

New Tactics and Technologies to Meet The Competitive Utility Environment

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INTRODUCTION

A new age is dawning for lower-cost energy use and supply. The deregulation of the electric industry is creating new pricing options that will change how we evaluate cost-cutting energy alternatives. As competition begins, smart users will grasp these opportunities and press for greater innovation on the part of marketers.

Energy users can best navigate these choices by:

- understanding the concepts inherent in deregulation (such as transmission constraints)
- influencing the deregulation process (which does not end when markets first open)
- learning to use new analytical tools (such as load profile analysis)
- applying new technologies (e.g., wireless automatic metering)
- being as creative as possible (because marketers won't be).

AT&T VS. MCI: A PARADIGM

To understand how electric utilities are transforming, think about how long-distance phone service has changed. When AT&T was forced by a federal court to divest its divisions, long-distance and local services were separated, and new providers such as MCI and Sprint became household names. After 13 years, that industry is still not fully deregulated (local service is still generally a monopoly), but during that time long-distance use

has nearly quadrupled, while the average price of a long-distance minute fell by more than 50%.

To satisfy consumer demand for communication services, a vast array of new technologies was also born. How many of us anticipated the home fax machines, cellular phones, pagers, and on-line services that would result from a single court order? While we can also expect the cost of power to eventually fall, the future of electricity similarly holds much more than price reductions.

FACTORS IMPACTING POWER PRICES

Electricity is generated by utilities and independent power producers (IPPs), both regulated to some degree by state public utility commissions (PUCs), and then transmitted through high-tension lines crisscrossing North America in a giant network. These lines are owned by utilities and regulated by the Federal Energy Regulatory Commission (FERC). Once voltage is stepped down at substations, power is distributed through local utility-owned lines and meters regulated by PUC's.

With the exception of rural co-ops and municipal utilities (which are controlled by local governments), PUC's determine how to distribute these costs to end user classes. Most of our bills break out only charges for electric consumption and demand (and perhaps a fuel charge), but the true cost of power includes many other components, including transmission, distribution, and a variety of ancillary services (such as voltage support, spinning reserve, and load following). Bills may also include taxes, social programs, and other charges that are not apparent to end users.

To develop the prices we pay, the PUC's apply a standard based on the utility's costs for providing a service, plus a guaranteed rate-of-return to ensure a ready supply of investment capital. All of these costs and profits are "bundled" together to create tariff pricing. While theory dictates that charges should be based on the true cost-of-service, politics and other pressures often result in cross subsidies in which one rate class (e.g., industrial) is charged more to contain prices charged to another (e.g., residential).

While the electric rates we pay are controlled by PUC tariffs, utilities and IPPs buy and sell electricity among themselves, and such wholesale prices vary with time, climate, power plant outages, fuel prices, and other factors. The base cost of power seen by a utility is therefore a mix of its own generating costs and the price it pays for electricity delivered from other

power providers through the transmission system. This base cost is subject to commodity market conditions usually not visible to end users, and increasingly influenced by factors such as commodity trading techniques (e.g., futures and financing plans), user load profiles (such as real-time pricing), and transmission system constraints (that can drive prices up to the highest local generating cost).

THREE GENERAL RELATIONSHIPS

There are three general relationships that clarify how new techniques both interact and can be applied to control energy pricing. They are:

- time of use - load variation - hourly pricing
- generation - transmission - natural gas options
- load shaping - financing methods - user technologies.

Time, Load, and Price

As they become more time-sensitive, deregulated retail power prices will begin to vary like those at the wholesale level; i.e., hour-by-hour. Since one's demand for power generally changes during the day and the week (and by season) we can expect the average price to also change with time and use (unless controlled by other factors, discussed below). As a result, load profile shapes (i.e., a graph of power versus time) will influence pricing, with flatter profiles generally having a lower average cost. Utilities generally typify such patterns via load factor, defined as average demand divided by peak demand. A high load factor would indicate a flattened profile while low load factors would occur where a peak demand is relatively brief, and is surrounded by much lower demand during the rest of the day. While the demand for power in most non-industrial buildings varies with time, it usually does so in predictable patterns. Knowing the shape of your typical daily load profile can often reveal ways to cut the present and future cost—and price—of power, while also helping your power supplier offer the best and most secure pricing.

