The Trouble with Freeriders

The debate about freeridership in energy efficiency isn't wrong, but it is wrongheaded.

By Hossein Haeri and M. Sami Khawaja

The energy efficiency programs administered by California's investor-owned utilities reported 6,500 GWh of electricity and 84 million therms of natural gas savings for the three-year program cycle from 2006 to 2008. Yet valuations of these programs later credited the utilities for less than two-thirds of the electricity and slightly more than just one-half of the natural gas savings the utilities claimed. The rest—2,400 GWh and 40 million therms, to be exact—was claimed by freeriders.

And for the next three-year program cycle, from 2010 to 2012, California utilities appear set to invest $3.1 billion from 2010 to 2012 to meet the saving targets, 6,965 GWh and 153 million therms, approved by the California Public Utilities Commission (CPUC).[1] However, if things go as they did before—and indications are that they might—much of these savings will again go to freeriders.

Investment in energy efficiency has been growing rapidly throughout the United States. In a recent report, the Consortium for Energy Efficiency (CEE) estimated that spending on ratepayer-funded energy efficiency programs was $5.3 billion in 2009, with planned expenditures of 6.6 billion in 2010.[2] More than 50 percent of the expenditures were concentrated in California, New York, Massachusetts, and the Pacific Northwest—a group of states that accounts for 20 percent of U.S. electricity and natural gas consumption. Expenditures are also growing geographically, as the number of states offering energy efficiency programs has increased from 37 to 46 in just the past three years.

This trend is likely to continue for at least the near future. Energy efficiency resource standards with aggressive saving targets are in effect in 26 states and probably will be put into place in more states through legislative action, regulatory mandates, or voluntary goals. Program administrators in these states are accelerating their programs to meet mandated saving goals. As these programs expand and investments in them increase, so will concerns about how freeriders factor into success and compliance metrics. And mechanisms for performance risk and reward appear even more controversial.[3] As a result, freeridership likely will continue playing a prominent part in the regulatory and policy discourse about ratepayer-funded conservation.

Signs suggest a coming shift in the focus in energy efficiency, from energy resource planning to greenhouse gas emission reductions. As the goals of the two policies converge, questions arise about how to track and appropriately credit energy savings attributable to a myriad of different programs, such as 1) the regional greenhouse gas initiatives, 2) regional market transformation initiatives, 3) the federal *American Recovery and Reinvestment Act* (ARRA), 4) state tax policies to promote energy efficiency, and 5) local stimulus funds earmarked for energy efficiency and creation of green jobs. Such questions will only intensify the debate over freeridership, and about monitoring and attributing savings.

The Origin of the Species

Freeridership is a long-standing issue in all areas of social science that involve public policy. Russell Hardin, in the *Stanford Encyclopedia of Philosophy*, traces the origins of the concept to *Plato's Republic* and points to references to it in the works of the 18th and 19th century political philosophers, including David Hume and John Steuart Mill, among others. As Hardin points out, despite this widespread recognition, it wasn't until 1965 that the concept of freeridership and its implications for public policy were systematically formulated by Mancur Olson in his *Logic of Collective Action*.[4]

With ratepayer-funded conservation, freeridership is probably less about fairness and more about economics.

Olson's analysis was based on Paul Samuelson's theory of public goods. Samuelson, in 1954, noted that some goods, once they're made available to one person, can be consumed by others at no additional marginal cost.[5] This condition, called "jointness of supply" or "non-rivalrous consumption," refers to situations where consumption of a good by one person doesn't affect others' consumption of the good. In other words, the good, once provided for anyone, "is *de facto* provided for everyone in the relevant area or group."[6]

A second distinctive feature to Samuelson's theory of public goods is the impossibility of exclusion: Once a public good is supplied at all, excluding anyone from its consumption is supposedly impossible.[7] This attribute gives rise to freeridership, whereby some individuals either consume more than their fair share of a common resource, or pay less than their fair share of its costs. In certain cases, individual consumers may reap benefits without paying for them.

