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A Roadmap for Navigating Voluntary and Mandated Programs for Building Energy Efficiency

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Abstract

Managers, building owners, and facilities operators are often faced with the challenge of blending and selecting from hundreds of different voluntary and mandated programs to improve building energy efficiency. This paper argues that the links between regulation and voluntary programs for energy efficiency in commercial buildings should be conceptualized in a more comprehensive form. To address the shortcomings in current research, this study establishes a conceptual framework for evaluating the main strategic drivers, the form that has emerged in response to those drivers, and the shortcomings of regulation and each voluntary program form for energy efficiency. The study uses illustrative cases to present the four main voluntary program forms that have emerged: economic incentives; certification; alliance and partnerships; and internal company programs. The framework presented in this paper is intended to help managers and policymakers identify the primary drivers for energy efficiency efforts, assess the efficacy and limitations of available policy tools, analyze how each tool can be used in conjunction with a number of other tools, and predict what new voluntary program forms can emerge.

Keywords: Energy Policy, Infrastructure, Government & business, Policy implementation, Regulation, Corporate social responsibility, Voluntary programs

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Introduction

Imagine that you are a manager at a company that we will call Energy User, Inc. This company develops widgets that are integral to everyday life for the citizens of a community. The community members take pride in knowing that these widgets were produced locally and as Energy User purports, the widgets are a "sustainable" alternative to a competitor's (cheaper) product. Recently, though, a report was released disclosing that poor energy practices at Energy User are largely to blame for community-wide brownouts and blackouts. Managers have hundreds, if not thousands, of possible responses among a cadre of voluntary and mandated programs to improve energy efficiency at the company. How should Energy User managers choose among all these options?

Energy consumed in buildings is the lifeblood of business powering American machines, lights, air-conditioning, computers, and many other devices that have helped to boost the U.S. economy. An increasing use of energy in buildings is driving the U.S. to resort to more precarious energy sources and ultimately contributing to the devastating and irreversible environmental effects associated with natural resource extraction and a changing climate. Beyond the "invisible" threats of energy consumption, businesses are squandering opportunities and potential financial savings that can be achieved through efficient use of energy. In 2009, the commercial building sector consumed 8.49 Quads of energy, of which over 20% was wasted energy[1].

There is considerable potential for businesses to save money through more efficient energy practices. Despite the technically available and economically viable opportunities for energy savings in buildings, there remain numerous known barriers to the adoption of energy efficiency in the built environment[2,3,4]. In addition to building codes, a wide range of voluntary programs, such as economic incentives, certification schemes, alliances and partnerships, and internal company programs exist. However, current research tends to examine each program separately and does not present a comprehensive framework to analyze existing approaches[5]. This paper argues that there exist linkages between various forms of voluntary programs and that these programs and their linkages must be examined in order to fully address the known barriers to energy efficiency. In examining our framework of existing programs, the paper addresses the following research question: What forms of voluntary programs for energy efficiency exist and how can they be employed comprehensively to address a broad set of barriers to commercial energy efficient development? Through four examples from each of the identified voluntary program forms, we answer this question by classifying the main strategic drivers, the forms that have emerged in response, and the shortcomings to each program form if viewed independently. We employ the framework to assess the relationships among each program form and ultimately present a roadmap for managers and policymakers to navigate the complex system of voluntary and mandated programs for building energy efficiency.

The framework developed in this study is used to reject any singular "silver bullet" solution, but makes the case that managers and policymakers should assess the various types of existing voluntary programs, their interoperability, how each program responds to the particular driver(s) they seek to address, and the subsequent lifecycle outcomes related to implementation. This framework for interpreting and implementing

selected options from a quiver of voluntary programs can guide managers seeking improved energy efficiency, cost savings, enhanced brand value, societal legitimacy, risk management, employee satisfaction, learning and innovation[6].

Barriers and Challenges to Energy Efficiency in Buildings

Stemming from the 1979 oil embargo, policymakers and researchers became interested in identifying, categorizing, and addressing barriers to the adoption of energy conservation and energy efficiency in buildings[7,8,9,10,11]. Recognized organizational barriers to the adoption of energy efficiency practices include, but are not limited to asymmetry of information, missing information, uncertain tradeoffs between first cost and long-term payback, uncertain non-energy related goals of the firm, unclear responsibility, challenges in defining energy efficiency for the organization, accurately assessing technologies, managing new technologies, and maintaining new technologies[12].

The complex and uncertain process of construction also carries inherent barriers to energy efficiency measures[13]. The building sector is highly complex and interconnected, which creates unique challenges to increasing energy efficiency. On an industry level, economic conditions, financial motives, and industry structures lead to lesser than desired participation in energy efficiency programs. The diversity in national and local regulatory frameworks coupled with the often misaligned incentives of the many actors involved throughout the lifecycle of a building project (i.e. broken agency) create an even more unstable environment for managers to make effective decisions related to voluntary programs for energy efficiency. As a result, project-based industries face a relatively high cost to adopt systemic innovations, including innovations that may lead to more energy efficient building practices[14,15,16]. Further, energy efficient building development requires new knowledge in an industry in which vast knowledge gaps exist—often times deeply embedded institutional knowledge that is difficult to identify and find among a diverse set of project-level actors[17].