Like Sprint's "dime-a-minute" long distance rate, marketers will likely offer highly simplified rates that smooth out such time-based price variations, but subscribing to such options is unlikely to yield the lowest average power costs. Rates that vary widely over time may provide the lowest average price, and techniques that cut, level, or shift peak demand will help reduce those prices.

Transmission, Generation, and Natural Gas Options

In some areas, peak loads exceed transmission capacity many hours each year. When low-cost power can't be brought in, prices could be bid up to the highest local generating costs. A good example of such constraints appeared during the early hot spell of June 1997 in the PJM (Pennsylvania-New Jersey-Maryland) power pool. While daily bulk wholesale generation prices (which make up 30% to 60% of most bills) generally don't vary from one end of the pool to another by more than \$.01/kWh, June saw *variations exceeding \$.13/kWh* when transmission constraints blocked cheap power from reaching high-cost areas¹.

In some urban areas with older power systems (such as New York and San Diego), transmission constraints could yield similar results. Such areas with constraints are sometimes called "load pockets" during the period of constraint (which may exceed 1000 hours a year). In the United Kingdom, which uses a national power pool supplied by deregulated generators, power suppliers have also found ways to "game" the system to purposely congest transmission, thereby driving up the price of their product².

To address such possibilities, some energy marketers have begun promoting new local generation (or cogeneration) facilities, either at customer-owned sites or through re-powering of obsolete utility plants inside the load pockets. Natural gas generators with very low emission levels have become quite cost-competitive for both peak shaving and as base load power, opening the door to competition during transmission constraints. Similarly, a variety of technologies (discussed below) exist to reinforce existing transmission systems. A recent study³ found that a small investment toward improving transmission capacity on one major power line in California could have a major impact on limiting summer power prices.

Substituting natural gas for electricity during peak pricing periods can also impact power prices. A variety of technologies exist for using gas to directly provide horsepower, cooling, air compression and other power-intensive needs. Such convertibility will create truly interruptible energy rates, allowing clever end users to contract for both interruptible gas and power, attaining the lowest possible energy prices. Under these circumstances, transmission, generation, and natural gas options will compete with each other, driving all prices down over time.

Load shaping, Financing, and User Technologies

A variety of choices are emerging to shape loads in advantageous ways. While most have been around for some time, deregulation will allow

marketers to help end users gather—and isolate—their loads more readily through metering and contractual means. In the end, there is little (if any) impact on the service (e.g., chilled water) supplied. Instead, each of these options reshapes loads (as portrayed to utilities and regulators) without major alterations to end user facilities.

Load Shaping

Coincident metering often cuts the average cost for power at facilities when many meters on different accounts serve one customer. At Columbia University in New York, for example, gradual expansion without attention to energy costs resulted in one property having several dozen accounts and meters. Each account peaked at a different time, but (due to tariff construction) peak demand charges were treated as though all buildings had peaked at the same time. By combining the accounts under one master demand meter, the average cost of power was cut by over 10%. Such combination will become easier under deregulation as usage (for the power commodity, as versus transmission and distribution) can be contracted under one account.

Load isolation, while not favored by utilities, can allow an end user to segregate loads with poor load factors (such as electric chillers) that would be cheaper under utility tariff-based power than under market-based power, thereby reducing the average cost for all loads.

Demand cooperatives (promoted by Planergy, Inc.⁴) are a way for end users to work together (typically through an organizing vendor) to obtain lower utility rates by pooling interruptible loads and agreeing to curtail them when requested by the utility. Creating such a cooperative distributes the need for interruption so that only a few loads are interrupted at any one time, but all participants gain some benefit.

District-wide systems serve multiple customers with (for example) chilled water from a central facility that, in effect, transfers many individual electric chiller loads (with low load factor) to a high load factor central facility that uses both electric and gas-driven units to minimize total cooling costs. Existing chillers may remain, but are either bypassed or cycled through a connection to a common chilled water loop serving numerous facilities.

