

Using Energy Information Services as a Delivery Channel for Energy Efficiency

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ABSTRACT

Benchmarking comparative building performance continues to be one of the major challenges for owners and programs seeking to improve efficiency across portfolios of buildings. EPA's ENERGY STAR program has done much to create a systematic approach based on census data and, at this point, applied it to a significant population of US buildings. However, data entry challenges are still significant for the target user audience, which are primarily large portfolio owners and managers who have to prioritize their approach to energy efficiency investments across multiple facilities. To address this challenge, several leaders in the field of energy information systems, which supply energy usage, demand, and billing information over time, have added the capability to automatically benchmark their customers' buildings. The advantage of this integrated capability is that all the pertinent data tends to reside in the databases hosted by these energy information providers and their customer base tends to be naturally interested in prioritizing buildings by performance using a third party metric.

Currently, six energy information providers have adopted the protocols required to provide benchmarks within their systems. During the pilot phase of this initiative, many of these participants provided critical guidance associated with the mechanics and larger integration opportunity. Lessons learned will be presented that will allow other initiatives to consider how to engage with this critical but still untapped segment of the marketplace, which is likely to grow in importance as service providers recognize the opportunity and ease with which they can offer value-added information services.

Introduction

Midstream energy efficiency market transformation programs all face the same difficult challenge; to not only reach their intended audience with their program offering as efficiently as possible, but to also make sure that program information is presented at the right place and the right time to most effectively affect behavior. The delivery channels utilized must also be responsive to changes in the marketplace, as well as be able to best fit with the inevitable life cycle changes of the program. The marketing mechanisms and delivery channels designed to introduce the program to early adopters eventually becomes inadequate to reach deeper into the marketplace, and overtime becomes out of sync with the delivery of services in the dynamic energy services market.

The national energy performance rating system developed by EPA's ENERGY STAR program is at such a crossroads. Five years from its introduction into the market, the rating has enjoyed growth, visibility, and acceptance by early adopters through a direct delivery through proprietary stand-alone software tool. As the rating matures it now faces the challenges of achieving deeper penetration across users' building portfolios, more frequent use by those

organizations, and, most importantly, utilization in building business transactions to influence energy efficiency. Servicing more users, more buildings, and more applications of the rating dictates that an alternative delivery channel be developed.

This paper will discuss EPA's perceived need, design, and development of a new delivery channel for the national energy performance rating system. Six energy information service providers have helped design and implement a new delivery strategy for this product that promises to meet EPA's pollution prevention objectives, while expanding the business opportunities for this sector of the energy service industry and improving the quality of service for their customers. The early experiences of this initiative indicate that although this market is difficult to understand and partner with, it is an untapped resource which can greatly leverage the distribution of similar energy information content produced by the energy efficiency market transformation community.

The National Energy Performance Rating System – Filling an Information Gap

Commercial building owners, operators, and energy managers consistently express a strong interest in understanding the energy performance of a building (Venables and Egan 2002). While numerous methods exist for understanding the energy performance of commercial buildings (ranging from basic energy consumption benchmarking, to engineering audits and analysis, to more sophisticated computer modeling and simulation), all have significant shortcomings in their practical utility (Von Neida and Hicks 2002). The national energy performance rating system, as conceived by the U.S. Department of Energy and the U.S. Environmental Protection Agency, was designed to supplement these approaches, improving the commercial building market's ability to cost-effectively measure and quickly communicate whole-building energy performance. This benchmark accounts for weather, climate, occupancy and operational characteristics to provide a method to compare the efficiency of a building relative to the national building stock, provide a simple 1-100 metric to communicate that relative performance, and establish a national performance target for excellence.

From its inception in 1999, the primary delivery strategy for distributing the rating into the marketplace has been through EPA's Portfolio Manager, a proprietary online energy accounting software application made freely available to public through the EPA's Web-site. To obtain a building rating, building owners, operators and occupants establish a Portfolio Manager user account, and enter 12 months of energy consumption information along with basic building characteristics such as building type, size, and roughly half a dozen other basic building occupancy and operational characteristics. Having derived a rating for their building, users can then apply the rating to basic energy management functions, such as establishing baselines, setting energy and cost improvement targets, tracking performance over time, and aggregate individual building information to the portfolio level. Within Portfolio Manager, buildings with ratings of 75 or higher also qualify for the ENERGY STAR and are eligible for recognition.

