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Improving Power System Efficiency in Developing Countries Through Performance Contracting

Philip Yates

Utilities in developing countries may want to consider a successful new approach to improving performance: engaging a performance contractor to improve their operations — in exchange for a share of the savings. The utility, in turn, fulfills its own performance contract with the government — getting more autonomy in exchange for better performance.

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In the United States, some large industrial and commercial energy users have successfully used energy performance contractors to effect energy savings in exchange for a share of the savings.

In some developing countries, governments have considered various forms of government/utility performance contract, whereby the governments give the utilities more flexibility and autonomy in exchange for better performance.

Why not merge the two concepts?

A utility could engage a performance contractor to improve operations in exchange for a share of the savings — thereby allowing the utility to fulfill its performance contract with the government. The government would give the utility more autonomy in exchange for better performance.

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Table of Contents

IMPROVING POWER SYSTEM EFFICIENCY

IN THE

DEVELOPING COUNTRIES

THROUGH PERFORMANCE CONTRACTING

by

Philip Yates[1]

I. Introduction and Summary.

It is generally recognized that electric utility systems in the developing countries are less efficient than utility systems in developed countries.[2] Many developing country utilities can improve their efficiency at relatively low cost, through better planning, improved maintenance procedures, adequate stocks of critical spare parts, and increased training of utility personnel.[3] In short, improving the operation of existing facilities may be the most attractive energy investment available to a utility in a developing country.

While there are a number of reasons for these operational deficiencies, the core problem is institutional. Developing country utilities are usually government-owned, and over-control by government frequently leads to decisions that conflict with good operational practice. Because of these institutional barriers, developing countries cannot improve utility efficiency simply by spending more money. Any money allocated to improve utility efficiency should be spent as part of a program that increases the chances that (1) funds are expended appropriately, (2) personnel are

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2. C. Tabet and R. Skjoeldebrand, "Unavailability Factors of Thermal Generating Plant and Availability Statistics, 13th Congress of the World Energy Conference, October 5-11, Cannes, France.

3. "Power system efficiency" is used in this paper in its broadest possible sense, to include availability factors, power plant fuel efficiency, line/distribution losses, billing procedures and administrative overhead.

trained, and (3) trained people stay at their jobs after training.

The "performance contract" concept may be a potential solution to this institutional problem. There are two basic forms of this kind of contract that are relevant to this paper.

1. Private sector "energy performance contracts" have been used by large industrial and commercial energy users to lower their energy bills with little or no capital outlay. The energy performance contractor provides the engineering, capital, and ongoing maintenance needed to derive energy savings through the installation of energy efficiency devices or equipment, e.g. a heat exchanger on an industrial boiler. In exchange for this investment, the energy performance contractor receives a share of the energy savings that are generated over the length of the contract.

2. The term "performance contract" has also been used to describe an arrangement between a government-owned utility and its central government, under which the central government agrees to provide greater freedom [illegible] utility management, e.g. an exemption from civil service [illegible] ations, in exchange for the improved performance of the utility. This type of "performance contract" has been used in a number of countries as a means of targeting and monitoring the performance of government-owned organizations such as utilities.[4]

This paper discusses the concept of merging the private sector energy performance contract with the government/utility performance contract to form the basis of a program that can solve some of the institutional problems that inhibit the efficient operation of many utilities in developing countries.

Section II contains a discussion of the potential for improving the efficiency of utilities in developing countries, the various types of energy performance contracts that have been used by the private sector, the government/utility performance contract model, and utility twinning. Section III outlines the potential synergy between private sector performance contracts and government/utility

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4. For the private sector energy performance contract, an energy performance contract usually creates a benefit for the building or facility owner by reducing energy consumption. In the utility context, the benefit is more likely to be increased production rather than reduced consumption.

performance contracts. Section IV addresses the design of a potential pilot project to test this potential synergy. Section V contains the conclusion of the paper. A sample contract between a government agency and a private sector energy performance contractor is contained in the Appendix.

II. Background.

A. The Potential for Private Sector Involvement in Developing Country Utilities.

A precondition to private sector participation in a particular market is the opportunity to make a profit. Fortunately, there are obvious money-making opportunities in improving the efficiency of developing country utilities. If adequate foreign exchange is available, these opportunities could attract private energy performance contractors.

For example, based on a survey conducted by the World Energy Conference, the average "availability factor" (the percentage of time a generating plant is capable of service) for 100-199 MW generating units in the U.S. is 81%. In contrast, the average availability for the same class of plant in the developing countries is 75%.[5] While the average differences are not as great for larger units, the averages obscure the extremes. In India, for example, availability averages 66-70%, with some units below 50%.[6] Conversely, many European and North American utilities are able to achieve availability factors in excess of 85%.

The economic impact of low availability is staggering. A 1% improvement in a 320 MW coal-fired unit's availability factor can reduce costs by US$500,000 a year.[7] For larger units, the losses are even more severe. For example, losing a 550 MW plant for a day can cost

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5 Id., note 1.

6. S.A. Subramanian, "Management of Availability in Operation," World Energy Conference, Rome, Italy, 28-31 October, 1985.

7. G. Galli, "Availability Management: The Experience of ENEL," World Energy Conference, Rome, Italy, 28-31 October, 1985.

US$240,000,[8] while losing a 600-700 MW plant for a day can cost US$300,000.[9]

These losses result from replacing power from a "down" plant with power from a plant that is less efficient and/or uses a more expensive fuel, e.g. replacing a unit fired with domestic coal with a unit fired with imported oil. However, for many utilities, an even larger price is paid indirectly through reduced economic activity caused by poor power quality and blackouts. Blackouts reduce economic activity in the short run (an industrial facility shuts down) and in the long run (the decision not to locate a new industry in an area with poor power quality). Further, blackouts lower utility revenues because no power is sold during a blackout, and poor electricity supply reduces the power market.

Losses of a similar scale are found in many other segments of the developing country utility operation, i.e. transmission, distribution, administration and billing. In particular, poor planning for the transmission/distribution system and poor billing procedures produce truly awesome losses in utility revenues.

For example, in Nigeria the gross revenues of the Nigerian Electric Power Authority (NEPA) are US$127 million per year. These revenues are derived from only 60% of the electricity that NEPA produces, because total system losses (technical and non-technical) are 40%. Thus, in Nigeria, a reduction of one percent in system losses is worth over US$2 million per year to the utility.[10]

The poor efficiency of developing country utilities creates potentially profitable market opportunities for firms that can help improve utility performance. The market is not only large, it is growing -- about $50 billion is spent on new developing country power systems each year and annual average developing country load growth is 7%.[11]

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8. J. Krasnodebski & M.S. Grover, "Life Cycle Costs in Planning and Designing for Availability," World Energy Conference, Rome, Italy, 28-31 October, 1985.

9. P.C. Warner, H. Langner, "High Availability in Steam Generator/Turbine Units," World Energy Conference, Rome, Italy, 28-31 October, 1985.

10. World Bank Report No. 6923-UNI, p.24 and annex 1-2.

11. Christopher Flavin, "Electricity for a Developing World: New Directions," Worldwatch Paper 70, January 1986.

Many architectural and engineering firms and a few utilities are pursuing this market. However, the international debt situation and limited foreign aid prevents many developing country power authorities from acquiring the foreign exchange needed to improve utility efficiency levels by hiring expatriate consultants under a traditional fee-for-services arrangement. Furthermore, as indicated above, even if the capital is available from concessional lenders or other sources, many efficiency problems are fundamentally institutional -- valid recommendations are ignored, and expatriate personnel either fail to train indigenous personnel or the personnel that are trained leave the utility for the private sector.

In short, two problems must be solved. First, developing country utilities must gain greater access to foreign exchange in a manner that allows them to attract private contractors interested in improving utility efficiency. Second, institutional barriers to efficiency must be removed or modified.

The thesis of this paper is that performance contracts can be used to solve the second problem.

B. Private Sector Performance Contracting.

Energy performance contracts executed by private sector firms are generally structured as follows:

(1) A contractor provides a client (usually a facility owner) with an engineering report. If the client agrees to install the items recommended by the contractor, there is no immediate charge for the report. If for some reason the client decides not to go through with the program, the client pays the contractor for the report.

