Beyond "Cost Only" Measurements:
A Deeper, More Substantial View of the
Competitive Energy Market

Green Power, Energy Conservation, And Cost Savings

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EXECUTIVE SUMMARY

Energy efficiency efforts could suffer significantly if electric deregulation results in less funding for efficiency incentives and if it allows declining block and marginal rate structures which undermine the economics of efficiency projects by reducing the dollar value of energy savings. On the other hand, introducing competition will create new choices for energy users as well as new opportunities for both energy users and energy service companies (ESCOs) to work as partners to achieve environmental as well as cost saving objectives.

Energy users will need to develop a number of "green" strategies to maintain their conservation efforts in a deregulated market while taking advantage of reduced energy prices. These strategies include incorporating energy efficiency services in power purchases; using efficiency measures to shift, level and reduce electric loads (to

help attract cheaper power); identifying rate structures which work in the marketplace but preserve efficiency incentives; and creating a "culture change" to shift to life-cycle cost/benefit evaluation of energy conservation projects. These endeavors lend themselves to creative partnerships with traditional energy efficiency ESCOs and with ESCOs which have expanded their offerings to include power sales.

With choice comes responsibility, and at least some larger energy users will want to buy electricity from less polluting sources. ESCOs can develop a portfolio of clean power sources and provide this product, or they can serve a consultant's role and help energy users learn and use the market to buy clean power. ESCOs which develop these value-added capabilities will serve the public interest while occupying an advantageous and profitable marketing niche.

Deregulation or restructuring of the electric industry presents opportunities for energy costs savings. But it is important for energy users to realize that saving money by buying cheaper electricity is not the same thing as energy conservation and efficiency. One challenge of electric deregulation for energy users is identifying a strategy or plan which will maintain or bolster energy conservation while still taking advantage of the cost saving opportunities which exist in a deregulated electric marketplace. Another challenge is buying power from sources which least harm the environment. This article will discuss possible strategies and explore areas where energy users and energy service companies (ESCOs) can work in partnership to achieve the twin objectives of cost savings and environmental protection.

BENEFITS OF ENERGY CONSERVATION AND EFFICIENCY

Energy conservation is defined in terms of projects and measures which reduce the total amount of energy consumed, whether measured in kilowatt hours or Btus. These efforts can produce numerous benefits in addition to saving energy costs. For example, a lighting retrofit may produce a higher quality light (T-8 lamps vs. T-12s) and maintenance savings due to replacing old lamps, ballasts and fixtures with new ones. Installing a variable speed drive with a soft start feature will re-

duce the maintenance required on belt and sheaves. A new boiler may reduce fuel consumption and energy costs while serving as a capital improvement thus avoiding a large future expenditure.

Energy conservation and efficiency improvements also produce environmental benefits. By saving energy, we mitigate the environmental impacts associated with energy production, distribution and consumption. These impacts include air pollution, acid rain and global warming, oil spills and water pollution, degradation of land and loss of wilderness areas, construction of costly new power plants, and the risk of international conflict and war over energy supplies.

Thus, energy conserving activities are important and worth preserving and enhancing.

EFFICIENCY AND CONSERVATION AT RISK

A deregulated electric marketplace may be less conducive to energy conservation for a number of reasons:

- In general, lower electric prices will reduce the dollar value of the energy savings produced by energy conservation measures. This will lengthen paybacks and make projects appear less attractive from a financial point of view —though it remains to be seen how quickly and significantly electric prices will drop. While the recovery of "stranded costs" by utilities may postpone significant decreases in electric rates in many regions of the country, rate reduction is likely to be a function of customer class—with larger customers seeing significant reductions sooner.

- A deregulated electric marketplace will permit rate structures which actively discourage energy conservation and efficiency. New rate structures may be tailored to provide attractive pricing for customers while encouraging load growth or increased energy use. Customers who opt for a "declining block" rate structure will see the unit price of electricity ($/kWh) go down as their consumption goes up. This will provide a disincentive to energy conservation. Any shift to large customer access charges coupled with low "marginal" kWh rates will have the same effect. These rate

structures will make it harder to justify energy conservation projects because the kilowatt hours saved by these measures will be discounted, resulting in longer paybacks.

