DSM Resource Acquisition and Market Transformation: Two Inconsistent Policy Objectives?

Ralph Prahl, Public Service Commission of Wisconsin
Jeff Schlegel, Wisconsin Energy Conservation Corporation

Until recently, the primary goal of most utility energy efficiency programs was to acquire demand-side resources. Recently, however, an alternative goal of market transformation has been widely discussed and, with increasing frequency, adopted. While the focus of resource acquisition is on achieving verifiable savings within the context of an existing market system, market transformation aims at lastingly *changing* markets, so that improvements in energy efficiency persist even after the program is changed or eliminated. As such, market transformation represents a potential paradigm shift in the field of demand-side management.

This paper systematically defines and compares the alternative paradigms of resource acquisition and market transformation, concluding that the two are fundamentally different, often inconsistent, though not necessarily incompatible program objectives. Compared to resource acquisition, market transformation may: (1) yield greater savings, at the price of being harder to control, predict and measure; (2) demand fundamentally different performance incentive schemes in order to motivate utilities; (3) require a decreased focus on financial incentive programs, and increased emphasis on education, moral suasion, and the generation of structural changes in the marketplace; (4) call for changes in the types of technologies and market actors that are emphasized in program marketing; and (5) require fundamental changes in evaluation and resource planning practices.

Such differences suggest that it will be difficult to simultaneously optimize the attainment of both resource acquisition and market transformation objectives. The authors conclude that there is thus a critical need for policy makers and program planners to consider the relative priority of these two objectives, and design programs, performance incentive mechanisms, and resource plans accordingly.

Introduction

Until recently, the primary goal of most utility energy efficiency programs was to acquire demand-side resources. Recently, however, an alternative goal of market transformation has been widely discussed and, with increasing frequency, adopted. While the focus of resource acquisition is on achieving verifiable savings within the context of an existing market system, market transformation aims at lastingly *changing* markets, so that improvements in energy efficiency persist even after the program is changed or eliminated. As such, market transformation represents a potential paradigm shift in the field of demand-side management.

However, thus far, there has been relatively little systematic analysis of what constitutes market transformation or which policies and program approaches are most likely to lead to it. Many observers appear to be assuming that current approaches, with minor modifications and elaborations, will serve to accomplish the desired market changes.

This paper questions this premise. The authors systematically define and compare resource acquisition and market transformation, concluding that the two are fundamentally different, often inconsistent, though not necessarily incompatible policy objectives. This suggests that there is a clear need for policy makers and program planners to consider the relative priority of these two objectives, and design programs, performance incentive mechanisms, and resource plans accordingly.

What Is Resource Acquisition?

Most DSM programs are currently conceived, implemented, and evaluated within a clearly defined framework, which we shall refer to in this paper as *resource acquisition.* This framework has its roots in the development of integrated resource planning which took place in the 1980s, and has since become so ingrained within the DSM profession that to even define it explicitly is to risk belaboring a point. However, in order to systematically compare resource acquisition and market transformation as DSM strategies, we require explicit definitions of both. In the view of the authors, then, the primary characteristics of the resource acquisition paradigm are as follows:

1. Energy efficiency actions taken by customers and induced by a utility are regarded as being in direct competition with supply-side measures. Both are viewed as resources which can meet the changing system requirements placed on the utility.

2. Because DSM is viewed as a system resource, and because the reliability of the system is considered of paramount importance, there is a strong emphasis on carefully and accurately planning, forecasting, controlling and measuring the utility's efforts to influence the usage patterns of its customers. This emphasis has a wide range of implications for the activities of both utilities and regulators, including:

    - The development of sophisticated forecasting methods to predict both the baseline demand for energy and the possible reduction in that demand that can be achieved through DSM programs.

    - A focus on those types of programs which are seen as producing the most predictable and quantifiable results, notably programs featuring financial incentives to customers. [1]

    - Within the field of program evaluation, a strong focus on impact evaluation and persistence research, both of which are seen as clarifying the true magnitude of the DSM resource.

    - Within the arena of regulatory policy, a focus on approaches which will encourage utilities to vigorously pursue and reliably document the DSM resources available to them (e.g., decoupling mechanisms and performance incentives to utilities based on ex-post savings estimates.)

What Is Market Transformation?