(2) Based on the engineering that is provided, the contractor and the client agree, through contract negotiations, to the implementation of improved operating procedures (including training to be provided by the contractor) and the installation of energy saving devices.

(3) The procedures are implemented and the devices are installed by the contractor, again at no immediate cost to the client.

(4) The contractor's compensation is in some manner tied to the financial benefit that the contractor's efforts helped to generate.

This basic structure can take a number of different forms, with the greatest distinction being the manner in which compensation is tied to performance. The most common energy performance contracts are shared savings, pay from savings, guaranteed savings, and micro-utility arrangements.

Each of the most typical energy performance contracts is described below:

1. Shared Savings. Under a "shared savings" contract an energy performance contractor provides energy efficiency services and equipment (the equipment can be supplied by a lender or lease company affiliated with the contractor), in exchange for a share of the energy cost savings or increased revenues that are generated. Under this arrangement, the risks of non-performance and the benefits of over-performance shift almost totally from the facility owner to the contractor.

For example, assume a facility has a need for $1,000,000 in rehabilitation improvements that is expected to decrease the facility's energy and operating costs by $500,000 per year. An energy service company could propose to design, install and maintain these improvements in exchange for one-half of the increased savings for a period of seven years, or an estimated $1,750,000 over the period of the contract. The contractor can lose money if the savings do not increase as much as expected. On the other hand, if savings increase more than expected, the contractor would make more than the estimated fee.

2. Pay-from-savings. A "pay-from-savings" arrangement is similar to a shared savings arrangement, except that the maximum payment is fixed, with the condition that the payments will never exceed the increased savings that are generated. Like a shared savings contract, a pay-from-savings arrangement limits the exposure of the facility owner to the increased savings that are generated. However, pay-from-savings limits the contractor's downside risk (by giving the contractor 100% of the increased savings until the maximum fee amount is reached) while also limiting the contractor's upside potential.

Using same hypothetical example, the contractor could agree to provide the $1,000,000 improvements in exchange for an annual maximum fee of $250,000 per year for five years. If the facility owner's savings increase by only $100,000 per year, the contractor would be paid this amount. However, if the increase in savings is $750,000 per year, the contractor would receive no more than the maximum payment under the contract ($250,000).

3. Guaranteed Performance. Under a "guaranteed savings" plan, an energy performance contractor provides a guarantee that a certain level of performance will be achieved. Under this type of arrangement the contractor can provide the financing, take over the responsibility to pay the facility's energy expenses, and bill the facility owner for a percentage of the facility's prior energy costs. The contractor's gross revenues are the difference between the amount paid to it by the facility owner and the amount the contractor pays to the utility/energy supplier.

For example, if the annual energy costs of the facility had been $1 million per year, the contractor could agree to pay the energy costs of the facility and install its equipment in exchange for 90% of this amount from the facility owner each year for a period of ten years. If the contractor can lower the facility's energy bills to $700,000 per year, the contractor pays out this amount and receives $900,000, for gross revenues of $200,000 per year.

Under another form of guaranteed savings, the facility owner borrows the money from a bank or other lender. Although the money is borrowed by the facility owner, the contractor guarantees that the increased savings will be more than sufficient to pay the debt service on the loan. By providing the contractor with its payment at the beginning of the contract (at the completion of the installation), the facility owner lowers the contractor's finance costs (these lower costs should be passed on the facility owner) while also affording the facility owner the ability to take advantage of potential financing advantages uniquely available to it, e.g. concessional lending.[12]

For example, the facility owner could borrow the $1,000,000 for a five year period with annual payments of $225,000 per year. The contractor could agree to guarantee the facility owner that its increase in savings will be at least $225,000 per year. At the completion of the installation, the contractor receives the $1,000,000 for its work. If the savings are $250,000 or more each year, everyone is satisfied. However, if the first year's savings are only $150,000, then the contractor would pay $100,000 to the facility owner (the difference between the increase in savings and the guaranteed amount).

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12. In the U.S., guaranteed savings is popular with state and local governments because interest paid by these entities are not subject to federal income tax. The guarantee savings approach allows government clients to enter into performance contracts using low cost government debt.

4. Micro-Utility. A "micro-utility" approach works for those energy investments that can be directly metered. Under this approach, the contractor installs equipment (usually generating equipment) and contracts to sell the output to the facility owner for a stipulated amount. The example set forth above cannot easily fit into this model, because most energy savings devices cannot be directly metered.

These four basic approaches to energy performance contracting can be combined or altered to meet a variety of needs and circumstances. Further, each type of payment scheme can be structured into a number of different legal forms, including various combinations of leases, service contracts, installment contracts, insurance policies, bonds, etc. The appropriate payment scheme and legal structure must be determined by the facility owner and the contractor on a case-by-case basis.

An energy performance contract can provide significant benefits for the owner of the facility. Most importantly for many owners, there is no need for "up-front" capital expenditures. Also, there is limited risk, because there are no payments due unless there are measurable performance improvements, and generally the payments are structured to be less than the savings so that there is always a positive cash flow for the facility owner. Further, the energy performance contractor may be able to act more quickly and do a better job than the facility owner could do for itself.

However, there are significant costs as well. The performance contractor will require a profit commensurate with its perceived risk. If risks are very high, the profit margin must likewise be very high. To lower those risks (and the required return to the contractor), performance contracts usually include a provision under which the facility owner agrees to operate the facility according to the contractor's specifications. While contractual operational parameters may limit the contractor's risk and thus reduce the required profit margin, the issue of losing exclusive operational control is a significant problem for many facility owners.

Administrative costs are also significant. Performance contracts are complex. They require a substantial amount of effort to negotiate, and once the contract is underway it may be costly and difficult to accurately measure performance. Further, even after a successful negotiation, enforcement of the obligations created by the agreement have caused problems for a

relatively large percentage of facility owners that have engaged in these arrangements.

For many government facility owners, the benefits of an energy performance contract are greater than the costs. Indeed, the popularity of performance contracting appears now to be greater in the public than in the private sector in the United States. The reason is principally that the public sector is more risk averse and less motivated by profit maximization than the private sector. Since performance contracts are characterized by lower risk for the facility owner, performance contracting clearly appeals to government facility owners on this basis.

Cogeneration and small power production facilities are frequently installed under contracts that both limit the risk of the facility owner and reward the contractor for good performance. Performance contracting has also been used in large industrial applications. However, performance contracts have been used most often to install energy saving devices in commercial buildings.

C. Government/Utility Performance Contracts.

Many observers complain that developing country utility managers cannot improve the efficiency of utility operations because of controls placed upon the utility by the central government. They argue that if the controls are lifted, performance would improve.

For example, a major problem for many developing country utilities is unscheduled outages. These are more frequent than "optimum" usually because the utility has postponed scheduled preventive maintenance. Unfortunately, the decision to postpone a scheduled outage is sometimes a political rather than a technical or economic decision. Further, unscheduled outages are longer than necessary due to a lack of critical spare parts and poorly equipped repair shops. Again, the decision to short-change maintenance in favor of new, more visible (and more popular) projects is a political decision with adverse economic consequences.

Equally important, many developing country utilities have problems in training and retaining qualified maintenance personnel, due largely to civil service regulations[13] and higher pay in the private sector.[14] As

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13. David Jhirad, Pirooz Sharafi, Ed Hillsman, "Innovative Approaches to Electric Power Delivery in Developing Countries," Asia and Near East Workshop, Asian

long as the utility is run as just another part of the government bureaucracy, these regulations and pay limitations will inhibit significant improvement in management performance. Poor management is not surprising when upper management are politically appointed (frequently with no regard for professional competence), and when management decisions are politically motivated.

Many believe that if these political influences are removed (also called "privatizing" or "commercializing" the utility), improved utility performance can be achieved with little capital outlay. Unfortunately, privatizing developing country utility operations is extraordinarily difficult. For understandable reasons, central governments are reluctant to relinquish control of what is frequently the most capital-intensive segment in the economy. However, for reasons that are just as understandable, many international lending institutions are beginning to insist on management reforms as a condition to providing loans for developing country utilities.

