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CONCEPTUAL PROPOSAL FOR AN INDUSTRIAL DEVELOPMENT FUND

ENERGY PRO CAPITAL
INDUSTRIAL DEVELOPMENT FUND
NUMBER1

Purpose of the Fund:

The purpose of the fund is to provide a vehicle for bringing together investors seeking a premium return with industrial manufacturing companies that have certain limitations in gaining financing through traditional methods.

For investors the fund provides:

- Access to a previously unexploited marketplace with premium returns
- Mitigation of risk through diversification among multiple companies/industries
- Mitigation of risk through control of critical operating parameters by ENERGY PRO on-site technical staff
- Accurate measurement of technical and financial performance of investments

For Manufacturing Companies the fund provides:

- Access to previously unavailable capital funds at moderate premium to risk free rates
- Improved balance sheet strength and operating ROI through creative off-balance sheet financing
- Technical staff resources to manage implementation and performance control of new manufacturing assets.
- Accurate measurement and management of technical and financial performance of investments -“Capital with Accountability”.

Background:

This conceptual proposal for an industrial development fund is constructed on the premise that industrial lending today is based on the cost of new equipment, credit-worthiness and associated collateral and does not take into consideration the measurable value of productivity improvement. Industrial manufacturing companies can hire a consultant to analyze their process and identify investment opportunities for process improvements. But often the consultant's report to the owner is the only tangible result. The consultant's recommendations may or may not be implemented, and the risk of failure -- in addition to the cost of the consultant -- falls entirely upon the manufacturing company. Asset-based lenders and general lending institutions can provide funds for new equipment, but lack the expertise to analyze the process and select the most profitable modifications. In addition, they leave the implementation of the modification to the borrower. Utility companies and equipment suppliers can provide expertise, equipment and financing, but only in their area of interest. Engineering companies have the skills to carry out the analysis, but require payment for their work irrespective of its ultimate success. In consequence, many potential capital improvements to existing industrial processes go unidentified and unimplemented due to lack of:

- a method to align interests so that both investors and manufacturing companies benefit from the ultimate success of the project.
- a method that provides suitable and attractive incentive for both investors and manufacturing companies
- a method that effectively apportions business, technical and financial risk
- a method that permits the financing of capital expenditures off the balance sheet of the manufacturing company.

In developing and deploying the proposed fund, ENERGY PRO's business model would be utilized to bring together investors seeking a premium return with industrial manufacturing companies needing financing for capital improvements. Industrial America has been systematically disinvesting in its capital asset base due to high hurdle rates and internal competition for funds. Financial underwriting criteria based solely on credit-worthiness further contributes to the scarcity of available capital for these companies.

The ENERGY PRO business model provides a new paradigm for industrial finance and development to achieve the benefits of higher operating efficiencies and increased ROI The greatest opportunity in the industrial marketplace resides with companies with constrained credit facilities. The structure of the fund will incorporate financial risk mitigation strategies to manage the financial, development and technology risks associated with investing in these companies. The link between investors and manufacturing companies will be provided through the ENERGY PRO business model, a partnering approach that focuses on increased profitability and guaranteed performance for all parties.
The ENERGY PRO model provides the systems and risk management tools to deliver projects having 1, 2, or 3 year payback, which would not be carried to completion under current investment constraints. The result? More projects are completed with built in accountability to ensure these investments meet or exceed target goals, thereby improving the manufacturing companies' long-term profitability and realizing, a premium return for the fund.

The ENERGY PRO business model is ideally suited to bring fund investors together with manufacturing companies to achieve the objectives of both groups. First, a performance-based contract is established between ENERGY PRO and an industrial manufacturing company. This allows ENERGY PRO to do an analysis of the process and develop statistical mathematical models that describe productivity/profitability-related parameters for each of the processes of that manufacturer. While this is being done, ENERGY PRO identifies capital improvement projects with attractive returns and presents these to the fund for consideration for financing. Upon approval of all parties, ENERGY PRO executes and manages the implementation of the capital improvement, utilizing a number of innovative risk management methodologies. When the project is installed and started up, then ENERGY PRO is responsible for measuring the impact on profitability of the improvement, allowing all parties to share in the benefits, commensurate with the risk borne by each.

1. ENERGY PRO establishes performance-based contracts with industrial manufacturing companies.
2. ENERGY PRO analysts derive statistical mathematical models that describe productivity related parameters for the processes of those manufacturers in terms of independent variables.
3. ENERGY PRO presents identified capital improvements to the fund.
4. ENERGY PRO develops and utilizes unique risk management strategies.
5. ENERGY PRO implements and manages the capital improvement project.
6. ENERGY PRO measures the increased profitability.
7. ENERGY PRO benefits from the return on increased operating profitability of the entire process, which can be greater than the return realized solely from the assets deployed from the fund's investment.
8. ENERGY PRO shares in the benefits of the increased profitability among all parties.

