



THE TIMES THEY ARE A CHANGIN'...

Could Coal Be Our Salvation?

Inside This Issue

Much of the hype about alternative energy sources concerns their ability to produce no (or no net) carbon dioxide (CO2), as occurs when fossil fuels are burned. More than half our electricity comes from coal, so it's a major part of that problem. But what would the future look like if the CO2 issue disappeared?

A variety of technologies are being developed to capture CO2 before it leaves the smokestacks, and sequesters (in liquid or solid forms) in geologic deposits. Several pilot separation facilities (one relatively large) are already in operation in Norway while others (e.g., in Algeria) are being planned or under construction.

Even coal's other pollutants, such as nitrous oxide (NOx) production, are getting attention. By using pure oxygen (instead of air, which is almost

80% nitrogen) to burn coal, NOx is nearly eliminated. However, oxygen production takes energy, and the jury is still out on the net effect of this option. But coal is enormously plentiful and inexpensive in the U.S., providing a large margin of savings (relative to oil or natural gas) even after such issues are taken into account. When married to an Integrated Gas Combined Cycle (IGCC) system that uses gasified coal in a high efficiency turbine power plant, coal could go in one end and clean (and relatively cheap) power can be provided.

But what would happen to alternative energy options if cheap, relatively clean coal became the energy source of choice?

That may depend on other factors, such as the development and proliferation of plug-in hybrid cars. If

'clean coal' is indeed feasible, it could provide the off-peak power needed to fuel such cars, at a national average price equivalent to about \$1.00 - \$1.50 a gallon of gasoline – half the present price. Such a change would, over time, cut automotive fuel consumption, the major use of oil in the U.S. Doing so could, in turn, contain or even reduce world oil pricing, which would shore up the value of the U.S. dollar.

The value of (and need for) Renewable Energy Certificates (RECs) and carbon offsets could drop, reducing available funding for renewable energy development, perhaps maintaining its existing higher cost relative to that of fossil fuels. On the other hand, accessing that potential coal power would require expansion of transmission systems

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(rather than shipping the coal by train) which, in turn, would foster proliferation of wind power, much of which is concentrated in states near major coal resources. The much-vaunted return of nuclear power could stall, because coal plants – even with sequestration – will likely be cheaper and faster to build and easier to site than nukes.

Greenhouse gas emissions would be reduced, both from power plants and in automobiles (two of the largest sources), mitigating climate impacts. If carbon sequestration comes to pass, coal – instead of being part of the problem – could become a big part of the solution.

For more on carbon sequestration, check out the following website link

<http://cdiac2.esd.ornl.gov/>



Luthin Associates Staff at the Beach in Avon, NJ
(Left to Right) Eileen, Ellen, Fran, Natale, John, Fallon, Catherine and Rakesh

Pricing Out Carbon Neutrality

Large energy users are being approached to voluntarily reduce their 'carbon footprint' (i.e., effects on the climate through emissions of greenhouse gases, especially carbon dioxide). While commendable, energy users should do their homework to avoid any unexpected financial and public relations impacts.

At present, there are no regulatory requirements in the U.S. for end users to cut carbon emissions, though that may change over the next few years. At this time, those that embark on such an effort may instead be doing so to fulfill a company mission statement and/or as a matter of good corporate citizenship.

While eager to participate in mitigating global warming, many firms have not yet quantified the potential financial or public relations ramifications when signing such a commitment. To get a clearer picture, let's look at a recent experience for a local facility.

Several of the commitment programs (there are more than a dozen uncoordinated efforts underway) call for participants to perform and deliver a greenhouse gas (GHG) inventory that quanti-

fies the carbon produced by the facility's operations. That process looks not only at fuel and power consumption at the site, but also such factors as the energy used by employees commuting to the site, refrigerant and chemical effluents at the site, fleet fuel usage, and methane from trash sent from the facility to landfills. It is not unusual, for example, for a GHG Inventory to find that carbon from direct energy use (e.g., electric power consumption and boiler fuel) is less than half the problem.

Such results are not merely theoretical: any attempt to fully 'neutralize' such emissions will involve more than site level energy conservation, efficiency, or recycling. To mitigate the impact of indirect emissions from power consumption, for example, may involve buying power from renewable sources (so-called 'green' power) or Renewable Energy Certificates (RECs) which may add 10% to 30% (or more) to the cost of power. Carbon offset credits may be bought to counter emissions from fuel consumption and other sources but (if all carbon emissions are addressed), they could add 30% to 50% to the fuel bill (depending on how a carbon offset market develops in the

U.S.). In Europe, where a mandatory carbon market evolved from efforts to comply with the Kyoto Protocol, some large facilities seeking to become carbon neutral have spent millions of dollars trying to do so.

