Converting Distributed Energy Prospects Into Customers

Primen's 2003 Distributed Energy Market Study

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About Primen

Primen is an independent information services company created to meet the needs of the rapidly evolving retail energy industry. Primen's in-depth research and advisory services are enhanced by a comprehensive, proprietary data warehouse and by web-based analytical tools that allow clients to obtain customized intelligence for their particular business challenges.

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Executive Summary

After shrinking dramatically in 2002, the market for distributed energy (DE) apparently hit bottom and began to rebound in 2003. For energy users in the 100 kW to 10 MW size range, 13% can be considered DE prospects on the basis of their stated likelihood of acquiring a DE system.

Extrapolating our results indicates that there are more than 12,000 North American energy users in the 100 kW to 10 MW size range that are strong prospects for DE — that is, companies that are exploring their DE options and rate themselves as having a likelihood of 50% or greater for adopting a DE solution in the next two years.

But the question remains: how to convert these prospects into DE buyers? Primen conducted 100 in-depth interviews to explore how and why energy users make decisions about DE. The picture that came out of those interviews — as well as the 806-sample quantitative survey used to supplement our research — includes both intuitive and counter-intuitive findings that confirm the challenges DE service providers face when trying to close a DE sale.

Prospective DE customers list their top three drivers for DE as energy cost savings, improved power reliability, and predictable energy prices. But while realizing these three benefits may be necessary conditions, they alone will not convert a DE prospect to a DE customer. Energy users cite other areas of concern — including service warranties, service agreements, environmental permitting, and natural gas price concerns — that need to be addressed before they'll sign on the dotted line and commit to a project.

Even though prospective DE adopters are looking for strong service agreements and warranties to guarantee the savings and reliability gains promised by DE vendors, they also want to retain control over the equipment. Few users are interested in comprehensive energy service arrangements that include DE.

Similarly, though natural gas remains the preferred fuel for prospective DE projects, and spark-ignition engines the preferred prime mover technology, most users are very concerned about rising and volatile natural gas prices. And energy users view the three main providers of DE sales and services — manufacturers, utilities, and third-party providers — with caution, as all have their detractors and credibility gaps to overcome.

When it comes to targeting decision makers for project approval, we found that no one functional position makes the DE decision. Rather, companies typically use a team approach, which leads to a lengthy and time-consuming sales process and requires preparing different arguments for different stakeholders.

Despite substantial interest among energy users, DE remains a tough sell. But understanding what energy users want from DE and their service providers will go a long way toward converting a prospect into a customer.

The Main Points

- The "bottom line" on selling DE systems is just that — the bottom line. Saving on energy costs is the primary driver of interest in onsite generation. Proposed projects must demonstrate clear economic advantages to be seriously considered, whether for peak shaving, baseload, or cogeneration (combined heat and power, CHP). Conversely, doubts about achieving savings are the largest factor behind customer resistance to purchasing DE systems.

- The second, and lesser, benefit of onsite generation is improving power reliability. For businesses whose operations are highly sensitive to power disturbances, the costs accrued from damaged equipment and lost production can outweigh the costs associated with DE systems. Reinforcing a potential customer's awareness of how outages affect their business may convert a prospect into a sale.

- After shrinking dramatically in 2002, the DE market apparently hit bottom and began to rebound in 2003. A sample of selected energy users sized between 300 kW and 5 MW indicates that a growing number, compared with 2002, were actively considering their DE options.

- No one functional position within a company can be targeted for making (or breaking) a DE acquisition decision. Rather, a wide array of people are involved, often using a team approach. Moreover, the number of voices in the decision-making process appears to grow as the process moves forward.

- Energy users who are leasing their buildings or under operating uncertainty (anticipating an acquisition, merger, or restructuring) are poor candidates for DE system purchases. On the other hand, users who are expanding or relocating facilities are good candidates.

- Companies with obsolete or failing boilers, chillers, heating systems, or generators are strong candidates for acquiring DE systems. The incremental

capital outlay for onsite generation looks much more reasonable for users who need to replace central plant systems anyway. In fact, many interviewees that had recently installed DE systems had done so as part of replacing aging central plant equipment.

- Expensive electric service failures, such as the Northeast Blackout of August 2003 and Hurricane Isabel in September 2003, represent "moments of opportunity" for closing DE deals, though acquisitions under such duress appear to be mainly standby applications, and not baseload systems. Also, these opportunities have historically been time limited, as their effects attenuated over time. Market crises, like the power shortages of the California energy crisis, have a similar effect.

- Companies want strong service agreements and warranties to guarantee the savings and reliability gains promised by DE vendors. Most energy users want their DE provider to allow them to take over care of their system, but still want assurances that the equipment will operate as promised. Interest in comprehensive energy services is fairly narrow.

- Energy users now considering DE projects express more concern regarding barriers posed by environmental permitting than energy users who installed DE projects in the recent past. This might reflect a real increase in difficulty obtaining permits, or it might only be an expectation energy users have. Regardless, helping energy users successfully navigate the reefs of environmental permitting is a key point of sales conversion.

- Energy users are concerned about the rising and volatile price of natural gas and are pessimistic about future gas prices. DE providers can alleviate this concern by emphasizing more attractive long-term natural gas price predictions by expert agencies and the links between natural gas and electricity prices. Another option would be offering price guarantees. Even though concerns about its price are high, natural gas is still the preferred fuel for those contemplating an onsite system.

- When it comes to providing DE equipment or services for that equipment, utilities are not considered as credible as manufacturers or third-party project developers. Energy users have doubts about utilities' competing against themselves by providing both electricity and independent generation. They also view utilities as slower moving and less innovative.

- Energy users view manufacturers as responding to strong competitive pressures, impelling them to continually improve their systems. However, a manufacturer's credibility is reduced to the extent that they promote their single proprietary line of products.

- Energy users perceive third-party developers as agile and customer-oriented, but less credible than manufacturers.

Introduction

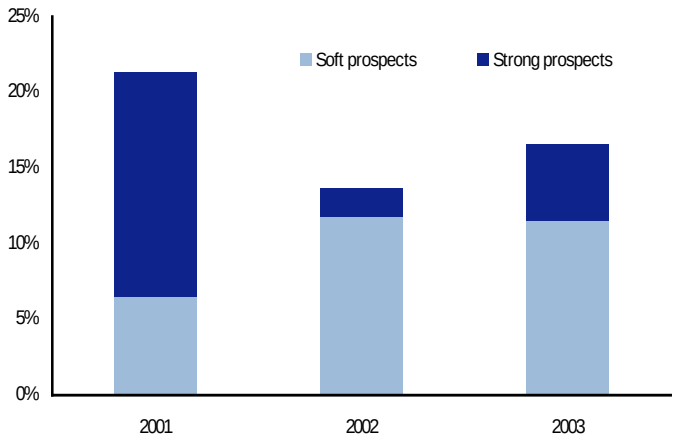
For this report, Primen interviewed 100 managers and executives at companies that either have existing distributed energy (DE) systems or a strong interest in acquiring such systems. Our principal aim was to discover which sales levers convert DE sales prospects to DE buyers. Who really makes DE purchase decisions? What specific aspects of the technology, sales/service agreement, and utility interface can make or break a deal?

We also provide summary findings from an 806-sample quantitative survey to create a snapshot on the status of the DE marketplace and its continued evolution.

2003 market snapshot: DE on the rebound

One significant finding is that after shrinking dramatically in 2002, the DE market has apparently hit bottom and began to rebound in 2003. **Figure 1** provides a snapshot of how the DE market appears to be recovering among selected energy user types in the 300 kW to 5 MW demand range. This rebound is specifically apparent for strong prospects (interviewees who stated their probability of acquiring grid-alternative DE in the next two years is greater than 50% and who are currently evaluating DE options). The number of soft prospects (interviewees who also have a stated probability greater than 50% of acquiring grid-alternative DE in the next two years, but who are not yet proactive in exploring their DE options) remains flat. Still, this evidence should prove heartening to companies that have patiently awaited a return to growing DE markets during the past two years.

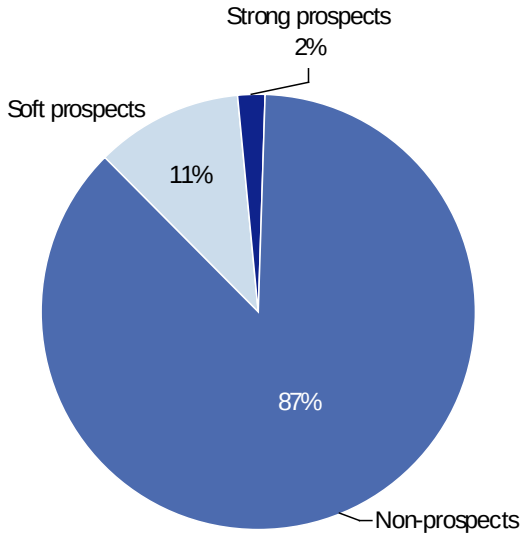
Figure 1. Changes in DE receptivity (selected users with a demand of 300 kW to 5 MW)



When we compare this year's data with the 2002 data — looking only at those sectors and customer sizes that were included in both years — we find a marginally significant increase in strong prospects, from 2% to 5%, meaning that receptivity to baseload DE has increased slightly in the past year.

More broadly, in looking at this year's interviewees, who include business and institutional energy users in the 100 kW to 10 MW size range, 13% can be considered DE prospects on the basis of their stated likelihood of acquiring a DE system. The vast majority (11%) are soft prospects, while the remaining 2% are strong prospects. (See **Figure 2**.) Even though these percentages are the same overall percentages that we observed in 2002, this year's findings come from a much broader group of industries and customer sizes. In 2002, our focus was on specific segments that have traditionally been leaders in adopting and investigating DE options, sized between 300 kW and 10 MW. In 2003, we included nearly all business types in the survey, as well as users down to 10 kW in average demand. This finding provides another indicator that interest in adopting DE appears to be rising.

