Some Thoughts on Treating Energy Efficiency as a Resource[1]

By Tom Eckman

On December 5, 1980, President Jimmy Carter signed into law the Pacific Northwest Electric Power Planning and Conservation Act (hereinafter, "Power Act").[2] This legislation, which has now been in effect for three decades, contained what was then (and to some still is) a revolutionary concept in electric power supply planning. For the first time, "actual or planned load reduction resulting from . a conservation measure" was defined as a "resource" equivalent to the "actual or planned electric power capability of generating facilities."[3] Since 1980 the term "conservation," as used in the Power Act, has been supplanted by the phrase "energy efficiency," which I prefer to use. In fact the Power Act defined "conservation" as "any reduction in electric power consumption as a result of increases in the efficiency of energy use, production, or distribution."[4] (emphasis added.)

Over the past 30 years other federal and state policies have recognized that a "kilowatt saved is equivalent to a kilowatt generated." Indeed, some states have adopted the Power Act's resource priorities, which gives energy efficiency the highest priority for resource development.[5] Many states' regulatory commissions and some state legislatures have adopted rules and laws that specifically seek to encourage or require that utilities develop energy efficiency resources as a means of meeting projected load growth. According to ACEEE's 2011 State Energy Efficiency Scorecard, 24 states have adopted or are well on the way to establishing energy efficiency resource standards.[6] Despite increased recognition that energy efficiency is a resource to be exploited, the full implications of this concept are not well understood, nor have they been internalized into the day-to-day decisions of utilities, regulatory commissions, legislators and other policy makers. The purpose of this paper is to more clearly define what is implied when energy efficiency is treated as a resource.

I believe that three principles must be followed to ensure energy efficiency is indeed treated as a resource. These are: (1) parity in resource planning; (2) equality in cost-effectiveness analysis; and (3) symmetry in resource acquisition payments. The major implications of these principles are described below.

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[1] This paper is a slightly revised and updated version of an article that first appeared in ElectricityPolicy.com. See: http://www.electricitypolicy.com/archives/3118-some-thoughts-on-treating-energy-efficiency-as-a-resource

[2] 16 United States Code Chapter 12H (1994 & Suppl. I 1995), Act of Dec. 5, 1980, 94 Stat. 2697, Public Law No. 96-501, S. 885. (Hereinafter "Power Act" or "Northwest Power Act.")

[3] "'Resource' means ... electric power, including the actual or planned electric power capability of generating facilities, or actual or planned load reduction resulting from direct application of a renewable energy resource by a consumer, or from a conservation measure." Northwest Power Act, *supra* note 1, §3(19)(A) and (B), 94 Stat. 2697

[4] *Ibid.* §3 U.S.C. §839a (3), 94 Stat. 2700.

[5] According to the Power Act, the regional power plan "shall … give priority to resources that the Council determines to be cost-effective. Priority shall be given: first, to conservation; second, to renewable resources; third, to generating resources utilizing waste heat or generating resources of high fuel conversion efficiency; and fourth, to all other resources." Northwest Power Act, §4(e) (1), 94 Stat. 2705. In the spring of 2003 the California Energy Commission and California Public Utilities Commission adopted the California Energy Action Plan that set forth a preferred "loading order" for utility resource development. This "loading order" gave first priority to conservation and energy efficiency; second, to renewable energy resources and distributed generation; and third, clean fossil fuel, central-station generation. *See* http://www.californiaenergyefficiency.com/docs/ EESPExecutiveSummary.pdf. According to ACEEE's 2011 State Energy Efficiency Scorecard, by 2010, seven other states had adopted similar policies. See ACEEE 2011 State Energy Efficiency Scorecard, p.18. Available at: http://www.aceee.org/sites/default/files/publications/researchreports/e115.pdf

[6] *Ibid*, at 16

Parity in Resource Planning

The primary objective of vertically integrated electric utilities, whether public or private, is to develop and maintain an adequate, reliable and affordable power supply system for their customers. This process requires that each utility regularly review its current load/resource balance, project future load growth and develop and implement plans to meet that growth.[7] Parity of treatment of energy efficiency in the resource planning process requires (1) assessment of the potential savings from energy efficiency; (2) estimation of the cost of their acquisition;[8] and (3) direct comparison of the relative costs (and risks) of meeting load growth with energy efficiency resources and supply-side resources. This means that assessments of resource cost and availability for energy efficiency should be developed with the same rigor as cost and performance estimates for new generating, transmission, and distribution facilities.