In the U.S. a variety of parallel efforts are underway, such as the Regional Greenhouse Gas Initiative (RGGI) and Renewable Portfolio Standards (RPS), that could raise the cost of carbon offsets and RECs, among them. In both cases, requirements by state agencies will increase the demand for, and the price of, carbon reduction options. All presidential candidates have also pledged to take action on global warming, which will likely result in federal actions having similar results.

In the case of our example facility, the total carbon neutrality 'hit' in the near future could approach \$1.00 per square foot per year, due mainly to its use of coal-based electricity, and commuting by most of its employees in single-occupant cars. Before committing to any action that could have comparable 'sticker shock,' it

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Betting Your Chips on CHP

The future often appears filled with potentially lucrative technologies that could cut energy use and/or cost. But building owners and managers need to understand possible downsides as well as the upsides when pursuing such new options. A recent study of installed small-scale cogeneration plants, for example, surprised many who previously believed that a mini-plant making on-site power and heat would surely save energy and money.

The concept is simple: generating power normally uses only 30-40% of the energy content of fuel that it consumes, with the rest being dumped as waste heat. If that heat could be used to warm buildings, heat water, etc., it would be essentially free. In hundreds of industrial facilities where heat is used in continuous process loads, that's exactly what happens: thermal efficiencies of 60% to 80% are not unusual. When applying such Combined Heat and Power (CHP) to commercial and institutional buildings, however, the heat load may vary greatly and may not occur at the same times that power is needed.

In recent years, many natural gas-fired CHP systems have been installed using microturbines (MT) and internal combustion engines (ICE). They produced power and heat, cutting utility electric bills in the process. But just how many have actually resulted in a net savings, once the recovered waste heat was measured? A recent (February 2007) study of 47 California systems

produced some surprising results.

Most of the 200 CHP systems installed since the 2000-01 California power debacle had no meters to measure the amount of heat that was recovered, so owners had no idea just how much they were actually saving. Where such metering existed, average thermal efficiency (energy in versus useful energy out) was less than 37% - no better (and, in some cases, worse) than utility power plants. While a few systems did reach 70% efficiency, many others were below the average.

The study found several factors that, with proper attention, could help avoid such disappointments. The main issue concerned verifying (or accurately modeling) electric and heating load profiles. Doing so would show exactly when waste heat is available from the cogen machine, and when it is needed in the building. If those two do not happen at the same time, much of the waste heat may be dumped, greatly reducing the overall thermal efficiency of the system. In many cases, erroneous assumptions were made regarding the coincidence of those two factors, resulting in overblown claims of potential savings.

The appropriate way to avoid that problem, before committing to a CHP system, is to install interval meters on both electric demand and heat usage by the building. While electric interval (also called 'smart') meters are becoming common, measuring heat consumption in such short (e.g., 15 minute) periods may be new to many facility operators. It may be done relatively easily, however, by connect-

ing to existing natural gas meters (where practical), or by installing BTU meters that measure hot water temperature and flow rates, with real-time output to a data logger. Chart the resulting data on the same graph to see when demand for electric power matches the need for heat. If the matchup is good, use the data to accurately model savings from a CHP system. If not, CHP may not be a good choice.

But that was not the only problem. In other cases, units were erroneously assumed to run 24/7, even when buying night and weekend utility power would be cheaper. Sometimes, systems were shut down when the spot market price of gas was too high to yield profitable operation. And when electric loads were high and heating loads low, extra power (and water) had to be consumed to serve the cooling towers needed to dump excess waste heat. Once again, careful modeling - and consideration of all factors influencing when units might not run - is essential to avoid disappointment.

A good summary of the California study may be found at http://www.distributednrg.com/de_0711_energy.html. The full study is available for free at

http://www.itron.com/pages/news_articles_individual.asp?nID=itr_014829.xml

Overcoming Issues With Biofuels

Ethanol is being developed as a biofuel to displace gasoline. It is derived by digesting cellulose plant matter in much the same way that moonshine is made: culturing bacteria that break down the material, and distilling the results. Fuel is needed to provide the heat necessary for those processes, and the cultivation and fertilizer for the plants involve additional energy inputs. The net gains (in both energy and greenhouse gas reductions) from ethanol have therefore been questioned.