This delivery mechanism has been successful at quickly and cost effectively introducing the rating system to the commercial buildings market. As of 2004, more than 4,000 Portfolio Manager users have evaluated the energy performance of 19,000 buildings totaling 3.2 billion square feet. For the 50 percent of the commercial buildings market that the rating is available, this represents a 10 percent penetration rate (by square footage) of the market, with some building types (such as acute care hospitals) having close to a 20 percent penetration rate (US EPA). Furthermore, delivery of the rating through EPA's Web site made further sense as a one

stop shopping experience to a pre-sold market of 950 ENERGY STAR Partner organizations that have committed 10 billion square feet of commercial buildings to be benchmarked and upgraded. Finally, delivery exclusively by EPA gave the program maximum control over algorithms, content placement, and brand usage – all of which were critical requirements to successfully introducing this novel content.

Growing Pains

While this delivery solution has been initially successful, its longer-term utility has become questionable. Success of the rating system is predicated on its use by a broad audience of end-users (owners, operators, and tenants), who would use the rating across their portfolio of buildings to understand relative building performance and prioritize investment, and continue to use the rating to watch individual building and portfolio movement over time as building performance is upgraded. EPA has witnessed a flattening growth curve over the past two years, with continuous benchmarking over time much lower than anticipated. Between 2002 and 2003, entry of new buildings has been flat at roughly 4,000 buildings per year, and re-benchmarking of those buildings at roughly half of that. Furthermore, the average portfolio size has remained consistent at 5 buildings per user. Given the burdens of manually entering and updating energy consumption information across all fuel types and meters in a building, users appear to be content with initial evaluations of their higher profile buildings, while not extending this practice across their portfolios over time.

The challenge of continually increasing market penetration for the EPA rating is understandable given the competition Portfolio Manager faces for end-user attention. There is a wide variety of competitive energy management software available to end-users, and a mature market for both in-house and 3rd party utility tracking solutions. An increased interest in providing energy information services has also accompanied the early attempts at restructuring the retail electricity market; the growth in advanced metering; and the opportunity to access real-time pricing through demand response (Venables and Egan 2002). E Source surveys also estimate that as much as two-thirds of blue chip organizations and one-quarter of the broader commercial market already receive interval data (E Source). Attracting those users to re-enter and manage that information in another energy management software application is not realistic.

Finally, limiting the delivery of the rating through Portfolio Manager has also limited its practical application to influence energy decisions in the building. In its most potentially effective application, the rating should represent and clarify a heretofore-underrepresented financial aspect of the building in business transactions - such as buying, selling, leasing, insuring, retrofitting and buying energy for the building. Limiting the distribution of the rating to the basic energy management functionality of Portfolio Manager does not allow the rating adequate exposure to inform and promote energy efficiency within those transactions.

For these reasons, a new distribution mechanism for the rating was explored. Early on it was acknowledged that the required manual data entry was a significant barrier to widespread user adoption. While several projects have been undertaken to facilitate bulk data transfer into the tool, these solutions have done nothing to counter Portfolio Manager's competition from commercial energy information products, increase ENERGY STAR's ability to introduce the rating into decision making environments, or ease the growing information technology platform maintenance burden placed on EPA. To accomplish these objectives, ENERGY STAR would have to not compete but collaborate with commercial energy information vendors.

Energy Information – the Coin of the Realm

A partnership with service companies which hold energy information for commercial buildings seemed a logical extension of the Energy Star commercial buildings program, which already has a history of partnering with energy efficiency product manufacturers, service providers, and retailers to promote the ENERGY STAR program. Before evaluating the market for potential partners to distribute the rating, EPA established several core requirements. First, to maintain quality, consistency, and currency for the rating EPA would have to maintain control of the scoring algorithms and be able to maintain, update, and expand the scope the rating system. Given the frequency that this happens, the algorithms would have to be centrally controlled and distributed by EPA. Passing out software updates and relying on vendors to run the most current algorithm versions was not an acceptable option. This defined the need to house the algorithms on EPA servers, and to work only with Web-enabled tools that could access those algorithms via the Internet. This eliminated stand-alone software applications from consideration (e.g. Faser, DOE2, etc). Second, to evaluate the program's impact on the marketplace, EPA would need to monitor the use of the algorithms and be able to generically track the scoring of buildings over time. This also dictated that the algorithms be housed on EPA servers. Third, the rating would need to be complementary with the vendor's content. This eliminated information services that were wed to their own competing benchmarking services, and tools that were not focused on energy (e.g. Tenant management and building services management software). Finally, as an ENERGY STAR branded product, proper application of the service mark would have to accompany the rating.