These management reforms can be instituted through a government/utility performance contract. Since utility performance can be quantified in a relatively straightforward fashion, a government/utility performance contract conditions the granting of management freedom with measurable improvements in utility operations.

A government/utility performance contract could work as follows:

(1) The central government agrees to exempt the electric utility from one or more of the constraints under which the utility has previously operated, e.g. civil service regulations, procurement regulations, interference with maintenance decisions from political appointees, timely payment of utility bills by government agencies, etc.

(2) The electric utility agrees to improve performance according to some measurable criteria, e.g. availability factor, employees per MW, losses due to technical and non-technical factors, etc.

(3) If the electric utility meets its goals, the central government continues and expands the operational freedom of action of the utility. However, if the goals are

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Institute of Technology, Bangkok, Thailand, September 29-October 3, 1986.

14. Id., Note 11.

not met, the freedoms that were previously granted can be withdrawn.

The performance contract provides the utility a measurable basis upon which it can extract freedom from the central government on a gradual basis. It also provides the central government with the power to reimpose controls unless certain goals are met. This freedom and the threat of losing it has the potential to provide important non-monetary incentives to utility management to achieve the goals set forth in the performance contract.

Most of the problems associated with private sector energy performance contracts will also be present in a government/utility performance contracts. The central government and the utility will find it difficult to estimate reasonable savings goals and investment needs and to measure performance improvements. In addition to these problems, utility and government officials will face the difficulty of negotiating issues of extreme sensitivity, e.g. changing working conditions for unionized workers. Further, enforcing a performance contract against the central government may be impossible, even if the negotiated performance targets are met.[15]

Despite these difficulties, commercialization of developing country utilities is regarded by many as a necessary precondition to improving their efficiency. A government/utility performance contract is one way to meet this precondition in a manner that may be more acceptable to the central government. Further, as discussed below, operational flexibility for the utility will be a requirement of any private sector firm that is interested in providing energy services and equipment to a developing country utility under a performance contract.

D. Utility Twinning.

"Utility twinning" is based on the concept that a developing country utility can gain useful training from another, "consulting," utility. This training can take place at the facilities of the developing country utility or at the facilities of the consulting utility. "Twinning" has been used in a number of countries, with mixed results. Despite these mixed results, the twinning concept could be coupled

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15. A central government that decides that autonomy for the utility is not in the national interest is unlikely to be dissuaded by a contract from reasserting control, particularly if the contract was executed by a previous government.

with the performance contract concepts discussed above, particularly for the private sector electric utilities that dominate the United States.

The author has discussed the performance contract/utility twinning concept with a number of U.S. utilities.[16] More than a few expressed an interest in establishing a partnership with a developing country utility through a long-term performance contract. There are three principal reasons for this interest:

o many U.S. utilities have excess engineering capabilities and investment capital due to domestic cut-backs in power plant construction;

o many U.S. utilities have non-regulated subsidiaries that are already involved (domestically) in performance contracting, others have non-regulated subsidiaries that are involved in international marketing of consulting services, and both kinds of subsidiaries are seeking new markets; and

o utilities are experienced in making equity investments.

There are obvious advantages in establishing a mutually advantageous long-term relationship between an efficiently run, capital rich utility and a poorly run, capital short utility. As described in the next section, it may be possible to structure this relationship as an energy performance contract in tandem with a central government/utility performance contract.

III. Barriers to Performance Contracting.

Private sector energy performance contracting has not yet been used to improve a developing country utility's level of efficiency. One reason for this is the relatively short history of private sector energy performance contracting.[17] However, there are two fundamental problems that must be overcome before private sector energy

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16. Research by Philip Yates for USAID, October, 1986.

17. Private sector energy performance contracting has been used for decades in France on a small scale for residential apartment buildings. In 1978, the business took off in the U.S. as a result of favorable tax treatment. Thus, large scale energy performance contracts have only a ten-year history.

performance contracts can be used to improve the energy efficiency of developing country utilities.

These problems are: (1) the energy performance contractor needs to control the factors that influence the performance of the utility; and (2) most developing country utilities do not have the foreign exchange available to allow foreign contractors and investors to remove their profits in hard currency. The first of these problems can be dealt with (at least in part) through the mechanism of the central government/utility performance contract. The second may require concessional lending from bilateral and multilateral agencies.

A. Operational Control.

A basic tenet of energy performance contracting is that the contractor must have control over the factors that govern the quantifiable measure of performance. For example, assume a developing country utility contracts with an energy performance contractor to provide training, pay bonuses for exemplary employees, spare parts, and management assistance in exchange for 10% of the increased revenues that are produced for the utility through improved power plant availability. Assume also that, as part of its management assistance, the contractor develops a preventive maintenance schedule for the plant. Because the contractor stands to lose its investment (in the training, pay bonuses, spare parts, and management studies) if the maintenance schedule is not followed, the contractor is certain to insist, as a condition to making the investment, that the utility abide by the contractor's maintenance schedule.

Likewise, the control of utility operations is the key issue addressed by the central government/utility performance contract concept discussed above. However, if the utility is not currently staffed with competent managers, simply providing greater power to management is unlikely to produce a significant short-term improvement in utility operations. Indeed, if the developing country utility's management is truly incompetent, providing them with greater operational freedom could degrade short-term performance. Accordingly, a developing country utility that lacks management skills needs to be able to acquire management expertise in order to meet its performance obligations to the government.

Clearly, the combination of a government/utility performance contract and a utility/contractor energy performance contract has the potential for a synergistic effect. The first contract provides the flexibility needed

for good management decisions, and the second provides the skills needed to make the freedoms pay off. Further, since the contracts are structured so that neither the utility nor the energy performance contractor receives its "payoff" (freedom, higher pay and greater status for the utility managers; profits for the contractor) in the absence of performance, a program structured around a combination of these two performance contracts may be politically acceptable to the central government.

B. Foreign Exchange.

Even if an energy performance contractor was able to secure absolute control over the operations of a developing country utility plant, the contractor would not be interested in investing in improving the plant's efficiency unless the contractor's profits can be expatriated from the country. Unfortunately, the countries with the greatest utility efficiency problems usually have such limited foreign exchange that there is not enough to pay expatriate contractors or investors, regardless of the profitability of their efforts.

This is true even if the savings produced by the energy performance contractor are savings in foreign exchange. For example, many developing country utilities fuel utility boilers with imported oil, which is purchased with foreign exchange. An energy performance contract could be structured between the utility and an expatriate firm to improve the efficiency of the utility's operation and thus reduce the country's imports of oil. However, if other, more senior creditors are already "in line" for payments from the country's limited foreign exchange reserves, there will be none left for the energy performance contractor.

Accordingly, a private sector energy performance contract can work for most developing country utilities only if the contract is in some manner connected with one of the country's senior creditors, i.e. one of the concessional lending institutions.

However, an energy performance contract requires periodic payments to the contractor based on the measure of performance for each period of the contract, e.g. 50% of the savings each year for five years. Thus, for concessional lending to be used in conjunction with the energy performance contract concept, the lender must be willing to leave the "account open" for the period of the contract, or to otherwise provide for foreign exchange payments to the contractor for each year of a relatively long-term contract. Thus, energy performance contracting will not only require reforms in the developing country utilities; it may also require reforms in international lending practices (which do not currently allow this kind of long-term payment structure).

IV. A Model Energy Performance Contract Using Concessional Lending.

No developing country utility has yet entered into an energy performance contract in conjunction with a government/utility performance contract. Despite the appeal of this concept on a theoretical basis, it will remain only a theory until it is attempted in some country. The following describes how the concept could be pilot tested by an international lending institution.

Step One: The Lender Determines to Test the Concept.

An international concessional lender decides to condition its next energy sector loan to a developing country utility on the structural reform of the utility. The long-term goal of this restructuring is to improve the quality of the utility's management, so that the utility will operate more efficiently. Specific needs identified by the lender are better training, higher status and higher pay for all levels of the utility's management, independence from political control, and relief from stultifying procurement regulations. Also needed are higher tariffs and for government agencies to pay their power bills.

