Energy Efficiency and Energy Conservation

The Ozone Transport Commission
Technology and Innovations Committee

September 2000

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Background

The OTC Technology and Innovations Committee has been tasked with exploring options that states can pursue concerning new technologies and innovative policies for reducing air pollution. The Committee took its first step in this process by hosting the Clean Air Technologies 2000 Conference in May of 1999. The resulting list of ideas from the conference was used to help formulate the Committee's work plan for this year.

Part of the Committee's work plan deals with the generation of electricity and its impact on air pollution. One specific topic, Energy Efficiency and Energy Conservation (EEEC), deals with practices that reduce energy-input requirements and demand for electricity. (Note: Sometimes this area is simply referred to as Energy Efficiency, or EE). Typical EEEC programs are often concerned with building design and industrial processes.

Potential Reductions

The following table summarizes NOx emissions associated with power generation in the Ozone Transport Region. These values are from the 2007 Level 0 OTAG inventories, and include the effects of Title IV State Measures, RACT and the NOx MOU:

Generation Source	NOx Emissions (tons per day)
Coal	673
Oil	241
Gas	155
Other *	82

* Includes coke, wood/bark waste, solid waste, liquid waste, kerosene/naptha, landfill gas, CO boiler, and large bore engine.

There is great potential to reduce these NOx emissions with well-designed EEEC programs. Quantifying the emission reductions and developing protocols associated with EEEC programs are topics that the OTC will need to continue pursuing as time progresses due to the constantly changing nature of the power industry. The following case studies are only "rough" estimates of the magnitude of NOx emission reductions that could result from EEEC efforts.

According to Fortune magazine, only one-third of U.S. manufacturers seriously scrutinizes energy use, although this sector collectively spent $90 billion for energy in 1997. *(Source: Power Boosters, PA's Energy Efficiency Success Stories).*

A recent editorial (Jan 13, 2000) in the Harrisburg Patriot-News is one of several articles promoting the benefits of EEEC practices. The article discussed a statement by U.S. Department of Energy Assistant Secretary Dan Reicher concerning the previously referenced Power Boosters book. If other companies would make similar investments in

EEEC, Pennsylvania alone could reduce its energy usage by more than a quadrillion BTUs by 2010. As detailed in Attachment A, this would equate to a reduction of approximately 75,000 tons of NOx (7500 tpy, or 21 tpd), if the electricity were being generated by coal sources.

Options (Summary)

The OTC could pursue a number of options on EEEC, as listed below. These topics are further expanded later in the document.

Short-term, regional options
- Meeting with energy officials
- Promotion of EEEC funding opportunities

Long-term, regional options
- OTC discussion of EEEC market forces
- OTC recognition program

Long-term, state options
- SBC Involvement
- SIP credits and NOx Budget Allowances

The majority of items can be classified as "directionally correct" strategies, without the need for regulations.

Options (Expanded)

Meeting with Energy Officials

The idea behind this concept is similar to the proposal outlined in the OTC paper on renewable energy. The annual NARUC meeting, scheduled for late September or early October, may provide an opportunity for environmental and energy officials to talk. Topics that could be discussed:

- Market Development for EEEC
- Impact of deregulation on air emissions
- System Benefit Charge Programs

Promotion of EEEC funding opportunities

Attachment B provides an example of the type of existing programs for funding of programs related to industrial energy efficiency. The OTC, perhaps through a clearinghouse, could help promote the availability of these funds.

OTC Discussion of Market Forces

Individual states have had varying degrees of success in implementing EEEC programs. As an example, some of the successes in PA have been highlighted in the previously referenced Power Boosters document recently published by the Safe Energy Communication Council. The OTC could provide some type of forum (e.g. conference call) to provide a "brainstorming session" specifically designed to stimulate thought on ways to promote to continue the development of this market (e.g. tax incentives, venture capitalists, etc.). The previously mentioned OTC Clearinghouse could help promote EEEC on a regional basis.

OTC Recognition Program

Several states have had great success in recognizing the EEEC practices of private industry. (Further details are contained in the OTC paper on “State Practices.) The OTC Clearinghouse could serve as another vehicle to recognize the accomplishments of these industries.

SBC Involvement

Deregulation of the power industry has resulted in funding for EEEC programs through what are referred to as System Benefit Charges (SBCs). SBC programs are funded through a small monthly charge on a customer's electric bill. Legislation in several OTC states requires that SBC funds be utilized to support EEEC programs.