- Prior to deregulation, regulatory agencies in many states had set up demand side management programs which offered rebates and other financial subsidies to encourage energy conservation and efficiency. These programs are up for grabs as each state moves toward electric deregulation. Total dollars available for incentives may be reduced, perhaps drastically. In some states, these incentive programs may be eliminated altogether.

These realities suggest that energy users may have to wage an uphill battle to maintain or enhance energy conservation and efficiency programs. The value of partnering with ESCOs to save energy is well established. Energy users face new challenges which suggest an even stronger imperative for working with ESCOs.

EVOLUTION OF ESCOS

Over the past few years the concept of Energy Service Company or ESCO has been evolving. Starting in the 1980's an ESCO was a firm that performed energy conservation projects, typically with some form of guarantee. Using either internal or acquired resources, these companies have combined analysis, design, financing, construction and often long term service and support. More recently however, the term ESCO has been broadened to include energy commodity sales and delivery.

Thus, there are now three different kinds of ESCOs in the marketplace, i.e. efficiency projects specialists, commodity sales specialists, and those companies attempting to do both. Those companies which seek to combine both types of service must cope with the fact that significantly different kinds of expertise are required to effectively develop energy efficiency projects vs. market and sell electricity.

During early market development, the profit margins on competitive electric power sales have been so small (some even negative) that many electric commodity ESCOs are betting that they can make their profits by simply "rolling over" into conservation and construction ac-

tivities with their commodity sales customers. That approach isn't necessarily bad as long as the "full service" ESCO can deliver a credible service on a par with conservation oriented ESCOs.

"Let the Buyer Beware" applies however. Most people underestimate the range and depth of talent needed to execute top quality comprehensive conservation/load management projects. Will the utility or power broker-sponsored conservation programs offer guarantees, know how to perform first quality audits and construction, demonstrate a proven track record of success, and have the team and knowledge to support a project long term?

Early evidence in the industry indicates that commodity-biased conservation ESCOs lack the wherewithal to execute large comprehensive projects. Many do have successes in lighting or simple technologies but are limited in what they can do beyond that. Over the past year or two, this recognition has caused a dramatic surge in the acquisition of (and prices paid for) previously independent conservation ESCOs (including the co-author Kennedy's employer).

ENERGY CONSERVATION AND EFFICIENCY STRATEGIES

There are a number of strategies which can be employed by energy users to maintain or even enhance energy conservation and efficiency programs as we move into an era of deregulated electricity. Accomplishing this task, however, may be more or less difficult, depending on old vs. new electric rates and how electric deregulation or restructuring is carried out in each state. Nonetheless, ESCOs with energy conservation expertise can help at nearly every step:

Join the Public Debate

With deregulation, "the devil is in the details." Options for energy users will be a function of the restructuring plans formulated for each state. If a state deregulates its electric industry with energy efficiency in mind, "the rules" defining the deregulated electric marketplace are likely to promote efficiency—which will make it easier for energy users to do the same. On the other hand, if deregulation is carried out exclusively to lower rates (ignoring social and environmental goals), energy users may find continued conservation activities a difficult undertaking. Thus, energy professionals—representing socially concerned en-

ergy users as well as ESCOs—need to get involved in their state's public policy debate to push for continued incentives and opportunities for energy conservation and efficiency.

Policy initiatives which will preserve conservation and efficiency opportunities include:

- Creation of System Benefit Charge funds to provide monetary incentives for efficiency projects (ample funding levels for these programs are essential);
- Financial incentives for electric distribution companies to promote efficiency;
- Restrictions on rate structures which promote electric load growth and thus discount energy waste; and
- Recovery of stranded costs on the basis of kilowatt hour consumption instead of through fixed charges.

Get Help Understanding the "Rules of the Game"

Buying electric power in a deregulated electric marketplace will be a much different experience than buying power directly from a regulated local utility. The rules governing power purchases will be new, placing most energy users on the steep part of the learning curve. Moreover, if natural gas purchasing is any indication, the new marketplace will be substantially more complicated than the old one, and it will place more responsibility on the part of the customer. This situation will create a market for expert consulting services which ESCOs can satisfy. ESCOs can assist energy users to understand and respond to the "brave new world" in which they find themselves. ESCOs can come to the rescue because ignorance and paralysis will mean lost savings.