Figure 2. Relative number of DE prospects (100 kW to 10 MW



Overall, 13% of the business establishments we surveyed this year say their likelihood of acquiring baseload DE in the next two years is greater than 50%. Within this 13%, however, are two distinct categories of prospects: strong and soft. **Strong prospects**, which totaled 2% of respondents, say they are greater than 50% likely to acquire baseload DE in the next two years and are actively evaluating their options. **Soft prospects**, which totaled 11% of respondents, also say they are greater than 50% likely to acquire baseload DE in the next two years, but they have not begun to actively investigate their options.

Extrapolating our results indicates that there are more than 12,000 North American energy users in the 100 kW to 10 MW size range that are strong prospects for DE, companies that are exploring their DE options and rate themselves as having a likelihood of 50% or greater for adopting a DE solution in the next two years.

But the question remains: how to convert these more than 12,000 energy users to DE buyers? Through qualitative, in-depth interviews, managers and executives told us how their companies:

- Make the decision to close deals for DE systems they have been considering, sometimes for years
- Structure their completed and in-process DE installations, and why they make the choices they do
- Walk their new or proposed DE systems through their internal approval process, and how they get over the hurdles in their internal groups
- Deal with market conditions and fuel prices
- Get their projects designed, built, and running
- Choose which services to outsource, and what they look for in system vendors and service providers

During interviews, we focused on how to apply this information to sales materials and presentations. Our goal was to find methods to counter sales resistance, capitalize on perceived and latent benefits, and structure service contracts or guarantees to convert DE sales prospects into customers.

Method details

Qualitative Survey

Primen conducted 100 in-depth, qualitative interviews with U.S. and Canadian business customers by telephone between July and September 2003.

We selected participants for the interviews based on the following criteria:

- **Interest in DE:** companies that expressed strong interest or purchase intent for DE systems during Primen surveys in 2001, 2002, and 2003; companies currently installing onsite generation systems; or companies that installed systems in the recent past
- **Size:** average facility demand in the 10 kW to 10 MW range
- **Business sector:** Companies from all business sectors, with the exception of agricultural, construction, and mining

In contrast, companies from the 2001 and 2002 surveys were from only five business sectors (see **Appendix B** for a complete description):

- Digital economy — Internet services, data processing, telecommunications, commercial banking, insurance, and electronics manufacturing
- Continuous process manufacturing
- Industrial establishments with significant heat-recovery potential
- Commercial establishments with significant heat recovery potential
- Sectors that produce gas as a byproduct

This year we contacted energy decision-makers at facility locations and, as described in detail in **Appendix A**, asked them about:

- **Current use of DE systems**, including installation type, size, usage (standby, peak shaving, and baseload), participation in load management programs, dispatch criteria, and cogeneration
- **Decision points and processes**, including project drivers, design, purchase or lease structuring, progress through the company and concerns raised, and the impact of various other factors
- **Likelihood of installing (additional) on-site generation within the next two years**, based on different levels of usage, project size, cogeneration, design, purchase or lease structuring, progress through the company, concerns raised, and the anticipated impact of different factors on project completion
- **Outsourcing** of routine maintenance, repairs, monitoring/dispatch, and turnkey operations, including criteria in the outsourcing decision
- **Credibility of manufacturers, utilities, and third-party project developers** in providing onsite generation equipment and services for that equipment, including expectations for innovation and strengths or weaknesses
- **Reactions to the 2003 Northeast Blackout** and expectations for the impact of that event on the DE marketplace (for those interviews conducted after August 14)
- **Awareness of natural gas price trends and volatility**, the effect of those price changes on DE system decisions, and expectations for future price trends

Quantitative Survey

For the 806-respondent quantitative survey component of this study, we sampled business customers based on the following criteria:

- **Size:** 406 surveys with Mass Market businesses (10 kW to 299 kW demand) and 400 surveys with Large businesses (300 kW to 10 MW demand)
- **Business category:** 130 surveys with Manufacturing companies; 115 with Schools, Colleges, & Universities; 100 with Restaurants; and 461 with a mix of other SIC categories (excluding agriculture, mining , and construction)

Businesses with fewer than five employees and those with energy bills included in their rent were excluded from the sample. The results in this summary were weighted to reflect the businesses' true representation in the population of U.S. businesses.

The Core Appeal of Onsite Generation

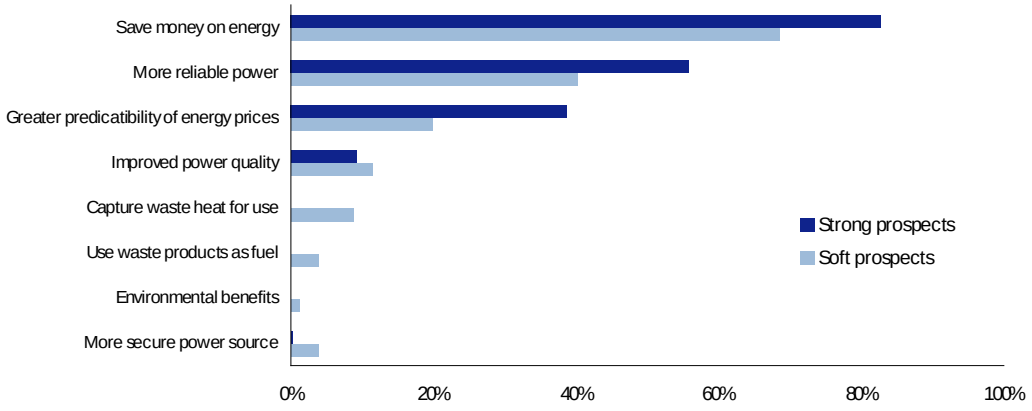
The shortest path to making a sale is understanding a prospective customer's needs and using sales materials and messages that consistently reinforce how the product will meet those needs.

When it comes to DE systems, prospective customers indicate their three top needs are:

- Energy cost savings
- Improved power reliability
- Predictable energy prices

Making certain that a proposed DE project has one if not all of these attributes is a necessary step before even walking in the door to initiate the sales process with an energy user. **Figure 3**, based on data from our quantitative survey, illustrates just how strong these three drivers are. This holds both for strong and soft prospects, even though the latter also value other benefits, though to a lesser degree. The interviews reinforced this finding.

Figure 3. Perceived benefits of DE systems (quantitative survey)



Prospective customers perceive three main benefits from DE systems: savings on energy cost, improved power reliability, and more predictable energy prices.

Cost savings

It's a basic case of "show me the money" — prospective DE customers want to know that their new installations will save them money in either the short or long term. Though the savings can come from directly reducing payments to electric service providers, reducing costs from unreliable power, reducing price fluctuation risks in volatile markets, or taking advantage of interruptible power tariffs, the ultimate purpose behind an onsite generation project is almost always saving money.

> *The cost savings is probably the main driver…The predictability of the price of energy was widely debated at the time. There was nothing certain about the cost of energy out there in the future.*
>
> — Clay Products Manufacturer, California

> *The main thing is that we are always interested in ways to control costs on power and utilities. If people can come up with a good idea that gives us lower costs and better reliability, I would be interested in listening to it.*
>
> — Semiconductor Manufacturer, Texas

> *You can pay the utility company, or you can pay yourself, for the equipment…I'm saving $80,000 a month, and I've got the DE system. It's paid for. The company didn't have to spend any more money than they would have if they'd have just paid the utility's invoices every month. And I didn't have any backup if I lost the utility before. Now I can lose the utility and run on my own indefinitely.*
>
> — Tool Manufacturer, Illinois

> *For the projects that we are looking into…it is really based on our rate being reduced to have interruptible power.*
>
> — Furniture Retailer, Minnesota

Ordinary cost-benefit models are of limited value when evaluating the particular economics of peak shaving. Fuel costs are a lesser concern when an installation's primary purpose is to operate during a limited number of peak demand days and thus reduce the customer's demand charge for the rest of the year. In this case, the primary considerations are the electric service provider's demand penalty, the amount of electricity consumption that penalty applies to, and the capital cost of the onsite generation system needed to reduce spiking demand on critical days.

> *We only ran the diesels for peak shaving five days last year, for a couple of hours each day. The amount of money we're saving [immediately] is really trivial, it's hundreds of dollars, maybe a few thousand. But what we're doing, because we're on a true time of day rate, we're reducing our peak on the five highest hours of the local grid… The five highest hours of the local grid demand are the five hours that determine what your demand charge will be for the next year. So we worked very, very hard to predict and reduce our load during those five highest hours.*
>
> — University, New Jersey

> *The amount one can save is primarily based on your individual utility billing structure. In this market, the demand charge is a large part of the bill. Then there is a ratchet charge each month in the winter where they take your highest demand of the summer and multiply it, and you will never get billed less than that amount of demand… All winter long, you will be billed by that number.*
>
> — University, Pennsylvania

> *We have already had discussions, and they have told us the interruptible rate, and we have used that to calculate what we would do… We take a penny per kilowatt-hour off by eliminating our demand charge.*
>
> — Data Storage Products Manufacturer, North Dakota

> *We are remodeling a building that will become our operation center, and the generator will be the backup power for the whole building. We will participate in the program with the power company for load shedding. By signing up to allow them to interrupt our service when they have peak demands, our rates will be discounted below what we would normally be paying.*
>
> — Bank, Iowa

However, calculating financial benefits is not a straightforward task in a changing marketplace. Onsite generation systems that were justified on the basis of participating in utility load-shedding programs can turn into losers when utilities increase their demands on the customer's equipment well beyond the original agreement.