Empirically classifying barriers presents a number of challenges[18]. Barriers are a theoretical construct. One can never 'truly' assess the reason an action on energy efficiency was *not* taken. We can, however, develop a proxy for barriers by empirically classifying fundamental challenges firms report to have experienced in their attempts to become more energy efficient. In 2009, the United States Department of Energy sent a survey[19] to major U.S. companies. The survey asked firms to report, among other things, their top five energy challenges. The overall results from the questionnaire are presented in Figure 1.

[INSERT FIGURE 1 ABOUT HERE]

Figure 1 – Top Energy Challenges of Major U.S. Companies (Survey from Commercial Building Energy Alliance Program)

These results show that technology and organization issues constitute the largest categorical barriers to energy efficiency. The three most prominent *technology* energy concerns among members were identifying and validating emerging technologies, implementing renewable energy technologies, and technical challenges specific to their firm. Members reported an almost equal concern with organizational issues. Among *organizational* challenges, members are primarily concerned with mechanisms to finance and reduce costs associated with energy efficiency and renewable energy. The second largest concern among respondents was usually phrased in terms of 'staying on top of evolving regulations and incentive programs.' Among *work process* challenges, the top

concern among firms related to the implementation of energy management systems (EMS). After EMS implementation, firms report challenges in responding to peak energy demand spikes. Finally, among work process challenges, the third most prevalent challenge related to "taking the human element out of energy conservation." Despite these work process challenges, not a single firm mentioned *personnel* challenges and only one firm had a personnel-related goal. Many of the work process challenges could be overcome through personnel related solutions, yet personnel goals or concerns are not mentioned. Consistent with the existing literature, these data show that firms face a diverse set of barriers and thus require a diverse set of tools to assist in overcoming these barriers. We also see that among the DOE's sample, firms may be failing to address a critical component to energy efficiency: namely, personnel.

Programs to Overcome the Barriers to Energy Efficiency

Drawing from the findings of the DOE's questionnaire on the fundamental challenges preventing the adoption of energy efficient strategies and employing the prior research on barriers to energy efficiency, the framework developed here simplifies the five primary strategic drivers that are associated with the emergence of five complementary energy efficiency program forms [Figure 2].

[INSERT FIGURE 2 ABOUT HERE]

Figure 2 – Roadmap for Navigating Voluntary and Mandated Programs for Energy Efficiency.

The framework depicts a mandated form promoting energy efficiency and the four forms of voluntary programs for building energy efficiency (economic incentives, certification programs, alliance and partnership programs, and internal company programs). The emergence of economic incentive programs such as tax incentives, direct subsidies, and loan programs are driven primarily by the need to reduce the often associated financial burdens that accompany building energy efficiency implementation. We use the Energy Efficient Commercial Buildings Tax Deduction—a program providing tax relief for implementing various forms of energy efficiency strategies—to illustrate the key drivers and shortcomings of economic incentive programs. Certification programs provide a strategic advantage to firms through the enhancement of organizational legitimacy[20]. We focus on U.S. Green Building Council's Leadership in Energy and Environmental Design (LEED) program to assess voluntary building certification programs. LEED aims at improving performance in energy savings, water efficiency, CO_2 emissions reduction, improved indoor environmental quality, and stewardship of resources. Alliance and partnership programs are driven by the vast knowledge gaps that exist in energy efficiency development. The U.S. Department of Energy's Commercial Building Energy Alliance program (CBEA) is particularly illustrative of the role of alliance and partnership programs for energy efficiency. The CBEAs bring together firms, trade associations, and U.S. National Laboratories to collectively strategize, share technology, partner in bargaining with suppliers, work to implement emerging technologies, and develop what is referred to as an "advising network". Finally, internal company programs are typically operated internally through corporate social responsibility (CSR) programming as a tool to boost shareholder value through a number of mechanisms. We explore a representative internal company energy reduction program of The Walt Disney Company. The proposed program was intended to incentivize employees and Disney building managers in the Florida region to augment the existing electric and natural gas

water heaters in their buildings with more energy efficient solar hot water heaters. Before stepping through the framework with the individual cases for each of the voluntary program forms, we will first summarize the mandated form intended to curb building energy consumption.

Building Energy Efficiency Regulation in the U.S.

National building codes were created in the late 1970s as a response to the energy and economic crises. Federal, state, and local building codes represent a set of legal requirements governing the design and construction of residential and commercial buildings. Energy codes specifically address the minimum standards for energy performance by referencing the various areas of construction such as ductwork, HVAC systems, fenestration, and lighting.

Building regulatory structures possess three fundamental shortcomings. First, it is well established that energy pricing does not fully reflect the social and environmental costs of energy consumption. Second, regulatory schemas rarely succeed in dramatically reducing energy consumption due to compliance failures. Compliance failures often occur due to inconsistent enforcement, conflicting local, state, and federal code requirements, lack of competent enforcement infrastructure, corruption among inspectors, and lack of awareness[21,22,23]. Third, regulatory compliance is currently not seen by many stakeholders as enough of a corporate effort to address sustainability challenges[24,25]. Merely following code is no longer enough in the eyes of many of the stakeholders involved in a building's lifecycle. Shareholders, top executives, consumers, and employees within companies are beginning to demand that building energy performance go above and beyond compliance lest they lose legitimacy as an organization. The voluntary programs addressed in this research represent a national response to the perceived failures of existing regulation to encourage a level of energy efficiency deemed necessary to prevent the catastrophic effects of over consumption, greenhouse gas emissions and resulting climate change, and natural resource extraction.