These programs provide an excellent opportunity to develop the market for new technologies designed for EEEC purposes. The OTC could play a role in the design of these programs at the state level, because OTC representatives often have a seat on the boards that govern the expenditure of these funds. The OTC representatives need to continue encouraging the expenditure of these funds for programs that reduce electricity consumption and positively impact air emissions.

Examples of EEEC programs are summarized in the following tables:

Energy Efficiency Programs in the OTR

State	Program
Connecticut	SBC-funded Energy Conservation and Load Management Fund that supports energy conservation programs.
Delaware	DP&L utility is scheduled to create an SBC-funded public purpose fund for environmental conservation and energy efficiency programs.
Maine	Restructuring legislation requires the establishment of a wires charge for funding conservation programs.
New Jersey	SBC-funded Energy Efficiency and Renewable Energy Fund (EE/REF)
New York	SBC-funded Energy Efficiency Programs and Energy Research & Development Programs (part of the New York Energy $mart Programs). The R&D program includes energy efficiency, renewables, environmental and strategic R&D.
Pennsylvania	Four Sustainable Energy Funds (SEFs), along with a state-wide advisory board, have been created as the result of restructuring. Fund boards are currently in the process of finalizing strategic plans. General goals are to include the promotion of energy conservation and energy efficiency.

Funding Mechanisms in the OTR

State	Program
Connecticut	The Energy Conservation and Load Management Fund is funded through a 3/10 of one cent per kWh charge. Could generate up to $90 million per year
Delaware	A charge of approximately $0.000178/kWh funds environmental incentive programs, and is expected to generate $1.5 million annually.
Maine	TBD
New Jersey	Funding mechanism could generate as much as $96 million for EE related projects
New York	The energy efficiency program is expected to receive $143 million in SBC funds over a three-year period. The program anticipates that private funding from trade allies will result in over $500 million being made available. Approximately $22.1 million will be generated through SBC funding for the research and development program.
Pennsylvania	The structure of each fund varies slightly, but a general rule of thumb is that the utilities will charge 1/100 of a cent per kWh in transmission and delivery rates for approximately five (guaranteed) years. Some funds were structured so that the utility also made a lump-sum payment. The total revenue for the four funds is expected to total approximately 55 million dollars.

SIP credits and NOx Budget Allowances

Individual states in the OTC may want to investigate the possibility of credits for energy efficiency practices.

For example, Texas recently analyzed building code practices and has requested a NOx SIP credit for energy efficiency practices. Based on a building code analysis, Texas determined that the codes were real, enforceable and quantifiable, therefore meeting the requirements for a SIP credit. The calculations (outlined in Attachment C) resulted in a request to EPA for a credit of 0.5 tpd of NOx.

Each state would need to evaluate whether their particular situation would allow for this type of idea.

Some concerns about trading programs and EEEC credits are similar to the concerns outlined in the OTC renewables paper. That paper mentioned that a prior program (CRER) had seen few applications for credit.

To help the success of these types of programs, innovative approaches need to be considered to add value to the program. New York recently introduced the Green Building Tax Credits program, which would provide up to $25 million in tax breaks over the next several years for using EEEC technologies. Although tax credits are not typically the responsibility of air programs, OTC Commissioners may be able to promote these ideas on the various boards on which they serve.

Attachment A
Calculation of NOx Emissions

Conversion Factors

$$\frac{\text{KWh}}{\text{3412 BTU}}$$

Factor obtained from Energy Information Administration (EIA)

Calculation of Tons of NOx:

$$1.0 \times 10^{15}\ \text{BTUs} \times \frac{0.15\ \text{lbs}}{\text{MMBTU}} \times \frac{\text{MMBTU}}{10^{6}\ \text{BTU}} \times \frac{\text{Ton}}{2000\ \text{lbs}} = 7.5 \times 10^{4}\ \text{tons}$$

Attachment B

Lockheed Martin Energy Research Corporation
Procurement Division
Post Office Box 2008
Oak Ridge, Tennessee 37831-6192

(865) 576-1426 (phone); 417-6495 (pager)
(865) 241-2426 (fax)
E-mail: ebs@ornl.gov
http://www.ornl.gov/Procurement/

December 8, 1999

Request for Proposal (RFP) No. 3500013672
Industries of the Future Plant-Wide Energy Efficiency Opportunity Assessments

Closing Date: April 3, 2000

Lockheed Martin Energy Research Corporation (the Company, LMER), operating under its Prime Contract No. DE-AC05-96OR22464 with the United States Department of Energy (DOE) invites you to submit a proposal for providing technical assistance to the Oak Ridge National Laboratory (ORNL) in support of the DOE Office of Industrial Technology (OIT).