> *We were on interruptible for a long time, with the power company, where they had this switchover thing where they could start us up and switch us over. There were substantial savings in kW to do that. But the problem is that the utilities kind of started to be pigs about it. They were running us sixteen hours a day, six days a week… As soon as you start generating two-thirds of your own energy, now you have quite a maintenance issue with the machinery, and reliability, and fuel, and the cost of the kWs about doubles. You're getting a substantial reduction in your rate from the utility… but it's only a big savings if they don't run you all the time.*
>
> — Food Distributor, Minnesota

> *We were on this special interruptible system, where if they were using too much energy we would automatically run our generators for a certain amount of time. By doing this we would get a bonus every year and cut our rates. It was getting to be too much, because it was happening every day… They would call us in the morning, and ask us to run 2, 4, 6, 8 hours on emergency power… so we would have to go run our emergency generators… Last year I would say out of 60 days we were on emergency power 48… The equipment took a lot of wear and tear, not to mention the diesel fuel costs and everything else.*
>
> — Hospital, California

Improving power reliability

Energy users with the most keen interest in DE systems often are strongly motivated by the high costs associated with unreliable electric service or power quality problems. It's not so much the lengthy, yet rare, weather-related blackouts that bother these customers. Rather, they cannot tolerate the continual equipment damage and business costs arising from their local electric service provider's inability to deliver sufficiently reliable, high-quality power.

For businesses sensitive to outages and poor power quality, aggravation and emotional frustration can strongly color their assessments of the costs and benefits of onsite generation.

> *We experienced seven minor blips in July [2003]. They hurt us. For example, we have three very short (a few seconds each) power failures very close together, and they cost us $93,000 of lost production… One disruption we can recover from, but when we experience consecutive disruptions, it blows a lot of fuses and damages a lot of electronic equipment.*
>
> — Glass Manufacturer, Alberta

We wanted to get away from the constant power outages, because it was devastating to our plastics manufacturing… You crash a machine sometimes when the power goes out, because it doesn't have a chance to follow its program, damaging machines and motors. Unplanned outages just raise havoc with manufacturing equipment… Reliability, next to cost savings, was the next greatest influence why we wanted [DE].

— Tool Manufacturer, Illinois

It's based on how reliable our incoming power is. Momentary outages, and things of that nature, tend to cost us a lot of money. If we factor in the cost of the lost opportunity, not only the cost of the power, but the potential for interruptions… We average one momentary interruption per month, but it is enough to drop off some of the critical processes… You have to balance the risk of onsite generation with the benefit of not relying on the local utility.

— Electronics Manufacturer, New Hampshire

The primary driver is the power is real bad out this way. It seems like power fails when the wind blows. The main driving factor is that every time they lose power, Information Services has to get involved, and it's a pretty lengthy process to get everything back up.

— Municipality, Texas

Things that hurt us don't bother 99% of the rest of the people on the grid. We are really susceptible to any kinds of power quality problems. We see transients once or twice a month. A breaker operation somewhere on the line, and we see it as a spike or we will see it as some sort of power upset, and it mainly locks our controllers off. We could lose $50,000 per year or more due to interruptions. In the last year we lost that in one hit.

— Semiconductor Manufacturer, Texas

DE marketers should not assume that customers have calculated the costs of outages on their own. Instead, DE project developers should be prepared to offer estimates regarding how much outages cost for the customer's area or general type of business.1

> *One thing would be the justification, to help identify the lost revenues or incurred costs by a power outage. If they could point out some of the ways to look at it, so that we could dig in and find the actual costs to help justify it or not justify it.*
>
> — Laboratory Testing Equipment Manufacturer, Ohio

Key Issues Influencing DE Sales: Past and Present

Although cost savings and enhanced reliability are the fundamental needs driving energy users to listen to DE proposals, other areas are critically important as well. These additional issues, listed below, can often determine whether a deal is closed and a prospect is converted into a customer.

- Company financial position and/or the state of the economy
- Availability (or lack thereof) of financing from the vendor/project developer
- Specific warranties/guarantees provided
- Service agreement included/offered
- Support for addressing environmental or permitting issues
- Electric service provider's flexibility, or lack thereof, in resolving tariff and interconnection issues
- Fuel prices, particularly for natural gas
- Ability to cogenerate heat, steam, or chilled water along with power

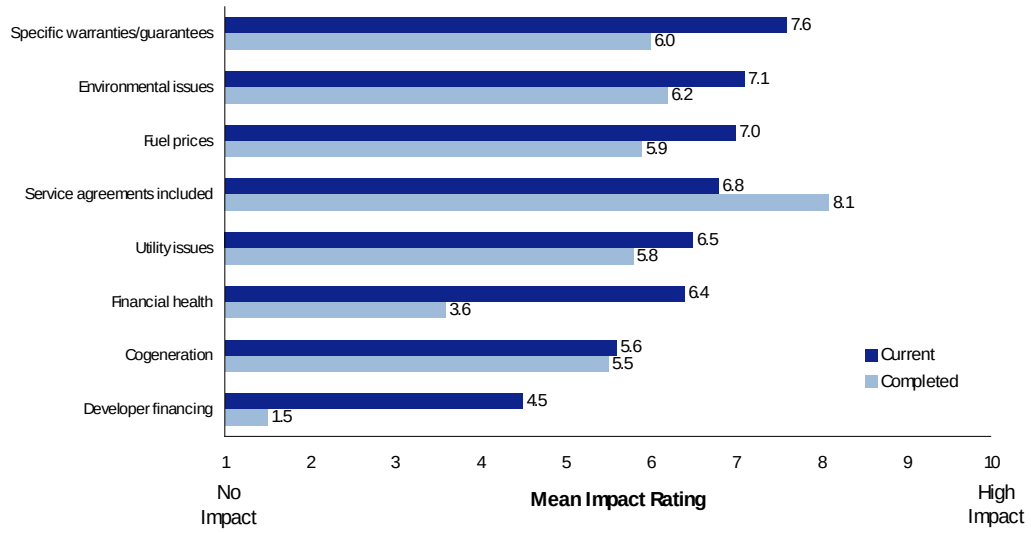
We explored the importance of these issues during interviews with energy users that fall into two distinct categories:

- **Current DE projects:** businesses currently installing onsite generation systems or with strong expectations of doing so
- **Completed DE projects:** businesses with DE systems already installed

Because of the long purchase/installation cycle for DE systems, this methodology allows us to consider perspectives from two distinct moments in time: from the current market, and from the recent past. By exploring these two temporal markets, we're able to track changes and identify the trends in DE decision-making.

In comparing the two markets, we found that warranties and service agreements have the highest overall impact on both completed and current projects, most likely because they are closely linked to customers' most important goal in DE installations: financial benefits. (See **Figure 4**.) Energy users are aware that they need warranties to keep systems running smoothly, and that (especially in the beginning) their service technicians lack vital skills to keep equipment operating at peak efficiency.

Figure 4. Impact of specific factors on current/or planned projects versus completed projects



Respondents indicated, on a 1-10 scale, how important various factors are in influencing their decision to implement DE projects. Warranties and service agreements exchange places as the most important issue respectively for completed project and current project groups. But in both cases, we can safely assume decisions are driven by a strong need to feel secure that projects will achieve planned cost savings and reliability benefits. Concerns over environmental permitting issues and fuel prices have jumped substantially for current or planned installations.

These results indicate companies strongly desire services and warranties to insure their new equipment performs well, providing the financial returns they have factored into their return on investment calculations. But in most cases, they also want assistance in developing expertise so that they can handle most maintenance and repairs themselves.

For companies seriously considering DE installations in the next two years or that are in the process of installing systems, warranties and services are the top two concerns, but fuel prices and environmental issues are also important.

Fuel prices and environmental issues both moved up to positions of relatively higher importance than they were for completed projects. Clearly, users express increased concern over fuel prices because natural gas prices have spiked twice in recent years, reaching double the levels of the prior decade. Consequently, onsite generation projects are more difficult to justify from an economic standpoint. (For more detailed views on natural gas price volatility, see page 28.)

The reasons for increased concern regarding environmental permitting are less obvious. However, a number of interviewees mentioned that their onsite generators are under close environmental scrutiny, and several stated that they are not allowed to peak shave with existing equipment because of environmental restrictions. This suggests that officials may be keeping a more watchful eye on onsite generators and prohibiting them from dispatching for peak shaving opportunities. Anecdotal evidence beyond this project's interviews supports this conclusion, as Primen has heard that users who once peak shaved with onsite generators no longer do because of a crackdown by local air permitting authorities. Then again, the apparent shift in ranking of environmental permitting might also be a reflection of the expectations energy users have, and not indicative of real difficulties.

> *There were lots of permitting issues, the trustees wanted an emissions permit in hand before we started construction… It would have been a full stop if they could not have met the emissions requirements.*
>
> — University, New Jersey

> *We are only supposed to run [the DE system] the minimum amount because of permitting regulations. It covers only critical processes during outages…Because of permitting, we are so restricted that it really doesn't require much maintenance. The reason that thing even runs is because of the servicing that takes place with it. It really hasn't been the asset that we had in mind.*
>
> — Clay Products Manufacturer, California

> *Due to the air pollution control district here, they are really restricting our use to 200 hours per year, and because of that we can't use [the DE system] for peak shaving, only for emergencies.*

> — Wastewater Treatment Plant, California

DE prospect concerns over increasing environmental regulation is legitimate. In the past three years, California and Texas have enacted new air emission control regimes, and a number of other states are in the process of issuing new standards that will probably be tighter than existing regulations.

Other areas, including financing and, surprisingly, internal financial health, remained relatively low in importance for energy users in deciding whether to go forward with a DE project.

For already completed DE installations, the service agreement included in the deal had the largest impact on projects. Energy users with already installed DE systems view them as rare, big-ticket purchases. They have evaluated the cost savings and power quality benefits, and want to protect their expensive investments. They rely on the vendor's or project developer's iron-clad commitments to help them care for their new assets.

> *Obviously we are going to rely on some expertise coming in, and having them be able to follow up and tell us what is wrong.*
>
> — Food Processor, Minnesota
>
> *We wanted qualified people. We didn't have anybody trained in maintaining the system.*
>
> — Tool Manufacturer, Illinois
>
> *We have a 12-year, all-inclusive agreement with Cummins, which Cummins had never done before.*
>
> — Municipal Utility, Tennessee

However, this does not mean most energy users want comprehensive energy services, or all-inclusive installations where the project developer maintains ownership, takes care of all repairs and maintenance, and sells the electricity at a fixed price. Although there exists a narrow interest in this concept (see **sidebar, *Comprehensive energy services***), most users say they want to control as much of the system maintenance and operations as they can, and only turn to outside firms when they lack ability or expertise.