In the case of generating resources these assessments typically assume that a utility can acquire resources outside its service area. For example, utilities assume that they will be able to invest in or purchase renewable resources such as utility-scale wind and solar generating projects from locations far from their service areas. Parity in assessing energy efficiency resource potential should, likewise, permit it to be not geographically constrained. For example, a utility might, in effect, acquire an energy efficiency resource from another utility to gain access to an excess resource of the other utility. Far from being speculative, the legal and institutional arrangements to make this a realistic option have already been tested and are functioning.[9]

Parity between supply curves[10] for energy efficiency and those prepared for generating resources also requires that forecasts of achievable energy efficiency potential not be arbitrarily limited by a utility's willingness to pay for efficiency measures.[11] Supply curves for generating resources represent the expected total cost of construction and operation. This is the cost that a utility forecasts it must be willing to pay to develop or acquire those resources. To maintain parity between efficiency resources and generating resources utilities should base the amount of energy efficiency resources they estimate can be developed by offering consumers full-cost reimbursement of all measures in the efficiency supply curve.[12] Unfortunately, it is not uncommon to find

[7] While resource development in "retail access" states may be done by unregulated entities, the load-serving entities that have default supplier roles may also plan "resource acquisition" to meet customer demand.

[8] The term "acquisition" is employed here deliberately. Utilities "acquire" resources, and so if energy efficiency is to be treated as a resource it therefore is subject to "acquisition" by the utility.

[9] On Dec. 11, 1989, an investor-owned utility, Puget Sound Power & Light (now Puget Sound Energy), headquartered in Bellevue, WA, executed a conservation transfer agreement with a consumer-owned utility, Snohomish County PUD, headquartered in nearby Everett, WA. Snohomish PUD, together with Mason and Lewis County PUDs, contracted to install conservation measures in their service areas, which freed up resources they had under contract. The agreement calls for Puget to receive power saved over the expected 20-year life of the efficiency measures. The agreement called for the Bonneville Power Administration to deliver the conservation power to Puget from March 1, 1990 through June 30, 2001, and for Snohomish County PUD to deliver the conservation power for the remaining term of the agreement. Power deliveries gradually increased over the first five years of the agreement, roughly matching the installation of the conservation measures, and reached 6 average megawatts (52,560 MWh/year) of energy in the fifth year. Under the agreement, deliveries of conservation power will then remain at 6 MWa (52,560 MWh/year) of energy throughout the term of the agreement. See Puget Sound Power & Light Co., Annual Report Pursuant to Section 13 or 15(d) of the Securities Exchange Act of 1934 for the fiscal year ended Dec. 31, 1993 or Transition Report Pursuant to Section 13 or 15(b) of the Securities Exchange Act of 1934 (Commission File Number 1-4393) at:

http://www.getfilings.com/o0000081100-94-000013.html

[10] "Supply Curve" is a standard economic representation of the cost and availability of a product or, in this case, "resources." It represents the amount of the resource available at alternative costs.

[11] "Willingness-to-pay" is a term frequently applied to the share of an energy efficiency measure's cost offered to consumers in order to incent them to install or adopt the measure by a utility or other energy efficiency program administrator.

[12] Energy efficiency measures provide both energy and capacity benefits. Therefore, evaluation of their cost-effectiveness must take into account the load shape of the savings from efficiency measures in order to properly value their contribution to the power system. The savings from efficiency measures must also be quantified, so investments in evaluation, measurement, and verification of savings should be included in the cost of acquiring this resource. There are generally accepted guidelines and protocols for quantifying savings. See: Energy Efficiency Program Evaluation: A Guide to the Guides, available at: http://www.cee1.org/eval/CEEGuideToTheEval uationGuides.pdf. For a more extensive treatment of energy efficiency evaluation, measurement and verification approaches see: Messenger, M., C. Goldman and S. Schiller,

assessments of energy efficiency achievable potential constrained by assumptions that resource acquisition payments to consumers will be less than the full cost of measures. For example, a relatively recent assessment of efficiency potential for an electric cooperative in South Carolina states:

"We examined three market penetration scenarios for energy efficiency measures (20%, 50%, and 80%). Incentives for energy efficiency ranged from 20% of measure incremental cost in the low case, 35% in the medium case, and 50% in the high case (emphasis added)"[13]

If this utility were to insist on parity in resource planning one might reasonably ask how many combined-cycle combustion turbines or wind turbines it would forecast to be "realistically achievable" if it were only willing to pay up to 50 percent of those resources' cost.