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A compelling case exists that some goods are both joint in supply and non-excludable—the so-called "pure public goods," such as clean air. But ratepayer-funded energy efficiency programs don't fit this category, at least not closely, for they lack both of the defining features of a public good. They are hardly non-rivalrous, as there have been many cases of budget constraints prohibiting some eligible consumers from participating in a program. Nor are they non-excludable, since utilities routinely set eligibility criteria for participation, and enforce those criteria when possible.

Indeed, the logic of public goods is of little practical relevance in the context of ratepayer-funded energy efficiency. In these cases, freeridership refers to program participants who presumably would have conserved regardless of the program. These consumers are presumed to be predisposed to conservation; they practice efficiency whether or not any incentives are available. As such, they're the opposite of what Samuelson would have considered freeriders: people unwilling to pay for a good while enjoying its benefits. Early adopters of energy efficiency and renewable technologies are a case in point.

Cause and Effect

The fundamental problem with freeridership in energy efficiency is attribution; that is, whether and to what extent the observed change in energy consumption or the adoption of an energy-efficient product is likely to have been triggered by a program. And the problem is by no means peculiar to energy efficiency. It arises in many policy areas, whenever economic agents are paid an incentive to do what they might have done anyway. The problem is inherent, for example, in the additionality requirement, which is the defining characteristic of the CO_2 offset concept established by the clean development mechanism (CDM) of the Kyoto Protocol. The mechanism, which is now the world's largest greenhouse gas emissions offset scheme, is intended to validate and measure impacts from projects to ensure that they produce authentic benefits and are genuinely additional activities that wouldn't otherwise have been undertaken.

In energy efficiency, freeridership factors into the calculation of a program's impacts as the ratio of savings attributable to the program (net savings) and the savings expected to be achieved according to planning assumptions (gross savings). The result is the net-to-gross (NTG) ratio.[8]

For utilities administering ratepayer-funded programs, the implications of NTG calculations can be large and wide-ranging. The calculations affect nearly all essential criteria that define and determine performance, particularly saving claims and cost-effectiveness. Uncertainty arises because the NTG ratio usually isn't known until well after a program has been implemented. Utilities become exposed to financial risks, particularly in jurisdictions where performance standards include penalties for under-performance (*e.g.*, Pennsylvania, New York, and Washington), provisions for lost-revenue recovery (*e.g.*, Nevada and North Carolina), or shareholder incentive (*e.g.*, California and New York).

For these reasons, the concept of freeridership has been a uniquely charged topic, eliciting frustration and disagreement among energy-efficiency policy makers, program administrators, and evaluation experts. Despite years of research, no commonly held or precise understanding has been established of what NTG means, what it includes, how best to measure it, and what to do with the results once the measurement is done. In fact, its very definition isn't firmly settled *(see "From Gross to Net.")*

Freeridership, and the broader concept of NTG, remain, in the words of William Saxonis, a regulator in New York, a "regulatory dilemma."[9]

Freeridership remains the most common criticism of ratepayer-funded energy efficiency among the skeptics,[10] along with the so-called rebound effect (the notion that greater efficiency leads to increased consumption due to an income price effect) and persistence of savings. The debate over these topics dates back to the mid-1980s, when energy efficiency consisted of what were, by today's standards, small-scale conservation programs focusing mostly on residential weatherization. Citing freeridership as an argument against public intervention in energy-efficiency markets, the critics of ratepayer-funded conservation argued that the presence of freeridership overstates the energy-savings potential of conservation programs and understates their actual cost, distorting resource choices.

Skeptics have criticized ratepayer-funded conservation on the grounds of distributional concerns arising from the potentially adverse rate impacts.[11] Because freeridership is correlated with the level of financial incentives available to the participant, the reasoning goes, if incentives are too high and the participant isn't expected to commit his or her own money to the effort, freeridership will go up, reducing the effectiveness of the program and leading to higher average rates for consumers, particularly those who don't benefit from the program.[12]