Establishment of a Performance-Based Contract:

"Performance contracts to insure that companies deliver on job-creation and investment promises will become ubiquitous"
Five Predictions for the 21st Century
James A. Schriner
Industry Weekly

Purpose: The performance-based contract is a means of achieving the benefits of a legal partnership without the disadvantages and long term commitments of a traditional partnership. This ENERGY PRO partnership vehicle adds value in a number of ways, which translates into larger equity-like returns for all parties.

The performance-based contract on which the proposed fund is based is a contract having at least the manufacturing company and ENERGY PRO as parties, and which defines the respective duties and responsibilities of each party with respect to development and implementation of capital projects to obtain savings in an industrial process or plant. When it is said that the contract is "between the manufacturing company and ENERGY PRO", it is to be understood that, at least these two parties are included.

The contract provides that ENERGY PRO will obtain financing for a capital project which will improve the efficiency and performance of an industrial process, and that ENERGY PRO will implement the project. It is believed that when the contract provides such terms, it serves to apportion the risk of failure between the manufacturing company and ENERGY PRO, and assigns primary responsibility for the success of each step of the project to that party most capable of controlling its success. For example, since ENERGY PRO has expertise in identifying and designing technical modifications, and installing and starting up new or modified equipment, those tasks are assigned to ENERGY PRO. As another example, since the manufacturer has greater access to historical process operating data and to personnel with experience in operating the process, the responsibility for providing access to data and to experienced operating personnel is assigned in the contract to the manufacturer.

The contract provides that the manufacturing company will share the profitability that results from the improvement with ENERGY PRO and its investors, as well as pay a market-based interest rate applicable to then current conservative, low-risk investments. It is believed that by paying ENERGY PRO from the actual increased profitability achieved by the improvement, the interests of both the manufacturer and ENERGY PRO in the success of the improvement can be aligned. This advantageous alignment minimizes friction between the parties and makes it more probable that a decision by one party will be in the best interests of both parties.

The performance-based contract also provides that the manufacturing company and ENERGY PRO agree on the measurement models prior to the implementation of the capital project; and that ENERGY PRO has sufficient authority to manage the implementation of the project. By reaching agreement on the model(s) that describe the increased efficiency and improved performance of the process due to implementing the capital project, the parties establish a strong basis for mutual trust and credibility. Whereas, if the project were to be implemented prior to such agreement, more opportunities for misunderstanding and disagreement could arise, When the contract provides ENERGY PRO with sufficient authority to manage the implementation of the project, the risk of failure is reduced. Under such a contract, ENERGY PRO can engage in activities, as follows: ENERGY PRO can have its own personnel on the plant site, schedule activities of the project, and subcontract various portions of the modification to subcontractors and can control the activities of those subcontractors; the manufacturer will provide ENERGY PRO access to its operating personnel for strategy team-building and implementation of the project, and provide ENERGY PRO access to historical operating data.

Although the performance-based contract can be for any length of time, the term must be long enough to permit full planning, implementation and operation of the improvement, and also long enough to provide for the repayment of borrowed funds and for the agreed-upon sharing in profits. Generally, the term of such contracts is between three and ten years.

The model must provide a valid means for determining the savings in efficiency and improved performance resulting from implementing the capital project. It is important that the model measures and models what it is intended to measure and model, rather than to be simply a good fit of past data, When the model is used as the basis for calculating the amount of savings is accurate, all parties involved can proceed with a higher level of confidence that payments due and paid to investors will be equitable. When ENERGY PRO has derived the model, it is presented to the manufacturing company management for approval prior to proceeding further with the identification and implementation of capital projects to improve productivity. If

the model is not approved, the model derivation process is begun again. This iteration is repeated until the model is approved, signed and incorporated into the contract between the manufacturing company and ENERGY PRO.

After a capital improvement project to increase efficiency and improve performance of the process is identified and implemented, the changes are measured/determined using the model, a dollar value is assigned resulting from the changes, with that dollar value assigned shared among the manufacturer, ENERGY PRO and the fund investors. In some cases financial benefits from the improvement increased from the upstream and downstream effects of increased productivity and/or cost savings. This sometimes allows for a greater dollar value return than from financial benefits measured solely from the equipment improvements.