While some studies indicate that ethanol may not provide much more net energy than it consumes, biodiesel (made by mixing deglycerized vegetable oils with diesel fuel) has generally received a clean bill of health – until recently. Even though the net energy equation still looks good for biodiesel, the net reduction of greenhouse gases (GHG) recently became an issue. To clear land to cultivate palm oil plants which are used to make biodiesel, trees in places like Indonesia have been cut down, and the land disturbed. That

often releases methane and/or reduces carbon normally pulled from the air during tree growth. Bottom Line: how you get the biodiesel feedstocks may impact net GHG reduction.

To resolve these issues, efforts are underway to start certifying biofuels. When the same issue arose years ago with regard to renewable power sources, the Green-E certification program was initiated to ensure that buyers knew they were getting the real deal. In the case of ethanol, approval might be secured by using only waste plant matter, such as bagasse (unused parts of the corn plant) and surpluses of edible products that would otherwise be discarded. Offending suppliers could then be screened out of the marketplace.

Even corn-based ethanol may get a reprieve. In a unique twist, nuclear power could be its salvation. The major reason corn-based ethanol looks to some like a net energy loser is the large amount of natural gas that must be burned to provide heat in the production process. If

that heat was supplied from a non-fossil source, ethanol might look a lot better.

To take advantage of the huge amount of heat discarded during production of nuclear power (over 60% of the total energy produced by most reactors), a proposed nuke in Idaho would instead use the waste heat to distill ethanol. Doing so could significantly cut its cost and respond to those claiming that ethanol needs more fossil fuel energy than it produces. Because the nuke heat would not involve production of GHG, the net impact of ethanol on GHG emissions would also be improved. In effect, the reactor would become a cogeneration plant providing both electricity and liquid fuel.

While not a reason by itself to build more nukes or ethanol plants, such an option just might change the way we look at both energy sources in the future.

Quotable Quote:

“The world hates change, yet it is the only thing that has brought us progress.”

Charles Kettering
Engineer, Scientist, Inventor & Social Philosopher

What's New at Luthin?

Since our last issue two of our Associates received professional certifications. Rakesh Parasuraman became a Certified Energy Manager CEM and Ellen Northrup became a Certified Energy Procurement CEP.

We have a new staff member, Ms. Fallon Barbera who joined as a Junior Associate. Fallon comes to us from JP Morgan Chase where she worked as a Risk Analyst. Fallon is supporting our efforts in procurement, budgeting and bill analysis.

Real Time Reverse Auctions 101

The original concept of an auction is a single seller who solicits competition from multiple buyers for the product or service being offered. As competition increases among the buyers, the sell price increases as well. In the Reverse Auction, there is a single buyer and multiple sellers; therefore, the direction of the sell price is inverse to the competition. In recent years, on line platforms such as E Bay have added a new element to the auction process. Allowing the bidders the ability to compete remotely, thereby, increasing the competition. Similarly, the advent of the on-line reverse auction has become popular and many companies use it to purchase janitorial supplies, paper and other business products that can be considered commodities, i.e. there is no difference between the characteristic, quality or nature of the competing products. The only difference is the price.

Reverse auctions are quickly gaining popularity in the procurement of gas, oil, and electricity and now you

can use them to purchase renewable energy credits (REC's) to assist you in attaining your sustainability goals. The characteristic that makes the Reverse Auction especially popular for energy is when it is accomplished Real Time.

The on-line, real-time competitive bidding process has introduced elements that are simply not possible in a manual RFP process. These elements favor the buyer and increase competition. In the standard RFP process, each bidder may get several opportunities to offer a better price but the number of opportunities is limited by 20th century technologies such as telephones, faxes and emails. With real time, on-line bidding, the process is much more fast-paced and dynamic. This requires that the bidder quickly respond to the competitor's price changes.

Another way that the real time component reduces pricing involves supplier risk. Reverse auctions can be structured to show the suppliers their rank in the bidding process

versus other bidders. This enables them to immediately re-bid a lower price. In a traditional RFP bids are evaluated by the buyer, shortlists are created and further negotiations continue using the slower communication tools. All this adds a time delay. Because of the volatile nature of the market, time costs money. Risk premiums must be added by the suppliers to provide extended price protection while decisions are being made. Some suppliers will state that their prices are subject to change at the time of contract execution based on market changes. Online auctions help do away with this time delay ensuring market based pricing that requires minimal risk management. This enables the risk premium to be added to the buyer's level of savings.

Another advantage is that most auction providers provide a platform that maintains a clear audit trail of the procurement process allowing transparency and compliance. If a buyer's procurement rules require such a level of competitive

certainty, the on-line platform can provide it.

While the quick-time advantages of the real time reverse auction are significant, in order to gain these benefits a significant amount of preparation must occur before the auction begins.