Bill consolidation allows many accounts held by one customer to be gathered for both coincident metering and attainment of cheaper energy block load rates previously beyond any one account.

Aggregation involves the gathering of different customer accounts

through a third party for purposes of bulk power purchasing, coincident metering, bill consolidation, transmission capacity reservation, and expert load analysis. Aggregators work along the same lines as MCI, buying co-ops, credit card handlers, and other organizations that compete for the privilege of bringing many end users together. All provide lower prices through bulk purchasing and handling. Present-day utility customers are, in effect, already “aggregated” into rate classes, but only to the point of developing a rate based on an assumed typical load profile.

Financial Tools

In similar ways, various financial tools exist that can often cut or levelize costs more readily than engineering solutions. Both marketers and financial firms are providing access to financing that ensures prices do not vary beyond predetermined levels. To take advantage of these opportunities, end users need to understand the following basic concepts:

- Electric futures (available on the West coast, and soon in many Eastern areas) are traceable contracts for monthly blocks of firm power, purchased in advance of need, that will later be provided during normal business hours at a predetermined price. They are, in effect, promises for supplies of power, though there is not necessarily a guarantee of delivery unless accompanied by a secure transmission arrangement.
- Options (typically in the form of “calls” and “puts”) are contracts between suppliers and marketers (and thus end users) that allow a user of power to know that he can “call” for power and be ensured supply, or that a seller of power can be ensured a buyer when he “puts” out an offer to sell, both at pre-determined prices.
- Payment plans and weather insurance have been offered to low-income customers by utilities for years. Now, however, marketers are ensuring levelized (or pre-determined) monthly bills (not just pricing) through risk management techniques that involve financial and load analysis tools. While some monthly bills may be higher than in prior years, other months will be lower, and the annual total will be confined to a narrow range. Such plans are often complicated, requiring careful analysis.

- Tolling allows an end user (or his designee) to provide a generator with boiler fuel (typically natural gas) in trade for electricity at negotiated, non-tariff, rates. This process is common among power marketers also trading natural gas, and is used at times that utilities have excess generating capacity that can provide power into another utility's territory.

For a more complete discussion of energy risk management tools, readers are referred to <http://www.powermarketers.com>, the Web site of the Power Marketers Association.

User Technologies

While all of these options provide end users with choices for controlling energy pricing, their impact can often be maximized when used in conjunction with new technologies. Just as we have seen an explosion of choice in communications, the future will see a variety of ways to create, store, and manage power. Many are already being offered, or are in the prototype stages of development.

Metering. Marketers are using more sophisticated power metering as a sales tool to ensure that their clients' power costs are minimized. The new standard in metering involves wireless communications, and automatic hourly, quarter-hourly, or real-time monitoring. Human meter readers, obsolete for many years, are disappearing as these cost-effective systems are installed. Such systems allow better load control, more accurate power nominations, better pricing and a reduction in theft and tampering (a major problem at the residential and small commercial level).

Software

Computerized building simulations and load analyses have taken on new prominence as tools for predicting and flattening load profiles. Analyzing short intervals (1/4 hour) has become essential to maximize savings through tighter load control and on-site power supplies. Names and acronyms such as PEDDA, RBOSS, and PowerManager are being heard as marketers offer new services to cut electric bills and power pricing.

Energy Management Systems (EMS)

As responding to real-time or market-based pricing signals becomes a common way to attain savings, an EMS takes on new importance for controlling variable loads, such as fans, pumps, DHW heaters

and chillers. When tied into the metering and software tools mentioned above, the load managing power of an EMS can be greatly enhanced.

Power Storage Devices

While many power practitioners and regulators continue to assume that power cannot be cost-effectively stored, flywheel power storage units are now in use as uninterruptible power systems (UPS) to supply “clean” power, and small (2 kWh) units act as backup power for cable TV systems. Larger units (over 12 kWh) are being prototyped as peak shifters/shavers for buildings. Chemical battery technology has advanced considerably, and will also play a part. A storage system that gets “filled” with cheap off-peak power at night (when there are no transmission constraints) and “empties” to flatten peak loads during the day, could be an instant moneymaker for a smart marketer and/or end user.