Parity in resource planning also requires that investments in energy efficiency resources not be assumed to be arbitrarily constrained by rate impacts or limits on the share of retail revenues dedicated to its acquisition. Since electric industry restructuring began in the mid-1990s numerous states have adopted "system benefits charges" (SBCs) targeted to the development of energy efficiency (and other "public purposes," such as low income weatherization and small-scale renewable resources).[14] All or a portion of these earmarks were designed to assure a minimum level of investments in energy efficiency. Unfortunately, these funding floors also serve as a ceiling on energy efficiency resource acquisition.[15] As a result, some states now have policies that *implicitly* seek to acquire "all cost-effective savings" while *explicitly* limiting utility or SBC fund administrators' financial ability to do so. Even in states like Illinois and Michigan with otherwise aggressive energy efficiency development targets, utility investments in the lowest-cost resource are constrained to within specific rate impact limits.[16]

In some states, where these public benefits charges have limited the total share of retail revenues allocated to energy efficiency, utilities are now providing additional funding for its acquisition. Both Oregon and California recognized the severity of the "share of revenue" constraints on investments in cost-effective efficiency. These two states have taken actions to overcome the limits of their system benefits funding. In 2007, the Oregon Legislature authorized the state's investor-owned utilities to contribute additional funds to the Energy Trust of Oregon (the state's SBC administrator) for acquisition of energy efficiency, provided the utilities find, through their Integrated Resource Planning process, that cost-effective investments in energy efficiency are available beyond those obtainable within the funding limits of the SBC.[17] As a result of this provision, in 2010 the Energy Trust of Oregon's budget for

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"Review of Evaluation, Measurement, and Verification Approaches Used to Estimate Load Impacts and Effectiveness of Energy Efficiency Programs" LBNL-3277E April 2010. Available at: http://eetd.lbl.gov/ea/emp/reports/lbnl3277e.pdf

[13] Electric Energy Efficiency Potential for Central Electric Power Cooperative, Inc. Prepared by GDS Associates, Inc. Final Report. Updated September 21, 2007.
http://www.energy.sc.gov/publications/GDS%20Energy%20Efficiency%20Final%20Report%2009-25-2007-REV%20A.ppt

[14] The use of the phrase "system benefit charge" is preferable to "public benefits charge" when used to refer to funds intended to develop cost-effective energy efficiency resources because it more clearly conveys that such funding is intended to provide direct economic benefits to the power system. Clearly, there are societal benefits associated with the support of low income bill assistance and weatherization, but these are "public" benefits and do not reduce power system costs.

[15] PBCs nationwide are generally set at a fixed rate, independent of an assessment of cost-effective efficiency potential and the amount of funding necessary to acquire the savings; hence, limited funding is a significant issue nationwide. *See* C. Grist and T. Eckman, *When Enough Is Not Enough: The Value of Conservation in an Uncertain World Calls for Expanding System Benefits Charge Funding* (American Council for an Energy Efficient Economy, Proceedings of the 2006 Summer Study on Buildings, at http://www.aceee.org/proceedingspaper/ss06/panel08/paper09

[16] Illinois limits the retail rate impact to not greater than 0.5 percent per year and 2 percent cumulatively. Michigan's acquisition of energy efficiency is capped at 1.7 percent of large commercial and industrial revenues and has an overall cap of 2.0 percent on retail rates across all customer classes.

[17] Oregon SB 1149 (Laws of 1999) requires investor-owned electric utilities to devote 3 percent of their rate revenues to cost-effective energy conservation, market transformation, and the above-market costs of renewable energy (ORS 757.612(2) (a)). The electric utilities paying into the fund have no further obligation to invest in energy conservation or market transformation. (ORS 757.612(4) (a)). In 2007, the Oregon Legislature passed the Oregon Renewable Energy Act, SB 838. Among other things, this Act allowed the electric utilities to include in

energy efficiency acquisitions was roughly double the level supported by the state's public benefits charge.[18] California also encourages its utilities to supplement that state's public benefits charge funding with energy efficiency procurement funding.[19] From 2006 through 2009 about two-thirds of the $2.65 billion investor-owned utility energy efficiency investments in the state have come from resource procurement budgets.[20]

Limiting the acquisition of energy efficiency resources that have costs below those of the next lowest-cost resource seems particularly illogical and contrary to the principle of parity of treatment in resource planning. To favor development of higher-cost resources simply because their cost is not constrained by their impact on rates or limited by the amount of a revenue stream dedicated to their acquisition seems clearly wrong.