Market transformation is a much newer concept than resource acquisition, and thus far, no clear and universally accepted definition for it appears to have evolved. However, most discussions of the issue appear, at least implicitly, to presume two basic concepts:

1. The market systems (e.g., relationships between customers, dealers, distributors and manufacturers) through which energy efficiency measures are distributed through the economy are in constant evolution.

2. DSM programs have the potential to fundamentally change the course of that evolution.

As for the specific *mechanisms* through which DSM can transform market systems, a wide range of possibilities have been suggested. Some observers have focused on the price and availability of energy efficiency measures, holding that incentives and education targeted to manufacturers, distributors and dealers can permanently alter these. Others have emphasized changes in the attitudes of customers, arguing that these hold the key to lasting improvements in purchasing behavior. Still others have stressed the importance of expanding the infrastructure of dealers and contractors skilled in marketing energy efficiency.

Clearly, market transformation is a complex and diverse phenomenon, affecting a wide range of technologies, economic players, and market structures. However, as in the case of resource acquisition, to assess its broader role in utility planning we need both a clear definition of it and a conceptual framework to help understand what different examples of market transformation may have in common.

The definition we adopt in this paper is that *market transformation occurs when DSM activities induce a lasting, beneficial change in the behavior of some group of actors within a market system.* [2] While "lasting" is a relative term, one plausible definition for it is "likely to persist once the program is modified or terminated." As for a conceptual framework, the one used in this paper is both simple and eclectic.[3] In order to understand how various forms of market transformation relate to one another, we classify market-transforming strategies along two dimensions: first, which group of market actors they affect; and second, the mechanisms by which they cause long-term changes in the behavior of individuals or organizations.

Types of Market Actors

We distinguish between three main types of actors in the marketplace: [4]

1. *Utility Customers,* including both individuals and organizations from all major sectors.

2. *Trade Allies,* or businesses which utilities believe can play a role in helping them to market their DSM programs. Depending on the specific type of program, utility trade allies can include appliance dealers, HVAC contractors, plumbers, electricians, repair shops, architects, engineering firms, department stores, and regional distributors.

3. *Manufacturers,* including appliance, lighting, and motor manufacturers.

Ways in Which Actors' Behavior May Be Changed

Our approach to classifying the ways in which peoples' behavior may be lastingly changed is based on the following simple model of human behavior: in order to make a choice, an actor must: (1) be able to make the choice; (2) be aware that the choice is available; and (3) either believe that the choice is in his or her own best interest, or believe that the choice is the right thing to do. This model suggests the following categories for how DSM may cause long-term changes in customer, trade ally, or manufacturer behavior:

1. *Changes in Actors' Options.* Options can be changed either by creating new options or by eliminating old ones. For example, the former can occur when utility programs increase the market availability of efficient appliances. The latter can occur when new building codes or appliance standards are created and/or enforced.

2. *Lasting Changes in the Structure of Actors' Incentives. The* key word here is "lasting." Most DSM programs *temporarily* change the structure of customers' incentives, by providing them with some benefit in exchange for adopting an energy efficient measure. However, in our framework, market transformation can only occur when a program creates new incentives for conservation that persist independently of the program. For example, if dealers perceive that appliance rebate programs have increased customer demand for efficient appliances, they may be provided with a long-term incentive to stock more such appliances. Their motivation to do so may persist even after the program is modified or terminated.

3. *Education.* Education is often thought of as being directed primarily at residential customers, and being primarily the result of information-oriented programs. However, in our framework, DSM-induced education can affect the behavior of any market actor, can result from any type of program, and can be the product of hands-on experience as well as information. For example, a compact fluorescent lighting program, by exposing retailers to a new technology, can teach them that it is possible to light their store less expensively without sacrificing aesthetics.

4. *Moral Suasion.* Moral suasion involves changing either a market actor's attitudes or values, or causing the actor to believe that some energy related behaviors are more "normal" than others. An example of the first effect is when a utility sends a marketing message that direct load control of air conditioners can prevent environmental damage by postponing new power plants. An example of the second effect is when an appliance labeling program leads appliance purchasers to believe that most shoppers in their position would weigh energy efficiency strongly in deciding which model to purchase.

A Typology of Market Transformation Strategies

Comparing the three types of market actors (customers, trade allies and manufacturers) with the four modes of behavioral change (changes in options, lasting changes in incentives, education, and moral suasion) results in the typology of market transformation strategies shown in Table 1. Within specific grids of this table, we have located a wide range of specific effects of DSM programs that have been cited as possible. sources of market transformation.