Derivation of the Baseline Statistical Models:

The productivity of an industrial process can be expressed on the basis of time, energy use, consumables use, labor, the amount of capital invested in the process, or on the size of the process equipment, or other basis. Productivity per unit time is often expressed as, for example, number of units of product produced ("production") per unit of time ("production rate"). Other productivity parameters include production per unit of energy use, production per unit of labor, production per unit of equipment size, production per unit of invested capital, and the like, The inverse of the productivity function -- i.e., energy use per unit of production --, or any parameter that is directly or inversely related to productivity, such as energy use per unit period of time, will serve the same purpose of measuring productivity and can act as the productivity-related parameter.

For the purpose of this discussion, some of the description will be in terms of productivity on the basis of energy (production per unit of energy use), or of the inverse parameter -- energy use per unit of production, or energy use per unit of time. However, it is to be understood that when energy use is used as an example, similar methods and equations could be derived for any other productivity-related parameter, simply by substituting the appropriate variables and parameters.

Industrial energy consumption is a function of numerous contributing factors, caused by equipment that uses energy in response to demands placed on it by the user and according to its particular design. Energy efficiency improvements usually concentrate on individual parts or systems, while overall energy consumption is often analyzed by examining the use of energy in its specific fuel forms. Because independent variables affect consumption of these fuels, accurate comparisons of the energy consumption for time measured periods for a process must include the effect of each of these variables.

Reductions in industrial energy consumption typically result in energy cost reductions. However, it should be recognized that energy cost can also be reduced by using energy at alternative times (e.g., by using electricity during "off peak" hours), using alternative forms of energy (e.g., fuel switching), or negotiating more favorable utility rates. ENERGY PRO can implement cost-effective scheduling of energy use and fuel switching and may assist the manufacturing company in negotiating more favorable rates for the purchase of energy and power.

It should be understood that any one of these models or any combination of two or more of these models can be, and often are, used to describe the changes in various productivity-related parameters for the same process. They can easily be calculated and reported at any time that the values of the significant independent variables for all of the models are measured.

One important consideration of a model is its validity as a predictive tool, It is important that the model measures and models what it is intended to measure and model, rather than to be simply a good fit of past data. The more accurately the model predicts the productivity-related parameter, the less "noise" there is in the calculated values and the easier it is to notice and identify special causes of variation in the process (causes that are not caused by changes in the independent variables) and to take timely corrective action. Second, if the model is to be used as the basis for calculating the amount of energy savings that is actually being achieved, all parties involved can proceed with a higher level of confidence when the model meets the required accuracy standards which provide appropriate benchmarks that measure the value added by the capital improvements and other follow-along financial benefits.

It is also important that the model truly measures the changes in the productivity-related parameter that are caused by changes in the independent variables. This quality can be measured by calculating the correlation coefficient (R). Statistical parameters, such as the value of R-squared (or R^2) , are measures of the degree of change in the dependent variable (the productivity-related parameter) that is explained by changes in the independent variables that have been selected for the model. It is believed that if R-squared is lower than 0.6, then it is likely that the model will not accurately predict values of energy use. The advantage gained from having a model that fully explains all, or most, of the degree of change in the dependent variable as a function of changes in the independent variables is that it provides a higher confidence level that the changes predicted by the model truly reflect the change caused by known events.

Another way to validate a model is to apply the model to future observations during a test period. In other words, to predict the energy use for each day based on the values of the significant independent variables for that same day and then to compare the predicted value with the measured value of energy use, If this can be done over a test period of several months, a good check of the validity of the model can be obtained, However, this method obviously requires additional time for model verification -- time that could otherwise be used to improve and benefit from the productivity of the process. Therefore, a preferred method for validating the model is to withhold a portion of the historical data as a validation sample. Then, as described above, a model that was derived on the basis of calibration data can be validated for accuracy by testing its predictive accuracy versus the data of the validation sample.

When ENERGY PRO has derived the model, it is presented to the manufacturing company management for approval prior to proceeding further with the identification and implementation of capital projects to improve productivity. If the model is not approved, the model derivation process is begun again. This iteration is repeated until the model is approved by the manufacturing company.

A key feature of the statistical mathematical model is that it describes a productivity-related parameter in terms of a validated set of independent variables. After a capital improvement project to improve the productivity of the process is identified and implemented, the change in the productivity-related parameter caused by the improvement is measured by determining the difference between a measured value of the parameter and a value of the parameter predicted by the model using measured values of each independent variable. A dollar value can be assigned to the change in the productivity-related parameter and other values such as quality, environmental and energy and the savings achieved by the improvement can be shared among the manufacturer, ENERGY PRO and the fund investor. The increased dollar value can sometimes be greater than the ROI associated with the specific improvement. This “leverage effect” achieved from gleaning a percentage of the entire operating budget may serve as an additional “equity kicker”. This flows from the financial values created throughout the entire production process and not necessarily just from the improvements.