Equality in Cost-Effectiveness Analysis

The economics of utility generating resource options (or long-term power purchase agreements) are generally tested against competing resources using some form a life-cycle cost analysis. These can range from a simple side-by-side comparison of present value of capital, operation and maintenance and fuel cost to testing an array of resources in sophisticated integrated resource planning processes. Regardless of which approach is taken, in no case should the cost-effectiveness of efficiency acquisitions be judged using different screening criteria than that used for generating resources. Yet such practices persist. For example, when estimating the national potential for energy efficiency, the Electric Power Research Institute (EPRI) stated that the "*cost-effectiveness screen applied in this study (to energy efficiency) is a variation of the Participant Test, which compares the incremental cost to a consumer of an efficient technology relative to its baseline option, and the bill savings expected from that technology over its useful life*.[21] While estimates of the cost-effectiveness of efficiency measures to consumers based on retail bill savings are useful for program planning, their use as the basis for judging cost-effectiveness for resource planning is inconsistent with the principle of equality.

The most prevalent example of the failure to adhere to equality in cost-effectiveness analysis is the use of the California Standard Practice Manual for Economic Analysis of Demand-Side Programs and Projects (SP Manual). Since 1983, when it was developed, the SP Manual has served as the basis for many cost-effectiveness analyses conducted by utilities, regulators, and other policy makers across much of the country.[22]

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rates the cost of energy conservation above the 3-percent level authorized in 1999. These funds may not be collected from or benefit consumers with loads greater than one average megawatt. (ORS 757.689). Although the 2007 Act was permissive - - it authorized but didn't require the Oregon Public Utilities Commission (OPUC) to allow utilities to include higher costs for energy conservation in rates – it conflicted with the OPUC's integrated resource planning requirements. If a utility's integrated resource plan identifies energy conservation as a least-cost/risk resource and the utility has authority to recover the cost in rates, it can expect questions to arise if it fails to pursue that level of conservation. Personal communication with John Volkman, General Counsel/Policy Director, Energy Trust of Oregon. March 22, 2011.

[18] In 2010 the Energy Trust of Oregon reported spending $84.6 million on energy efficiency, of which $43.6 million came from public purpose funding and $41 million from incremental investments by the state's two electric investor-owned utilities. Energy Trust of Oregon, 2010 Quarter Four Financial Statements available at: http://energytrust.org/library/financials/2010_Q4_PUC.pdf

[19] California's utilities collect a Public Goods Charge (PGC) on customer utility bills to fund utility energy efficiency programs. Public Goods Charge is California's name for a public benefits fund established in Assembly Bill 1890 in 1996. The PGC on electricity consumption is about 0.48 cents/kWh and covers energy efficiency, renewable energy and R&D. About 0.3 cents of this charge support energy efficiency programs. AB 995, which became law in 2000, extended the electric PGC through January 1, 2012. *See*: http://www.aceee.org/sector/statepolicy/california

[20] Lewis, Kae, Che McFarlin, Cynthia Rogers, Nick Fugate, and Doug Kemmer. 2010. "2009 AB 2021 Progress Report: Achieving Cost-Effective Energy Efficiency for California." California Energy Commission, Electricity Supply Analysis Division. CEC-200-2010-006. Available at: http://www.energy.ca.gov/2010publications/CE C-200-2010-006/CEC-200-2010-006.PDF

[21] Electric Power Research Institute, "Assessment of Achievable Potential from Energy Efficiency and Demand Response Programs in the U.S. (2010–2030)." Executive Summary, p. 8. January 2009. http://www.electric-efficiency.com/reports/EPRI_SummaryAssessmentAchievableEEPotential0109.pdf

[22] The California standard practice manual was first developed in February 1983. It was later revised and updated in 1987-88 and in 2001; a Clarification Memo was issued in 2007. The scope of this manual extends to all demand-side management programs, including the economic analysis of "load building" and "fuel switching," as well as "energy efficiency." The 2001 California SPM can be found at: ftp://ftp.cpuc.ca.gov/puc/energy/electric/energy+efficiency/em+and+v/Std+Practice+Manual.doc and the 2007 Clarification Memo at: http://www.cpuc.ca.gov/NR/rdonlyres/A7C97EB0-48FA-4F05-9F3D-4934512FEDEA/0/2007SPMClarificationMemo.doc

This is indeed unfortunate because none of the "standard practice" approaches set forth in this document treats energy efficiency resources equivalent to generating resources for purposes of evaluating cost-effectiveness.