Several general facts are worth noting about Table 1. First, while it is intended to convey the broad diversity of ways in which DSM programs can make lasting changes in markets, it is not intended to be exhaustive. An exhaustive inventory would need to consider each type of DSM program individually.

Second, Table 1 represents a *dynamic system,* in that market changes listed in each row or column can and do lead to market changes in other rows or columns. For example, changes in customer attitudes can lead to alterations in customer purchasing patterns, which can in turn lead to long-term changes in dealer stocking, displaying, or marketing practices. Changes in dealer behavior can influence distributor and even manufacturer practices, which can then reverberate to cause further changes in the behavior of customers and dealers. In short, Table 1

Table 1. Examples of Market Transformation Strategies

How Behavior Changed	Whose Behavior Changed?		
	Customers	**Trade Allies**	**Manufacturers**
Change in Actors' Options	• Increasing availability of efficient equipment • Bringing new technologies to market • Codes and standards	• Increasing availability of efficient equipment • Bringing new technologies to market • Codes and standards	• Codes and standards
Change in Actors' Incentives	• Changing market availability of efficient equipment • Permanent financial incentives	• Changing what dealers stock by changing their perception of customer preferences • Building market infrastructure by directly or indirectly increasing demand • Forcing non-participants to change behavior to remain competitive • Changing what distributors order or push by changing perceived demand • Building an "efficient dealer" niche	• Golden Carrot approach (SERP) • Changing efficiency mix by changing perceived demand • Changing shipments to area by changing perceived *relative* demand • Accelerating transition to new Federal standards
Change in Knowledge (Education)	• Getting customer to take the crucial "first step" with other steps following • Causing customer to repurchase technology due to satisfactory experience • Making customers more aware of existing inefficiencies or of the range of efficient options • Changing customer perceptions of the costs of efficiency (financial & other)	• Making dealers aware of customer preferences • Informing dealers of the characteristics of efficient equipment and the options for energy services	• Making manufacturers aware of what products are needed in the marketplace
Change in Norms, Values, or Attitudes (Moral Suasion)	• Changing what customers perceive to be "normal" behavior • Building conservation ethic • Increasing legitimacy of efficient options by demonstrating utility support for them	• Changing attitudes and values of business owners • Changing trade ally perceptions of "normal" behavior • Leading trade allies to believe they will be viewed negatively if they do not carry efficient options	

correctly represents the fact that energy efficiency markets are complex, interrelated systems, in which the actions of any one group of actors can have a ripple effect felt by all other groups.

Finally, Table 1 suggests that both the mode and extent of market transformation can be expected to vary by customer sector, end-use, and technology. Changes to manufacturing practices are likely to be more relevant for appliances, which are highly differentiated in the production process, than for insulation, which is not. For C&I lighting, changing market availability is likely to be more relevant for a technology like high-efficiency ballasts than for delamping. In essence, there are as many market systems as there are combinations of customer sectors, end-uses, and technologies. In order to fully understand the transforming effects of DSM, it is necessary to consider the potential changes described in Table 1 for each market system.

In What Ways Is Market Transformation Similar to Resource Acquisition, and in What Ways Does It Differ?

The preceding discussions of resource acquisition and market transformation suggest several fundamental similarities between the two paradigms. First, both resource acquisition and market transformation are based on the premise that there are market failures limiting the independent adoption of energy efficiency measures among utility customers, and that these failures can and should be addressed by the utility. Second, both involve attempts to influence the market-oriented behavior of other participants in energy efficiency markets. And third, at least when practiced successfully, both lead to the diffusion of energy efficiency measures and practices, and thus eventually to reductions in energy consumption and demand.

However, here the similarities between the two paradigms would appear to end. In the remainder of this section we argue that the definitions of market transformation and resource acquisition used in this paper imply a number of important differences between the two. These differences can be summarized by saying that, compared to resource acquisition, market transformation may: (1) yield greater savings, at the price of being harder to control, predict and measure; (2) demand fundamentally different performance incentive schemes in order to motivate utilities; (3) require a decreased focus on financial incentive programs, and increased emphasis on education, moral suasion, and the generation of structural changes in the marketplace; (4) call for changes in the types of technologies and market actors that are emphasized in program marketing; and (5) require fundamental changes in evaluation and resource planning practices.