Financing the Improvement and Management of the Fund

When ENERGY PRO implements the improvements, the cost of the improvements can be borne by either the manufacturing company or by ENERGY PRO. It is advantageous, however, that ENERGY PRO bear the costs of implementing the project because ENERGY PRO has carried out the analysis and modeling of the process, and has participated with the manufacturing company in the identification and selection of cost-effective projects, and is in the best position to know the risks of the project and to guard against financial loss that could be caused by such risk. ENERGY PRO will obtain the financing and bear substantially all of the costs associated with purchase of the capital equipment, purchase the capital equipment and act as the initial sole owner of record for the capital equipment.

There are several advantages to this approach. The equipment cost can be shown on ENERGY PRO's balance sheet, rather than that of the manufacturing company. ENERGY PRO finances the purchase and installation of capital equipment by borrowing funds from a lender. This loan can be of any form that meets the specific needs of the manufacturer and ENERGY PRO, and will be repaid from the savings that result from the capital improvement.

Such savings can come from energy savings, increased production rate, reduction in the use of labor or consumables, environmental benefits, quality improvements, or any other measurable value-added benefits caused by the improvement.

Moreover, if ENERGY PRO provides such financing for capital equipment for at least two or more separate manufacturing companies, then ENERGY PRO can spread the risk of loss for the lender by obtaining the financing required for all of the capital equipment required in all of the projects under cross collateralized loans to ENERGY PRO.

This method of financing provides advantages over conventional loans to a manufacturing company for which the capital improvement is carried by the owner on its balance sheet. By way of contrast, ENERGY PRO owns the asset and carries it on its balance sheet. By such off-balance sheet financing means, the manufacturing company can keep the resulting capital assets and associated debt burdens off its balance sheet, thereby tapping a new source of capital to fund improvements and strengthen its own financial position from the savings generated from the capital improvement. As described previously, such off balance sheet financing for the owner permits the implementation of capital projects that it otherwise could not undertake due to financial limitations.

To ensure that the capital project delivers the benefits required to recapture the debt and earn a favorable return, ENERGY PRO will train the operating personnel of the manufacturing company to use and maintain the new equipment. Upon the completion of the project, the process is started up and operated with the improvement(s), thereby obtaining the benefits of the productivity improvements that result from the project(s).

Examples of financial criteria for the industrial manufacturer and capital projects

1. The industrial manufacturer has more one, two and three year quality payback projects than available human and capital resources.
2. The project will provide new equipment or a major retrofit to improve the marginal performance of productivity, quality, capacity, or capability to produce a new product.
3. The equipment to be installed is critical to the profitability of the industrial manufacturer
4. The equipment not only ensures the production, quality, and material consumption rates, which were existing prior to its introduction, but also increases these performances substantially.
5. If possible, the equipment can be removed from the site of the industrial manufacturer and can be marketed to another industrial manufacturer.
6. The payback period and ROT must be suitable for the level of risk involved and will be determined on a case-by-case basis.

Conditions for underwriting the investment

1. The industrial manufacturer, the fund, and ENERGY PRO will share the increased profitability attributable to the improvement according to a schedule which returns above market rates to fund investors, earns appropriate compensation for ENERGY PRO, and returns the balance of the benefit to the industrial manufacturer.
2. The industrial manufacturer will operate the equipment in accordance with the standard operating practice (SOP) provided by ENERGY PRO. (This SOP will be drawn up with inputs from the equipment vendor, process and quality control and safety requirements).
3. ENERGY PRO will review the performance of the equipment with the industrial manufacturer on a daily and weekly basis.
4. The industrial manufacturer will be required to correct any deviation from the SOP as soon as ENERGY PRO brings such deviations to the attention of IP.
5. ENERGY PRO will have the right to improve or add more equipment in case any deficiencies are discovered. The cost of such changes will be deducted from the savings due to the industrial manufacturer.
6. ENERGY PRO will have the right to remove the equipment for resale or lease to another industrial manufacturer if the performance continues to remain below the standard for a certain period. The industrial manufacturer will be required to compensate ENERGY PRO and the fund for any contingent loss due to this.
7. All capital improvement projects are subject to evaluation by an independent engineer.
8. Operation, condition, and performance of equipment may be covered by insurance from a major insurance underwriter.