Develop and Implement a Purchasing Policy that Commits a Facility to Energy Conservation, Efficiency and Environmental Protection

Developing a electricity purchasing policy is essential to meeting the environmental challenges of electric deregulation head-on. Policies of this type are implemented by a purchasing process which can include the development of a request for proposal (RFP) and bid specifi-

cation, identification and pre-qualification of prospective power brokers or suppliers (bidders), and evaluation of bids. All these are tasks with which an ESCO could assist an energy user. Of course, this type of partnership precludes the ESCO from also bidding on power sales. (See addendum on SUNY Buffalo electricity purchasing policy.)

Focus Energy Conservation and Efficiency Efforts on Measures Which Increase Load Factor and Flatten Load Profile

Load factor is defined as average demand (kW) divided by peak demand (kW). The closer the two numbers, the higher the load factor.

In a deregulated electric market, energy conservation and efficiency measures which improve load factor and thus flatten load profiles will be advantageous because they provide cost savings in two ways. First, like other conservation measures, they produce savings by reducing kilowatt hour consumption. Buying less generally means paying less. Secondly, energy conservation and efficiency measures produce additional savings by reducing demand charges and by enabling the customer to attract lower priced electricity. It is anticipated that power marketers will be able to provide lower cost power to facilities with high load factors and flat load profiles.

The owner of an electric power generator, previously a utility but more likely to be an unregulated investor in the future, receives income by selling the plant's output, i.e. electricity. Since a generator will be more profitable if it can run at peak output continuously and since it is difficult to store electricity, electric power wholesalers prefer to sell power in large blocks. The most common is 25 megawatts and either 7X24 (7 days a week and 24 hours a day) or 6X16 (6 days a week and 16 hours a day). These economically generated blocks of power can be sold economically to customers with large, continuous, constant loads—which, by definition, have high load factors and flat load profiles.

Load factors are likely to be more important to large energy users than small ones. Smaller customers may purchase power based on customer class profiles. Conservation measures that improve load factors include:

- demand control and peak load shedding (which typically save energy while shifting load);
- appropriate use of gas equipment to reduce electric loads (this is

fuel switching but also conserves source energy due to better overall system efficiencies); and

- any conservation or efficiency measure which saves energy and reduces demand during a peak period, e.g. lighting retrofits, high efficiency motor replacement, variable speed drives on pumps and fans, improved temperature control (in the case of electric heating), and energy management system strategies.

ESCOs can assist energy users in studying their load profiles and identifying opportunities to improve these profiles by implementing any and all of the measures above. And to make these projects happen, ESCOs can assist energy users in qualifying for and obtaining rebate or incentive moneys which may be available through system benefit charge funds. Conservation-oriented ESCOs are also capable of providing turn-key services to fast-track urgent projects which can improve load profiles and quickly help users qualify for lower priced electricity.

In addition, ESCOs can also help users implement other measures which will improve load profile such as thermal energy storage (TES) and self-generation. TES may actually increase energy consumption while self-generation, especially if cogeneration, will reduce overall energy consumption and thus can be regarded as a conservation measure. Another (non-conservation) strategy for improving load factor is aggregation with other users or accounts; ESCOs can also provide the expertise to assist energy users in evaluating aggregation options.

Include Comprehensive Energy Services in Your Power Purchase so that Your Power Supplier is Obliged to Assist in Achieving Load Reduction and Energy Conservation

As previously explained, ESCOs whose primary interest is power sales are becoming interested in supplying energy efficiency services as well. Additionally, companies with experience in energy efficiency are looking to the new market in power sales to bolster their offerings. Count on these companies, to put together packages of electricity sales and efficiency services. The goal of this approach is the least-cost total energy bill over the long run, not just lowest commodity price.

Successful implementation of this strategy means identifying an ESCO that can perform both tasks well, i.e. provide excellent commodity pricing and excellent energy conservation services. Finding compa-

nies with this combination of talents may be difficult; thus, pre-qualifying firms before bidding is essential.