The lender decides that the utility management wants greater freedom from the central government, and will enthusiastically support the testing of the synergy between the private sector energy performance contract and the government/utility performance contract. Accordingly, the lender modifies its lending procedures to meet the needs of an energy performance contract procurement.

In effect, the lender creates an escrow account to receive the loan proceeds. The escrow funds will be drawn down for disbursement to the contractor at the end of each year (yearly outlays will necessary vary, because performance will vary from year to year). The escrow must remain in place for the duration of the contract, which is likely to be from five to ten years.

Step Two: The Government/Utility Performance Contract.

The utility and the central government (under pressure from the lender) negotiate a government/utility performance contract. The contract has a number of stages, with a performance target associated with each stage.

For example, the first stage could call for the lifting of central government control over personnel,

procurement and maintenance decisions. The utility's performance target (over some time period) could be to improve system losses by, say, 5%, and to increase productivity by some specific measure, e.g. reduce the ratio of employees to MW produced by 5%. If these targets are met, the second stage would call for the utility to be provided with the authority to increase tariffs according to some formula based on its cost of providing service. Since this latter reform is financial rather than operational, the performance goal should be in measurable financial terms, e.g. amount of government subsidy per MW produced.

Obviously, the reforms needed and the performance improvements that can be expected to result from these reforms will vary from utility to utility.

Step Three: Request for Proposal.

Once the government/utility performance contract is negotiated, the utility knows what freedoms it has, and what performance targets it must meet. The utility publishes a "Request for Proposals" (RFP) to select a contractor to improve the efficiency of the utility under an energy performance contract. The RFP states the performance improvement that is deemed achievable, and the time period over which that goal should be achieved. The RFP is structured in two steps: (1) a preliminary analysis; and (2) an energy performance contract.

The first step calls for the contractor to provide a preliminary engineering analysis for the utility. The contractor will be asked to identify operational improvements that should be undertaken by the utility. Included in these tasks will be the work elements the utility identified in the RFP, plus others that the contractor believes are important. Essentially, the contractor is asked in the first step to specify its recommendation for the scope of work under the second step -- the energy performance contract. The preliminary analysis contract will be for a relatively short time period, e.g. three to six months.

The second step of the procurement is the negotiation of the long-term energy performance contract between the utility and the contractor. Only if the negotiations are successful will the contractor begin to implement the recommendations it made in the preliminary analysis.

The RFP specifies the compensation mechanism for the contractor: the contractor's costs are guaranteed, but its profits are tied to performance improvements. This

assures the contractor that its participation with the utility will not lose money. This limitation on the contractor's risk is suggested because some limitation on risk will almost certainly be required until contractors gain the confidence that they can make money improving developing country utility efficiency using the performance contracting concept.

A basic rule of economics is at play: the higher the risk on the contractor, the higher the return that will be required to induce a contractor to take that risk. The application of this rule means that the profits that will be demanded under an energy performance contract (even with the risk limitation feature suggested here) are higher than the profits that would be demanded under a straight fee-for-service contract. Later, if performance contracting for developing country utilities proves successful, a developing country utility may be able to negotiate a "pure" energy performance contract, such as a shared savings contract, which ties all of the contractor's compensation (return of investment capital plus profits) to performance improvements. Of course, the contractor's profit expectations under this "pure" contract will have to be higher than under the compensation scheme suggested here.

Under the RFP's compensation scheme, the contractor bills the utility for two items (all bills will be paid from the escrow account set up by the lender). First, the contractor periodically sends "cost bills", to recover its expenses as those expenses are incurred. Cost bills are reviewed and paid just as normal fee-for-service bills. Second, the contractor sends "performance bills" at periodic intervals. Performance bills are reviewed to determine whether or not the contractor's bills match the performance levels actually achieved.

While the RFP states an upper limit for all payments to the contractor under the contract, the RFP does not allocate those costs between "cost" payments and "performance" payments. The RFP will allow the contractor and the utility to negotiate a split between the available funds between contractor costs and performance-based profits.

Step Four: Contractor Selection.

Under traditional procedures, the government dictates the terms of the contract, and awards that contract to the firm that presents the "lowest responsible bid" to perform the contract. However, in the context of energy performance contracting, there are two basic problems with traditional bid procedures.

The first is that an energy performance contract cannot be executed until after the contractor has completed a preliminary analysis that provides to the contractor an understanding of what is needed to achieve a given improvement in performance. This understanding cannot be gained by reading the RFP. In each case, the contractor needs to make this evaluation on its own. Since the utility cannot expect each prospective bidder to make this evaluation at its cost in anticipation of winning the bid, it makes sense for the utility to select the winning bidder, allow the winner to perform a preliminary analysis, and begin contract negotiations upon the completion of the analysis.

The second problem with "lowest responsible bidder" procedures is the difficulty in producing cost numbers that will allow meaningful comparisons. More often than not when dealing with energy efficiency, the lowest "first cost" is not the lowest "life-cycle cost." Choosing the lowest first cost energy performance contractor may be a mistake, while relying on a contractor's savings projections for a life-cycle cost analysis may also be a mistake. Further, for many energy performance contracts there are no fixed cost. If contractor X bids "50% of savings" and contractor Y bids "40% of savings," can it be said that contractor Y has the lowest bid? Contractor Y will not be the low bid if the savings that can be achieved by contractor X are 20% more than the savings that can be achieved by contractor Y. And, of course, there is no way to tell from the bid numbers which contractor is most likely to achieve the greatest savings.

Conversely, an examination of qualifications may provide a good indication of the firm that it is the most likely to achieve the best performance. Accordingly, the appropriate criteria is "most qualified bidder" rather than "lowest responsible bidder." Qualification criteria can include a host of specific qualifications, e.g. native language capabilities, financial strength, professional expertise, experience in improving the efficiency of similar facilities, etc. Of course, "qualifications" are more subjective than "lowest bid," which is why the procurement flexibility provided to the utility by the government/utility performance contract will be useful in selecting the energy performance contractor.

Step Five: Preliminary Analysis Contract.

Once the utility determines that a contractor is the "best qualified," the utility and the contractor execute a contract under which the contractor can conduct a "preliminary analysis."

The contractor sends its cost bill for preliminary analysis as soon as the analysis is complete. However, there is no immediate opportunity for the contractor to make a profit on the preliminary analysis. A profit on the preliminary analysis will only be possible if the contractor and the utility execute an energy performance contract and if the contractor improves the utility's performance under the contract.

Step Six: Negotiating the Details.

Upon the completion of the preliminary analysis, the parties will be ready to negotiate an energy performance contract.

The negotiations could immediately fail because the contractor concludes that the utility's performance cannot be improved for the amount specified in the RFP. (If the contractor needs a particular profit to participate, and the direct costs of the program will exhaust all or almost all of the funds available from the lender, then the contractor will not be interested in proceeding.) If this is the case, then the utility may determine that its facilities are not suitable for the energy performance contract concept, and terminate the program.

Alternatively, negotiations could fail because the utility and the contractor cannot agree upon the scope of work, the issues of operational control, the cost/profit split of the available funds, or upon the way that performance will be measured. If one of these issues causes negotiations to break down, the utility may find it desirable to terminate its relationship with the winning bidder, contact the second best qualified bidder and execute a contract with that contractor to provide an independent review of the preliminary analysis,[18] and begin negotiations anew.

A successful negotiation of an energy performance contract is dependent upon the clear understanding of both

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18. Although each energy performance contractor will insist that only it can perform the engineering upon which it performance contracts will be based, the cost of this engineering will be much lower if another firm has already performed the work. The second firm then needs to do nothing more than verify that the results are accurate. Only if the first job is inadequate will the second attempt be expensive.

parties that risk allocation is the fundamental purpose of the contract. In particular, the utility must understand that the potential profits that will flow to the contractor if the performance targets are met must be higher (perhaps much higher) than the profits the contractor would make on a straight fee-for-services contract. Otherwise, the contractor will have no incentive to take the risk of entering into a contract that potentially will provide no profits. Conversely, the contractor must understand that its opportunity for higher profits must in fact be offset by higher risks; there is no reason for the utility to pay higher than normal profits unless the contractor assumes greater than normal risks. The relationship between risks and rewards is fundamental to all aspect of an energy performance contract.