Management of the fund:

The fund will be owned by the investor group. Voting rights will be proportionate to the amount invested in the fund. There will be advisory board comprising an Investor representative, ENERGY PRO, and (possibly) an Initial subscriber who represents a key position In the fund. The advisory board member might be an outsider qualified board member who could bring in deal flow. Preference in fund participation and advisory board membership would be given to investors who brIng both capital and deal flow capability. ENERGY PRO will provide the development*, construction, engineering and day-to-day management services for the fund In return for associated prevailing market fees for these services and an agreed upon equity position in the fund.

Fund investments will target a preferred return of approximately 400 - 500 basis points over risk-free rates, plus up-front financing and commitment fees, payable to the fund. A comprehensive management policy and procedures manual, covering operations of the fund is to be written by ENERGY PRO and approved by the initial Investor sponsors. The fund will endeavor to allocate project revenues on a schedule that assures reaching target returns for the fund i.e. higher share of savings in the early yeah of the project if necessary, and other financial risk sharing strategies.

Prior to recommending specific investments, each will be subject to due diligence provided by an independent engineering firm and a committee of the fund including ENERGY PRO and the investor representatives. In the event of default by the industrial partner additional management responsibilities of the industrial partner would be taken over by ENERGY PRO at appropriate compensation as described in the policy manual. The advisory board and management policy would then undertake actions to further secure the collateral, renegotiate terms, relocate the equipment and utilize the pooling of credits and industries to maintain target returns for the fund.

Exit strategies are based on a review of the actual portfolio and amortization term of the investments. After reaching an agreed upon subscription level, the fund will determine whether to be amortized out or utilize a securitization strategy.

Risk Management

Most projects that fail to produce desired results were flawed from their inception. Few after-the-fact remedies can make up for the lack of due diligence at the beginning of the project. The most effective method for risk mitigation is to complete a thorough investigation of the project assumptions, and to clearly assign costs and responsibilities.

The following are some of the potential causes of a shortfall in performance:

- Insufficient material availability for processing.
- Poor quality and process control.
- Lack of systems integration between the equipment and other related plant, equipment and systems.
- Poor maintenance practice by the IP resulting in frequent breakdowns.
- Excessive delays causing decrease in the equipment utilization.
- Lack of communication and coordination by the workforce of IP resulting in performance below the standards.
- Lack of proper training of IPs workforce to operate and/or maintain the equipment
- Lack of demand for the output from the equipment.
- Force Majeure conditions.

For each of the above causes, ENERGY PRO will develop a causal tree analysis and develop a plan of action in cooperation with the industrial manufacturer. In addition, ENERGY PRO will:

1. Undertake a detailed feasibility analysis with respect to the criticality of the equipment to the industrial manufacturer's production capability. This analysis will cover all engineering features, market and commercial conditions, the role of workforce, etc.
2. Use the best available knowledge, expertise and experience to draw up the engineering specifications which will ensure the desired improvement. Endeavor to select a project that contains other collateral benefits and is core/central to the operations of the process.
3. Select an equipment vendor who will guarantee the specified performance.
4. Reach a contractual agreement with the vendor which will bind the latter with penalties including liquidated and contingent damages.
5. Provide insurance against unsatisfactory performance.
6. Measure and monitor the performance of the equipment on a daily basis and bring any deficiency to the attention of the industrial manufacturer.
7. In the event of a performance deficiency, draw up detailed action list to bring the performance to the expected level. If necessary, ENERGY PRO will bring in experts including equipment vendor's qualified personnel to restore the performance of the equipment. The cost for this will be met out of the savings due the industrial manufacturer.

Each industrial partner will represent a unique need and structure in developing these financial opportunities. ENERGY PRO will identify and incorporate creative risk mitigation strategies. The following are presented as examples and will not apply in every case.

8. Incremental Value of Inventory

Examples of Incremental Value of Inventory and Other Collateral that can be Created Independent of the Equipment Improvement.
In many cases, the installation of a capital improvement to a manufacturing process provides benefits in the form of both increased production and increased value (quality) of the product. Existing credit lines are based on current production rates and product values. It can be argued that the subject improvement has created an unencumbered asset in the form of an increase in both the size of the inventory and the value of each unit. This asset can be used as collateral for the subject improvement. The value of the asset is calculated as follows:

Av=(P2XV2X N)-(P,XV,XN)

Where:

Av is the value of the new asset

P2 is the daily production rate of the product after installation of the improvement

V2 is the unit value of the product after installation of the improvement

N is the number of days of inventory normally maintained

P, is the daily production rate before installation of the improvement

V i is the unit Nalue of the product before installation of the improvement

9. Ground Lease on Critical Equipment

It is not sufficient security to have claim to a piece of equipment that is critical to the process if the output of that equipment is not salable product. An example is the financing of an electric arc furnace. The output of this equipment is liquid steel which has little intrinsic value because it cannot be sold in its "as is' condition. In order for this claim to be adequate security, access must be available to a continuous caster to convert the liquid steel to solid blooms or slabs, One way of accomplishing this is to lease all or some of the land underlying critical pieces of equipment of the industrial facility.