This argument sounds right, but is wrong. Free riders in energy efficiency programs tend to be those willing to adopt a measure with low (not high) incentives, relative to a measure's incremental cost. These are the consumers who most likely would have adopted the energy efficiency on their own. This negative correlation between freeridership and incentives was amply demonstrated in a recent study in Washington. The study surveyed about 350 consumers who had participated in eight conservation programs that offered different levels of incentives. Participants were asked a number of questions on why they took part in these programs. Based on their answers, each respondent was assigned a freeridership score. A comparison of these scores with the incentives received by the respondents showed a strong

From Gross to Net

Freeridership—and the general issue of attributing observed results to program implementation—has long been recognized as a problem in ratepayer funded conservation. The problem is discussed thoroughly in early manuals for impact evaluation of conservation programs by the Oakridge National Laboratory[1] and the Electric Power Research Institute.[2]

Conceptually, freeridership reflects an aspect of self-selection bias, a problem in voluntary programs under which participants may be propelled to adopt conservation measures by factors unrelated to a conservation program.

That places a premium on how NTG is defined, the net-to-gross ratio—the ratio of savings attributable to the program (net savings) versus the savings expected to be achieved according to planning assumptions (gross savings).

But no consensus exists on what NTG means and what its elements are. The lack of a common perspective was amply demonstrated in a 2010 scoping study sponsored by the New England Energy Efficiency Partnership (NEEP).[3] The study started with a survey of local experts in energy efficiency, asking them apparently simple questions: What are "net" savings? What are the elements of NTG? What's the proper role of NTG in program evaluation? How should it be measured and what would be the appropriate amount that should be invested in measuring it?

It turns out that none of these questions has an obvious or easy answer. The study concluded that, even within a region with one of the longest histories of energy conservation, "the definition and measurement of net energy savings remains a controversial issue." Even more surprising is that the experts could not even agree on whether more consistent definitions and measurement approaches were needed or even desirable. The lack of consensus was echoed in a 2007 survey of 20 energy efficiency program planners, implementers, and evaluators, carried out for the California Evaluation Outreach Initiative under the auspices of CPUC.[4] –***HH and MSK***

Endnotes:

1. *Handbook of Evaluation of Utility DSM Programs*, ORNL/CON-336, Oak Ridge National Laboratory, December 1991.
2. *Impact Evaluation of Demand-Side Management Programs, Vol. 1: A Guide to Current Practice*, EPRI CU-7179, Electric Power Research Institute, Palo Alto, Calif., February 1991a.
3. *Evaluation, Measurement, and Verification Forum, Northeast Energy Efficiency Partnerships (NEEP), Net Savings Scoping Paper*, Prepared by NMR Group and Research Into Action, November 2010.
4. *Survey of Energy Efficiency Evaluation Measurement and Verification (EM&V) Guidelines and Protocols and Gaps and Needs*, Schiller Consulting, Prepared for The California Evaluation Outreach Initiative, May 2007.

negative correlation between ridership and incentives.[13]

An element of equity does come into play in ratepayer-funded conservation. Any disparity between how benefits and costs are distributed among customers is important; If a customer enjoys the benefits of conservation, one might wonder why the bill for those services should be divvied up and sent to his neighbors, especially if he was willing to pay for them. However, in the context of ratepayer-funded conservation, freeridership is probably less about fairness and more about economic efficiency.

The economic efficiency argument was first formulated systematically in 1992 by Paul Joskow and Donald Marron.[14] In their analysis of data on 16 utility-sponsored conservation programs, the authors identified freeridership as one of the most important issues in determining the costs and valuing the benefits of conservation programs. The particularly remarkable aspect of the study was its characterization of freeridership as a dynamic problem. The problem, they argued, derives from the fact that freeridership isn't limited to consumers who would have adopted energy-efficiency measures without the utility program, but also involves consumers who are likely to adopt the measures in the future.

From this perspective, a conservation program merely speeds up the adoption of energy-efficiency measures and increases the maximum penetration the measures are likely to achieve. Freeridership, therefore, isn't merely a question of "*whether* some of this year's participants would have adopted a conservation measure absent the utility's program, but *when* they would have adopted the measure."[15] Thus, if all of the participants would have installed the measure at some point in the future whether the program existed or not, "the static approach significantly overstates the actual savings of the program." The failure to account for such dynamic diffusion effects, they argue, results in overestimating the savings and underestimating the cost of conservation.