Distributed Generation

The ability to generate power in a pinch has always been useful. New small (C100 kilowatt) modular gas-fired turbine generators⁵ can also cut billing for peak demand by operating in parallel with utility power, or (to avoid backup charges) by feeding dedicated loads. Using ceramics and few moving parts, the low emissions of these devices create an intriguing option, while natural gas fuel cells with extremely low emissions have already racked up an impressive operating record. Once prices on these devices come down, watch marketers and end users grab them up to minimize stranded cost payments. Smart utilities may also invest in them to minimize transmission constraints and/or provide competitively priced localized power during such constraints.

Transmission and Distribution (T&D) Networks

Since market-based power is cheap only when transmission is available to move it, pressure for new or more robust transmission will increase as large price differentials between adjacent areas become visible. Thyristor-based switching of high-voltage loads on T&D systems can raise the effective capacity of existing transmission lines. Such options are among a family of Flexible AC Transmission System (FACTS) improvements under development or deployment. Even new types of underground high-voltage cables⁶, designed for use in transmission-constrained urban areas, are being rolled out to meet the expected demand for beefed-up transmission.

Gas-Powered Motor Drives. Natural gas-driven devices, such as gas engine-powered air compressors and chillers, have replaced electric motor-driven units in industrial and commercial facilities, cutting their peak demand.

Advanced HVAC Systems. Chemical desiccants dehumidify outside air using natural gas, thereby cutting peak electric chiller loads. This process is already common in new buildings with large outside air loads (e.g., hospitals) and industrial processes (such as air compression). For smaller facilities configured around rooftop units, Entergy has been offering a super-high-efficiency replacement unit which takes advantage of several refrigeration engineering innovations⁷.

Many other options are either in the queue or already being sold. Try to imagine what the “fax machine” or “cell phone” of tomorrow’s power industry will look like. As we have seen in other industries, the combination of several new technologies often results in devices few of us could have imagined only a few years ago.

Who Offers these Options?

Accompanying the profusion of technical choices is an ever more bewildering expansion of vendor choices. Even as merger/acquisition mania creates new firms out of old ones, most energy services providers (ESP’s) continue to fall into a few distinct groups.

- Unregulated utility subsidiaries: e.g., Cinergy, Southern Electric Corp.
- Independent power providers: e.g., Sithe Energies, Calpine Inc.
- Mega-wholesalers: e.g., Enron, Duke Energy
- Equipment vendors: e.g., Johnson Controls, Honeywell
- Gas marketers: e.g., Eastern Energy Marketing, Colonial Energy
- Existing ESCOs: e.g., Xenergy, EUA Cogenex
- Agaregators: e.g., New Energy Ventures, Wheeled Electric Power Co.
- Financial firms: e.g., Goldman-Sachs, Merrill Lynch

And, of course, local utility distribution companies (UDCs) are also trying to retain their load, despite claims that they are becoming neutral deliverers of others’ power and gas.

The College of Power Knowledge

How does one cope with this continuously changing panorama? Fortunately, both the advancing energy industry and other innovations are

providing some of the means to do so.

Getting Up to Speed. There's no need to enroll in college (none of them teach this stuff anyway). Start by learning the "lingo" and concepts. Most PUC's provide readable summaries of their decisions (both on paper and on their Web pages), and a variety of newsletters and free magazines are available to keep abreast of the latest changes (see appendix 1 for a list). Computer-savvy managers can "surf" informative Internet sites for even quicker access (see appendix 2 for another list).

Attending a conference focused on competitive energy issues can be very helpful to get your questions answered (see appendix 3 for a list of seminar providers). Such events are also a good way to make useful contacts. Be sure the event you would like to attend is not geared mainly for marketers, however, or you may end up both disappointed and confused. Local trade associations often sponsor panel discussions on deregulation issues, or are open to holding them if interest is expressed by their members.

