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From Energy Audits to Home Performance: 30 Years of Articles in Home Energy Magazine

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From Energy Audits to Home Performance: 30 Years of Articles in Home Energy Magazine

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ABSTRACT

Home Energy Magazine has been publishing articles about residential energy efficiency for 30 years. Its goal has been to disseminate technically reliable and neutral information to the practitioners, that is, professionals in the business of home energy efficiency. The articles, editorials, letters, and advertisements are a kind of window on the evolution of energy conservation technologies, policies, and organizations. Initially, the focus was on audits and simple retrofits, such as weatherstripping and insulation. Instrumentation was sparse—sometimes limited to a ruler to measure depth of attic insulation—and a blower door was exotic. CFLs were heavy, awkward bulbs which might, or might not, fit in a fixture. Saving air conditioning energy was not a priority. Solar energy was only for the most adventurous. Thirty years on, the technologies and business have moved beyond just insulating attics to the larger challenge of delivering home performance and achieving zero net energy. This shift reflects the success in reducing space heating energy and the need to create a profitable industry by providing more services. The leading edge of the residential energy services market is becoming much more sophisticated, offering both efficiency and solar systems. The challenge is to continue providing relevant and reliable information in a transformed industry and a revolutionized media landscape.

Introduction

Home Energy Magazine ("Home Energy Magazine" 2014) has been publishing articles about residential energy efficiency for thirty years. That translates into 180 issues and over one thousand articles, plus hundreds more trends, clips and more recently, blogs and tweets. These articles mirror the creation and evolution of an industry. At the same time, the magazine's history reflects the challenges of delivering reliable information to a diverse community of trades, manufacturers, researchers, and policymakers. We describe below the creation of *Home Energy*, its business model, and plans for the future. Anecdotes about specific articles illustrate these aspects. A timeline of major events is shown in Table 1.

Origins of Energy Auditor & Retrofitter, Inc.

In the late 1970s and early 80s, energy prices were rising and people expected them to continue rising. Shortages of gasoline and oil from the mid-70s were still etched in the public's memory. During this time Lawrence Berkeley National Laboratory (LBNL) grew into one of the world's largest research establishments addressing energy use in residential and commercial buildings. Scientists there (and elsewhere) helped create the modern field of energy efficiency, including simulation, technology development, and field measurement and evaluation. The

Table 1*: Home Energy* timeline

Year	Notable Event
1984	**Incorporated as *Energy Auditor & Retrofitter;* First issue published**
1985	
1986	
1987	
1988	
1989	
1990	***Energy Auditor & Retrofitter* retitled *Home Energy***
1991	
1992	**Earliest appearance on worldwide web**
1993	
1994	
1995	
1996	**Emphasis on home performance**
1997	**Publication of *No Regrets Remodeling***
1998	***Home Energy* appears on the worldwide web**
1999	
2000	
2001	
2002	
2003	
2004	**Web presence greatly upgraded**
2005	***Home Energy* staff join social media**
2006	
2007	
2008	
2009	
2010	**Moved out of LBNL to own offices**
2011	
2012	**20,000 users/month on website**
2013	**Second edition of *No Regrets Remodeling***
2014	**26,000 user sessions per month and 2100 subscriptions**

Source: Meier, 2014.

researchers mostly published their results–covering everything from novel insulations to duct sealing to performance of wood stoves–in *ASHRAE Proceedings*, peer-reviewed journals, and obscure technical reports. Meanwhile, governments at all levels, utilities, private firms, and individuals were ramping up weatherization and energy conservation programs in response to the skyrocketing energy bills. New concepts and skills were appearing, too, such as the energy audit. The term "retrofit" was borrowed from the aerospace industry and applied to the energy conservation industry. Solar energy (mostly of the thermal variety) was a growth industry and supported several popular magazines.

But there was a disconnect between the research results from building scientists and the huge "home weatherization" programs in the field responsible for insulating ceilings and weatherstripping doors. The weatherization groups, contractors, and regulators weren't picking up the new ideas or, worse, continuing to focus on demonstrably unsuccessful technologies and procedures.

Many new energy-saving technologies seemed to make sense, yet there was often little rigorous testing behind them. One example was the outlet gasket. Installing gaskets behind outlet plates was an attractive conservation measure: they were cheap, easy to install, and manufacturers claimed extraordinary energy savings through infiltration reductions. In fact, they offered little benefit. Similarly, manufacturers of radiant barriers for use in attics claimed energy savings that defied physical principles (or they just lied). In this pre-Google era, it took years for information that building scientists already knew to percolate down to the decision-makers because they did not read the literature where the researchers reported their findings.