This argument is true, but only partly. Rather, it only applies to programs involving a retrofit—replacing functioning equipment with more efficient equipment. It doesn't apply to programs that offer incentives for replacement of equipment on burnout, a significant part of today's portfolios of ratepayer-funded programs. In these cases, if the failed appliance isn't replaced with an energy efficient one at the time of its replacement, the opportunity to do so will be lost for the course of the equipment's useful life.

The argument is also one-sided. It places the emphasis on the acceleration component of diffusion and ignores the potentially large effects of conservation programs on shifting the curve. What if the services offered under a program induced participants to take further conservation actions? What if they encouraged other consumers to adopt conservation measures without taking advantage of the program's incentives? They might take action because the program changed their perceptions about the benefits of conservation, or because the increase in demand induced a shift in supply, making energy-efficient products more available.

These behavioral effects on participants (participant spillover) and consumers in general (non-participant spillover or market transformation), although they're hard to quantify, can be sizable. Joskow and Marron recognized the validity of this proposition, but didn't explicitly account for these effects in their analysis.

Motivation and Social Desirability

A variety of methods have been used to either measure or account for freeridership. These methods fall into one of two general categories. The first is the general difference-in-differences approach, which involves comparing actual energy consumption of participants before and after they participate in a program to change consumption among a comparable group of non-participants in the same period.

Implemented properly and with a well-chosen comparison group, this quasi-experimental research design produces reasonably reliable results for net savings, but doesn't provide separate estimates for the components of NTG, freeridership, spillover, and market transformation effects, individually. The method is often implemented using regression-based techniques to control for residual difference between the two groups, evaluate the sensitivity of savings to various factors, and estimate savings for individual measures for programs that bundle measures.

The main limitation of this approach is that it isn't well suited for measuring savings for programs involving large commercial and industrial consumers. These consumers tend to be unique in many ways, identifying a comparable group of non-participants is often impractical. Savings, relative to total consumption, may also tend to be too small to measure against the many unpredictable factors that affect energy consumption of these consumers. It's also less effective in new construction programs, where the lack of pre-program data doesn't allow a complete comparison.

The second, and by far the more commonly used, group of methods rely on "self-report." At a basic level, self-report involves asking participants a series of questions about what they would have done in the absence of the program. Responses are then scaled, weighted, and combined to produce a composite freeridership score (or index) for each respondent. The scores for individual respondents are then weighted (by their savings) and averaged to produce a program-level freeridership fraction.

The obvious limitation of the self-report approach is that it doesn't produce an NTG ratio. Other components of NTG—spillover and market transformation effects—have to be estimated separately and then factored into the calculations. But eliciting reliable information about intentions and motivations can be thorny.

Using surveys to assess freeridership also raises concerns about response bias, particularly those biases involving social desirability, which is the tendency of respondents to gauge their responses to conform to socially acceptable values. This issue is well recognized in social sciences, and it's discussed in a vast body of academic and professional literature, including conservation program evaluation manuals.[16]

One aspect of social desirability is the tendency of respondents to offer what they think is the right answer, and this tends to result in an overstatement of freeridership. Also, as some evaluation experts have noted, people have internal reasons as explained by social psychology's attribution theory that motivate them to make certain decisions and to follow a cognitive process for justifying those decisions.[17]

Survey design practices have improved, and sophisticated ways of designing questionnaires promise a more nuanced way of eliciting information more reliably. Instead of simply asking what participants would have done in the absence of the program, multiple questions probe respondents about timing (would they have adopted the measure at the same time), amount (would they have adopted the measures in the same quantity), and level (would they have adopted the measures at the same level of efficiency).

Freeridership is a long-standing issue. The *Stanford Encyclopedia of Philosophy* traces the concept to *Plato's Republic*.

What questions to ask, what kind of scale to use for recording responses, what weights to consider appropriate, and how to apply the final scores are decisions that expose the analysis to subjective judgment.[18] This problem could make the analysis a subjective exercise, open to constant dispute. Different evaluations of similar programs conducted by analysts using seemingly similar methods have produced drastically different results. The use of surveys for determination of spillover effects, for participants or non-participants, is especially sensitive to variances in spillover scores. Small fractions multiplied by very large numbers of customers can dramatically boost the savings.