The attached Statement of Work (SOW) dated November 12, 1999, describes the work to be performed.

We are requesting proposals from manufacturers for plant-wide assessments that will lead to substantial improvements in industrial energy efficiency, waste reduction, productivity and global competitiveness in support of the OIT Industries of the Future (IOF) strategy. The goal of such assessments is to develop a comprehensive strategy that will significantly increase plant energy efficiency and reduce environmental emissions.

We intend to award up to ten fixed-price subcontracts based on technical quality, price and the availability of funding.

The maximum subcontract award will be $100,000, and cost sharing of at least 50% is required. We anticipate that a period of performance of 6 to 12 months will be required for the assessments.

In evaluating proposals, we will be concerned with finding the most advantageous balance between expected performance and overall price (or cost) to us. You must, therefore, be persuasive in describing the merit and value of methods, characteristics, and features that will enhance potential performance, application or otherwise contribute to achieving our objectives.

Technical proposals must be limited to 10 single-spaced pages, exclusive of letters of intent, personnel resumes, and exhibits.

Attachment B (cont.)
We will award subcontracts only to industrial "end-users". End-users are those companies that own and operate the facility that is the focus of the assessment. In addition to the end-user participation, a project team may include design and consulting engineering firms, manufacturers, distributors, utilities, energy service companies, state energy offices, research institutions, etc. End-user companies are encouraged to include such participation.

Please submit six (6) copies of your technical and business management proposals and a diskette containing an electronic version of the technical proposal on or before the above closing date. Address your proposal to my attention at the address above. For express mail or personal delivery, my address is:

Lockheed Martin Energy Research Corporation
Oak Ridge National Laboratory
Bethel Valley Road
Building 4500-N, Room 140, Mail Stop 6192
Oak Ridge, Tennessee 37831-6192.

Evaluation Criteria and Proposal Instructions for this RFP are shown below. A pre-proposal conference is not planned. If you do not intend to submit a proposal, a prompt negative response, stating your reason would be appreciated.

All reference materials can be accessed at:

http://www.ornl.gov/Procurement/

If you have any questions regarding this RFP please contact me only by E-mail at the above address.

Sincerely,

S. E. Bridges
Subcontract Administrator

Attachments:

Evaluation Criteria
Technical and Business Management Proposal Instructions
General Information
Statement of Work

Attachment C

Details on Texas Calculation for SIP Credit Request

Code upgrades for the Dallas-Fort Worth area were to occur in the year 2001, affecting 6 years of new housing starts for the 2007 plan.

Texas used information from the Alliance to Save Energy (ASE, 1998) report titled "Opportunity Lost" to determine that, for single and multi-family residences and buildings, the codes would save approximately 3600 Billion BTU/year.

For six years:

$$3600 \times 10^9 \text{ BTUs} \quad \times \quad 6 \text{ years} \quad = \quad 2.16 \times 10^{13} \text{ BTUs}$$

Assuming a NOx emission factor for large wall-fired natural gas boilers with low-NOx burners (140 lb/10^6 scf) and 1 scf of natural gas containing 1000 BTUs:

$$\frac{2.16 \times 10^{13} \text{ BTUs}}{\text{Year}} \times \frac{1 \text{ scf}}{1000 \text{ BTU}} \times \frac{140 \text{ lb}}{10^6 \text{ BTU}} \times \frac{\text{Ton}}{2000 \text{ lbs}} = \frac{1512 \text{ tons}}{\text{Year}}$$

Texas equated this to 4 tpd in the ozone season. They viewed the benefit as being reduced in proportion to the effectiveness of any NOx control measures applied to Electric Generating Facilities (EGFs) in the service area. For example, if 4 county EGF emissions are reduced by 75% in 2007, then this measure would only produce a 1 tpd benefit in that year.

They assumed a 0.5 tpd benefit.

Source: E-mail from TNRCC, December 1999