Home Energy Magazine emerged from Alan Meier's dissatisfaction with this gap in the information dissemination process. The process was too slow, if it happened at all. Couldn't the research findings be "translated" into something more accessible to the practitioner? This would speed the transfer of knowledge from the laboratory to the marketplace, leading to greater energy (and dollar) savings. The vehicle for this "translation" seemed to be obvious: a magazine devoted to home energy conservation technologies and strategies.

Meier, along with his colleagues, tried at first to establish the magazine within the administrative structure of a DOE-funded research facility, LBNL. Establishing and running a magazine meeting Meier's requirements proved impossible because DOE regulations stymied the features needed for effective technology dissemination. For example, federal rules prevented endorsing or criticizing specific products. Articles needed to be thoroughly reviewed by outside referees—and sometimes even by lawyers–and special approval was required for the slightest deviations. Advertising was prohibited. Even printing in color required separate approval. We concluded that any magazine emanating from LBNL would almost certainly take months to prepare and be filled with highly generic information. Worse, any material emerging from this process would be boring and unappealing to the intended audience. To avoid this fate, we created a non-profit organization, Energy Auditor & Retrofitter, Inc. to take responsibility for publication[1]. The magazine and staff however remained physically located inside LBNL in a kind of symbiotic existence: LBNL staff could easily advise magazine staff on technical aspects while the magazine provided LBNL scientists a useful channel to the practitioners. By virtue of this loose affiliation with LBNL, the magazine staff could also more easily draw upon an even wider network of expertise in the national labs and universities. The cover of the premier issue is shown in Figure 1.

[1] Meier serves in an unpaid position as Senior Executive Editor and President of the Board. Paid staff include the Publisher (Tom White) and the Senior Editor (Jim Gunshinan).

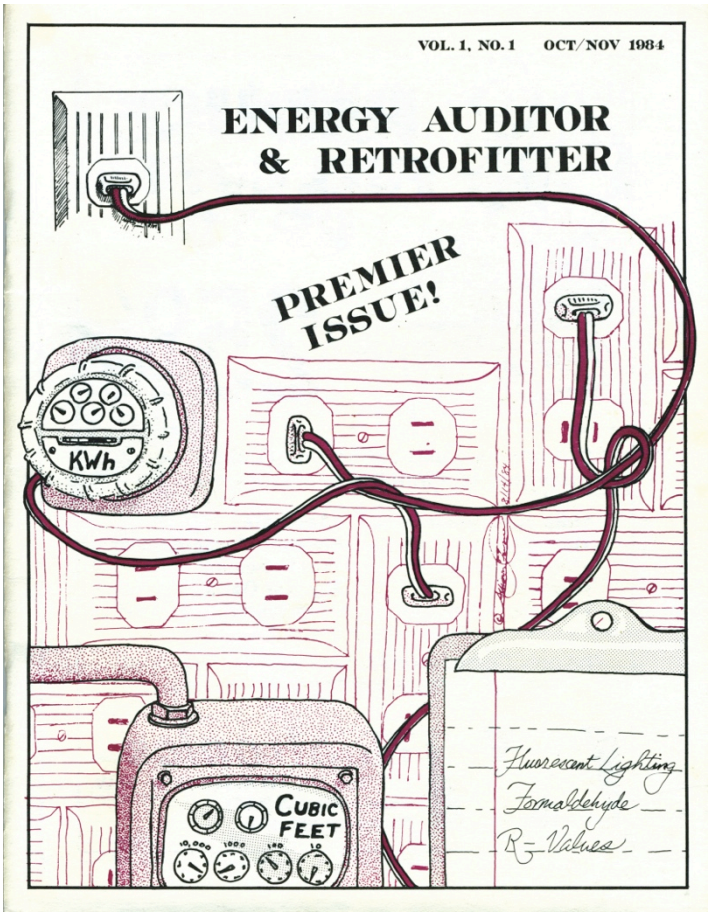

Figure 1. The cover of the premier issue of *Energy Auditor & Retrofitter*, which was still deeply rooted in the "granola" era.