Changes in the Program Approach

The preceding discussions of market transformation and resource acquisition suggest that there are important differences between the program approaches that will optimize the achievement of each of these policy objectives. These differences can be viewed as falling into three categories: (1) differences in the market actors to be targeted; (2) differences in the delivery mechanisms employed; and (3) differences in the technologies emphasized.

Differences in the Market Actors Targeted. While there has been some evolution in the marketing strategies employed for resource acquisition programs of late, most such programs still target utility customers. When other actors such as dealers or design firms have been targeted, it has usually been because they have been perceived to have a direct influence on customer behavior. However, Table 1 suggests that, if market transformation is the primary policy goal, a wide range of other market actors, including trade allies, manufacturers, and even government agencies, must also be targeted as the recipients of marketing efforts. In addition, the interactive nature of the various strategies shown in Table 1 suggests that market transformation programs will be most successful when they seek to change the overall system of relationships among market actors, rather than viewing one set of actors primarily as a route to another set.

Differences in Delivery Mechanisms. As noted earlier, up to now resource acquisition programs have been largely dominated by financial incentives to customers. After several years of rigorous impact evaluation and ensuing program redesign, this approach has proven quite successful at generating predictable savings to contribute to system resource needs. However, Table 1 suggests that, if market transformation is the primary policy objective, incentives to customers are only a small part of the picture. Also required are efforts at education, moral suasion, and the generation of lasting structural changes to the marketplace. In addition, delivery mechanisms must be developed to help market to trade allies, manufacturers, and government agencies.

Some observers have argued that there is not that great a difference between the delivery mechanisms that are required for purposes of resource acquisition and those that are required for purposes of market transformation. Usually, such arguments revolve around the fact that customer incentive programs can have market-transforming

effects beyond the direct impacts of the measures rebated. For example, appliance rebate programs have been known to influence dealer stocking, displaying, and promotional practices by increasing the perceived demand for efficient appliances. Similarly, utility rebates for compact fluorescent lights have played a key role in building demand for this technology, thereby stimulating production and helping to reduce prices.

While there is little doubt that customer incentive programs can and do have market transforming effects, such arguments appear to miss the mark.[5] Because the DSM industry faces sharp and increasing resource constraints, the key question is not whether resource acquisition programs can change markets at *all*, but whether they can do so optimally. Given the wide range of routes to market transformation, it seems doubtful that traditional rebate programs can generate the desired market changes as efficiently, as comprehensively, and as lastingly as can programs that are explicitly designed for. that end. There is thus an unavoidable tension between the optimal delivery mechanism for resource acquisition programs and that for market transformation programs.

Differences in the Technologies to Be Emphasized. To date, resource acquisition programs appear to have worked best with relatively mature technologies that are near the middle of their diffusion curve—for example, efficient C&I lighting. If a technology is too new, the marginal cost of efficiency is likely to be too high to compete with programs targeting more established measures; if too old, rebate programs are likely to result in excessively high rates of free riding. In addition, it is established technologies for which customer response is well enough understood to be reasonably predictable, and for which an adequate and predictable market infrastructure exists.

However, in many cases, it is precisely those measures that are reasonably well established that are least in need of market transformation. Rather, it is measures that have either been only recently introduced, or that have, for one reason or another, failed to establish thriving markets for themselves. Not surprisingly, most of the well-documented cases of market transformation to date have involved technologies that had not yet reached substantial levels of diffusion, such as super-efficient refrigerators, compact fluorescent, and efficient motors. Thus, it appears that the optimal selection of technologies may vary depending on whether the primary policy objective is resource acquisition or market transformation.

Greater Savings, Less Control

As their proponents have often argued, there seems little doubt that market transformation programs have the potential to generate much greater savings, much more cost-effectively, than traditional resource acquisition programs. As the aphorism goes, "Give a man a fish and he can eat for a day; teach him to fish and he can eat forever." However, the conceptual framework for market transformation employed in this paper suggests that, in the case of DSM, eating forever comes at a cost—for the benefits from market transformation programs may be harder to predict, control, and measure than those from resource acquisition programs.

Part of the difficulty stems from the very iterative nature of market processes that can cause market transformation programs to have so many beneficial side effects. Customer education may increase the demand for energy efficiency measures, which in turn may influence dealer stocking behavior. If enough dealers change their behavior, the business practices of regional distributors may also be changed. Such changes upstream in the distribution channel may lead to further changes in customer purchasing behavior, as shoppers find a wider array of energy efficiency measures in the marketplace. This iterative process is highly desirable, but how can we predict ahead of time the magnitude of the efficiency gains that will result from it? How can we time those gains to match the changing needs of the utility system? And if we cannot do these things, how reliable a resource are the benefits accruing from market transformation programs?