Another—and less tractable—aspect to response bias is construct validity, which raises questions about what the survey results actually measure. The problem stems from the fact that survey respondents are naturally predisposed to conservation; After all, they are program participants. Thus, it remains far from clear whether their responses are conditioned by the effects of the conservation program itself.

The survey results would overstate freeridership because the survey may be asking the question from the wrong people: those identified as freeriders are, in fact, exactly the type of participants program administrators would want for a program.[19] What's being measured, it appears, are the effects of the program—not what would have been expected in its absence.[20] In areas with long histories of conservation programs and activities, it's no longer possible to parse out who is a freerider and who was influenced by the program.

Could it be that, in the case of such transformed markets, what's being measured in freeridership surveys is in fact the opposite: spillover?

Considerable practical matters limit the usefulness of self-report as a means of eliciting information about freeridership in upstream, mass-market programs, where it might not be possible to identify participants, let alone freeriders, because consumers might not be aware that the price they pay for a product includes a utility discount. This happens routinely in programs that offer point-of-sale incentives for products such as compact fluorescent light bulbs.

The use of self-report is even more problematic in the large commercial, industrial, and new-construction sectors, where investment decision-making processes are complex and finding the right people to survey is rarely easy. Using the method is even more problematic in upstream programs deployed through retailers, where purchasing and stocking decisions can be especially complex, particularly in chains, where decisions tend to be made centrally and based on competitive considerations.

Self-report remains the most common method for determining freeridership. The approach has been defended by its protagonists as a transparent and appropriate approach for evaluating complex and diverse programs and markets.[21] They have argued that the method's shortcomings are mostly a matter of misunderstanding and misapplication,[22] and that the noted biases are readily addressed through improved survey design, better scaling algorithms, and analytic techniques.[23]

A report produced by an independent evaluator in 2006, summarizing the results of recent programs in California, noted that "the issues of identifying freeriders are complicated and estimating reliable program-specific freeridership is problematic at best."[24] One year later, the California Public Utilities Commission formed a working group of experts to explore ways to improve the self-report method and produce standardized questionnaires to collect the data and algorithms to analyze them consistently. The result was 17 recommendations that were largely useful but somewhat too general to address the fundamental shortcomings of the approach.[25]

A 2011 study commissioned by the Association of Energy Efficiency Program Administrators in Massachusetts developed survey instruments to assess freeridership and spillover in the commercial and industrial sectors. These instruments go a long way toward standardizing the data collection, scoring, and analytic steps. [26] The study concludes that the self-report techniques are "based on sound methodologies and are consistent with analytical methods used in the social sciences." But the study doesn't satisfactorily address the essential questions of response bias.

Baseline and Spillover

Related to the measurement problem is an idea advanced by some energy-efficiency planners. Freeridership, they say (and NTG, too), is essentially a question about baseline. "Counterfactual" is another way to put it: that is, the conditions that might have existed in the absence of a program.

As the argument goes, if actual market conditions, instead of hypothetical conditions based on codes and standards, were used as the basis for calculating expected savings of conservation measures, the resulting estimates would then need no further adjustment.

Using surveys to assess freeridership raises concern about bias — especially involving social desirability.