A problem emerged almost immediately with the magazine's title, *Energy Auditor & Retrofitter*. Few people knew what an energy auditor or retrofitter was. So before people could be introduced to the magazine, somebody needed to explain the meaning of these terms. Ultimately, the obscurity of the title became such an obstacle that we changed the name to the self-explanatory *Home Energy Magazine*. The new name created a different misunderstanding because people now confused Home Energy with another magazine, *Home Power* ("Home Power" 2014). Both magazines provided advice on saving energy but had different philosophies; *Home Power* served readers seeking to operate off the grid, while *Home Energy* served readers wishing to stay on the grid. Thirty years on, with the rise of zero net energy (ZNE) homes, the interests of the two magazines have converged.

The Business Model

Home Energy is a registered non-profit corporation whose mission is to disseminate reliable information about energy efficiency. It lives up to this tax category with a vengeance. Prior to the organization's creation, there was no business plan and only the crudest estimate of the potential subscriber base for its sole product, the magazine. A back-of-the-envelope calculation suggested that the "energy-efficiency practitioner market" could eventually grow to 10,000 subscribers (or, alternatively, the magazine needed 10,000 subscribers to be sustainable –

this was never clear). The original business model was built on three pillars: subscription revenues, advertising revenues, and grants for projects. The magazine accepted advertising to serve two purposes. Naturally it created a second revenue stream but, equally important to the organization's mission, was the belief that advertising served to educate readers about new technologies. When several firms advertised blower doors or IR cameras, readers would realize that the technology had some credibility and perhaps they should investigate it further. The supportive role seemed especially important when those advertisements coincided with credible articles on the same topics. Each of the three pillars contributed roughly 1/3 of the organization's revenue. The magazine has been published bimonthly from its inception. This decision—made with little careful thought—has limited the magazine's ability to deliver "news" to its readers. *Home Energy Magazine Online*, which first appeared in 1992 and originally hosted by Argonne National Laboratory, has created a capability to supply "news" in between issues.

Over time, we gradually realized that Home Energy's articles contained valuable information that could be re-used to target other groups, and resulted in a range of special projects. Early projects mostly involved re-packaging articles into special compilations geared towards specific audiences or covering narrow topics, such as use of blower doors. *Home Energy* also repackaged the magazine material in the form of a book, *No Regrets Remodeling.* In a departure from normal strategy, the book's target audience was the homeowner/consumer rather than the practitioner. Staff also helped write ACEEE's first *Consumer Guide to Home Energy* Savings. A small, but important role for *Home Energy* staff has been to produce the ACEEE Summer Study's daily newsletter, the *Grapevine*. Meier started this in 1986 when he chaired the ACEEE Summer Study. At the time, a daily conference newsletter was an innovation, stretching the limits of word processing, overnight photocopying, and staff endurance.

Home Energy has always had difficulty identifying with a specific audience. The original audience was intended to be residential "energy auditors and retrofitters" and the "practitioners" of energy efficiency. But this was a new industry and many of these practitioners worked inside larger organizations, such as utilities and weatherization agencies. Their customers were often low income or those suffering from "energy poverty." These practitioners were hard to find and worse, were often not authorized to subscribe through their organizations. Sometimes our target audience did not even realize that they were auditors or retrofitters! We tried to reach them, with limited success, through bulk subscriptions arranged through utilities, state energy agencies, and other groups.

We also discovered that a much larger group of "practitioners" were only intermittently involved in the magazine's key areas. These included general contractors, utility staff, building code officials, architects, researchers, and energy efficiency enthusiasts. For example, a contractor might be proud of his energy efficiency skills but, frankly, pretty kitchens generated sales. Similarly, a "solar architect" would want to know the latest about energy efficiency, but the practical matters of building a house occupied the majority of her time. A building codes inspector (or his office) needed to track code-related energy-saving technologies and procedures. Staying current with respect to energy efficiency could be sufficient justification for a subscription, yet it must compete with the need to follow developments in electrical and fire safety, plumbing, and seismic resistance. This means that a person might be intensely interested in energy efficiency for brief periods but not consistently enough to justify—or renew—a subscription. Multiple audiences could be an asset; however, it greatly complicated selecting articles that would appeal to everybody

Over time, however, the "home performance" industry has emerged. (The metamorphosis of Affordable Comfort into ACI is an example.) These contractors, manufacturers, and trade groups address a much broader range of topics than merely energy efficiency; nevertheless, they need to keep current on new energy-saving technologies and can more easily justify subscribing to *Home Energy*.