For example, there is a clear connection between the profit formula (how improvements in performance relate to contractor profits) and the operational assurances that the contractor receives. If the contractor does not receive the control it needs for the profit formula it proposes in the negotiations (e.g. 10% of the improved revenues that accrue to the utility as a result of its services), it may live with less control with a more generous formula (e.g. 20% of the revenues). Conversely, if the utility believes that the contractor's profit formula is excessive, the contractor may insist on greater operational control than originally proposed in exchange for a lowering of the profit formula.

In addition to the fundamental issues of risk and reward, there are a number of other contractual issues that will be the subject of the negotions. However, only the issues related to the measurement of performance will be addressed here.

An energy performance contract must include a "baseline formula" under which performance improvements can be measured. In effect, the baseline formula is hypothetical; it estimates what the performance of the facility would have been if the performance contractor had not provided its services. The facility owner does not want to pay for performance that would have been achieved without the intervention of the performance contractor. Likewise, the performance contractor does not want to lose revenues through actions over which it has no control. A baseline formula should be fair and simple, and yet be flexible enough to deal with the myriad of factors that can affect energy performance.

Utility facilities change over time, with or without a performance contractor in the picture. Equipment is added or removed; refurbishing takes place; loads change;

fuel quality changes. The baseline formula should be able to predict how these changes would have affected the performance of the facility if there had been no program implemented by the performance contractor.

A baseline formula requires an adequate database and a methodology for manipulating the data. The required data falls into three general categories: historical performance, facility characteristic variables, and other variables.

The starting point is the facility's past performance. The main consideration in negotiations is whether there are anomalies or trends in the data. If there are, the "raw" data must be adjusted to compensate for the anomaly or trend. For example, if the utility has installed performance-enhancing equipment shortly before entering into an energy performance contract, the baseline formula should not be based on raw historical data. The new equipment will already be influencing the facility's performance. Unless the baseline is adjusted for this, the contractor will be paid for savings that would have occurred regardless of its efforts. In this situation a baseline formula can still be negotiated, but it must be based upon theoretical (and lower) performance figures than the raw numbers. In some situations, the raw numbers are so erratic (sometimes for reasons that are not readily apparent) that a good baseline is impossible to generate and performance contracting is simply inappropriate.

The second point of negotiation involves the characteristics of the facility. It is important to inventory all significant equipment in the facility and to list them in the contract, because a change in this equipment will have an impact on energy performance. Likewise, the facility's general characteristics must be identified, so that any refurbishing can be quantified and its energy impact computed.

Finally, the other known variables that affect performance must be accounted for. For example, if a coal fired plant is the subject of the energy performance contract, the quality of the coal must be addressed in the performance formula. If coal quality goes up or down, performance and maintenance costs will be affected. If this factor is beyond the control of the energy performance contractor, the baseline formula should be able to make adjustments for changes in coal quality.

After agreement is reached on the appropriate data to consider, agreement must then be reached on how to manipulate that data. It is beyond the scope of this paper

to delve into the intricacies of the different methodologies. However, it is extremely important to recognize that unknown factors can cause variations in performance. For example, efficiency over time is rarely steady; even factoring in all known variables, performance can vary for unknown reasons. Consequently, it can be expected that in some periods performance improvement may be measured without any effort from anyone. To eliminate the chance of paying for random performance improvements, the contract should require a certain minimum level of performance improvements before any payment is due.

Absolute baseline accuracy is a laudable goal, but almost impossible to achieve. What is achievable is fairness. There should be an equal probability that the measured improvement is higher or lower than the "actual" improvement. Under a fair baseline formula it is likely that one or the other party may come out a little ahead but neither party will know which is the winner. In a successful project, neither will care.

Step Seven: Implementing the Contract.

One of the attractive features of an energy performance contract is that the success or failure of the contract is readily apparent -- performance either improves or it does not. Clearly, the success of an energy performance contract between a developing country utility and a private sector contractor will depend on the quality of the contractor and the willingness of the utility to follow the contractor's suggested changes.

However, an energy performance contract is a long-term undertaking. It is extraordinarily difficult to consider in a contract all the things that may turn out to be important in several years. Accordingly, success also will depend on the reasonableness of each of the parties, and their willingness to flexibly respond to unforseen events. Further, because the contract is long-term, it may be several years before an energy performance contract can be considered to be a success or a failure.

V. Conclusion.

The efficiency problems of developing country utilities are enormous and not easily solved. Energy performance contracting can help solve some of the institutional problems of the utilities of developing countries by providing a mechanism through which institutional reforms can be implemented.

During the current developing country debt crisis, international lenders and aid institutions may wish to focus their aid to improve utility efficiency through performance contracts. If performance contracting can be tested and developed with the assistance of subsidies during the present period, unsubsidized performance contracting will be more likely to be used by private investors when developing countries have better access to foreign exchange.

APPENDIX

Sample

ENERGY PERFORMANCE AGREEMENT

BETWEEN STATE AGENCY AND PRIVATE CONTRACTOR

[Names and addresses of the parties have been removed].

CONTRACT CONTENT

APPENDIX

ENERGY MANAGEMENT AGREEMENT

THIS AGREEMENT, made and entered into this _____ day of _____ 19____, shall be the agreed basis of performing the following work by and between _____, hereinafter referred to as the Owner, and _____, hereinafter referred to as the Contractor.

The Owner has determined that a need exists to secure energy management equipment and services for the purpose of reducing energy consumption at the following facility(s):

_____

_____

_____

The Owner is authorized by the laws of the State of _____ to enter into this Agreement, and

The Contractor is authorized by the laws of the State of _____ to provide such energy management equipment and services, and,

The Owner has requested the Contractor to provide for such energy management equipment and services.

THEREFORE: It is agreed, in exchange for mutual consideration, as follows:

SECTION 1
DEFINITIONS

Unless otherwise stated, the terms defined in this Section have the meaning specified for all purposes of this Agreement.

"Agreement" means this Agreement and any amendment or supplements including the Exhibits attached hereto.

"Agreement Term" means the duration of this Agrement as provided in Section 9 of this Agreement.

"Audit" means a detailed energy audit of a facility which identifies the energy conservation measure and services to be recommended for inclusion in the energy management agreement.

"Baseline" means the monthly baseline energy consumption of the facility as calculated from historical energy use for all fuels and normalized monthly for weather.

"Contractor" means an entity functioning as an energy service company (ESCo).

"Emergency" means any sudden or unforeseen situation that requires immediate action including threats to life, safety and health.

"Energy Savings" means the reduction in energy consumption during the current period which is the difference between the baseline consumption and the current consumption for all fuels.

"Energy Cost Savings" means energy savings in kWh, therms, gallons, tons, etc. multiplied times the current (or monthly average) unit price for that type of energy.

"Energy Service Company" means the company which provides services that include, but are not limited to financing, design, installation, repair, maintenance, management, technical advice, and/or training for energy conservation project(s).

"Equipment" means the personal and/or real property described in Exhibit A, any amendments thereto, and any other energy conservation measures the parties agree upon.

"Full Contract Amount" means the total amount to be reimbursed the Contractor for the Equipment and Services provided under the conditions of the Agreement.

"Owner" means the State of _____ and/or its lawful successors or assigns.

"Services" means those personal services provided by the Contractor to fulfill the requirements of this Agreement to include maintenance, monitoring, training and other services as described in Exhibit F.

SECTION 2
COVENANTS OF AGREEMENT

The Owner covenants that it is a duly constituted agency of the State of _____, and is authorized by the laws of the State of _____ to enter into the transaction contemplated by this Agreement and to carry out its obligations. The Owner has been duly authorized to execute and deliver this Agreement and agrees that it will do or cause to be done all things necessary to preserve and keep the Agreement in full force and effect.

The Owner further covenants that all procedures have been met and that the Owner has complied with all selection requirements where necessary and by due notification presented this Agreement for approval and adoption as a valid obligation on its part.