Another difficulty stems from the fact that desirable market changes can occur slowly and incrementally. For example, attempts to inculcate a conservation ethic into one's customers, to the extent they are successful, can be expected to result in a gradual shift in purchasing behavior. But to expect to be able to accurately predict or control the pace of this change would fly in the face of all that is known about the complex relationship between attitudes and behavior.

It would appear, then, that adopting market transformation as a policy goal involves a fundamental trade-off between the likely magnitude of savings and the degree of control the utility has over these savings. As discussed in the remainder of this section, this trade-off has profound implications for the role of market transformation in the integrated resource planning process.

Changes in Evaluation Practices

In an earlier paper (Prahl and Schlegel, 1993) the authors have argued that adopting market transformation as a primary policy objective will require fundamental changes in the theory, practice and application of DSM program evaluation. One such change is a broadening of research objectives, away from the current fixation on precisely measuring the savings associated with the installation of specific ECMs, and toward measuring changes in a wide range of market indicators regarded as demonstrative of market transformation. One approach would be to identify which of the specific changes identified in Table 1 are expected to occur as a result of a utility's intervention, and to focus on documenting the extent to which these changes do occur. Due to the complex, iterative, and potentially slow-moving nature of market transformation, it may be neither feasible nor desirable to make measured reduction in energy consumption the prime outcome variable to be studied. Instead, evaluators may have to be content to amass evidence of market changes from a variety of sources, and assemble this evidence into a mosaic which helps policy-makers interpret the results of market transformation-oriented programs.

In addition, a wide range of methodological and institutional innovations are likely to be needed if the effects of market transformation programs are to be adequately documented. The first such innovation is improved efforts to document the market baseline. Currently, such efforts occur sporadically, and are usually focused on a small number of market indicators which are expected to help document the direct impacts of financial incentive programs. Any one (though not necessarily all) of the potential changes listed in Table 1 that are expected to result from a given program strategy may call for its own baseline analysis.

Second, given the central role that some observers assign to attitudinal change as a mechanism for market transformation, it may be necessary to better document the long-term relationship between attitudes and behaviors considered conducive to energy efficiency.

Third, it will be necessary to much more thoroughly track the sales of efficient equipment and practices through the distribution chain. In addition, if causal inferences are to be drawn about whether DSM programs are responsible for changes in sales patterns, it may be necessary to overlay such sales tracking efforts with experiments and quasi-experiments that selectively expose market actors to the effects of DSM marketing. Given the practical difficulties of conducting such experiments within a single service territory, this will probably necessitate much greater coordination and collaboration between the evaluation departments of different utilities and states.

Finally, just as increasing attention and resources have been devoted of late to documenting the persistence of impacts from resource acquisition programs, methods will have to be developed to assess whether the market changes wrought by market transformation programs persist once the programs are changed or eliminated. In fact, given that we are concerned here with the persistence of attitudes, behaviors and patterns of transactions rather than simply of measures, it would appear that persistence may be an even more daunting issue for market transformation than it has been for resource acquisition

Clearly, these changes in the scope and focus of DSM program evaluation will not be easy to make. However, there is every reason to believe that the challenge can be met. Ten years ago few observers would have predicted that it would be possible to perform the impact evaluation feats that are now relatively commonplace. However, the magnitude of the risks associated with resource acquisition decisions led to increases in research funding, attracting skilled practitioners and generating impressive methodological advances. As market transformation becomes more widely accepted as a policy objective, it seems likely that similar advances in research methods will develop to help support it.

Changes in Resource Planning Practices

Given the greater difficulty of predicting, controlling and measuring the efficiency gains resulting from market transformation programs, it would appear that fundamental changes in resource planning practices may be necessary. First, and most obviously, impacts from market transformation programs probably should not be regarded as interchangeable with supply-side measures in the same way that impacts from resource acquisition programs are. This suggests that a fundamentally different way of establishing the role of market transformation impacts in a utility's resource portfolio may have to be established. One such approach might be to view market transformation efforts primarily as a hedge against the risk of unexpectedly high growth in demand, rather than as a dispatchable resource. Forecasting the expected benefits from market transformation programs could then be viewed more as an exercise in assessing the likely reduction in risk, rather then establishing a point estimate for expected savings. In turn, this would suggest that resource planning under a market transformation framework should become more concerned with analyzing the determinants and consequences of uncertainty than with deriving point estimates of future outcomes.