The number of subscriptions to *Home Energy* has fluctuated between 2000 and 3500. The actual number was difficult to track because it contains both individual and bulk subscriptions. Print runs peaked at 5000. *Home Energy* benefitted from a remarkably stable subscriber base. The renewal rate hovered around 80% for almost two decades. This high rate reflected the kinds of institutional subscribers – utilities, government agencies, and dedicated energy efficiency professionals – who were attracted to the material offered by *Home Energy*. But the subscriber demographics are clearly shifting as several trends play out. First, institutional programs (supported by DOE and utilities) are winding down. Second, the number of contractors specializing in home performance appears to be increasing. As a group, these contractors are more responsive to their short-term needs and likely to let subscriptions lapse if not immediately and directly deriving business benefits. Tips on running a successful business are equally important as learning about the latest technology.

Home Energy subscribers are well distributed across the country with the exception of Texas. Since Texas is the second most populous state, it represents a serious gap–geographically and financially–in Home Energy 's coverage. We speculate that many of the economic and environmental drivers for energy efficiency were not present in Texas. Low energy prices, a climate not needing much space heating, plentiful energy supplies, and a laissez-faire attitude among utilities and regulators probably all contributed to the lack of subscribers to the paper issue. Recently, Texas is becoming better represented in the electronic subscription list, possibly as a result of the rapidly escalating electricity prices and recent power shortages there. But *Home Energy* 's "Texas problem" illustrates the regional diversity of interest in residential energy efficiency by institutions and consumers.

Home Energy suffers from the same existential threat that all print-based media face, that is, competition with free sources on the web. Both professionals and consumers increasingly expect information to be free; even a modest pay wall will deter them. The challenge for *Home Energy* is to deliver sufficient value to these new professionals so that they will pay to access information. We are still searching for a successful formula.

The Editorial Model

How do articles get selected for publication? Articles in *Home Energy are* typically created in two ways. First, experts are invited to contribute articles. *Home Energy* Editors identify a technically significant report, presentation, or article and then work with the authors to "translate" it into language suitable for *Home Energy*. Alternatively, *Home Energy* staff research and write the article themselves. *Home Energy* also receives unsolicited articles, a few of which get published. Technical articles typically get sent out to review. The diverse subscriber base has affected editorial policy (and continually stresses the Editors). The Editors try to include at least one article in each issue that targets each of the key audiences; the goal is to insure that every subscriber finds at least one article addressing his or her specific needs.

Most Editorials are written by Meier, but with important contributions from staff. Roughly one third of the Editorials call the reader's attention to a specific article in that issue and offer additional perspectives or context. The remaining Editorials are inspired by topical energy-

related events, such as the significance of the California electricity crisis, the value of smart meters, and electricity impacts of growing marijuana. When deadlines press, Editorials are often thinly-veiled excerpts from Meier's own research. A draft of every Editorial goes to *Home Energy*'s Board of Directors and experts in that topic for review and comment. The Editorial's interpretation and conclusions often take unexpected turns during this process.

Initially *Home Energy* had two unwritten editorial policies: "no solar" and "no new homes." "No solar" meant that the magazine should let other magazines write about solar energy. The "no new homes" policy reflected a desire to focus on retrofits (which, after all was a much larger market). These policies reflected *Home Energy*'s origins in the energy efficiency research establishment. But it also gave *Home Energy* an opportunity to better define itself and its audience. Few weatherization agencies, for example, were allowed to perform solar retrofits. It may have made good business sense, too since, during *Home Energy*'s early life, several solar magazines appeared and vanished. Now, however, solar energy is becoming better integrated into whole-building performance—sometimes even economically—so that including solar in the *Home Energy* portfolio is a natural direction. Another important consideration for the future is the extent to which *Home Energy* should adopt the broader aspects of home performance in its portfolio, such as comfort, dealing with aging populations, hyper-allergenic problems, and resilience from energy interruptions.

This editorial model worked well for a paper magazine but not for the web. Much more content, and in smaller pieces, needs to be posted and perhaps repackaged in various ways to be attractive to different audiences. For example, *Home Energy* is now publishing more technical evaluations and comparisons of equipment and materials unique to the industry—a kind of *Consumers Reports* for the efficiency practitioners. Carefully researched and vetted articles (behind a pay wall) may be the key to maintaining an on-line destination (and reputation). A web-based "magazine"—distinct from a digital image of the magazine—may enable us to solve the "diverse subscriber" problem in entirely new ways. For example, we might be able to construct streams of content tailored to several specific audiences. Ideally, we would leave the customization to the readers by letting them create the streams.