Additional problems or challenges arise when bidding both services at once. For example, a meaningful bid on the energy conservation services portion of the bid requires a detailed scope of work. That will have to be prepared (perhaps with the help of a disinterested ESCO consultant) and inserted in the bid specification. Then there is the problem of establishing low or best bid when evaluating commodity pricing and conservation services pricing. One ESCO may be low bidder on commodity while another may present the best pricing for efficiency. Energy users must be able to assess overall impact on total energy costs, taking both factors into account. This may be difficult. It may also be a place where help from a disinterested ESCO (i.e. one selling services but not power) is essential.

Contract duration may also be a hurdle. While implementing a comprehensive energy efficiency project may take a few years (and thus require a contract for that duration), an energy user may not wish to be under contract with the same commodity supplier for that long a period. This conflict could lead the energy user to contractually separate the efficiency and commodity functions. In this event, savings from lower rates could be used to finance an in-house fund dedicated to energy conservation and efficiency projects (thus accomplishing the same objective).

Bid Power Contracts with Specifications Which Call for Rate Structures Which Will Not Undermine the Economics of Potential Energy Conservation and Efficiency Projects

One strategy for protecting the economics of potential energy conservation projects is to avoid marginal rate structures entirely. A competitively bid flat rate structure could provide excellent pricing and cost savings while maintaining incentives for energy conservation (which can produce additional cost savings). Alternately, incentives for efficiency and conservation can be maintained by a rate structure which includes an adjustment mechanism to permit documented energy savings to be credited at the base rate. A knowledgeable conservation-oriented ESCO could assist an energy user in determining appropriate bid spec rate structure language as well as evaluate the possible risks associated with requesting commodity pricing in different ways.

Use Life Cycle Cost/Benefit Analysis to Evaluate Energy Conservation and Efficiency Projects

A common way of evaluating prospective energy conservation measures is to calculate a simple payback, i.e. the cost to install or implement the measure divided by its annual energy dollar savings. The simple payback tells you in a simplified way how many years it takes a project to pay back its initial cost. Energy users often have payback thresholds for proceeding with a project, e.g. 5 years or less.

But simple payback calculations underestimate benefits. At a time when energy dollar savings from energy conservation measures may decline (because of lower rates or/and new rate structures brought by deregulation), it makes sense to more thoroughly identify and quantify all benefits of a prospective project. This can be done by a life-cycle analysis which looks at all costs and benefits over the lifetime of the measure. Thus an energy conservation measure which also produces a capital improvement (e.g. a new roof, new windows or a boiler replacement) or maintenance benefit (e.g. lighting or motor retrofit) will show additional savings and thus be more likely to be done.

Life-cycle cost/benefit analyses demonstrate the true value of projects and justify embarking on projects with the kinds of longer simple paybacks we are likely to see in a deregulated marketplace.

ESCOs can help energy users better understand and quantify all the benefits of energy conservation projects. Moreover, professional facilities energy managers may need the support of outside ESCO expertise to make the best possible case for changing project evaluative methods, especially since this change may be resisted and entail a significant managerial "culture change."

Prioritize Efficient Design and Construction of New Buildings and Facilities

This becomes more important when lower rates and marginal rate structures make it a lot harder to undertake retrofits. Generally, it is cheaper to "do it right in the first place" than to go back and retrofit. ESCOs can provide design review services to contribute to good design.

HOW DIRTY IS YOUR POWER?

In a deregulated electric marketplace, energy users will be able to

choose their electrical supplier. Options may include continuing to buy electricity from the local utility (now a distribution company), buying power from a competitively operated regional power exchange and/or buying power via a bi-lateral contract from an energy broker or independent generator. In addition, many energy users will continue to have the option of self-generation.

With choice comes responsibility. Once choice exists, all customers will bear some responsibility for the source of their power and its environmental impact.

Not all electric power is equal from an environmental perspective. Electric power generation ranges from dirty to clean. Electricity produced by coal-fired power plants without pollution controls may be the dirtiest. Somewhere in the middle of conventional generation are oil-fired plants with pollution controls. Natural gas-fired plants are among the cleanest conventional sources of electricity. While nuclear power does not produce air pollution, unresolved radioactive waste disposal and other fuel cycle issues discount it environmentally.