Economic Incentive Programs for Energy Efficiency

A representative example of an economic incentive program aimed at improving building energy efficiency is the Energy Efficient Commercial Buildings Tax Deduction (EECBTD). EECBTD provides a tax relief of $0.30-$1.80 per building square foot, depending on the technology and the amount of energy reduction. It was established in 2005 by the federal Energy Policy Act and has since been extended twice and now is applicable through 2013. A tax deduction of $1.80 per square foot is available to owners of new or existing buildings who install either interior lighting, a building envelope, heating, cooling, ventilation, or hot water systems that reduce the building's total energy cost by 50% or more in comparison to the minimum requirement. Deductions of $0.60 per square foot are available to owners of buildings in which individual lighting, building envelope, heating and cooling systems meet target levels that would reasonably contribute to an overall building savings of 50% if additional systems were installed. The deductions are available primarily to building owners, although tenants may be eligible if they make construction expenditures.

EECBTD is representative of a number of market-based interventions aimed at promoting building energy efficiency beyond regulatory requirements. Market-based interventions such as this one are driven by perceived financial failures. There are three

broad types of financial failures that economic incentive programs are aimed at correcting: 1) energy market failures, 2) capital market failures, and 3) innovation market failures[26]. Capital market failures can arise due to the higher first-cost of energy efficiency investments as compares with traditional approaches. Innovation market failures often occur when a particular energy efficiency innovation requires a higher first-cost (or possesses higher risk) than a traditional approach due to the unproven nature of the invention. Economic incentives such as EECBTD provide corrections to each of these financial failures, but EECBTD is primarily focused on addressing capital and innovation related market failures by subsidizing the first cost through tax savings.

Economic incentive programs have been only marginally successful[27,28]. As an example, Sassone and Martucci took a micro-level approach to analyzing the underlying factors influencing business decision-makers participation in energy conservation[29]. In a survey of industrial firms throughout the state of Georgia, they confirm that economic incentives often fall short in that fewer than a quarter of the cost-justified conservation measures recommended to firms by independent auditors were carried out[30]. The authors conclude that firms under-invest in cost-justified energy efficiency programs due to "low priority and low visibility [of energy consumption]" as well as neglect from top management[31]. More recent studies confirm the weak performance of economic incentives such as the EECBTD[32].

There are two potential explanations for the failures of economic incentive programs. First, and specific to project-based industries such as construction, economic incentives fail to address what Levitt and Sheffer refer to as the "broken agency" problem—a misalignment of incentives and risks among a number of different actors on a project[33]. Broken agency leads to the fact that "separate individuals, different departments within an organization, or different companies incur the risks and benefits associated with each phase of a building project's life cycle, so no individual or firm on the project has a truly multidisciplinary, life cycle perspective."[34] Economic incentive programs may address a financial barrier for one firm or a single individual, but may neglect to address other types of barriers inherent in the entire life cycle of a building project.

Second, economic incentives may provide the financial incentive structure to address capital constraints, energy market failures, and innovation market failures; however, just because a firm *can* afford to undertake an energy efficiency strategy does not mean they *know how* to implement an energy efficiency strategy. Economic incentives incompletely address the knowledge barriers to energy efficiency. A likely more effective implementation of economic incentives is when they are coupled with other voluntary program forms to address the diverse set of barriers inherent to a diverse set of actors involved in an energy efficiency project.

Certification Programs for Energy Efficiency

Examples of voluntary certification programs in the field of building energy efficiency are the U.S. Green Building Council's Leadership in Energy and Environmental Design (LEED), the joint Environmental Protection Agency (EPA) and Department of Energy's (DOE) Energy Star Program, and American Society of Heating, Refrigerating and Air Conditioning Engineers' (ASHRAE) Building Energy Quotient Program. While the Energy Star for Buildings Program is explicitly targeted at "improving the energy

efficiency" of buildings, LEED certification provides a broader set of criteria to promote sustainable development in other areas such as water-use and materials selection[35,36].

LEED is one of the most widely recognized green building programs in the United States. The U.S. Green Building Council has certified over 7,000 projects totaling over 1.2B gross square feet throughout the world[37]. LEED strategies are "aimed at improving performance across all the metrics that matter most: energy savings, water efficiency, CO2 emissions reduction, improved indoor environmental quality, and stewardship of resources and sensitivity to their impacts."[38] Energy efficiency is one of the cornerstone components of LEED building design. A building cannot achieve the higher levels of LEED certification (Gold or Platinum) if serious efforts are not made to achieve enhanced energy efficiency.

Although not much research has been done specifically on LEED, other research has confirmed that the fundamental driver for the emergence of certification programs is to promote organizational legitimacy. Arora and Carson found firms with closer ties to their end product were more likely to participate in various waste and pollution reduction certification programs[39]. Videras and Alberini confirmed that firms with greater consumer pressure were more likely to participate in the Green Lights Program in which the EPA provided a stamp of approval for an organization's voluntary efficient lighting efforts[40]. Researchers have found companies that place a higher importance on external recognition were more likely to participate in EPA's National Environmental Performance Track – a program offering companies "public recognition."[41, 42]. Henriques and Sadorsky found that shareholder pressure was a motivating factor for companies to participate in voluntary environmental programs[43]. This body of prior work establishes a consistent message: firms are under pressure from a variety of external and internal sources to become more 'environmental,' 'sustainable,' and 'green.' What remains unclear to firms is what 'going green' means and how they convey that message to external agencies or organizations placing pressure to change the way they do business. This uncertainty has several interesting ramifications.