Speeding Up the Process. You may already belong to a trade or professional organization that is (or could be) taking action toward deregulation. Several local BOMA (Building Owner's and Manager's Association) chapters, for example, are already actively pursuing power issues. To properly represent your company's interests, membership in a customer group—or working through an energy "partner"—(i.e., a consultant or marketer) involved in rate proceedings can also be of great value. Your PUC can provide lists of groups that have intervened in deregulation proceedings. On the national level, ELCON (Electricity Consumers Resource Council, in Washington, DC) represents many large industrial firms, and is a good resource for user-friendly information.

But all the preparation in the world does no good unless your PUC or state legislature acts on this issue. Experience has shown only intervention in the process can move that process in the right direction. While the better marketers are already involved (and those that aren't don't deserve your business), customer input is essential to ensure acceptable results.

Waiting on the sidelines for "the other guy," or the PUC, to release you from your utility's grip will only prolong the present situation. Trusting your utility to do the right thing (by reducing its profit margins, selling off its assets, cutting its staff and perks) is naive: no industry has ever done so without the push of competition. Watching others bear the cost of interventions, while you reap the benefits, might give you a free ride on others' success, but experience shows that utilities use that apathy by dragging out proceedings long enough to exhaust opponents' financial resources.

You can help make the right changes happen by supporting interventions into the regulatory process. When energy users financially sustain such actions (directly, through a group, or with an energy partner), the contribution needed from each is small compared to the value of quickening competition: the payback period of such efforts is typically measured in *weeks*, not years. Participating in such efforts will also help you grasp the opportunities to come. Those who do will reap the benefits of that knowledge, for both their facilities and their careers!

APPENDIX 1 - free magazines focusing on the competitive utility marketplace (request subscription card)

Energy Buyer
Christine Strobel, editor
Infocast, Inc.
13715 Burbank Blvd.
Sherman Oaks CA 91401
ph: 818-902-5400
fx: 818-902-5401

MegaWatt Markets
Randy Rischard, managing editor
Pasha Publications
1616 Ft. Meyer Drive Suite 1000
Arlington VA 22209
ph: 703-816-8626
fx: 703-528-4296

PowerValue
Greg Porter, publisher
Intertec International Inc.
2472 Eastman Avenue, Bldg. 33
Ventura CA 93003
ph: 805-650-7070
fx: 805-650-7054

APPENDIX 2 - Web sites addressing deregulation issues

Strategic Energy Ltd. (best site for state updates)
<http://www.sel.com>

Direct Access Working Group Workshops (California dereg issues)
<http://162.15.5.2/wk-group/dai/>

Welcome to Convergence Research (general electric industry)
<http://www.converger.com/>

NYMEX Electricity Financial Tools (helps to understand futures and other instruments)
<http://www.nymex.com/contract/electric/intro.html>

The MCGI Home Page (good links and other data)

<http://www.mcgi.com/>

Electric Restructuring in California (Calif. PUC electric deregpage)

<http://www.cpuc.ca.gov/elec.shtml>

Newspage for Retail Wheeling (just what it says)

<http://www.newspage.com/NEWSPAGE/cgi-bin/walk.cgi/NEWSPAGE/info/d13/d4/d10/>

Electric Utility Information (good links and other data)

<http://home.ptd.net/~sjrubin/electric.htm>

NARUC Home Page (Natl. Assoc. of Regulatory Utility Comm.)

<http://www.erols.com/naruc/>

The Utility Connection (good links and other data)

<http://www.magicnet.net/~metzler/index.html>

Energy Central Home Page (headlines and synopses of the day's energy news)

<http://209.31.214.202/EC/MAIN.CFM>

The National Council on Competition and the Electric Industry (group information)

<http://www.erols.com/naruc/ncei.htm>

Utility Deregulation Project (from the Minnesota renewable energy perspective)

<http://www.me3.org/projects/dereg/>

The Power Marketing Association (day's news and other information)

<http://www.powermarketers.com/main.htm>

New York State Public Service Commission (just what it says)

<http://www.dps.state.ny.us/>

misc.industry.utilities.electric Web Site (good links and other data)

<http://www.digiserve.com/cpreecs/miue/>

The Electric Utility WWW Resource List (good links and other data)