Content

The ideal *Home Energy* article describes a new material, technology, or tool. It concludes by offering recommendations. A successful article engages the readers and, by the end, convinces them to revise their practice by adopting a new technology, material, or procedure. Alternatively, the article may give the readers a new appreciation for an aspect that they had not considered (such as safety, comfort, or quality control). Those are ambitious goals and not appropriate for every article. Finally, one cannot forget that saving energy involves *people*; to that end, pictures with practitioners doing their jobs is an important ingredient of an engaging article (see Figure 2). It is surprising how many articles fit these templates. Of course, this strategy pre-supposes that the readers and article have been correctly matched. When the match happens, then the article will have impact. We describe below some articles that have had impact in different ways.

Figure 1. One goal of *Home Energy* artwork is to show people doing things.

Bigger Is Not Better: Sizing Air Conditioners Properly (by John Proctor et al., 1995)

This has been *Home Energy*'s most reprinted article. The authors addressed a problem that had been mostly ignored by contractors and energy experts; furthermore, it explained many of the consequences of oversizing on performance, comfort, and reliability, aspects that are desperately important to contractors. The article also perfectly fits the template for an ideal *Home Energy* article, ending with recommendations to contractors (and consumers). Dozens of articles, blogs, and reports link or refer to the 1995 article and one can detect its influence on hundreds of others. Several later articles addressed the problem, sometimes for specific regions and climates.

Some Like it Hot (by Alan Meier, 1986)

This was one of the earliest attempts (anywhere) to link thermal comfort research to home energy use. It explained how increased comfort from insulation and window management offered benefits beyond the value of the straight energy savings. Also, it explained how an occupant's activity level and clothing insulation could affect thermal comfort. Finally, it gave auditors recommendations to help improve occupant comfort. Many articles—sometimes in archival journals—cite this *Home Energy* article because so little thermal comfort research has

been applied to residential situations. For years, the Wikipedia article on thermal comfort cited *Home Energy*.

Waterbed Energy Use: The Economics of Making Your Bed (by Alison Turner, 1984)

Waterbeds were popular in the 1980s, when almost 10% of homes had them, but people didn't realize how much electricity was consumed heating them. *Home Energy* wrote the first exposé, along with recommendations on how to minimize electricity consumption. This kind of advice, we imagined, would be valuable to energy auditors as they tried to understand where energy in homes went. The article also equipped the auditor with useful tips to impart to residents about how to lower their bills. The illustrations were memorable, too, pairing a languid cat with a waterbed. Waterbeds are less common today but this article remains a frequent reference.

Retrofitting Mobile Homes (by Ron Judkoff, 1992)

Raising the efficiency of existing mobile homes ranks low among the goals of private sector energy-efficiency professionals. But *Home Energy* covered the topic, focusing on the special technical problems associated to a kind of building (such as its metal walls whose walls needed to be carefully unpeeled). The author, Ron Judkoff, observed that one of his articles in *Home Energy* generated more responses in a few weeks than his related paper in an ASHRAE publication received in a year.

Saving the Other Energy in Homes (Leo Rainer et al., 1987)

This article introduced the concept of miscellaneous energy use in homes and its rising importance. It also provided estimates of energy use for many overlooked devices, such as well pumps and de-humidifiers. The Energy Information Administration (EIA) adopted the estimates and made them the basis of a table of energy use of appliances in the 1987 Residential Energy Consumption Survey (Energy Information Administration 1999) and in every survey since then. One EIA staff member confided that the table generated more questions from consumers than any other table in their publication.

Blower Doors and Infiltration: Just ACH50 Divided by 20? (Max Sherman et al., 1986)

Throughout its thirty years of existence, *Home Energy* has been a constant advocate for the use of blower doors, publishing more articles about the procedures, problems, manufacturers, and energy savings associated with blower doors than any other periodical. Researchers invented the blower door as a residential fan pressurization device in the late 1970s to measure absolute infiltration levels. A small market of dedicated energy conservation professionals quickly adopted the tool. Weatherization agencies and government programs began using blower doors to reduce energy use in low-income homes. By 1994, 15% of all weatherization programs used blower doors whereas less than 1% of homes in the private sector benefitted from this diagnostic. Now many building codes require a blower door test.