As is seen in the previously cited empirical studies, firms have found initial success and recognition by participating in programs providing certification for meeting some defined higher standard for energy efficiency or the environment. The construction of a LEED certified building provides legitimacy for a firm among its consumers, other firms, its shareholders, and employees. Other firms see this success and mimic what they perceive to be legitimate or successful. Put into Suchman's conception of legitimacy, other firms mimic what they perceive to be as "desirable, proper, or appropriate within the socially constructed system of norms values, beliefs, and definitions."[44, 45] The mimetic tendencies in which firms adopt what they view as legitimate has been documented in other fields such as the development of the human resources management division and grievance procedures in equal employment law[46, 47].

Studies have shown that when considering energy savings alone, the LEED certification program, on average, is associated with buildings that perform better than the national average[48]. However, Turner et al. found that out of 121 LEED buildings, roughly half "are doing worse [in terms of energy performance]—sometimes much worse" than anticipated[49]. In other words, the stamp of approval can be quite misleading. This is not meant to discount the value of legitimacy or the value of certification programs as important components to meeting a policy goal of reducing energy

consumption in the United States. As Hoffman pointed out, legitimacy vis-à-vis certification provides a potential strategic advantage for firms[50]. What is still not well understood is the how legitimacy may moderate the success or failure of other program types.

Alliance and Partnership Programs for Energy Efficiency

In 1977, the U.N. sponsored Alliance to Save Energy emerged as one of the first programs intended to fuse knowledge gaps that were preventing the adoption of energy efficiency in buildings. Other alliances at the regional, national, and international scale have arisen in the last three decades such as: the United States Department of Energy Commercial Building Energy Alliance (CBEA) program, Northwest Energy Efficiency Alliance (NEEA), Massachusetts Energy Efficiency Partnership (MEP), and the Southeast Energy Efficiency Alliance (SEEA). Direct partnership programs such as U.S. Department of Energy Commercial Building Partnership Program have emerged at the project-team level to address the knowledge gaps specifically inherent to project-based industries. Prior research often identifies the supply network of actors within construction as the culprit for slow or non-existent innovation in the built environment—innovations that could potentially lead to energy efficient building development[51, 52]. The alliance and partnership programs that have emerged are a policy attempt at identifying and employing supply network actors, comparative companies or even competitors to fuse the disparate knowledge gaps that exist in energy efficient commercial building development.

Due to the fact that the United States Department of Energy Commercial Building Energy Alliances are national in scope and the authors of this research were provided high-level access to the alliance members and program directors, the CBEAs are used here to illustrate a representative energy efficiency alliance program. Launched in August 2008, CBEAs aims are to "collectively strategize, share technology, partner in bargaining with suppliers, work with DOE National Laboratories to implement emerging technologies, and develop what is referred to as an 'advising network."[53] They represent national sector-specific networks of companies, nongovernmental organizations, and trade associations that work with U.S. National Laboratories and other federal agencies to promote energy efficiency in commercial, real estate, and hospital buildings. CBEAs include about 150 member companies (between 17% and 23% of market share of respective industries in the U.S.), and represent almost 9 billion square feet of building space. Collectivist organizations, such as this, represent an opportunity for members to influence organizational transformation through an emphasis on the "sharing of organizational knowledge."[54]

Economists often distill knowledge-based barriers into a combination of what are referred to as information problems and behavioral failures[55]. Prescriptions for overcoming these barriers often call for education, information, and improved product standards. One potential explanation for the mixed levels of effectiveness for each of the education and informational programs is that nearly all of the traditional mechanisms to diffuse knowledge neglect the diverse set of actors involved in the lifecycle of a building and the relational processes by which knowledge may be acquired. The barriers to energy efficiency cannot be solved through the distribution of informational pamphlets or an in-depth energy audit in which firms are provided with cost-justified strategies. Again, these techniques have been only marginally successful at inducing energy efficiency behavior

in firms[56, 57]. The educational and informational programs may address some of the knowledge gaps related to energy efficiency by providing information on what *can* be done to improve energy performance. But, these simple information and education programs fail to address the organizational learning disability inherent in project-based industries. Traditional educational and informational policy responses ignore the deeply embedded organizational knowledge gaps and the incentive-compensation relationships among a diverse set of actors.

As observed in the survey cited earlier, many major U.S. companies are struggling to access three distinct components required to implement energy efficiency strategies: data, information (i.e. contextualized data), and knowledge (i.e. actionable information)[58]. Companies participating in the DOE survey mentioned lacking reliable building performance *data*. Other firms had difficulty *interpreting data* collected through an energy management system. Other companies had trouble making sense of data without access to contextual information. Several companies mentioned struggling with a sound *response* to peak energy demand scenarios due to a lack of knowledge enabling direct action. Several surveyed firms reported concerns with accessing both tacit and explicit knowledge related to energy efficiency. Several firms revealed challenges associated with "remov[ing] the human component of energy conservation." This statement embodies so-called tacit knowledge or knowledge that is often implicit and difficult to articulate. These companies want their operations to become so automatic that they no longer think about conserving energy; energy efficiency becomes implicit in their work processes. Others had concerns related to explicit knowledge such as technology evaluations and access to incentive programs and regulations—types of knowledge that can be easily articulated, explained, and enacted.