> *On normal equipment, we handle routine maintenance. Test running and changing the oil, and filters, and stuff like that we take care of. I outsource high-voltage work. If we have the skill and tools we will do repairs ourselves. If we don't we will outsource.*
>
> — Semiconductor Manufacturer, Texas

> *We do the routine maintenance on pretty much everything… For instance, reciprocating engines — part of the reason we didn't opt for that is the labor. We are a small facility, we do everything in-house and that is something we would have to subcontract out. It is the same with the turbines. It is relatively easy to do a core replacement on them, and that was one of the benefits that we looked at as part of the total cost of the package.*
>
> — Wastewater Treatment Facility, Vermont

> *If we have people trained in-house we will handle it. If not, we rely on the vendor. Part of the reason why we want the vendor to do it is to help our people learn more on how to do it so that in the future we can do it ourselves.*
>
> — University, New Mexico

Energy users with existing DE systems gave very low ratings to the importance of financial factors. As the purchase of DE systems happens very infrequently, and such systems are expected to have a long lifetime, companies most likely focused on the long term when making decisions about these investments, ignoring short-term market fluctuations.

Also, large companies (or public bodies) typically have much better abilities to obtain attractive financing for these systems than vendors or project developers. Many of the energy users we interviewed either have the resources to allocate financing directly or the ability to float their own bonds for construction. As a result, they infrequently rate supplier financing as an important component in their decision-making process.

Comprehensive energy services: interest narrow but intense

The apparent disconnect between energy users with installed DE systems giving high ratings to the impact of service agreements, while also expressing a self-sufficient "we'd rather do it ourselves" message raises the following question. What is the real level of interest in comprehensive energy services?

For a narrow group of energy users, the prospect of bundling maintenance, energy management, and reliability issues — with fixed costs — as the responsibility of the DE vendor or project developer, is clearly appealing. They believe their primary business is not generating electricity, and any resources they free up from that task can be reallocated to their primary business function.

> *We're looking for someone that will design the project, build it, and operate it for the first five years or so…We want them to run the project from start to finish. Any obstacles in the way, we'd like them to handle it.*
>
> — Community College, California

> *Third-party ownership is the least risky option…He likes the idea of a full-service, hands-off deal where he just purchases the utilities. I don't want my people involved at all.*
>
> — Nursing Center, New York

> *The less people that are involved with operating and maintaining the central heating plants, the more time we have for core activities. So if the operations were taken over by a third party to focus on that, and we just purchased the heat and electricity, and chilled water from that, that sort of achieves that.*
>
> — University, Alberta

> *What business are we in? Do we want to be in the electric generation business?… There is a lot of planning, a lot of implementation, a lot of maintenance, there are a lot of modifications to take care of the waste heat, and what kind of business do we want to be in?… Cogeneration is a neat thing to do, but again, how well does it fit in with your business?*
>
> — Ski Resort, California

Although a small group of customers spontaneously brought up ideas relating to comprehensive energy services, attraction to this product concept appears limited to a small number of interviewees. Overall, a large share of users state their preference to be involved as much as possible in operating their DE systems.

Who's Behind the DE Decision?

Processes for deciding whether to invest in DE systems are anything but standardized. DE acquisition represents a highly infrequent, capital-intensive purchase, requiring input and sign-off from multiple centers within the purchasing organization, with no common protocol identifiable except that many companies use a team approach. Further complicating the sales process, it appears that the number of voices in the decision-making process grows as the process moves forward and more stakeholders speak up.

An internal, primary "champion" for the acquisition generally shepherds the project along, but we found this role can fall to personnel holding a wide variety of job titles. Facilities managers often take on this task, but financial department personnel can equally well carry the torch. No one functional position within companies can be targeted for making (or breaking) a DE acquisition decision.

Both private businesses and public institutions appear to have complex, seemingly ad hoc decision processes when it comes to DE. Both types of organizations are accustomed to making capital expenditures and typically have processes in place for approving such purchases. But in so much as DE impacts a wide range of stakeholders within an organization, including many who normally are not part of the capital outlay process, the usual approach may be expanded. This explains the often lengthy time required before DE prospects decide to move forward with a project.

> *There is a team of five that oversees this function. The team doesn't have a name. They cover management of the building.*
>
> — Nursing Center, New York

> *There is a lot of people involved... the residential life people, the research people, health, safety and security people... the University campus is like a small city where everybody gets involved with all decisions.*
>
> — University, New York

> *Initially the impetus came from the engineering department, then the general manager for facilities, and the VP of facilities, then Treasury got excited about it. The trustees had to be convinced that it was worth the investment.*
>
> — University, New Jersey

> *Basically the VP and myself did the payback amongst ourselves, and it didn't take a lot to convince the other partners...I got quotes from a Kohler and Caterpillar distributor. We looked at the two quotes and what they were capable of; size, fuel consumption, cost, and made our decision based on that.*
>
> — Food Distributor, Iowa

> *Although it is corporate capital, the mill manager, sector vice president, and environment would have to put a push on there as well. It is a large corporation and there is a lot of effort needed.*
>
> — Paper Products Manufacturer, Ontario

> *Production (is involved), but there is not much of an excuse there, because they can make up the time. The other ones would be sales and marketing, and they would be harping about lost sales, or lost response to customer demand, and need to identify what we are losing when the electricity goes out. The computer boys are going to worry about the quality of the electricity... whether it is clean enough so that their computers will run.*
>
> — Manufacturer, Ohio

Many publicly owned institutions have additional hurdles to cross. Government organizations usually require a sign-off at least from the administrative head of the organization, and more typically, a public vote from an elected government body such as a city or county council approving the expenditure.

> *It went through the energy conservation specialist, and the budget coordinator for public works, and then we had to make a presentation to the Water Commission, and once they approved it had to go to the Council.*
>
> — Wastewater Treatment Plant, California

> *He carefully laid the groundwork with the board of directors, taking each one out to discuss the project before it was proposed, feeling them out, preparing them for when it was suggested. After that, he got the staff's buy-in, and finally the city administration, and then the community. "I spoke to Rotary Clubs, to anybody that would listen to me."*
>
> — Municipal Electric Utility, Tennessee

Moments of Opportunity

Because DE installations require significant capital expenditures, happen infrequently, and are highly dependent on market conditions at the moment of the sale, correctly timing the sales effort can mean the difference between a successful deal and a fruitless string of contacts.

We found three distinct times when DE sales efforts will be heard by more receptive ears:

- When old and failing boilers and other HVAC equipment needs replacement
- When crises in infrastructure or market conditions occur
- When electric service failures damage sensitive equipment or cause downtime

Any of these events can serve as a catalyst to convert DE prospects into customers, yet each requires a different strategy to consummate the deal.

Obsolete or failing equipment

An astute facilities manager has the ability to plan for replacing ancient, worn out equipment. For example, boilers, chillers, and heating systems are all candidates for replacement after decades of service life.

If energy managers perceive a need for near-term capital expenditure in these areas, they may be open to the extra step of modifying the system design to incorporate the additional benefits DE provides. Furthermore, getting one capital expenditure approved is easier than battling over two different ones.

> *Two years ago, when they were getting ready to get capital funds lined up to replace four of the six boilers in the central plant because they were older than dirt, we did three studies.*
>
> — University, Ohio

> *There are a number of issues. First off, aging facilities that we have here, and the cost that would be encountered for upgrading the existing central plants, heating plants, and the money that would be spent on that could be offset and invested in a new facility that also provides cogeneration.*
>
> — University, Alberta

> *[DE] was discussed over a period of years, and when we went into a digester rehabilitation project, replacing piping, the mixing system… we felt it was a good opportunity then to revamp the entire system… It was really the digester project that kind of opened the door to explore the possibility…To stand on its own would have been cost prohibitive. To couple it with a project made it more feasible.*
>
> — Wastewater Treatment Plant, Pennsylvania

This suggests that DE vendors should develop collateral that illustrates how piggybacking DE equipment onto already-needed capital improvements can provide significant economic benefits.

Anecdotal evidence from DE providers confirms that this piggyback approach works. But DE providers also contend that by including equipment replacement as part of the DE sales pitch can make the sales cycle more complicated and lengthy.

Infrastructure or market crises

Energy users' perceptions of market conditions and trends largely determine whether they are truly viable DE prospects. Our research indicates that users who believe their electric service can be relied upon for stable, reasonably priced power are poor candidates for a DE sale.

If, on the other hand, local or regional events raise doubts about the predictability of their provider, onsite generation becomes more attractive. Moments of large-scale electric system or market failure create considerable uneasiness among customers, with one result being increased interest in DE.

> *During the (California) energy crisis it was very difficult getting energy from our utility. We decided to go with a cogen system because of all of the problems we were having with our utility, as far as getting electricity.*
>
> — Hospital, California

> *We were talking about the situation in California at the time, and the electrician was saying that in the next few years the same things are going to be happening here if things don't change.*
>
> — Greenhouse, Massachusetts

However, market and infrastructure crises are considered "moments" of sales conversion opportunity because their effects fade with time. When a crisis situation occurs, users may shift their plans, but once the crisis passes, they revert to "business as usual." Consequently, vendors must move quickly to take advantage of these opportunities.

> *In the last couple of years the energy world has changed several times… When the emergency first hit California, we were looking at going with some fairly substantial generation capacity. In the next two years I was looking at some cogeneration stuff, microturbines or an IC engine for one specific facility as sort of a test bed. But I don't think that is going to happen now… in the long run caution and cooler heads have prevailed, eventually.*
>
> — Ski Resort, California

> *People forget real easily, until the next time… It is like the roof leaking… it only leaks when it rains.*
>
> — Nursing Home, New York

Our results suggest that during times of crisis, narrow windows of opportunity exist for converting prospects into sales. To best take advantage of this brief opportunity, vendors must have already provided contacts with information and education about the benefits of onsite generation.