The SP Manual sets forth five economic tests. Two of these tests, the Total Resource Cost (TRC) Test and its variant, the Societal Cost Test directly compare the cost of new supply-side resources with energy efficiency.[23] Despite its name, the SP Manual's TRC test as defined and interpreted by the California Public Utilities Commission (CPUC) is not intended to measure energy efficiency's cost-effectiveness as a resource. According to the CPUC, the SP Manual's formulation of the TRC test is program cost-effectiveness (emphasis added), not a resource cost-effectiveness test. Specifically, the CPUC states that: "*The Total Resource Cost Test measures the net costs of a demand-side management program as a resource option based on the total costs of the program, including both the participants' and the utility's costs*."[24] In its 2007 Clarification Memo, the CPUC reiterates the intended use of the TRC test: *". the SPM defines the "perspective" of this test as one of evaluating program cost-effectiveness, that is, looking at "the total costs of the program, including both the participants' and the utility's costs*."[25]

In fact, the CPUC's formulation of TRC is actually closer to a Program Administrator's Cost Test because it includes only those costs incurred by the utility or program administrator and only those benefits (i.e., savings) that are attributable to the efficiency program. According to instructions in the SP Manual: *The avoided supply costs should be calculated using net program savings, savings net of changes in energy use that would have happened in the absence of the program.*[26] Costs incurred by program participants that are "free-riders" and the savings of these participants are excluded from the calculation of cost-effectiveness.[27]

As implied by the use of the term "total," it seems logical to assume that the purpose of a Total Resource Cost test is intended to compare *all* costs with *all* benefits, not how these costs and benefits are distributed across society. The express purpose for estimating free-ridership is to test whether too many program participants are being subsidized to undertake energy efficiency measures they would have installed without the subsidy. Thus, estimating the extent of free-riders is a measure of the *distribution* of cost among parties, and not a measure of whether an investment's total benefits exceed its total costs.[28] If an energy efficiency resource is less expensive than the alternative power supply cost, then investing in it lowers the total cost of meeting society's demand for electricity. Under the principle of equality in economic analysis, utility rebates taken by free-riders are still investments in the lowest-cost source of supply. Moreover, the savings from free-riders have the identical impact

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[23] The other four tests address different questions. The Participant Cost Test focuses on benefits and cost to program participants. The Ratepayer Impact Measure Test addresses the distributional equity of benefits and costs, not whether benefits outweigh costs as a whole. The Program Administrator (formerly Utility) Cost test limits its consideration to the benefits and cost that accrue to efficiency program operators. Some advocates for energy efficiency would prefer to use this test because it only counts as "costs" the expenditures made by the program administrators or utilities and ignores "participant" contributions. See: Neme and Kushler, "Is it Time to Ditch the TRC? Examining Concerns with Current Practice in Benefit-Cost Analysis," ACEEE 2010 Summer Study on Energy Efficiency in Buildings, Available at: http://www.aceee.org/proceedings-paper/ss10/panel05/paper06. The Societal Test differs from the TRC test in that it includes the effects of externalities (e.g., environmental, national security), excludes tax credit benefits, and uses a different (societal) discount rate. As the Standard Practice Manual states, all of these tests have their strengths and weaknesses and each is designed to answer different questions.

[24] California SP Manual, at 18.

[25] *Ibid*, 2007 Clarification Memo, footnote 8, at 4.

[26] California Public Utilities Commission, California Standard Practice Manual for Economic Analysis of Demand-Side Programs and Projects, Oct. 2001, at 18.

[27] Administrative costs for all participants are included in the calculation.