SECTION 3
ENERGY AUDIT

The Contractor shall undertake a detailed energy audit of the facility(s) at its expense. The Owner agrees to furnish the Contractor with any prior energy audits which have been performed on the Owner's facility, current and historical energy consumption for the facility, occupancy information, a description of energy management practices presently utilized and other information which may assist the Contractor in conducting a detailed energy audit.

The Owner further agrees to pay the Contractor a predetermined fee for the energy audit if the Owner fails to enter into an energy management agreement with the Contractor through no fault of the Contractor. Payment to the Contractor will be based upon the reasonable value of the equipment and services recommended to the Owner. The Owner will consider such things as effect on facility operation and budget, maintenance, environmental constraints, technical feasibility and accuracy of computations in determining the appropriateness of the Contractor's recommendations. The Owner will have no payment obligations under this Agreement in the event the audit shows an energy consumption savings of less than ten percent (10%) annually or the Contractor is unable to provide financing for the project(s).

The energy audit will include an analysis and description of the facility's energy consuming equipment, a description of the current maintenance practices, recommended energy conservation measures, and services for inclusion in the energy management agreement, baseline energy consumption, energy savings, energy cost savings, equipment description, training requirements, construction schedule, payment procedures, guarantees, warranties and other items which the Contractor may identify in the audit.

SECTION 4
BASELINE ENERGY CONSUMPTION

The baseline of energy consumption for the facility(s) which will be used to determine the amount of energy consumption savings is shown in Exhibit B, attached hereto and incorporated by reference.

SECTION 5
BASELINE MODIFICATION

Modification of the facility baseline energy consumption may be required to reflect any planned or actual material changes in the facility(s), changes in facility use or changes in energy supplied to the facility(s). Such changes shall include the following:

a. A change in operating hours of the facility(s) or a change in the operating hours of any energy consuming equipment.

b. A change in the occupancy rate or occupancy pattern of the facility(s).

c. A material change in a structure to include building remodeling, additions or demolitions.

d. A change in the types of equipment used in the facility(s).

e. Any other conditions which may affect or change annual energy use by five percent (5%) or more, thereby requiring baseline modifications.

Baseline modification will be accomplished through mutual agreement by the Owner and Contractor. The Owner shall deliver to the Contractor within ten days of receipt of such information calculate a modified baseline and forward to the Owner a notice of the proposed modification. Such modification shall become effective within ten days of receipt by the Owner unless disapproved by the Owner. Cost to modify the baseline shall be borne by the Owner when such modification is requested by the Owner. Any disagreement on any proposed baseline modification shall be negotiated in good faith by both parties.

SECTION 6
CALCULATION OF ENERGY SAVINGS

Total energy savings is the projected energy consumption (baseline consumption adjusted for weather and occupancy) less the monitored energy consumption. The procedures for calculating energy consumption, energy savings and energy cost savings is presented in Exhibit C, attached hereto and incorporated by reference.

SECTION 7
PAYMENT FOR EQUIPMENT AND SERVICES

Payment to the Contractor will be indexed to the energy cost savings resulting from the implementation of energy conserving measures and services. The Owner agrees to pay to the Contractor as compensation for its services an amount which shall not exceed the amount of energy cost savings. Such payments shall be made on a monthly basis and will become due within thirty days of receipt of the Contractor's invoice. The terms of the payment process are shown in Exhibit D.

Contractor invoicing and Owner payment shall be accomplished in the following manner:

a. The Owner will send to the Contractor copies of all energy bills for the facility and copies of all other data required by Exhibit C within ten days after the receipt by the Owner.
b. The Contractor shall calculate the energy consumption savings achieved by comparing energy consumption for the current month with consumption during the equivalent baseline month prescribed in Exhibit C.

c. The Contractor shall multiply the amount of saved energy by the unit cost (monthly average) then in effect for each type of energy which was consumed during the month. The sum of each type of energy cost savings will be the total amount of energy cost savings for that month.

d. The Contractor will prepare and send to the Owner a monthly invoice for the amount of compensation as defined in Exhibit D. The invoice will set forth the amounts of energy consumption savings, energy consumption cost savings and the amount due the Contractor. The Contractor will attach its calculations with the invoice.

e. Within sixty (60) days after each anniversary of the commencement date of the Agreement, the Contractor will calculate the annual cost savings or guaranteed minimum energy cost savings whichever is greater.

SECTION 8
INDEPENDENT AUDIT

The Owner may, at its own expense, have conducted an independent audit of the Contractor's energy savings calculations and billings. Such audit, to be done by an energy auditor, certified public accountant or other qualified person agreed to by the parties, may be conducted at any time during the term of this Agreement. Irregularities in savings or payments that may arise from the audit will be resolved by the provisions set forth in Exhibit "E".

SECTION 9
AGREEMENT TERM

The term of this Agreement shall begin on the date of the execution of this Agreement and shall run continuously from such date until _____. The commencement date shall be the first date of the month after the month in which the Contractor has substantially completed installation of the Equipment and such Equipment is operating and producing an energy savings confirmed in writing by the Owner and the Contractor. The Contractor will deliver a written notice to the Owner that it has substantially completed the Equipment installation.

SECTION 10
EQUIPMENT ACCESS

The Owner shall provide mutually satisfactory reasonable rent free space to the Contractor for the installation and operation of the Equipment and shall protect its own property. The Owner shall further provide access to its facility for the Contractor and its subcontractors during regular operating hours and such hours as may be requested by the Contractor which are acceptable to the Owner. The purpose of such access shall be to install, adjust, inspect and/or maintain the Equipment and to make any necessary emergency repairs.

SECTION 11
EQUIPMENT MAINTENANCE

The Contractor will provide for all necessary maintenance of the installed Equipment unless maintenance responsibilities have been transferred to the Owner through mutual agreement. The Contractor's maintenance responsibilities includes normal maintenance, adjustments, repairs and service as necessary to keep the Equipment in normal running order and to assure the continued comfort and safety of the facility occupants. The Contractor will avoid interruptions of the facility operation, as well as any adverse effect on the health or safety of the building occupants. The Owner shall incur no additional costs for such maintenance or repairs, except when the need for such service is due to improper operation or negligence by the Owner.

SECTION 12
EQUIPMENT OPERATION

The Contractor shall at all times attempt to attain the maximum energy consumption savings and associated cost savings from the Equipment installed under this Agreement and from pre-existing equipment, which may include recommendations to improve the existing methods for operating and maintaining the Owner's facility. The Contractor will, under no circumstances, operate and maintain such Equipment in a manner which will reduce the standards of comfort, health and safety as defined in Exhibit 1, attached hereto and incorporated by reference.

The Owner shall operate the Equipment in compliance with the Contractor's instructions and shall make modifications to operation only through written approval of the Contractor, unless an emergency situation exists. The Owner will notify the Contractor within twenty-four hours of any emergency or malfunction in the operation of the Equipment or of any interruption of energy which may effect the operation of the Equipment.

The Contractor may replace or upgrade Equipment for the purpose of maximizing energy savings. Such modification will require the written approval of the Owner, which shall not be unreasonably withheld when the modification does not adversely effect the facility operation. Such replacement, modification or addition shall be performed by the Contractor at no cost to the Owner.

SECTION 13
GUARANTEE OF SAVINGS

The Contractor shall guarantee the Owner that the facility energy costs plus costs associated with payments to the Contractor for that same period will be less then the energy costs for that period before implementation of energy conserving measures by the Contractor. The guarantee will provide for a mutually agreeable minimum level of energy savings to the Owner before payments to the Contractor become due. In the event the energy savings do not equal the guaranteed minimum level, the Contractor shall reimburse the Owner for the shortfall within ninety days of the annual anniversary date of implementation of the energy conserving project. Such guarantee shall be written with an insurance firm familiar with third party financing of energy projects and will achieve the guaranteed minimum level of savings. The mutually agreeable guaranteed minimum level of savings is presented in Exhibit E attached hereto and incorporated by reference.