Driven by the so-called knowledge gaps identified in the DOE survey, alliance networks have the potential to help overcome the knowledge barriers preventing the adoption of energy efficiency in buildings. It is too soon to ascertain conclusively as to whether a knowledge gaps are closing as a result of participation in the CBEAs; however, in a separate survey administered by the authors of this paper to members of the Retailer Energy Alliance steering committee, one member from a large retailer chain reported "LED parking lot lights would not have been a reality this soon without the alliance."[59] Although this response indicates that a particular technology for energy efficiency would not have been possible without the alliance, it is still unclear as to whether it is the result of the alliance that has led to these knowledge gains. As a form of knowledge sharing, alliances may serve as a tool to defray the relatively high prototyping costs of new technology implementation. Firms participating in the alliance can collectively experiment with new technologies and strategies more efficiently by sharing the cost and risk burdens associated with unproven energy efficiency investments among a larger set of actors. Drawing from the survey administered by the authors of this study, one member of the retailer energy alliance summed up this process nicely, "We have saved…based on [others'] success or lack of success with new processes or technologies [for energy efficiency]."

Alliance networks may also serve as an all-encompassing policy tool bringing together many of the voluntary programs for energy efficiency. For example, firms may intend to use LEED as a tool to address legitimacy barriers. However, they may lack the knowledge to develop a LEED building. They may also lack the credibility to confidently

implement LEED and be certain that the organization will retain their legitimacy so they turn to their alliance members in the network to access knowledge and confirm their efforts as a credible effort to promote energy efficiency through LEED. Firms may struggle to reduce costs or fully take advantage of economic incentive programs. Firms may possess incomplete information as to which economic incentive programs exist and are applicable to their organization. Again, through the network of actors, access to this new knowledge enables the firm to take full advantage of the other voluntary programs for energy efficiency.

If the goals of the alliance networks are to close knowledge gaps and ultimately promote innovation, a key question for the alliance and partnership programs is what type of innovation is being promoted: radical or incremental. The type of knowledge that is diffused in the network is likely to be of little competitive value and provide only incremental improvements (e.g. LED lights). Knowledge about more systemic or radical innovations is potentially withheld to preserve competitive advantage within an organization. In the style of a cartel, alliance networks may actually promote a type of collusion whereby members commonly agree to keep energy efficiency targets at a "reasonable" level to maintain credibility and legitimacy among stakeholders. One member of the Retailer Energy Alliance provided early evidence of this process in the survey administered by the authors of this study, "…many exchanges of ideas do not result in 'big' wins, but rather incremental improvement." Despite their relative age as an energy efficiency program form, alliance networks tend to be understudied in the literature. Empirical studies should assess the outcomes of the alliance networks and partnership programs by assessing the extent and types of knowledge that are shared among participating organizations.

Internal Company Program for Energy Efficiency

> *At The Walt Disney Company, we believe that being a good corporate citizen is not just the right thing to do; it also benefits our guests, our employees and our businesses. It makes the company a desirable place to work, reinforces the attractiveness of our brands and products and strengthens our bonds with consumers and neighbors in communities the world over*[60]. —The Walt Disney Company

As a representative case of an internal company program for energy efficiency, in late 2007 the environmental science and technology team at The Walt Disney Company put forward a proposal to key decision makers within the company for an energy reduction program. This program was selected for inclusion in this paper because the first author was personally involved in the project and worked for the company at the time. Thus, the authors had excellent access to the case. The proposed program would incentivize building managers to augment the existing water heaters in Disney buildings with more energy efficient solar water heaters. This particular energy efficiency program—which combined various government sponsored financial incentives to bring down the cost of new technologies—represented a cost-justified approach to reduce company energy consumption. In addition, the program met other criteria for the company, including an internal carbon reduction mandate. The program was designed to

improve shareholder value by providing cost savings and legitimacy gains. However, senior executives at Disney rejected the proposal.

Instead of the proposed solar hot water heater exchange project, Disney opted for a mixture of carbon-offset projects in South America – programs involving very few, if any, voluntary incentive programs offered by governments, little connection to employees, and no capital improvement to company facilities. The executive decision to not undertake a solar water heater program by Disney may have been the correct choice for Disney, but it became clear in the decision process that without a comprehensive view of *all* voluntary programs for energy efficiency, the solar water heater exchange program did not stand a chance against the others. Mainly, the solar hot water heater exchange program for energy efficiency was perceived as a response to a financial driver, but did not clearly respond to the fundamental strategic drivers for Disney, which were legitimacy, knowledge gaps, and ultimately improving shareholder value.

In terms of knowledge gaps, executives cited concerns about where they would source the necessary technical systems, who could install, train and maintain the new systems, how they would coordinate the implementation of a new technology into Disney's existing infrastructure, what metrics could be used to gauge performance of the new technology, and how Disney's reputation would be affected by the program. To address the knowledge gaps surrounding the implementation of a new technology, partnerships between local governments, local technology contractors, and manufacturers may have provided the necessary security to address the executives' concerns regarding gaps in technical and strategic knowledge.