[28] This is not to say that assessments of "free-ridership" and its polar opposite, "spillover," do not provide valuable insights into program design and management. However, in the author's view, due to the degree of uncertainty surrounding such assessments they are best used as part of process evaluations to improve program effectiveness rather than as "adjustments" to savings. For a more thorough discussion of the issues surrounding adjustments or free-ridership and spillover, *see* L. Skumatz and E. Vine, "A National Review of Best Practices and Issues in Attribution and Net-to-Gross: Results of the SERA/CIEE White Paper," 2010 ACEEE Summer Study on Energy Efficiency in Buildings, p. 5-347 - 5-361 at: http://eec.ucdavis.edu/ACEEE/2010/data/pape rs/2078.pdf

on the need for additional generation, transmission, and distribution facilities and reduce greenhouse gas emissions as the savings from non-free-riders. Thus on a true TRC basis, payments to free-riders are still preferable to investments in new generation that cost more than energy efficiency. Indeed, alternative investments in new generation might be viewed more logically as more expensive subsidies provided to resources that are not cost-effective.

Unfortunately, as a result of the widespread use of the SP Manual, an entire regulatory policy model has developed and now operates to gauge the efficacy of utility *program* investments in energy efficiency as opposed to the cost-effectiveness of those resources.[29] This model often does not produce the least total cost to society. Even in the states with progressive and sustained efforts to use energy efficiency as a resource, this regulatory model often focuses on the question of whether the share of costs to acquire energy efficiency savings being borne by ratepayers is equitable, not whether it is the most economically efficient course of action – i.e., that which minimizes the present value cost to society of providing electricity service.

For example, in California, Connecticut, Massachusetts, Vermont, and Wisconsin utilities and/or system benefits charge administrators can only claim credit for those savings that would have occurred had they not operated efficiency programs.[30] As discussed previously, under a true TRC utility incentive payments made to free-riders are properly viewed as transfer payments from one group of ratepayers to another. They are not additional costs. Hence, under this current regulatory model the cost-effectiveness of efficiency resources is biased by inter-customer equity consideration rather than economic efficiency considerations. Regulators do not judge the cost-effectiveness of new generating resources by judging their impact on one segment of ratepayers compared to another. To do so with energy efficiency investments is a violation of the principle of equality of cost-effectiveness analysis.

Because the Northwest Electric Power Planning and Conservation Act is structured around the concept of treating energy efficiency as a resource, Congress did not create separate definitions or processes for determining the cost-effectiveness of "conservation measures or resources." The cost-effectiveness of any resource is to be determined by comparing its cost to that of the "least-cost, similarly reliable and available measure or resource."[31] That is, resource planners are to be agnostic about whether a resource is on the "supply side" or the "demand side" of the meter when evaluating its relative economic merit.

Beginning with the adoption of its first Power Plan in April 1983, the Northwest Power and Conservation Council has compared the total cost of acquiring energy efficiency (including the costs of program administration, marketing and evaluation, measurement and verification of savings) to the total cost of

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29 For example, a recent evaluation of the cost-effectiveness of a natural gas efficiency program in New Mexico states that the "Total Resource Cost Test was calculated by taking the ratio of net benefits over net costs, including both participant and utility costs." This is identical to the language used in the CPUC's SP Manual. See: "DSM Portfolio Evaluation, New Mexico Gas Company, Program Year 2010 Measurement & Verification Report," June 2011 Final, prepared by ADM Associates, P3-1 at: https://www.nmgco.com/2010%20Energy%20Efficiency%20MV%20Report.pdf

30 This de-rating of savings for "free-ridership" assumes that all of the prior investments made by utilities in their service areas had absolutely no impact on the either the existence of the infrastructure supplying energy efficiency nor on the availability and price of the energy-efficient technology adopted by the "free-rider." That is, it has been assumed that the energy efficiency action taken by "free-riders" would have been equally available and equivalently priced in the "parallel universe" that is identical to ours in every way except for the billions of ratepayer dollars invested in energy efficiency over the past 30 years. In this scenario utilities built the road, bought the bus, hired the driver, paid for the gas, and gave a discounted fare to a young blind girl so she could ride the bus to visit her dying grandmother. A month later, an evaluator calls the blind girl and asks: "Would you have taken that ride to visit your dying grandmother if you would have had to pay full fare?" If she says "yes" we consider our investments in the transit system are no longer cost-effective because she "would have got there anyway." Based on this finding, the bus driver is fired, the bus is decommissioned and the road (and bus stop) are torn up. This assumption is at best overly conservative and more likely just plain illogical.