SECTION 14
ENERGY COST CHANGES

The Contractor assumes no responsibility or liability and shall not be required to compensate the Owner for a shortfall in energy cost savings as a result of reduced energy costs. The Contractor's liability to generate energy cost savings shall be based on current energy costs. In the event the quantity saved times the current energy cost, due to reduced energy costs, does not equal or exceed the payment due the Contractor, the Owner shall use its best efforts to obtain additional adequate funds to meet its obligations hereunder. Increases in energy costs which may result in energy cost savings exceeding the amount required and guaranteed for the purposes of this Agreement will benefit the Owner and the Owner is under no obligation to share these windfall energy cost savings with the Contractor.

SECTION 15
PROJECT IMPLEMENTATION

The Contractor will begin installing energy conserving equipment and will begin providing energy management services in the Owner's facility within sixty days of signing of this Agreement. Such equipment will be fully installed within _____ days of signing of this Agreement, and will from that time forward provide the energy savings described in this Agreement. Failure of the Contractor to install equipment and reduce energy consumption within ____ days will be cause for default. Such delays may result in penalties, Agreement termination or other remedies as described in Section 23.

SECTION 16
ASSIGNMENT OF CONTRACT

The Contractor may assign or transfer its rights and obligations stated herein only with the prior written consent of the Owner. Owner consent will be provided only when the assignees agree to honor the terms of this Agreement and other terms which may arise from assignment of Contractor rights and obligations.

SECTION 17
PERSONNEL TRAINING AND OTHER SERVICES

The Contractor will provide training to Owner personnel on the proper operation and maintenance of any Equipment installed or modified under this Agreement. Training may also be provided on the proper operation and maintenance of existing equipment or on other areas of facility operation which may affect energy consumption. Such training

will be provided as defined in Exhibit F, attached hereto and incorporated by reference.

SECTION 18
EQUIPMENT ACQUISITION

The Owner may at any time terminate this Agreement by paying for the Equipment installed pursuant to this Agreement or by exercising the default remedies as defined in Section 23. Owner acquisition may not be sooner than one year after the effective date of this Agreement and will be accomplished by notifying the Contractor not less than ninety days prior to the intended date of acquisition. Payment of the acquisition value of the Equipment shall be the lesser of the fair market value of the Equipment or the amount calculated pursuant to Exhibit G, attached hereto and incorporated by reference. Acceptance of equipment is contingent upon inspection and written approval by the Owner and receipt of all related insurance documents and permits.

SECTION 19
LIABILITY INSURANCE

The Contractor will, at all times during the term of this Agreement, maintain in full force and effect, at its own expense, casualty and liability insurance on the Equipment and liability insurance for its other undertakings. If any item of the Equipment is damaged or destroyed by an event which is covered by insurance, the Contractor will utilize the insurance proceeds to repair or replace the Equipment. If the insurance proceeds are insufficient or if the Equipment has been damaged or destroyed by an uninsured casualty, the Contractor will provide the necessary funds to repair or replace the Equipment at no cost to the Owner. Liability insurance will be maintained as described in Exhibit H.

SECTION 20
BONDING

The Contractor will, at all times during the term of this Agreement, maintain in full force and effect, at its own expense, a Payment and Performance Bond.

The Contractor shall make, execute and deliver to the Owner, prior to the commencement of any work under this agrement, a good and sufficient bond with a surety company, conditioned that the Contractor shall faithfully perform all provisions of this Agreements and pay all laborers, mechanics, and subcontractors and materialmen, and all persons who supply such person for the carrying on of work under this Agreement. The Bond shall be equal to the full contract amount agreed to be paid for such work, and shall be to the State of _____. The Contractor shall indemnify the State of _____ against any loss or damage directly due to the failure of the Contractor to faithfully perform the conditions of the Agreement.

Sureties or Bonding Companies must be register with the State of _____ Insurance Commissioner's Office.

SECTION 21
HOLD HARMLESS

The Contractor shall protect, indemnify, and save the Owner harmless from and against any damage, cost or liability for injury or death to person or to damage or destruction of property, arising from the acts of the Contractor, his employees or his subcontractors in the performance of this Agreement.

If the injuries, death or damages as provided in the preceding paragraph is caused by or results from the concurrent negligence of (a) the indemnitee or the indemnitee's agents or employees, the indemnity provisions provided in the preceding paragraph shall be valid and enforceable only to the extent of the indemnitor's negligence.

The Contractor will further hold harmless the Owner from all fees, taxes, and assessments which may be levied upon or with respect to the Equipment installed under this Agreement, and shall hold the Owner harmless from any other charges which may be imposed or incurred by any public or private authority with respect to the Equipment or its operation.

This Agreement shall be interpreted, construed and enforced in all respects in accordance with the laws of the State of _____. In case of any lawsuit, venue will be in _____ County.

SECTION 22
LEGISLATIVE APPROPRIATION AND FISCAL FUNDING OUT CLAUSE

The Owner's obligation to pay any amounts due under this Agreement or to perform any covenants requiring or resulting in expenditure of money are contingent and expressly limited to the extent of legislative appropriations made to fund this Agreement. Nothing contained in any other Section of this Agreement shall be construed as creating any monetary obligation on the part of the Owner beyond such current and specific legislative appropriations.

In the event that the Legislature fails to appropriate the funds necessary to continue this Agreement, the Agreement shall be terminated as to any obligations of the Owner requiring the expenditure of money for which no such appropriation is available to the end of the last fiscal year for which such appropriation is available. In such event, all obligations of the Owner will cease so long as all payments previously approved or appropriated have been paid, and all interest of the Owner in the Equipment will terminate and this Agreement shall be terminated.

Notwithstanding the foregoing, the Owner agrees not to terminate this Agreement under this provision for the fiscal year in question. If any future funds are appropriated in order to continue this Agreement, the Owner will use its best efforts to obtain inclusion of such funds in its budget.

SECTION 23
EVENTS OF DEFAULT

Events of default by the Owner. Each of the following events or conditions shall constitute an "Event by Default" by the Owner:

a. Any failure by the Owner to pay the Contractor compensation as required by Section 7 and Exhibit D for a period of ninety days after the date of the invoice;

b. Any material failure by the Owner to comply with the terms and conditions of this Agreement, including breach of any covenant contained herein, providing that such failure continues for thirty days after notice to the Owner requesting that such failure to perform be remedied, or if a remedy cannot be effected in such thirty days, without commencement of a remedy and diligent subsequent completion therefor;

c. Any voluntary discontinuation of use of more than _____ percent of the facility in which the Contractor has provided energy equipment and service for more than _____ days during the first _____ years of this Agreement which would thereby reduce energy savings and the Owner's ability to make payments to the Contractor as described in Exhibit D.

Events of default by the Contractor. Each of the following events or conditions shall constitute an "Event of Default" by the Contractor:

a. The Equipment fails to function properly or as described in Exhibit A;

b. The Contractor fails to produce the level of energy savings guaranteed and as described in Section 13;

c. The standards of comfort and service required are not provided due to failure of the Contractor to maintain,repair, or adjust the Equipment, or failure to provide other services as described in Exhibit J and said failure continues for thirty days after written notice to the Contractor;

d. Any material failure by the Contractor to perform or comply with the terms and conditions of this Agreement, provided that such failure continues for thirty days after written notice to the Contractor demanding that such failure be cured, or if a cure cannot be effected in such thirty days, without commencement of a cure and diligent subsequent completion.

Remedies. In the event of default by the Owner, the Contractor may exercise all remedies available at law or at equity including bringing action for recovery of amounts due and unpaid by the Owner. Also, the Contractor may, without recourse to the legal process, terminate this Agreement by delivery of notice declaring termination, enter the facility and dismantle and/or remove the Equipment from the facility and reconnect and restore the Owner's equipment to the condition which existed prior to the inception of the Agreement, normal wear and tear excepted.

In the event of default by the Contractor, the Owner may exercise all remedies available at law or at equity including bringing action for recovery of amounts due to the Owner, and/or for damages. Also, the Owner may exercise its option to purchase the Equipment for the acquisition value as set forth in Exhibit H. Further, the Owner may, without recourse to the legal process, terminate this Agreement by delivery of notice declaring termination, whereupon the Contractor shall remove the Equipment and reconnect and restore the Owner's original equipment to the condition which existed prior to the inception of this Agreement, normal wear and tear excepted.