<http://sashimi.wwa.com/~merbland/utility/utility.html>

Energy OnLine (LCG Consulting Corp., news and other data)

<http://www.energyonline.com/>

Gridwatch.com Global Power Directory (formerly "Energy Yellow Pages")

<http://www.gridwatch.com/>

GEM: Global Energy Marketplace (formerly "Virtual Library: Energy")

<http://gem.crest.org/>

Power Providers (electric service upgrades in West coast areas)

<http://www.powerproviders.com/>

Electricity OnLine (news and other data)

<http://www.electricity-online.com/>

PEAR's Electric Intelligence: Insights on Competition (subscription newsletter)

<http://www.peartree.com>

LEAP Letter (paid newsletter on restructuring)

<http://www.spratley.coin/leap>

New Energy Ventures (NEV) (major aggregator's site)

<http://www.newenergy.com>

California Energy Institute (publications page) (good technical treatises on dereg)

<http://www-path.eecs.berkeley.edu/%7Eucenergy/>

Cons. Energy Cncl. Restructuring Forum (dereg from alternate energy advocate's view)

<http://www.cecarrf.org/restructuring/>

ElectricRates Home Page (good source of load profiles and other data)

<http://www.electricrates.com/>

"Access Energy"—The California Energy Commission (CEC) (technical energy group)

<http://www.energy.cat.gov/>

Automated Power Exchange - We make electricity...(private power exchange)

<http://www.energy-exchange.com/>

PowerValue Online Magazine - Articles (good free magazine covering competition issues)

<http://www.powervalue.com/articles.html>

Public Utility Home Page (good links and other data)

<http://home.ptd.net/~sjrubin/pubutil.htm>

Energy and Environmental News (good links to publications covering dereg, energy issues)

<http://www.serve.com/commonpurpose/news.html>

PJM OASIS Home Page (see an ISO in action at no charge)

<http://oasis1.pjm.com/index.html>

Electricrates MLM/Deregulation Forum (chat room for small time power selling schemes)

<http://www.electricrates.com/drforum/drboard.htm>

Comparison of "Green" Power Products (just what it says)

http://www.edf.org/programs/energy/green_power/c_providers.html

<p>Yahoo Utility News (generic news source) http://biz.yahoo.com/news/utilities.html</p>	<p>UtilityGuide Information Network for Electricity Users http://www.utilityguide.com/body_index.htm</p>
<p>Continental Power Exchange (another private power exchange) http://www.cpex.com</p>	<p>ElectricityChoice http://www.electricitychoice.com/default2.htm</p>
<p>Talkpower (mostly electric utility distribution discussions, but some good scuttlebutt) http://www.talkpower.com/</p>	<p>California Independent System Operator (ISO) http://oasis.caiso.com/iso/isolnk/splashhouses.html</p>
<p>California Competition Network (marketers trying to improve markets methods, rules) http://www.gcnet.org</p>	<p>Energyworld - The global business site for electric power and energy producers http://www.energyworld.com/</p>
<p>FacilitiesNet Deregulation Forum http://www.facilitiesnet.com/forums/cgi/get/deregulation.html</p>	<p>New York Power Pool http://www.nypowerpool.com/</p>
<p>FacilitiesNet Energy Forum http://www.facilitiesnet.com/forums/cgi/get/energy/html</p>	<p>New Energy Ventures (customer services site) http://www.nevservice.com/</p>
	<p>California Power Exchange (CAPX) http://www.calpx.com/</p>

A useful bulletin board that discusses these issues can be accessed by logging on to: manager@aesp.org and entering SUBSCRIBE AESP-NET. You will then automatically receive e-mail covering a variety of energy issues, deregulation being one of them.

A bulletin board focusing on developments in California from an "insider's" viewpoint is DAWGNET. DAWG is an acronym for Direct Access Working Group, which consists of people (mostly energy and services vendors) directly involved in making deregulation work from a nuts-and bolts standpoint. Access by sending e-mail to dawg-net@uspi.org and entering SUBSCRIBE in the body copy. See also their web site (second one down on the above list) to update this information should it not be correct at this time.