31 The Northwest Electric Power Planning and Conservation Act's definition of resource cost-effectiveness pre-dated the publication of the California Standard Practice Manual by three years. The Power Act's definition states that: *"cost-effective," when applied to any measure or resource referred to in this chapter, means that such measure or resource must be forecast to be reliable and available within the time it is needed, and to meet or reduce the electric power demand, as determined by the Council or the Administrator, as appropriate, of the consumers of the customers at an estimated incremental system cost no greater than that of the least-cost similarly reliable and available alternative measure or resource, or any combination thereof.* Northwest Power Act, *supra* note 1, at §3(4) (A) (ii), 94 Stat. 2698.

acquiring supply-side resources. Over time, while specific inputs[32] and models used to assess resource cost-effectiveness have evolved to be more precise, the principle of "equality of resource cost-effectiveness" has been maintained.[33] In practical terms, following this principle means that energy efficiency resources are compared to generating resources based on their economic and other relevant resource characteristics (e.g., construction lead times and schedule flexibility, load shape, "dispatchability," reliability, forced-outage rates, carbon emissions, etc.). All resources compete based on these characteristics. No resource is given a preference. In fact, in order to be truly "agnostic," the Council's load forecasts do not assume that any additional energy efficiency resources are cost-effective without being tested.[34] Therefore, the Council does not "embed" future savings from the continuation of existing programs or estimate what consumers might do in response to future prices in the load forecasts it uses in its resource portfolio model. The Council tests the cost-effectiveness of all potential improvements in energy efficiency, even if those measures are included in current programs. This analytical process parallels the process for determining whether an existing generating resource should be retired or mothballed because its production costs are above those of new resources.

Finally, equality in resource cost-effectiveness analysis requires that all power system "avoided" costs are captured in the analysis of energy efficiency's benefits. A new gas-fired generator provides both energy and capacity services. However, the addition of this resource to the inter-connected grid also increases system reserve requirements, requires investment in interconnection with the existing transmission system, and may require investment in new transmission and related facilities. Moreover, operation of the new generator may impose external and unquantified environmental costs as a result of its emissions.

In order to be treated equivalently in determining cost-effectiveness, the value of energy and capacity savings produced by energy efficiency measures must be taken into consideration and treated the same as resources on the supply side of the ledger. Similarly, the deferred cost of increased reserve requirements and transmission and distribution system reinforcement or expansion must also be taken into account. This can be done either by reflecting these system integration costs in the avoided cost of generation, or by crediting those that apply as an offset against the cost of energy efficiency. Failure to account for these values and potential cost offsets results in inequitable economic analysis.[35]

Symmetry in Resource Acquisition Payment

As stated above, utility forecasts of the "achievable potential" savings from energy efficiency that form the basis of supply curves used in the resource planning process should assume symmetrical utility willingness to pay for all resources. This does not mean that the utility must offer to pay the full incremental cost of an energy efficiency measure. However, it does mean that utilities should size the amount of energy efficiency they should acquire based on the understanding that it is cost-effective to pay a measure's full incremental cost and, when it is necessary to acquire cost-

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[32] *E.g.*, the transition from "avoided plant" cost to "avoided long-term market purchase" cost as the proxy for "avoided source of supply."

[33] In particular, the Council's process now takes into account the relative "risk" associated with investments in each resource. Sources of resource risk include but are not limited to such factors as fuel-price risk; carbon control cost risk, resource cost and availability risk, and load growth risk.

[34] Employing a load forecast that includes savings from the continuation existing programs, or forecast savings from consumer price response, as the basis for determining when additional generating resources are needed, implicitly assumes that these savings have a cost below that of alternative resource options. Even though this might favor energy efficiency, this analytical process violates the principle of equality in cost-effectiveness analysis because the cost of these savings is not to be tested against those of other resources. There is also a risk that the load forecast will include energy efficiency projected to occur from consumer price response. If these savings are not removed from the load forecast yet are included in the assessment of efficiency potential then it is probable that they will be double counted, overstating the availability of this resource.