Liquidated Damages. In the event of default by the Owner, the Owner shall be liable to the Contractor, as liquidated damages in lieu of all other claims for damages, the acquisition value of the Equipment as set forth in Exhibit G. In the event of default by the Contractor, the Contractor shall be liable to the Owner, for "lost energy savings opportunities", as liquidated damages in lieu of all other claims for damages, the following amounts:

Default Date	Lost Opportunity Amount
Month/Day/Year	$

SECTION 24
ARBITRATION

All disputes, claims or questions subject to arbitration under this Agrement and under the law shall be submitted to arbitration in accordance with the provisions then obtaining, of the Standard Form of Arbitration Procedure of the American Arbitration association, and this Agreement shall be specifically enforceable under the prevailing arbitration law, and judgment upon the award rendered may be entered in the state or federal court having jurisdiction. It is mutually agreed that with regard to all disputes, claims or questions subject to arbitration, the decision of the arbitrators shall be a condition precedent to any right of legal action that either party may have against the other.
Notice of the demand for arbitration of a dispute shall be filed in writing with the other party within thirty (30) days of last written impasse.

This Agreement, together with the Exhibits attached hereto, constitutes the entire Agreement between the parties and this Agreement shall not be modified, altered, or changed except to the extent agreed to by the parties in writing. Any provision of this Agreement found to be prohibited by law shall be ineffective to the extent of such prohibition without invalidating the remainder of this Agreement. Nothing contained herein shall be construed to require the Owner to pay for additional Equipment installed by the contractor but such additional transactions shall be subject to negotiations between the parties. Subject to the specific provisions of this Agreement, this Agreement shall be binding upon the insure to the benefit of the parties and their respective successors and assigns.

IN WITNESS WHEREOF: Owner and Contractor have caused this Agreement to be executed by their respective officers duly authorized.

OWNER: CONTRACTOR:

APPENDIX

EXHIBIT A

DESCRIPTION OF EQUIPMENT

_____will install and provide maintenance and repair for the Equipment described below:

Item Description	Manufacturer	Model Number	Quantity

EXHIBIT B

FACILITY BASELINE ENERGY CONSUMPTION

The parties agree that the following Baseline data has been determined in a manner which is acceptable to the Owner and to the Contractor, and that the data is acceptable for the purposes defined in this Agreement.

The baseline energy consumption shown in the three-year average energy consumption for _____:

	January	February	March	April	ect.
Number of Days in Month					
Electricity Consumed (kWh)					
kWh/Day					
Demand for Electricity (kw)					
kw/Day					
[other energy consumed]					
_____/Day					
BTUs Consumed					
BTUs/Day					
Heating Degree Days Elapsed					
Heating Degree Days/Day					
Cooling Degree Days Elapsed					
Cooling Degree Days/Day					

EXHIBIT C

METHOD OF CALCULATING ENERGY SAVINGS

All energy savings produced by energy conserving measures under this Agreement which are affected by degree day changes shall be normalized for such weather changes and the energy cost savings calculated as follows:

A. Calculate Energy Consumption.

1. For each energy account bill for the month calculated the average daily energy consumption in units/day by dividing the total units of energy consumed by the number of days in the billing period.

2. For each energy account bill multiply the units/day by the number of days in the month.

3. For each energy account bill, sum the units calculated in A,2.

4. Electrical demand for the month will be the electrical demand usage for the billing month.

B. Calculate Energy Savings.

1. Subtract the total amount of energy consumed calculated in A,3 from the baseline energy consumption for that month.

2. Determine the energy savings as done in B,1 for each type of energy.

3. Determine the electric demand savings in units of kw by subtracting the demand calculated in A,4 from the baseline demand for the month.

C. Calculate Cost Savings.

Calendar month energy cost savings will be determined by applying the average cost/unit of energy to the energy savings in the following manner:

1. For each energy account bill calculate the average cost/unit of energy by dividing the total amount of the bill for energy by the total units of energy included in the bill.

2. For all energy account bills calculate the total cost of the energy consumed during the calendar month by multiplying the average cost/unit of energy by the energy consumption for the energy.

3. For each type of energy used calculate the total cost savings by multiplying the average cost/unit of that energy savings in units of that energy.

4. For each rate schedule with a demand cost component, calculate the total cost savings by multiplying the current monthly demand unit cost, including adjustments to base charge, by the corresponding demand savings for the same rateschedule as determined in B,3.

5. Calculate the total cost savings during the calendar month in question as the sum of the total cost savings for each type of energy during the calendar month as calculated under C,3 & C,4 above.

D. Adjustments to Calculated Savings.

An hourly energy simulation (thermal model) program will be used to estimate energy use at baseline operating hours and at actual operating hours. If there is a variation in the actual hours of operation of more than 10% from the baseline for more than ____% of the year, an adjustment will be made
for actual hours. The ratio of the baseline energy use and the estimated actual use will be used to adjust for actual hours.

EXHIBIT D

CONTRACTOR PAYMENT

Compensation for _____ services described herein will be made _____ (monthly/quarterly) in the following amounts.

Month/Year	Amounts

EXHIBIT E

GUARANTEED SAVINGS AMOUNT

Year	Fuel Type	Fuel Savings	*Estimated Cost Savings

* Based on current costs.

EXHIBIT F

TRAINING AND OTHER CONTRACTOR SERVICES

_____ agrees to provide the following training or other services:

EXHIBIT G

EQUIPMENT ACQUISITION VALUE

Year	Acquisition Value
2	$
3	
4	
5	
6	
7	
8	
9	
10	

EXHIBIT H

CONTRACTOR'S LIABILITY INSURANCE

The Contractor shall obtain all insurance required hereunder, and such insurance must be approved by the Owner, prior to the commencement of any work under this Agreement. The Contractor will not allow any subcontractor to commence work on a subcontract until such subcontractor has obtained insurance similar to that required hereunder for the Contractor. Companies writing the insurance under this Exhibit shall be licensed to do business in the State of _____ or be permitted to do business under the Surplus Lien Law of the State of _____.

The Contractor shall comply with the _____ State Industrial Insurance Act, the Federal Longshoremen's and Harbor Workers' Act, and the Jones Act. The Contractor shall purchase and maintain during the life of this Agreement "stop-gap" insurance for all of its employees to be engaged in work on this project under this Agreement.

The Contractor shall take out and maintain, during the life of this Agreement, Bodily Injury Liability and Property Damage Liability Insurance. The Amounts of such insurance shall not be less than:

(a) Comprehensive General Bodily Injury Liability Insurance

PER PERSON	PER OCCURRENCE
$500,000	$1,000,000

(b) Comprehensive Property Damage Insurance

PER PERSON	PER OCCURRENCE
$500,000	$1,000,000

(c) Comprehensive Automobile Bodily Injury Insurance

PER PERSON	PER OCCURRENCE
$500,000	$1,000,000

(d) Comprehensive Automobile Property Damage Insurance

PER OCCURRENCE
$500,000

(e) Contractors, at their option, may purchase comprehensive general liability and property damage and comprehensive automobile bodily injury and property damage insurance in a combined single limit policy not less than One Million and No/100 Dollars ($1,000,000.00) per occurrence. With respect to projects and completed operations, the limit of liability will apply in the aggregate.

The insurance coverage under this Exhibit shall protect the Contractor from claims for damages which may arise from work performed under this Agreement, whether work be by contractor or by any subcontractor.

The State of _____, shall be named on all certificates of insurance as an Additional Insured. The certificate of insurance shall cover the work specified in this Agreement and designated under the specific contract number.

No cancellation of the foregoing policies shall be effective without thirty (30) days prior notice to the Owner.

EXHIBIT I

STANDARDS OF SERVICE AND COMFORT

_____ agrees to maintain for the term of this Agreement environmental conditions as set forth hereunder.

Minimum room temperature during occupied hours during heating season: _____

Maximum room temperature during occupied hours during cooling season: _____

Minimum domestic hot water temperature _____

Minimum lighting levels:

Hallways	_____
Classroom	_____
Gymnasium	_____
Other	_____
	_____

Occupied hours heating season:

Month/Day	Operating Hours

Occupied hours cooling season:

Month/Day	Operating Hours

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