"Green power" implies minimal environmental impact. Included in this latter category are new electrical energy sources such as fuel cells and renewable energy technologies, e.g. wind, photovoltaics and certain types of biomass energy. While hydroelectricity is a form of (non-fossil fuel) renewable energy, already existing hydro may be excluded from green power programs because buying this power will not help expand the green power market. Moreover, in some cases hydro may be regarded as environmentally damaging, e.g. when natural ecosystems are destroyed by the reservoirs created by hydroelectric dams. Environmental groups and energy marketers in different regions are currently discussing methods of evaluating emissions profiles and assigning energy sources a "green label."

Of course, buying clean or green power doesn't mean that the actual output of electrons produced by cleaner generation is going to be delivered to the customer's facility. Unless an energy user is self-generating its power, that's not the way it will work. The electricity an energy user buys goes into the electric distribution grid and mixes with all the other power. The electricity an energy user's facility receives is part of that mix. Buying clean or green power means paying a supplier of electricity to generate and put power into the grid which is produced in a manner which meets the customer's environmental specifi-

cations. Thus, the environment benefits (at the point of generation) and the energy user receives the power it needs. Purchasing green power puts "buying power" in the hands of those who are investing in cleaner ways of generating electricity.

Cleaner, greener power is likely to cost more. Hopefully, this premium will be modest for green products developed for larger customers who may be unlikely to be interested if the premium is too high. In any event, energy users will be challenged with the need to balance fiscal responsibility and the imperatives of cost saving vs. the need to be environmentally responsible. While buying cheap, dirty power should earn energy users environmental criticism, buying cleaner, greener power should warrant praise. Buying green power may also mean sacrificing some or all of the price-saving benefits touted for deregulated electricity—though this equation may change as cleaner forms of generation become more established and cost competitive.

How can energy users determine the environmental merits of prospective clean or green power? How will customers know how dirty or clean their power is?

Many states are expected to pass laws requiring all power marketers to disclose either their "power mix" or, specifically, their emissions in terms of the amount of sulfur dioxide, nitrogen oxides and carbon dioxide emitted per kilowatt hour of electricity. The federal government may require disclosure. Moreover, non-governmental green power certification programs—like the Green-e program sponsored by the Center for Resource Solutions in California—may also emerge in various markets to identify and certify suppliers of cleaner sources of electric power.

STRATEGIES FOR BUYING CLEAN, GREEN POWER

Buying cleaner electric power or "green power" can be viewed as a multi-step process for end users. ESCOs can play an important consultative or marketing role.

Conduct a Careful Study of the Electric Market to Determine Options and Potential Costs for Clean or Green Power.

Markets for clean or green power are likely to develop differently in different regions. Getting to know the regional market is essential.

Energy users may wish to solicit proposals from prospective suppliers of clean and/or green power. Energy users may wish to conduct some interviews in order to learn the lay of the land and pre-qualify bidders.

A market study will show what clean/green electricity "products" are available. ESCOs which develop expertise in the green power niche may be able to play a consultative role, assisting energy users to understand and evaluate their market. ESCO market familiarity can help users to sort out authentic clean or green products from green power marketing hype.

Green power products may be standardized and marketed in a variety of ways. Labeling programs, e.g. California's Green-e program, may exist which define environmental standards (in terms of power mix, emissions rates, acceptable sources, etc.) and certify suppliers and products.

Some products may appeal to residential customers willing to pay substantially more for electricity from newly developed renewable (solar) energy technologies. Other products, based on different environmental standards, may be developed for larger industrial, commercial or institutional customers. These less expensive "light green" products (e.g. natural gas-generated electricity) would be cleaner and greener than conventional power or the regional power mix but they would not meet the more stringent environmental standards of more purist green power products which may appeal to smaller or more socially conscious users. The standardization and certification of green power products will reduce the need for ESCO consultation.

Define Clean/Green Power Goals

Energy users interested in purchasing cleaner power need to decide their standard. Do they want to rule out coal and oil generated electricity and instead limit purchases to much cleaner gas-fired electricity and to hydroelectric generation? Or are they interested in cleaner new renewable generation like wind or photovoltaic power, or a mix of conventional and new technologies? Price will be a factor.