APPENDIX 3 - alphabetical list of seminar providers

AIC Conferences

50 Broad Street, 19th Fl.

New York, NY 10004

212-952-1899

fx: 212-248-7374

<http://www.aic-usa.com>

Yalmaz Siddiqui

All Utilities Auditing Co. (a/k/a

Electricity Infosource)

3130 So. Harbor Blvd., Ste.

370 Santa Ana, CA 92704

714-432-0100

fx: 714-432-8805

<http://www.all-utilities.com>

AUACO@aol.com (Richard

Strauss)

American Assoc. of Utility Market-
ing Executives

P.O. Box 8770

Emeryville, CA 94662-8770

510-450-1815

fx: 510-655-7887

barbarap@aaume.com

(Barbara Pereira)

www.aaume.com

American Business Symposiums

60 Webster Road, Suite 300

Weston, MA 02193

617-736-0800

fx: 617-736-0844

Association of Energy Engineers

4025 Pleasantdale Rd. Suite 420

Atlanta GA 30340

770-447-5083 X223

fx: 770-381-9865

www.aeecenter.org

Camber Corporation (DOE contrac-
tor)

601 13th St., NW, Suite 350

North Washington, DC 20005

202-737-1911

fx: 202-628-8498

Center for Business Intelligence

70 Blanchard Road, Suite 4800

Burlington MA 01803

800-767-9499

fx: 617-270-6216

registrar@cbinet.com

Chartwell, Inc.

1900 Emery Street, Suite 332

Atlanta GA 30318

800-432-5879

fx: 404-352-8016

utilityinfo@chartwellinc.com

Clemson University

Office of Professional Development

P.O. Box 912

Clemson, SC 29633-0912

864-656-2200

fx: 864-656-0938

Amy Wright

Economics Resource Group

1 Mifflin Place

Cambridge, MA 02138

617-491 -4900

fx: 617-576-3514

Electric Consumers Resource
Council (ELCON)
1333 H St., NW, The West Tower,
8th floor
Washington, DC 20005
202-682-1390
fx: 202-289-6370
John Anderson

Enerdata Ltd.
Suite 304, 100 Allstate Pkwy.
Markham, Ontario, CANADA L3R
6H3
905-479-2515
fx: 905-470-0117
www.enerdata.com

Energy Expo, Inc.
5 Lewis Lane
Chester NJ 07930
908-879-8351
fx. 908-879-8371
www.energyexpo.org

Energy News Data
117 Mercer Street
Seattle, WA 98119
206-285-4848
fx: 206-281-8035
newsdata@newsdata.com
www.newsdata.com/enernet

Energy Institute (Energy Seminars,
Inc.)
2001 Holcombe Blvd., Suite 806
Houston, TX 77030-4214
888-353-7451
fx: 713-797-0144
nrginst@aol.com
Joshua Schwager (202-986-6746)
www.obnm.com/
theenergyinstitute

Energy User News (Chilton Company)
Mike Randazzo, managing editor
201 King of Prussia Road
Radnor PA 19089
610-964-4223
fx: 610-964-4647
mrandazz@chilton.net
www.energyusernews.com

E-Source
1033 Walnut Street
Boulder, CO 80302-5114
303-440-8500
fx: 303-440-8502
ndoty@esource.com (Nancy Doty)
www.esource.com

Exnet
c/o The Management Exchange
123 East 54 St., Suite 4C
New York, NY 10022
212-371 -8320
fx: 212-371 -8325
exnet@erols.com
www.exnet.net

GDS Associates
Suite 720, 1850 Parkway Place
Marietta, GA 30067
770-425-8100
Betty Reiber

Infocast
13715 Burbank Blvd.
Sherman Oaks CA 91401
818-902-5400 X22
fx: 818-902-5401
103116.625@compuserve.com (Jim
Naphas)

Insight Information Inc.
55 University Ave., Suite 1700
Toronto Ontario M5J 2V6
CANADA
416-777-1242
fx: 416-777-1292

King Publishing Group
627 National Press Bldg.
Washington DC 20045
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Footnotes

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