The land lease would have a tie-in mechanism with the lease of the new equipment which would provide that the land lease and the equipment lease payment were inseparable. In the event of a default on the payment, the host would be defaulting not only on the payment of the new equipment but also would lose access to the use of their other essential equipment. The land lease would contain provisions which would prohibit (i) the removal or relocation of the equipment situated thereon, and (ii) a prohibition against the host developing essentially redundant capacity of similar equipment within an extended (say, 50 mile) radius.

10. Monetizing the Future Value of Energy Savings:

As a means to form capital to complete an energy savings project with predictable energy reductions after installation, the Company could work with a selected energy provider to contribute the present value of the energy savings as a lump sum contribution to the project financing. In consideration of this capital contribution by the energy provider, the Company (the host or equipment user) would continue to pay their energy bill as though no energy savings were accomplished. For example, if a host desired to install equipment which would reduce energy consumption at the rate of 100 KwH per shift, the host would agree to pay (in consideration of a negotiated capital contribution from the energy provider) the actual energy used per shift plus 100 KwH per shift. *This approach allows the host to avoid paying a fixed higher rate in periods of reduced production.* The term of such an agreement could be determined by the actual return generated to the energy provider, so the level of energy utilization would not be shifted to the provider. If an industry slowdown resulted in fewer shifts or hours of operations, the term of the agreement would be extended. In fact, the easiest way to determine the term may be in hours of operation times an annual rate of return. This way the capital provider (the energy supplier) will know they will get a premium KwH rate *plus a cost of money adjuster* for a period of time long enough to justify their investment without taking a production level risk.

Imp1ementation and Management of the Improvement

Many industrial plants have extensive information gathering systems that report data for their processes. Some of this data is reported for productivity-related parameters, such as energy use, consumables use, labor use, production rate, and the like. However, what is lacking is an accurate standard against which to compare productivity. Often what is used is an accounting standard, such as an average of past performance. However, such a standard does not take into account changes in production levels, product mix, weather conditions, operation of different pieces of equipment in the process, and the like -- all of which can affect productivity. Compared to this standard, measured productivity can be either positive or negative, but the standard provides no basis for determining whether the measured productivity is good or bad. Such a situation puts management in the position of solving non-existent problems, or ignoring real performance deterioration.

It has been found that the statistical productivity models on which the fund is based can serve as a basis for a reliable decision support system for improved management of process productivity. The productivity model, or models, can be applied to the measured values of the independent variables - as soon as they are available -- to provide an almost instantaneous comparison of the process productivity with the productivity that would have been expected without present improvements. In other words, the model indicates whether process productivity is actually improving or degenerating.

The general procedure for using the models as management tools is shown in Figure 1 . Following approval of the project by the manufacturing company, ENERGY PRO and the manufacturing company use the model(s) to monitor the benefits due to the project. This monitoring is performed by using models that cover the total industrial process, or even more than one process, if present in the industrial plant, and also by using the models for each of the unit processes. Data for each dependent variable and each independent variable in the validated set is collected and segregated into months. From these monthly data sets, monthly reports can be generated. The monthly reports indicate -- for each day of the month the cumulative savings resulting from the project, and also, in the case of a monthly plant-wide report, serve as the basis for sharing the resulting cost savings or productivity improvements by which ENERGY PRO is paid (as described above).

The application of certain control rules to the daily data, as defined below, indicate when monitored data reveals processes to be outside statistical control, at which point various remedial measures, can be quickly taken.

One specific way that the models are used as a management tool is to plot the productivity-related parameter versus time in the form of a daily report. If the value of the productivity-related parameter predicted from each days values of the independent variables is also plotted on the same chart, or otherwise compared against the actual value of the parameter, the positive or negative deviation from the predicted value can be readily envisioned. Moreover, if data from several weeks or months is included in the chart, any trends in the productivity can also be seen. This can be seen in Figure 2, where daily energy ‘savings’ is plotted versus time. The application of simple statistical control tools to plots such as this, as will be discussed in more detail below, can provide an accurate means of determining when to make a process change or when to analyze the process further to solve a problem or take advantage of an opportunity to increase returns associated with equipment.