In addition to the observed knowledge gaps that existed, the solar hot water heater program did not improve shareholder value in a fashion that guaranteed improvement or preservation of legitimacy. There was great uncertainty among Disney executives of how the solar exchange program would be perceived among internal and external stakeholders. In line with prevailing normative pressures, Disney has a separate corporate social responsibility (CSR) group that is in charge of corporate citizenship activities[61, 62, 63]. The formal process at Disney of a CSR review for voluntary energy efficiency programs, such as a solar hot water heater exchange program, is a structural response to assessing how each type of internal program addresses the overall normative institutional pressures in a society. Disney is also strongly affected by mimetic pressures from other large corporations. Each of the five highest ranked companies on Fortune 500's list (excluding natural gas and oil companies) seem to illustrate isomorphic tendencies toward the institutionalized environment of good corporate citizenship. The CSR websites of these five companies, Wal-Mart Stores, General Electric, General Motors, Ford Motor, and AT&T, illustrate the predominate norms of proper stewardship in energy efficiency. Littered throughout the websites of these companies are notions of and commitments to practice sustainable development through more energy efficient practices. Major companies show overwhelming support for the argument that businesses must adapt to the institutional environment in order to avoid the risk of losing legitimacy and subsequent failure.

In some cases, where the institutionalized environmental pressures are vague, an organization will reduce its uncertainty by imitating the interpretations and actions of what it views as successful peers[64]. In the case of internal energy efficiency programs, Disney saw other organizations such as Dell Computers and Wal-Mart adopt carbon-

offset programs to address the harmful impacts of energy consumption. The solar hot water exchange program was not a successful representation of energy efficiency stewardship among other companies. In cases where the law or rational norms are "… ambiguous and politically contested…the more open it is to social construction."[65] However, the rational norms for how to successfully demonstrate to stakeholders the ambiguous concept of 'sustainability' stewardship were quite clear for Disney. There was little room, in this case, for Disney to invent a new approach. In the case of energy efficiency, or rather improving shareholder value by undermining the harmful impacts of excessive energy consumption, the prevailing rational norm were through programs such as the purchase of carbon offsets—not energy efficiency improvements on-site through programs such as the solar water heater exchange program. In carbon-offset programs, there is no quantitative evidence that they bring back financial returns or that they are economically efficient. What we see are mimetic responses to ambiguity in understanding how excessive energy consumption affects the environment, how companies can protect legitimacy through internal programs and promote the image of environmental stewardship. It is through these processes structured as an internal company program that a firm is able to improve shareholder value. In the absence of a clear internal definition for how to respond to energy efficiency concerns, Disney became subject to mimetic pressures and latched on to other forms of stewardship responses that had gained greater legitimacy and acceptance amongst other firms.

Applying the Framework

The linkages between the various voluntary and mandated program forms are incredibly complex. It is worth noting, however, that the utility of our new framework is that it takes a seemingly complex system of hundreds of policy tools and distills them into five fundamental forms. To elaborate on this theme: recall from the DOE survey that firms reported a wide array of concerns and struggles related to energy. To intervene effectively, managers and policymakers must turn to a diverse set of tools. No single solution can address the challenges inherent in energy efficient development. From this perspective, the framework provides a roadmap for managers and policymakers to navigate the complex system of energy efficiency program development.

Let us return to the hypothetical firm, Energy User, Inc. As we mentioned, a report was recently released disclosing that poor energy practices at Energy User, Inc. have caused community-wide brownouts and blackouts. Our framework provides a roadmap for managers. In this case, it is clear that the fundamental driver for Energy User's participation in a voluntary program should be legitimacy. Serious threats to the company brand are driving the need for participation in a program that effectively responds to legitimacy concerns. If consumers no longer see Energy User's products as 'sustainable,' they are likely to start buying from the competitors. Employing the framework, managers can look to certification programs as a partial response to the legitimacy concerns. Participation in LEED or Energy Star will help demonstrate to the public their commitment to energy efficiency in their buildings. The 'stamp of approval' on their buildings through retrofit projects will demonstrate to the citizens of the community that their widgets are still the sustainable alternative. Nonetheless, certification programs will not solve all of their problems. The framework indicates that financial barriers, knowledge gaps, and pressure to improve shareholder value may still

exist. Further, Energy User, Inc. must demonstrate that whichever path they take, they are at least meeting the long-term minimum national, state, and local standards for energy consumption.

The competing strategic drivers are all critical considerations for managers at Energy User. It is likely that the company will be more successful at preserving their business by assessing each of these competing drivers, selecting programs that respond to each of the complementary drivers, and implementing each program in a coherent fashion. For example, participation in a widget producer's alliance network may help close the knowledge gaps on *how* to implement a LEED building. Discussions with local government and state officials will confirm that through participation in LEED, Energy User will secure compliance with minimum standards for a specified length of time. The economic incentive programs will help bring down the additional costs associated with LEED design and construction. The framework ensures that Energy User, Inc. managers are responding to each of the critical drivers with a complementary program form.

Managerial, Policy and Research Recommendations

The framework presented distills a complex system of energy efficiency options into a single framework encompassing the relationships between various forms of voluntary programs and regulation. Our framework focuses on identifying the five fundamental forms of energy efficiency programs: regulation, economic incentives, certification programs, alliance and partnerships, and internal company programs. In examining each of these forms, we have assessed the strategic drivers for their emergence and the remaining challenges to each program. Our objective is to point out that none of these programs alone or even in conjunction with regulation meet company needs for environmental efficiency programs. The forms must be viewed as components in a greater system for promoting energy efficiency.

