



Delivering Energy Services to Internet Hotels and Other High-Density Electronic Loads

What do data centers, colocation facilities, server farms, Internet hotels, and fiber nodes have in common? They're all big boxes filled with computers, hard drives, switches, routers, and rectifiers, designed to store and channel digital information. We call them "high-density electronic loads," or HiDELs for short, and they have four intriguing characteristics:

- Highly dense power requirements. HiDELs typically feature power loads ranging from 100 to 200 watts per square foot, but we're aware of several facilities under construction that will have a connected capacity of 300 watts per square foot. That's nearly 60 times the average peak demand for the commercial building sector in the United States. Just half a dozen HiDELs in one small area near a shopping mall requested 445 megawatts of power—about as much as would typically be needed to power six oil refineries. And one utility in the Pacific Northwest reported that when three new data centers open in its service territory, their combined load will constitute an 11 percent increase over all the power the utility provided during the previous year.
- Extremely high load factors. For these facilities, load factors are reportedly in the range of 80 to 90 percent.
- High sensitivity to power supply disturbances. These facilities face huge losses if they go down due to surges, sags, or outages. Nearly all HiDELs are equipped with extensive on-site electric storage and backup generation systems.
- Rapid growth. The HiDEL developers we have spoken with are putting these facilities up as fast as they can. Qwest plans to triple the server farm real estate it currently has, jumping from 500,000 to 1.5 million square feet over the course of a single year. Inflow, one of the largest providers of colocation facilities, plans to more than double its capabilities in the coming year. And these facilities seem to be widely dispersed, popping up near nodes in the fiber-optic network.

Do HiDELs sound like perfect candidates for a wide variety of services and products offered by energy service providers (ESPs)? Maybe, but there's trouble in paradise. To quench HiDELs' incredible thirst for power, ESPs will likely spend billions of dollars over the next few decades installing generation, transmission, and distribution infrastructure. But HiDELs are so new that no one knows whether they're here to stay. Could they turn out to be another short-term technological blip, leaving the high-tech scene as quickly as other formerly hot dot-com innovations? Many utilities are wondering whether they'll recoup their investments or be left holding the bag.

"Officials at Puget Sound Energy . . . said that since January Internet infrastructure companies have requested 700 megawatts of new power—all of it for data centers. The new load will increase the average demand by 25 percent."

*Interactive Week
October 23, 2000*

"Puget Sound Energy . . . asked the Washington Utilities and Transportation Commission to accept a tariff on new data centers. The tariff is designed to protect the company's existing customers from footing the bill for new base stations necessary to support the projects. Those stations could cost as much as \$20 million each."

*Seattle Post-Intelligencer
September 5, 2000*

Study Objectives

As part of our continuing effort to help ESPs make the most of the opportunities presented by the new information economy, we are undertaking a study aimed at answering these central questions:

- What are the advantages and disadvantages of having HiDEL customers?
- What can ESPs do to attract more HiDELS as customers, and what products and services do they most want?
- What can ESPs do to manage those HiDEL customers that are likely to be unprofitable?

Scope of Study

We plan to interview HiDEL industry leaders and laggards, as well as representatives from the first ESPs that serve them, measure power consumption in typical facilities, conduct in-depth research, perform profitability analyses, and investigate technological trends that are likely to have a bearing on this industry's future. The topics we'll cover include:

Structure of the HiDEL Industry

There are probably only about 100 companies in the U.S. currently developing HiDELS. They include such high-profile firms as MCI Worldcom, Sprint, Level III, Qwest, IBM, and AT&T, but there are also many small, one-site shops. What are the market demographics of the HiDEL industry? Who are the key decision-makers? What are their business models? What sorts of electronic equipment do they operate? What other systems, besides electronics, do they typically invest in, including buildings, air conditioning, humidification, power integrity protection, and security?

Doing Business with HiDELS

A key challenge for ESPs doing business with HiDELS is responding to these customers' demands in Internet time. In a few well-known cases, HiDELS that planned to be online in 6 months were informed by their providers that it would take 18 months to design, purchase, and install the necessary electric power infrastructure. What are HiDELS' actual power requirements—in terms of both quantity and quality? What are the results of E SOURCE's HiDEL profitability analyses? What products and services do HiDELS

want to purchase from ESPs? How much are they willing to pay? What marketing messages do they respond to? What tools will help ESPs effectively attract HiDELS and deliver products and services to them? What techniques, such as innovative rate structures, can ESPs use to manage HiDELS that are likely to be unprofitable?

Helping HiDELS with Power Integrity Infrastructure

Most of the HiDELS we're aware of use relatively conventional systems to protect against power disturbances. What other technologies might be more effective? What additional power integrity services, such as monitoring and analysis, might ESPs offer to HiDELS? What infrastructure upgrades, such as power parks and T&D hardening, could ESPs implement to deliver premium power to HiDELS? What other mechanisms might ESPs use to deliver power integrity products and services to HiDELS?

Forecasting the Future

The best approach to serving HiDELS depends on how they'll evolve in the future. How long will telecommunications and Internet infrastructure create a compelling need for HiDELS? How might data be stored and channeled under different scenarios of telecommunication industry development? What new ultra-low-power computing technologies are being spurred by the rise of handheld Internet devices, and how might these technologies change the computer and Internet servers market? How would these new technologies alter future HiDEL loads?

Deliverables

- An interactive summit to be held in March 2001 in the Boulder-Denver high-tech corridor. Study subscribers will be able to send two attendees to this event. Featured speakers will include energy managers, developers, information technology experts, ESP executives, and of course, E SOURCE staff, who will present our preliminary findings. Subscribers will have ample opportunity to discuss the research methodology with project leaders and may possibly be able to tour a HiDEL facility.
- Four reports, delivered every two months, starting in March 2001 and ending in September 2001. Subscribers will receive two printed copies of each report and will have unlimited access to download additional copies from the study's exclusive Web site.

Subscriptions

In addition to receiving special introductory pricing, those who subscribe to the study before January 15 will be able to participate in preliminary discussions about the focus of the

research. If a minimum number of subscriptions have not been received by January 31, 2000, the schedule and the deliverables may be adjusted accordingly.

Project Team

Jay Stein, E SOURCE Director of Technology Assessment, will lead the team working on "Delivering Energy Services to Internet Hotels and Other High-Density Electronic Loads." Director of the E SOURCE *Emerging Technology Series*, Jay leads all of our research on energy end-use technologies. He directed the earlier E SOURCE *Multi-Client Study*, "Delivering Energy Services to Semiconductor and Related High-Tech Industries." Other team members will include:

Doug Nordham, Executive Consultant, E SOURCE Consulting Group

John Egan, Director, E SOURCE Strategic and Marketing Issues

Ira Krepchin, Research Manager, E SOURCE Technology Assessment Group

Charlotte Otero-Goodwin, Research Manager, E SOURCE *Power Quality Series*

Plus a team of HiDEL industry experts from Qwest, Inflow, and CreekPath Systems

For More Information

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