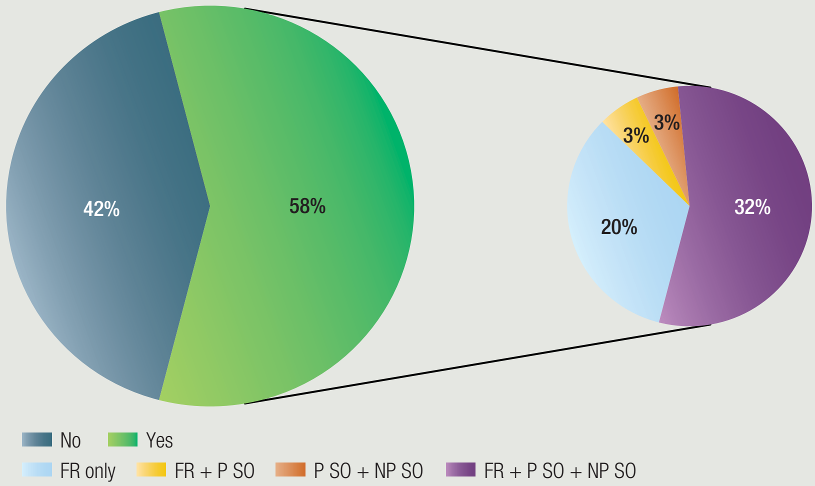
True enough, the concepts of NTG and baseline are linked. The actual penetration of conservation measures is a reasonably strong indicator of what might have happened in the absence of a program—but only for a planned program. It doesn't address the question of attribution in *ex post* evaluation of existing programs, because the observed market conditions also reflect not only a program's known direct impacts, but also the effects it might have induced—in other words, spillover. Disentangling what might have occurred in the absence of a program from the program's spillover effects is practically impossible in most cases. The longer a program operates, the more biased the estimates of freeridership are likely to be.[27]

Policy Differences, State by State

The definition, measurement, and treatment of freeridership, and NTG in general, vary across jurisdictions in the U.S. Some jurisdictions include both freeridership and spillover in their definitions of net savings, while others allow only freeridership to be counted. In several cases, freeridership and spillover are measured separately and incorporated in NTG, while other jurisdictions estimate NTG without specifying freeridership and spillover individually. In the majority of cases where NTG is required, it's applied only prospectively for planning and improving program design.

A review of practices in 31 jurisdictions with active energy efficiency programs illustrates this variation. All but six of these jurisdictions (82 percent) have energy efficiency resource standards (EERS) in place, setting minimum performance requirements.[28] Remarkably, documents and reports are lacking on NTG or how

FIG. 1 TREATMENT OF FREERIDERSHIP AND SPILLOVER BY JURISDICTION



Different states take different approaches to defining, measuring, and accounting for freeridership and program result assessments in general. Some jurisdictions calculate both freeridership and benefit spillover in their definitions of net savings, while others count only freeridership.

Notes: FR = freeridership; P SO = participant spillover; NP SO = non-participant spillover; EERS = energy efficiency resource standards.

		Spillover		
Jurisdiction	EERS	Participant	Non-Participant	Freeridership
Arizona	Yes	No	No	No
Arkansas	Yes	Yes	Yes	Yes
California	Yes	Yes	No	Yes
Colorado	Yes	No	No	Yes
Connecticut	Yes	Yes	Yes	Yes
Delaware	No	No	No	No
District of Columbia	No	No	No	No
Florida	Yes	Yes	Yes	Yes
Hawaii	Yes	No	No	Yes
Idaho	No	No	No	No
Illinois	Yes	Yes	Yes	Yes
Indiana	Yes	No	No	Yes
Iowa	Yes	No	No	No
Maine	Yes	No	No	Yes
Maryland	Yes	No	No	No
Massachusetts	Yes	Yes	Yes	Yes
Michigan	Yes	No	No	No
Minnesota	Yes	No	No	Yes
Nevada	Yes	No	No	Yes
New Hampshire	No	Yes	Yes	No
New Jersey	No	No	No	No
New York	Yes	Yes	Yes	Yes
North Carolina	Yes	No	No	No
Ohio	Yes	No	No	No
Oregon	Yes	Yes	Yes	Yes
Pennsylvania	Yes	No	No	No
Texas	Yes	No	No	No
Utah	No	Yes	Yes	Yes
Vermont	Yes	Yes	Yes	Yes
Washington	Yes	No	No	No
Wisconsin	Yes	No	No	Yes

Source: The Cadmus Group

it's treated in different jurisdictions. For many jurisdictions, this information must be gleaned from multiple sources, such as regulatory filings and evaluation reports. Indeed the authors' research couldn't determine with certainty the requirements for calculating and reporting NTG in several jurisdictions.