Decide Whether to Pre-Qualify Power Suppliers and Thus Only Allow Successfully Pre-Qualified and Pre-Accepted Suppliers to Bid

Pre-qualifying suppliers makes sense, given the newness of the

market for competitively bid electricity in general and clean and green power in particular. There may be a lot of totally unproved vendors vying for business. Energy users will find it easier if they know in advance that all bidders have the demonstrated capability to reliably supply power based on pre-determined environmental criteria. Energy users will also want to make sure bidders are able and willing to meet disclosure requirements (see below). Also, if users are seeking to combine power purchases with other energy services (including energy efficiency services), prospective vendors should meet pre-bid requirements in that area as well.

Prepare Appropriate Bid Specifications

These would minimally address the following issues:

- Electric load for which the energy user is interested in buying clean or green power;

- Environmental criteria (or product label) used to define the clean/green power prospective suppliers are bidding on; and

- Disclosure requirements to guarantee that the power being generated and purchased does in fact meet agreed-upon environmental standards.

Concerning disclosure, standardized products certified by a government body or a credible independent third party may eliminate much of the worry in this regard. In the absence of such certification, the energy user's specification will need to detail disclosure requirements which, if met, will satisfy the user that the power it is buying is coming from the sources agreed upon and is as clean as it should be. This could get complicated. The more complicated it gets, the greater the role for an ESCO.

In addition to verifying emissions, an energy user will also want to assure itself that the total demand on its supplier's clean/green power supply is not greater than the supplier's capacity and output. This, too, can get very complicated, given different methods of accounting (e.g. do you track kilowatt hours based on monthly average production vs. sales or by hourly matching on-line capacity vs. sales?) and

given the inclination of suppliers to buy power from different sources by the hour, depending on pricing and availability. In the absence of government regulations guaranteeing honest resolution of these problems, expert ESCO assistance with supplier disclosure methods and verification may be essential for energy users interested in green power options.

Consider Bidding Clean/Green Power Options as Bid Alternates in Order to Identify the Premium or Additional Costs of These Services

Customer decision-makers will need to know this price differential information when awarding contracts; using bid alternates is a way of providing it. In any event, facilities advocates for clean or green power will need to develop in-house constituencies and arguments which support the idea of spending more money in order to do what is environmentally responsible. ESCOs which market green power will want to identify and encourage those constituencies as part of their marketing activities. ESCOs which provide green power consultative services may be asked by those constituencies to help them make their case to higher level management.

Concluding Remarks

The deregulation or restructuring of the electric market provides numerous opportunities for energy service companies and energy users to work together to produce win-win results. While some ESCOs will provide both conservation services and electric commodity sales, our analysis suggests that there will be a substantial role for ESCOs which continue to concentrate on providing conservation and consultative services, especially if they strengthen their offerings by developing expertise in the emerging electric market. The new electric marketplace is sufficiently complicated and enticing to guarantee energy user interest in specialized ESCO services to help them through the maze. Moreover, we see a natural alliance between conservation-oriented ESCOs and energy users which are interested in achieving energy cost savings while benefiting the environment.

ADDENDUM

SUNY Buffalo Electricity Purchasing Policy
Approved February 1998

The following principles should apply to all electric purchases for the State University of New York at Buffalo:

1. **Compatibility with Campus Energy Conservation Efforts** — The terms and conditions of electricity purchases should sustain or enhance SUNY Buffalo's energy conservation program --not undermine it—by avoiding damaging rate structures and, if possible, by incorporating energy efficiency services.

a.) **Rate Structure** —Electric rates should be structured to maintain appropriate financial incentives for continued energy conservation and efficiency. Declining block or marginal rate structures discourage conservation and efficiency and should be avoided. Flat rates maintain incentives. Acceptable rate structures provide sufficient financial incentive to sustain a program of campus energy conservation improvement.

b.) **Energy Efficiency Services** —The University will attempt to negotiate electricity purchase agreements which include, as a value added component, energy efficiency services.

2. **Buying Clean Power** –SUNY Buffalo should buy power from environmentally clean sources as defined by emissions profile, i.e. CO_2, SO_x and NO_x per kilowatt hour. Dirty coal power should be rejected in favor of efficiently produced, natural gas-fired electricity. The University should explore buying a percentage of its power from clean, renewable power sources when these are available.

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Walter teaches environmental studies courses at UB. He has published numerous articles in his field, and is now working with Erie County, NY, to develop an energy action plan to reduce energy consumption in county buildings by 20 percent in the next 5 years.

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