There are two fundamental managerial and policy implications to viewing voluntary energy efficiency programs through the lens of our framework. First, it is imperative that managers and policymakers move away from "silver bullet" solutions to reduce energy consumption. Efficiency, effectiveness, and sustainability must be evaluated at the systemic *and* program level. While one particular program form may seem to be effective, there is potential for this program to have minimal or even negative consequences on a system's design intent. Representatives of regulatory agencies, building owners, and construction companies are all limited in terms of their information processing capacity and in terms of the information available to them[66]. This problem is especially compounded when viewing energy efficiency and construction as a systemic challenge. As a result, valuations need to consider not only how actors perceive a specific program, but also how it relates to a wider infrastructure of available approaches.

Second, in supporting the emergence of new forms and the successful transformation of existing forms, entrepreneurs and a cluster of small and innovative companies will play a key role. Government actors (local, state and federal) must identify situations of broken agency and evaluate whether new businesses or policies are able to address these particular challenges. To successfully promote building energy efficiency, government and private sector firms must identify situations wherein each actor involved in the lifecycle of a building project has the opportunity to benefit from increased energy efficiency. In viewing the spectrum of forms intended to promote energy efficiency, one

can easily detect that the various forms have differing degrees of government involvement. We are not advocating for more or less government involvement. Instead, we are advocating for a systemic view of *all* program forms in which policymakers and managers are capable of viewing participation in a particular program in the context of the diverse set of actors involved in the lifecycle of a building project. While it is not necessarily an effective role for the government to integrate all approaches, government actors should take on responsibility for ensuring a clear system-wide lens for which all actors can view energy efficiency. In some cases, voluntary programs in their current forms, cannot address the challenges associated with broken agency. It may also be the case that new forms incompletely address the broken agency involved in building development. In this case, the only effective response to inducing national and regional energy reductions is through more stringent regulations (i.e., stricter building codes with stronger enforcement).

Caution should be taken when considering the application of a program form as a response to an incongruent driver. As asserted earlier, LEED and other certification programs provide businesses with legitimate support of an accepted process for mitigating the harmful impacts of energy consumption. In 2008, however, Mayor Newsom of San Francisco signed into law a *requirement* that all new large commercial buildings achieve LEED Silver Certification. As the city states San Francisco has "opted to make several voluntary systems mandatory practice." In doing so, the new requirement dramatically alters LEED as a program form. In San Francisco, LEED has now become regulation. It is no longer a voluntary certification program. The emergence of a program such as LEED was of potential value to organizations in conveying their legitimacy to the community. With the transformation to regulation, how and what program forms now exist for firms to retain or promote their legitimacy as a strategic advantage? As codes and voluntary certification programs converge, what will allow firms to separate themselves as more or less legitimate? Further, this transformation is attempting to take a program driven by the demand for firms to claim legitimacy and use it in response to an entirely different driver—mainly, a citywide minimum standard. That is to say, the initial drivers do not match with the current program form. How will this misalignment truly address the goals of energy reduction?

A substantial amount of research is still required before the framework developed here can be fully evaluated and refined. First, our research alludes to form emergence and form transformation processes. A historical review may provide a better context for analyzing the impact of various form transformations and new form emergence. Second, our research provides a conceptual lens for viewing programs for energy efficiency. However, we fall short in that we do not provide a systematic methodology for evaluating the impacts of each program on a number of critical variables. Future research should identify criteria for reviewing system-wide impacts. Third, our framework addresses the U.S. context. This approach has its benefits in that we are able to take a complex system and distill it into a digestible, yet meaningful, fashion. Further comparative studies across industries and institutional, national and cultural contexts would allow further generalization and thus provide a broader contribution to the field. Although our framework makes a contribution to the field of energy efficiency, policy, and management, the tools presented here should be generalized and tested in order to address some of our country's other great challenges for which neither free markets nor

governments offer complete solutions, including environmental quality, health promotion, and democracy building.