The available information shows that 13 of the jurisdictions (42 percent) have no NTG requirements. 18 jurisdictions (58 percent) include freeridership in determination of NTG, and in seven of these jurisdictions freeridership is applied at the energy efficiency measure level. In six jurisdictions (20 percent) only freeridership in accounted for. Participant spillover is measured in 12 jurisdictions (37 percent) and in 10 cases (32 percent) NTG calculations include all three effects *(see Figure 1)*.

The high proportion of cases where only freeridership is assessed suggests an asymmetrical treatment of spillover and freeridership effects. Should spillover be included, it's likely that many of the NTG ratios will be near or greater than 1.0. Over two-thirds of all evaluation studies reviewed in a recent best-practice study had a net-to-gross value of approximately 1.0.[29]

Finally, there are cases where NTG—or its components—don't require measuring. Gross savings, adjusted for actual installation rates, are employed instead as the measure of program performance. That's also the case with regional transmission organizations (RTO) such as the New England independent system operator (ISO-NE), where verified gross savings are used as the basis for verification of energy-efficiency bids into the forward energy market.

There's also the question of what to do with the NTG ratio once it's measured, and how to factor it into performance metrics, such as cost-effectiveness tests. Although the total resource cost test (TRC)—as formulated in the *California Standard Practice for Cost-Benefit Analysis* *of Conservation and Load Management Programs* (SPM)—has been almost universally adopted as the principal criterion for economic assessment of conservation programs, there was no clear or uniform method to how the NTG should be applied to the cost side of the TRC equation. Indeed it wasn't until 2007, almost 25 years after the SPM's initial publication in 1983, that the CPUC issued a memorandum to clarify the matter.[30] Even today there's little consensus on how to account for NTG in the calculation of TRC.

Assessing Blame

It's tempting to blame the critics of energy efficiency for the prolonged confusion over what to make of freeridership; and that wouldn't be entirely wrong. But skepticism about ratepayer-funded conservation isn't the full story. The fact is that the proponents of energy efficiency have failed to devise and make a convincing case for workable solutions to the problem.

In truth, the energy efficiency community holds no common view about a precise definition of what constitutes net savings or how to quantify it. Even the relevance of freeridership lacks consensus. Advocates of ratepayer-funded conservation have regarded freeridership as irrelevant and have dismissed it as a mere distraction.[31] Some skeptics, on the other hand, have singled out freeridership as a fundamental flaw in energy-efficiency policy; a byword for everything that's wrong with ratepayer-subsidized conservation.

Freeridership and the broader question of attribution are legitimate concerns when ratepayer funds are used for what's presumed to be a socially optimal outcome. Efficient allocation of resources must be a part of the process of making policy decisions and designing programs to implement them.[32]

But the lack of progress and the resulting uncertainty have surely inhibited creativity and innovation in program design and delivery. Program administrators have tended toward risk aversion, encouraged to focus on performance targets and to avoid regulatory penalties, instead of experimenting with potentially better programs.

An even more important reason for taking these seemingly conceptual and methodological disagreements seriously is this: If the concept of NTG and its measurement are perceived by policymakers and much of the public as dubious and inherently problematic, then political support for energy efficiency and, critically, its role in addressing larger global environmental issues, could dissipate.

Of course, measuring program performance remains a challenge. The measurement of NTG remains, as some experts have noted, an art rather than a science.[33]

But what if the measurement itself turns out to be the problem? Certainly, program administrators should avoid programs where freeridership is known to be high and discontinue offering the programs when high freeridership is suspected. But insisting on measuring freeridership with tools of questionable reliability isn't the answer.

A Modest Proposal

Knowing whether a program is likely to attract freeriders may be easier than it's made to appear. Simple rules might well do.

First, regulators could establish a series of hurdles, or tests, that a program has to pass to avoid high freeridership. The exact nature of the tests would vary depending on the program, but the amount of the incentive relative to the cost of the measure is a good general gauge. When very low incentives appear to attract a large number of participants, or net benefits to participants are very high, chances are the majority of participants will be freeriders.