Expensive electric service failures

Identifying specific prospects who are particularly sensitive to electric service failures requires information on both local power failures and on how those failures affect business operations. Efforts to gather this information would probably be well spent, as this combination of outages and expensive business disruptions can create powerful incentives for installing DE systems. In other words, frustration and exasperation can be far more compelling than mere cost-benefit analysis.

> *We were down 10 hours this past December, and lost over $2.5 million worth of revenue. It was right around Christmas time, and just like in California, the utility didn't care that we didn't have power.*
>
> — Portrait Studio, North Carolina

> *What prompted this was there was a storm locally that took the utilities out for several days, and we had $5 million worth of product in a holding freezer and no refrigeration…It prompts things to change fairly quickly.*
>
> — Food Manufacturer, Iowa

> *I think there are a number of drivers to do this project, and the value we put on reliability probably significantly increased after [the 2003 outage]. We do a lot of bioresearch here. When you have little critters that you have breeding for 10's if not 100's of generations, depending on their lifecycles, and you lose power, the study is no longer valid.*
>
> — University, New York

Conversely, companies that either think their local electric service companies provide reliable power, or think that they can easily suspend and restart operations, are more difficult sales challenges.

> *I've only lost power in this city one time in six years, and that was due to a severe thunderstorm with a tornado. Before I could get my generator here, they had the power back up. When my generator hit the alley, the lights came on.*
>
> — Telecommunications Company, Texas

> *[DE is] very, very unlikely. Because of the reliable electricity supply currently, that I think would be at a reasonable cost. We have really not researched it to know whether that is the case or not.*
>
> — Industrial Manufacturer, Arkansas

> *[Chances for DE are] very slim, because we are a small operation, and when the power goes down it is usually back up in a short period of time.*
>
> — Sawmill, Georgia

Hospitals are an exceptional case. Because hospitals are required by code and certifying organizations to install backup power systems, their facility managers have experience operating onsite generation.

Thus, hospitals would seem like quick candidates to upgrade from standby only to more complex (and for the seller, lucrative) baseload or peak-shaving systems. The snag is that, either through regulation or tradition, many hospitals keep their backup systems entirely separate from their primary electric feed, which would require the installation of two complete DE systems for separate functions.

> *State regulations require dual-source availability of power at all times… We are not allowed by law to run the generators to save costs unless there is a problem with the utility feed. Once you are on the generator, you don't have an alternative source of power.*
>
> — Hospital, New York

> *Being a hospital, we don't want them playing with our power, because if Murphy's Law comes in, and something fails, what do we do?*
>
> — Hospital, North Carolina

> *Last summer they looked at putting in a larger generator, a 500 kW diesel to peak shave, in connection with the municipal utility. They were looking to get the municipal utility to put it in instead of replacing their smaller, older emergency generators with a new one. The state stepped in and said they couldn't do it that way, because critical power had to be separated from baseload power. It ended up to be such a mess that we just backed out of the idea and just replaced what we had for emergency power.*
>
> — Hospital, Wisconsin

Still, there are a number of ways to overcome these limitations through engineering approaches. (See Primen Perspective, Rx for Health Care Power Failures, for a discussion of one such approach for providing high-availability power systems. Note: this report is only available to Primen Distributed Energy Strategic Service subscribers.) The key in this case is educating hospital decision-makers and helping them overcome regulatory hurdles. In one a recent case, a state regulatory board approved a hospital CHP project that was designed with only a single utility feed to provide backup power.

A shock to the system: the Northeast Blackout of 2003

Power outages in 2003, including the widespread August 2003 blackout that struck the northeastern United States and Ontario and those created by Hurricane Isabel in September 2003, are the latest incidents to test whether power crises have a positive effect on DE sales. In fact, interviews Primen conducted with energy users following the August blackout confirm that such events place onsite power generation back on the radar screen for energy users.

The August 2003 blackout was fresh in respondents' minds during our interviews, and their reactions showed how much this crisis had sensitized them to the benefits of DE systems.

> *A few of the hospitals in the Northeast area failed. Some of those systems were similar to the ones that we have. I just want to make sure that when we are hit with that type of demand our generation stands up to it.*
>
> — Health Care Facility, Georgia

> *I think it sensitized the other people, because of what we have… We had some emergency generators that were not configured properly, and not connected to the right loads, and this is the type of thing that brings it home… If this had been in the midst of winter when it was 40 below outside, God forbid, we would have been in trouble… The outage brought generation back to life. They are now planning another pow-wow and they want me to sit in on it.*
>
> — Medical Training Center, Ontario

> *Issues in the Northeast made the generator issue come to the table faster… They were in the process of installing additional standby generation prior to the August blackout. The project was pushed up on the priority list by the event.*
>
> — Bakery, Indiana

Some parties have speculated that the August 2003 blackout and other recent supply problems in England, Scandinavia, and Italy might lead to a permanent, rather than transitory shift in DE's favor. So far, even though markets for backup power are booming, there's no conclusive evidence that the blackouts will provide a long-term boost for baseload/CHP applications.

Points of Resistance to DE

Onsite generation systems require significant capital resource allocations and include substantial elements of risk arising from changing market conditions and lost opportunities for capital spending. Choosing the right equipment suppliers or partners can also be a daunting challenge. Our research identifies four specific obstacles that businesses must overcome en route to becoming DE customers.

- Concerns about natural gas prices
- Unattractive cost-benefit analyses
- Operating uncertainties
- Competing utility offers

Concerns about natural gas prices

With the exception of projects using waste fuels, most baseload DE systems sold today use natural gas as their primary fuel. Recent rapid increases in the price of natural gas — and some projections that show high natural gas prices for years into the future — are creating considerable uncertainty about the financial viability of onsite generation.

> *Natural gas is volatile in terms of pricing. As the market became deregulated it became very volatile, and it will continue to be very volatile… Volatility is something you need to plan for and design for… selecting a cogeneration system that gives you the flexibility to operate your system differently depending on the price of fuels.*
>
> — University, New York

> *I actually wanted to go with diesel because I didn't want to be tied to another fluctuating energy resource, like natural gas… we're looking at an upward trend in natural gas prices…the more that other sources of energy are dependent on natural gas, the more market prices will prevail. Those prices will continue to go up. I do not see any long-term downward trend in natural gas prices.*
>
> — Municipal Utility, Tennessee

> *Utility costs are only going to grow, gas and electricity… In fact, with the gas prices, I foresee that the electricity is going to be used more than natural gas, because of the glitch we saw in the natural gas price this winter.*
>
> — Prison, Georgia

> *I'm the one who buys the natural gas, and I am not greatly encouraged. We try to do some hedging here and there. I'm not real optimistic. I think all of the cheap and easy wells have been drilled… I think prices are going to tend higher… Don't believe it when the President says we are just going to burn hydrogen: I haven't seen any hydrogen wells lately.*
>
> — University, Ohio

> *We are 40% higher this year for natural gas than we were last year at this time. That could be the thing that would put the kibosh on the whole system. The payback is going to go from two years to three years… I have a projection right in front of me an in 1995 we were paying $1.50 a therm, and by 2005 we will be paying around $7.00.*
>
> *— Nursing Home, New York*

Although concerns about natural gas prices are high, Primen does not expect a strategic market shift away from natural gas toward some other fuel. In fact, all of the strong prospects (in the quantitative survey component of this study) who indicated a preferred fuel for their potential DE project picked natural gas.

> *Natural gas prices are not affecting their generation decisions. If there continues to be a correlation between natural gas prices and electrical power pricing, … whether we went with generation onsite or not, we require "X" amount of natural gas anyway, and if we self-generate we would only increase our consumption by 20% to 30% from what we're currently already expending. But we could avoid well over 50% of our electrical requirements or costs by doing so.*
>
> — University, Alberta

To counteract energy user uneasiness about natural gas prices, DE sales materials can cite long-term predictions by expert agencies, or research demonstrating the links between natural gas prices and electricity prices in some regions of North America. Although contracts locking in current natural gas prices are not particularly helpful, longer term contracts that move downward with wholesale gas prices, but also include a cap in the event of price increases, could relieve some prospects' concerns. However, the liquidity in natural gas markets is currently so poor, that opportunities for favorable long-term contracts are virtually nonexistent.

Unattractive cost-benefit analyses

The current glut of low-cost electricity in many areas of North America makes it quite challenging to create a convincing DE business case. Energy users, even those that consider themselves strong prospects for DE now or in the recent past, realize that today, DE economics are tough.

> *The cost of my electricity is very cheap. Currently I am paying an average cost per kilowatt-hour since January of 3.389 cents. That includes everything, including substation rental… With the cost of natural gas being what it is, if we were to run on natural gas there is no big savings there. I doubt that I can make electricity as cheaply as I am buying it.*
>
> — Semiconductor Manufacturer, Texas

> *It doesn't take a rocket scientist to do the math... The generators are currently out of commission and there is no sign of them being fixed any time soon... When the generators were running, the length of time and the time the generators were run was based on the cost of natural gas vs. the purchase price of electricity from the grid… With natural gas prices off the map there are currently no plans to get the generators back up and running.*
>
> — Hotel, California

> *While our electric costs are high, they are not as significant as our natural gas costs. If an onsite power generation facility required natural gas to operate, then the cost of the natural gas would make it prohibitive… If we saw an advantage to doing some generation because our energy costs were getting ridiculous at our plant we'd consider it, however, it would have to show significant returns to justify that type of investment.*
>
> — Metal Manufacturer, Arkansas

> *Right now we are paying the equivalent of $32 per MWh for straight energy at our particular location, and with everything added in it is about $49 per MWh at our main breaker. The higher gas costs and lower power costs have rendered a lot of projects difficult to justify.*
>
> — Paper Products, Ontario

> *It is a lot cheaper to buy power than to produce it. Dealing with generator suppliers and looking at what we would have to do here as far as equipment… we came up with about 13 cents to 15 cents per kW (from the supplier) to produce, and that makes no sense to do when we can still buy it at 5 or 6 cents. That pretty much sums up the decision not to do it.*
>
> — Hospital, Washington

DE projects must also overcome the hurdle posed by the intrinsic cost of capital. Many projects must demonstrate that they can achieve payback within specified time periods, or that they can achieve return on investment faster than other projects competing for the same capital funds.