One potential disadvantage of treating market transformation programs as a hedge against unexpectedly high load growth is that this approach could increase the opposite sort of risk: the possibility that, if such programs are

successful, too *much* supply-side resource will be acquired. An alternative approach which would reduce this risk would be to simply use market transformation programs to facilitate the adoption of more conservative demand forecasting methods and assumptions. For example, utility-induced changes in energy efficiency markets could be viewed essentially as a form of reserve margin, thus allowing for a reduction in the supply-side reserve margin—with attendant benefits.

Whatever changes are made in resource planning methods, given the difficulty of assigning causality for market changes to the utility, adopting market transformation as a policy goal may require a decreased emphasis on net savings, and a corresponding increased emphasis on gross savings, throughout the planning, forecasting, marketing and measurement process. This means that market transformation programs will have to be sufficiently cost-effective that they can withstand the possibility of their true net-to-gross ratios falling substantially below expectations.

Given all these challenges, some might argue that the difficulty of building a resource planning framework around market transformation is a strong argument against adopting it as a primary policy goal. However, others might argue that the potentially greater savings and improved cost-effectiveness of market transformation programs compared to resource acquisition programs are worth the extra effort. This would appear to be a value judgment that is best left to individual policy makers.

Changes in Regulatory Strategy

Regardless of whether market transformation or resource acquisition is adopted as a primary policy objective, the economic and institutional barriers which have made many utilities reluctant to invest in DSM programs remain in effect. Thus, under either a market transformation or a resource acquisition regime, PUCs will probably need to consider strategies which can overcome these barriers, such as performance incentives and decoupling schemes. However, it would appear that fundamental changes in the nature of such strategies may be needed if market transformation is adopted as a major policy objective.

To begin with, most of the performance incentive mechanisms currently in place can be expected, if anything, to *discourage* rather than *encourage* utilities to pursue market transformation as a goal. Most existing mechanisms are linked in some fashion to the measured, direct, net impacts of resource acquisition programs. These impacts are usually estimated, in one fashion or another, by subtracting the change in consumption shown by a sample of nonparticipants from that shown by a sample of participants. Most successful attempts at market transformation will lead to savings among nonparticipants, thereby reducing the apparent direct impacts for which the utility is credited—and thus the utility's incentive payment. Clearly, alternative mechanisms will be needed to encourage market transformation than to encourage resource acquisition.

In addition, if market transformation and resource acquisition incentive mechanisms are applied simultaneously, efforts will be needed to make the two compatible with one another. Given the fundamental conflict noted above, it is difficult to see how this can be done, beyond applying the two types of performance incentive mechanisms to completely difference measures, markets, or customer sectors. [6]

Finally, the difficulty of reliably assigning causality for complex market changes to the utility suggests that incentive mechanisms intended to encourage utilities to pursue market transformation may need to be based on gross rather than net results. This suggests, in turn, that any such mechanisms will need to be designed so as to minimize the degree of ratepayer risk associated with the possibility of paying for market changes that were not actually wrought by the utility. For example, a conservative way to minimize ratepayer risk would be to make any payments to the utility dependent on a degree of gross improvement in market processes that is so great that customers will be significantly better off even if it turns out that much of the change would have occurred without utility intervention. Fundamentally, there would appear to be two ways of assuring such an outcome: (1) putting a relatively low cap on potential incentive payments to the utility; or (2) putting a relatively high floor on the degree of market change required before the utility can receive an incentive.

How Compatible Are Resource Acquisition and Market Transformation?

The preceding discussion suggests that market transformation is a fundamentally different policy objective than traditional resource acquisition, requiring substantial changes in program delivery mechanisms, the technologies to be emphasized, the market actors to be targeted, resource planning and evaluation practices, and regulatory strategies.

The question that remains is, how compatible are these two fundamentally different policy objectives? Do the magnitude of the necessary changes to planning practices mean that we will have to abandon traditional resource

acquisition in order to seriously pursue market transformation? Or is there some way for these two to peacefully coexist?