As in all services, not all on-line, real time platforms are the same. The cost to participate varies and the level of services does as well. Luthin Associates is utilizing a platform, eDynaquote which is moderately priced, that meets all of the above criteria.

Did You Know?

The Renewable Energy and Energy Conservation Tax Act of 2008 (HR 5351), passed in February 2008, ups the incentive for purchasing a plug-in hybrid car to \$4,000 while eliminating an existing tax break for gas guzzling SUVs. Now is the time to Trade Up.

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Visit Our Website
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Web Resources

CarbonFund.org:

<http://www.carbonfund.org/site/pages/businesses/category/CarbonFree%20Products/>

The Center for Resource Solutions (CRS):

<http://www.resource-solutions.org/index.htm>

Alternative Energy News:

<http://www.alternative-energy-news.info/>

Luthin Associates, Inc. is an energy management consulting firm serving Tri-State and national clientele with a variety of energy procurement services since its founding in 1994. Our core business is fossil fuel contract development; fuel, steam and electric negotiation and alternate rate opportunities; energy purchase management and customer education for deregulated markets; benchmarking and other sustainability services. Our client experience includes strategic energy initiatives for major universities, state and local governments, numerous major healthcare facilities and real estate concerns. In our former positions, and as Luthin Associates, we have 85 years' collective experience in energy and financial management.



CPA Schedule 2008

June	July	September
CPA Meeting June 17	CPA Meeting July 15	CPA Meeting September 16

Pricing Out Carbon Neutrality

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therefore pays to have a clear idea of the magnitude, both near-term and down the road.

A typical commitment program may initially ask only for production and delivery of the GHG inventory, with efforts toward neutrality to start within two years. Once the inventory has been provided to the commitment organization, however, the customer may lose some control of the process. As has occurred with at least one fac-

ility, a commitment organization publicized (without its knowledge or permission) a firm's failure to achieve results comparable to those of similar institutions.

To avoid such unforeseen difficulties, customers considering participation should first perform their own in-house GHG inventory, or use a consultant operating under a signed confidentiality agreement.

Free downloadable software is available at:

<http://www.greenerchoices.org/globalwarmingathome.cfm?page=Toolkit#Carbonfootprintcalculators>.

Once the potential impact has been quantified, taking on a climate commitment may then be done with a clear eye on the bottom line. Luthin Associates stands ready to confidentially assist (or fully handle) the task, quantify the financial implications, and suggest ways to economically address them.

On a Personal Note...



Many of you know that I am a child of the sixties. Bob Dylan's "The Times They Are A Changin'" was written in 1964 and for many of us the words sound a bit prophetic.

**Come writers and critics
Who prophesize with your pen
And keep your eyes wide
The chance won't come again
And don't speak too soon
For the wheel's still in spin
And there's no tellin' who
That it's namin'.
For the loser now
Will be later to win
For the times they are a-changin'.**

Bob Dylan, Poet & Musician

These days you can hardly stumble out of your door way to pick up a newspaper or log on the internet without encountering news about how to make the world a greener place.

The transformation of how the world per-

ceives our industry versus a few years ago is still amazing to me. One of my colleagues, who works at a prestigious bank told me, "three years ago it was impossible to get anyone to celebrate Earth Day." This year it seems anyone and everyone was celebrating Earth Day. Almost every magazine cover, over the past few months, featured their "green issue".

Since it is in vogue to "be green" a lot of options are being pursued that may not be the best choice. An acquaintance of mine is planting bamboo in his yard because "It is green". Bamboo is the "it" floor covering that has acquired a green seal of approval because it replenishes quickly on its own. However, it grows like a weed - as much as a foot a day - and quickly cover areas in which it is planted. His front yard is going to look like a jungle soon. Right now, bamboo may be a wise choice for floor covering but may not be for landscaping small areas.

I believe more than ever that your home work needs to be done when evaluating energy efficiency projects. For instance, your boss may

ask you to evaluate installing distributed generation. However, look before you leap. Understand the real economics of installing distributed generation at your site. As we mention in our **CHP article on page 2**, understand how net savings in this type of project is measured. Do not assume the developer's economics are correct. It is important that you do your homework.

My big fear is that because green is in vogue, a lot of projects that really do not make sense will be implemented. This could result in the wheel spinning in a different direction. In the future, green projects may not be seen in such a favorable light.

Making sensible choices that have a demonstrated impact on the environment and a reasonable return on investment will steer you in the right direction in long run when *The Times They Are A Changin*.

Catherine Luthin