> *It's a case of priorities, and where we get the biggest bang for the buck. I'm probably one of the ones that's not pushing too hard, because I keep finding projects we can do that have a one-year payback or less. You can only do so much with your staff, so it's just a case of priorities.*
>
> — Lumber Manufacturer, Washington

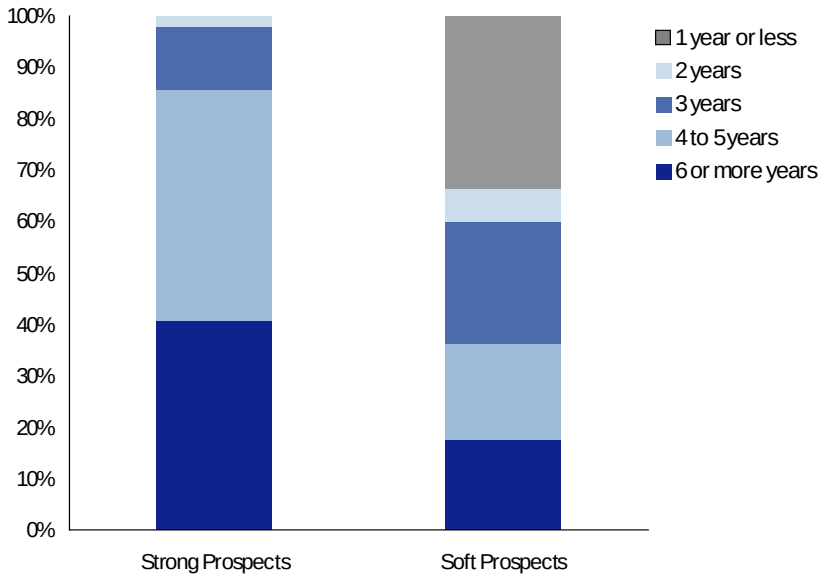
> *ROI and getting capital are seen as major barriers to an onsite generation project. The parent company requires an annualized return of 16% on any capital investments. Getting the capital initially would be a barrier. It'd take us a couple of years to get approval.*
>
> — Metal Manufacturer, Arkansas

> *We were looking at it a little more seriously a couple of years ago, but the paybacks aren't there…I think we are typical of any other company in that we've got three and four times the amount of money requested for capital dollars as there is capital dollars available. We have to prioritize where those capital dollars are going, and the energy stuff just doesn't come to the surface.*
>
> — Hospital, Wisconsin

> *Being a manufacturer, you are more interested in programs that are internally funded, if they have a year payback or less… We said we would like to do [DE], and we were told no, this is not a good enough payback, we are not going to put $3 million into a generator. We are going to put $3 million dollars into process equipment… What a manufacturing business wants to invest its capital in is its manufacturing process.*
>
> — High Tech Manufacturer, North Dakota

Despite these comments, DE prospects from our quantitative study indicated reasonable requirements for payback on DE capital expenditure. For strong prospects, 86% are willing to accept a payback of four years or more. However, only 37% of soft prospects find a four-year or longer payback acceptable. (See **Figure 5**.)

Figure 5. Acceptable payback for purchase among DE prospects



Strong prospects have fairly reasonable payback requirements for DE projects, with 86% willing to accept a payback of four years or more. For soft prospects, only 37% find a four-year or longer payback acceptable.

Sales campaigns should directly address the capital investment benefits of DE systems, perhaps by presenting favorable comparisons with other types of capital investments. Alternatively, DE project developers could retain ownership of the generating equipment, and offer prospective customers a guaranteed energy savings contract. But the reality is, for much of the continent, justifying DE on simple energy cost savings alone is a tough sell given the current market combination of low electricity prices and high natural gas prices.

Energy user operating uncertainties

DE systems, aside from requiring considerable capital expenditures, also require a long-term planning horizon in which to achieve returns on investment. Energy users who are having trouble seeing their corporate futures have even more difficulty making DE system plans, and are less likely to include onsite generation in their strategies. Companies that lease their facilities or are engaged in a merger/acquisition situation are unlikely prospects for a DE sale.

> *Eight years ago we had a company come in and do a study on putting in two gas-fired generators to power the entire place. The owner got cold feet, because he does not own the building, he just leases it. There is always a power struggle going on between the owner of the building and the owner of the business. The business owner is not an engineering type, and he was afraid to do it because he really didn't know if he would see the savings or not.*
>
> — Casino, Nevada

> *The company has looked into the potential of adding baseload generating capacity about two years ago. However, this has been put on hold as the company might be sold in the coming years, and management does not wish to make any large capital expenditures.*
>
> — Food Manufacturer, Iowa

> *They are probably going to phase out the main building, it will be demolished in the next five years. [DE] chances are nil.*
>
> — State Agency, Arizona

On the other hand, DE opportunities increase when energy users relocate or undertake new construction, or after an internal management reorganization. Careful timing of sales contacts at companies in transition can take advantage of these opportunities.

> *They are abandoning their current facility and moving. In the new facility they will be thinking very carefully about installing a major DE project.*
>
> — Nursing Center, New York

Competing utility offers

Incumbent electricity providers can carry enormous weight in convincing energy users ***not*** to pursue DE. Not surprisingly, utilities typically don't have to offer cheaper or more reliable electricity until after an energy user expresses interest in a DE project. Keeping rate structures in fluctuation, promising improved future service, and providing counter-offers when interconnection inquiries are made are three effective strategies to delay DE systems.

Utilities appear adept at such practices, as Primen's research found ample examples of energy users who believed that electric utilities were confounding their intentions to go forward with DE projects.

> *The glitch there is you have to reduce your peak demand for a 13-month period before you can see any savings. And if at any time during the 13-month period your peak goes above what the peak is when the DE system is on, all bets are off. So it is not that easy to do. We were doing really well, and then we had our 90 kW go down after about three years of run time and we did an engine rebuild, so we were off-line for a couple of months and that whole peak rate goes right down the drain.*
>
> — Food Processor, Vermont

The reason it took four years was we kept getting resistance from the utility. Finally, it was obvious to the Chairman of the Board and everyone that the utility was just stalling us… They just didn't want to lose the business, didn't want to lose the income… They just kept throwing up little roadblocks, but nothing was regulation, they were showing that there were going to be better incentives, that they had new packages or programs coming out that were going to be better than installing cogeneration, and none of those came through.

— Tool Manufacturer, Illinois

We can't use them [DE generators] for peak shaving here, because of the agreement with the utility. We pick up a load following rate, because they call it "spinning reserve." They can call on us to generate power for them, so we get a special rate for that. But we can't use it if we see our peak demand coming through. We can't crank up our generators to shave that… We are just questioning where we are with this operation right now, and that we don't seem to get enough benefit from the load following rate, and we are seeing that charge is so close to our interruptible.

— Paper Manufacturer, Nova Scotia

On August 1st our whole business changed, because we went from a tariff to a pure time-of-day electric rate, so, as opposed to having a fixed, predictable electric cost, now we have a continuously variable, every five minute variable, electric rate… We're not wanting to make a lot of changes in our capital investments in electric generation, because we want to see what this is going to mean … Right now the best position is not to move, but just to watch probably for about a year.

— University, New Jersey

The utility doesn't want you to leave them, has been my experience. They're going to say anything, and do anything, to keep you as their customer so they keep getting your dollars.

— Tool Manufacturer, Illinois

> *The electric utility wanted to put a penalty on us. They wanted to charge us a standby charge for power… They will verbally tell you, and publicly say, that they are encouraging cogeneration, but behind the doors, when it comes to negotiations, they don't want it.*
>
> — University, New Mexico

By creating uncertainty regarding cost savings, the very heart of onsite generation benefits, utilities can block sales of new DE systems at the earliest stages of the purchase cycle. DE vendors have few options to counter rate fluctuations or changes in rate structure. One possible approach would be to prepare marketing materials that include testimonials from existing customers who developed successful DE projects despite utility efforts to the contrary.

DE Provider Options

Do energy users have a preference for a particular category of DE providers? Do they view one group as more credible than another? We talked to energy users about the pros and cons of three broad categories of onsite generation providers:

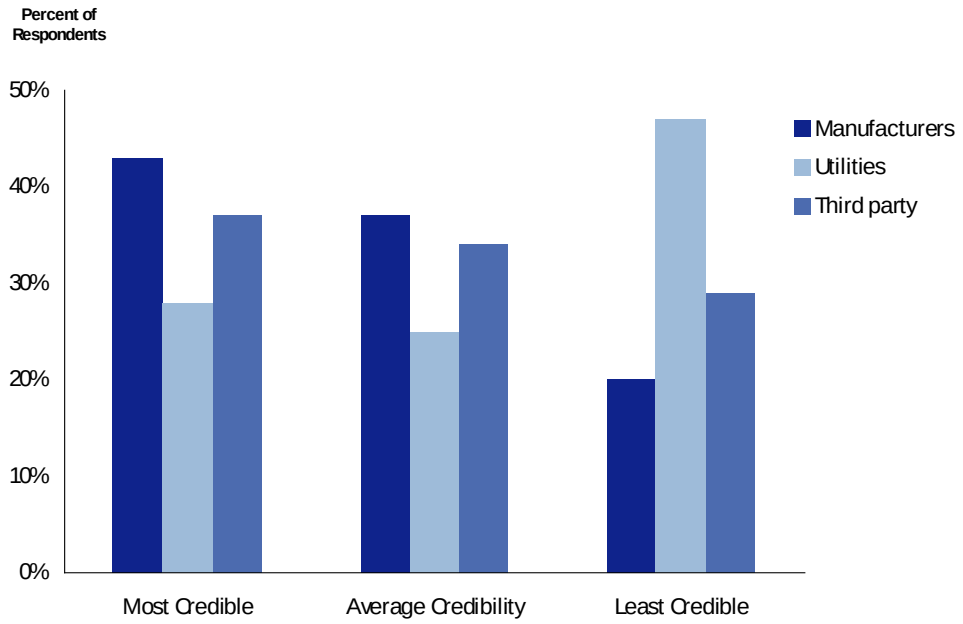
- Manufacturers
- Utilities
- Third-party developers

Overall, energy users see manufacturers and third-party developers as being more credible equipment suppliers and DE service providers than utilities. However, each of the groups has its detractors. The underlying message is that each has a subset of energy users that trusts it the most, and another subset that trusts it least.