Any project that is cost-effective and that will produce an improvement in productivity can be implemented by any party, either the owner, or ENERGY PRO. It is preferable that the project be implemented by ENERGY PRO because ENERGY PRO carried out the analysis and modeling of the process, and because ENERGY PRO was involved in the identification and selection of potential projects. An advantage of having ENERGY PRO implement the improvement is that ENERGY PRO is free of the responsibility of operating the process and running the plant, in general. Thus, ENERGY PRO can focus all of its energies upon the rapid and accurate design, ordering, construction, shake-down, testing, and start-up of the process after the improvement. After construction of the improvement, ENERGY PRO ensures continued performance of the improvement based on the important financial benchmarks established as part of the project.

The risk is shifted to the contractor for achievement of the financial objectives and performance of the modification, and for the provision of accountability for its success. To ensure the success of the modification, ENERGY PRO undertakes a number of steps: monitors project performance in terms of meeting minimum requirements, builds teams between ENERGY PRO and the manufacturing company, holds daily team meetings, builds a management system for the operating perspective, trains manufacturing company personnel to maintain the process, ensures the project is being operated by the SOP (Standard Operating Procedures), ensures proper maintenance is completed, and ensures that a portion of the initial capital is kept as reserve for any additional equipment or contingencies. This latter activity can be accomplished by establishing a credit line, where the credit can be in the form of an insurance policy or other financial instrument. Other actions ENERGY PRO undertakes to ensure success include improving or adding equipment as required to meet minimum requirements,

arranging/providing alternate services or financing in case of failure to meet minimum requirements, and arranging/providing operating consultation to ensure meeting minimum requirements/maximized performance.

Measuring and Sharing the Increased Profitability:

After the project has been implemented, it is necessary to measure the change in productivity, quality, environmental, energy and other/profitability caused by the improvement in a manner that will distinguish the effects of the improvement from effects caused by other reasons. This is done by determining the difference between a measured value of the productivity-related parameter and a value of the same parameter predicted by the model using measured values of the one or more independent variables.

The model can be used to measure energy savings, for example, due to a capital improvement. This is done by measuring the actual value of the energy use, energy use rate, or parameter that is proportional to either of these, for the process (the actual energy use"), and - at the same time measuring the actual values for all of the independent variables that appear in the energy use model. The values for the independent variables are used with the model to calculate a predicted energy use that the process would have experienced without the improvement (the "predicted energy use"). The energy savings is calculated by comparing the actual energy use with the predicted energy use. The difference between the two indicates the energy savings due to the modification (the "energy savings").

As mentioned previously, the same approach can be used to calculate the improvement in any productivity-related parameter simply by substituting appropriate parameters for energy in the method described above. By way of example, the savings in consumables use can be measured as: (predicted consumables use) - (actual consumables use) savings in consumables use or, the savings due to increased production rate can be measured as: (actual production rate) - (predicted production rate) increase in production rate. In case any of the calculated values result in negative numbers, the negative numbers can simply be used as is For example, negative savings can be plotted on a graph as negative numbers.

One feature of the proposed fund is that repayment of any loan for the purchase and installation of capital equipment is to come from profitability increases due to the improvement (savings derived from the project). When the terms "savings derived from the project" are used, what is meant is the savings or increased profits, expressed in terms of money, that accrue to the process as a result of the project. By way of example, these could be energy savings, savings in the amount and type of raw materials or consumables, or labor, increased production rate, environmental benefits, quality improvements or the like.

It is the intent of the fund that the savings exceed the costs to the extent that a favorable return is earned by the manufacturing company, ENERGY PRO, and the fund. The excess of the savings over the costs of the modification represents the economic incentive to both ENERGY PRO and the manufacturing company to undertake the project and is shared between the two parties. The sharing of profit improvements between the manufacturing company and ENERGY PRO can start as soon as these improvements resulting from the modification can be identified. The savings can be shared in any way the parties mutually decide, but generally, ENERGY PRO recovers its costs including debt service with the balance of the savings being shared between the parties on the basis of a predetermined proportion that is defined in the performance-based contract.

When capital equipment is purchased, the purchaser is normally required to show the equipment on its balance sheet. Thus, if the manufacturing company purchases capital equipment, the cost is normally shown on its balance sheets. However, if ENERGY PRO purchases any capital equipment that is required for the project, the cost appears on ENERGY PRO's balance sheet rather than on the balance sheets of the manufacturing company. This is advantageous because it permits the manufacturing company to obtain and take advantage of the new capital equipment without the burden of the purchase on its balance sheet -- thus, freeing its own capital for other projects and increasing overall return on assets.

Capital Project Examples

The attached project summaries and selection criteria are included to illustrate the types of financial returns from industrial capital projects and the equity value added by the related ENERGY PRO operational improvement projects. Each of these projects has a simple payback period of 1 to 3 years. Projects to be financed through the fund will generally be larger and more complex, but similar financial performance is attainable.