In general, there appear to be few substantive barriers to the peaceful coexistence of these two policy objectives. Fundamentally, there is no reason why utilities cannot operate two separate planning tracks, each with their own program approaches, planning, evaluation and forecasting practices, and performance incentive mechanisms. While the difficulty of simultaneously encouraging both resource acquisition and market transformation poses challenges for regulatory policy, this challenge can probably be met by applying different performance incentive mechanisms to different measures, customer sectors or programs.

However, on a practical level, maintaining two separate planning tracks probably implies a significant increase in the administrative costs of DSM. In an era in which many utilities are trying to reduce DSM expenditures to deal with perceived competitive threats, such an increase must be viewed as being problematic. Given this, while resource acquisition and market transformation are not fundamentally incompatible, it would appear that there are limits to the extent to which the attainment of both policy objectives can be simultaneously optimized. In turn, this suggests that there is a need for a clear strategy for allocating resources between the two approaches, just as integrated resource planning allocates resources between supply- and demand-side measures. The following are some possible approaches toward this end:

1. View resource acquisition as the primary strategy to be pursued for mature technologies with thriving markets, and market transformation as the primary strategy for immature technologies or those facing particularly pressing market barriers.

2. View the major purpose of market transformation as setting the stage for resource acquisition. Under this approach, the primary role of market transformation programs is to accelerate the diffusion of immature technologies to the point where resource acquisition becomes a viable strategy. This would more or less obviate the need to have a special planning approach for market transformation programs; both the costs and benefits of preliminary market transformation programs could be viewed as components of the resource acquisition program that is expected to result.

3. Pursue a resource acquisition strategy under circumstances in which highly predictable, timely and controllable impacts are needed, as in the case of imminent supply-side construction. Pursue market transformation strategies under less urgent circumstances.

4. Pursue a market transformation strategy for those customer sectors in which energy efficiency is thought to face greater market failures. For example, some might argue that the residential and small C&I sectors face greater market obstacles than the large C&I sector, where customers are generally large enough and have enough clout that they can overcome market barriers independently if they so desire.

Conclusions and Recommendations

Market transformation is a popular but still emerging paradigm. As such, little attention has been paid thus far to its compatibility with the more established paradigm of resource acquisition. This paper has sought to systematically compare these two policy objectives, concluding that they require substantially different utility planning practices. While such differences do not appear to make resource acquisition and market transformation fundamentally incompatible with one another, at the very least they do suggest that the two should be viewed as competing with one another for scarce planning resources. In turn, this suggests that there is a critical need for policy makers and program planners to consider the relative priority of these two policy objectives, and design programs, performance incentive mechanisms, and resource plans accordingly. Ultimately, it will be necessary to develop clear principles for allocating resources between resource acquisition and market transformation efforts. In addition, serious pursuit of market transformation as a policy goal will require substantial innovations in utility planning practices, including advances in evaluation and resource planning methods, the development of new forms of utility performance incentives, and a more sophisticated understanding of market structures and processes.

Endnotes

1. The extent to which financial incentives to customers have dominated other program approaches has varied both over time and across states. Recently, some states and utilities have begun to focus more on other program delivery approaches such as training and education, and to target other market actors beside customers. However, such approaches are still sufficiently rare that it seems fair to characterize resource acquisition as largely focusing on financial incentives to customers.

2. This is in contrast to direct program impacts, which may be taken to be the result of a temporary behavioral change—e.g., a customer buys an efficient appliance instead of an inefficient one, simply because he or she has been given a one-time incentive to do so. It should be noted that, while factors such as

free-driving and spillover are often considered to be examples of market transformation, under this definition, they should be viewed as such only if they reflect lasting behavioral changes.

3. The framework used here was first developed in conjunction with a study conducted by the authors for the California Public Utilities Commission, and, has been presented in more detail in several other papers. For example, see Schlegel et al. (1993) and Prahl and Schlegel (1993).

4. Two important market actors not explicitly included in this framework are government agencies and utilities themselves. This is because the primary purpose of the framework is to identify market participants whose behavior can be lastingly altered by utility DSM efforts.

5. One issue that has seldom been addressed in studies. documenting the market changes induced by customer incentive programs is the long-term persistence of these changes. If beneficial changes in dealer behavior are due to perceived increases in the demand for efficient appliances, should we not assume that dealer behavior will eventually revert to normal once the elimination of rebates causes them to perceive that demand has returned to its pre-rebate level?

6. One alternative would be to base performance incentives intended to encourage resource acquisition on gross rather than net savings. However, this would have the disadvantage of removing any incentive for the utility to pursue savings that would not occur without its help.

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