Credibility of DE provider categories

When we asked energy users how they rate the credibility of DE equipment providers, manufacturers were rated the most credible, and utilities the least credible, shown in **Figure 6**.

Figure 6. Credibility of DE equipment providers



Energy users rank manufacturers as the most credible DE equipment providers, with third-party providers and utilities lagging.

Although each of the three provider categories has its proponents, each also has a significant fraction of detractors. For example, while manufacturers' credibility rankings are better than either of the other two groups, less than half of the strong DE prospects interviewed rated manufacturers as the "most credible" provider. There are apparently credibility gaps implicating all three groupings of energy service providers when it comes to reliable information on DE.

Utility credibility questioned

That some energy users feel utilities lack credibility when it comes to providing DE systems is not surprising, but perhaps the depth of their skepticism is. In short, some energy users believe that by offering both electric service and onsite generation, utilities are competing against themselves, and so have divided loyalties.

> *It seems kind of like the utility would be biting off their own toe… If it [the DE system] runs off of fuel oil, or diesel, or gas, they're not getting the income off of it.*
>
> — Grocery Store, South Dakota

> *The utility provider is interested in selling you utilities, not in buying utilities back from you.*
>
> — Food Processor, Mississippi

> *The PUC forces the utilities to do things and administer projects that they have to be a little schizophrenic about…trying to promote conservation, and at the same time their business is to sell electricity.*
>
> — Ski Resort, California

> *Right now we get some equipment from our utility, and they are not credible…The utilities in my interaction have not been innovative. Their innovation is more pushed by regulation. What they are in business for is profit.*
>
> — High Tech Manufacturer, North Dakota

Utilities are also more often singled out for criticism about their inertia and lack of innovation, characteristics that some energy users attribute in part due to utility oversight by regulatory commissions.

> *It seems kind of a pat industry, kind of regulated in many cases, and not much incentive for them to be innovative.*
>
> — Industrial Manufacturer, Arkansas

> *They don't have any competition… A lot of times they are pretty set in their ways of doing things.*
>
> — Bank, Iowa

> *Utilities tend to be slow moving, stable, and predictable, not risk takers, working within a regulated business for a long time. In other words, established operating costs plus profits.*
>
> — Electronics Manufacturer, New Hampshire

But paradoxically, this same regulatory supervision seems to make utilities more trustworthy in the eyes of some energy users.

> *We have to trust utilities every day and we do. They do their job in this market, and they have a track record, and hold a lot of the cards in terms of where the service starts, and where the service ends, and they are familiar with our equipment.*
>
> — Furniture Retailer, Minnesota

Utilities engaged in DE sales can work to directly counter these negative perceptions, but care must be taken that any claims made in sales materials are firmly supported by company policy. To utilities' benefit, they can capitalize on the sense of security and dependability that they already project to customers.

Manufacturers under competitive pressure

We found a diverse range of opinions about DE manufacturers' credibility, even though they receive the highest relative ranking among the three types of companies. Because their core business is driven by the performance of their products, energy users perceive them as highly motivated to make sure systems work.

> *I think manufacturers are the most familiar with the technology and how it operates, and what its capabilities are… Manufacturers have to find ways to make their equipment more efficient from an operating and from a cost standpoint. There is always that competition.*
>
> — Electronics Manufacturer, New Hampshire

> *I like to go with the one who has the most to lose. The company that is selling it really wants it to work, because they want to be able to bring people in and show them how good it works, and how much money you can save. If it doesn't work it will be a big financial drain on them.*
>
> — Laundry Facility, Wisconsin

Some energy users, though, recognize that manufacturers have their own credibility gap, due to their obligation to push their own company's product line. Also, some energy users disparage manufacturers' credibility since manufacturers are typically looking forward to the next sale, rather than the past one.

> *They want to sell their equipment, so they're going to tell you what you want to hear.*
>
> — Tool Manufacturer, Illinois

> *A manufacturer's basically set up to design and build one particular product. That's what they'll do. It's very hard to go in to a manufacturer and say, "This is what I need built." So basically you kind of get what they build, and if you have to make any adjustments you're on your own.*
>
> — Municipality, Texas

> *If you go to the manufacturer, it is a sales pitch. They are all going to sell their product, and tell you it is the best product, and that they don't have any problems with it. I just believe that we don't get a straight answer.*
>
> — Hospital, Wisconsin

Manufacturers can overcome some of this skepticism with sales materials highlighting their experience in providing real solutions for customers, preferably through testimonials.

Third-party developers agile, but hard to pin down?

Third-party developers, without allegiance to a particular manufacturer's products or restrictions of utility regulation, are often seen as more impartial, flexible, and sensitive to the needs of customers than other providers. If third-party developers can convince energy users that they have successfully met the needs of other companies with DE systems, their credibility and appeal will increase significantly.

> *An outside party would be more adept at looking at all the options available, and would probably be more likely to find a solution to meet individual needs.*
>
> — Sawmill, Georgia

> *They are not as biased…they can adapt or take best of breed from possibly several different areas or manufacturers, and put something together that may be a hybrid, but it makes the most sense.*
>
> — Bank, Iowa

> *They have the most to win or lose. They put together deals based on who is making the best equipment, on where you can get the best financing, and who is going to do the best engineering. They don't toe the party line.*
>
> — Ski Resort, California

The downside of being small is that some energy users won't have as much confidence or trust in a third-party developer as they would have in large equipment manufacturers or even regulated utilities. Interviewees express concern regarding whether third-party developers will stand behind their work if problems arise. Third-party developers are sometimes seen as short-term opportunists, rather than long-term partners.

> *Consultants can walk away from their mistakes… a consultant went almost $4 million over budget on an expansion and just threw up his hands, and said "that's the best that I can do." They are very glib and have all the answers. If it doesn't work they are very quick to just tiptoe away from it and not answer their phone anymore.*
>
> — Commercial Laundry, Wisconsin

> *They're looking to make money, and generally looking to make money shorter term.*
>
> — University, New Jersey

What energy users are looking for

Whatever the category of DE supplier, energy users have expectations for reliability and experience. DE providers can strengthen their case by demonstrating to prospective customers that their firm has a strong track record of successful projects, and is not a fly-by-night operator. Energy users also want information about the people who work at the DE provider, providing evidence that people, and not just company names, are important differentiators among providers.

> *They would have to have a proven track record and work on equipment. They would have to be economical.*
>
> — Retirement Facility, Florida

> *Reliability, we would look at the equipment we are purchasing and do some research as to other people that have it, and how happy they are with it…how happy they are with maintenance. Reliability is a big issue for us, because they are our emergency source.*
>
> — Hospital, Wisconsin

> *I look for people that know what they are doing. I would look for reliability, and people that stand behind their work. I don't want to be bickering about what the contract says here or there. I want them to stand behind their work.*

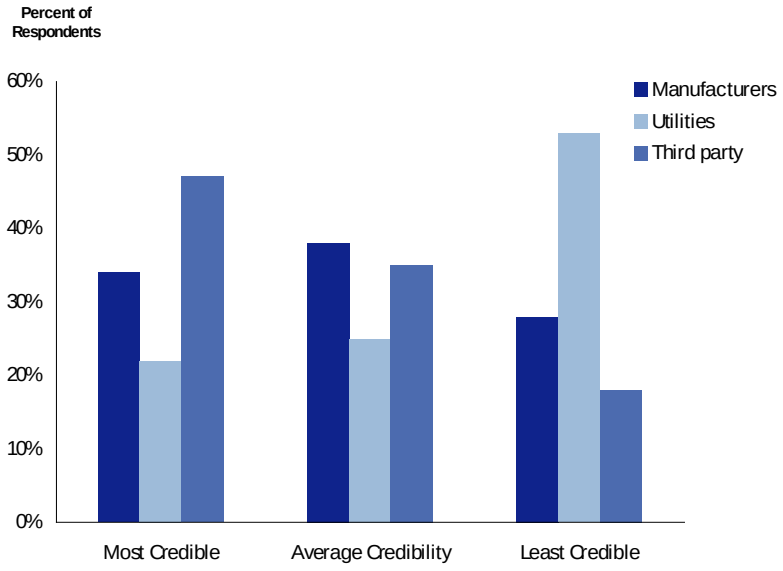
> — Semiconductor Manufacturer, Texas

Energy users also express their desire to visit DE systems similar to what they're considering, and to interview existing DE users about their systems and their relationship with the DE provider. DE providers should be prepared to supply information listing nearby installations and contact information.

DE service provider preferences

Once a company has procured DE, ensuring its long-term performance moves to the forefront of their priorities. When we asked energy users who they have more confidence in for providing services on their DE installations, nearly half of them said they believe third-party providers have the most credibility. (See **Figure 7**.) In explaining why third-party providers have the edge in this regard, interviewees cite flexibility and a focus on the customer, rather than on equipment sales.

Figure 7. Credibility of DE service providers



Energy users rank third-party companies as the most credible DE service provider. Equipment manufacturers are also found to be fairly credible, while most energy users see utilities as the least credible DE service provider.

At the other end of the spectrum are utilities, with more than 50% of users saying that utilities are the least credible provider of DE services. In fact, some energy users expressed outright disbelief that utilities can provide these services at all.

> *I don't think that utilities would have anybody on staff to do this kind of thing. I would frankly be surprised if they're into that.*
>
> — Grocery Store, South Dakota

> *Utilities are not involved in that at all, so they are at the bottom of the list.*
>
> — Nursing Center, New York

When searching for a service provider, energy users look for more or less the same qualities they expect in an equipment supplier: reliability, a proven track record, and qualified staff.