Expansion Turbine

Project Description

Project will procure and install a 13 MW capacity top gas pressure recovery turbine, utilizing blast furnace gas. Using the turbine for power generation will reduce power demand and electrical energy purchased from the utility.

Justification

- Increased electrical production

Other Considerations

- Leverage to make energy deals
- Freedom to schedule boiler operations
- Improved control of furnace gas backpressure One day maximum shutdown for hookup

Ease of Sale

- Client has approached Energy Pro for development of project.
- Plant President, Plant Vice President, Power & Utilities Manager, Controller, Corporate Program Manager, and Blast Furnace Manager support
- Corporate approved capital project

Speed of Implementation

- 12-l8months

Automatic Roll Changers

Project Description

Manual roll changers for three finishing stands at the Hot Strip Mill will be automated under this project. This will substantially expedite roll change, resulting in reduced delays and an increase in productivity. Also, the amount of scrap and natural gas usage will be reduced.

Justification

- Increases productivity

Other Considerations

- Improves scheduling for Hot Strip Mill
- Provides potential for hot charging the hot strip mill Union supports project - Reduction scrap
- Energy Savings

Ease of Sale

- Corporate approved capital project
- Project has general and area management support

Speed of Implementation

- Less than 6 months

Ladle Metallurgical Furnace (LMF)

Project Description

This project will enable production of more heats at higher quality, since checking of temperature and chemistry measurement, and required adjustments, will be done more quickly and efficiently at the new LMF. Accompanying benefits include less wear and tear on the BOF lining, and more efficient use of refining alloys.

Justification

- Oxygen savings
- Decreased maintenance on the BOF

Other Considerations

- Scheduling improvements - Quality improvements
- Ties to expansion turbine project Union support - Inventory reduction Show piece
- Better utilization of transition material

Ease of Sale

- BOF Superintendent , Union, Power & Utilities Manager, and Plant President support

Speed of Implementation

- 12 - 15months

Power Feeds to Main Office and Waste Water Facility

Project Description

ENERGY PRO proposes to disconnect the wastewater treatment plant and main office area from the utility, and install separate 13.8 kV electric power feeders from the plant distribution system.

Justification

- Decreased electrical per unit charges.

Other Considerations

- Collateral negotiating benefit for Client with electric utility

Ease of Sale

- Not political, project stands alone on payback (1 yr)
- Power & Utilities Manager supports

Speed of Implementation

- 6 - l0 months

Level 11 Optimization Computer at Hot Strip Mill

Project Description

ENERGY PRO proposes to install a new optimization computer capable of controlling up to four furnaces, upgrade communication to existing Rosemount DCS, upgrade field instruments and add position feedback and interface to present Rolling Mill Computers. Improvements will improve combustion efficiency and enhance quality control.

Justification

- Energy savings
- Increased yield
- Decreased rejects
- Reduced claims

Other Considerations

- Maintains Client’s leadership in hot strip market

Ease of Sale

- Corporate approved capital project
- Project has general and area management support

Speed of Implementation

- 8 - l2 months

Level 11 Optimization Computer at llO4nch Plate Mill

Project Description

ENERGY PRO proposes to provide a new Level 11 Combustion Control computer system for the 110 Inch Plate Mill. ENERGY PRO will also provide communication interfaces to the Rolling Mills Level 11 computer and Production Scheduling System. The ENERGY PRO improvements should improve quality control, provide delay and heating strategies and improve combustion efficiency.

Justification

- Energy savings

Other Considerations

- Quality improvements

New Reheat Furnace for Hot Strip Mill

Project Description

ENERGY PRO proposes to install a new slab reheat furnace for the Hot Strip Mill. The new furnace is a top- and bottom-fired walking beam type with an effective heating length of 120 ft. 8 inches. Savings will result in improved combustion control, scale reduction, quality control and fuel efficiency.

Justification

- Improves energy efficiency of process
- Increased yield
- Decreased rejects

Other Considerations

- Show piece
- Maintains Client's leadership in hot strip market

Ease of Sale

- Corporate approved capital project
- Project has general and area management support

Speed of Implementation

- 24 months

Boiler Project

Project Description

ENERGY PRO will procure, install, and own 2 new skid-mounted 70,000 #/hr water-tube boilers (1 for standby) to replace an old oversized existing boiler and sell the steam produced to Client.

Justification

- Energy savings
- Saviners from improved turn-down ratio

Other Considerations

- Improved system reliability
- Improves ability to meet environmental, standards

Ease of Sale

- Plant President and Power & Utilities Manager supports

Speed of Implementation

- 6 months