Figures

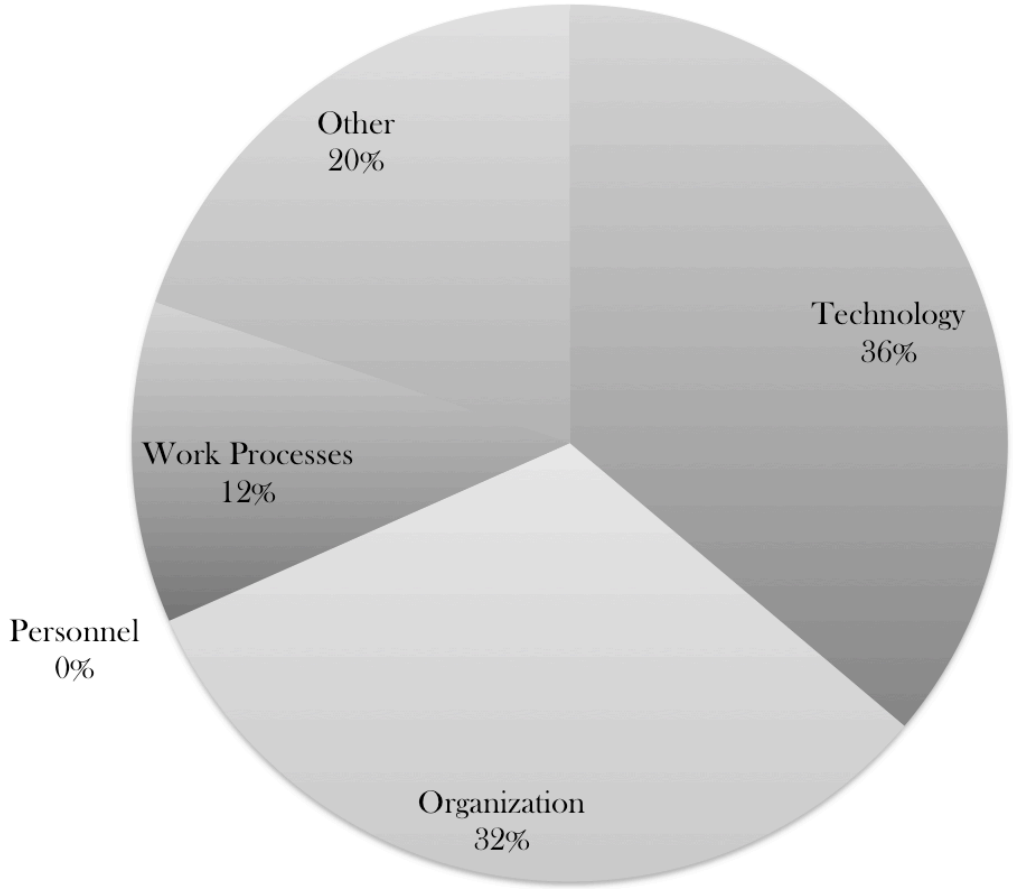

Figure 1 – Top Energy Challenges of Major U.S. Companies (Survey from Commercial Building Energy Alliance Program)

A Roadmap for Navigating Voluntary and Mandated Programs for Building Energy Efficiency

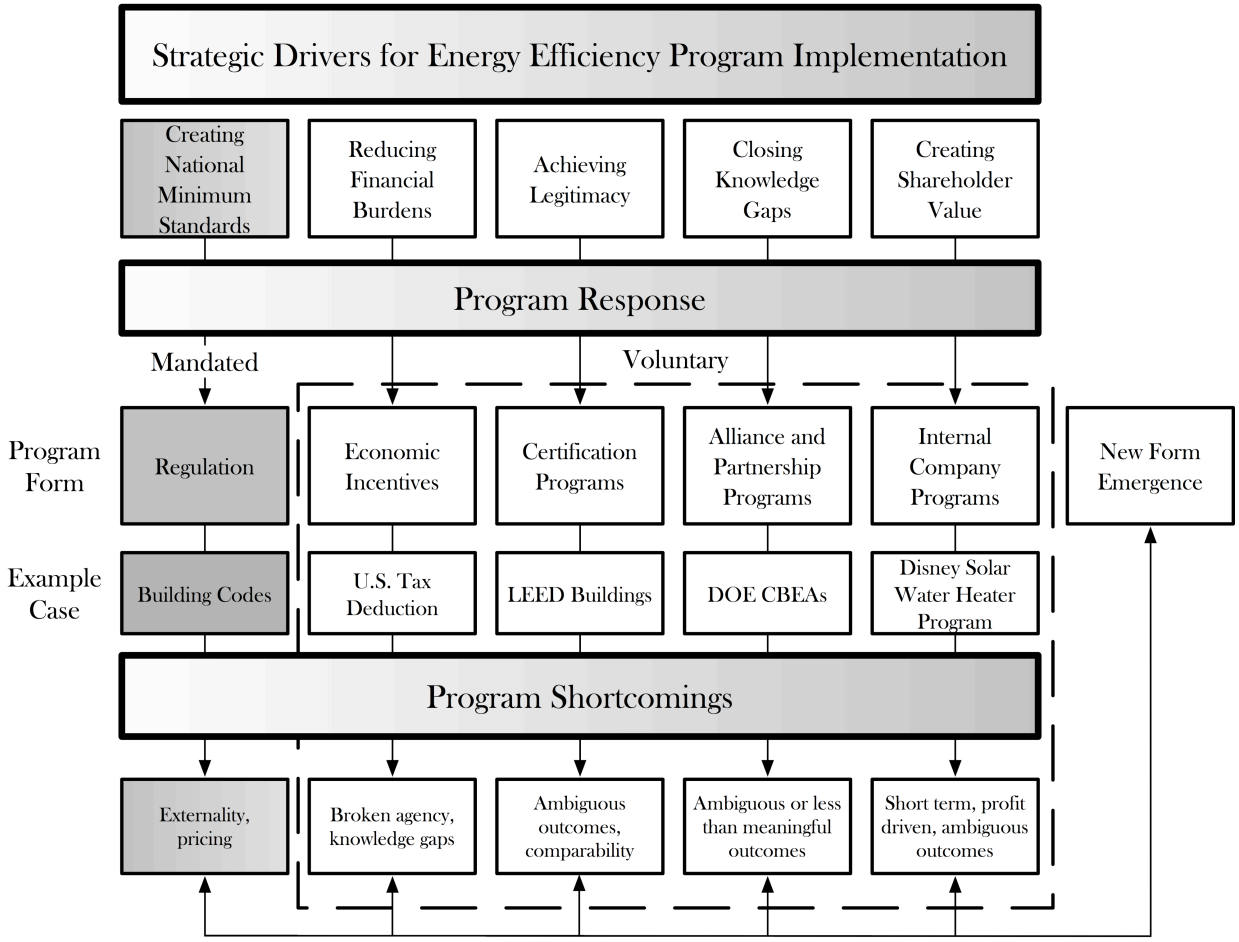

Figure 2 – Roadmap for Navigating Voluntary and Mandated Programs for Energy Efficiency.

Notes:

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