Second, program administrators should monitor product markets closely to see if a transformation has occurred and exit the market when it has. Expected savings and costs of conservation measures should be revised periodically based on actual saturation of energy-efficient products. In this way, research and evaluation resources are invested in improving programs, rather than merely proving compliance.

Freeriders are, in fact, exactly the type of participants that administrators would want for a program.

For this approach to work, regulators would have to recognize such obvious, albeit hard-to-quantify, benefits, and be willing to credit program administrators with the results by lowering their saving targets accordingly, or even reward them. These ideas already seem to be taking hold in several states, where gross savings, adjusted for a deemed level of freeridership, are the basis for determining compliance and program performance. This sensible approach ought to address most of the concerns about freeriders. More importantly, it will encourage program administrators to undertake more optimal levels of energy efficiency and focus more on programs such as market transformation that might produce longer-lasting effects at potentially lower costs.

Well-conceived and effectively executed programs will likely generate enough spillover savings to offset freeridership. What few freeriders remain can be regarded, as one evaluation expert puts it, simply "a cost of doing business."[34]

Endnotes:

1. *Decision Approving 2010 to 2012 Energy Efficiency Portfolios and Budgets*, CPUC 09-09-047, California Public Utilities Commission, September 2009.
2. *State of the Efficiency Program Industry - 2009 Expenditures, Impacts & 2010 Budgets*, Consortium for Energy Efficiency (CEE), Boston, December 2010.
3. For a discussion of risk-reward mechanism in California see Rufo, Michael, *Evaluation and Performance Incentives: Seeking Paths to (Relatively) Peaceful*

Coexistence, Proceedings, the International Energy Program Evaluation Conference, Portland, Oregon, August 2009.

4. Hardin, Russell, "The Freerider Problem," *The Stanford Encyclopedia of Philosophy* (Fall 2008 Edition), Edward N. Zalta (ed.).
5. Samuelson, P. A., "The Pure Theory of Public Expenditure," *Review of Economics and Statistics*, 36, 387-389, 1954.
6. Hardin, Russell, Op. cit.
7. It's been argued that exclusion is, more often than not, merely a problem of technology, not of logic. People are often easily excluded from enjoying public goods such as television broadcasting through the use of various devices that enable providers to charge the beneficiaries and to exclude those who don't pay, as for example, service providers that use cable rather than broadcasting over the air to provide television programming at a substantial price.
8. In some jurisdictions NTG is defined more broadly and the difference between gross and net savings includes other factors such as spillover, price-induced, or naturally occurring conservation and, in the case of certain upstream programs, leakage: purchase of energy-efficiency products by consumers outside a program administrator's service area.
9. Saxonis, William P., "Freeridership and Spillover: A Regulatory Dilemma," Proceedings, *Energy Program Evaluation Conference*, Chicago, August 2007.
10. For a discussion of general criticism of energy efficiency see Geller, Howard, et. al., "The experience with Energy Efficiency Policies and Programs in IEA Countries, Learning from the Critics," International Energy Agency Information, August 2005.
11. "Utility Energy Efficiency Programs: Too Cheap to Meter?" ELCON Policy Brief, Electricity Consumers Resource Council, December 2008.
12. It's paradoxical that these concerns are often raised by industrial consumers, who have historically received at least a proportionate share of the conservation subsidies provided by utilities.
13. The Cadmus Group, *Net-to-Gross Evaluation of Avista's DSM Programs*, Prepared for Avista Utilities, Spokane, Wash., April 2011.
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28. The surveyed jurisdictions were Arizona, Arkansas, California, Colorado, Connecticut, Delaware, District of Columbia, Florida, Hawaii, Idaho, Indiana, Iowa, Maine, Maryland, Massachusetts, Michigan, Minnesota, Nevada, New Hampshire, New Jersey, New York, North Carolina, Ohio, Oregon, Pennsylvania, Texas, Utah, Vermont, Washington, and Wisconsin.
29. Quantum Consulting (now part of Itron). This study was managed by Pacific Gas & Electric under the auspices of the California Public Utility Commission in association with the California Energy Commission. The information from the study is available at: http://www.eebestpractices.com/index.asp
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