> *Expertise is a number one concern for us. We want qualified people coming to work on these generators. We simply can't have someone with a lack of experience working on these generators and making some bad decisions, and when we need them they fail.*
>
> — Hospital, Wisconsin

> *Their reputation and their knowledge…Is the customer base they have now satisfied with them. Because if they're not, the chances are that I won't be either. I would also like to see their stability in the marketplace. Have they moved from here to there, to try and duck and dodge?*
>
> — Nursing Center, New York

Notes

1. Primen's report on The Cost of Power Disturbances to Industrial & Digital Economy Companies (commissioned by EPRI's Consortium for Electronic Infrastructure for a Digital Society (CEIDS), 2001) provides empirical estimates of the costs of outages and power quality for a variety of types of companies. It is available at www.e2i.org.

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Appendix A. Interview Topic Guide

2003 Distributed Energy Market Study

Interview Guide

Respondent Information

- Name: _____
- Title: _____
- Company: _____
- Telephone Number: _____
- Interviewer: _____
- Interview Date: _____
- Interview Time: _____
- Interview/sequence number (e.g., SM01, BB03): _____
- End-user Category (e.g., Industrial heat-recovery, commercial heat-recovery, other user segments): _____

1. Please describe your facility (including size in sq. ft.) and the primary processes/operations that occur there.
   a. Which of these processes consume the most energy?

2. What are your responsibilities with respect to facility and energy management?

3. Electrical demand of the facility (kW or MW)? **Capture total, average, and peak demand if known**.
   a. Total electric demand
   b. Average demand
   c. Peak demand

4. Approximately how much natural gas do you consume at this facility? What are the primary processes that use natural gas?

5. (**Where appropriate**) Do any of your processes produce waste gasses that could be combusted? If so, how much gas is produced and how is it currently dealt with? What would be involved in capturing these gasses for onsite generation?

6. Do you currently have onsite power generators? **If no, skip to 14**

7. Types and sizes of generators
   a. What types of generators do you have (include fuel options)?
   b. What size are the generators?
   8. How are the generators used?
   a. For standby/emergency only?
   b. Peak shaving?
   c. Generate power on a regular basis (baseload)?

9. (**Ask only if they dispatch generators as part of a utility or third-party load management program**)
   a. What was the primary reason you decided to participate in this program?
   b. What is the nature of the monetary incentive you receive from the utility? How much have you saved/earned by participating in this program?
   c. Were there any reasons for participation beyond the savings on your energy bill?
   d. Has the experience of participating in this program made you more or less likely to do other onsite generation projects?

10. (**If they dispatch generators on their own to reduce their peak demand**)
    a. How do you determine when and for how long to dispatch them?
    b. How much money do you save by using your generators to peak shave?

11. (**If they generate part or all of their own power on a regular basis**)
    a. Approximately what % of your total electrical needs do you generate at this facility?
    b. Do the generators produce heat that could be/is captured and used for other purposes? If useable waste heat is available but not being tapped, why not? What would be involved in capturing and using the heat?
    c. Do the generators produce steam and/or chilled water through cogeneration?

12. (**If they are doing anything with onsite generation beyond simple standby, explore the decision-making process that led to these actions.**)
    a. What prompted you to first consider this application for onsite generation?
    b. What are the primary drivers for this project?
    c. Did you design the system in-house?
    d. Did you purchase/own the generators or lease them?
    e. Did you finance the project using your own capital resources, your company's usual lenders, or finance it through the project developer?
    f. Who within your organization championed the project? Why?
    g. Who were the other important stakeholders who had to be convinced? What ultimately appealed to them about the project?
    h. What concerns did people raise about the project? How were they addressed? Which one was the hardest to address?
    i. What role (if any) did the vendor or project developer play in helping the internal champion "sell" the project to others within the organization? What could they have done (or done differently) that would have been more helpful?

13. How much of an impact did each of the following have on your ability to go forward with the project? (**Rate on 10-point scale**)
    a. The company's financial position and/or the state of the economy at the time of the project
    b. The availability (or lack thereof) of financing from the vendor/project developer

c. Specific warranties/guarantees provided

d. The nature of the service agreement included/offered

e. Support from the vendor/project developer in addressing environmental or permitting issues?

f. Your electric utility's flexibility (or lack thereof) in resolving tariff and interconnection issues

g. Fuel prices (diesel, NG, etc.)

h. The ability to cogenerate heat, steam, or chilled water

i. Other specific features of the generation technology

j. Other issues?

14. How likely is it that you will install additional onsite generation within the next two years? (**Try for a probability/percent likelihood rating**)

    a. For standby only?

    b. For baseload/peak shaving?

15. **For any DE projects they say are likely or being considered:**

    a. How large would this project likely be (kW)?

    b. Would heat recovery or cogeneration of steam or chilled water likely be part of the project?

    c. What would the primary drivers for this project be (savings on electricity/energy costs, power reliability, power quality, stabilizing energy costs, other)?

    d. How likely would you be to design the system in-house?

    e. How likely would you be to purchase/own the generators vs. lease them?

    f. How likely would you be to finance the project using your own capital resources, your company's usual lenders, or finance it through the project developer?

    g. Who within your organization is likely to champion the project?

    h. Who are the other important stakeholders who have to be convinced? What will each of them be looking for in the project?

    i. What concerns are people likely to raise about the project? How will they be addressed? Which do you expect to be the hardest to address?

j. What role (if any) should the vendor or project developer play in helping the internal champion "sell" the project to others within the organization? What could they do that would be helpful?

16. How much of an impact is each of the following likely to have on your ability to go forward with the project? (**Probe for as much detail as possible on each, especially if they say it will have a big impact. If they say one or more of the following is a non-issue, find out why — rate on 10-point scale**)

    a. Your company's current financial position or the state of the economy

    b. The availability (or lack thereof) of financing from the vendor/project developer

    c. Specific warranties/guarantees provided

    d. The nature of the service agreement included/offered

    e. Support from the vendor/project developer in addressing environmental or permitting issues

    f. Your electric utility's flexibility (or lack thereof) in resolving tariff and interconnection issues

    g. Fuel prices (diesel, NG, etc.)

    h. The ability to cogenerate heat, steam, or chilled water

    i. Other specific features of the generation technology

    j. Others?

17. Are there other onsite generation projects that have been discussed but that are not likely to proceed at present? What would have to change for them to proceed? (**Economy improve, gas prices drop/stabilize, other?**)

18. Which if any of the following do you outsource for your current onsite generators?

    a. Routine maintenance

    b. Repairs

    c. Monitoring/dispatch

    d. Turnkey operations

19. Why did you choose to outsource/handle in-house each of these services?

20. Are there services related to onsite generation that you would like to outsource but have not? If so, why not?

21. What are the most important criteria in deciding whether to handle a particular function in-house or outsource it?

22. When you are doing an onsite generation project, what services need to be provided by the vendor or project developer?

23. What services don't have to be provided by the vendor/developer, but would ideally be provided by them?

24. Are there any services that are not currently available that would make it easier for you to generate power onsite?

25. What are the most important qualities you look for in a vendor of onsite generation equipment?

26. In a provider of services for onsite generation?

27. How credible would you find each of the following as a **provider of DE equipment**?
    a. An equipment manufacturer
    b. An electric utility
    c. A third-party project developer

28. How credible would you find each of the following as a service outsourcer for generation O&M, monitoring/dispatch, or turnkey solutions?
    a. An equipment manufacturer
    d. An electric utility
    e. A third-party project developer

29. Which of the types of companies we have been discussing would you expect to be the most innovative in creating new services related to onsite generation? Which would you expect to be the least innovative?

a. Most innovative?

b. Least innovative?

30. Is there anything else related to this topic that we haven't already discussed that you would like to mention?

31. If I have clarification questions as I am reviewing my notes, may I call you back for clarification?

32. Enter respondent email address for executive summary

33. If respondent accepted our offer of an incentive check — to whom should the check be made out too and to what address should the check be mailed?

Thank you for participating.

Appendix B. Sampling Category Method

The purpose of the DE survey was to examine the potential of using DE in a broad marketplace.

Business sector

We drew participants from five business sectors:

- Digital economy
- Continuous Processing Manufacturing
- Electronics manufacturers
- Heat Recovery Potential (includes sectors with significant heat recovery potential)
- Gas Byproducts (includes sectors that produce methane GBP)

Table B-1 shows the populations of possible industries and respective SICs within the five sectors.

Table B-1. Industries and SICs for corresponding business sectors

Group	Industry	SIC
Digital Economy	Custom computer programming services	7371
	Systems integration services	7373
	Data processing and preparation	7374
	Information retrieval services	7375
	Biological research	873101
	Noncommercial biological research	873301
	Chemical manufacturing — biological products, except diagnostic	2836
	Depository institutions	60
	Communications	48
	Security and commodity brokers, dealers, exchanges, and services	62
Continuous Processing Manufacturing	Paper & allied products	26
	Chemical & allied products	28 (exclude 2836)
	Petroleum & coal products	29
	Rubber & misc. plastics products	30
	Stone, clay & glass products	32
	Primary metals industries	33
Heat Recovery Potential (HRP)	Dairy products	202
	Canned, frozen, preserved fruits and vegetables	203
	Hospitals	806
	Grain mill products	204
	Sawmills and planing mills	2421
	Hardwood dimensions and flooring	2426
	Colleges, universities, and other professional schools	8221
	Correctional institutions	9223
	Grocery stores	5411
	Operators of apartment buildings	6513
	Hotels and motels	7011
	Industrial launderers	7218
	Power laundries, family and commercial	7211
	Skilled nursing care facilities	8051
Electronics Manufacturers	Electronic and other electrical equipment and components, except computer equipment	36
	Measuring, analyzing, and controlling instruments; photographic, medical and optical goods; watches and clocks	38
	Computer and office equipment	357
Gas By-products (GBP)	Landfill or solid waste disposal	4953
	Wastewater treatment	4952
	Coal mining	1222
	Oil or gas drilling or extraction	1311