Wading into this market led to three potential targets. Energy utilities and bill processing bureaus, as the largest holders of building energy consumption data, were obviously considered first. Regulated utilities dropped out of consideration when it became apparent that no practical level of security could be provided to data transmission or off-site storage which would satisfy their state mandated obligations to maintain privacy and confidentiality of their customer data. Deregulated operations within utilities were also an attractive target, given their closeness to larger customers and their growing interest to own customer's data to forge stronger service relationships. Over the past several years, however, this market, while receptive to this idea, has been difficult to pin down as they undergo an identity and market positioning dilemma: do they package energy information services as a loss leader to sell energy commodities and other services, position it as a revenue generator, or is it simply provided as customer service? This combined with the unanticipated startup expenses and timeframes these utilities have incurred have caused limited action in that market.

Having dismissed those potential partners, the internet-enabled data service vendors (manual data entry and analysis), full service bureaus (utility accounting, analysis, bill verification, and payment), and energy management and maintenance service vendors with energy information services (e.g. ESCOs, upgrade contractors) were approached.

The fundamental business proposition of becoming a delivery agent or host of the ENERGY STAR rating content was immediately attractive to them for several reasons. First, although most had basic benchmarking capability, they recognized the significant investment ENERGY STAR had made in creating and maintaining a more robust benchmark than they currently offered. Those without whole building benchmarking typically focused on more granular interval data and system level analysis and welcomed the complimentary and expanded content the rating represented. Second, in an increasingly competitive market where

differentiation between vendors is difficult, the affiliation with EPA and association with the ENERGY STAR brand was also attractive as a method to differentiate themselves from their competition. Third, these vendors recognized a business opportunity to service the large ENERGY STAR partner base that had committed their portfolios to benchmarking, but had not begun to do so in earnest. When viewed as a preferred provider of ENERGY STAR benchmarking, the rating could become a new revenue service to their existing customers, or become a loss leader to a new revenue source from ENERGY STAR partners seeking to fulfill their program commitments. Having found a complimentary fit between the rating and their business model, if a balance could be found to satisfy EPA's core requirements and the vendor's investment in creating the delivery mechanism, a new marketing channel for the rating would be created.

Creating a Third Party Hosting Model

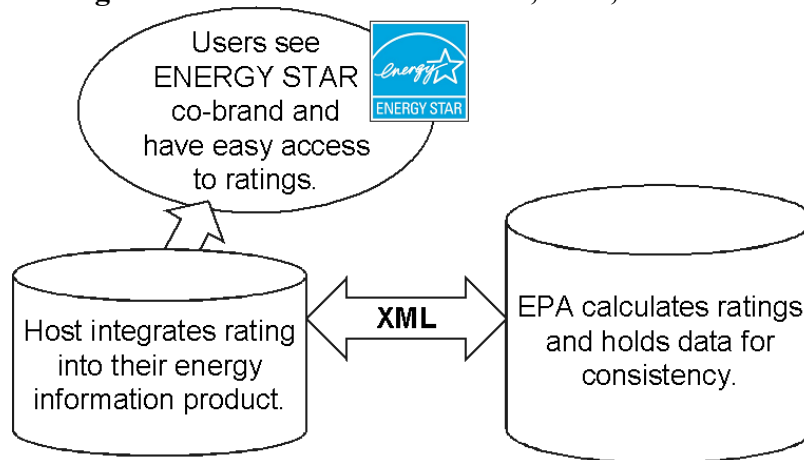
As EPA began to consider providing the national energy performance rating via commercial energy information products, several key programmatic and functional issues surfaced that dictated the decision-making associated with the hosting relationship. The following issues made it essential that EPA maintain control of the actual calculation events rather than simply supply algorithms to host entities:

- EPA needs to own, host, and evolve the benchmarking algorithms used in the rating. It would not be feasible to provide all third party hosts with algorithms and then periodic **updates to algorithms** since EPA's goals assume a single, consistent rating at all times. Sharing algorithms, although discussed, would have been a mistake, as end-users would not accept a situation where some third party hosts upgrade their algorithms immediately while others waited for the next upgrade to their software to be tested and released.
- EPA currently performs **weather normalization** using NOAA temperature data feeds run through an application developed by EPA. This process requires an ongoing relationship with the NOAA data source and could not reasonably be extended to all third party hosts, who see EPA's unbiased, consistent approach to weather normalization as one of the reasons to host the rating.
- Like most voluntary programs, ENERGY STAR has program assessment metrics, mostly based on the penetration of the benchmark in the US marketplace. It would have been difficult to **count the total number of benchmarks** over time if these benchmarks were all being delivered in isolation through different commercial energy information products.
- Users of the national energy performance rating system demand different levels of data **confidentiality and anonymity**, however, users that elect to apply for the ENERGY STAR Label need to identify themselves. Any third party solution must preserve the ability of an energy information provider's end-user to remain anonymous until they apply for a label.

This combination of factors resulted in the decision to process data for ratings in a single, consistent, EPA-hosted analytical environment. Ratings are supplied to the third party hosts after being calculated by EPA on an EPA server. Third party hosts receive the ratings and then display them as part of their product offering. Figure one diagrams this approach, where data is

passed from the third party host server to the EPA server, where calculations take place, and the third party host server retrieves ratings in their energy information system for display. This approach allows algorithms or the weather normalization approach to be updated by EPA for all end-users simultaneously. It also allows EPA to count incidences of benchmarking and movement of benchmarking ratings over time. It does not require that EPA view the owner name or address, which meets some hosts' concerns about confidentiality.

Figure 1. Data Flow between EPA, Host, and Users



In order to facilitate this approach to data transfer, EPA worked with early third party host candidates to identify Extensible Markup Language (XML) as the best technology for third party hosting. XML is similar ASCII, but for numbers: a simple, easy to master approach that is already being used by the energy information community. This decision turned out to be a wise one as many of the third party hosts already have in-house XML capability and it has taken as little as two weeks for hosts to develop and utilize the ability to convert their existing data into the EPA XML data schema.

In partnering with ENERGY STAR to offer the rating, third party hosts commit to follow specific protocols associated with the XML data transfer approach, including updating this approach as new space types and other refinements are made to the EPA rating. In addition, hosts commit to working with ENERGY STAR to ensure that messaging associated with the rating, its application, and associated program offerings is consistent. As these relationships evolve, it is anticipated that the third party hosts will facilitate application for the ENERGY STAR Label, Statement of Energy Performance, and new program offerings associated with exemplary, portfolio-wide energy performance.

EPA recognizes that business-to-business relationships, especially those that require consistent messaging and complex data transfers, are among the most challenging for extending the reach of voluntary programs and associated branded offerings. Because of this, EPA kept this initiative in a "pilot" mode that allowed interested hosts to help define the initiative and prevented EPA or third party hosts from being overloaded with requests from potential hosts or end-users, respectively. This approach has prevented a relatively common weakness of IT-driven program initiatives: attempts to anticipate, design for, and handle all possible user scenarios rather than phasing development to address issues as they are identified with pilot participants. The phased approach being used by EPA does require that buy-in is strong enough

to allow flexibility over time, and can result in getting to market more quickly and with a smaller investment.

With almost 250,000 sites represented by the current set of third party hosts, the maximum throughput is promising and, importantly, EPA maintains the ability to ensure quality of interaction with program partners as well as effectively monitor hosts to learn how to manage more relationships and expanded capabilities in the future. Hosts have offered to franchise the rating; take over the algorithms and their development; integrate other EPA tools into theirs; and/or train other potential hosts, so interest is high and varied regarding the future. Currently, however, EPA is working to fully build out and stabilize the existing host relationships around the rating and associated offerings.

Several Models for Success

Dramatic changes in the energy information industry during the deregulation era allowed EPA to experience all manner of business models, including start-up and companies trying to add capabilities as their market share contracted. Currently, there are several types of successes, each of which seems to be a viable avenue for moving forward:

- One of ENERGY STAR's award-winning energy service providers is integrating Web-based energy information services for their customers. They are also a longtime user of the rating, having benchmarked over 1,000 buildings on behalf of their customers. Incorporating the rating into their information services offering seemed like a natural fit, and will significantly reduce the time required to provide their customers with benchmarks on a regular basis.
- Two of the leading billing services, which process, aggregate, and present utility billing information to identify errors and track expenditures over time, have signed on to host the ENERGY STAR rating. This is proving to be an easy way for them to expand their offering to include unbiased energy information, and, with over 150,000 sites between them, gives ENERGY STAR access to an unprecedented number of buildings. Additionally, both companies offered to assist ENERGY STAR in collecting data required to develop rating algorithms for space types not currently including in the ENERGY STAR algorithm set. This is an important opportunity, as census data for subsequent space types may not be sufficiently detailed to use for this purpose.
- A provider of operational data for industrial processes is expanding their reach to include commercial buildings. They have focused on the ENERGY STAR rating as an offering that provides entrée to this marketplace. They involved their high level managerial and marketing staff early on, and have evolved a sales pitch that is focused on the rating and large ENERGY STAR Partners in sectors where they have had some success. Their aggressive marketing approach has resulted in both contracts with key commercial building owners and added motivation on the part of their competition to host the rating.
- In 2003, ENERGY STAR participated in a very creative market relationship built around energy information and the ENERGY STAR rating. The California Hotel and Lodging Association used CEC demand reduction funding as a monetary incentive for association members to try energy information services for a one-year period. These energy information services include the ENERGY STAR rating. As a result, a number of California hotels will have the rating delivered to them via two companies that provide

the rating, and, their hotel chains, many of which are national, will get some experience with both energy information and the rating.

There seems to be an opportunity for all of these hosts to service more of the building portfolio for any of their customers. In other words, many large users of these types of services do not use them for their entire portfolio. As ENERGY STAR evolves program motivation associated with changing the performance of a participant's entire portfolio of buildings, ENERGY STAR participants will have reason to consolidate their energy information services under a single vendor. For hosts of the rating, the promise of expanding existing relationships seems to be more compelling than building new relationships, as the sales cycle is shorter and cost of sale lower.

Conclusion

Having worked for over two years to establish innovative and challenging business-to-business relationships that deliver voluntary program analytical benefits through a currently underutilized commercial resource, there are several lessons learned for others attempting to connect with energy information providers or attempt similar business-to-business program delivery channels:

- **Keep the value proposition simple:** commercial enterprises do not want to be distracted from their core business, so this effort maintained focus on the ability of ratings hosts to sell services to large companies who are already committed to the rating. Now that we have established relationships, we are able to talk to our hosts about extending the relationships to include other programmatic offerings (i.e., financial analysis of energy saving opportunities).
- **Minimize the IT focus:** Information technology is often erroneously identified as the hardest and most immediate challenge associated with any relationship involving data exchange. In fact, the initial value proposition and the ability to sell the initiative to key decision makers (not technicians), is more important. Each of the current third party hosts has had little trouble mastering the mechanics of the XML data exchange relationship, but some have struggled to integrate the offering in their sales approach.
- **Get to vendors quickly** (before their business model or personnel changes): The energy information marketplace is still too dynamic for a relationship that requires too much patience or definition in process. Our ability to quickly define both the value and the mechanics of participation was critical in getting companies to commit and move forward. On several occasions, a company champion dedicated to the success of the relationship left the company or got reassigned, resulting in a serious setback in the relationship.
- **Create a self-serve marketing environment:** Most programs like ENERGY STAR are obligated to serve all comers. For this reason, it was important to create, early on, a Web resource to allow any potential host to understand and try out the data exchange using the ENERGY STAR Web site. This approach saved many contractor hours compared to hand holding each company that expressed interest, and allowed focus on more likely success stories.

- **Focus on leaders:** While the ENERGY STAR Web resource allowed all interested companies to participate, highly desirable and obviously aggressive companies were shepherded through the process. These included companies motivated enough to fly to EPA Headquarters for brainstorming and presentations. As a result, several recognized players were fast-tracked into the initiative. It was then highly beneficial to be able to mention recognized players as hosts, since this motivated other companies deciding whether or not to participate. Now that the rating is somewhat established among key market players, new hosts are approaching EPA and are highly motivated.
- **Allow for creative application of content:** All of the current hosts make their living manipulating and displaying energy data. They have proven adept at integrating the rating into their offerings, in many cases offering their customers more creative and flexible viewing environments than those in which ENERGY STAR is likely to invest.

In the coming months, it is anticipated that the third party delivery channel will far exceed the original model in delivering ratings. In addition, the benefits associated with having a commercial delivery channel, both in educating program participants and soliciting new participants, will be tested.

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