO2 emissions reductions associated with the energy efficiency project. In the Connecticut, Nevada, and Pennsylvania program, the ownership of the CO2 emissions reductions is retained by the entity that originated the project.

Voluntary Market: If the EEC is sold in the voluntary market, ownership of the energy reduction credit and the associated avoidance of indirect CO2 emissions transfer to the EEC purchaser and the originator of the EEC must account for and report the CO2 emissions associated with the EEC in its CO2 emissions inventory. Specific requirements will be documented in the EECs standards planned for release in the fourth quarter of 2007.

Q: Who will perform the verification of energy savings?

A: The verification will be done by the Neuwing Energy or the standards group in accordance with the M&V plan that will be developed, maintained and executed by Neuwing Energy as part of their service. The verification will be performed by reviewing documentation detailing the post-project energy use. Neuwing Energy will only issue an EEC after such verification is complete.

Q: Who pays for such verification?

A: Verification services are provided by Neuwing Energy as part of its service. It is covered by a fee of \$2.50/MWh of energy saved or by transferring the ownership of 25% of the MWh savings to Neuwing Energy.

Q: How will the energy savings be verified?

A: For the IBM program, the electricity use data will be collected from one of two sources:

- a) For server consolidation projects, IBM and Neuwing plan to use IBM Director or other internal power measurements (System z) enabled by the server software.
- b) In some cases, power measurements from the UPS system or metered breakers may be available for use. Use of these methods will require special arrangements between Neuwing Energy and the Client.

For data center level energy efficiency projects, such as consolidation projects, new facilities equipment, and/or improved air flow management, the data will be verified using actual utility bills.

Q: Who pays the EEC supplier? When do they get paid?

A: Neuwing Energy will receive a fee of \$2.5/MWh of saved energy or take possession of 25% of the EECs as their compensation for performing the initial documentation, registering the EECs and performing the required Monitoring and Verification plan.

Where Neuwing sells their EECs into the voluntary market or a mandatory market which requires transfer of CO2 emissions ownership, the client will lose the indirect emissions avoidance associated with the EECs retained by Neuwing.

Q: I have seen some literature that suggests that EECs can represent the environmental attributes such as reduced carbon dioxide, nitrous oxide (NOX) and sulfur oxides (SOX) of avoided power generation. Why aren't we publicizing savings on environmental attributes as well?

A: Identifying the environmental attributes of avoided power generation is very difficult, as it is dependent on the specific electricity generation assets that supply electricity to a given location. Because this can vary with facility location, time of day, and over extended periods of time due to changes in the electrical supply portfolio, it is very difficult to specifically identify the environmental savings achieved by an efficiency and account for the exact emissions avoidance. The structure of the EEC program allows a clear determination of the electricity savings achieved by an energy efficiency project and represents, but does not directly quantify the environmental benefits of the project. As discussed in questions 5 and 6, the generator of the EEC (the client) will transfer the ownership of the energy savings and the indirect CO2 emissions associated with the energy conservation savings in the voluntary and mandatory markets, unless stated differently in the legislation or regulations establishing the mandatory market or in the EEC contract.

Neuwing Relationship

Q: Why is IBM working with a third party on this initiative?

A: IBM is running its energy efficiency certificate program through Neuwing Energy because they offer leadership and proven experience on the energy efficiency certificate market.

Under the planned terms of the agreement between IBM STG and Neuwing Energy, the EECs will be prepared, monitored and verified by Neuwing Energy in exchange for an initial fee of \$2.50/MWh of saved energy or 25% of value of the EECs generated by the project.

Execution of the project will require IBM STG and its clients to gather baseline information on each consolidation or data center efficiency project, and track and report the ongoing energy use of the more efficient systems over time. Earned certificates can be kept and retired or traded on the voluntary market, or in the regulated market in selected U.S. states through Neuwing Energy.

By calculating or measuring energy use at the server or data center level before and after undertaking a project, the achieved energy savings can be determined, documented and verified over time in the form of an Energy Efficiency Certificate.