[35] For a more extensive treatment of the value of energy efficiency in avoiding other power system costs see: Jim Lazar and X. Baldwin, "Valuing the Contribution of Energy Efficiency to Avoided Marginal Line Losses and Reserve Requirements," Regulatory Assistance Project, August 2011, at: http://www.raponline.org/document/download/id/4537

effective savings, be willing to do so.[36] Unless utilities are prepared to ask merchant plant developers and/or generating equipment vendors to "cost-share" on new supply side resources, they should neither estimate the amount of energy efficiency that is achievable based on such "cost-sharing nor claim that they cannot offer full-cost reimbursements to acquire efficiency measures."[37] Again, there are multiple examples of utility assessments of the energy efficiency potential that contain statements such as the following:

Realistic Achievable Potential (RAP) further refines the Maximum Achievable Potential by accounting for barriers of a programmatic nature that are likely to further limit program participation. For example, utilities do not have unlimited budgets for energy efficiency and demand response programs, and as such may not be able to provide funding for program marketing or incentives sufficient to induce participation.[38]

It seems highly unlikely that such a statement would ever be made regarding the ability to find adequate budget to fund the acquisition of a new generating resource, or transmission or distribution facilities that were deemed necessary to maintain a reliable power system.

Considerable resources and staff talent are now dedicated to designing and implementing energy efficiency programs to find the most effective mix of marketing message and financial incentives to encourage consumers to install efficiency measures or adopt more efficient practices. Countless hours are spent debating, "How big should the rebate be to attract participants, but not overshoot our budget?" As intellectually rewarding as these efforts may be, if they result in programs that fail to capture all cost-effective energy efficiency opportunities, they are time ill spent. If we are to treat energy efficiency as a resource, the primary task of program implementers is to acquire as much of this resource as possible as soon as possible so long as it meets the previously described cost-effectiveness test.[39] To the extent that violating the principle of symmetry in resource acquisition payments leads to significantly lower acquisition of energy efficiency resources, it results in a less affordable and perhaps less reliable and certainly less environmentally benign power system

Finally, not only is the willingness-to-pay for energy efficiency resources often asymmetrical but the means for collecting the funds to pay the cost of energy efficiency resources from ratepayers is as well. In many states that fund energy efficiency through a system benefits charge and in some states where utility-funded efficiency is otherwise treated as a resource acquisition, the cost of these resources is shown as an itemized charge on consumers' retail bills.[40] These "line item charges" call attention to the cost of energy efficiency without comparison to the cost of alternative resource options. To adhere to the principle of symmetry, either the cost of each resource should be shown

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[36] While utilities need not automatically choose to pay the full incremental cost of a measure in their energy efficiency acquisition programs, if a measure is determined to be cost-effective then paying up to just below the cost of the next similarly available and reliable resource still results in net economic benefit. This also means that for measures whose cost of conserved energy is below the "avoided cost" of new generation utilities could offer to pay more than the full incremental cost of the measure.

[37] Some major consulting firms now offer their clients econometric models that forecast program participation rates based on assumed levels of cost-sharing between consumers and utilities. While these models may be useful for program budgeting, when applied to integrated resource planning only one future scenario, "100 percent utility cost sharing," is consistent with the principles set forth in this paper. Indeed, as noted in the prior footnote, scenarios that assume greater than 100-percent utility cost sharing may be appropriate for energy efficiency measures with levelized costs well below the cost of generating resources or the forecast long-run price of market purchases.

[38] *Ibid*, EPRI, at 2-24

[39] Program designs that are particularly parsimonious run the risk of attracting only those participants that "would have taken the action" without utility cost-sharing. For example, an industrial program that contributes 5 percent of an efficiency measure's cost is much more likely to include a much larger share of "free-riders" than a program that contributes 50 percent of measure cost. That is, it is much more likely that the industrial program that pays half the cost of efficiency projects will attract participants that were not intending to upgrade their facilities than a program than only covers five percent of those costs. This is simply due to the fact that discounting the cost of a measure by 50 percent has a significantly larger impact on the participating customer's rate of return than a 5-percent cost reduction.

[40] For example investor-owned utilities in California, Oregon, and Washington state recover their energy efficiency costs through "tariff riders" that appear as itemized components on all retail customer bills.

on an individual line of a customer's bill, or the cost of energy efficiency should be included along with all other resource costs.

Conclusion

Without question state and federal policies and utility and regulatory practices that seek to place energy efficiency on an equal footing with generating resources have evolved both positively and dramatically over the last three decades. There is now widespread acceptance that energy efficiency plays an essential role in the resource portfolios of utilities and other load-serving entities. Yet despite this progress, pervasive policies and practices remain that are biased against investments in energy efficiency as compared with generating resources. In order to capture the full measure of benefits available to society from investments in cost-effective energy efficiency, all states – and all utilities – should practice the principle of equal treatment for all resources.

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