One reason for the blower door's success in the low-income weatherization sector was its role in quality control. A blower door made it possible to quantify air infiltration reductions with a blower door and determine if the crews have been successful. This was not the function originally envisioned by researchers. One impetus for the innovative and widespread adoption of

blower doors was that *Home Energy* kept weatherization agencies and practitioners informed of these adaptations and their results.

Black Stains in Houses: Soot, Dust, or Ghosts? (Frank Vigil, 1998)

A source of great consternation to homeowners (and contractors when called back) is the appearance of black soot on material transitions, such as wall-to-floor connections or door undercuts, on ceilings; on furniture, in heating and air conditioning filters, and on blinds. The origins of the soot and the mechanisms of deposition are mostly understood although the causes in a specific home are often difficult to untangle. *Home Energy* has devoted several articles to this topic. This remains one of the most frequently visited articles on the *Home Energy* website; in addition, many technical reports and consumer guides reference the original *Home Energy* articles. This article and topic also illustrates the overlap between the professional and consumer audiences for *Home Energy*'s material.

***Home Energy* Serves Researchers**

One of *Home Energy*'s goals is to translate research findings into accessible information for the practitioner. But information also flows the other way, that is, researchers draw upon results published in *Home Energy* articles to assist their own investigations. A Google Scholar search turns up hundreds of articles in peer-reviewed, archival journals citing *Home Energy*. The diversity of articles citing *Home Energy* is surprising; these articles appear in journals ranging from electrical engineering to psychology to environmental policy, in addition to the topically closer journals in building science. A similarly large number of citations to *Home Energy* appear in technical reports and other documents logged by Google Scholar.

How Will Future Home Energy Efficiency Information Be Delivered?

The landscape of residential energy efficiency is changing rapidly, so it is not surprising that the strategy for training and updating this labor force must also undergo a transformation. DOE, Energy Star, and other official sources have greatly expanded their dissemination of information about results and findings from their programs and research. These government sites are often the first destination of a web searcher because the information is free. On the other hand, these agencies are still hamstrung by the same rules that initially forced *Home Energy* to become independent. It is difficult for government agencies to name brands and express opinions. This material, while professionally produced, is fated to be more static and less editorially engaging. *Home Energy* can still add value by identifying the key research and "translating" the findings into a more accessible format, but some practitioners will be satisfied with the original, free, on-line sources.

Many professional and trade associations have also moved to occupy the home performance and building science space. Groups such as ACI and BPI are examples of groups offering training and literature. These groups introduce their members to these topics while creating alternative pathways to deliver the information. Since most professional organizations remain narrowly focused on their trades, this leaves *Home Energy* an opportunity to focus on issues that cross boundaries, which are potentially more exciting and able to attract wider audiences.

While the home energy efficiency industry may be undergoing a transformation, the media industry is undergoing an upheaval. The original *Home Energy* business model based on a paper magazine is no longer sustainable. The overwhelming majority of activity will soon occur on the Internet, although people will continue to subscribe. In early 2014, electronic subscriptions–that is, digital images of the paper issue downloaded to tablets and PCs–to *Home Energy* overtook paper subscriptions. This is just the first step in the path of (hopefully) creative destruction and rebirth. The "subscription" is already fading in favor of other means of acquiring information more precisely tailored to the individual customer. Newspapers, for example, allow readers access to a fixed number of free or paid-for articles each month. The concept of an "article" is likely to be abandoned in favor of a new, smaller, more dynamic, quantum of information. Even if *Home Energy* successfully delivers the right kind of information to the customer, where is the revenue? These problems are being faced by every print-based source.

The Internet has also allowed curious consumers (as opposed to professionals) to discover articles on *Home Energy*'s website that answer their questions. This greatly enlarges the impact of *Home Energy*'s information, yet it is not directly related to *Home Energy*'s primary mission. Should this be encouraged? Here, too, we are searching for a successful balance.

The future business model for *Home Energy* – like many other media organizations in this situation—is not clear. However, the primary mission of *Home Energy* remains, that is, to disseminate reliable information on energy efficiency to the practitioner. There is no shortage of subjects to cover; the challenge in the next thirty years will be to construct new sources and outlets for that information.

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